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NO. 127

USAF HISTORICAL STUDY

(*Unclassified*)

UNITED STATES AIR FORCE OPERATIONS IN THE KOREAN CONFLICT

1 July 1952—27 July 1953

1 JULY 1956

Prepared by
USAF Historical Division
Research Studies Institute
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Foreword

This monograph is a successor in point of time coverage to AHS–71, U. S. Air Force Operations in the Korean Conflict, 25 June–1 November 1950 and to AHS–72, U. S. Air Force Operations in the Korean Conflict, 1 November 1950–30 June 1952. Each of these monographs is conceived to be an operational history, and no more consideration is given to administrative and logistical problems than is necessary to understand the employment of air units in combat. Each of these monographs is also designed to take the nature of a reference history which must record a multitude of detail in order to cover the spectrum of air operations. As reference histories, these monographs (although considered to be readable) are not designed for "popular" reading. Having completed these three basic monographs, the USAF Historical Division expects to use them as sources for the preparation of an unclassified history which, upon publication, will offer to military readers and to the public the story of USAF operations in the Korean war.

In general, AHS–127 is the history of the last year of USAF operations in Korea, and it records the significant story of the utilization of an air pressure strategy to attain United Nations and United States political objectives in Korea after other forms of military pressure had been tried and had failed to attain these objectives. How this successful air strategy—which pioneered beyond the scope of then current USAF doctrines—was planned and implemented is the central theme of the monograph.

In the preparation of this monograph principal use has been made of the semi-annual histories and historical data submitted in compliance with USAF Regulation 210–3 by the Far East Air Forces, Fifth Air Force, Far East Air Forces Bomber Command (Provisional), the Far East Air Logistics Force, and the 315th Air Division (Combat Cargo). These historical reports are accompanied by selected supporting documents, which generally prove to be of especial value. In the two earlier monographs in this Korean series, great use was made of wing, group, and squadron histories which, prior to 1 July 1952, were submitted on a monthly basis. Effective on 1 July 1952, however, a change in the Air Force historical regulation permitted tactical wings to prepare and submit a single consolidated semi-annual history. Written some six months after the events described had taken place, often by an officer or an airman who was newly arrived in the theater, these consolidated semi-annual wing histories unfortunately lacked the authenticity and operational detail which was found in the current reporting of the former monthly historical reports. Although some of the semi-annual wing histories were good, none of them provided the rich file of operating level information which was had from the formerly monthly wing, group, and squadron histories. In addition to these historical materials, many reports on special subjects were found in the Air University Library and in the files of the Evaluation Staff, Air War College. Extensive use was also made of the definitive FEAF Report on the Korean war which was issued in two volumes in 1954.

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As is the case in all historical monographs, only a small part of the vast store of information included in the command and wing histories of the FEAF could be incorporated in this study. All of these histories, however, are on file in the Archives Branch, USAF Historical Division, Research Studies Institute, Air University, and it is the desire of that unit to invite the widest possible use of these documents. It must be emphasized that these historical materials can furnish much information of value to most agencies of the USAF which have an interest in the Korean conflict.

This monograph was prepared by Dr. Robert F. Futrell of the USAF Historical Division. Although it has been reviewed by several commands within the USAF, the policy of the USAF Historical Division is to welcome any other criticisms and comments which may be of additional value in revising its historical monographs. Since this study has been written at a fairly early date after the events, the Historical Division by no means considers that the historical record is closed.

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Air Research and Development Command	30
Headquarters Command, USAF	5
USAF Security Service	2
United States Air Force in Europe	10
Caribbean Air Command	2
Pacific Air Forces	30
Alaskan Air Command	5
Northeast Air Command	2

THIS PAGE Declassified IAW EO12958

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Contents

Chapter	Page
I. FACTORS INFLUENCING AN AIR STRATEGY IN KOREA	1
United Nations Objectives and Policies	1
Strategic Concepts of the United Nations Command	4
Organization of the United Nations/Far East Command	9
Command Relationships	9
NAVFE–FEAF Command Relationships	12
Status of FEAF in Middle 1952	15
Organization of Forces	15
FEAF Aircraft Problems	19
FEAF Potential for Sustained Combat	22
II. PLANNING THE STRATEGY OF AIR PRESSURE	24
Planning the Revision of Air Strategy	24
Early Thoughts on Air Pressure	24
The Randolph-Mayo Staff Study	25
Hydroelectric Attacks Test the New Air Strategy	27
Hydroelectric Power as an Air Target	27
The Hydroelectric Strikes	31
Evaluation of the Hydroelectric Attacks	32
Redefinition of the UNC Air Strategy	34
Statement of FEAF Operational Policy	34
Development of the Air Pressure Strategy	35
III. CONTROL OF THE AIR OPERATIONS	38
Growth of Communist Air Capabilities	39
Augmentation of Red Air Strength	39
Construction of Communist Airfields	41
Communist Antiaircraft Artillery	41
Red Warning and Control Establishments	43
Communist Aircraft and Aircrew Capabilities	45
Communist Air Strategy	46
Air-to-Air Combat Over North Korea	49
Limitations on Sabre Combat	49
Performance Comparisons of MIG and Sabre	50
MIG Actions and Sabre Counter-Tactics	53
Counting the Combat Score	58
Records of Red Aircraft Destroyed	58
Sabre Pilots and the Air Victory	58
A Note on Project MOOLAH	62
Improving the Performance of the Sabre	63
Gunnery Problems	63
Project GUN-VAL	63
Gun-Bomb-Rocket Sighting Systems	64
Performance Problems	66
Thrust Augmentation	67
Solid Leading-Edge Wings	68
Improved Combat Performance of the Sabre	68
Night Combat Over North Korea	69
Augmentation of Red Night Air Defenses	69
Vulnerability of UNC Aircraft to Night Air Defenses	70
Medium Bomber Losses to Red Night Defenses	70

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Chapter | Page

III. CONTROL OF THE AIR OPERATIONS—Continued

Countering the Communist Night Defenses 72
Adjusting Attacks to Weather 72
Failure of Searchlight Suppression 73
Fighter Support for the Medium Bombers 74
Compression of Bomber Streams 76
Electronics Countermeasures 77
Augmenting Medium Bomber Defense Capabilities 79
Summary of the B-29 Experience 80
Air Defense of South Korea 81
Communist Air Menace to South Korea 81
Developments in Aircraft Warning Services 81
Antiaircraft Artillery 84
Passive Defense Measures 87
Korean Air Defenses in Operation 88

IV. THE AIR PRESSURE CAMPAIGN 93
Expanding the Air Targets Horizon 94
The Problem of Targets 94
Development of Air Pressure Targets 95
Coordination of the FEAF Air Effort 96
Launching the Air Pressure Operations 97
Air Operations in their Political Context 97
Massed Attacks Against Pyongyang Military Targets 98
Light Bomber Attacks against Communications Centers 99
Cleanup of North Korean Industrial Remnants 100
Attacks against Communist Personnel and Supplies 102
Communist Reactions to Air Pressure 103
Intensification of Air Pressure 104
United Nations Debates on a Korean Armistice 104
Intensified Air Operations 105
Return to Sustained Air Pressure Operations 106
Utilization of Interdiction for Pressure 108
The Military Situation in Korea 108
Reorganization of Night Intruder Effort 110
Fighter-Bomber Night Harassment 112
Beginnings in Coordinated Interdiction 112
Cooperative Attacks Keyed to Chongchon Estuary Bridges 114
Operation SPRING THAW 116
Attacks against Other Air Pressure Targets 120
Impact of Destructive Interdiction on the Communists 121
Air Pressure Produces a Korean Armistice 122
Resumption and Conclusion of Truce Negotiations 122
Destruction of North Korean Irrigation Dams 126
Air Attacks against Sensitive Targets 131
Interdiction of Communist Ground Forces 133
Neutralization of North Korean Airfields 135
A Note on Weapons Selection for Airfield Neutralization 139

V. ADJUSTMENT OF AIR MEANS TO AIR PRESSURE 141
Bomber Command Increases Its Effectiveness 141
Augmentation of Fifth Air Force Resources 151
Adaptation of Tactical Air Capabilities 151
Buildup of Tactical Aircraft 153
Evaluation of the F-86F as a Fighter-Bomber 157
Tactical Aircrew Problems 160
Development of REMCO Activities 166
Service Tests of a Reinforced Tactical Air Wing 169
Construction of Air Facilities in Korea 172

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Chapter	Page
VI. AIR-GROUND ACTION IN KOREA	184
Air Support to the Defensive Ground Battle	184
Training and Testing in Air-Ground Operations	193
Eighth Army Discontent with Tactical Air Doctrine	193
The CINCFE Paper on Air-Ground Operations	197
Air-Ground Operational Training	200
Air-Ground Operations "Experiments"	201
Developments in the Joint Air-Ground Operations System	205
Expansion of the Joint Operations Center	205
The Tactical Air Operations System	208
The Air-Ground Operations System	209
Tactical Air Control Parties	211
Mosquito Tactical Air Coordinators	215
Artillery Flak Suppression for Air Support Strikes	219
Radar-Directed Close-Support Bombing	222
Flare Support for Ground Operations	228
VII. RECONNAISSANCE, AIR TRANSPORT, RESCUE, AND WEATHER	230
Reconnaissance	230
The Role of Air Reconnaissance in Korea	230
FEAF Reconnaissance Organizations	231
Problems of Day Reconnaissance	233
Problems of Night Reconnaissance	239
Tactical Electronics and Weather Reconnaissance	248
Photographic Technical Services	251
Allocation of Reconnaissance Capabilities	253
Theater Airlift	260
The Concept of Flexible Air Transport	260
Deployments of Troop Carrier Units	263
Problems of Aircraft Utilization	267
Air Terminal Operations	277
Aeromedical Evacuation	281
The Last Year of the Korean Airlift	289
Divisive Factors Affecting Theater Airlift	293
Search and Rescue	297
Air Weather Services	304
FOOTNOTES	313
GLOSSARY	339
INDEX	341

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Chapter	Page
VI. AIR-GROUND ACTION IN KOREA	184
Air Support to the Defensive Ground Battle	184
Training and Testing in Air-Ground Operations	193
Eighth Army Discontent with Tactical Air Doctrine	193
The CINCFE Paper on Air-Ground Operations	197
Air-Ground Operational Training	200
Air-Ground Operations "Experiments"	201
Developments in the Joint Air-Ground Operations System	205
Expansion of the Joint Operations Center	205
The Tactical Air Operations System	208
The Air-Ground Operations System	209
Tactical Air Control Parties	211
Mosquito Tactical Air Coordinators	215
Artillery Flak Suppression for Air Support Strikes	219
Radar-Directed Close-Support Bombing	222
Flare Support for Ground Operations	228
VII. RECONNAISSANCE, AIR TRANSPORT, RESCUE, AND WEATHER	230
Reconnaissance	230
The Role of Air Reconnaissance in Korea	230
FEAF Reconnaissance Organizations	231
Problems of Day Reconnaissance	233
Problems of Night Reconnaissance	239
Tactical Electronics and Weather Reconnaissance	248
Photographic Technical Services	251
Allocation of Reconnaissance Capabilities	253
Theater Airlift	260
The Concept of Flexible Air Transport	260
Deployments of Troop Carrier Units	263
Problems of Aircraft Utilization	267
Air Terminal Operations	277
Aeromedical Evacuation	281
The Last Year of the Korean Airlift	289
Divisive Factors Affecting Theater Airlift	293
Search and Rescue	297
Air Weather Services	304
FOOTNOTES	313
GLOSSARY	339
INDEX	341

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

MAPS AND CHARTS

Figure		Page
1.	FEAF Area of Responsibility, 30 June 1952	14
2.	Disposition of Fifth Air Force Units, 1 June 1952	16
3.	North Korean Hydroelectric Plants and Power Transmission Grid	28
4.	Chinese Communist Airfields, North China and Manchuria	40
5.	North Korean Heavy Antiaircraft Deployment, 27 July 1953	42
6.	North Korean Searchlight Deployment, 27 July 1953	44
7.	Areas of MIG–15 Operations	48
8.	USAF Claims of Enemy Aircraft by Type Aircraft, 26 June 1950 through 27 July 1953	59
9.	Fifth Air Force Jet Fighter Aces	61
10.	UNC Ground Radar and IFF Coverage, 31 Dec. 1952	83
11.	North Korean Railways, Spring 1953	109
12.	North Korean Main Supply Routes, Spring 1953	118
13.	North Korean Irrigation Dams	128
14.	Status of North Korean Airfields, 27 July 1953	137
15.	Fifth Air Force Adherence to Planning Factors, 1 July 1952–30 June 1953	152
16.	Disposition of Fifth Air Force Units, 31 July 1953	174
17.	Sorties by Type Flown by FEAF, Marine, and Friendly Foreign Aircraft, July 1952–July 1953	192
18.	Targets Identified by Mosquito Controllers and Damaged or Destroyed by Close-Support Fighters, 1 July 1952–27 July 1953	193
19.	Bases of Operations and Unit Locations, Korean Airlift, June 1952	264
20.	Bases of Operations and Unit Locations, Korean Airlift, June 1953	266
21.	315th Air Division Achievements, 1 July 1952–31 July 1953	290
22.	Air Rescue Achievements in Korea, June 1950–July 1953	303

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Chapter I

FACTORS INFLUENCING AN AIR STRATEGY IN KOREA

In mid-1952 the forces of the United Nations Command stood at the threshold of the third and decisive year of Korean hostilities. This would be the year in which the United Nations Command abandoned its old predelictions for a ground strategy and utilized air power for the successful achievement of its objectives. The role that air power had played and was to play in Korea is understandable only when viewed in relation to the United Nations objectives and policies relative to Korea, the strategic concepts of the United Nations Command (UNC), and the organization, capabilities, and relationships of UNC forces in the Far East, for these were the factors which had to be recognized, modified, changed, or sublimated as Far East Air Forces leaders planned and implemented the air strategy which was to be triumphant in Korea.*

UNITED NATIONS OBJECTIVES AND POLICIES

After November 1947, when its General Assembly established a commission to supervise the creation of a popularly responsible central government in Korea, at which time both Soviet and American troops were supposed to be withdrawn, the United Nations had consistently supported a political objective of Korean unification under a single representative government. The extent to which military power was to be used to secure this unification, however, was uncertain and varied according to the time and situation. During the period immediately prior to the invasion of the Republic of Korea (ROK) by the North Korean People's Army (NKPA) in June 1950, the United Nations and the United States held a political objective of Korean unification but emphasized that they had no military objective toward Korean unification or even for the preservation of the status quo in Korea. In a speech delivered on 12 January 1950, the U. S. Secretary of State, Dean Acheson, publicly stated that the U. S. defense perimeter ran from the Aleutians to Japan through the Ryukyus to the Philippines. Such an announcement informed the world that Korea lay outside the unilateral military cognizance of the United States.[1] U. S. military missions in the Pacific reflected this same decision: following the withdrawal of U. S. occupation forces from Korea in 1948–1949, the U. S. Far East Command (FEC) had no mission to defend the ROK against aggression; instead, its sole mission, and the mission of its air component, the Far East Air Forces (FEAF), was the defense of the theater area, including Japan, the Ryukyus, the Philippines, the Bonin-Volcano, and the Marianas Islands.[2]

Obviously expecting to profit from the dichotomy of political and military objectives pertinent to Korea, the Communist NKPA invaded the ROK on 25 June 1950.† Informed of the undoubted fact of Communist aggression against South Korea, the United Nations Security Council on 25 June (26 June in the Far East) ordered a cease-fire in Korea, withdrawal of North Korean forces to the 38th parallel, and called upon all member nations to support the ROK and to withhold support from the aggressor North Koreans. On 27 June (28 June in the Far East), when it was evident that ROK troops could not

*This chapter represents a summary of material presented in greater detail when within the time periods of AHS–71, USAF Operations in the Korean Conflict 25 June–1 November 1950 and AHS–72, USAF Operations in the Korean Conflict, 1 November 1950–30 June 1952.

†Because of differences in time zones, a given day in the United States is dated one day prior to the same day in the Far East. Thus 25 June in Korea was 24 June in Washington.

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withstand the aggression, the Security Council recommended that member nations "furnish such assistance to the Republic of Korea as may be necessary to repel the invasion and restore international peace and security in the area." [3]

The United Nations had now stated a military objective toward Korea and President Harry S. Truman, late on the evening of 26 June (27 June in Japan), directed General of the Army Douglas MacArthur, commanding the FEC,* to support the ROK. Since the United Nations military objective apparently contemplated no more than the repulse of the Reds from South Korea, the U. S. Joint Chiefs of Staff directed that FEAF would limit its air attacks to hostile forces found south of the 38th parallel.[4] This severe restriction continued until 29 June, when Lt. Gen. George E. Stratemeyer, the commander of FEAF who had just returned from witnessing the disintegration of ROK forces in Korea, protested personally to General MacArthur in Tokyo that any effective air attack had to include targets in North Korea.[5] Acting on his own authority, General MacArthur verbally approved air attacks against North Korean targets, and on 29 June (30 June in the Far East) the JCS confirmed the action: "You are authorized," it informed MacArthur, "to extend your operations into Northern Korea against air bases, depots, tank farms, troop columns and other such purely military targets, if and when, in your judgment, this becomes essential for the performance of your mission." [6] Already on the afternoon of 29 June FEAF had begun to attack military targets in North Korea,[7] but this confusion had cost three critical days in which the NKPA had got its assault into full momentum.

The statement of the limited military objective toward Korea was not soon changed. On 30 June 1950, moreover, the U. S. Department of State, noting that the United Nations political and military objectives were distinct and separate, advised General MacArthur to make it clear that the U. S. military effort in Korea was intended solely to restore the ROK to its territorial status as of 25 June 1950.[8] Still there was some indecision in many minds as to whether the UNC was going to enter and pacify North Korea, and this indecision greatly complicated the task of FEAF air planners who desired to balance the destruction of hostile industrial targets against some knowledge as to whether such plants were going to have to be rebuilt during a UNC occupation.[9] Although FEAF sought a clarification of the United Nations military objective, the problem was not resolved until ground troops of the United Nations Command (UNC) were poised at the 38th parallel. On 7 October 1950, the United Nations General Assembly recommended that: "All appropriate steps be taken to insure conditions of stability throughout Korea," and directed the conduct of elections and the establishment of a "unified, independent and democratic government in the Sovereign State of Korea." [10] This resolution signified that the United Nations political objective of Korean unification was to be achieved through an expanded military objective which now was to liberate, occupy, and unify all of Korea.

The United Nations political and military objectives in Korea remained synonymous until late November 1950 when outright intervention of superior numbers of Chinese Communist ground forces necessitated a reassessment of the military objective. In view of the gravity of the situation, the JCS informed MacArthur on 3 December 1950 that preservation of the safety of the UNC forces in Korea was to be his primary consideration.[11] On 9 January 1951, the JCS instructed MacArthur to conduct a ground defense from successive positions and to inflict such damage on the Communists as was possible, subject always to the safety of the forces under his command.[12] During the cataclysmic month of December 1950 the JCS were aware that any attempt to achieve the political objective of Korean unification solely by military means would be to incur the grave risk of an Asiatic or general world war, either prospect being equally repugnant to the United States and to the other nations supporting the UNC in Korea. The most feasible solution to the Korean war would be to secure a cease-fire agreement, during which the United Nations could proceed with the political, military, and economic stabilization of the ROK, while continuing to seek to accomplish an independent and unified Korea by political actions.[13] To this end the United States sponsored and the United Nations General Assembly on 14 December 1950 adopted a resolution proposing that immediate steps be taken to end

*The FEC was additionally designated as the United Nations Command pursuant to a Security Council resolution of 7 July 1950 which requested the United States to establish a unified command in Korea and to designate a commander for the force.

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the fighting in Korea and to settle the existing issues there by peaceful means. When no cease-fire agreement was acceptable to Communist China, the General Assembly on 1 February 1951 declared the People's Republic of China to be in aggression in Korea and affirmed the determination of the United Nations to meet the aggression. It also reaffirmed and continued the policy whereby the United Nations sought to bring about a cessation of hostilities and then to achieve the political unity of Korea by peaceful means.[14]

After December 1950 the United Nations political objective continued to visualize a united Korea, but the military objective required no more of the UNC than the conduct of such operations, consistent with the security of its forces, as would inflict maximum cumulative damages on the Communist armed forces, thereby compelling Communist China and North Korea to seek a military armistice. Whether this military objective was insufficiently spelled out for General MacArthur, or whether he was so fundamentally lacking in sympathy for the directive that he could not grasp it, cannot be determined, but General MacArthur later testified that he was "operating . . . in a vacuum" and, although aware that his directives had somehow been changed, was informed only that his military objective was the security of his forces and the protection of Japan.[15] In the spring of 1951 General MacArthur was critical as to the ultimate expectations of the "accordion fashion" fighting in Korea and noted in one letter subsequently released to the press that: "There is no substitute for victory."[16] Believing it evident that General MacArthur did not agree with U. S. policy in Korea, President Truman relieved him from command on 10 April 1951. To the American people President Truman explained that the U. S. military objective in Korea was "to repel attack . . . to restore peace [and] . . . to avoid the spread of the conflict."[17]

Shortly after he assumed command of the UNC/FEC, Lt. Gen. Matthew B. Ridgway announced to his subordinates that: "Our principal objective is to keep the United States out of war and in Korea to restore international peace and security and to repel aggressions. The job of unifying all Korea, while desirable, is not an element of this principal mission."[18] Under the terms of a codification of extant directives furnished by the JCS on 10 July 1951, the UNC was charged with the over-all mission "to assist the ROK in repelling the armed aggression against ROK and to restore international peace and security in Korea." The Commander in Chief, United Nations Command (CINCUNC), was specifically charged, consistent with the security of forces under his command, to inflict the maximum personnel and materiel losses on the forces of North Korea and Communist China operating within Korea and its adjacent waters. The policy objective of this military mission was to create conditions favorable to the settlement of the Korean conflict which would, as a minimum, (1) terminate hostilities under appropriate armistice arrangements, (2) establish ROK authority over all Korea south of a northern border so located as to facilitate to the maximum extent both administration and military defense, but in no case south of the 38th parallel, (3) provide for the withdrawal of non-Korean armed forces from Korea in appropriate stages, and (4) permit the building of sufficient ROK military power to deter or repel a renewed North Korean aggression.[19]

From the beginning of Korean hostilities the United States and other members of the United Nations who extended support to the Republic of Korea held firmly to a basic policy that the local Korean war must not be allowed to spread. "The whole effort of our policy is to prevent war and not have it occur," stated Secretary Acheson; "our allies," he added, "believe this just as much as we believe it, and their immediate danger is much greater than ours because if general war broke out they would be in a most exposed and dangerous position."[20] Opposition to any extension of Korean hostilitites was very determined in Great Britain, second-most important contributor to the UNC; thus Prime Minister Clement R. Atlee stated flatly: "Our view had always been that the Far Eastern war should be confined to Korea and that it would be a great mistake to have large forces committed to a major campaign in Asia."[21] The determination of the U. S. Government to limit hostilities to Korea was motivated both by humanitarian motives and by sound military reasoning. In the years following World War II the retaliatory power of the United States Air Force, most particularly of its Strategic Air Command, had been the major deterrent to the forces of aggressive international Communism as represented by the Soviet Union, and, as General Hoyt

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S. Vandenberg, USAF chief of staff, explained it, the United States possessed an air capability sufficient to destroy Manchuria and China if it so desired but in doing so the air capability was bound to be attrited and might in fact lose so much of its power that it could no longer deter Russia from overt aggression.[22]

This United Nations policy of limiting military operations to the territorial confines of Korea necessarily restricted the effectiveness of UNC military operations within Korea. Communist forces in Korea were accorded privileged rear areas for assembling and equipping, and the sources of Red war materiel in China and Russia were free from attack. Statement and reiteration of this policy by United Nations spokesmen permitted the Communist powers (who remained enigmatic as to what they intended to do) to make decisions based on a foreknowledge that their homelands would be safe from retaliation. The policy was also productive of a multitude of politico-military restrictions upon military operations within Korea, restrictions which General of the Army George C. Marshall, U. S. Secretary of Defense, said were the result of "an intermingling . . . of political necessities along with military directions." Stated by the Joint Chiefs of Staff after discussions in the National Security Council, these restrictions were framed not only in terms of United States security but "in order to avoid a break with our allies and a complete confusion in our relations to the United Nations." [23]

One grouping of these politico-military restrictions was designed to prevent aerial violation of China's Manchurian and the USSR's Siberian borders. Although the JCS finally allowed UNC aircraft to approach as near as needful to the Manchurian border, it continued to prohibit air or naval operations within 12 miles of Soviet territory on the Asiatic mainland.[24] A second category of politico-military restrictions was not precisely defined but was manifest most usually by consistent JCS disapproval of suggested operations. The JCS, for example, did not sanction "indiscriminate use" of incendiary weapons.[25] Moreover, the JCS generally disapproved massed air attacks which might be interpreted to be against the North Korean civilian population.[26] The JCS specifically forbade attacks against "hydroelectric installations on the Yalu River." [27] Viewed in their full extent, the politico-military restrictions not only positively limited UNC operations, but they lent an uncertainty to planning at every level. The knowledge that certain targets were "sensitive" and that certain air techniques possessed "far reaching political implications" compelled the CINCUNC constantly to seek decisions from Washington authorities, who not infrequently had to coordinate their answers with the allied powers.

STRATEGIC CONCEPTS OF THE UNITED NATIONS COMMAND

In some measure the politico-military restrictions dictated against any reliance upon an air strategy in Korea, but it would also appear that neither General MacArthur nor General Ridgway ever doubted that their army force was the decisive force and that the ground mission was the decisive mission. As received from CINCUNC, the FEAF mission (which remained unchanged until June 1952) revealed the opinion that UNC ground forces were decisive: FEAF was required to: "Conduct air operations as a part of the United Nations Command, to assist in the destruction of North Korean forces." [28] "Your mission," Ridgway informed the Eighth Army commander on 22 April 1951, "is to repel aggression against so much of the territory . . . of the Republic of Korea, as you now occupy. You will direct the efforts of your forces toward inflicting maximum personnel casualties and materiel losses on hostile forces in Korea, consistent with the maintenance intact of all your major units and the safety of your troops." [29] Ridgway simultaneously ordered the FEAF commander to "provide general air support for the United Nations forces in Korea, to include: (A) Close air support of surface forces. (B) Interdiction, including isolation of the battle area. (C) Air transport, troop carrier, and air evacuation. (D) Special missions, including electronic countermeasures, psychological and clandestine." In these sections of the FEAF mission which dealt with Korea, Ridgway thus indicated that the FEAF was to play a supporting role to the Eighth Army.[30] As late as July 1952 a FEAF staff officer had occasion to request that subordinate UNC units should be "made aware [that] the CINCFE and his staff

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recognize that the Army, Navy, and Air Force are each responsible for attaining the theater commander's over-all objective" in order to "put an end to the opinion so often expressed or implied that the Eighth Army is responsible for winning the Korean war, and that the role of other Services is to support it in its effort." [31]

Following the disastrous defeat of the Communist ground armies by UNC air-ground action in the spring of 1951, Lt. Gen. O. P. Weyland, who had assumed command of the FEAF on 10 June 1951, informed General Vandenberg that FEAF now had "its first real opportunity to prove the efficacy of air power in more than a supporting role." [32] At the beginning of the truce negotiations at Kaesong on 10 July 1951, the Air Force did indeed possess an opportunity clearly to demonstrate the innumerable advantages of air power as a predominant weapon. Unlike ground forces, which are always bound to action along a narrow, one-dimensional, surface line of action, and now in July 1951 were limited by directive to an active defense of currently held positions, the Air Force could range far and wide over hostile Korea and by selective attack motivate the enemy to accept such UNC terms as were offered at the conference table.

Unfortunately, however, FEAF was not going to be permitted to exercise these decisive attributes of air power for some while. Taking into consideration the climate of world opinion and the viewpoints of the nations which were furnishing troops to the UNC, the JCS stated the rule that: "If Armistice discussions fail, it is of the greatest importance that clear responsibility for failure rest upon the Communists." [33] In July 1951 when General Weyland proposed to employ a maximum number of medium and fighter-bombers against pinpoint military targets in Pyongyang, after first having warned the civilian population of the impending attack, the JCS disapproved of such an attack in the manner suggested because, it said, "to single out Pyongyang as the target for an all-out strike during the time we are holding conferences might in the eyes of the world appear as an attempt to break off negotiations." [34] That same month, General Ridgway suggested to the JCS that the dispatch of the 116th Fighter-Bomber Wing to the Far East as scheduled might be "ill-advised," since Communist propaganda might construe this to be an indication that the United States was preparing for war while seeking to conclude an armistice. Ridgway was willing to postpone the deployment of the badly needed wing until "the course armistice negotiations may take shall have become clear," but the JCS sent the wing as scheduled, deliberately publicizing its transfer as an augmentation of Japan air defense.[35] One FEAF officer noted that the policy was: "Don't employ air power so the enemy will get mad and won't sign the armistice." [36]

Instead of being allowed a decisive role which would speed the truce negotiations, FEAF was once again cast in a supporting part to the stalemated Eighth Army. Even before the negotiators sat down at Kaesong, General Ridgway was gravely concerned by intelligence reports which said that the Communists were diligently increasing their offensive capabilities.[37] On 6 July he informed the JCS that numerous reports "indicate a planned large scale offensive effort to be launched in the event . . . peace overtures fail." [38] In August he reported that the enemy was "capable of launching limited attacks to gain local advantages and of expanding such piecemeal efforts rapidly into a general offensive at a time suiting his purpose." [39] These estimates that the Communist armies had not recognized their defeat but were instead utilizing the truce negotiations as a respite in which to prepare for another offensive were completely accepted by the UNC staff and "deeply concerned" the JCS.[40] The result was that UNC air power, beginning on 18 August 1951 and continuously thereafter, was employed in a comprehensive rail interdiction campaign designed "to interfere with and disrupt the enemy's lines of communication to such an extent that he will be unable to contain a determined offensive by friendly forces or be unable to mount a sustained major offensive himself." [41] A few over-enthusiastic air officers—someone tagged this operation with the name of STRANGLE—believed that these interdiction operations might so seriously deplete hostile logistics as to force an enemy retreat, but a more considered viewpoint was that no better employment for UNC air was available under the existing policies. The real significance was that UNC air forces were again supporting UNC ground forces—although these ground forces were stalemated—and that these interdiction

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efforts were not going to provide sufficient pressure to compel the enemy to accept the UNC terms for an armistice.

From the time that truce negotiations were first proposed by the Soviet delegate to the United Nations, the Communists evidently determined to seize every advantage which could be wrung from such discussions. When CINCUNC proposed on 30 June that the cease-fire talks be held aboard a hospital ship in Wonsan harbor, the Communists instead suggested that they take place at Kaesong, an ancient Korean town lying northwest of Seoul and just south of the 38th parallel. Designation of this site was a shrewd stroke which not only allowed the Reds to realize the psychological advantage of meeting on South Korean soil but also created a neutral zone—called the HOLY LAND—around Kaesong which greatly hampered UNC air and ground operations at the western end of the battle line. Although CINCUNC accepted the Kaesong site, he later noted that it was the "first harbinger of Communist delay." [42] As the talks got underway the UNC delegation was under instructions to demonstrate an attitude "characterized by calmness, firmness, patience," [43] but the Communist delegates soon showed that they were neither the usual diplomats nor gentlemen. In short, Ridgway soon said that the Red delegates were "treacherous savages." [44] In negotiating, the Communist delegates displayed an utter timelessness which if "not consistently dilatory" was "demonstrably obstructive and stubborn." [45] When they gained an inkling of concessions decided on or even being considered by the United Nations, or knowledge that some new course of action not necessarily a concession was up for decision, they became obdurate and unwilling to negotiate.[46]*

Initially the Reds delayed the adoption of an agenda by a stubborn insistence that the proposed settlement should comprehend political matters. Finally on 26 July the UNC delegation conceded that the cease-fire instrument could make recommendations for the consideration of a subsequent political conference, and the Communists agreed to the agenda, containing the following five items: (1) adoption of an agenda, (2) establishment of a military demarcation line and demilitarized zone, (3) concrete arrangements for a cease-fire, (4) disposition of prisoners of war, and (5) recommendations to governments concerned of matters for settlement at a political conference.[47]

When discussions of the demarcation line began on 26 July the Communists were adamant that the line should be drawn at the old 38th parallel, and the UNC delegates insisted just as firmly that the line would have to conform to the military realities of the existing battle line. Finally on 18 August the UNC proposed and the Communists agreed to let a subcommittee discuss the deadlocked matter. While these discussions had been going on the Communists had been consolidating their control of the area around Kaesong, so that what had initially been a no-man's land became a Red stronghold. On 4 August the Reds brazenly marched armed troops through the neutral zone. The UNC delegates at first mistrusted this bravado but took no action. On 23 August, however, the Communists, having manufactured an incident whereby they claimed that a UNC plane had bombed Kaesong, broke off the sub-delegation talks. Armistice talks were not resumed until 25 October and then at Panmunjom, a site which the UNC had selected as being adjacent to the actual lines of military contact. Here the Communists finally agreed to accept the existing point of ground contact as the demarcation line and then quickly sought to get agreement on a de facto cease fire, an arrangement which would obviously have permitted them to reinforce their troops without hindrance during the remainder of the armistice negotiations. By way of a compromise, the UNC proposed that, beginning on 27 November, the then existing battle line would become the effective demarcation line in any agreement reached within 30 days. This compromise was accepted by the Reds, and for a few weeks it appeared that a cease-fire agreement might be near.

But the truce talks were not going to be concluded by 27 December for, having failed to secure quick agreement on the essentially simple matter of a demarcation line, the negotiations relative to the more complex agenda items became a wrangle. On 27 November the main armistice delegations began discussion of the third item of the agenda. The UNC delegation urged that a neutral nations supervisory organization be established for the supervision of armistice terms and that it should

*See Adm. C. Turner Joy, *How Communists Negotiate* (New York: The MacMillan Company, 1955.)

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have inspection access to all of Korea, that the military forces to be maintained in Korea during the armistice would not exceed in number those there at the cessation of hostilities, and that a definite restriction be imposed against the construction or rehabilitation of airfields during the armistice. A subcommittee began consideration of these thorny problems on 4 December, and it worked out a broad agreement on all proposals except that concerning airfields, which the Reds stoutly maintained they were going to build and rehabilitate during the armistice. Discussion of other details, including troop rotation, ports of entry, and the membership of the neutral nations inspection team prolonged negotiations on this agenda item into the spring of 1952. During April no progress was made: the Communists insisted that the USSR would be one of the neutral nations and declared that they would accept no denial of a right to construct airfields during the armistice. Discussion of the fourth agenda item, which related to the disposition of prisoners of war, had deadlocked even earlier. This item had been introduced on 11 December 1951, and on 1 January 1952 the UNC delegation proposed an all-for-all exchange, with the prisoners of war to be permitted freedom of choice to accept or reject repatriation. Although some information was obtained by the UNC relative to the names of POW's held by the Communists and the location of POW camps, no material progress was made on this item.

By April 1952, it was increasingly apparent that the armistice negotiations were approaching a complete deadlock. At a plenary session of the main armistice delegations on 28 April 1952 the UNC chief delegate therefore made a package proposal incorporating equitable solutions to the three outstanding problems. The UNC was willing to concede on the airfield question and to agree that the armistice document would make no reference to reconstruction or rehabilitation of airfields during the armistice. Holding that membership on the neutral nations supervisory teams had to be mutually acceptable to both sides, the UNC was unwilling to accept the USSR as a neutral nation, but it announced that it would accept Poland and Czechoslovakia provided the Reds would accept Sweden and Switzerland. Finally, the UNC proposed that the basis for the exchange of prisoners of war would be equitable, reflecting the principle of no forced repatriation. At another executive session on 2 May the Communists formally rejected the UNC solutions, proposing instead that they would withdraw the name of the USSR provided the UNC would withdraw its objection to the rehabilitation of airfields and agree to a compulsory repatriation of prisoners of war. While careful not to break off the negotiations, the senior UNC delegate summarily rejected the Communist proposal, announcing that the UNC position was now "clear, final, and irrevocable." A little later on, the senior Communist delegate, Lt. Gen. Nam Il, announced that his side was just as adamant as was the UNC: "Our side," he said, "absolutely cannot consider under whatever circumstances any proposal of the so-called no-forced repatriation which would detain war prisoners. No matter what your side should do inside or outside of the conference, the Korean People's Army and the Chinese People's Volunteers will fight to the very end for the return of every single war prisoner." [48]

As the truce talks dragged on, General Weyland and his staff became increasingly impatient to be allowed to strike more decisive target systems. Early in January 1952, General Ridgway recognized that the Reds were stockpiling supplies by the accretion of small amounts in excess of closely regulated expenditures. He nevertheless warned the JCS that: "If the interdiction program should be discontinued or reduced, the enemy could, within a relatively short period of time, be capable of accumulating sufficient supplies to permit him to launch and sustain a major offensive."[49] On 5 January 1952, Brig. Gen. James Ferguson, vice commander of the Fifth Air Force, requested authority to attack the North Korean hydroelectric installations. General Weyland recommended that the destruction of this complex would "accomplish immediate as well as long range military effects against the enemy, and would additionally create significant psychological and political effects to our advantage." [50] When the request to attack the hydroelectric plants came to him on 3 March 1952, however, General Ridgway refused to approve it but agreed that: "In the event that a decision is reached that the Communists are deliberately delaying armistice negotiations indefinitely and are increasing their offensive capabilities, your recommendations will be reexamined." In the event that negotiations were broken off or hopelessly deadlocked, Ridgway indicated that he would like to coordinate these hydroelectric at-

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tacks with other military operations in a renewed Korean ground campaign.[51] That same month General Ridgway was preparing plans to loose the Eighth Army from its operational restrictions if the Communists broke off the talks, but he informed the JCS that he still had faith in the eventual success of the negotiations provided the United States stood inflexibly on major issues. He said that he was not ready for the last resort, which was "to apply the one influence which the Communists the world over recognize, and that is force." [52]

By the end of April 1952 FEAF planners had prepared the outlines of an air strategy which they believed would bring sufficient pressure to bear on the Communist enemy to force him to accept the UNC armistice terms.* On 28 April the UNC made its "final" offer of peace terms to the Communists. And on 29 April 1952, President Truman announced General Ridgway's relief for other duty and the appointment of General Mark W. Clark to be CINCUNC/CINCFE. General Clark, who had commanded the U. S. Fifth Army in Italy during World War II and had lately served as chief of Army Field Forces, assumed command in the Far East on 12 May 1952.[53] General Clark had seen Communism at first hand when he had commanded American occupation forces in Austria, and he firmly believed that "only through forceful action could the Communists be made to agree to an armistice the United States considered honorable." To each of his subordinate commanders, he posed the question: "What can I do militarily and otherwise to make the Communists realize that the price of peace is not as cheap as they are trying to make it?" [54]

As General Weyland expressed it, "A significant change in combat operations policy took place in May." Interdiction operations were expanded to include destruction of important targets, target complexes, and target systems.[55] Announced in mid-June was a new and imaginative air mission directive: "The primary missions of the Far East Air Forces are to maintain by air action in Korea maximum military pressure on enemy forces, to provide general air support for the United Nations forces in Korea, and to be prepared to carry out Far East Air Forces tasks in the event of a general emergency." [56]

*See Chap. II, pp. 24–27.

While General Clark approved the FEAF plans to lay intolerable air pressure upon the Communist enemy in North Korea, he nevertheless had some expectation that Eighth Army ground pressure might also prod the balky Reds. In July, Clark approved an Eighth Army plan BUCKSHOT for a battalion-sized raid against enemy positions west of the Nam River; but when the ROK battalion suffered more casualties than it inflicted on the enemy, Clark would not approve the Eighth Army's request to repeat such actions.[57] Again the Eighth Army commander urged that offensive employment was needed to keep the enemy on the defensive, to capture advantageous terrain, and to maintain combat efficiency, and General Clark approved operation SHOWDOWN, a two-battalion limited objective attack designed to seize Triangle Hill and Sniper Ridge, northeast of Kumhwa in the IX Corps area, on the night of 13/14 October. This attack, mounted as scheduled by one battalion each of the U. S. 7th and ROK 2d Divisions, successfully secured its objectives, but determined enemy counterattacks inflicted heavy UNC casualties and eventually recaptured Triangle Hill. When the Eighth Army proposed additional localized attacks in November, General Clark stated firmly: "We should not unless absolutely necessary initiate another action which may be a repetition of the bloody battle for Triangle Hill and Sniper Ridge." [58] After October the Eighth Army undertook no more offensives against the Communist ground forces: an accumulation of evidence had convinced the JCS and the CINCUNC that such ground offensives were fruitless.

On 8 August the JCS directed Clark to put forth no new proposals at the armistice talks but to "continue, within existing directives, to make maximum practicable use of available air strength in attacks upon all military targets in North Korea." [59] Later in August General Clark stated his full agreement that maximum pressure should be maintained upon the Communists: "The capability for such pressure, without unacceptable cost," Clark noted, "lies in the air arm." [60] Between April and September 1952 the armistice negotiations had remained stalled upon the sole issue of the disposition of anti-Communist POW's. Finally, on 25 September, President Truman approved the JCS recommendations in favor of an indefinite recess in the negotiations. When the

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negotiations were recessed, the JCS instructed, CINCUNC would "maintain unrelenting military pressure on the enemy, particularly through air action." [61] As it had been instructed to do, the UNC armistice delegation on 28 September recapitulated the UNC positions on repatriation and then recessed plenary sessions until 8 October. When, on this latter date, the Communists were unwilling to accept the UNC proposals, Lt. Gen. W. K. Harrison, senior UNC delegate,* announced that the UNC was thenceforth recessing, not terminating, the plenary armistice sessions. At such time as the Communists were ready to accept one of the UNC proposals, or when the Reds had a constructive proposal of their own, the UNC could be contacted through its liaison officers at Panmunjom.[62]

Anticipating that the Communists would refuse the UNC proposals, the JCS and CINCUNC had been discussing measures to be taken in the event that active hostilities were resumed. General Clark was firmly convinced that the "underlying reason for failure thus far to achieve an armistice is that we have not exerted sufficient military pressure to impose the requirement for an armistice on the enemy." He was nevertheless dubious about any prospects of UNC ground offensive pressure: unless such an offensive could destroy the superior numbers of the well-entrenched Red ground armies and could carry victory to the Yalu, General Clark did not think a UNC ground offensive could compel the enemy to seek armistice terms. Any achievement short of military victory attained by UNC ground forces "would be purchased at highly unpalatable personnel cost." Such ground offensives, moreover, would be impracticable with currently available UNC ground divisions; and even if he could get these needed ground reinforcements, Clark still noted that he would first prefer to extend the air war to Chinese and Manchurian targets and to implement a naval blockade of China before launching any major UNC ground offensive or committing major ground elements to an amphibious assault.[63] Thus it was recognized in the autumn of 1952 that only the UNC air forces had an ability to exert potent pressure against the Communists in North Korea. General Omar N. Bradley, chairman of the JCS, summed up the situation in November 1952 when he said that UNC air power "constitutes the most potent means, at present available to the United Nations Command, of maintaining the degree of military pressure which might impel the Communists to agree, finally, to acceptable armistice terms." [64]

ORGANIZATION OF THE UNITED NATIONS/FAR EAST COMMAND

Command Relationships: Viewing air power as a supporting force to Army operations and never doubting that the surface battle was decisive, Generals MacArthur and Ridgway not unnaturally failed to perceive the pressing need for unified controls which would have permitted the maximum exploitation of the air weapon. The lack of such unified controls was quite apparent in the organization of the headquarters of the Far East Command, which, pursuant to the United Nations Security Council resolution of 7 July 1950 requesting the United States to establish a unified command and designate a commander for the United Nations forces in Korea, was simply additionally designated as the United Nations Command, without change in existing organizational structure. This action was accomplished on 24 July 1950.[65]

The command structure of the UNC/FEC was shaped as follows: serving the CINCUNC/CINCFE was the Headquarters, UNC/FEC, and under this apex were the Naval Forces Far East (NAVFE) and the Far East Air Forces (FEAF), both being major coequal commands. Official organizational charts showed another headquarters, called "Army Forces Far East," on the major command level, but supposedly for reasons of economy this major Army headquarters had never been activated. Instead the CINCUNC/CINCFE served also as the force commander to Army organizations in the Far East and the Headquarters, UNC/FEC provided the necessary staff work for top-level Army guidance. For this reason, although not properly major commands equivalent to NAVFE and FEAF, the U. S. Eighth Army and for a time during 1950 the U. S. X Corps reported directly to CINCUNC/CINCFE. Under this arrangement the Headquarters, UNC/FEC, was essentially an Army staff, and by no stretch of

*General Harrison relieved V/Adm. C. Turner Joy as senior UNC delegate on 23 May 1952.

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imagination could it be considered a joint staff equally representing Army, Navy, and Air Force components. On 20 August 1949 CINCFE had ordered the establishment of a Joint Strategic Plans and Operations Group (JSPOG) to assist and advise him on matters pertaining to the exercise of unified command over Army, Navy, and Air Force forces allocated to the FEC.[66] Since it comprised three Army officers, three Navy officers, and two Air Force officers, the JSPOG was frequently cited as evidence that the Headquarters, UNC/FEC possessed a joint staff, but it was apparent that this small group could not serve as the joint staff contemplated by the JCS unified command plan.[67] By a similar type of logic, the G–2 Intelligence function of the Headquarters, FEC was reorganized on a "joint basis" in January 1948 by the assignment by FEAF and NAVFE of "one suitably qualified Air and Naval intelligence officer . . . to act as the Air and Naval representatives and experts, for the various publications of Theater Intelligence."[68] Manned primarily by Army personnel and preponderantly concerned with Army business, the Headquarters, FEC was quite naturally "dominated by Army thinking, and prone to honor Army concepts."[69]

The lack of a properly constituted joint UNC/FEC headquarters staff which was capable of advising the CINCUNC/CINCFE was resultant in many interservice problems, many of which have been noted in earlier historical monographs. At least three of these problems were so major as to require especial notice.

In the absence of a joint staff, the Headquarters UNC/FEC proved incapable of giving centralized direction to UNC air effort. Without coordinating with either FEAF or NAVFE, the FEC chief of staff on 14 July 1950 established the GHQ Target Group as a part-time organization, comprising a senior officer from the FEC G–2 section as chairman, an Air Force and a Navy officer from the JSPOG, and a member representing the FEC G–3 section. These four men were charged to select air targets for FEAF and NAVFE, thus coordinating the employment of these two forces, and such targets were transmitted to these forces for attack by an order of the CINCUNC/CINCFE. Unfortunately the GHQ Target Group did not prove to be conversant with problems of air target selection: utilizing faulty maps (although correct maps were available) and reading errors into these maps, the GHQ Target Group selected some 220 primary and secondary targets, of which some 20 percent did not exist. Thus in August 1950 FEAF aircraft were dispatched to bomb bridges on rail lines which had never been built. To secure a resolution of this difficulty, General Stratemeyer on 22 July 1950 persuaded CINCFE to establish the GHQ Target Selection Committee, consisting of the FEC deputy chief of staff, the FEC G–2, the FEAF vice commander for operations, and a NAVFE representative. This action restored the burden of target identification to qualified analysis functions in FEAF and NAVFE and the GHQ Target Selection Committee limited its activities to the determination of the large scale application of the available air effort.[70] This committee functioned as long as it was needed and eventually went out of business.

No such fortuitous arrangement was ever matured in the FEC theater organization to handle covert and clandestine activities, a function which vitally concerned the lives of airmen forced down in enemy territory. By JCS directive of 18 August 1951 CINCFE was authorized to exercise direct command of the conduct of covert operations in direct support of combat operations in which his forces were engaged. Without formal coordination, CINCFE on 28 November 1951 established an organization known as Covert, Clandestine and Related Activities in Korea (CCRAK) and charged it to function as a "single headquarters . . . to direct all Army, Navy, and CIA [Central Intelligence Agency] operations of this nature . . . in Korea." CCRAK was in theory under direct CINCFE command, but it was supervised by the Assistant Chief of Staff, G–2 FEC. Since this officer was also G–2 for the Army Forces in the Far East, this directive in effect negated the direct command channels of the component force commanders to CINCFE and purportedly established a joint task organization not in consonance with appropriate JCS criteria.[71]

Allocation of transportation space among the FEC commands was a third problem inequitably solved at theater level: as was entirely proper for the most efficient use of a scarce service, air transport space was closely monitored and allocated to using services by theater allocations board; on the other hand, land and sea transport were frequently

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critical but space allocations of surface transport were managed by the Japan Logistical Command within Japan and by the Eighth Army in Korea.[72]

"Whenever combinations of Air Force, Army, and Navy are in a joint command," General Weyland had stated in 1950, "it is essential that the Commander-in-Chief have a joint staff with proportionate representation of the services involved."[73] Under Generals MacArthur and Ridgway no reorganization looking toward a joint staff at the UNC/FEC level was effected, but shortly after he took command General Clark announced that his headquarters "should be a joint, tri-service operation, rather than an army project."[74] On 20 August 1952 General Clark therefore made known his intent to organize a small joint FEC headquarters staff, to be composed of appropriate members from each of the three military services in key positions of responsibility. He concurrently intended to establish the long-absent Headquarters, Army Forces Far East (AFFE) on the same major command level with FEAF and NAVFE. On 1 October 1952 AFFE was accordingly activated, with manning provided by the simultaneously inactivated Japan Logistical Command and the Headquarters and Service Command, FEC. Although the functions of these commands, as well as many of the "joint" functions of the old Headquarters, UNC/FEC, were assumed by the new AFFE, it was found that there was a small but real savings in personnel, thus disputing the old assertion that the nonexistence of a theater Army headquarters saved personnel.[75]

Although planning got underway in September 1952, the reorganized UNC/FEC Headquarters did not begin to function until 1 January 1953. As a joint organization the new headquarters was staffed by 91 Army officers, 48 Air Force officers, and 43 Navy officers.[76] The new joint staff included a chief of staff, three deputy chiefs of staff representing Army, Navy, and Air Force components, and five J-staff positions: J-1 Personnel, J-2 Intelligence, J-3 Operations, J-4 Supply, and J-5 Civil Affairs. Of these top-level positions, two were authorized to the Air Force: a deputy chief of staff, a position filled by Maj. Gen. Ernest Moore, who came from command of the Thirteenth Air Force to assume the duties, and the J-2 Intelligence position, a job which FEAF subquently released without filling in order to nominate an Air Force officer as J-3 Operations. Not until October 1953, however, when Maj. Gen. Elmer J. Rogers assumed the duties, would an Air Force officer serve as J-3 Operations.[77] General Clark was highly enthusiastic concerning his new joint UNC/FEC staff: "all had outstanding records," Clark wrote, "and . . . pulled together in the tri-service team." At the late date of its accomplishment, the top-level reorganization lacked much significance to the Korean war, but as Clark observed: "Had we carried the war to a victorious conclusion it would have required the closest kind of integration of ground, naval, air and amphibious operations. A truly integrated staff of the three services, in which men were picked for their ability rather than the color of their uniforms, is the answer to combined operations."[78] A USAF study of the theater command situation in the Far East was in complete agreement with General Clark: "It becomes increasingly clear," stated this study, "that one branch of the service should never, under any circumstances, be placed under a commander of another branch of the service unless he has a truly joint staff. Although the alternative might temporarily eliminate a few minor problems, the abuses to which it would inevitably lead are so dangerous that it must not be permitted."[79]

The theater headquarters reorganization was a wholesome reform, but as implemented it was less than a complete solution to the theater problems already noted. Stating that his action was necessary in order to give personal direction to the Eighth Army and to avoid the requirement for another Army general in a grade senior to the Commanding General, Eighth Army, General Clark assumed personal command of the new AFFE, announcing that he would normally exercise control through a deputy. Headquarters, AFFE, moreover, was named executive agent for nearly all of the theater functions previously exercised by the old UNC/FEC headquarters, an action which was somewhat less than desirable according to criteria for a unified command. Thus AFFE took over the allocation of surface transportation in Japan previously controlled by the now-deactivated Japan Logistical Command, whereas all surface transportation allocations (as was the case with air transport) might have been more properly managed by a theater transportation board with joint representation of the using service components.[80] Similar disposition was made of CCRAK: at the

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time of the top level reorganization, the commanding general AFFE was designated "Executive Agent for CINCFE/CINCUNC for joint matters pertaining to . . . direction of theater clandestine and covert operations," thus continuing to violate JCS instructions that CINCFE would exercise direct command over these activities. CCRAK continued to emphasize an intelligence gathering function and was supervised by the Assistant Chief of Staff G-2, AFFE. At the end of the Korean conflict not over 15 airmen could attribute their successful evasion to any help accorded them by indigenous personnel in North Korea.[81]

NAVFE-FEAF Command Relationships: In Korea the coequality of FEAF and NAVFE in the theater command structure, without joint air and naval representation on the theater headquarters, prevented the maximum application of the available air effort. The greatest utilization of essentially scarce air power in a theater of operations, moreover, requires not only the minimum essential of a joint theater staff but poses a direct requirement that all theater air forces be placed under the command or operational control of a single theater air commander. Receiving tasks and priorities from the theater commander, the theater air commander is able to exercise a centralized control in order to ensure the fullest exploitation of available air power.

Cognizant at the very beginning of the Korean war that some form of centralized control of Air Force, Navy, and Marine aircraft was required not only for maximum effectiveness but for safe flying in the combat zone, General Stratemeyer on 8 July 1950 requested that, with the exception of units used in air-sea warfare, all Navy and Marine land-based and carrier-based aviation when operating over Korea be placed under his operational control. General Stratemeyer construed "operational control" to mean nothing more than: "the authority to designate the type of mission, such as air defense, close support of ground forces, etc., and to specify the operational details such as targets, times over targets, degree of effort, etc., within the capabilities of the forces involved." [82] Instead of granting this clearcut authority, the chief of staff, FEC, directed in a letter bearing a file date of 8 July 1950 that: Commander FEAF would have command or operational control of all aircraft in the execution of the FEAF mission as assigned by CINCFE. COMNAVFE would have command or operational control of all aircraft in execution of missions assigned by CINCFE to NAVFE. When both NAVFE and FEAF were assigned missions in Korea, "coordination control, a Commander-in-Chief, Far East, prerogative," was delegated to commander FEAF.[83]

The precise meaning of this unusual term "coordination control" was never apparent although it would continue to guide the course of air operations during the Korean hostilities. During the first six months of the Korean war, the uncertain meaning of "coordination control" was productive of much unnecessary confusion which might have been fatal to the UNC cause had the enemy been able to make an all-out air attack. Gradually some extemporized order was obtained. Under the terms of the FEC directive, FEAF charged its Fifth Air Force with the direction of tactical air operations and the support of the Eighth Army in Korea, and, after two periods in which it supported the independent U. S. X Corps, the 1st Marine Air Wing—the elements of U. S. Marine Corps aviation in the Far East—was by the end of 1950 clearly operating in an area of Fifth Air Force authority and thus the Joint Operations Center (JOC) in Korea assigned it missions to be flown in exactly the same manner as it assigned missions to Fifth Air Force wings. Coordination control of the carrier-based aircraft of the U. S. Seventh Fleet (Task Force 77) presented more difficult and long enduring problems. In late July and early August 1950 the Eighth Army frequently requested close support from the fast carriers and CINCFE ordered it, often without informing either FEAF or the Fifth Air Force, a procedure which invariably was resultant in confusion when carrier aircraft were launched by the deckload and suddenly appeared over the battle lines, seeking targets from tactical air control parties who had not known they were coming. Beginning in August 1950 an informal Navy liaison section sent to the JOC provided some coordination for Task Force 77 and Fifth Air Force effort, but not until January 1951 was Task Force 77 able to arrange direct radio communications with the JOC, messages having been passed in the meanwhile through NAVFE in Tokyo. Carrier pilots were customarily given a special sector of the front for ground support and specific armed reconnaissance route responsibilities. Having no actual authority over carrier

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air operations, the JOC, however, was nevertheless frequently hard pressed to make up from Fifth Air Force resources many planned supporting air strikes which had been suddenly, often without advance notice, cancelled by Task Force 77. There was, moreover, no real integration of available close-support effort since Navy and USAF aircraft had to operate in separate sectors of the battle line.[84]

When FEAF and NAVFE aircraft were utilized against Korean target systems not directly supporting ground operations, the FEC chief of staff had originally contemplated that the basic selection and priority of target areas would be accomplished by the GHQ Target Group. When this agency had been unable to handle this duty, the responsibility for coordinating targets was taken over by the high-level GHQ Target Selection Committee. This committee met informally for several weeks, passing upon targets recommended to it by the FEC, FEAF, and NAVFE. Only FEAF possessed a target analysis section conversant with Korea, and as a result its target committee, representing its deputies of operations and intelligence, undertook a great portion of FEC air targets development and nomination. Subsequently reorganized to bring in representatives from the FEAF Bomber Command and the Fifth Air Force and designated as the FEAF Formal Target Committee, this agency met every two weeks and made recommendations to the FEAF commander. In effect, if not in actuality, the FEAF Formal Target Committee became the basic theater agency for target selection and the medium through which basic tasks outlined by CINCFE and commander FEAF were translated into planned air campaigns.[85] Although FEAF gradually undertook most of the responsibility for implementing tasks assigned by CINCUNC/CINCFE into air campaigns, FEAF and NAVFE remained coequals. In planning air campaigns, FEAF therefore had to arrange for Seventh Fleet aircraft participation by requesting such through CINCFE, or, when authorized, directly from COMNAVFE. During the first two years of the Korean war naval aircraft were generally given separate areas of attack from those of the FEAF forces. Such arrangements not only vitiated the capabilities of air power when employed in mass, but they also resulted in situations where no single air commander could be held responsible for the success or failure of the whole air effort.[86]

In the absence of a joint headquarters staff at the FEC level, the fact that no one knowledgeable individual controlled the employment of all available UNC air units was especially critical, but the reorganization of Headquarters, UNC/FEC, while it was of salutary effect, did not in itself secure a unity of air effort since FEAF and NAVFE continued as independent equals in the command structure. Although the new UNC strategy of air pressure demanded the employment of massed air in attacks representing the full force of the UNC air capability, General Clark preferred to obtain such unification of air actions through "team play," and he later stated that "there has been complete team play."[87] Although FEAF–NAVFE cooperation was greatly improved in the last year of Korean hostilities, it would appear that the "team play" was derived from the fortunate personalities of the commanders involved rather than from more certain and stable dictates of command organization. Fundamentally, NAVFE participation in the FEAF-inspired air activity was still obtained on a request basis. Thus in June 1952 when he perceived that the North Korean hydroelectric facilities had to be taken out in a single maximum effort, General Weyland requested and General Clark directed that FEAF and NAVFE forces would be employed against these objectives, with Weyland being designated the "coordinating agent." At the end of the initial series of strikes, FEAF suggested and NAVFE approved a proposition whereby continued surveillance and repeated attacks against the North Korean hydroelectric plants would be coordinated between the Fifth Air Force and the Seventh Fleet at the JOC in Korea.[88] By August 1952 the rapprochment between the Seventh Fleet and Fifth Air Force was sufficiently cordial that FEAF authorized the latter to request naval strike participation in operations where it was necessary, although FEAF would continue to negotiate for assistance from NAVFE when such was advisable.[89] COMNAVFE also directed his subordinate commanders to give advanced notice of independently planned naval air strikes to CINCFE, to commander FEAF, and to himself in order to ensure effective coordination with other air operations which might be scheduled or planned.[90]

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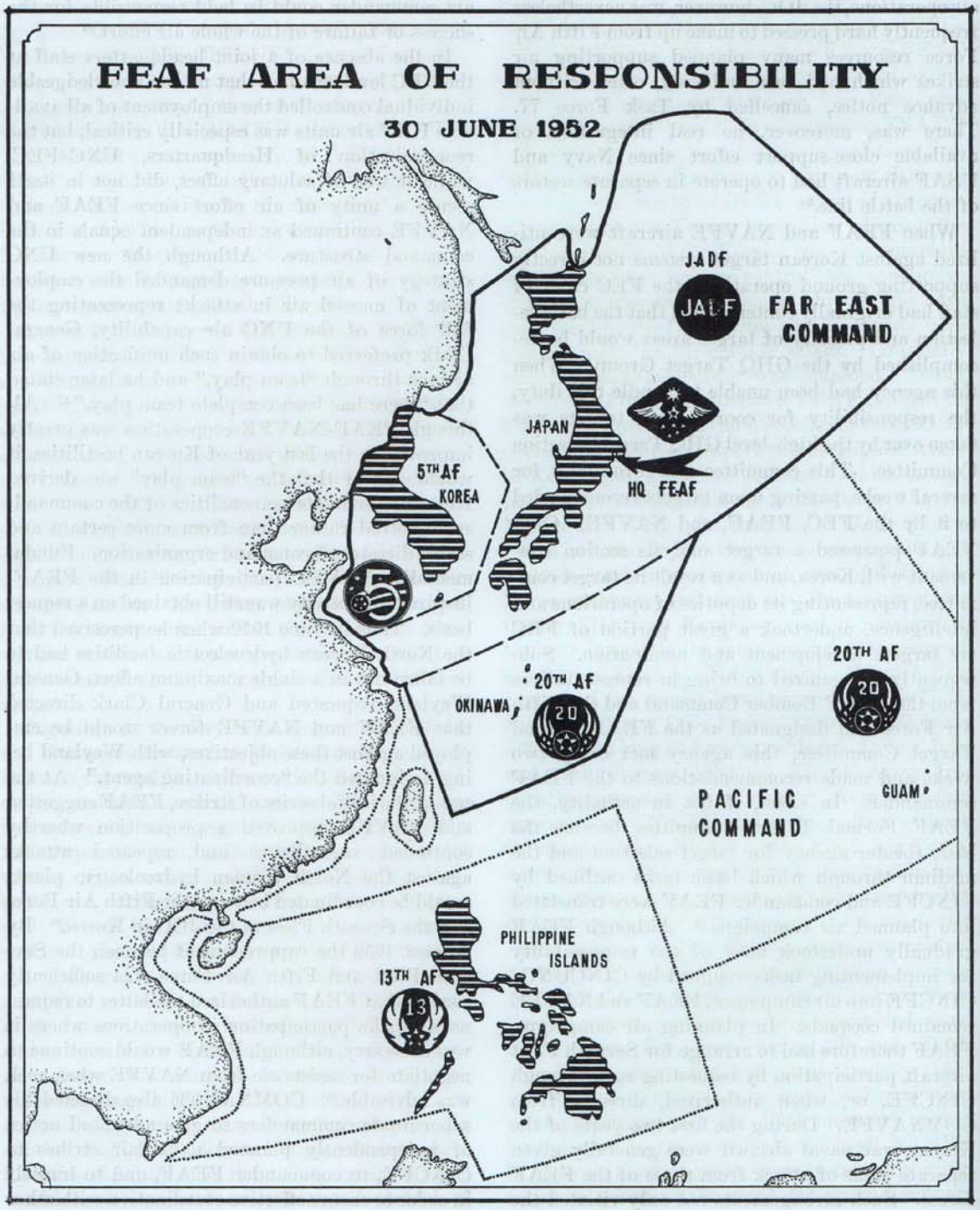

Figure 1.

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Before the end of hostilities the Seventh Fleet and Fifth Air Force locally effected an extremely close coordination of battle line support. Beginning in August 1952 Navy pilots got back into the close-support business and flew an average of 12 ground-support sorties daily for the U. S. X Corps and ROK I Corps at the eastern end of the battleline. Early in September NAVFE informed FEAF that it would like to provide carrier aircraft support across the entire Eighth Army front whenever such was necessary, a proposition with which FEAF concurred. Such across-the-front close-air-support by carrier aircraft began in September 1952 and continued for the remainder of the war. Beginning on 9 October 1952 and remaining thereafter a major Seventh Fleet activity was "Cherokee" attacks, carrier air strikes against prebriefed general support targets directly behind the bombline under the control of a Fifth Air Force tactical air coordinator (Mosquito). For the first time, on 23 May 1953, Navy aircraft utilized the MPQ technique* to blast enemy targets in bad weather, through cloud cover.[91]

Following these months of increasingly intimate cooperation with the Fifth Air Force, the Seventh Fleet in June 1953 agreed to abandon "coordination" in favor of an integral participation in the Korea JOC. At this time the commander Seventh Fleet appointed to the JOC a naval member (NMJ) whose duties were made roughly analogous to those of the Fifth Air Force director of operations. Specifically, the NMJ committed carrier aircraft to integrated tactical air operations and had a positive control of close-air-support effort and the target selection for Cherokee attacks. Commander Task Force 77 provided the NMJ with his air operations intent daily, 24 hours in advance; the NMJ notified the task force commander daily, 12 hours in advance, of the assignment of these airplanes to immediate and preplanned missions. The NMJ was assigned the additional duty of senior naval liaison officer with Fifth Air Force, and, as such, operated a naval air operations center which maintained current information concerning the movement of fleet naval aircraft, the location of surface units, and functioned as a local fleet message center.[92] This action was a final step needed to create the centralized control so necessary to successful tactical air operations in support of the Eighth Army in Korea, but as FEAF noted "it came too late to have any real effect on the course of the war." [93]

No such integration of planning and operations as was belatedly obtained through personal agreements between the commanders of the Fifth Air Force and the Seventh Fleet was attained at the FEAF–NAVFE level. In June 1953, after the Seventh Fleet had agreed to participate integrally in the work of the JOC in Korea, the Fifth Air Force proposed that a Navy representative might also properly be included as a member of the FEAF Formal Target Committee. The FEAF reaction to this proposal, however, noted that no over-all theater air commander had ever been appointed by CINCUNC. General Weyland therefore reasoned that since naval air units were not under FEAF's operational control a naval air officer could not be ordered to participate as a member of the FEAF Formal Target Committee. He nevertheless noted that FEAF was charged with the coordination control of all air operations over Korea and that naval representation in the target committee meetings was highly desirable. Based on this decision, the commander Fifth Air Force was instructed to invite a Navy representative from the JOC in Korea to attend meetings of the FEAF Formal Target Committee.[94] This action, taken during the last days of Korean hostilities, came too late to have any operational significance.

STATUS OF FEAF IN MIDDLE 1952

Organization of Forces: With headquarters at Tokyo in May 1952 the Far East Air Forces, the USAF component of the UNC/FEC, was commanded by Lt. Gen. O. P. Weyland. In World War II, General Weyland had been outstanding in the field of tactical air warfare and had commanded the XIX Tactical Air Command in Europe. After 4 May 1950 he had been commander of the USAF Tactical Air Command, but on 20 July 1950 he had come to FEAF on supposedly temporary duty as vice commander for operations. He had assumed command of FEAF on 10 June 1951 shortly after General Stratemeyer had been stricken with a heart attack. Promoted

*See Chap. VI, pp. 222–28.

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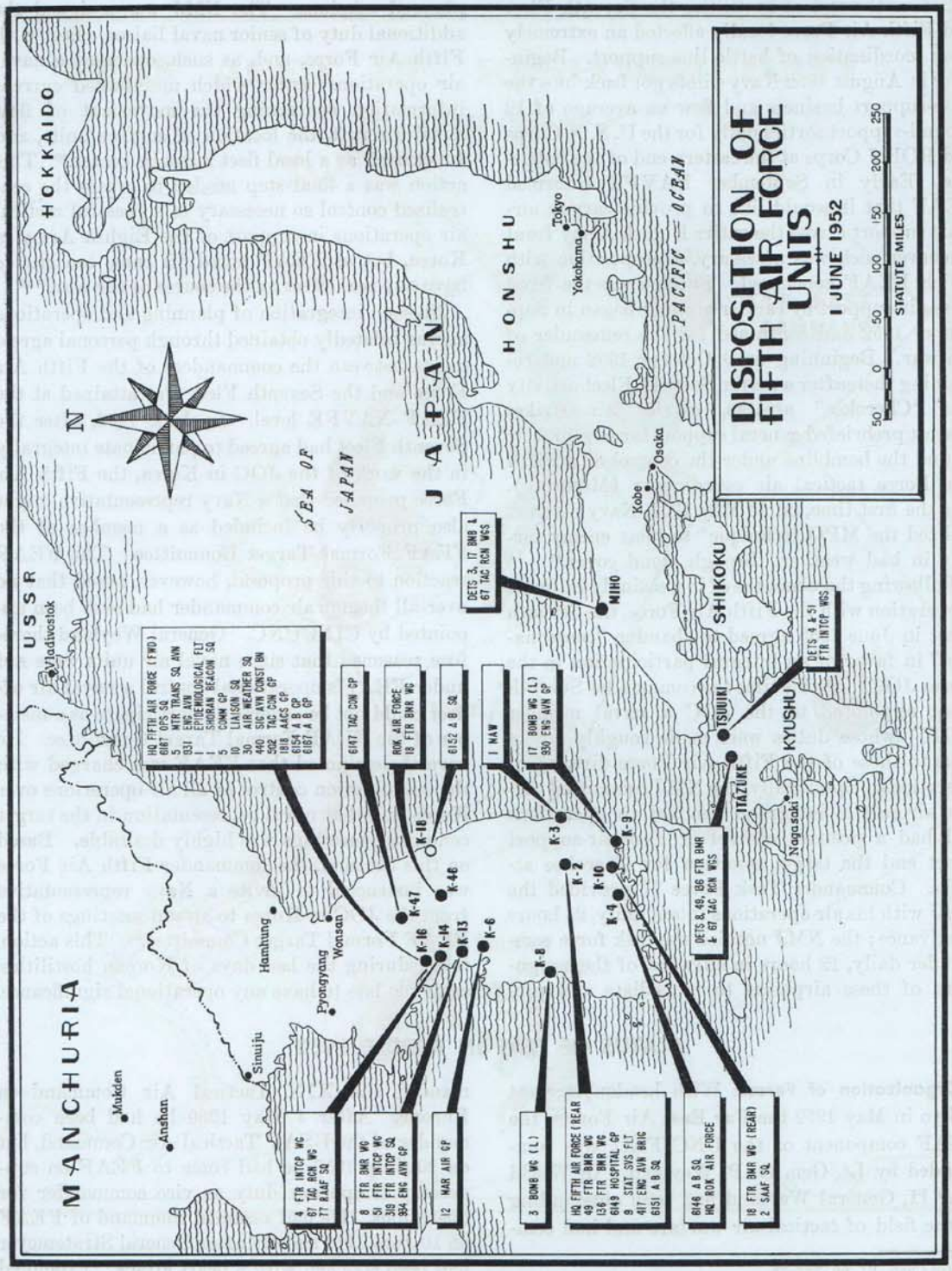

Figure 2.

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to the rank of general on 5 July 1952, Weyland would remain as commander FEAF during the remainder of the Korean war.

Although FEAF was the USAF command component of the UNC/FEC, its area of responsibility was actually larger than that of the Far East Command (*see* figure 1). This situation had come about as the result of two JCS decisions: the first, on 16 April 1951, had transferred the security responsibilities for the Marianas and Bonin-Volcano Islands to the Pacific Command; the second, on 15 March 1952, had charged the Pacific Command with the defense of Formosa, the Pescadores, and the Philippines. These actions did not change the authority of commander FEAF over USAF units and installations in the Marianas and Philippines.[95] For the accomplishment of its missions in its area of responsibilities FEAF had organized its forces into seven principal subordinate commands, based both in the Far East Command and Pacific Command areas of operations.

Largest of the FEAF subordinates was the Fifth Air Force, with a divided headquarters comprising a forward echelon at Seoul and a rear echelon at Taegu, Korea. It was USAF practice to accord the Fifth Air Force commander a temporary rank as lieutenant general and to rotate this commander yearly. Thus since 1 June 1951, Lt. Gen. Frank F. Everest had commanded the Fifth Air Force, and he was succeeded on 30 May 1952 by Maj. Gen. Glenn O. Barcus, who was promoted to lieutenant general on 10 June 1952. At the end of another year, Lt. Gen. Samuel E. Anderson assumed command of the Fifth Air Force on 31 May 1953. Brig. Gen. Dudley D. Hale served as Fifth Air Force vice commander until 23 September 1952, at which time he was relieved by Brig. Gen. E. H. Underhill. The position of deputy commander (rear) with the responsibility for control of the rear echelon of the Fifth Air Force headquarters at Taegu was filled by Brig. Gen. Ernest K. Warburton, who was relieved on 10 March 1953 by Brig. Gen. Stuart P. Wright.[96]

A succinct statement of the Fifth Air Force mission required it to perform the following tasks:[97]

Maintain air superiority in the combat zone, with the exception of areas in amphibious operations as designated by commander FEAF.

Conduct joint planning, training, and operations with UN ground and naval forces.

Within capabilities, provide escort when requested by commander FEAF Bomber Command and commander 315th Air Division (Combat Cargo).

Conduct search and rescue activities in the Fifth Air Force area of responsibility, or as required.

Provide for the maintenance, operation, and internal security of assigned air bases.

Exercise operational control of antiaircraft artillery units in Korea with the exception of antiaircraft units organic to army divisions.

Conduct air reconnaissance as necessary to the accomplishment of its own mission and as directed by commander FEAF.

Conduct special missions as directed by commander FEAF.

With the exception of a few rear echelon maintenance combined (REMCO) detachments at air bases in southern Japan, the entire tactical unit strength of the Fifth Air Force was deployed in Korea (*see* figure 2). The deployment of Fifth Air Force assigned or attached tactical units as of 31 May 1952 was as follows:[98]

Kimpo Airfield (K-14)
- 4th Fighter-Interceptor Wing (3 squadrons F-86's)
- 67th Tactical Reconnaissance Wing (3 squadrons RF-51's, RF-80's, and RB-26's)
- 77th RAAF Squadron (Meteor-8's)

Seoul Municipal Airfield (K-16)
- Det. 1, 3d Air Rescue Squadron
- 10th Liaison Squadron

Suwon Airfield (K-13)
- 51st Fighter-Interceptor Wing (2 squadrons F-86's)
- 8th Fighter-Bomber Wing (3 squadrons F-80's)
- 319th Fighter-Interceptor Squadron (F-94's)

Chunchon Airfield (K-47)
- 6147th Tactical Control Group (2 squadrons T-6's)

Kunsan Airfield (K-8)
- 3d Bombardment Wing, Light (3 squadrons B-26's)

Chinhae Airfield (K-10)
- 18th Fighter-Bomber Wing (2 squadrons F-51's)
- 2d South African Air Force Squadron (F-51's)
- 39th Fighter-Interceptor Squadron (F-51's)

Pusan East Airfield (K-9)
- 17th Bombardment Wing, Light (3 squadrons B-26's)

Taegu Airfield (K-2)
- 49th Fighter-Bomber Wing (3 squadrons F-84's)
- 136th Fighter-Bomber Wing (3 squadrons F-84's)

Available to commander Fifth Air Force's coordination control were the six fighter squadrons comprising Marine Air Groups 12 and 33 of the 1st Marine Air Wing based at Pohang (K-3), Pyongtaek (K-6), and Kunsan (K-8). With the exception of an all-weather fighter squadron, the units of the 1st Marine Air Wing were generally utilized by the Fifth Air Force JOC in close-support missions.

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The Far East Air Forces Bomber Command (Provisional) had been organized on 8 July 1950, and from its headquarters at Yokota Air Base near Tokyo the FEAF Bomber Command gave operational direction to the three B-29 medium bomber groups and the strategic reconnaissance units present in the Far East. Personnel and aircraft replacements for this command were furnished by the USAF Strategic Air Command (SAC), which also provided the commander FEAF Bomber Command, generally rotating this officer every six months. On 15 March 1952 Brig. Gen. Wiley D. Ganey had taken command and would continue as commander until 5 October 1952, when relieved by Brig. Gen. William P. Fisher. General Fisher would, in turn, be relieved by Brig. Gen. Richard H. Carmichael on 15 June 1953. The FEAF Bomber Command was directly responsible for conducting long-range bombardment operations, the attack and destruction of targets in support of UNC forces in Korea, for conducting air reconnaissance as necessary, and for assisting in the defense of Japan and the Ryukyus. The command was also responsible for planning and training in preparation for Strategic Air Command operations, and the support thereof, in the Far East. The FEAF Bomber Command possessed operational control of the following tactical units:[99]

Yokota Air Base, Honshu
- 98th Bombardment Wing, Medium (3 squadrons B-29's)
- 91st Strategic Reconnaissance Squadron, Medium, Photo (RB-29's, RB-45's, RB-50's)

Kadena Air Force Base, Okinawa
- 19th Bombardment Group, Medium (3 squadrons B-29's)
- 307th Bombardment Wing, Medium (3 squadrons B-29's)

With the exception of the 19th Bombardment Group, which was assigned to the Twentieth Air Force, all of these organizations were attached from the U. S. Strategic Air Command. Both the Headquarters, FEAF Bomber Command and its combat units were tenants on the bases they occupied and drew varying amounts of logistical support from the Japan Air Defense Force on Honshu and from the Twentieth Air Force on Okinawa.

The 315th Air Division (Combat Cargo) had been activated by FEAF on 21 January 1951 to replace the temporary FEAF Combat Cargo Command and to serve as a permanent organization required to control all theater airlift in the Far East. Under the command of Brig. Gen. Chester E. McCarty* since 10 April 1952 and with headquarters at Higashi Fuchu, near Tokyo, the 315th Air Division was a major subordinate air command, directly responsible to commander FEAF. The mission of the 315th required it to provide continuing airlift and air evacuation support for UNC forces in Korea and within the FEC as required, to conduct airborne missions and aerial resupply, to establish and operate aerial ports of embarkation, and to provide air transportability and airborne training.[100] The tactical units of the 315th Air Division occupied the following deployment on 30 June 1952:[101]

Seoul Municipal Airport (K-16)
- 21st Troop Carrier Squadron (Fwd. Ech.) (C-47's)

Tachikawa Air Base, Honshu
- 374th Troop Carrier Wing (2 squadrons C-54's and C-124's)
- Royal Thai Air Force Det. (C-47's)
- 61st Troop Carrier Group (2 squadrons C-54's)

Ashiya Air Base, Kyushu
- 403d Troop Carrier Wing (3 squadrons C-119's)
- 314th Troop Carrier Group (3 squadrons C-119's)
- 21st Troop Carrier Squadron (Rear Ech.)
- 53d Troop Carrier Squadron (C-54's)
- Royal Hellenic Air Force Det. (C-47's)

Brady Air Base, Kyushu
- 315th Troop Carrier Wing (4 squadrons C-46's)

The 315th Air Division (Combat Cargo) also controlled the 801st Medical Air Evacuation Squadron and the 6127th Air Terminal Group, both of which had detachments where needed in Japan and Korea. A series of organizational changes in the 315th Air Division would not be completed until the autumn of 1952.†

The Japan Air Defense Force had been activated by FEAF on 1 March 1952 to replace the simultaneously disbanded 314th Air Division and to conduct the air defense of the Japanese Islands. Brig. Gen. Delmar T. Spivey (promoted to major general on 4 December 1952), who had come to Japan on 10 August 1950 as Fifth Air Force vice commander for the rear echelon and who had commanded the successor 314th Air Division, would continue as commander of the JADF until 20 January 1953, when relieved by Maj. Gen. Roy H. Lynn. Although its major defense mission was not directly related to the Korean air war, the

*General McCarty was promoted to major general on 23 June 1953.

†*See* Chap. VII, pp. 263–67.

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JADF provided logistical support for Fifth Air Force detachments at Japanese bases and furnished numerous administrative services to the 315th Air Division. From the beginning of its separate existence it had been obvious that the JADF could not compete with the Fifth Air Force for the possession of scarce tactical air units but would rather manage an interchange of tactical units when this was necessary. By 31 May 1952 the assigned or attached units of the JADF had the following deployment:[102]

Chitose Air Base, Hokkaido
- 196th Fighter-Bomber Squadron (F-84's)

Misawa Air Base, Honshu
- 116th Fighter-Bomber Wing (2 squadrons F-84's)
- Flt., 68th Fighter-Interceptor Squadron (F-94's)
- Flt. C, 3d Air Rescue Squadron

Nigata Air Base, Honshu
- Flt., 41st Fighter-Interceptor Squadron (F-94's)

Johnson Air Base, Honshu
- 35th Fighter-Interceptor Wing (2 squadrons F-51's and F-80's)
- 339th Fighter-Interceptor Squadron (F-94's)
- 3d Air Rescue Squadron, and Flt. A.

Komaki Air Base, Honshu
- Flt. B, 3d Air Rescue Squadron

Ashiya Air Base, Kyushu
- Flt. D, 3d Air Rescue Squadron

Itazuke Air Base, Kyushu
- 68th Fighter-Interceptor Squadron (F-94's)

Combat crews and squadrons from JADF tactical units were utilized in Korea when they were needed. Thus beginning on 30 November 1951 the 116th Fighter-Bomber Wing, although based at Misawa for the defense of northern Japan, maintained one F-84 squadron in rotational combat at Taegu (K-2). The USAF had agreed to maintain one SAC fighter wing on rotational defense duty in Japan, and when the first of these units, the 31st Fighter-Escort Wing, reached Japan with its F-84G's in July 1952, it would be possible for the JADF to release the tactical units of the 116th Fighter-Bomber Wing to the Fifth Air Force for station in Korea. During 1952 and 1953 a few additional unit transfers from the Fifth Air Force would augment the never large tactical strength of the JADF.

Providing logistical support to USAF units in the Far East in May 1952 was the Far East Air Materiel Command FEAMCom) with headquarters at Tachikawa Air Base, and commanded by Brig. Gen. John P. Doyle. On 10 June 1952 Brig. Gen. Paul E. Ruestow (promoted to major general on 6 September 1952) relieved General Doyle, and on 2 July 1952, in order to bring its nomenclature into line with its major status, the command was redesignated as the Far East Air Logistics Force (FEALogFor). Responsible for air force supply and maintenance in the Far East, FEALogFor had a tremendous air depot at Tachikawa, and it controlled smaller depots at Iwakuni Air Base and at Clark Air Force Base, Luzon. In January 1953 another depot would be established at Chinhae (K-10) Airfield in Korea.[103]

The remaining two major subordinate FEAF air commands did not participate directly in the Korean hostilities. The Twentieth Air Force, with headquarters at Kadena Air Force Base, Okinawa, was commanded by Maj. Gen. Ralph F. Stearley until 8 February 1953, when he completed a normal tour of duty and was relieved by Brig. Gen. Fay R. Upthegrove. As a part of its mission the Twentieth Air Force defended and supported the operations of the medium bomber organizations based at Kadena.[104] The Thirteenth Air Force, with headquarters at Clark Air Force Base, Luzon, provided for the maintenance, security, and operations of USAF installations and organizations in the Philippines. Maj. Gen. Ernest Moore was commander of the Thirteenth Air Force until 9 October 1952 when he was relieved by Brig. Gen. John W. Sessums.[105] Unlike the other FEAF subordinates, a large part of the Twentieth Air Force's and all of the Thirteenth Air Force's geographical areas of responsibility lay not in the Far East theater but in the Pacific theater (*see* figure 1). Neither had a large tactical deployment since each had furnished all but a single squadron of their fighter wings to the Korean air war. The Thirteenth had retained the 44th Fighter-Bomber Squadron of its 18th Wing and had also the 581st Air Resupply and Communications Wing. The Twentieth had retained the 26th Fighter-Interceptor Squadron of the 51st Wing and also utilized the 4th Fighter-Interceptor Squadron (F-94's) for the defense of Okinawa. Scattered at bases in these two air forces' areas of responsibility were flights of the 2d Air Rescue Squadron.

FEAF Aircraft Problems: Measured in terms of the Communist air order of battle in the Far East, or in context with the potential target systems in Korea, the number of combat aircraft available to the FEAF in mid-1952, although the largest

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aggregation of USAF aircraft in an overseas theater, was quite limited. During the spring of 1952 the shortage of combat planes had gravely affected the success of the comprehensive railway interdiction programs, and the continued shortage of combat aircraft at mid-1952 was a factor of considerable importance to the air planners who were working out the details of a new air pressure strategy.

Counting every airplane, including those in storage and in salvage and of all types, the FEAF had in May 1952 a grand total of 1,954 aircraft. Only aircraft in units, however, possessed immediate operational significance. Of such planes, the Fifth Air Force possessed 111 B-26's, 45 F-51's, 83 F-80's, 97 F-84's, 138 F-86's, and 24 F-94's, for a total of 111 light bombers and 387 fighters. Supplementing the Fifth Air Force strength were approximately 25 Meteor Mk.-8 aircraft of the 77th Royal Australian Air Force Squadron, approximately 27 F-51's of the 2d South African Air Force Squadron, and approximately 134 fighters and fighter-bombers possessed by the 1st Marine Air Wing. The FEAF Bomber Command had 99 B-29 medium bombers. The Thirteenth Air Force had 27 F-80's. The Twentieth Air Force had 28 F-80's and 24 F-94's. The Japan Air Defense Force possessed 23 F-51's, 28 F-80's, 60 F-84's, and 49 F-94's, for a total of 159 fighters. The 835 aircraft possessed by FEAF tactical units represented a potential FEAF striking force, but only a part of this force was available for duty in Korea. Active in this combat area were the 498 aircraft of the Fifth Air Force, the 99 FEAF Bomber Command medium bombers, and approximately 186 SAAF, RAAF, and 1st Marine Air Wing planes, or a total of some 783 aircraft. Counting all aircraft in committed units, which included reconnaissance, transport, rescue, and liaison aircraft as well as fighters and bombers, FEAF possessed at the end of May 1952 1,031 planes actively engaged in the Korean war, a total which, when friendly foreign and Marine fighters and transports were added, rose to a figure of approximately 1,261 aircraft.[106]

Measured in terms of the Communist air order of battle in the Far East even the generally meaningless grand total of 1,954 FEAF aircraft was dwarfed by the mammoth-sized Soviet Air Forces in the Far East and was nearly equalled by the size of the Chinese Communist Air Force (CCAF). During the first half of 1952 the Soviet Far Eastern Air Force remained virtually stable at an over-all estimated strength of 5,360 aircraft, but the Russians were believed to have made substantial progress in converting their fighter units from piston to jet aircraft. These Soviet air units were not expected openly to intervene in Korea, but from time to time Soviet "volunteer units" appeared for combat at the Yalu. By mid-1952 the CCAF had gotten its 22 air divisions nearly to authorized strength, and, out of a total of 1,830 aircraft, the CCAF had concentrated in Manchuria an estimated 1,115 planes, including 640 jet aircraft.[107] *

As the peace talks had dragged on and the Communist air forces had waxed in strength, General Weyland had become increasingly apprehensive about the prospect of maintaining UNC air superiority in Korea. If the war were to continue, he reasoned on 12 July 1951, the success of the UNC forces would be determined by a struggle between the CCAF and the FEAF. "Unless our relative air strength . . . is maintained equal or better than the CCAF," Weyland had informed USAF, "I feel that our expenditures of men and money in the Korean war may well have been in vain."[108] In December 1951 General Ridgway had urged the JCS to consider the serious challenge to UNC air superiority over Korea: to achieve bare numerical parity with the hostile MIG-15 forces, FEAF required eight F-86 wings.[109] But the best that USAF had been able to do in the way of furnishing the F-86 Sabres which alone were able to combat the MIG's on anything approaching equal terms had been to provide FEAF with a total of five Sabre squadrons: thus in May 1952 the Fifth Air Force possessed some 138 F-86's in tactical units with which to confront an estimated 640 Chinese MIG-15's based in Manchuria. FEAF, moreover, did not possess any large back-up theater reserve for the Sabres: all together the total theater inventory of Sabres at the end of May stood at 167 aircraft.[110]

The striking force with which FEAF put ordnance on hostile targets in North Korea comprised the medium bombers of the FEAF Bomber Command and the light bombers and fighter-bombers of the Fifth Air Force. In terms of enemy opposition much of this striking force was obsolescent;

*See Chap. III, pp. 39–41.

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in terms of the potential target systems it was actually quite small; and during the first year of truce negotiations it had been slipping downhill due to depreciation, battle damages, and combat losses. In view of its global responsibilities, the USAF had fixed the strength of the FEAF Bomber Command at a total of 99 B–29 bomber-type aircraft (30 unit equipment, plus 3 command support planes per group). These medium bombers were available for strikes against fixed and prebriefed targets, but, in recognition of the MIG hazard, they flew only at night, directing their bombs by shoran or by ground radar control. Although the Strategic Air Command generally maintained a few more than the 99 aircraft in the theater to provide for such factors as battle damage and pipeline transit time, the maintenance of such a number of B–29's at FEAF's disposition was increasingly difficult as the SAC converted its Zone of Interior wings to more modern strategic bombers.[111] As a result of a long series of emergency actions, the USAF by the spring of 1952 had been able to increase the Fifth Air Force's authorization of light bombers to 120 B–26 aircraft, plus 50 percent theater reserve. Such an authorization had been sufficient to equip only the 3d Wing at a war strength of 24 B–26's per squadron, and the 17th Wing had remained equipped at a reduced strength of 16 B–26's per squadron. Like the B–29's, the B–26 light bombers operated at night in a duty for which they were not particularly fitted, flying principally night-intruder missions and having the capability of bombing by ground radar control. In May 1952 FEAF possessed a theater inventory of 187 B–26's, but most of these were "cats and dogs" models, the modification of which for combat was requiring a large share of FEAMCOM's depot effort. The two B–26 wings were not going to reach their authorized strength of possessed aircraft until September 1952.[112]

Of all the force available to FEAF only the fighter-bombers of the Fifth Air Force were able to attack by day either fixed or moving targets in Korea; yet at mid-1952 every Fifth Air Force fighter-bomber wing was gravely deficient in authorized aircraft and only two of these wings were partially equipped with modern jet fighter-bombers. Each of these wings was authorized a strength of 25 aircraft per squadron: in May 1952 the 8th Fighter-Bomber Wing actually possessed 79 F–80 aircraft, the 18th Fighter-Bomber Wing possessed 46 F–51 Mustangs, the 49th Fighter-Bomber Wing possessed 47 F–84's, and the 136th Fighter-Bomber Wing possessed 40 F–84's. The deficiency in the assigned fighter-bomber strength was resultant from some three causes. The F–51 Mustang was a conventional fighter and the F–80 was the earliest of Air Force operational jet fighters; both were obsolescent, no longer in production, and had seen hard service in the first two years of the Korean war. Although FEAF carried a substantial inventory of F–80's and F–51's, most of these planes were so combat worn as to prevent any practicable renovation. The F–84 Thunderjet, on the other hand, was a new USAF fighter-bomber, as yet unavailable to FEAF in requisite numbers. These fighter-bomber aircraft, moreover, had taken heavy losses from Communist ground fire during the comprehensive rail interdiction program. Between August 1951 and March 1952 FEAF had lost 236 aircraft on interdiction sorties as against a replacement of only 131 of the same types during this time.[113]

The USAF had long been thoroughly cognizant of FEAF aircraft problems, but in 1950 it had been what General Vandenberg had described as a "shoe-string Air Force," and it had had to support FEAF initially from stored stocks of equipment left over from World War II.[114] At the end of 1951 the best that the USAF had been able to do was to maintain that: "The Korean war has had first priority in every respect and has been equipped to our poor best at the expense of SAC, the Air Defense of the United States, and our overseas deployment program." [115] By mid-1952 aircraft production in the United States was beginning to catch up with demands imposed by the Korean war, and FEAF was at last promised the modern equipment which it required to bring its units up to strength.

In February 1952 the JCS advised CINCFE that the USAF had purchased 60 F–86's from a Canadian aircraft corporation (Canadair), which with other Sabres to become available from U. S. production should enable FEAF to achieve two war-strength F–86 interceptor wings, together with 50 percent theater reserve, by June 1952.[116] In order to provide the 51st Wing with a full squadron complement, FEAF effected the transfer of the 39th Fighter-Interceptor Squadron from its attachment to the 18th Fighter-Bomber Wing

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on 1 June 1952, and during that month the 39th Squadron began to receive new F-86F aircraft, the first of this model Sabre to reach the Far East. This conversion program met some slippage in aircraft deliveries, so that it was not until August 1952 that the six Sabre squadrons were up to authorized strength. During September, FEAF built up the authorized 50 percent combat reserves of Sabres.[117]

In May 1952 USAF further agreed to bring the Fifth Air Force F-84 fighter-bomber wings up to authorized war-strength and to provide FEAF with a 50 percent combat reserve of F-84's.[118] Aware that something had to be done to relieve the F-51's and F-80's from combat, and expecting increased Sabre production, USAF on 18 July 1952 agreed to plans whereby the 18th Wing with the 2d SAAF Squadron and the 8th Wing would be converted to F-86F aircraft, properly modified as fighter-bombers, with a target date of January 1953.[119] These fighter-bomber programs would meet some slippage due to production delays,* but these long-awaited augmentations of aircraft strength offered a considerable amount of reassurance to the FEAF planners who were projecting the air pressure strategy.[120]

As the air pressure operations were getting underway, a few theater actions offered some benefit to the fighter-bomber situation. During June 1952 the 18th Fighter-Bomber Group left the 18th Wing as a rear echelon at Chinhae (K-10) and moved up to Hoengsong Airfield (K-46), where its old Mustangs were only 60 miles behind the front lines and could reduce their flying hours.[121] At the arrival of the SAC rotational fighter wing in Japan during July, the Fifth Air Force took over the F-84 wing which had been attached to the JADF: thus effective 10 July the 116th Fighter-Bomber Wing was inactivated† and its personnel and equipment received by the simultaneously activated 474th Fighter-Bomber Wing which opened at Kunsan Airfield (K-8) that same day. The 474th Wing, which had then had 57 F-84's, flew its first combat missions from Kunsan on 1 August.[122]

*See Chap. V, pp. 155–56.

†Because their unit designations had to be returned to the U. S. Air National Guard, the 116th and 136th Fighter-Bomber Wings and their subordinate organizations were relieved from the federal service effective 10 July 1952 and their personnel and equipment were assumed by the simultaneously activated 474th and 58th Fighter-Bomber Wings (Hist. D/Org. and Manpower FAF, July 1952).

The FEAF Potential for Sustained Combat: Although FEAF's combat potential was directly related to the number of its possessed aircraft, two other major factors—availability of aircrews and of logistical support—dictated the rate at which the possessed planes could be flown. During World War II aircrew training and aircraft production had been sufficiently bountiful that combat air units had been generally able to fly their crews and planes to exhaustion with a reasonable certainty of securing timely replacements. In Korea, however, such was not the case and combat operations had to be closely figured in terms of spare parts and supply, engine availability, aircraft age, expectations of battle damage, and personnel manning and experience, all of which had to be forecast and requisitioned up to six months in advance. At times of adversity for the UNC cause, FEAF planes could be and were flown to exhaustion, as in November and December 1950 when the medium bombers were required to sustain a rate of effort which decimated their in-commission status and hospitalized crews with combat fatigue. In this same effort FEAF had knowingly used up a great number of F-51 and F-80 fighter-bombers. Operations in times of emergency could for a short time exceed calculated planning factors, but such expenditures of effort had to be compensated by a subsequent proportionate reduction in the rate of operations.[123] These planning factors thus represented the maximum sortie rate which could be sustained by a given type of aircraft per month, a rate which if long exceeded would result in the collapse of the support and a shortage of replacement crews for that type aircraft.

The maximum combat capability which FEAF could sustain was a derivative from the number of its possessed aircraft in terms of an operational planning factor representing logistical support and aircrew availability. For the B-29 medium bombers the FEAF planning factor at mid-1952 was six sorties per month per aircraft, which meant that in all-out combat the Bomber Command could sustain a daily average of 16 B-29 sorties. Actually, Bomber Command preferred to schedule from 12 to 15 combat sorties daily and to devote the remaining capability to sorely needed shoran flight training.[124] Calculated on a basis which sought to maintain 75 percent of Fifth Air Force aircraft in a combat ready status at all

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times, FEAF planning factors set the maximum monthly sortie rate per F–51 at 25.5, per F–80 at 28.5, per F–84 at 25, per F–86 at 25, and per B–26 at 17. Although the figure would vary upwards with the increased number of possessed aircraft in the autumn of 1952, and could be juggled by the expedient of flying shorter missions than the averages contemplated by the planning factors, the Fifth Air Force in mid-1952 could, on the basis of the FEAF planning factors, sustain something on the order of a daily average of 115 F–86 counterair sorties, 196 fighter-bomber sorties, and 63 light bomber sorties. Figured on a basis of the FEAF F–51 factor, the 2d SAAF Squadron could add about 24 fighter-bomber sorties each day to the Fifth Air Force total. While planning factors are not available for these units, the 77th RAAF Squadron in the period July through September flew an average of about 18 counterair sorties with its Meteors each day, while the 1st Marine Air Wing averaged approximately 100 close-support, interdiction, armed reconnaissance, counterair, and escort sorties each day.[125]

The total FEAF striking power was thus a finite quantity and actually quite small in terms of the tasks presented to it. In any programming of a sustained air campaign the limited capability of the FEAF effort had to be taken into account in order that each sortie flown should be directed against a carefully selected target which, once destroyed, would represent the maximum damage to the enemy. General Weyland emphasized the fact that FEAF never possessed the requisite strength to do a job completely: air action against the Communist rail lines in North Korea stopped all but 4 or 5 percent of the prewar rail traffic, but neither FEAF nor the entire UNC air forces had a sufficient force to take out the remaining small percentage of traffic which proved able to sustain the Communist armies in a static employment. During the air pressure campaign, moreover, FEAF would not have sufficient strength to attack many marginal value targets identified in North Korea.[126] The manner in which this essentially scarce air effort could be most profitably employed against the most lucrative targets was going to be a major concern of the FEAF air commanders who implemented the air pressure strategy.

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Chapter II

PLANNING THE STRATEGY OF AIR PRESSURE

After December 1950 the United Nations military objective in Korea was to achieve acceptable armistice terms, not to destroy the Communist armies nor to capture enemy territory. And yet, even after the Communist armies had been decisively defeated by air-ground action in May and June 1951, the UNC military strategy had remained directed against these already-beaten Communist armies. UNC air power, which alone possessed an ability to effect a selected destruction over the entire spectrum of hostile objectives in Korea, was utilized by the UNC in an intensified interdiction campaign designed to delay and disrupt the flow of enemy logistical support to his frontline forces. No small portion of the UNC air effort, yet not as much as the ground commanders desired, was directed into close-support strikes against dug-in enemy troops along the stalemated battle line. In short, UNC air power was being employed in a nondecisive tactical concept against an enemy army which could not afford to launch another major assault and in support of UNC ground forces which were expected to do no more than to defend the ground they held. The UNC military strategy was not in context with its military objective.

As long as the UNC military operations remained directed against the entrenched personnel and fleeting logistics of the Red armies and inflicted no unacceptable damage upon the ruling regime itself, the Communist hierarchy was satisfied to prolong the armistice talks, using these meetings as a forum for propaganda while they obtained concessions from the UNC. Finally, in April 1952, the UNC could compromise no further and still maintain its honor, and it was at last compelled to reassess its military strategy. Long prior to this breaking point, FEAF commanders had known the need for a new UNC strategy which would utilize air pressure against hostile targets in North Korea in a manner designed to secure acceptable armistice terms. Quite a few air leaders had never swallowed the myth that a rejuvenated Red army was going to attempt another all-out offensive in Korea, but before they could pry loose the air effort from this ground concept they had both to demonstrate the indecisiveness of the UNC military strategy pursued thus far and to convince ground commanders that there were logical reasons why the Communists could not afford another all-out ground offensive. Finally, the top FEAF air officers had to pioneer beyond existing air doctrine to establish a plan whereby air power would be used as the sole agent to sustain such relentless pressure upon the hostile military forces as to force the ruthless Red leaders to accept terms agreeable to the UNC. When the truce talks began to founder in April 1952, the FEAF leaders had already prepared a strategic air plan which they had seen at least in concept from the beginning of Korean hostilities.

PLANNING THE REVISION OF AIR STRATEGY

Early Thoughts on Air Pressure: During World War II air power had demonstrated an ability to produce emotional or psychological responses in the ruling elites and peoples of enemy nations which were often more significant than the actual physical damage done to enemy targets. Early in the Korean hostilities, FEAF leaders had desired to exploit these psychological attributes of air power. Maj. Gen. Emmett O'Donnell, Jr., first commander of the FEAF Bomber Command,

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had greatly desired "to cash in on our psychological advantage in having gotten into the theater and into the war so fast, by putting a very severe blow on the North Koreans, with advanced warning . . . telling them that they had gone too far in what we all recognized as being an act of aggression." O'Donnell had desired to inform the aggressors that they could "either stop the aggression and get back over the thirty-eighth parallel or they better have their wives and children and bedrolls . . . with them because there is not going to be anything left up in North Korea to return to."[1] Again at the end of September 1950, when the North Korean Communists were retreating in wild disorder whence they had come, General Stratemeyer had proposed to send a 100 B-29 strike against military targets in the hostile capital of Pyongyang, a strike which would both destroy military objectives and cause the enemy to listen attentively to UNC terms. The JCS, however, had immediately informed the CINCUNC that any plans calling for an all-out bombing attack against Pyongyang involved "serious political implications."[2] Sensitive to world opinion, the JCS had been willing to permit no employment of air power which might inflict unnecessary civilian casualties.

The first year of the Korean war had been fought according to established air doctrines. A strategic air assault had largely destroyed the North Korean industrial capability to support a war. Tactical air operations had maintained control of the air, had interdicted hostile lines of supply, and had given close support to UNC ground troops. In the circumstances presented, these established doctrines had been sufficient to defeat the Communist land armies. But with the beginning of the truce talks these established doctrines lacked applicability: "Almost imperceptibly," noted a FEAF report, "we moved into a situation where the conventional doctrine for the employment of tactical air forces applied only to a portion of the air effort."[3]

"In time," wrote General Weyland, "the pressure from air attack came to be recognized as the prime objective of the air offensive."[4] Early in 1952 it was quite apparent to the FEAF leaders that the military situation in Korea was completely stalemated. Chief among those who began to advocate the necessity of a new air strategy was Brig. Gen. Jacob E. Smart, who in January 1952 became Deputy for Operations, FEAF.[5] At the end of February 1952, quietly and without fanfare, General Smart had a new statement of FEAF combat operations policy inserted in the weekly intelligence publication: whereas up until that time these statements had recorded an emphasis upon air superiority, interdiction, and air support, the new statement noted that FEAF operations sought:[6]

1. To maintain effective and positive military pressure on the North Korean military armies, as well as on the Chinese Communist military forces committed to the Korean war.
2. To influence current Korean armistice negotiations in order that the United Nations Command may obtain the most favorable results.
3. To retain a capability for other operations in event of a general emergency.

There had been no change in officially stated FEAF mission directives nor were the air operations at the end of February 1952 greatly different from those which had been conducted weekly since August 1951, but FEAF was now ready to announce that it conceived its operations to be in the nature of military pressure against the enemy.

Given the acceptance of the opinion among FEAF operations personnel that the current emphasis on rail interdiction was not getting results and that a new application of FEAF effort was required, General Smart nevertheless had to reconcile two strongly held and widely divergent viewpoints before he could secure official acceptance of a strategy of air pressure. The first of these viewpoints was the attitude of some ground commanders that more and still more close air support was needed. Another viewpoint, this one held by several members of the FEAF Target Committee, was that increased interdiction effort on rail lines and bridges was vital to the maintenance of the static ground situation. Having answered these diverse viewpoints, General Smart had to offer a plan by which air power could break the truce talk stalemate.[7]

The Randolph-Mayo Staff Study: Given the problem of devising the ways and means of exerting maximum air pressure on the Communist forces in North Korea through the optimum application of FEAF effort, Col. R. L. Randolph, director of the FEAF combat operations division, and Lt. Col. B. I. Mayo matured on 21 April 1952 a study which was to provide the framework for the adoption of

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a new air strategy in Korea.[8] This study was introduced by a penetrating analysis of the previous seven months' experience against the North Korean railways, in which the two authors demonstrated that the enemy, benefiting from controlled supply consumption in a generally static ground war, would eventually through logistical osmosis build his frontline stockpiles to any level he desired. This rail interdiction effort had not been wasted because these routes of transportation had been so badly mauled that they would further deteriorate during the summer rains of 1952. The rail net, moreover, had been put in a marginal condition for supporting any major Communist offensive and it could be kept in limited operating condition by subsequent periodic air attacks. But the continuation of the railway interdiction program as a major sustained UNC air effort was obviously impracticable: neither rail track nor rail lines was especially costly to the enemy, and after December 1951 air attacks against the rail system had reached a virtual state of balance wherein the UNC air ability to inflict damage was approximately equalled by the enemy's ability to repair the damage. To continue the rail attacks would be, in effect, to pit skilled pilots, equipped with modern, expensive aircraft, against unskilled oriental coolie laborers, armed with pick and shovel. Even if UNC air action did delay or diminish the flow of hostile supplies to the enemy, such air action could not place intolerable pressure upon the enemy so long as he maintained a static ground front.

After this introduction, Randolph and Mayo examined the possible applications of FEAF effort which appeared practicable under the circumstances prevailing in Korea. They determined that FEAF could:

(1) Maintain UNC air superiority through counterair action and airfield neutralization;

(2) Destroy or damage enemy supplies, equipment, facilities, and personnel;

(3) Delay the movement of enemy supplies, equipment, and personnel; and

(4) Provide close support for ground operations.

With a static ground situation, delaying the enemy's supplies or attacking entrenched troops along the front lines promised no more than minimum achievements with the probability of costly air losses. Since the enemy based his airplanes north of the Yalu, FEAF could hardly bring pressure upon the enemy by destroying his air capability, but FEAF nevertheless had to maintain an air superiority over North Korea as a matter of first priority to prevent the enemy from bringing pressure to bear on UNC forces. Airplanes, moreover, were expensive to the enemy and Randolph and Mayo thought that as many of them as possible should be destroyed in air-to-air fighting. The real opportunity which FEAF had to lay pressure upon the enemy was by destroying his supplies, equipment, facilities, and personnel. They therefore recommended that the first priority of FEAF effort be given to the maintenance of UNC air superiority and that such effort as remained should be employed to accomplish "the maximum amount of selected destruction, thus making the Korean conflict as costly as possible to the enemy in terms of equipment, supplies, and personnel."

Having arrived at the broad concept of achieving air pressure through selective destruction, Colonels Randolph and Mayo attempted to show what sorts of targets could be attacked. They proposed that any target list utilized for the air pressure operations had to be highly flexible and subject to constant review in order to exploit the inherent flexibility of air power. Target evaluation, moreover, had to consider the importance and value of the target to the enemy, the air capability to destroy the target, and the cost in loss and damage to air units to be expected in attacking the particular target. These factors had to be weighed and balanced since it was evident that FEAF would have to live within its means. While "gold targets" were quite rare in North Korea, it was possible that the solution to the targets problem would be to attack the targets which were least unremunerative. Finding lucrative targets did not promise to be easy, but the problem would not be insurmountable, once available reconnaissance and intelligence effort was directed toward that end. "It is believed," these planners stated, "that once the concept—destruction—is clearly stated and made known to all operations and intelligence agencies, targets can be found, developed, and successfully attacked."

Before FEAF could expect to secure the adoption of the strategy of air pressure, it had to provide answers to two questions of interest to the UNC ground forces: Would the enemy be able to stockpile at an appreciably faster rate if FEAF

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applied its effort in a different way? What risk did the UNC take in allowing the enemy to stockpile faster? Colonels Randolph and Mayo posed these questions and proposed answers. They assumed that FEAF aircraft would, to a great extent, continue to interdict enemy movement as long as they maintained air superiority and continued to operate over North Korea. Under these circumstances the enemy would be compelled to move only by night. They did not, moreover, intend to abandon interdiction but rather to focus the air effort upon destroying materiel, killing personnel, and maintaining armed reconnaissance over the enemy's rear areas. Consideration of the risk of allowing the enemy to stockpile faster involved a realistic estimate of what the enemy would do when he accumulated a sufficiency of supplies. Inevitably the enemy was going to build up his supplies to any level which he desired: over a period of time he could do this by expending less supply than he received. But as long as the UNC maintained air superiority and the whip-hand of air attack, the Communists could not hope for ultimate victory in South Korea, no matter what their jump-off supply level might be. Just as had been the case in 1950 and 1951, an offensive would force the enemy to expose his personnel and supply lines to a violent air attack as he moved out of his prepared positions and dispersed supply dumps. The Eighth Army could be expected to preserve itself by maneuver. Back of the enemy lines, moreover, the cumulative effect of the destruction of the enemy's rail net would deprive him of fast and reliable resupply for any renewed offensive. Since the enemy could not logically expect a ground victory in Korea, the UNC had little real risk even if the enemy did build up his front-line supplies at a faster rate.

The Randolph-Mayo staff study received serious consideration in FEAF, and its recommendation that UNC air should attack accumulations of hostile supplies was almost immediately accepted. General Ridgway said, for example, "that the hostile forces now opposing . . . the United Nations Command in Korea have a substantially greater offensive potential than at any time in the past." [9] There was thus good reason to clean up such personnel and supply targets as existed in the immediate vicinity of the front lines. On 28 April, Bomber Command was informed that the target systems considered suitable and desirable for medium bomber attack were airfields, railway systems, and supply and communications centers, in that order.[10] Early in May, massed Fifth Air Force fighter-bomber attacks began the destruction of hostile supplies, equipment, and personnel concentrated near the main battlefront. On 8 May approximately 485 fighter-bombers blasted a supply buildup north of Suan over a 13-hour period in the "biggest single attack since the beginning of the Korean conflict," destroying several hundred buildings sheltering personnel and supplies as well as many supply revetments, vehicles, and gun positions. On 15 May, 256 fighter-bomber sorties completely destroyed a vehicle repair factory at Tang-dong, and a third attack was made on 22–23 May in the Kijang-ni industrial area. On 22 May some 472 fighter-bomber sorties destroyed factories making hand grenades, small arms, and ammunition, while that night light bombers dropped butterfly bombs to harass salvage crews. On 23 May, 275 fighter-bomber sorties, again followed by night harassing B–26's, attacked a steel fabricating factory in the same area. Photo interpretation showed 93 percent of the first day's target destroyed and 80 percent of the second day's objective turned into ruins.[11] General Weyland stated that "a significant change in combat operations policy took place in May." "The scope of interdiction operations," he explained, "was expanded to include destruction of important targets, target complexes, and target systems." [12]

HYDROELECTRIC ATTACKS TEST THE NEW AIR STRATEGY

Hydroelectric Power as an Air Target: From the very beginning of Korean hostilities FEAF airmen had recognized the significance of the North Korean hydroelectric facilities (*see* figure 3). In North Korea the Japanese had developed one of the world's principal hydroelectric complexes. Utilizing the advantage of mountainous terrain, they had built five power systems near the east coast of Korea, namely, Fusen, Chosen, Kyosen, and the smaller Funei and Kongosan. Large reservoirs had been dammed up on the broad, shallow, western slopes of the mountains, from which water was tunneled through the drainage divide and dropped through penstocks down the precipi-

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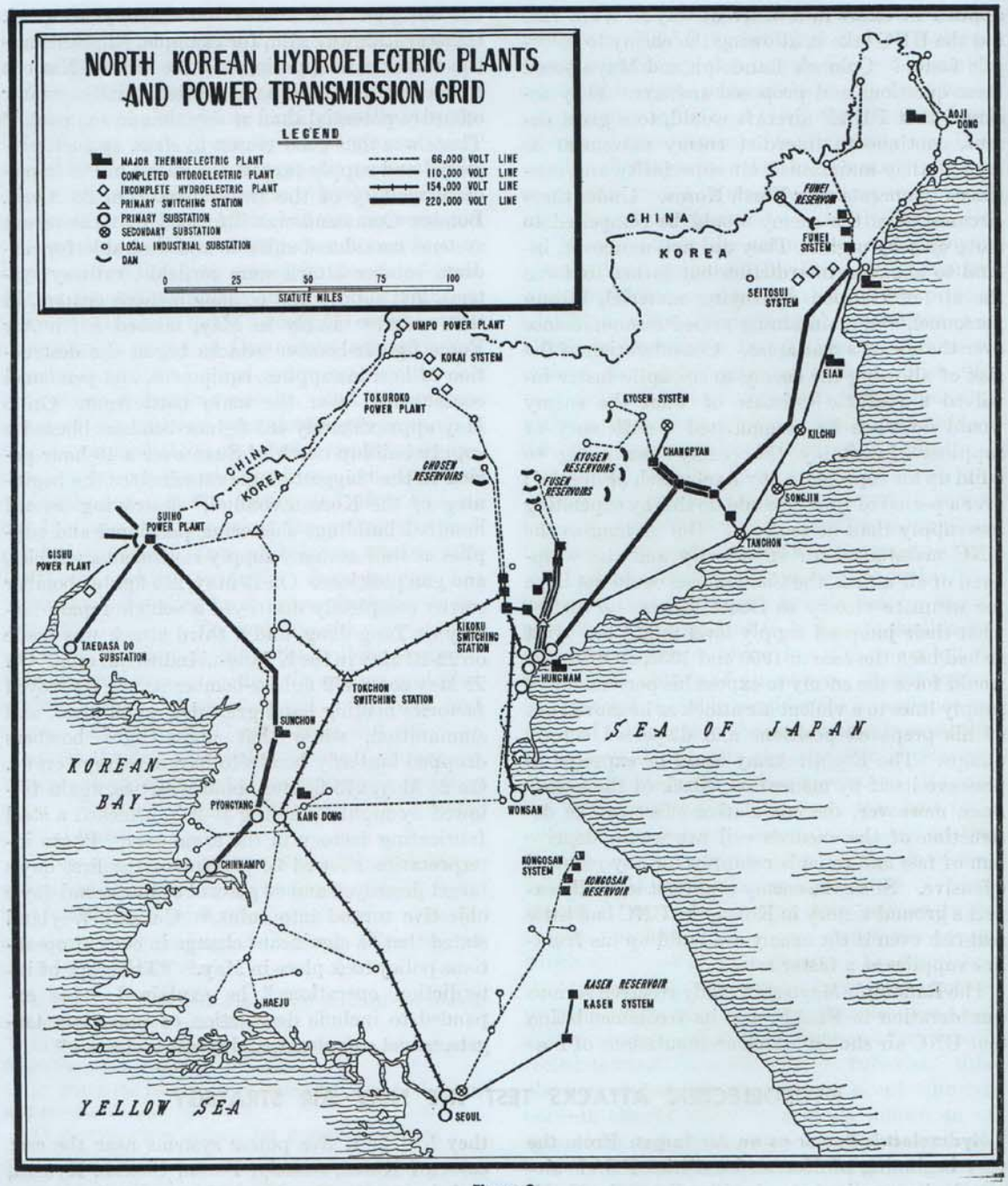

Figure 3.

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tous eastern mountain slopes to a series of generating plants.

The oldest hydroelectric project was the Fusen complex, along the Pujon-gang River, northwest of the port city of Hungnam and furnishing power for the vast electrochemical production at that city. Second of the major systems was the Chosen, along the Changjin River, northwest of Hungnam, with four generating plants in a series ranging down the eastern mountain slope. The Kyosen system, also consisting of four generating plants and located north of Hungnam, was integrated into the eastern electric grid with Chosen and Fusen. The remaining two eastern systems, Kongosan, which was south of Wonsan, and Funei, which was near the Musan Iron Works in the Tumen area, were plants of lesser design capacity built primarily to supply local consumers. In addition to these eastern plants, the Japanese had built at Sui-ho, on the Yalu River about 30 miles northeast of Antung, the world's fourth largest power generating plant in both capacity and size. Unlike the east coast facilities, Sui-ho had an impounding dam with adjacent powerhouses, and exploited a large volume of water rather than head for its hydraulic pressure. Various scattered thermoelectric plants supplied local consumers, but their total output was a small part of the North Korean electrical production.

That this North Korean hydroelectric system had never reached its maximum designed capacity of 1,614,400 kilowatts was due to the failure of the Japanese to receive certain equipment ordered from Germany in the 1930's, the removal of generators and equipment by the Russian occupation forces in 1947, and the loss of competent Japanese technicians after 1945, but the North Korean plants nevertheless had a potential to produce far in excess of domestic requirements, for electrical power and the power surplus had been further increased after May 1948 when transmissions south of the 38th parallel had been cut off. In 1952 it was estimated that Sui-ho alone had an output of 300,000 KW, the Chosen complex of more than 200,000 KW, and the Fusen complex of over 100,000 KW. Sui-ho, the most important single installation, was transmitting about one-third of its production into Manchuria.[13] Following the destruction of most of the North Korean industries in the summer of 1952 the power surplus had become even larger, but the Communists had channelled electrical power into many small shops where they repaired rail and automotive equipment, and into numerous small factories, many of them underground, which produced military items such as clothing, shoes, hand grenades, submachine guns, mortar shells, and small arms.

Through a strange combination of circumstances, the North Korean hydroelectric plants had become "sensitive" targets. In September 1950 FEAF target experts had noted that the electrical power industry of North Korea was the "most important target remaining" which contributed directly to the industrial and war potential of the Communist Far East. They had therefore recommended that all of the major plants, with the exception of Sui-ho which could be neutralized by destruction of its transformer stations, should be destroyed by air attack. General Weyland had directed that these targets be made available to the FEAF Bomber Command. At a FEC staff briefing on 26 September, however, one FEC staff officer had questioned the advisability of destroying plants which would have to be rebuilt when the UNC forces occupied North Korea, but General MacArthur had directed that FEAF would execute the attacks as planned.[14] Seven B–29's attacked Fusen No. 1 plant on 26 September 1950, but that same day the JCS, noting that UNC ground operations in North Korea were progressing favorably, directed the suspension of air attacks against such strategic targets as remained in enemy territory.[15]

In the autumn of 1950, when the Chinese Communists first began displaying increasing hostility, the U. S. Department of State conceived the idea that the Chinese might fear that a UNC occupation of North Korea would deny them the electrical power that they had been getting from Sui-ho, and it suggested on 21 October 1950 that the CINCUNC might well express an intention not to alter arrangements for the distribution of Sui-ho power. General MacArthur thought that this proposition was both inadvisable and unacceptable.[16] The belief that the Chinese were worried about the ultimate fate of Sui-ho evidently gained credence, and on 6 November the JCS prohibited "the bombing of any dams or power plants on the Yalu River."[17] MacArthur immediately replied that the destruction of these hydroelectric installations had "never been contemplated."[18] Lacking conclusive evidence as to

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what was motivating the Chinese Communists, the JCS by 9 November 1950 were willing to accept the validity of the proposition that the Chinese wished to protect their electric power sources in North Korea, possibly by the establishment of a border buffer zone in northwestern Korea. This appraisal accepted the significance of the hydroelectric plants to China: "If the Chinese Communists were prevented from obtaining electricity from these power systems, it would be a severe economic blow to Manchuria." [19] Seeking to reassure the Chinese, various American and United Nations officials made public statements that the dams, power plants, and distributions would not be damaged and that the current distribution of electricity would not be arbitrarily changed. On 24 November the JCS further proposed to CINCUNC that he might hold his forces in terrain dominating the approaches to the Yalu and leave ultimate handling of the extremely sensitive northern Korean provinces to the United Nations.[20] This course of action was completely repugnant to General MacArthur, who asserted in some heat that the importance attached to the hydroelectric facilities was "for the most part a product of British-American speculation, finding little reflection in any Soviet or Chinese utterances." [21]

Seeking to justify his intention to march to the Yalu, General MacArthur had perhaps underestimated the importance of the Sui-ho to China, but on 26 December 1950, when the JCS had queried him as to the desirability of destroying both the power installations and the dam on the Yalu if the Chinese crossed the 38th parallel, MacArthur replied that the power value of Sui-ho was unknown. Since highest governmental circles had announced that the hydroelectric plants would not be destroyed, MacArthur stated that "their preservation or their destruction is predominantly a political rather than a military matter." [22] In February 1951, when General Stratemeyer urgently requested permission to destroy the whole power complex, including Sui-ho, General MacArthur passed the request on to the JCS, only to be informed that the request could not be approved in the light of MacArthur's own information forwarded during December 1950.[23] In the late spring of 1951 General George C. Marshall, U. S. Secretary of Defense, explained the matter to a Congressional committee in these words: "As to the hydroelectric plants and installations of that character, we have kept, we haven't bombed them out in most instances because their relation to . . . [the military effort] was not immediately so direct as to demand that destruction, and they always remained a possibility in negotiations." [24]

Comprising as they did the one major hostile economic asset still virtually untouched by UNC air action, the North Korean hydroelectric facilities were not forgotten by FEAF air leaders. On 23 June 1951 the Fifth Air Force requested that the installations be targeted, only to receive a FEAF indorsement that if cease-fire efforts failed it would seek an immediate revision of the policy restricting attacks against the hostile electric power facilities. Believing on 5 January 1952 that the truce talks had been long enough continued to warrant a revision in policy, Brig. Gen. James Ferguson, Fifth Air Force vice commander, again requested authority to attack the hydroelectric facilities. "These targets," he said, "are some of the most lucrative in North Korea, and their destruction would hinder the enemy's ability to wage war." [25] The commander FEAF concurred, pointing out that production could be disrupted by destroying generator facilities, transformer installations, or switching yards, without totally destroying the plants. Rehabilitation of the power complex would require qualified engineers and scarce equipment available only from the Soviet Union. He believed that it would be especially important to neutralize Sui-ho because this plant supplied power which was consumed by war-production industries in the Mukden-Dairen area of Manchuria. He pointed out that destruction of the North Korean electrical power complex "would accomplish immediate as well as long range military effects against the enemy, and would additionally create significant psychological and political effects to our advantage." [26] When the request came to General Ridgway on 3 March 1952, he stated that: "In the event that a decision is reached that the Communists are deliberately delaying armistice negotiations indefinitely and are increasing their offensive capabilities, your recommendations will be reexamined." [27]

The major stimulus for UNC air attacks against the North Korean power complex finally came from the JCS rather than, as would have been more natural, from the CINCUNC. At the direction of the JCS in the spring of 1952 USAF

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planners were surveying the problem as to what might be done if the armistice negotiations broke down. In reply to a request for information, FEAF on 29 April 1952 told these planners that the hostile hydroelectric facilities comprised legitimate and profitable military targets, which, if suddenly destroyed, would deny power to many small factories and might "impress the North Koreans with the price they are paying for their continued recalcitrance." FEAF wished to attack as soon as possible in order to deprive the Soviet-Chinese bloc of the industrial potential which the system supported and to present the Communists with a substantial rehabilitation cost; should attacks against the plants be postponed until such time as the Eighth Army was permitted to undertake an offensive, FEAF doubted that the plants could be attacked since at such a time most of the UNC air power would again be required to support the surface effort.[28] When, on 1 May 1952, USAF assured that the FEAF views would be fully considered in a presentation to the JCS, General Ridgway quickly rejoined that he saw no unusual circumstances whereby the JCS should direct attacks against the hydroelectric facilities rather than to follow the normal procedure of allowing the CINCUNC to make recommendations. He therefore recommended that the JCS take no action unless CINCUNC so recommended after a continuing surveillance of the targets.[29] While the JCS replied that Washington analyses indicated that the destruction of the targets was desirable and reminded Ridgway that, with the sole exception of Sui-ho, he already possessed authority to attack the hydroelectric plants, it assured him that further action would await CINCUNC's recommendations.[30]

The Hydroelectric Strikes: As soon as he could get the attention of the new theater commander, who was much occupied during May with Communist prisoner riots at Koje and internal troubles in the ROK government, General Weyland, on 6 June 1952, held an informal discussion with General Clark regarding North Korean electrical power. Although the "choicest plum" at Sui-ho was off-limits without JCS approval, Weyland pointed out that CINCUNC was able to order the destruction of most of the major complexes on his own authority. Getting Clark's approval, Weyland immediately ordered his operations staff to prepare briefing plans, and the resulting briefs recommended joint FEAF–NAVFE air attacks, one plan including Sui-ho in the attack program, and the other excluding it. To render the four complexes inoperational would require a minimum of 610 fighter-bomber sorties and 50 B–29 sorties; getting good weather, the operations could be carried out within 48 hours. Without Navy assistance, FEAF would require an additional 24 hours for the effort. These plans were forwarded to General Clark on 11 June, with the request that FEAF and NAVFE be authorized to conduct the attacks as soon as coordinated plans could be written.[31]

After study of these plans at his headquarters, General Clark on 17 June directed the commanders of FEAF and NAVFE, with commander FEAF being designated the "coordinating agent," to attack as soon as possible all major electrical power complexes and separate power installations in North Korea, with the exception of Sui-ho, utilizing the closest coordination in order to attain maximum surprise and to minimize reinforcement of air and antiaircraft artillery defenses at the installations.[32] Receiving an information copy of this directive in Washington, the JCS determined on 19 June that the facilities at Sui-ho should also be attacked in order effectively to neutralize the entire hydroelectrical system. After the President gave his consent, the JCS authorized CINCUNC that same day to attack Sui-ho, maintaining reasonable precautions against inadvertent bombing of Manchurian territory.[33]

Already on 18 June FEAF had alerted the Fifth Air Force and Bomber Command for strikes against the power complexes on 23 or 24 June, these dates being selected, weather permitting, in deference to COMNAVE who wanted to have four fast aircraft carriers on the line off eastern Korea for the first time in the Korean hostilities. When Sui-ho was added to the target list, a conference on 20 June worked out the detailed coordination of the FEAF and NAVFE effort. It was agreed that FEAF was to name the time of the attack on the basis of the weather at Sui-ho and that no electric power target would be attacked until a mixed force of carrier aircraft and fighter-bombers was committed at Sui-ho. This precaution was necessary because only at Sui-ho were UNC aircraft expected to get air opposition. After the initial strike, Chosen plants No. 3 and No. 4 would be attacked by Fifth Air

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Force "turn arounds," while carrier air units attacked the Kyosen and Fusen complexes. The Chosen plants No. 1 and No. 2 would be attacked by B–29's on the night of the daylight strike. FEAF first planned to begin the strikes on the morning of 23 June but weather forecasts indicated that postponement might be necessary. During the morning of 23 June, however, target weather at Sui-ho cleared, and General Weyland, in a rapid recasting of plans, ordered an afternoon strike at Sui-ho, to be followed up on 24 June and concluded by a medium bomber attack on the night of 24/25 June.[34]

Beginning at 1600 hours on 23 June, 24 AD Skyraiders from the aircraft carriers *Boxer*, *Princeton*, and *Philippine Sea*, escorted by 12 F9F fighters, spearheaded the assault at Sui-ho and suppressed the 44 heavy guns and 37 automatic weapons defending the area. Immediately behind the flak suppressors, 36 heavily-loaded AD's attacked the generating plant, and from 1610 to 1700 hours, 79 F–84's and 45 F–80's of the Fifth Air Force ran the bomb total up to 145 tons on target. Eighty-four F–86 Sabres provided constant top-level cover for all of the strikes and covered the withdrawal of each force. Two hours after the strikes were over, 25 F–86's escorted two RF–80 photo planes back to the target to record what had happened. The strikes at Sui-ho went off without a hitch. Flak was meager and inaccurate, not at all up to the hostile capability, and inflicted minor damage to two aircraft.[35] Strangely enough, the Communists offered no air opposition although 250 swept-wing MIG's were sighted at nearby Antung and Ta-tung-kou airfields just a few minutes before the strikes started. In fact, during the course of the bombing some 160 of these MIG–15's took off and withdrew into the interior of Manchuria. The most likely hypothesis for this strange action was that the enemy was unaware of the UNC target and erroneously withdrew to the rear before discovering that Sui-ho and not the Antung airfields was to be attacked.[36] Photographic interpretation revealed that Sui-ho, fourth largest of the world's hydroelectric plants, was at least temporarily out of operation.[37]

A few minutes after the attacks began at Sui-ho, the 1st Marine Air Wing struck Chosen No. 3 with 41 planes of Marine Air Group 12 and Chosen No. 4 with 38 planes of Marine Air Group 33. At virtually the same moment, 90 Skyraiders, Corsairs, and Panthers from the *Bon Homme Richard* and *Philippine Sea* poured destruction on Fusen No. 1 and No. 2, while 52 Fifth Air Force Mustangs bombed Fusen No. 3 and No. 4. That same afternoon, 70 Corsairs, Skyraiders, and Panthers from the *Boxer*, *Princeton*, and *Bon Homme Richard* hit the power plants at Kyosen.[38] On the following day, 24 June, the Fifth Air Force sent 30 F–80 sorties to Chosen No. 1, 70 F–51 and 12 F–84 sorties to Chosen No. 2; while other F–51's, F–80's, F–84's and Marine dive-bombers attacked Chosen No. 3 and No. 4 and Fusen No. 3 and No. 4. Task Force 77 again sent its aircraft to the Fusen No. 1 and No. 2 plants and to the Kyosen complex.[39] Having tasted blood, the Fifth Air Force had attacked Chosen No. 1 and No. 2, which had been scheduled for the medium bombers on the night of 24/25 June; since the B–29's had lost their target and in view of the fact that the second anniversary of the Korean war required some celebration, FEAF ordered the 25 B–29's which were bombed-up and ready to go to fly radar-directed close-support missions along the front lines at 15-minute intervals throughout the night.[40]

The Fifth Air Force continued attacks against Chosen Nos. 1, 2, and 3 and Fusen No. 3 on 26 June, and it again bombed Chosen Nos. 1 and 2 on 27 June. When the photography had all been analyzed on 30 June, 11 out of the 13 plants in the four major hydroelectric complexes were unserviceable. Only Chosen No. 1 was evaluated as "probably unserviceable" and Chosen No. 2 as "probably operational."[41] In the course of the effort the Fifth Air Force had flown 730 fighter-bomber sorties, while the F–86's had covered the attacks with 238 sorties. No casualties were sustained due to enemy action.[42] Although the number of sorties flown by Task Force 77 against the plants is not apparent in available reports, only two Navy planes were lost to ground fire on the two days and both pilots were rescued.[43]

Evaluation of the Hydroelectric Attacks: To NAVFE and FEAF commanders and pilots alike the three days of sustained operations against a vital target system were especially pleasing. Vice Adm. Robert P. Briscoe, who had lately taken command of NAVFE, informed General Weyland: "It was a real privilege and a decided pleasure to work with you and your command in our

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latest enterprise together. Your planning was superb. Every amplifying report indicates definite success and darker days for the enemy." [44] For NAVFE the hydroelectric attacks marked many first occurrences: for the first time in the Korean war four carriers were simultaneously on the line; for the first time Navy aircraft had penetrated the effective defenses of the MIG-15's; for the first time in Korea Navy and Air Force planes had made closely coordinated attacks against a single target.[45] To FEAF commanders, the attacks were equally gratifying. Lt. Gen. Glenn O. Barcus stated to pressmen that 95 percent of the power production of North Korea had been knocked out and predicted optimistically that the giant Sui-ho would probably never operate again so long as Korean hostilities continued.[46] Looking back over the Korean experience at the end of the war, General Weyland described the hydroelectric attacks as one of the "two particular strikes [that] stand out in my mind that are spectacular on their own merit." [47]

When the smoke cleared after the three-day hydroelectric attacks, photo reconnaissance showed that something more than 90 percent of the North Korean power potential had been put out of operation. FEAF nevertheless recognized that surveillance must be maintained and followup strikes launched to keep the plants neutralized, and, with NAVFE concurrence, it directed that the coordination of the reconnaissance and the repeated strikes would be handled between the Fifth Air Force and Seventh Fleet at the JOC in Korea.[48] Keeping the plants out of operation would require continued air strikes,* but by utilizing the full capability of the UNC air forces against a critical target system, FEAF had so managed the hydroelectric attacks as to inflict and then to maintain air pressure upon the Communist enemy, not only in North Korea but in the Soviet bloc.

There was no doubt that the Communists attached great significance to the source of an important part of their hydroelectric power. The rapidity with which the Reds dispatched scarce Russian and Chinese technicians to the ruined plants bespoke their importance.[49] According to agent reports an almost complete power blackout prevailed in North Korea for 15 days after the June strikes; after this time the production of small thermoelectric generating plants plus some limited use of the lesser damaged hydroelectric plants restored electric power to perhaps a static 10 percent of the former capacity.[50] Other agent reports confirmed FEAF's prediction that the loss of electric power would either stop or curtail war production in many small factories, themselves so dispersed as to be impracticable air targets. Loss of electric power greatly hindered vehicle and rail equipment repairs since electric welders could no longer be used; rice merchants reportedly complained that they could not get their rice milled; and farmers who used electric pumps to irrigate paddy fields had to depend upon other resources.[51]

Intelligence reports received from Manchuria indicated that the neutralization of Sui-ho represented a loss of 23 percent of the 1952 power requirements in northeast China. As a result of power shortages 30 out of 51 key industries in the Port Arthur, Dairen, Funchun, and Anshan areas failed to meet their 1952 production quotas and four were 75 percent or more in arrears. Various short-term measures, including staggering of shifts and alternate day and night operating schedules, along with such long-term measures as procurement of small generators for allocation to plants and mines and the construction of new thermoelectric generating stations were attempted by the Reds in an effort to make up some 120,000 KW lost at Sui-ho, but by December 1952 these various expedients had provided only a fraction of the deficient power requirement.[52]

Although the North Korean hydroelectric power facilities were military targets, were located within North Korea, and no violation of Chinese or Russian territory was even alleged, the June air attacks were met with vehement protest from British Laborites, the Labor Party now being the minority in the British Parliament. Labor Party leaders Clement Attlee and Aneurin Bevan denounced the bombing in Commons speeches on 24 June as provocations which might lead to a third world war. Prime Minister Churchill insisted that there was no change of policy in Korea but admitted that he had not been consulted prior to the hydroelectric raids. What made the attacks doubly galling to the British was that the British Defense Minister, Lord Alexander of Tunis, had visited General Clark in Tokyo to discuss greater coordination of British-American

*See Chap. IV, pp. 100–102, 120, 132.

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effort just before the strikes; he had been informed that they were impending but had departed the Far East before the last-minute decision was made to add Sui-ho to the target list. In informal discussions, Clark had already told Alexander that the appointment of a British general officer to the UNC staff might be productive of better Anglo-American liaison and understanding.[53] The announcement by Churchill on 1 July that such a British staff deputy would be appointed did much to clear the controversy, and on the same day a Labor motion criticizing Churchill's failure to "secure effective consultation" on Korean air operations failed of adoption in Commons. On 28 July, Maj. Gen. Stephen N. Shoosmith, then in charge of the Army Staff of the British Joint Staff Mission in Washington, was appointed as the British deputy at the UNC headquarters in Tokyo.[54]

Concurrently with these British criticisms, the JCS received queries from members of the U. S. Congress asking why the North Korean power plants had not been bombed earlier. Asked to comment on the matter, General Clark replied that it was his "personal opinion that the power installations in North Korea have been profitable military targets for attack at any time since the intervention of the Chinese Communists into the Korean war." Clark noted that FEAF and NAVFE press releases had emphasized the military aspect of the targets without implying any change in UNC policy other than a mild suggestion "that the raids could be interpreted by Communists as gentle hint of more to come if the Communists want it that way." [55] The official Secretary of Defense reply to Congress, however, stressed the military nature of the targets and said that military considerations had forestalled destruction of the targets until June 1952. The result of the British controversy and the queries from Congress was again to inform the Communists that the UNC intended to fight a limited war. "Once again," noted FEAF, "the persuasive threat of air power had been lessened." [56]

REDEFINITION OF THE UNC AIR STRATEGY

Statement of FEAF Operational Policy: In view of the fact that both Washington and London had announced that there had been no change in policy in Korea, FEAF had some reluctance in admitting that there had been any change in its basic combat operations policy. Having observed the massed air attacks of May and June which marked the initiation of air pressure operations, USAF on 25 June sent out a query as to whether FEAF had changed its policies. The FEAF combat operations division replied that basically there was no change in policy but that "there had been a change in the weight of effort expended against various targets occasioned by several factors including increased concentration of enemy defenses, reports of increased troop concentration and supply build-ups along the battle line and enemy rear areas, and necessity for varying tactics to force the enemy to disperse his defenses." [57]

Such circumspection may have been justifiable, but on 26 June the FEAF Target Committee proposed that the FEAF combat operations policy should at least be rewritten sufficiently to direct the Fifth Air Force and FEAF Bomber Command to maintain air pressure through destruction operations rather than to continue with the old policy of delay, disruption, and dislocation. General Weyland approved the recommended action, and within the next two weeks representatives of the FEAF intelligence and operations deputies matured a new policy directive.[58] Even before this directive was issued, however, General Smart cautioned the FEAF Formal Target Committee "to keep in mind that this modification is not a major change in policy, but rather a shift in emphasis from delay and disruption operations to destruction." [59]

As issued to the Fifth Air Force and FEAF Bomber Command on 10 July 1952, the new FEAF operational policy directive reflected a change from the old emphasis upon delay and disruption and ordered the selected destruction of enemy supplies, equipment, facilities, and military personnel. The new air attack program recognized three factors. The first was that the Communists had amassed in the Far East considerable air power which could be employed offensively against UNC forces at any time. The second was that the major sources of enemy supply were off-limits to UNC air attack and the enemy pipeline from the sanctuary to the front lines was relatively short. The ground front in Korea, moreover, had

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been so long stable that enemy resupply requirements were low. Thus the obstruction of enemy supply movements in Korea could not prevent the enemy from gradually building up his supply stockpiles. The third factor was that friendly ground forces in a stabilized ground situation did not require great amounts of close air support.

In order to exert the maximum pressure against the Communist forces in North Korea, FEAF air effort was to be employed with first priority given to the maintenance of control of the air. Secondly, other combat air effort as available would be employed to accomplish the maximum selected destruction in order that the Korean conflict should be made as costly as possible to the enemy in terms of equipment, supplies, facilities, and personnel. Third, such air operations as were feasible would be conducted to reduce the immediate threat to UNC forces posed by Communist ground armies. Direct air support would be provided to UNC ground forces as required by the initiation of friendly or enemy offensive ground action. As a general principle, the scope and tactics of air employment would be constantly monitored to assure that all units were kept at a high level of combat readiness. The air attack program would also include provisions to assure crew proficiency in any type mission which they might be required to fly in a future emergency or a renewed ground action.

As long as there was no major change in the tactical situation in Korea, the major proportion of air attack effort would be employed in destruction operations. The following priority listing of target categories was specified: (1) aircraft, (2) serviceable airfields, (3) electric power facilities, (4) radar equipment, (5) manufacturing facilities, (6) communications centers, (7) military headquarters, (8) rail repair facilities, (9) vehicle repair facilities, (10) locomotives, (11) supply, ordnance, and POL, (12) rail cars, (13) vehicles, (14) military personnel, (15) rail bridges and tunnels, (16) marshalling yards as facilities, and (17) road bridges. The selection of specific targets for attack would have to be made with a consideration to the relative listed priority, the vulnerability of the target to air attack, and the defenses of the target. Within the target categories all sources of information would have to be exploited to search out and identify the most lucrative objectives. The possibility of developing lucrative objectives was to be exploited, and sufficient attack against the enemy rail system would be employed both to develop targets such as locomotives and rolling-stock concentrations and to assure that the system was not rebuilt to such an extent that it could support extensive sustained enemy ground operations.

Close coordination between the Fifth Air Force and FEAF Bomber Command was essential in order that fleeting targets developed by destruction attacks were followed up with the least practicable delay. Since it had the more flexible capability, the Fifth Air Force was assigned the responsibility for exploiting fleeting-type targets. The Fifth Air Force was also given responsibility for maintaining air superiority in Korea, but Bomber Command was instructed to attack such airfields as the Fifth Air Force recommended and FEAF directed. Bomber Command would normally apply its efforts against communications centers, manufacturing facilities, rail bridges, and concentrations of supplies and rail cars. Such targets, however, could also be attacked by the Fifth Air Force.[60]

Development of the Air Pressure Strategy: While the FEAF operational policy directive of 10 July 1952 remained in effect during the remainder of Korean hostilities, it actually provided no more than the bare bones of the air pressure strategy. In some measure the directive was even unrealistic: the targets list, for example, accorded radar equipment the fourth priority for air attack, obviously because such equipment was expensive to the enemy and its destruction would hinder hostile interceptions of UNC aircraft, but the Fifth Air Force was never able to perfect an adequate technique for locating and attacking these pinpoint targets.* Locomotives and vehicles were accorded low attack priorities, yet it would be found practicable to concentrate these elusive targets and to attack them with a large measure of success. In the state of hostilities prevailing in Korea, moreover, FEAF would get desirable results from an intensification of its air effort against targets which were actually of little importance. Attacks against "sensitive" targets in the vicinity of the Yalu were found to have a degree of profit which was quite apart from the value of the target. The FEAF Formal Target

*See Chap. VII, pp. 248–51.

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Committee therefore ignored the target listing when necessary and built an air strategy upon the philosophy of the policy directive, which required FEAF "to accomplish the maximum selected destruction in order that the Korean conflict is made as costly as possible to the enemy."

This air strategy which was to develop would display a sound recognition of the Communist political situation. It recognized that North Korea was in utter political subordination to, and militarily dependent upon, Red China and Soviet Russia. Any final decision regarding armistice terms would be made by China and Russia, and the effects of the air pressure attacks within North Korea had to be made to be felt by the senior partners in the Soviet conspiracy. The FEAF planners reasoned that the destruction of the North Korean hydroelectric facilities would not only impress the North Koreans with the price that they were paying for continued recalcitrance but would deprive the Sino-Russian bloc of the important industrial potential which the system supported. They reasoned correctly that to rehabilitate the destroyed North Korean power system the Russians would have to divert scarce technicians and electrical equipment from their own resources, thus delaying the Soviet Union's own programmed domestic electrical power expansion.[61] In this and other destruction operations, FEAF intended that the direct effect of its air pressure in North Korea would be "felt as far as Moscow."[62] The Communist armies in Korea constituted a huge outlay of Red capital: FEAF reasoned that if these armies were held to an indecisive defensive employment and concurrently destroyed by air action, the Communists would not long continue to argue about truce terms. FEAF air pressure, moreover, could cause the Chinese to make demands upon the Russians for additional military equipment, which the latter might not be able to supply; hence, air pressure promised to strain Sino-Soviet unity.

From their outset, however, the air pressure operations had one serious limitation: only targets directly related to the hostile military structure and its immediate support could be attacked. General Smart nevertheless planned that "whenever possible attacks will be scheduled against targets of military significance so situated that their destruction will have a deleterious effect upon the morale of the civilian population actively engaged in the logistic support of the enemy forces."[63] During the latter stages of World War II, Twentieth Air Force B-29's had dropped warning leaflets announcing the names of Japanese cities to be attacked and advising civilians to leave those cities. Morale surveys made soon after the Japanese surrender had shown that these announcements had undermined the people's faith in the ability of their government to defend them, had caused whole populations to flee the proscribed cities, thereby seriously interfering with war work, and had persuaded many Japanese civilians of the good intentions of the Americans.[64] Psychological warfare planners at FEAF on 1 July 1952 recommended a specific warning program which was designed to exploit the psychological effect of the air pressure operations.[65]

The necessary psychological warfare leaflets were prepared by the FEC psychological warfare agency. In support of the massed air strikes directed against military targets in Pyongyang on 11 July 1952,* FEC psywar plan BLAST was employed. The day before the bombing, 150,000 leaflets expressing the theme of "Bomb Warning" were dropped over the North Korean capital, and five days after the attack 150,000 leaflets with the theme of "General Civilian Bomb Warning" were released in the same area. The written text of both of these leaflets urged civilians to stay away from military installations of any kind because all such military targets would be bombed.[66] Visiting in Seoul on 14 July, Gen. J. Lawton Collins, chief of staff of the U. S. Army, told newsmen that the Yalu and Pyongyang raids had seriously crippled the Reds' ability to start an offensive and added that they "haven't a ghost of a chance of driving us out of Korea." In Tokyo on 15 July, General Collins warned that even heavier bombings were in store for the Reds if they "insist on prolonging the war."[67]

Preparatory to the initiation of light bomber attacks against communications and supply centers in North Korea,† the FEC psychological warfare agency implemented plan STRIKE. Beginning on the night of 13 July aircraft dropped leaflets entitled "You are Next," containing a map of northwest Korea with the main supply routes outlined in red and warning that all military targets along these routes were going to be attacked.

*See Chap. IV, pp. 98–99.
†See Chap. IV, pp. 99–100.

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These leaflets were carefully directed at 78 towns in North Korea known to house Communist military installations and supplies. Designed for dropping in an area after an air attack had taken place was another leaflet, entitled "You were Warned," which was designed to impress civilians with the credibility of UNC leaflets.[68] General Barcus announced to the press on 5 August that 78 North Korean towns had been warned of impending attack and that his B-26 bombers had already made night attacks against supplies in two of these towns. Just prior to these attacks against Sinchon and Yonan, both being towns in the Haeju peninsula area, leaflets had been dropped advising the civilians to clear the vicinity, and Radio Seoul had broadcast spot announcements right up to the moment of the attack warning civilians that their town would be bombed that night. Subsequent to the attack the follow-up leaflets had been dropped, informing all concerned that they had been adequately alerted and that other strikes would doubtlessly follow.[69]

While these warnings were both humanitarian and utilitarian—they enabled civilians to save their lives and disrupted Communist civil order and war-work schedules—the U. S. Department of State on 5 August stated that it deplored the warnings as "an unfortunate move" which would be intensively exploited by Communist propaganda. In a message to the American Embassy which was passed to CINCUNC, the State Department noted that Oriental audiences were particularly vulnerable to such psywar since they tended to see the use of massive airpower as the symbol of "western technology domination" of Asia and as reminiscent of methods used by the Japanese. No matter how it was handled, the State Department message said, the subject of massive bombings of military targets in or near heavily populated areas could not be useful to UNC purposes. The main theme of a moderate number of "hard stories" should best be that targets for UNC air attack were selected on a strictly military basis and that air action was not being aimed at the civilian population.[70]

The JCS did not prohibit the use of warning leaflets, but it emphasized on 8 August that air pressure attacks should be directed against military targets and that all justifications of air actions would have to be based solely on military grounds. The JCS further stated that it was "considered important to avoid public statements ascribing the high level of air activity as bringing pressure on the Communists to agree to an armistice, so that Communist prestige is not so seriously engaged as to make more difficult ultimate Communist agreement to an acceptable armistice." [71] The rule that air power could be applied only against military targets had prevailed from the beginning of the Korean hostilities, but these actions in August 1952 greatly circumscribed FEAF's plan to utilize its air power so as to disrupt North Korean civil order. General Clark subsequently issued a general rule that: "Every effort will be made to attack military targets only, and to avoid needless civilian casualties." [72] The directive of 8 August, moreover, deprived psywar of a potent theme that the Communists could resolve the air pressure laid against them by the simple agreement to accept voluntary repatriation of prisoners of war, the only armistice issue still outstanding.

The determination of what was a "military target" and what comprised "needless civilian casualties" would give FEAF much trouble in the spring of 1953 when a target study identified North Korean irrigation dams as an exceptionally lucrative air pressure target system.* At this time General Weyland felt himself morally compelled to rule that these dams could not be attacked for the purpose of destroying the North Korean rice crops, and he permitted air strikes against only those dams whose released flood waters would wash away rails and military supplies. At the end of the hostilities in Korea, however, General Weyland observed that "the policy of attacking only targets directly related to the military structure and its immediate support may be completely invalid for another situation." If the nation under attack were a flagrant international criminal, or if the friendly ground forces were not committed during the air campaign, or if the air forces were completely investing the enemy by air, Weyland said that "the systems chosen for attack might be, and possibly would be, quite different." [73]

*See Chap. IV, pp. 126–31.

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Chapter III

CONTROL OF THE AIR OPERATIONS

Air superiority operations under the limited combat conditions of the Korean hostilities did not resemble similar air operations in the past, nor were they likely to be typical of the future. The story of how the UNC air forces controlled the air in Korea nevertheless provides one more historical justification for the overriding priority which USAF doctrine accords to the air superiority mission.

During the first few weeks of Korean hostilities FEAF as a matter of first priority easily destroyed the small North Korean Air Force. Once accomplished the achievement of UNC air superiority paid large dividends; yet the very fact that FEAF initially seized and continuously thereafter maintained air superiority over North Korea with a minimum commitment of forces could lead to a mischievious misconception that the feat could be duplicated at will in some future conflict. In a war with a major power the aerial superiority which FEAF obtained so easily in Korea would be dearly purchased at a cost of pilots, planes, and an all-consuming air effort. After the defeat of the NKAF, the UNC owned the air to the Yalu, but here air superiority ended because under no circumstances could UNC aircraft violate the sanctity of the Manchurian borders. The UNC, in fact, maintained an artificial foul line three miles south of and parallel to the Yalu River, beyond which UNC aircraft could not fly without special authority.

As they were free to do because of the UNC politico-military rule which confined air hostilities to Korea, the Communists rebuilt their air order of battle behind the Yalu, bringing it up to a magnitude which threatened the survival of UNC forces in Korea. At such a time as the CINCUNC could state that Communist air operations imperiled the security of his forces in Korea, the JCS indicated that it would consider air attacks against enemy air bases outside Korea,[1] but this situation never arose. After November 1950, however, Communist MIG–15 jet interceptors attacked UNC aircraft over North Korea, and within a year these speedy fighters had gravely hazarded the slower models of UNC aircraft and had prohibited day-time medium bomber operations over northwestern Korea. By June 1952 the Communists had built over northwestern Korea a coordinated air defense system which employed fighters, antiaircraft artillery, searchlights, and radar control. The degree of effectiveness with which FEAF countered this defense system—by day and by night—would be a major factor affecting the success of the UNC air pressure operations.

What intelligence there was of enemy motives indicates that the Communists did not utilize their Manchurian-based aircraft against UNC airfields and installations in South Korea primarily because they correctly judged that this would be to invite UNC reprisal attacks. By a corollary rule, however, the Communists reasoned that if they could rehabilitate or build air facilities south of the Yalu they could base air units there which could attack UNC positions. From time to time the Reds did succeed in staging light plane sneak attacks against UNC positions, always at night. These heckling attacks, mounted from North Korea, demanded that the Fifth Air Force devote constant attention to the air defenses of its base installations. The Communist air potential north of the Yalu similarly demanded that the Fifth Air Force plan a base defense which could weather an all-out Red attack.

Withering FEAF fighter-bomber and medium bomber neutralization strikes prevented the Reds from building and repairing air facilities in North

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Korea during 1951. While the continued neutralization of these facilities remained a primary objective of the air pressure strategy, the status of these Red airfields in North Korea after April 1952 came into context with the truce negotiations. At such time as an armistice was about to be effected, UNC air would have to neutralize all of these fields and thus prevent the Reds from bringing a last-minute air order of battle into North Korea.*

Under the FEAF air pressure policy directive, the first priority of air effort was accorded to those operations necessary to maintain a friendly control of the air over North Korea. Such a priority had been in effect since June 1950, but until July 1952 the primary mission of Fifth Air Force Sabre wings had been not to kill Communist aircraft as a major endeavor but rather to shield and protect slower UNC aircraft. The air pressure planners recognized that Red aircraft represented a significant value to the Communists, and they therefore directed that enemy aircraft and airfields would have the highest priorities for destruction under the new strategy.

GROWTH OF COMMUNIST AIR CAPABILITIES

Augmentation of Red Air Strength: The strangest phenomenon of the initial phase of Korean hostilities was that the North Korean Communist forces who invaded in June 1950 should have been so excellently equipped with Russian armor and ordnance, so well reinforced with Chinese-trained foot soldiers, and yet so meagerly supplied with Soviet aircraft. In June 1950 the NKAF had possessed no more than 122 old conventional combat aircraft and some 30 other miscellaneous planes, including trainers. The Reds had evidently expected that the United States would not intervene in Korea, in which circumstance the NKAF would muster superiority over the 16 liaison and trainer aircraft possessed by the Republic of Korea. Exactly the reverse was true and within a few weeks FEAF had sought out and destroyed the NKAF.[2]

The Chinese Communists did not repeat this mistake, and they did not commit their ground troops until they had augmented their air force. As early as 14 February 1950 a Sino-Soviet aviation agreement had been concluded looking toward the "reconstruction" of the Chinese Communist Air Force. Under the terms of this agreement, the USSR apparently undertook to sell China as many as 3,000 training and combat aircraft, to provide China with advisory and technical assistance, and to deliver as many as one-fourth of the firstline aircraft by December 1950. China was to let the Russians use any new Chinese airfields, and the CCAF was to become "one integral part of the Russian air force."[3]

By November 1950, when the Red Chinese ground troops intervened in Korea, the CCAF had begun to get substantial deliveries of aircraft and was growing. FEAF intelligence in December 1950 estimated that the Chinese had some 650 combat aircraft, including 250 conventionals and jets, 175 ground-attack planes, 150 twin-engine conventional light bombers, and 75 transports. The once-destroyed NKAF was also rebuilding behind the Yalu and FEAF credited it with possession of at least 60 Yak-type fighters. In addition, some 400 to 500 Soviet Air Force planes at bases around Dairen could be made available for use in Korea.[4]

By June 1951 FEAF estimated that there were 1,050 combat aircraft in China, including 445 jet fighters. Some 690 of these combat planes were based in China's northeast military district adjacent to Korea.[5] The FEAF estimates of Chinese air strength rose to 1,255 planes on 1 September 1951, the additional aircraft being MIG–15's and bringing the total of these jet fighters up to 525.[6] By June 1952, China's 22 air divisions had been built up to a strength of 1,830 aircraft, including 1,000 jet fighters. Sixty percent, or 1,115 of the total aircraft, was massed within Manchuria.[7] In the meantime the Russians had also been strengthening their own air units in the Far East, and during the first half of 1952 the Soviet air units had reached and stabilized at a strength of approximately 5,360 aircraft.[8]

After June 1952 the combined Communist air order of battle in the Far East remained approximately stable at 7,000 aircraft, roughly 5,000 of

*While these UNC airfield attacks were tactically a part of the control of the air operations, they were most significant as the culmination of the air pressure campaign. They are therefore discussed in their chronological position within the air pressure campaign. *See* Chap. IV, pp. 135–40.

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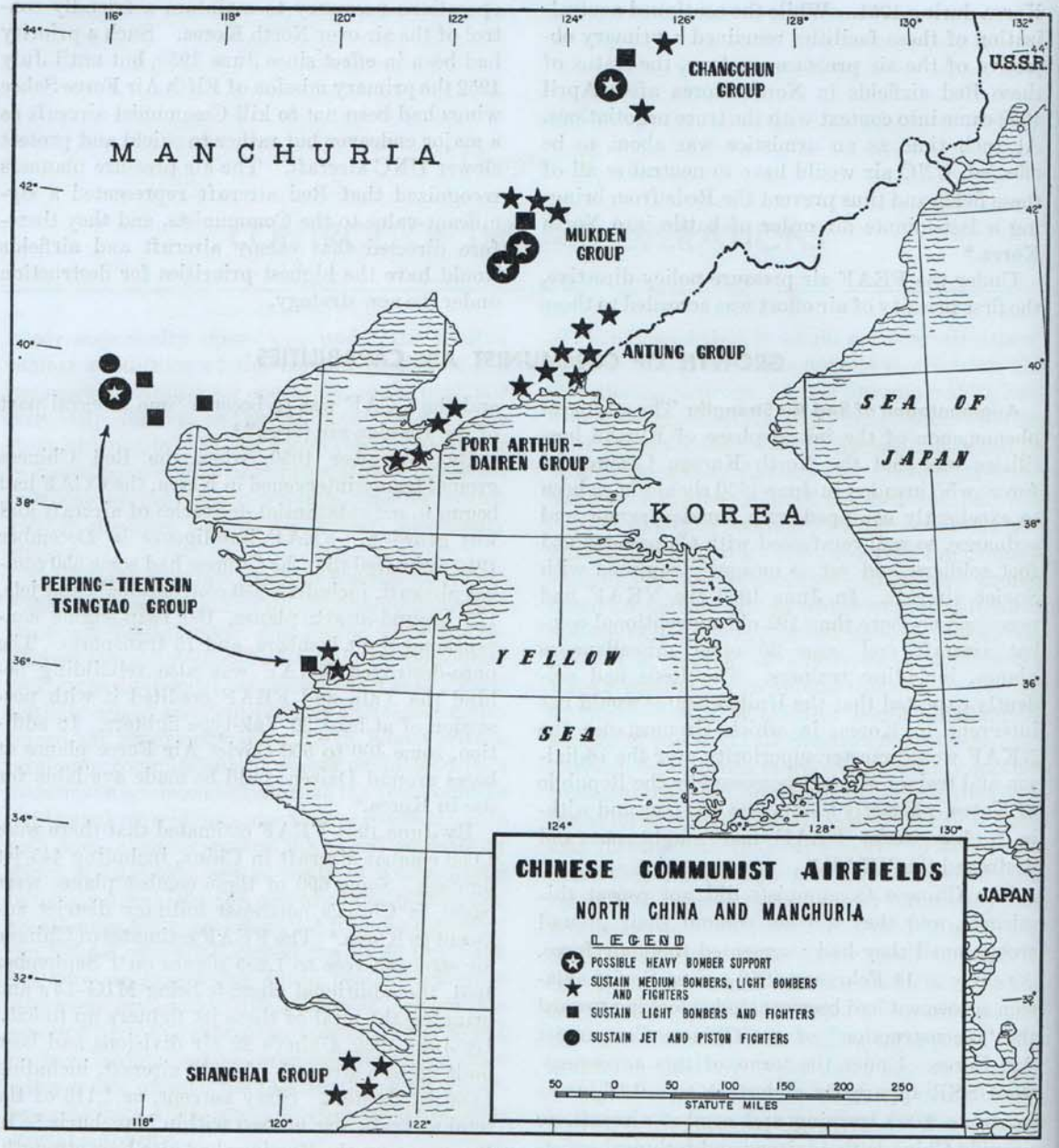

Figure 4.

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them belonging to the Soviet Union, a little less than 2,000 of them to the CCAF, and some 270 of them to the rehabilitated NKAF. In the last year of Korean hostilities, the Soviet bloc continued a vigorous modernization program, replacing conventional aircraft in units with modern jet types. In November 1952, for example, FEAF learned that the CCAF had acquired modern IL-28 light jet bombers and had stationed them in Manchuria. Two of these new IL-28's were first sighted along the Yalu on 17 December 1952, and in January 1953 FEAF estimated that the CCAF possessed 100 of these aircraft.[9] Shortly before the end of the Korean hostilities, enemy military aircraft in Manchuria were estimated to total 1,485 planes, including 950 jet fighters, 165 conventional fighters, 100 IL-28 jet bombers, 65 conventional light bombers, 115 ground-attack planes, and 90 transports.[10]

Construction of Communist Airfields: Concurrently with their buildup of aircraft, the Chinese constructed or expanded their air facilities in their northeast military district, on the Kwantung peninsula, and on the coastal areas of north China (*see* figure 4). These air facilities lay in a large arc which topped and ran along the left flank of the Korean peninsula. Of chief interest to FEAF, since it directly supported MIG-15 operations over northwestern Korea, was the Antung base complex. Here, within sight of UNC aircraft patrolling south of the Yalu, Red interceptor forces were initially based on the main airfield at Antung and on operational bases at Ta-tung-kou and Ta-ku-shan. Eventually the Reds built other airfields at Kuan-tien, Feng-cheng, Tapao, and Kachiapa. Antung was the logistical center and main base, but MIG's were based at five of these fields, each of which was capable of supporting continued operations of up to 300 fighter aircraft.

Six major airbases in the Mukden area defended this significant industrial complex and additionally provided back-up and dispersal facilities for the Antung complex. From 100 to 200 miles northeast of Mukden were four other active airfields, each of which had been rebuilt in 1950 and 1951. These fields provided depth and flexibility for defensive units and were probably used for moving aircraft between Siberia and the South Manchurian bases. On the Kwantung peninsula a dozen various type bases, of which four were particularly important, provided local defense and served both CCAF and Soviet air units, the latter being maintained there to protect Russian leaseholds. On 16 July 1952 a MIG-15 from one of these bases (probably Dairen) made some 15 passes against a Fifth Air Force RB-26 which was flying weather reconnaissance over the Korean Bay. Flanking the southern extremities of both Korea and Japan were the Chinese bases in the Peiping-Tientsin-Tsingtao group of fields and in the Shanghai complex.

By USAF standards most of these major CCAF airfields were relatively poor installations, mainly because they lacked extensive facilities for servicing and maintaining aircraft. The Chinese nevertheless indicated that they could accept much lower standards of flying safety and personnel comfort and still operate on a fairly large scale.[11]

In addition to these facilities which were forbidden to UNC air attack, the Communists had some 35 airfields in North Korea, nearly all of which were unserviceable and kept that way by UNC bombings. Only the airfields at Uiju and Sinuiju, both being immediately across the Yalu from Antung, were customarily kept operational, and these two airfields were virtually a part of the Antung complex and did not appreciably extend the southward range of Red aircraft. These 35 Korean airfields would have to be completely neutralized by UNC air action prior to an armistice.*

Communist Antiaircraft Artillery: At the beginning of the Korean conflict, only a meager amount of Red antiaircraft artillery was deployed in North Korea, and antiaircraft artillery units were the poorest equipped organizations in the NKPA. For defense of ground forces in the field each NKPA division had 18 x 12.7-mm. Soviet machineguns; for the defense of the rear areas, the North Koreans reportedly possessed a total of approximately 20 x 76-mm. Soviet AAA guns of World War II vintage. As late as September 1950, the only significant grouping of AAA was at Pyongyang, where the addition of a battalion of 85-mm. Soviet AAA guns raised the total weapons deployment to 33 pieces.[12]

From such modest beginnings the Reds built up their antiaircraft artillery: the flak order of battle increased from a total of 252 guns and 673 automatic weapons in May 1951 to 720 guns and

*See Chap. IV, pp. 135–40.

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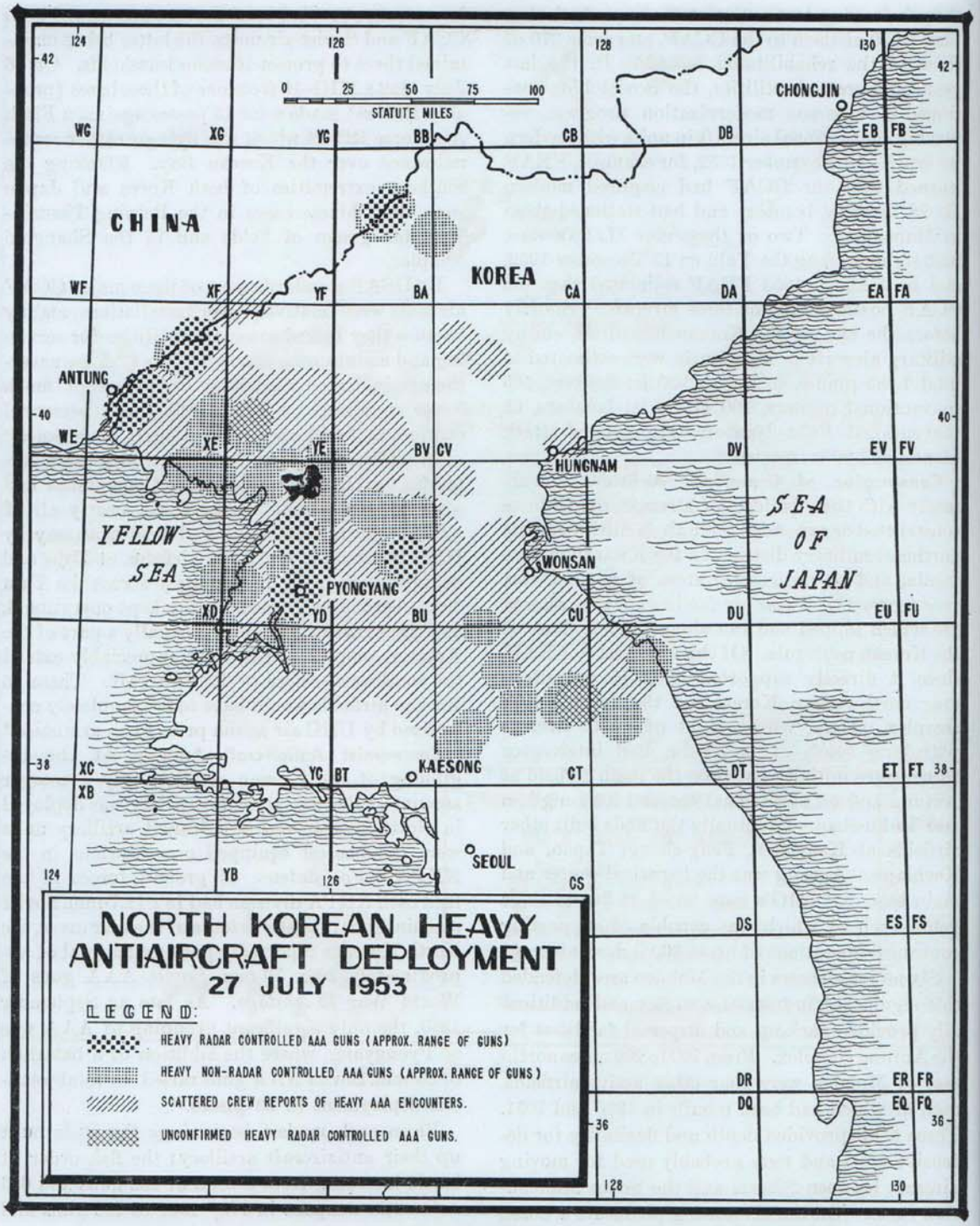

Figure 5.

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922 automatic weapons at the end of hostilities. Why it was so was not entirely clear, but the Communist flak order actually peaked well before the end of hostilities and then tapered downward to the July 1953 totals. A major addition of guns was observed in the last quarter of 1952 so that by the end of February 1953 the total of heavy guns was 786. Accompanying the guns were gun-laying radars which in May 1951 numbered 20, increased to 26 in February 1953, and then stood at 22 when the war ended. The mobile automatic weapons demonstrated a great fluctuation: they reached a high of 1,672 pieces in January, then dropped to 1,088 in mid-April 1952, climbed to 1,584 in May 1952, and then again declined downward to a low of 1,077 in mid-November 1952, built up to 1,304 at the end of December 1952, and then dropped steadily off to stand at 922 at the end of hostilities.[13]

Although the Reds moved their flak in context with the UNC air objectives, heavy AAA guns, of which the Soviet 85-mm. with an estimated effective service ceiling of 25,000 feet was the foremost type, most of the gunlaying radars, and a part of the automatic weapons were usually concentrated around various critical installations in northwestern Korea. The most heavily defended areas were customarily the Pyongyang complex, the Sinanju bridge complex, the Sui-ho dam, the Antung-Sinuiju area, and Manpojin (*see* figure 5). Although Pyongyang City and the Antung-Sinuiju area had semblances of all-around defenses, the usual Red deployment was to put the AAA defenses in close vicinity to the target being defended, which meant that UNC aircraft could get into the target but had no possibility of evading the hostile fire once over the objective. Although the amount of enemy antiaircraft artillery gave the impression of strongly defended areas, Communist AAA defenses in comparison with World War II standards were weak and incapable of denying UNC aircraft access to target areas. While light weapons concentrations bothered the Fifth Air Force a great deal, Bomber Command aircraft, operating above 18,000 feet, generally met meager flak. "As a matter of fact," stated General Fisher, "we can fly anywhere in North Korea under any weather conditions with little concern for flak except on the Yalu River."[14]

Lacking enough gun-laying radars to go around and compelled to use day fighter aircraft in a night fighter role, the Reds made extensive use of searchlights, eventually displaying about 500 of them, some of which were radar controlled. From 20 to 30 searchlights were customarily deployed around Antung-Sinuiju, the Sui-ho dam, Pyongyang, and the Sinanju bridge complex, but anywhere north of the Chongchon River there were enough searchlight belts so that a night-flying aircraft stood a good chance of being picked up and illuminated (*see* figure 6). On clear nights the searchlight beams ranged up to 30,000 feet, and enough of them had radars or sound control mechanisms to pick up and track an aircraft until other visually directed lights could switch on and cone the plane. Sometimes these lights were revetted in protective emplacements, but the usual Red practice was to keep them mobile and moving from place to place.[15]

Red Warning and Control Establishments: Prior to June 1950 the North Koreans were operating early-warnings (EW) radars at Chongjin, Wonsan, and Pyongyang, and when the MIG–15's began to operate, early-warning and ground-controlled intercept (GCI) sets were sited around Antung. The Communist radar network eventually included a confirmed 25 EW and 11 GCI installations whose electronics emanations could be noted but not pin-pointed by UNC electronics reconnaissance. Hostile early-warning coverage ultimately extended well south of the 38th parallel, and the hostile GCI was most effective along the west coast of Korea and particularly so within a 90-mile radius of Antung, where in the spring of 1953 a CPS–6 type radar, evidently of recent Soviet manufacture, was established. Over northeastern Korea (east and north of the Chosen reservoir) there was no GCI coverage except for a 90-mile radius of coverage out of Vladivostok, where the Russians had a GCI.[16]

The actual number of Communist radars in North Korea was greatly out of proportion to the need for them: in almost every instance facilities were duplicated, usually by a different type of equipment. At first this was thought to be a countermeasure against UNC jamming, but a later speculation was that the Russians, Chinese, and North Koreans each manned separate radar systems designed to assist pilots of their nationality who flew in combat. Equipment employed for the most part included old Japanese radars, old German Freya sets, old U. S. or British SCR–527's,

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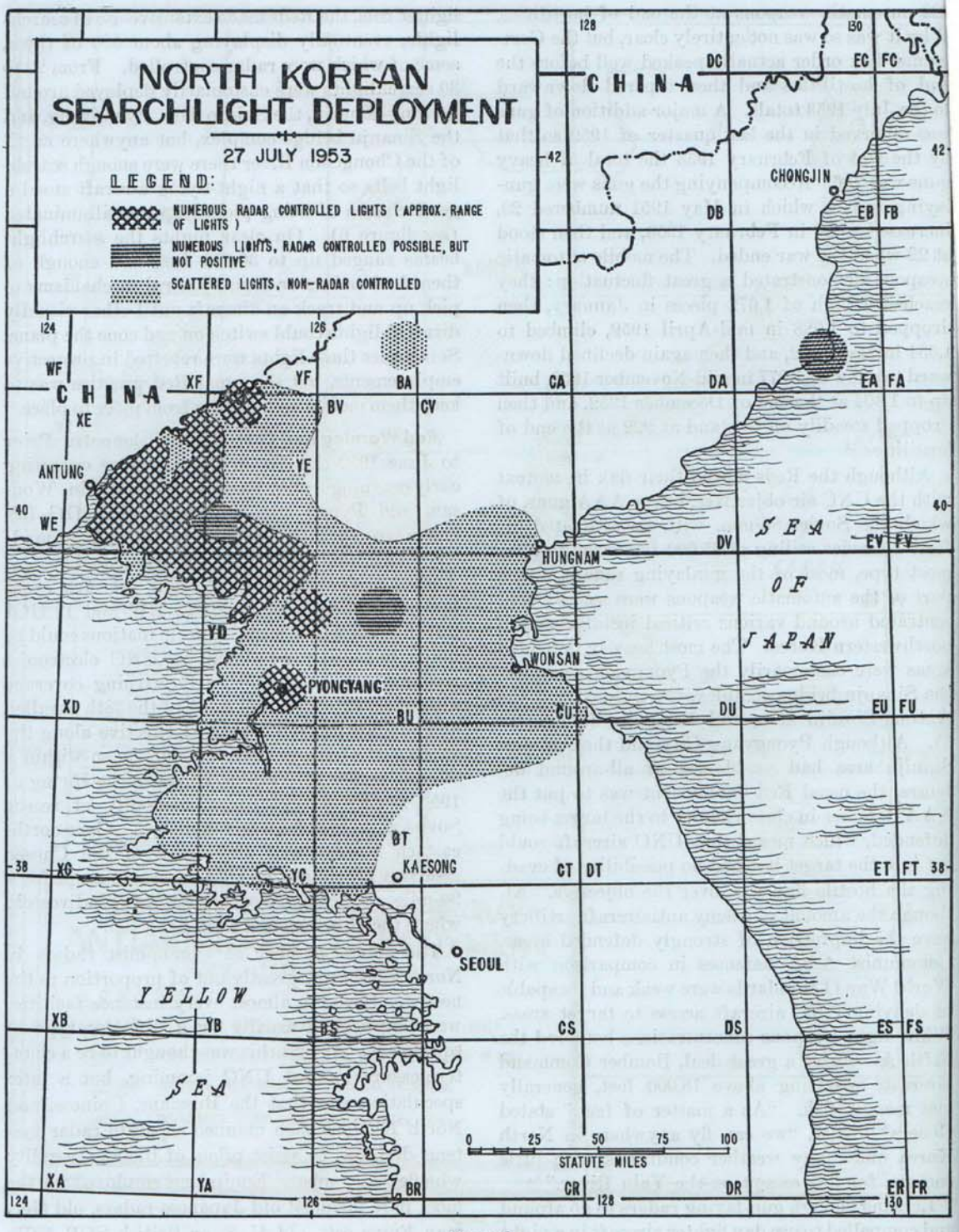

Figure 6.

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and a small amount of more modern Russian equipment.[17]

Utilizing the Red air order of battle based in Manchuria and receiving information from the radars, an "allied joint headquarters" at Antung, staffed by CCAF and NKAF personnel, exercised day-by-day control of Communist air employment in Korea, including the commitment of aircraft to combat. The "supreme joint headquarters" of the Chinese Communist and North Korean forces in Shengyang (Mukden) apparently functioned in air matters chiefly as an administrative headquarters, and Red pilots appear to have been unaware of the existence of the Mukden headquarters. The operations center at Antung doubtlessly received orders of general instructions from Mukden, but top-level management of ground-controlled interceptions was reportedly at Antung. Although the Antung JOC appeared to be managed by the Communist Chinese, one source reported that it was actually run by Russian advisors who were present in the control rooms at all times.[18]

Communist Aircraft and Aircrew Capabilities: Figured in terms of theoretical aircraft performance, the Communist air forces after November 1950 possessed an increasingly serious capability against the UNC. Backbone of the Red order of air battle was the MIG–15, which had been designed to fill the role of a high-speed, high-altitude interceptor against bomber attacks. Although primarily a defensive weapon, the MIG's heavy-caliber armament system could find ready use in ground attack. A crashed MIG–15 recovered from the coastal waters off North Korea by a combined Fifth Air Force and Seventh Fleet expedition in June 1951 had bomb shackles and electrical circuits for bombing.[19] According to theoretical calculations of FEAF intelligence, however, the MIG–15 possessed a limited potential as a fighter-bomber because of existing distances in Korea. From Antung to the battle line was 270 miles and to Seoul was 290 miles. These distances fairly well ruled out use of MIG–15's for bombing so long as they were based around Antung, because a late-type MIG–15 with internal fuel and two 550-pound bombs was figured to have a combat radius of only 135 miles. FEAF intelligence figuring estimated that the best range of a MIG would be with one 550-pound bomb and one 70-gallon external tank and would be 265 miles, or perhaps 295 miles if no fuel reserve was retained for emergencies.[20] A more likely proposition was that MIG's would escort TU–2 conventional light bombers: without external fuel tanks the MIG could go approximately 245 miles, or with internal fuel plus two 70-gallon external tanks it could fly some 415 miles.[21] All of these computations were based on standard USAF flight profiles, but as FEAF cautiously pointed out there was little likelihood that the Reds would use USAF profiles, in which case "the limited-range MIG–15 is not so limited as we once thought."[22]

After November 1952 the chief hazard to UNC ground installations in South Korea was no longer the MIG–15, which at best had a dubious ground-attack capability at distances so close to its range limits, but the force of 100 IL–28 light jet bombers which the Communists had gotten into Manchuria. These modern bombers were promptly reported as "the greatest present threat to FEAF," for the IL–28 could fly a normal profile to a maximum radius of 690 miles with a two-ton bomb load.[23] Its speed of 400 knots promised to make an IL–28 vulnerable in daylight attacks, even with MIG escort, but it also had a night attack potential. The presence of these bombers in Manchuria enhanced the possibility of a major night sneak attack against Fifth Air Force bases in Korea.[24]

When the fog of war had cleared and FEAF had secured and tested the latest type MIG–15BIS aircraft, it would become evident that this airplane did not represent as great a threat as had been imagined,* but even during the course of hostilities it was quite evident that the major limitation on the employment of Communist air power was the caliber of its pilots. As met in the air over northwestern Korea, Communist pilots were either very good or more usually very poor, and there was no moderately skilled but capable medium grade. "We've placed the MIG pilots into two classes, the 'Honcho' or professional and the 'Students,'" stated Col. John W. Mitchell, commander of the 51st Fighter-Interceptor Wing, who added: "We can always tell which one we are up against. . . . When we hit the 'Students' we have an easy time of it, but when we run into a 'Honcho' we know immediately that we've got to exert every bit of skill and technique at our command to set this bird down."[25]

*See pp. 52–53.

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Although the nationality of the "honcho" or "boss" pilots could never be exactly proved, there was little real doubt that they were Russians. Such was reported by covert intelligence sources, and from time to time enemy pilots who bailed out were visually seen to be Caucasians. The NKAF flight leader, Lt. Ro Kum Suk, who defected with his MIG–15BIS in September 1953, simply assumed that everyone knew that Russian, Chinese, and North Korean pilots had flown in Korea.[26] Unmarked but unmistakably Russian MIG's rose from bases around Vladivostok to intercept Task Force 77 aircraft on 18 November 1952 when they attacked Hoeryong, near the northeastern Korean border.[27] Whatever their nativity, these "honcho" pilots could be easily identified by their proficiency, by the way they flew formation, and by their aggressiveness. Sabre pilots frequently encountered these particularly skilled adversaries accompanying MIG formations as instructors, and other such pilots were evidently rotated through Korea in units.[28]

The masses of MIG–15 pilots were "raw recruits." Each "class" of new pilots appeared to be rotated through a six- to eight-week training cycle which followed a regular pattern: the new class generally flew high and fast, in large formations, was neither aggressive nor proficient, and usually declined to engage the Sabres. In such a period the Sabres scored few kills. As training progressed, the MIG pilots flew at lower altitudes, became a bit more aggressive and proficient, and engaged the Sabres in fairly well-planned tactics. In this period Sabres scored more kills. In the final period the Red trainee pilots reached their peak of proficiency and aggressiveness, flew at altitudes more open to active combat, and engaged the F–86's more frequently. Sabre kills were frequent in this period. Then the class evidently rotated, and a new class came in, once more flying high and in large formations.[29] By the end of each of these training cycles, the trainee pilots had improved but they were never as good as their instructors: Sabre pilots commonly referred to the large straggling, training formations as "jackpot flights," meaning that if they could just get into the formation they could reap a wealth of destroyed aircraft.[30]

When the Communist neophyte pilots could be brought under attack they were apt to display utter confusion. Some forgot to drop their external tanks, others fired their guns wildly at nothing in particular, and many ejected from the their aircraft without particular provocation. Flight tests would later confirm combat observations that the MIG was not very stable at high altitudes or in high speeds, and this instability was aggravated by panic-stricken trainee pilots, who yanked at the stick to evade, applied too much power, and threw their planes into uncontrollable spins.[31] In May 1953 one MIG pilot ejected from his plane as he was approaching a Sabre headon, before either plane came within firing range.[32] Bursts of tracers in front of a trainee pilot was often enough to make him break off.[33] In combat, moreover, MIG pilots would seldom break into an F–86 when attacked: Lt. Ro explained that the Red pilots knew that to break would expose their cockpits to fire, whereas, by absorbing the fire in the engine and armor plate behind them, the MIG pilots found that they had an excellent chance to recover, or at least safely to bail out after the F–86's had broken off.[34]

Communist Air Strategy: Under the circumstances which existed in the peculiar Korean combat, the Communists chose to employ their air forces primarily in a defensive role. This was not because the Communists did not recognize the importance of controlling the air: viewing Korean hostilities in retrospect in the late summer of 1951, a Chinese Communist general staff delegation which visited Korea reported that the Red attempts to secure a ground victory had failed because of a lack of air superiority. The delegation predicted that the United States could not be defeated in Korea unless its "air supremacy" was first destroyed; the outcome of the Korean fighting, they said, could well be determined not on the ground but in the air.[35]

The major reason for the Communist failure to launch air attacks from north of the Yalu, as General Weyland believed and stated, was because they operated "under restrictive directives to reduce the likelihood of retaliation."[36] That this assessment was exactly correct was borne out in the report of the Chinese general staff delegation, which bitterly observed: "The United States has repeatedly declared that any attempt by the Red air force to bomb the U. S. troops would be retaliated with relentless bombing of the Northeastern Provinces by the USAF. For this reason, the Red China air force has not dared to make

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such an attempt in the past and it may not make it in the future. The conservative policy adopted by Red China has apparently ensued from the high-handed policy of threats of the enemy." This report further stated that the UNC policy of avoiding border violations "could be construed as similar to our avoiding bombing the area south of the 38th parallel." [37]

If the Chinese could have rehabilitated Korean airfields to a degree permitting them to move their air units forward, they would have doubtlessly attempted air attacks against South Korea. But, having lost air superiority over North Korea, the Chinese in 1951 were taught the "basic lesson that an air force cannot be reconstituted or developed in an area where his foe has won air superiority." [38] These efforts to base Communist air units in North Korea were not entirely out of respect for the international border but in a great measure they represented a recognition of the short-range (until November 1952, when the IL–28's arrived) capabilities of the CCAF and NKAF. The first conclusion of the Red Chinese general staff delegation was that China required long-range attacking air power. This group expressed great dissatisfaction with the limited range of the MIG–15 fighter: based at Antung, they asserted, a MIG–15 could attack ground targets no further than 100 miles distant. Thus to extend operations over UNC positions required bases in North Korea, but each effort to build such airfields was thwarted by UNC air attacks, leading the delegation to conclude that airfield construction in the combat area was "a burden far beyond the financial power of Red China to support." This delegation suggested that Russia ought to send China mostly Yak–15's, whose range and performance was more like the USAF F–84. The delegation stated that the MIG–15's, although provided in generous numbers, were not suitable for use either in Korea or in Indo-China and would probably be of limited value against Taiwan.[39]

Other reasons suggest themselves as to why the Communist air forces did not attack UNC installations in South Korea to any appreciable extent. The over-all proficiency of Communist pilots was so poor that the Red air command could expect high casualties in any sustained offensive.[40] For a Red aircraft to be shot down over UNC territory, moreover, would compromise both the plane and the pilot. Probably out of respect for this same phobia against compromise, Communist pilots also refused prior to February 1953 to fly any distance out over the Yellow Sea, even in pursuit of a disabled UNC aircraft.[41] When a knowledgeable North Korean lieutenant colonel, captured as an enemy agent in May 1953, was interrogated, he confirmed this deductive reasoning: MIG pilots, he said, did not generally fly south of the Chongchon River because they were unqualified for unlimited aerial combat and prohibitive loss was feared, because there were no suitable emergency landing fields in the forward areas, because there was always danger that a MIG would fall into UNC control, and because there was danger that definite proof would be given that Russian and Mongolian pilots were flying some MIG's.[42]

The foregoing reasoning—some of it deductive but most of it based on intelligence evaluations—would indicate that the Reds were attempting to make the best of an adverse air situation in Korea. They may well have hoped that sooner or later the MIG masses would attrite and wear out the inferior numbers of Sabres. These explanations of Communist air strategy, however, do not completely satisfy the whole course of Korean air events. Never altruistic but proverbially frugal with her material resources, Russia in the three years of the Korean war built up a Chinese air force of respectable proportions with modern combat types and at the same time provided replacements for at least 827 MIG–15's lost in combat. Why did the USSR, whose doctrinaire leaders generally work from long-range plans, support such a costly and seemingly unprofitable venture? Three plausible answers emerge: by supporting China, Russia got access to airfields stretching from the Arctic to Indo-China, she built a satellite air force for eventual united employment, and she enjoyed the unique opportunity afforded by the Korean conflict for testing equipment and training personnel.[43] "The MIG . . . and its equipment," surmised FEAF intelligence as early as March 1951, "are undoubtedly being subjected to combat testing and its pilots are at the same time acquiring priceless experience and knowledge of USAF aircraft and tactics." As hostilities wore on, the course of air events continued to indicate the existence of a far-reaching Soviet plan to utilize a substantial portion of the air combat in Korea in preparation for some future war. Quite unlike World War II, when Soviet air units had been

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chiefly concerned with ground support, the Reds used their aircraft in Korea in an air superiority mission, and Communist air commanders may well have had a directive to devise air superiority tactics and to develop fighter-interceptor cadres—sacrificing quality for quantity.[44] This theory goes far in explaining seemingly erratic and unorthodox Communist actions in the air battle. MIG's often ignored fighter-bombers, but they always attempted to intercept medium bombers. Not frequently MIG formations tried against Sabre fighters tactics which obviously were intended for use against bombers: in January 1953, for example, flights of MIG's would fly in trail parallel to a flight of Sabres and then suddenly turn into line abreast and make a simultaneous firing pass through 2,000 yards range, then climb high and turn back across the Yalu. Against fighters this tactic was hardly effective, but such tactics had been used by ME–109's against bombers over Europe in World War II.[45] In February 1953 the Seoul TACC frequently observed coming south of the Chongchon MIG tracks which immediately withdrew when Sabres were sent out: the supposition was that the enemy was probing UNC radar defenses and testing scramble reactions.[46] These and other similar experiences made it evident that the Communists were working out the mechanics—command, staff, maintenance, supply, and related problems—of a sizeable counterair efforts against the best of United Nations airpower.[47]

AIR-TO-AIR COMBAT OVER NORTH KOREA

Limitations on Sabre Combat: Under the circumstances of a normal war the Fifth Air Force would have been directed to destroy enemy aircraft wherever found within the operating range of its aircraft, in the air or on the ground, but in Korea the politico-military rule that UNC aircraft could not cross the Yalu precluded attacks against MIG's while they were parked on their Manchurian bases or while they were flying in their vulnerable take-off and landing patterns. In Korea, Fifth Air Force air superiority activities were virtually limited to such air-to-air fighting as the Red chose to sustain by sending their aircraft across the Yalu. Possessed with the initiative of joining or refusing combat, and remaining callously indifferent to the fate of their ground comrades in Korea, the Red air commanders attempted constantly to devise situations which would give maximum advantages to their pilots.

With infrequent exceptions, the Reds chose to make the northwestern quarter of North Korea the scene of their counterair operations (*see* figure 7). The area in which the enemy was normally contacted was even more restricted, lying between the Chongchon and Yalu Rivers, bounded on the west by the Korean Bay and on the east by a line running roughly between the Sui-ho Reservoir and the town of Huichon. This was the area popularly called "MIG Alley." Why the enemy liked to fight in this locality was easy to understand, for here he had the maximum of geographic advantages. Based at the Antung complex of airfields, his short-range MIG interceptors could be quickly alerted and could take off, form up, climb to superior altitude, and maneuver for a speedy penetration southward, all the while remaining within the Manchurian sanctuary. After making speedy passes against UNC aircraft in "MIG Alley," the Reds could break off pursuit merely by crossing the Yalu barrier. At one time in December 1950 the JCS had been willing to permit UNC interceptors a few minutes of "hot pursuit," in which they could chase the Communist bandits across the Yalu, but several of the allied nations had objected and the proposition was dropped. In March 1953, when there were newspaper reports that American pilots were pursuing Communist aircraft across the Yalu as a matter of common practice, the JCS directed CINCFE to take measures to insure that its instructions were fully complied with. CINCFE reported, in turn, that UNC pilots were conscientiously breaking off engagements at the Yalu, even though this practice allowed many MIG's to escape. He admitted that in the heat of combat it was likely that some border violations had occurred but emphasized that they were not common practice.[48]

North of the Chongchon River the light, specialized MIG interceptors held most of the advantages over heavier all-purpose UNC fighters, who had not only to fly some distance to reach their targets and patrol stations but also had to retain sufficient fuel for their return to base. When they saw fit to give combat, the Red airmen

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almost always possessed a numerical superiority, and UNC aircraft faced superior numbers of MIG's ranging anywhere from an occasional 60 to 1 down to normal 3 to 1.

In part the numerical superiority of the MIG's was permitted by the enemy's fortunate tactical situation, but no small part of the advantage in numbers was due to the fact that the Communists simply had more MIG–15's than the UNC had day-interceptor aircraft, of which the F–86 Sabre was the foremost type. On 31 May 1952, for example, the 4th and 51st Fighter-Interceptor Wings had 139 Sabres; on 31 December 1952 they had 163; and on 31 July 1953 they had 181 Sabres. Counting F–86 fighter-bombers, which could double as interceptors when needed, the Fifth Air Force at the end of hostilities had 319 Sabres assigned to units.[49] In addition to the Sabre force, the Fifth Air Force used the RAAF 77th Squadron's Meteor–8's as day interceptors until January 1953, when these jets, clearly outclassed by the MIG's, were converted to fighter-bomber work.[50] At any time after November 1950 the Communist MIG–15's far outnumbered the Sabres.

Never large in terms of aircraft, the Sabre force's operations were additionally limited by the necessity of living within never-plentiful logistical means and by the requirement that 75 percent of all aircraft had to be maintained in combat ready status against the day that they might be needed to meet a sudden Communist onslaught. In their peak month of Korean operations—May 1952—the Sabres flew 5,138 effective sorties, but thereafter F–86 sorties had to be cut back to balance with logistical support, and October 1952, when 4,261 F–86 sorties were flown, was the highest month of Sabre interceptor activity in the last twelve months of the Korean war.[51] Improving logistical support in the autumn of 1952 actually allowed the Fifth Air Force to increase its planning factor for Sabre operations above that which had been predicted by FEAF,* and the F–86 interceptors were each permitted to fly a maximum of 29.6 sorties monthly. Unfavorable flying weather in the winter of 1952–1953 caused stand-downs or limited operation, with the result that the Sabres flew at a sortie rate of 21.18 missions per month.[52] This lower than maximum sortie rate was also a result of General Barcus' policy of conserving air effort: "this is not the time to do or die for dear old Rutgers," he told the Sabre pilots, promising at the same time, "I'll let you know when the time comes, and then I will expect the very best of everything that you have."[53]

Performance Comparisons of MIG and Sabre: "I have often been asked how the F–86 compares to the MIG–15," commented General Weyland, who then answered: "In my opinion, when all variables are balanced out, I believe the F–86 is the better airplane—at least for our purposes."[54] Comparisons of MIG and Sabre performance in combat were complicated by the fact that three models of Sabres—F–86A's, F–86E's, and F–86F's—saw duty against at least two models of MIG's—the basic MIG–15 and the MIG–15BIS, the latter's suffix meaning "encore" and denoting an improved model. In the given tactical situation in Korea, however, performance comparisons involved a fundamental equation that the MIG–15, a light airframe with a powerful engine, possessed certain advantages over the F–86, a heavy airframe with a powerful engine. What the Sabre pilots in Korea would have liked to have had was a small, lightweight, highly maneuverable, day-fighting air superiority fighter,[55] but since no such aircraft was immediately obtainable USAF gave the highest developmental priorities to functional improvements on the existing F–86.

When the 4th Fighter-Interceptor Wing began combat in December 1950 it was equipped with F–86A model aircraft, the original production version of the Sabre. This aircraft was powered by a J–47–GE–13 turbojet engine which delivered a maximum thrust of 5,200 pounds. The last of these original production models would not be phased out of the theater until October 1952, but replacements of the F–86A with the F–86E model Sabres on a one for one basis was begun in July 1951. The F–86E, however, was essentially the same aircraft as the F–86A with the exception that it had an all-movable horizontal tail surface and power-operated controls, improvements which made for better handling at high Mach but added over 500 pounds to the weight of an already-heavy aircraft. Until mid-1952 these Sabres fought two models of MIG's: the basic MIG–15, which had an LK–45F engine (a copy of the British Nene II) delivering 5,000 pounds thrust, and the improved MIG–15BIS, powered by a 6,000 pound-thrust Soviet-designed VK–1 engine.[56]

*See Chap. I, p. 23.

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Apparently both MIG models were in action as early as the spring of 1951, and according to pilot reports either model MIG–15 was generally superior in performance to the F–86E. The MIG could consistently outclimb F–86's at all altitudes, with its rate-of-climb advantage becoming more apparent at higher altitudes. Below 20,000 feet the difference was not so great but the MIG could still pull away from the F–86 in a sustained climb; above 30,000 feet the MIG's superiority of climb was particularly obvious; at 45,000 feet the MIG could chandelle away from a Sabre. It was generally agreed that the MIG could at least initially out-accelerate the F–86 in level, climbing, or diving flights. At altitudes below 20,000 feet the F-86 had a small advantage in level flight speed, but this advantage was reversed in favor of the MIG at higher altitudes. Above 30,000 feet the MIG could pull away from a Sabre and continue accelerating or convert the speed into a climb which was even more effective in leaving the F–86.

In all diving maneuvers the MIG had a slight initial advantage because of its superior acceleration, but the F–86, as was natural for a heavier aircraft, had advantages at all altitudes in dives steep enough and long enough sustained to result in airspeeds above .95 indicated Mach. The MIG, however, almost never dived away when chased. The ability of the MIG to convert its speed into a high angle "zoom" climb was outstanding and advantageous at all altitudes. The rate of roll of the MIG and F–86 appeared about equal with perhaps a slight advantage to the F–86. Although the MIG was lighter than the Sabre, had greater thrust ratio, a higher rate of climb, more rapid acceleration, more zoom, and an equal or greater top speed than the F–86, the Sabre, oddly enough, demonstrated an ability to out-turn the MIG at altitudes below 30,000 feet; Sabre pilots correctly guessed that this was due to timidity of the MIG pilots. At 40,000 feet and above, however, the F-86 would stall when trying to turn level with a MIG. One of the chief MIG advantages was its service ceiling: in comparison with the F–86 which only with difficulty could maintain 4-plane flight integrity at 45,000 to 47,000 feet, the MIG could be held in a 6-plane formation at 50,000 feet or higher. In summary, the flight performance of the MIG over the F–86A or F–86E was definite above 35,000 feet, marginal above 25,000 feet, and nil below 20,000 feet.[57]

Combat observations convinced Sabre pilots that the MIG–15 was aerodynamically capable of flight at Mach numbers as high as the F–86, while its structure was so much lighter that its ratio of power-to-airframe weight permitted it a superior performance. In October 1951 the commander of the 4th Group therefore filed an unsatisfactory report on the J–47–GE–13 engine. To enable the Sabre to match performance with the MIG, he said, the Sabre's airframe weight required an engine delivering a minimum of 6,500 to 7,000 pounds of thrust. In December 1951 the USAF accordingly stated the requirement for the development of such a more powerful engine, but for the Korean operations it could furnish nothing better than the recently developed J–47–GE–27 engine, which surpassed the thrust of the −13 by more than 700 pounds to develop a maximum of 5,910 pounds of thrust under full military power. Already this engine was being incorporated in production model F–86F's, which otherwise were little changed from the F–86E series aircraft.[58]

The first F–86F's received in the Far East arrived in June 1952 and were used to equip the 51st Wing's new 39th Squadron. Beginning in September 1952 the 4th Wing's 335th Squadron also received these new model aircraft. When retrofitted with an extended leading edge wing,* the F–86F greatly reduced the various advantages previously enjoyed by the MIG. Maximum operating altitude jumped to 52,000 feet, an increase of 4,000 feet over the earlier Sabre's ceiling. Maximum Mach number went to 1.05 and at high altitudes the F86F with extended leading edges was able to make tighter High-G turns, evidencing over the older Sabre models a superiority of maneuverability which meant much when thrown against the agile MIG. The F–86F was also approximately 8 to 10 knots faster than the F–86E in level flight and exceeded the earlier plane's rate of climb by 200 to 300 feet a minute.[59]

As a general rule, the MIG could still out-accelerate, out-climb and out-zoom the F–86F, but this aircraft, with its extended leading edge wings and greater thrust engine, was able to get up into the higher altitudes at which the MIG had formerly operated with comparative impunity.[60] Since the F–86F interceptor models were in short supply, these planes were initially segregated into

*See p. 56.

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two squadrons to simplify operations and maintenance, but in March 1953 this arrangement had to be broken up and the aircraft redistributed throughout the squadrons of both wings; the reason was that pilot morale was suffering in the squadrons which were equipped with older model Sabres. The 335th Squadron, between 1 October 1952 and 1 February 1953, had scored 81 MIG kills while the other two squadrons in the 4th Wing had turned in a combined total of only 54 MIG kills, the difference being attributed "solely to the F-86F type aircraft . . . being flown by the 335th." [61] When the F-86F Sabre proved to be superior, FEAF made arrangements whereby all its F-86E's would be exchanged over a period of months for F-86F's possessed by the USAF Air Defense Command. Although delayed by difficulties met in processing the -E's for shipment to the United States, the exchange program was well underway by the end of hostilities, at which time the 4th and 51st Wing possessed respectively 60 and 62 F-86F aircraft against their unit authorizations of 83 Sabres.[62]

During most of the Korean war, Sabre pilots generally argued that the MIG was an aerodynamically stable aircraft in flight; many of them cited instances where they had fought their controls while chasing MIG's which appeared to have no similar problems.[63] Before the fighting had finished, however, there were a good many pilot reports that the MIG was unstable at high speeds, subject to unintentional spins, especially at altitudes above 35,000 feet, and very difficult to bring out of a spin. During 1951 and 1952, 32 instances were reported in which a MIG was observed to go into a spin for causes other than battle damage.[64] In a shorter but more intensively watched period between September 1952 and April 1953 there were 24 instances of MIG spins—12 of which were assessed as accidental and 11 of which resulted in losses to the enemy.[65] In the first half of May 1953 when there were seven incidents in which the enemy went into inadvertent spins from maneuvers at or above 35,000 feet and in most instances the pilots immediately ejected, FEAF commented that: "A new, inexpensive, highly efficient 'MIG KILLER' technique has been found." [66]

Taken as a fighting weapon—an amalgamation of maneuverability and ability to deliver destructive fire—combat observations demonstrated that the MIG did not achieve the stature of the Sabre.[67] Of excessively heavy caliber, insufficient in number, and too slow in rate of fire by USAF standards was the standard MIG-15 armament: one 37-mm. gun in the lower right nose and two 23-mm. guns in the lower left nose. The Russians, however, habitually preferred heavy caliber armament in all their aircraft, and the guns were well suited for the destruction of bombers at high altitudes.[68] At the high rates of speed and fast closures of combat between jet fighters, the combined cyclic rate of the six 50-caliber M-3 machineguns mounted in the Sabre was approximately four times that of the MIG armament. Battle damage statistics, moreover, indicated that the superior terminal ballistics of the heavier MIG armament did not compensate for its lower cyclic rate, shorter firing time, and resultant lower hit probabilities.[69] The cone of dispersion and rate of fire of the MIG armament was similarly too large for fighter-against-fighter combat, although several unlucky F-86's were lost simply because they inadvertently flew into the heavy caliber fire.[70] While there was some evidence of experimentation, MIG armament remained characterized by a low rate of fire and a definitely inferior fire direction system throughout the hostilities in Korea.[71]

Most of the foregoing combat observations relative to the performance of the MIG-15 aircraft were validated when FEAF secured a late-model MIG-15BIS aircraft through the defection of a North Korean pilot, who flew his plane to Kimpo on 21 September 1953. This "Kimpo MIG" was carried by air transport to Okinawa where a team of specialists from the Wright Air Development Center (WADC) gave it flight performance tests. At best, the MIG-15 was pronounced to be "a usable weapon for high-altitude interception of modern bombers." Its desirable features were: (1) an ability to operate at altitudes above 50,000 feet; (2) a high rate of climb; (3) a rapid horizontal acceleration from relative low speeds; (4) a short turning radius, which Red pilots were reluctant fully to exploit because of poor accelerated-stall characteristics; and (5) a short takeoff and landing distance requirement. The MIG's undesirable features were: (1) loss of aircraft control at high Mach numbers; (2) loss of vision caused by inadequate defrosting of canopy and windshield; (3) poor lateral-directional stability at high altitudes; (4) low rate of roll; and (5) poor aircraft control at high indicated air speeds.

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In short, the undesirable features of the MIG–15 greatly out weighed its good points.[72]

MIG Actions and Sabre Counter-Tactics: "Tactics that are successful in the morning may be obsolete in the afternoon," noted the 51st Fighter-Interceptor Wing study on tactical doctrine.[73] The truth of this observation was due largely to the fact that the Sabres were seldom permitted a free rein to devise the most effective methods of destroying MIG's; instead, the Sabre forces usually had to devise and employ the tactics which would most effectively counter such tactics as the MIG pilots cared to employ.

In the course of 32 months of air-to-air combat over Korea the Communists demonstrated a learning process in the employment of their jet fighters. Beginning on 1 November 1950 and continuing through January 1951 small formations of MIG's appeared intermittently in small sections, seldom venturing more than a few miles south of the Yalu, their usual tactics being hit and run passes against UNC aircraft. As the Red strength increased between February and April 1951, MIG's were frequently engaged over the Sonchon-Taechon area, still well within the relative safety of "MIG Alley." Their common tactic was a high stern attack made out of the sun by elements of two MIG's who would dive down firing and immediately zoom back into the sun. During May and June 1951 the MIG's edged down to the end of "MIG Alley," being frequently encountered over Sinanju and showing themselves to scattered observations as far south as Pyongyang. If the Red pilots now believed that they had sufficient strength to stop hugging the Yalu, they nevertheless still sought security in superior numbers. Introduced to cover this situation was what the Sabre pilots called a "Yo-Yo" Communist tactic, in which 20 or more MIG's orbited at an altitude superior to a UNC formation, and on signal elements of MIG's would peel off, preferably from up-sun, and come in high astern, fire through the pass, and then zoom back up into another pool of orbiting MIG's.

In the late summer and autumn of 1951 the Communists made their bid for air superiority in tactics employing superior numbers of inferior pilots in maneuvers calculated to encircle and overwhelm the UNC air forces. Day after day the enemy committed more than 100 MIG's in pincer and envelopment tactics: often a force of 60 to 80 MIG's crossed into Korea in the vicinity of Sui-ho on a southeastern heading, dropping off flights or small sections to engage UNC Sabre patrols north of the Chongchon. As the main "train" continued southward, scouting forces for flank patrols went over toward Wonsan. Timed to coordinate, another similar "train" proceeded out of Manchuria down the west coast of Korea, also dropping off pockets of resistance and dispatching scouting flights to Chinnampo and Cho-do Island. Over Pyongyang the main forces converged, dropped down to 15,000 to 20,000 feet and then swept back northward looking for fighter-bombers, homeward-bound Sabres, or stragglers. A fresh section of MIG's usually came as far south as Sinanju at high altitude to cover the withdrawal. These pincer and envelopment tactics were well thought out, but the caliber of the Communist pilots was not good enough to execute them. When the MIG's got outside "MIG Alley" and operated at lower altitudes, the Sabre force (augmented by the conversion of two squadrons of the 51st Wing in December 1951) scored a good number of kills: 13 in September, 24 in October, 25 in November and 28 in December.[74]

In the latter part of January 1952, after the Sabres had destroyed a record number of 31 MIG's during the month, the Reds broke up their "trains" in favor of more aggressive and smaller formations, which usually remained north of the Chongchon and flew at both high and low altitudes, a few flights being directed against the Sabre screen and larger numbers of Red aircraft attempting to strike UNC fighter-bombers. Enemy attacks against the fighter-bombers numbered 8 in January, 6 in February, 10 in March, 9 in April, and jumped to 25 during May 1952. With two exceptions, all of these attacks were made while the fighter-bombers were attacking rail targets between the Yalu and the Chongchon. Considering the number of times they tried to attack the fighter-bombers, the Red airmen were not notably successful: only 8 of this type aircraft were lost in air-to-air action between January and June 1952. For their aggressiveness and willingness to engage, however, the MIG pilots paid a heavy toll: the Sabres in April 1952 turned in what was up to then a record claim of 44 MIG's destroyed. In May the Sabres destroyed 32 MIG's. Probably in context with their losses, the Reds severely curtailed their MIG operations in June and July 1952.[75]

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In the period prior to mid-1952 the F–86 pilots had fought the MIG's under conditions which lent every advantage to the Communist aircraft, but they had nevertheless devised tactics to suit the situation. These tactics have been discussed in more detail in an earlier study,* but briefly they included special escort where needed, with the majority of Sabre effort going into a Yalu River sweep or screen, flown twice daily so long as the 4th Wing was the only Sabre organization and four times daily when the 51st Wing secured Sabres. The fighter-bombers timed their strikes to coincide with the Yalu screens. Basic tactics used for screening included a "jet stream" formation, whereby Sabre flights were dispatched at close intervals, arriving in "MIG Alley" at diverse altitudes, times, and headings. In order to locate higher flying MIG's by their contrails, the Sabres stacked the screen up just under the contrail level. When one flight located MIG's, it called out the fact and all Sabre flights closed to give battle. The optimum flight composition was the "fluid four," comprising four F–86's, spaced generally in fingertip formation. Quite early the Sabres discovered that they could not dawdle in "MIG Alley," and they therefore habitually entered the combat zone at the highest speed at which flight integrity was possible: at least Mach .85 and preferably above .87 if there was danger of enemy attack. The jet-stream tactics exploited both mass and flexibility, brought both security and economy of fuel, and, with each 4-Sabre flight operating on its own, increased the normal aggressiveness of the individual Sabre pilot. High-speed cruising gave the slower-accelerating Sabres a chance to save themselves if bounced by the MIG's. These fundamentals of the jet-stream, fluid-four, and high-speed cruising permitted optimum utilization of the F–86 aircraft under the local situation of the time in North Korea.[76]

Until the middle of 1952 both the MIG's and the Sabres had operated over North Korea with little, if any, assistance from electronics control. The Communists had, of course, benefited from early-warning radar, but it was not until 18 May 1952 that two MIG's dropped down out of an overcast against a flight of Sabres, indicating that the Reds had begun to employ ground radar to control and vector their aircraft into the most favorable position for an interception.[77] In May 1952, as a result of an effort which had begun some months earlier, the Sabres also began to get electronics assistance. As early as the autumn of 1951 Fifth Air Force electronics officers had desired to site radar eyes on Cho-do Island, just off the western coast of Korea and some 125 miles behind enemy lines. Doubt as to the security of the island and transportation difficulties in moving equipment ashore there delayed the Cho-do project, but a detachment of the 606th Aircraft Control and Warning Squadron (later assigned to the 608th AC&W Squadron) got on the air at Cho-do with an SCR-270 early-warning radar on 12 February 1952. This set gave good coverage of Red aircraft landing and taking-off at the Antung complex, but it had no ability to control friendly fighters.[78] The Fifth Air Force therefore directed on 1 May 1952 that a small tactical air direction center (TADC) would be located on Cho-do, and that same month a lightweight AN/TPS–1C was flown to the island. Results were immediately good for in May the Cho-do Dentist Charlie radar furnished the information required to vector F–86's to six MIG kills.[79] Particular attention was given thereafter to improving the GCI capability at Cho-do Island, with the result that the TADC there would function admirably during the remainder of hostilities.†

Although the UNC attacks against the Sui-ho hydroelectric plant went unopposed on 23 June, the Reds brought their more skilled pilots into action during July 1952. At the same time that the FEAF was getting seriously down to business with its air pressure campaign, the Communist air arm brought out a new and effective technique. In this endeavor the Reds used scattered MIG formations, a part of the MIG force engaging or luring off the patrolling Sabres, whose location was obviously pinpointed by Communist GCI radar, while other MIG's penetrated or flew around the ends of the Sabre screen at moderately high altitudes. On 4 July, when UNC aircraft attacked the North Korean Military Academy near the Yalu, some 90 MIG's were observed in the area, and at least two strikes got through the Sabre screen to make unsuccessful attacks against the fighter-bombers. The MIG's positioned themselves well enough but they lost kills because of poor gunnery and eager-

*See AHS–72, pp. 111–16.

†See p. 82.

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ness. In the course of the engagement, 13 MIG's were claimed destroyed at a loss of two Sabres.[80] As a result of this experience and in view of the need for a change in tactics as the fighter-bombers switched to targets of more importance, the Fifth Air Force made modifications in the old, generally free-lance Yalu barrier patrols which had fixed a screen of Sabres between UNC fighter-bomber targets and the MIG airfields. Beginning in July the Sabres were required to place more stress on visual contact with and flying top cover for the fighter-bombers. More escort missions were now required for the reconnaissance aircraft which sought out and photographed targets deep in enemy territory.[81]

By August 1952 the Communists were giving evidence that they were severely galled by the UNC air pressure campaign. Nam Il stated at the truce conference table on 11 August that the UNC had "brazenly attempted to apply the so-called 'military pressure' and carried out wanton and indiscriminate bombings of our peaceful towns and inhabitants." He warned the UNC negotiators that "any so-called 'military pressure' on your side will only invite you to miserable defeat."[82] Evidently stung into action by the intensified FEAF operations and having benefited by a period of reduced activity since April, the Red air forces surged back into action on 1 August as if by signal. Once again the majority of the Red pilots were getting combat experience and displayed reluctance to tangle, but other MIG's employed end-runs, decoys, and "Yo-Yo" tactics. The major aerial battle of the month was fought on 6 August between 52 MIG and 35 Sabre pilots, resulting in the destruction of at least 6 MIG's. The increase in the tempo of the air-to-air war in August permitted the Sabres to destroy a total of 33 enemy aircraft.[83]

The most intense aerial engagements since the beginning of the Korean hostilities took place in September 1952. The major air duel of the month occurred north of the Chongchon on 4 September, when 39 F–86's met 73 MIG's in 17 separate engagements. The MIG pilots were aggressive and displayed good tactics, but the F–86's destroyed 13 of the enemy planes at a loss of 4 of their own number. On other occasions in September, however, the MIG's demonstrated an ability to break through or evade the Sabre screens. On 1 September, eight of them got down to Haeju where they bounced and damaged a Mustang. On 9 September, some 175 MIG's effected a well-planned defense of the North Korean Military Academy near Sakchu: part of the MIG force engaged the Sabre cover while some 77 other MIG's prosecuted 12 attacks against the fighter-bombers, destroying three F–84's and forcing three flights of them to jettison their bombs. In this month of intensive and bitterly-fought actions the Fifth Air Force lost six Sabres and three Thunderjets, but its Sabres destroyed a new monthly high of 63 MIG's.[84]

After September 1952 the Communists again returned to more cautious schedules of air combat marked by sporadic engagements with the Sabres. Even the experienced "honcho" pilots were not markedly aggressive unless they had odds heavily in their favor, and the neophyte pilots flew high, in relatively large formations, and when necessary scurried for protection at the Yalu. In October the Reds demonstrated continued ability to elude the Sabre screens, and three times MIG pilots penetrated all the way to Wonsan where they shot down three conventional Navy aircraft.[85] In the latter part of November, when UNC fighter-bombers attacked targets north of the Chongchon on three successive days, MIG's broke through on the third day to effect major damage on three F–84's.[86] Earlier in the summer the Sabre tacticians had concerned themselves with devising an answer to MIG evasion of their screens. After the MIG's got to Wonsan three times in October, a subsidiary daylight barrier patrol was established along the Chongchon River and was flown by four Sabres or Meteor–8's.[87] When the enemy had some success in luring off Sabres with high flights and then getting a follow-up strike through to the fighter-bombers at lower altitudes, the Sabres instituted both high and low patrols. The newly arrived F–86F's were especially worthwhile in this effort for they were generally kept at altitudes above 40,000 feet while the F–86E's operated at altitudes in the vicinity of 30,000 feet.[88] Beginning in November 1952 the high- and low-level patrols were augmented by other flights of Sabres which were posted to certain areas where they were readily available for controlled interceptions of such MIG's as might elude the main screens. After February 1953, when the MIG's began to cause scrambles by penetrating south of the Chongchon in the time intervals between regular

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Sabre patrols, the Fifth Air Force added a flight of four F-86's which flew airborne alerts north of Cho-do Island between the schedules of the main screening patrols.[89]

During the winter of 1952–1953, Communist pilots displayed a wide variation of aggressiveness and ability. The majority of MIG's observed flew high and were evidently engaged in training, but those Red pilots who were willing to fight often displayed good coordination and skillful handling of their aircraft. Early in 1953, observations of camouflage patterns and aircraft markings indicated that the enemy was probably keeping some selected air units in combat. The 4th Wing, for example, reported encounters with a unit of "copper-colored" MIG's that flew as a unit, maintained excellent flight integrity, and demonstrated aggressiveness, tenacity, and skill.[90] During February, March, and April 1953, the 51st Wing commented on a noticeable absence of Red Chinese insignias upon the enemy planes it engaged. These anonymous MIG pilots who committed themselves to combat put up terrific struggles, many times hanging onto the attack or prolonging evasive actions when they could have easily crossed the Yalu. Where MIG's had formerly climbed to evade, these pilots, many of them flying aircraft marked by plain red stars, used almost every maneuver in the book: spins, split "S's," or combinations of swaying back and forth or up and down which made it extremely difficult for a pursuing Sabre to get in a shot.[91] As a general rule, however, Communist pilots after September 1952 were reluctant to attack unless the odds were decidedly in their favor, and they usually singled out small Sabre formations upon which they could work coordinated attacks with superior numbers. One favorite Red tactic was to initiate an attack with a 4-MIG flight, and, when the Sabre flight broke defensively, the first MIG flight would break off and a second Red flight would strike from the opposite side. These changes in the tactical employment of the MIG's demanded larger Sabre flights, and the 4th Wing began to employ sections of eight aircraft to good advantage.[92] The 51st Wing again used 6-aircraft flights, with the fire power concentrated in the flight leader and the two element leaders and with wingmen serving as watchers.[93] Subsequent to 1 January 1953, both F-86 wings experimented with a "train" type of squadron formation. Each "train" was made up of six flights of four aircraft each. In this refinement of the jet stream, the flights flew the usual "fluid-four" formation, but they remained in a loose trail formation, each flight following another within supporting distance, usually trailing by about one mile. This formation permitted the Sabre wings to get a maximum number of friendly fighters into contact with enemy formations, while it did not hamper the maneuverability, cruising speed, or offensive flexibility of the individual flight. This "train" formation appreciably reduced the susceptibility of individual Sabre flights to enemy attack.[94]

During January 1953 pilots of the 4th and 51st Wings sighted a total of 2,621 MIG-15's over North Korea, succeeded in engaging a total of 333 of these sighted aircraft, and destroyed 32 of those engaged.[95] After this month, which represented the peak sightings of MIG's during the last year of the war, the number of MIG's sighted each month was less than the month before, and, since the ratio of MIG's sighted to MIG's engaged remained approximately constant, combat kills fell off. The Fifth Air Force's Sabre potential was increasing—the 18th Group began flying Yalu sweeps on 25 February and the 8th Group on 7 April, both groups undertaking this activity while transitioning to F-86 fighter-bomber activities—at the same time that fewer MIG's were available for destruction. The 4th Wing had observed, however, that the rate of MIG kills was not necessarily in any direct relationship to the number of MIG's sighted in a month: what was more important was the degree of aggressiveness of the MIG pilots and their willingness to engage in aerial combat. Although it had asked the question before, the Fifth Air Force psychological warfare division therefore began an intensified campaign early in March 1953 on the theme of "Where is the Communist Air Force?" After Communist troop concentrations were attacked by UNC air strikes, specially prepared leaflets were dropped in the vicinity asking the ground soldiers why they were not being helped by their air forces.* Radio Seoul hammered the theme in

*It would appear that the Communist ground soldiers were peculiarly apt targets for such a propaganda theme. As early as October 1951 a POW had reported that the Red Chinese soldiers were making such remarks as: "We have superior air power while we hide in air raid shelters," and: "Our President Mao loves airplanes, not soldiers." (FEC INTSUM #3391, 22 Dec. 1951).

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broadcasts beamed northward.[96] The broadcasts and leaflet drops were continued during April, and on 1 May 1953 General Barcus personally supervised against the Communist radio station at Pyongyang an all-Sabre attack which marked the peak of the Fifth Air Force's psychological warfare program. On this Communist holiday, the 4th and 51st Wing covered the 8th and 18th Wing's F-86 fighter-bombers as the latter planes, proceeding initially as if on the usual Yalu patrols, suddenly made a let down from an initial point, dive-bombed the radio station target and the power lines feeding it, and then swept away at low altitudes. After all bombs had been delivered, the voice of General Barcus, who, unknown to higher command had been flying missions with the 51st Wing during March and April, could be heard delivering a message to the enemy over a frequency known to be monitored by them. The General informed the Communists that the Fifth Air Force would be back to bomb military targets in Pyongyang every time that they broadcast "filthy lies" about it.[97]

Whether the Communist air command was spurred into action by this propaganda campaign or whether it instructed its pilots to take combat more seriously in view of the Red ground attack which was going to start on 10 June cannot be established, but the aggressiveness and perhaps the nationality of MIG pilots who engaged the Sabres changed quite sharply in mid-May 1953. In the first half of May the Red airmen stood down on several days when weather would have permitted them to fly, and on the days when the MIG's were out they were reluctant to engage. During this period of 1–15 May, Sabre pilots observed 608 MIG's, of which 138 or 22.7 percent were encountered in combat. In the last half of May, however, 899 MIG's were observed and 399 or 45 percent of them were encountered by the F-86's. Numerous aircraft with Red Chinese insignia were met, and their pilots revealed that they had "more enthusiasm than know-how." Although these pilots had obviously been instructed to fight, they were generally lacking in skill: unintentional spin-outs were frequent and one reluctant Red ejected from his plane before an engaging Sabre could get within firing range. All of the combat took place north of the Chongchon River, and during the month there were no more than a few scattered MIG flights south of that river. While the total MIG sightings during May continued the downward monthly trend of MIG sorties, the Sabre pilots, now benefiting both from technical improvements in their aircraft and from the willingness of the MIG pilots to engage in combat, effected an excellent kill-to-loss ratio. In May, 56 MIG's were destroyed, 4 more were probably destroyed, and 27 were damaged. The loss to enemy action was one F-86, and the pilot of this plane was successfully rescued.[98]

In June 1953 the total monthly sightings of MIG aircraft was even less than it had been in May, but during this month the Sabre pilots effected the peak kill of the Korean hostilities. The Red air command probably felt that it was necessary to put out an effort to accompany the Red ground offensive, but during the first half of June the MIG pilots were wary and hesitant to engage in combat. The Sabres observed 637 airborne MIG's but only 184 (29 percent) of them could be engaged in combat. Again the Red pilots were poorly skilled: a mid-air collision between two MIG's chopped the tail off one and the other spun in while attempting to turn tight inside a pursuing F-86; four other MIG's were observed to go into fatal spins, two after they had been hit and two before the Sabres fired on them. During the last half of June the MIG pilots continued to be neither alert nor aggressive, but a combination of circumstances permitted the Sabres to engage 317 (50.2 percent) of 631 MIG's observed. In the period there was an incidence of heavy, multi-layered clouds and the Communist pilots apparently attempted to sneak under the weather, thus evading the Sabre barrier patrols. Whatever the Communist reasoning may have been, the air combat during the last half of June was characterized by an unusually high proportion of encounters below 40,000 feet. For once, higher flying Sabres were able to initiate 70 of the 92 engagements with the enemy planes, and during June 1953 the Sabres made their peak monthly kill of the Korean hostilities: 77 MIG's destroyed, 11 probably destroyed, and 41 damaged. On 30 June, the Sabres destroyed 16 MIG's for a new day's record which exceeded the previous highs of 13 kills scored on 4 July and 4 September 1952. During the month there were only 17 MIG sightings south of the Chongchon, of which 16 were noted on 30 June when a formation of MIG's was caught heading northward from Pyongyang, probably intending

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to ambush Sabres who were returning home low on fuel. During the June combat actions the Sabre wings lost no F-86's to the enemy, and only one F-86 received major damage in combat with Red aircraft.[99]

Although the Communists were reckless with their ground troops in the line and continued useless ground attacks in July 1953, they played it safe with their airplanes in "MIG Alley" during this last month of the Korean hostilities. The Sabres got only 32 MIG kills in July, which, while good for the period of hostilities, represented a let down from the remarkable victory of June 1953. On the last day of the war, 27 July, 369 Sabre sorties saw only 12 MIG's, all headed for home in Manchuria. At twilight on this day, however, Capt. Ralph S. Parr, 4th Wing, met and shot down an unwary IL-12 transport which had apparently wandered off course and had crossed south of the Yalu near Manpojin. Captain Parr thus achieved the distinction of destroying the last enemy aircraft in the Korean war.[100]

COUNTING THE COMBAT SCORE

Records of Red Aircraft Destroyed: During the Korean hostilities pilots of FEAF units, the 1st Marine Air Wing squadrons, the 77th RAAF Squadron, and the 2d SAAF Squadron claimed to have destroyed a total of 976 Communist aircraft. Some 953 of these Red aircraft destroyed were claimed by USAF pilots, 900 of them in the air and 53 of them on the ground. These USAF claims are detailed in figure 8.

While nearly all types of UNC aircraft at some time destroyed Red aircraft, the air superiority battle for Korea was characterized by air-to-air combat between American F-86 Sabrejets and Communist MIG-15 jet interceptors. That air superiority was maintained was demonstrated by the combat destruction records of the Sabres, which, in the course of the war, destroyed 792 MIG-15 fighters in aerial combat and lost only 78 of their own number to enemy air action.[101] The Fifth Air Force Sabre wings so adequately discharged their mission that General Barcus could state that the UNC possessed "unquestioned air supremacy over the North Korean homeland between the main line of resistance and the Chongchon River, and complete air superiority between the Chongchon and Yalu Rivers."[102] The extent of this air superiority was evidenced by negligible losses and damages to UNC fighter-bombers and other such vulnerable aircraft from MIG attacks.

The extent of the UNC air superiority was also demonstrated in the 10 to 1 combat victory which the F-86's achieved over the Red MIG-15's. As was the case with any facet of the Korean operations, however, this 10 to 1 margin of Sabre victory had to be viewed with recognition of the fact that the UNC was never allowed to make all-out attacks against the Communist air forces and that Sabre employment was primarily defensive. It must also be equated with an understanding of the fact that the Reds did not utilize their full potential to contest the UNC control of the air over North Korea.[103] But the Sabre victory was nonetheless significant and must have been persuasive to the Communist bloc nations: as succinctly phrased by Col. John W. Mitchell, "the ability of our pilots to take the MIG . . . has undoubtedly slowed the Russian in his headstrong rush into another war. It has made him consider the fact that he is not quite ready yet, and it must rankle him to know that we are getting better and stronger all the time."[104]

Sabre Pilots and the Air Victory: "The Fifth Air Force," said General Anderson, "maintained air supremacy through an adequate combination of the technical capabilities of its fighter aircraft with superior individual pilot proficiency, flight integrity, and air tactics."[105] Although technical improvements in the Sabre aircraft helped, the 10 to 1 Sabre victory was due, more than to any other single factor, to the well-trained, experienced, and aggressive F-86 pilots who utilized the tactics best calculated to exploit the capabilities of the planes they flew.

Situational conditions over northwestern Korea, the fantastic speeds of jet air combat, and visual limitations in the great grey realm of high altitudes demanded more skill and judgment from Sabre pilots than previously known in air-to-air fighting. In fighter versus fighter combat, advantage lies with the pilot who maintains a superior altitude since he has opportunity to engage or break off at will. "Knowing that the MIG-15 has a higher service ceiling than the F-86," stated the 4th Wing Ace, Capt. Manuel J. Fernandez,

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USAF CLAIMS OF ENEMY AIRCRAFT BY TYPE AIRCRAFT

26 June 1950—27 July 1953

Type claim and type enemy aircraft	Grand total	Air-to-air by type model USAF aircraft										Total air-to-ground
		Total	B-26	B-29	F-51	F-80	F-82	F-84	F-86	F-94	RB-29	
Destroyed—All type	953	900	7	18	10	37	4	9	810	4	1	53
TU-2	9	9							9			
YAK-3, 9, 11	40	24	3		3	10	2	1	5			16
LA-5, 7, 9	6	6			1	1			3	1		
IL-2, 10	5	5			5							
MIG-15	827	823		16		6		8	792	1		4
IL-12	1	1							1			
PO-2	5	5	4							1		
U/I Fighter	59	26		2	1	20	2				1	33
U/I Aircraft	1	1								1		
Probable—All type	193	168		11	3	21	2	12	118	1		25
TU-2	1	1			1							
YAK-3, 9, 11	16	7			1	6						9
LA-5, 7, 9												
IL-2, 10	1	1			1							
MIG-15	148	145		7		8		11	118	1		3
IL-12												
PO-2												
U/I Fighter	27	14		4		7	2	1				13
U/I Aircraft												
Damaged—All type	1,009	973	7	15	12	41		82	814	2		36
TU-2	4	4							4			
YAK-3, 9, 11	33	15	3	3	1	8						18
LA-5, 7, 9	8	4	1						2	1		4
IL-2, 10	3	3			2	1						
MIG-15	951	946	3	11	9	32		82	808	1		5
IL-12												
PO-2												
U/I Fighter	9											9
U/I Aircraft	1	1		1								

SOURCE: USAF Statistical Digest, FY-1953, p. 52.

Figure 8.

Jr., "we must compensate for our deficiencies by outsmarting the enemy and forcing him to make a mistake once contact has been initiated." [106] In "MIG Alley" the enemy had so many advantages of altitude, air speed, and position that he could almost always be expected to initiate combat on the terms most favorable to himself: the work of the Sabre pilot was to neutralize this momentary tactical advantage which the enemy had gained and then, within the few seconds permittting, initiate his own attack. Fortunately, the USAF possessed men with the skill and the courage to win under such unfavorable combat situations.

The background of the Sabre pilots who fought in Korea was generally high even by USAF standards and very high when related to the probable proficiency of the average fighter pilot who would be available in any large-scale war. Viewed as a body, the Sabre pilots fell into three general categories of experience. When it came to the Far East, the 4th Fighter-Interceptor Wing was manned by highly qualified professional and reservist career officers, most of whom had been fighter pilots in World War II and not a few of whom were already conventional Aces. In the late summer of 1951 many of these pilots were rotated either as 100-mission veterans or as Aces,*

*On 1 June 1951, USAF stated the policy that jet fighter pilots who destroyed five or more hostile jet aircraft in air combat would be returned to the United States, but when many of

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but similarly experienced fighter pilots would continue to fill the key slots as element and flight leaders. Most of these experienced fighter pilots were "old men" by usual standards for fighter pilots, but jet combat experience in Korea early demonstrated that the age of a pilot was much less important than his mental outlook and that the strain of jet air combat on a man's physical constitution was actually less than that encountered in conventional fighters during World War II. A FEAF statistical study made in March 1953 further demonstrated that the majority of MIG kills went to experienced pilots: some 68 percent of pilots who destroyed MIG's were over 28 years old, whereas 67 percent of pilots who scored no kills were less than 25 years of age. Pilots with MIG kills to their credit in Korea had flown an average of 18 missions in World War II, while pilots with no kills had flown an average of 4 missions in World War II. It appeared clear from this study that the more actual combat experience a pilot had, the better were his chances of destroying enemy aircraft.[107]

"Age as measured in years," reported the 4th Group, "is not the criteria for selecting fighter pilots. So long as a pilot's reflexes and vision can hold up, and his physical machinery will continue to stand the pace, he can continue active fighter flying provided he started out in fighters." [108] While the 4th Group experience demonstrated that an "old" fighter pilot had advantages in jet air combat, such was by no means true of other experienced pilots who had not had their combat time in fighters. In the winter of 1951–1952 the Korean Sabre wings received a large number of reservist and regular pilots whose combat experience had been in multi-engine transports or bombers. The personnel action lying behind the assignment of such people was a serious shortage of F-86 replacements following the conversion of the 51st Wing to Sabres,[109] but the 4th Group stated: "We feel that it is an almost impossible task to take a pilot who flew transports or heavy bombers in World War II, who got out of the service and grew old mentally and fat physically for several years, recall that pilot, and expect him to fly a quick course in F-80's and become a replacement pilot for F-86 flying." The group completely endorsed the old Air Force custom whereby pilots were typed for flying fighters or multi-engine aircraft at the end of cadet training: this had been a sound practice which had become even more valid with the high degree of modern aircraft specialization. "We feel," stated the Group, "that it is a waste of the government's time and money to take a 30- to 32-year-old man whose service has been in troop transport or multi-engine flying and attempt to train that man to engage in the highest form of aerial combat that has ever been developed. There are very few individuals who can do it, but they are rare and unusual." [110]

Utilization of the third category of Sabre replacement pilots—young jet fighter pilots fresh from flying training schools—received in ever increasing proportions after early 1952* presented problems but gave less difficulty than the conversion of older multi-engine pilots: "As long as we continue to receive qualified jet pilots," reported one Sabre squadron, "the training program will not be impossible, merely difficult." [111] A few of these young pilots were precocious: Lt. James F. Low became the 17th jet Ace on 15 June 1952 when just six months out of flying school and after only six weeks in combat.[112] But these newly graduated pilots arrived in such numbers in the winter of 1952 and the spring of 1953 as to overwhelm the training flights of both Korean fighter-interceptor wings. Since a pilot in active Sabre combat had to have at least 15 combat missions a month to maintain his peak proficiency, there was no solution to the excess of pilots but to maintain a backlog in training flights, often in varying degrees of idleness. Because of this backlog the young pilots were cleared for combat flying not when they were proficient but when slots were available through rotation of other pilots. The Sabre wings realized that "idle pilots, like idle aircraft, tend to develop eccentricities and small faults," [113] but there was no better local solution to the problem of an excessive flow of fighter pilot replacements which was common in all Fifth Air Force fighter wings in late 1952 and early 1953.

As waged over northwestern Korea, aerial combat between the men who flew the Sabres and the Reds who piloted the MIG's was quite properly called "the highest form of aerial combat that

them desired to remain in combat the policy was amended to allow commander FEAF to return or retain jet Aces who volunteered to remain in the theater. (Staff Hist., DC/S Pers. USAF, July–Dec. 1951, p. 14.)

*See Chap. V. pp. 162–63.

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has been developed." To see the enemy first was vital, and the development of such a degree of alertness required hard work and constant practice. Jet aerial combat above 40,000 feet required precision flying ability derived from a thorough knowledge of aircraft characteristics, both of friendly and hostile planes. To profit from an enemy's mistakes in the few seconds allowed, successful Sabre pilots had to possess an ability to shoot accurately. Team spirit was of utmost importance, and the individualist was of no value and an actual hazard to his comrades in combat.[114]

Perhaps the greatest requirement of jet air combat, however, was a pilot's driving will to succeed—an "Every Man a Tiger" aggressiveness—because victory in jet air battle could be scored only by an aggressive pilot. Whether in setting up an attack against the agile MIG's, or in evading an initial MIG pass and then counterattacking, the advantage in high-speed jet combat lay with the aggressive pilot. "Many times," stated 4th Group doctrine, "the tide of air battle has been changed by aggressive attack on superior numbers of enemy aircraft, ejecting enough confusion and panic into the situation to cause the larger force to take the defensive and attempt to run. Always remember, the enemy is probably twice as scared as you and only half as skillful." [115] One of many incidents illustrating the worth of an aggressive spirit occurred on 18 February 1953 just south of the Sui-ho reservoir when 4 F-86's attacked a formation of 48 MIG's, shooting down 2 of the enemy planes and causing 2 others to spin-out and crash when they attempted to follow the Sabres through violent evasive maneuvers.[116]

There were a few peak periods of action in the counterair war over "MIG Alley" when the Red airmen were obviously instructed to fight viciously, but on each occasion the Reds lost heavily and soon went timid. Such months of peak MIG destruction were April 1952 with 45, September 1952 with 63, May 1953 with 56, and June 1953 with 78 MIG kills. The bulk of Sabre victories, however, was rolled up at a rate of not more than a few on any one day. Benefiting from periods when the MIG pilots demonstrated a willingness to engage in combat but accumulating other scores in more usual day-to-day patrolling actions, a total of 39 Fifth Air Force pilots downed 5 or more hostile jet aircraft to enroll themselves among Air Force immortals as jet air aces. This Honor Roll of Jet

FIFTH AIR FORCE JET FIGHTER ACES

1.	Maj. James Jabara	20 May 1951
2.	Capt. Richard S. Becker	9 Sep 1951
3.	Capt. Ralph D. Gibson	9 Sep 1951
4.	Lt. Col. Richard D. Creighton	27 Nov 1951
5.	Maj. George A. Davis, Jr	30 Nov 1951
6.	Lt. Col. Winton W. Marshall	1 Dec 1951
7.	Maj. William T. Whisner, Jr	23 Feb 1952
8.	Col. Francis S. Gabreski	1 Apr 1952
9.	Capt. Robert H. Moore	5 Apr 1952
10.	Capt. Iven C. Kincheloe	6 Apr 1952
11.	Capt. Robert J. Love	21 Apr 1952
12.	Maj. William H. Wescott	26 Apr 1952
13.	Capt. Robert T. Latshaw, Jr	3 May 1952
14.	Maj. Donald E. Adams	3 May 1952
15.	1st Lt. James H. Kasler	14 May 1952
16.	Col. Harrison R. Thyng	20 May 1952
17.	2d Lt. James F. Low	15 Jun 1952
18.	Capt. Clifford D. Jolley	8 Aug 1952
19.	Maj. Frederick C. Blesse	4 Sep 1952
20.	Capt. Robinson Risner	21 Sep 1952
21.	Col. Royal N. Baker	17 Nov 1952
22.	Capt. Leonard W. Lilley	17 Nov 1952
23.	Capt. Cecil G. Foster	22 Nov 1952
24.	Capt. Dolphin Overton III	24 Jan 1953
25.	1st Lt. Harold E. Fischer, Jr	24 Jan 1953
26.	Capt. Manuel J. Fernandez, Jr	18 Feb 1953
27.	Capt. Joseph McConnell, Jr	9 Mar 1953
28.	Maj. James P. Hagerstrom	27 Mar 1953
29.	Col. James K. Johnson	28 Mar 1953
30.	Lt. Col. George L. Jones	29 Mar 1953
31.	Lt. Col. George I. Ruddell	23 May 1953
32.	Lt. Col. Vermont Garrison	5 Jun 1953
33.	Capt. Lonnie R. Moore	18 Jun 1953
34.	Capt. Ralph S. Parr	18 Jun 1953
35.	Col. Robert P. Baldwin	22 Jun 1953
36.	1st Lt. Henry Buttelmann	30 Jun 1953
37.	Maj. John F. Bolt (USMC)	11 Jul 1953
38.	Capt. Clyde A. Curtin	19 Jul 1953
39.	Maj. Stephen L. Bettinger	20 Jul 1953

Figure 9.

Aces is recorded in figure 9. Of these Aces, the 4th Fighter-Interceptor Wing produced 24, the 51st Fighter-Interceptor Wing had 14, and the 18th Fighter-Bomber Wing had one (Maj. James P. Hagerstrom) during its transitional period to fighter-bomber work. The first jet air Ace was Maj. James Jabara, who was promptly removed from combat under the initial policy of mandatory rotation for jet Aces but was later allowed to volunteer for a second Korean tour, during which he became a triple jet Ace. High scorer in the Korean conflict was Capt. Joseph McConnell, Jr., the first triple jet Ace and ultimate destroyer of 16 MIG's. Third ranking Ace was Capt. Manuel J. Fernandez, Jr., with credit for the destruction

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of 14½ MIG's.[117] To these men who became jet aces, to the many other pilots who scored lesser numbers of kills, and to the many more wingmen who scanned the skies, covered their leaders, and seldom got good shots must go the credit both for the 10 to 1 Sabre victory in Korea and for the maintenance of UNC control of the air over North Korea.

A Note on Project MOOLAH: On the night of 26/27 April 1953 two medium bombers dropped approximately 1,200,000 leaflets over enemy air bases and other selected targets deep in North Korea. These leaflets offered in Russian, Chinese, and Korean language texts a monetary reward to any Communist pilot who would deliver a MIG–15 or other Soviet-made jet plane to the UNC forces in Korea. The first enemy pilot who took advantage of the offer was promised an additional $50,000 bonus, but all comers were to receive $50,000, political asylum, resettlement in a non-Communist country, and anonymity if desired. Escapee pilots were instructed to fly to Paengnyong-do (island), to proceed thence at 20,000 feet altitude to Kimpo (K–14), and to make an immediate landing at this field. On 27 April, FEC radio transmitters began to broadcast the same offers and instructions in Russian, Chinese, and Korean. So was initiated project MOOLAH, a plan from which the USAF hoped to get a flyable Red jet for testing and through which CINCFE expected to promote mutual suspicion among enemy pilots.[118]

According to General Clark's memoirs, project MOOLAH had first been conceived early in 1952 by war correspondents in Seoul as they communed with a bottle of brandy and speculated on the possible effect of "silver bullets" upon the Chinese Communists.[119] Another report had it that MOOLAH was born in discussions by a group of social scientists at the Harvard University Russian Research Center.[120] Whatever its genesis, the project was discussed in Washington, was approved and cleared by the JCS on 20 March 1953, and was transmitted to CINCFE in final form by the U. S. Joint Psychological Committee on 1 April 1953. On 13 April, CINCFE made AFFE the coordinating authority for the project, which was to be initiated about 15 April, the exact date to be agreeable to AFFE and FEAF.[121] The Fifth Air Force on 21 April issued the necessary instructions providing for the reception of such Communist aircraft and airmen as defected.[122] And finally, on 27 April MOOLAH was implemented, the date being set to coincide with the resumption of armistice negotiations: General Clark selected that particular date in order to give the Communists some "extracurricular worries" at the same time at which he was having troubles with Syngman Rhee.[123] Following the initial leaflet drops, two more drops were made: 90,000 leaflets upon two enemy airfields near the Yalu on the night of 10 May and 400,000 leaflets in the same area on the night of 18 May.[124]

The results of MOOLAH were difficult to assess. One journalist whose article extolled the Harvard Russian Research Center stated that: "It proved astonishingly effective. As a direct result, all MIGs were promptly grounded for eight days. Even when they started flying again, the effectiveness of the Red Air Force had been seriously impaired."[125] General Clark wrote that: "The Reds' first reaction to it was to ground all MIG's for eight days. It might have been because of the weather, or because they wanted time to screen out the politically unreliable pilots. Most likely it was the latter." General Clark also thought it significant that "the Communist MIG pilots who were permitted to fly after the offer was made were the worst—on their record—of the whole Korean war."[126]

Closer analysis of the record fails to substantiate the claim that following the implementation of MOOLAH "all MIGs were promptly grounded for eight days." On 28 and 29 April adverse weather kept the MIG's and most Sabres grounded, but on 30 April an estimated 166 MIG's were sighted and the Sabres shot three of them down. Activities of the MIG force were slack on the first three days of May when the weather was completely operational: 30 MIG's were sighted on 1 May, 44 on 2 May, and none appeared on 3 May. Thereafter through 7 May the weather was marginal to nonoperational, and, although hostile flights were tracked by radar, no enemy aircraft were sighted. While there were no engagements between Sabres and MIG's during the first seven days of May, there was no substantiation for such a sweeping claim as that all MIG's were grounded.[127]

There was some circumstantial evidence that the USSR feared the MOOLAH offer more than did the Chinese and North Koreans. An unlocated

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radio transmitter began jamming Russian language broadcasts of the reward for defector pilot but did not interfere with Korean or Chinese language versions. Possibly pertinent was a Soviet news broadcast which noted that Soviet Far Eastern audiences were being shown a film depicting the failure of U. S. intelligence agents to bribe the crew and passengers of a Czech plane into defecting to the west. On 27 May, moreover, an unusual message from Korean Communist leader Kim Il Sung to the "heroes" of the NKAF promised that this air force would have a greater responsibility for air defense than theretofore and exhorted Korean airmen to strengthen their military discipline and protect their equipment.[128] Presumably the Russians may have well believed that the UNC reward offer would appeal to their satellite airmen: the leaflets, for example, carried the picture of Lt. Franciszek Jarewski who had flown his MIG-15 from Poland to political asylum in Denmark in March 1953. It is possible that in early May the Russians may have withdrawn their own and their European satellite pilots from the Korean conflict: during this month, as has been seen,* the Sabre pilots speculated that there had been some change in the nationality of MIG pilots. As for getting the MIG-15 aircraft which USAF desired for tests, MOOLAH was quite unsuccessful. On 21 September 1953, North Korean Lt. Ro Kum Suk did bring a MIG-15 aircraft to Kimpo, but Lt. Ro's defection was due to his disgust with the Communist regime and he claimed never to have heard of the $100,000 windfall which he was to receive.[129] The final FEAF statement on MOOLAH was: "No positive information has been made available to substantiate the conclusion that the announcement of the $100,000 offer was responsible for any variation in Communist air activity." [130]

IMPROVING THE PERFORMANCE OF THE SABRE

Gunnery Problems: In Korea almost all air-to-air fighter versus fighter kills were made from fairly close range and from dead astern. Although necessary because of aircraft performance and the geographical situation, Sabre pilots recognized a number of disadvantages to the stern attack: a tail chase, even when the Sabre possessed an initial speed advantage, normally covered so much ground that the MIG could be expected to escape across the Yalu; moreover, if either a MIG or a Sabre pilot prolonged a tail chase, he could expect a coordinated hostile attack on his own rear. The MIG's structure was also such that it was least vulnerable to attacks from this quarter: in this attitude the MIG presented its smallest area, its engine protected the main fuel cells, and both engine and armor plate protected the pilot. For this reason the estimate was that from the rear only 6 or 10 percent of hits scored on a MIG could result in kills.

Sabre Aces agreed that the most desirable spots to gun a MIG were in the cockpit or just behind it and into the engine and fuel tanks, but the best of them found such deflection shots next to impossible in the usual combat situation. With the existing Sabre equipment the best attacking attitude was therefore from astern and up the MIG's tail-pipe: at close enough range such an attack would nearly always badly damage the MIG and might slow it up enough so that better aimed bursts could shoot it down. The MIG, moreover, had a "U" shaped auxiliary fuel tank wrapped around its tailpipe. Because this tank apparently had no self-sealing or purging feature the enemy pilot probably was expected to exhaust it first, but if a Sabre's burst found fuel in this tank there was an excellent possibility of a stern kill. These rearward attacks nearly always damaged and frequently destroyed MIG's, but they increased the longevity expectations of the MIG pilots: the Fifth Air Force estimated, for example, that at least two-thirds, and probably more, of the MIG pilots shot down in Korean combat successfully escaped their aircraft and returned to fly again.[131]

Project GUN-VAL: Quite early in their stint of duty in Korea, Sabre pilots reported and gun camera film verified that they were getting a large number of hits on MIG's without destroying or slowing these planes. The Sabre pilots found that their six M-3 .50-caliber guns were effective at ranges within 1,000 feet but not so effective in the typical stern chases where they could get no closer than from 1,500 to 2,500 feet. Most pilots believed that heavier armament would have en-

*See p. 57.

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abled them to have destroyed a number of MIG's at ranges up to 2,500 feet, which had otherwise been claimed as "damaged" or "probables." What 4th Wing pilots wanted was a six 20-mm. cannon battery with the high cyclic rate and dependability of their old machine guns. Already cognizant that fuel-purging systems and the fleeting opportunities of jet combat demanded harder-hitting aerial weapons, the USAF had in design more destructive weapons. Under development were two revolver-type guns based on German experimental designs: the T–130, a 15-mm. gun, and the T–160, the same gun in a 20-mm. size. The objective of this developmental program was a high rate of fire weapon which could use 15-mm., 20-mm., or 27-mm. ammunition merely by interchanging barrels and ammunition drums.[132]

Delivery of production versions of the T–130 and T–160 guns began in October 1952, and an Air Proving Ground Command (APGC) project called GUN-VAL was promptly established to test the 20-mm. gun in combat. Eight GUN-VAL F–86F's, each equipped with four T–160 guns, were received by the 4th Wing in January 1953.[133] Twelve combat sorties were flown and three MIG's fired on at extreme ranges without apparent damage before 25 January, when one of the GUN-VAL pilots, returning from a "MIG Alley" test, cleared his guns at 37,000 feet over the Yellow Sea. This pilot experienced an immediate engine compressor stall and was unable to restart but successfully ejected and was rescued from the water.[134] The diagnosis was that blast gases resulting from simultaneous firing of all four guns at high altitude had caused a compressor stall, and wiring circuits in a local fix were changed to permit selective firing of two guns above 35,000 feet and four guns below this altitude.

Investigators at Wright Field determined that about four times as much gas was emitted from the muzzles of four T–160's as from six M–3 machine guns, and power plant technicians conceded that a sizeable puff of burning gas could enter the air intake of a jet fighter and snuff out its engine. While the Fifth Air Force experienced three of these compressor stalls when the four-gun battery was fired at high altitude, a variety of field test agencies in the United States at first failed to reproduce the burning gas effect. Using special ammunition, the North American Company in March 1953 finally was able to reproduce these stalls, and it then devised blast deflectors which in tests dissipated the gun gases. Such blast deflector kits were sent to Korea, but there they failed to accomplish their purpose, perhaps because of some peculiarity of atmospheric conditions. Until the gun gas phenomena was exhaustively tested and better understood, further developmental work was effectively halted.[135]

In Korea, however, results of GUN-VAL were not entirely disheartening. Using limited fire the T–160 equipped F–86F's in the period February through April 1953 flew a total of 284 combat sorties, sighted 139 MIG's, and fired on 41 of these. Of 22 MIG's seen to be hit, 6 were destroyed, 3 more probably destroyed, and 13 damaged. If the GUN-VAL aircraft had been able to use all four guns there was a good probability that there would have been more kills. No GUN-VAL aircraft were destroyed by enemy action, although one was lost because of the gun gas induced stall and another to engine failure not related to this problem. The T–160 guns demonstrated a capability to fire consistently at a rate of 1,500 rounds per minute with a stoppage rate in 108,893 rounds fired of only 2.2 per thousand rounds. The Korean phase of GUN–VAL was ended on 1 May 1953, at which time the remaining aircraft in the project were returned to the United States for further testing.[136]

Gun-Bomb-Rocket Sighting Systems: Few problems in the Fifth Air Force were more vexing and longer lived than those involving the electronic sighting systems used in late model Thunderjets and Sabres. The F–86A's first arrived in Korea with K–18 sights, but these sights received adverse reports and were replaced on production model F–86E's with a newly developed J–1 fire control system. This system, also installed in later model F–84 aircraft, comprised the A–1C gun-bomb-rocket (GBR) sight, the AN/APG–30 radar, a range servo, and a power pack. The USAF Air Materiel Command later conceded that the decision to produce the A–1C sight had been a little premature, considering its state of development. Too few trained maintenance people were available in the theater, and supply support and test equipment were inadequately provisioned.[137]

Although the A–1C sight differed radically from the gunsights it superseded, spare parts, spare components, and test equipment did not reach the Far East until at least six months after

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the sight was first put into use in mid-1951.[138] In the meanwhile, the sighting system was beset by a multitude of maintenance problems, some due undoubtedly to rough Korean runways which jarred delicate electronics components, but most of them developed from a dearth of trained personnel, necessary equipment and supplies, and a general lack of pilot training in the use of the system. Sabre pilots soon came to have little faith in the sight's functioning, and as a result many of them favored the clearly inferior but dependable K–18 sight, while others caged the A–1C sight to eliminate radar and gyro-inputs and get fixed sight characteristics. Considerable reliance was also put in tracer ammunition, which allowed several MIG kills to be made when sighting systems failed; this tracer ammunition also made jittery MIG pilots break and permitted the pursuing Sabre to close.[139] The F–84 fighter-bomber pilots similarly used the A–1C sight in make-shift fashion: for dive-bombing one wing used the rocket setting with the sight caged, the other wing used the bombing function as intended but released manually, and neither F–84 wing successfully used the automatic bomb function.[140] In February 1952 the Fifth Air Force director of operations had witnessed so much trouble with the A–1C sight that he informed a staff conference that it was "too complicated to be maintained." [141]

General Weyland was nevertheless convinced that the A–1C sight and its associated equipment had not received an adequate test in combat, and at his request the Air Materiel Command instituted all-out remedial action. Having diagnosed the problem as one of inadequate provisioning and insufficient technical training, the AMC and the Air Training Command cooperated in a project called JAYBIRD, which sent technicians to Korea both to renovate the sighting systems and to train the wing sight specialists needed to maintain them. At the suggestion of this team various local remedial actions were also taken: one which proved very practical was to consolidate squadron sight maintenance sections into one fighter wing sight shop, allowing maximum use of scarce personnel and equipment.[142] By the end of June 1952 project JAYBIRD had almost completed its work and sighting system problems were much improved. Factors which contributed to JAYBIRD's success were a high USAF precedence and supply priority which permitted adequate supplies of test equipment, spare parts, and components and the utilization of topflight technical representatives. In addition, JAYBIRD provided an emergency solution to the perplexing problem of systems responsibility: the J–1 fire control system comprised components manufactured by at least five contractors, no one manufacturer having had complete systems responsibility. The USAF project officer with JAYBIRD assumed such a responsibility with complete success.[143]

Hardly had the problems of the J–1 fire control system been brought under improved control, however, than production model F–84G's and F–86F's began to arrive in the Far East with an improved MA–3 system, incorporating a new A–4 GBR sight. These planes arrived in August through October 1952 without prior notification that the sighting system had been changed, and they were unaccompanied by necessary test equipment.[144] Once again there was a lag, this time of four months, before adequate spare components and specialized test equipment were made available in the theater.[145] Meanwhile, frequent radar malfunctions rendered these automatic-computing sights useless except in manual ranging positions. When the sight did work it was very effective, but numerous design difficulties made it so undependable as to raise new pilot doubts as to the value of the equipment.[146] In the Thunderjet wings the automatic dive-bombing function of the A–4 sights proved unsatisfactory, necessitating the use of the rocket function for fixed-sight bombing. The Fifth Air Force now frankly questioned the use of any system where two of its three basic functions were out of order.[147]

Once again the AMC instituted remedial action, and in February 1953 a 15-man team of technicians reached Korea to institute a five-fold project called SIGHTLINE. This project provided a 90-day stock level for the A–4 sight at each K–site, provided each unit with its authorized test equipment and instructed maintenance personnel in its use, replaced D–7 inverters with more rugged D–2 inverters, set up a depot maintenance shop at FEALOGFOR for the repair of sighting systems, and designed and supplied mobile armament systems trailers which could perform the work previously done in improvised radar sight shops. An arrangement was made whereby FEALOGFOR controlled all sight and radar equipment and ran a twice-weekly C–47 courier service to each K-

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site.[148] By October 1953 SIGHTLINE had completed its work and all sight systems had been provided with the latest modifications. The 58th Fighter-Bomber Wing spoke for the success of the project, calling it "outstanding." [149] Shortly after SIGHTLINE had gotten to work, discontent with the A–1C and A–4 gunsights and the APG–30 ranging radar materially diminished. Greater experience with the systems, improved supply and maintenance, and better training provided the answers to the sighting system problems.[150]

Improvements to the mechanics and electronics of the fire control systems were made by both JAYBIRD and SIGHTLINE, better suiting them to their specialized purpose in Korea. The A–1 and A–4 sights, for example, had been designed to compute leads at ranges up to 1,500 yards. While this feature was desirable against slow-moving bomber targets, it introduced over-sensitivity when the sight was used against a violently maneuvering MIG at the closer ranges demanded by the M–3 machine guns. A "Jenkins Limiter" which was worked out at the Air Proving Ground reduced the sensitivity of the sight at long ranges and provided visual indications to the Sabre pilot when he was within a preselected maximum shooting range.[151]

Preparatory to the utilization of the F–86F as a fighter-bomber, the A–4 sight was especially modified for this work by the addition of a manual pip control (MPC), consisting of a bombing altimeter and a dive-angle indicator. Activated by an off-on toggle switch, the MPC when "on" provided a control which would electrically depress the A–4 sight reticle through a range of 0 to 170 mils.[152] Under the combat conditions in Korea the MPC was unsatisfactory, "primarily because it is not tactically sound to depend on pre-planned entry altitudes and air-speeds for the dive bomb run." Use of the automatic bombing function of the A–4 sight was similarly unsatisfactory, with the result that F–86F fighter-bombers continued to use the rocket function for the most satisfactory dive bombing. The final Fifth Air Force report on the F–86F fighter-bomber noted that the terminal velocity of this aircraft was usually constant in a dive-bombing run and release altitudes could be instinctively determined through practice; the recommendation was therefore made that the A–4 bomb function should be deleted, the gunnery and rocket functions retained, and a gyro-controlled automatic sight depression system added to the sight for varying dive angles in bombing runs.[153]

The many troubles incident to the use of the A–1 and A–4 GBR sights led to serious questioning as to whether they should be retained on USAF fighters, or whether such systems were merely 200-pound "luxury gadgets" which represented superfluous weight. In the summer of 1952 some 14 Korean Aces, who had fought the MIG when the A–1 sights were performing at their worst, vigorously recommended to General Vandenberg that the A–1 sight be replaced with a manual ranging, gyro-computing sight similar to the K–14 or K–18. On 8 September 1952, General Vandenberg therefore directed both the APGC and FEAF to evaluate the sight problem. An APGC test soon concluded that the kill probability with the A–4 sight with radar ranging was twice that attainable with the A–1 or K–14 sights with manual ranging. The APGC recommended that efforts be made to improve the reliability of the sighting systems, especially the functioning of the APG–30 radar. A seminar of current Fifth Air Force Aces, held on 11 September 1952, agreed that the automatic features of the A–1 gunsight should be retained. In Korea they recognized that most MIG kills were obtained from low deflection shots, but all of the pilots attributed this to the short-range guns of the Sabre. With improved armament, they predicted that deflection shots would become more usual. It was true, they said, that superior pilots with a number of years of experience would probably do well with a Mark 18 sight, but in any future conflict they foresaw that the burden of air combat would fall upon younger pilots who would have neither the experience nor the training which would make them superior gunners. The Sabre Aces believed that sighting system problems could be resolved by a redesign to include fast change components, judicious assignment of competent technicians, and an accelerated training program both for the technicians who would maintain and the pilots who would use the automatic sighting systems.[154]

Performance Problems: During most of 1951 it seemed to Sabre combat veterans that the USAF was giving far too much attention to armament problems and was failing to come to grips with the fact that under the conditions of the Korean air-to-air war the MIG–15 could simply outperform the F–86A and F–86E aircraft then in use. "Almost

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all the experts except those who actually fought here," observed a 4th Fighter-Interceptor Group study, "looked at everything but the thrust coming out of the tailpipe." What the group wanted was an ability to match the MIG–15 in climb, ceiling, and top speed: "When a man goes hunting with a gun," the study pointed out, "he's got to get close enough to whatever he's after with that gun to kill it." [155] On 26 December 1951 a man who had fought in Korea, Col. J. C. Meyer, who before his recent return to the United States had commanded the 4th Wing, wrote Lt. Gen. Earl E. Partridge, who had formerly commanded the Fifth Air Force but now commanded the USAF Air Research and Development Command, concerning the subject which was uppermost in the minds of combat Sabre pilots: improvement of the Sabre's performance. Quite promptly, on 11 January 1952, General Partridge established an A–1 priority ARDC program designed to increase Sabre performance. Three avenues of approach to the problem were ordered explored: reduction of the weight of the Sabre, reduction of the drag of the Sabre, and increasing the war emergency thrust of available Sabre engines.[156]

Thrust Augmentation: As the Wright Air Development Center (WADC) got to work on this crash project, improving the F–86 performance by the reduction of its weight sounded very feasible, but investigations soon demonstrated that while equipment adding to the basic airframe could be stripped off there was no way to get rid of the extra weight which had been built into the airframe to accommodate this equipment. North American Company engineers drew up plans to reduce the Sabre's weight by 2,800 pounds, but these plans required a virtual redesign of the airframe which would take about as much lead time to effect as the production of an entirely new aircraft.[157] Any immediate reduction of the Sabre's weight was therefore infeasible.

Some good progress was made in increasing the thrust of existing Sabre engines. Representatives of North American, who reached Korea in March 1952, demonstrated that a slight readjustment of the nozzle area of the tailpipe would increase its temperature by 70° centigrade and permit the use of full-rated thrust at altitudes above 35,000 feet. In October 1952 the installation of needle valves to change fuel spray patterns allowed Sabres to maintain a constant tailpipe temperature of 690° from the ground to 40,000 feet, so contributing to full-thrust operations at high altitudes.[158]

There was some initial hope that over-temperature operations of a Sabre engine for short periods might be practicable: tests showed that at 820° a J–47 engine delivered approximately 15 percent more thrust at 35,000 feet, but the same tests demonstrated that such a practice would be so deleterious as to be impracticable in Korea, where logistical support was already marginal. Two other projects were undertaken to secure thrust augmentation. Water-alcohol injection already was used to increase the thrust of jet engines on takeoff, and tests indicated that water-alcohol injection at altitudes of 40,000 feet would give a substantial burst of power without substantially decreasing engine life. The disqualifying defect of this technique, however, was the extra weight of the additive and the apparatus required. In order to provide two minutes of water-alcohol injection at 40,000 feet, some 1,000 pounds of fluid and apparatus had to be added to the total weight of the aircraft. This possibility was therefore laid aside in favor of pre-turbine fuel injection, which promised to create an after-burner effect in the normal combustion chamber of the J–47 engine. Although tests of preturbine injection were very promising, long term developmental work was required and nothing in this line would become available for operations in Korea.[159]

In an effort to better the burst performance of the Sabre, North American engineers in May 1952 installed three solid fuel rocket bottles on this fighter. Each of the bottles developed 1,000 pounds of added thrust, and they could be fired simultaneously with a burning time of 14 seconds or in overlapping sequence with a time of 38 seconds. The additional thrust provided a noticeable but not outstanding improvement of performance: in a climbing turn the increased thrust increased speed by about 20 knots. While the drag of the installation was negligible, the weight penalty was on the order of 600 pounds before the rockets were fired and 450 pounds after they were fired.[160] By early August 1952 five of these rocket kits were in Korea, and subsequent combat testing soon demonstrated that the added thrust was not sufficient to warrant the additional weight and impaired maneuverability of the aircraft at high altitudes. Pilots said that it was quite difficult to stabilize the Sabre when the rockets were fired,

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and one pilot reported that the ensuing disturbance had actually prevented him from destroying a MIG. Combat tests were accordingly ended in November 1952, and the installations were removed from test aircraft. The final FEAF report stated that the rocket installation was unsatisfactory because the short duration of added thrust made timing of employment extremely critical, they were an added weight penalty, the installation created longitudinal instability which reduced maneuverability, the duration of the thrust was too short and the thrust itself was insufficient, the turnaround time on rocket-equipped aircraft was almost three hours instead of a normal 30 minutes, and, finally, the rocket smoke betrayed aircraft positions.[161]

Solid Leading-Edge Wings: The most significant development on the Sabre which would be of value in time for the Korean operations lay in the reduction of its drag. In deference to the stall characteristics of a swept-back wing, the Sabre had been designed and manufactured with standard leading-edge wing slots. For experimental purposes, however, the North American Company retrofitted one F–86E with extended, solid leading edge wings. Colonel Meyer flew this modified plane and reported enthusiastically in December 1951. Late in January 1952 test pilots at the WADC also obtained favorable results from an F–86 whose wing slots were sealed with fabric and dope, and, while flight tests with the proposed modification were still underway at Edwards AFB, the Fifth Air Force, on 26 April 1952, signaled its impatience to service test the solid leading edge modification in combat.[162] The Edwards tests soon showed that the new solid leading edges, which increased each wing chord by six inches at the base and three inches at the tip, were a "noteworthy improvement." Such tip-stalling characteristics as the modified wing brought could be reduced by the installation of a small flow fence on the upper wing surfaces.[163]

When the first four of an initially ordered 50 leading edge wing kits were ready a WADC team left with them for the Far East on 28 July 1952. By 18 August, three 51st Wing F–86F's had been modified and put into combat. The pilot response was highly enthusiastic, and the project officer reported that once pilots had flown the modified F–86 they were reluctant to fly the unmodified aircraft. At the end of August, FEAF requested procurement and delivery of sufficient "6 x 3" leading edges to retrofit all F–86E and F–86F aircraft assigned to the Fifth Air Force. Procurement of additional kits for modifying all Fifth Air Force Sabres was initiated in September 1952.[164]

As employed in Korea the Sabre with solid leading edge wings demonstrated substantial advantages over those with the older wing configurations. It climbed faster and had greater level flight speeds at all altitudes; there was a significant improvement in available "G-loadings," particularly from .85 to .95 Mach where maneuverability of the unmodified aircraft was poorest. With drag decreased, the cruising range of the modified aircraft was automatically increased. In short, the modified Sabre could out-maneuver its unmodified equivalent, particularly at high altitudes and high Mach, and it had improved high speed performance. At high Mach numbers at all altitudes the accelerated stall characteristics of the modified aircraft were superior. The modified Sabre required larger traffic patterns and hotter landings since the stalling speed of the solid leading edge was approximately 10 knots higher than the slot type leading edge, but as one combat pilot remarked: "Since the air war is not won in the traffic pattern these characteristics cause little concern."[165] With some additional development, which would not be completed in time to see service in Korea, it would be possible to add fuel cells in a "wet" extended leading edge configuration, thus allowing the Sabres internal fuel roughly equivalent in added range to the two 120-gallon external tanks habitually carried for operations in Korea.

Improved Combat Performance of the Sabre: When the F–86F, with its higher thrust engine, was equipped with the solid leading edge wings, the Sabre series finally reached a performance nearly equalling that of the best of the MIG–15's. That the solid leading edge planes were in combat, however, was one of the best kept of USAF technical secrets, and this modification was mysteriously mentioned by the American press as the "new secret device" and "new combat device" which was resulting in increased MIG kills. By late March 1953, Col. James K. Johnson, commander of the 4th Wing, could state with some exaggeration that "the performance of the F–86 and MIG–15 are practically equal," provided the F–86 was maintained in peak condition.[166] In

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April, however, FEAF nevertheless informed the ARDC that "MIG kills are continually lost each day due to the inability of the F-86 to close on the MIG." FEAF wanted still more thrust augmentation for the Sabre which would permit it to "obtain complete air superiority." [167]

That the improved performance of the F-86 Sabre contributed to the successful kills of MIG-15 aircraft in the final months of the Korean war is undoubtedly true. Thus in May and June 1953 the percentage of engaged MIG's which were destroyed jumped from approximately 5 to 15 percent, and this improvement was no doubt due to the improved performance of aircraft and armament systems.[168] But, as is the case with most glib generalizations, it would be erroneous to ascribe the Sabre victory to any "new secret device." Much more judicious and aptly describing the improved situation was the already noted statement of General Anderson, who said: "The Fifth Air Force maintained air supremacy through an adequate combination of the technical capabilities of its fighter aircraft with superior individual pilot proficiency, flight integrity, and air tactics." [169]

NIGHT COMBAT OVER NORTH KOREA

Augmentation of Red Night Air Defenses: By a change-over to night shoran bombing techniques, the FEAF Bomber Command in November 1951 regained an ability to operate freely over northwestern Korea.* Just as promptly, however, the Communist enemy began to figure out and implement countertactics to these night bomber operations. In September 1951 the enemy had already begun using radar for searchlight control; that the Reds were using S-band gun-laying radars was evidenced in October 1951, and this type of radar was shortly confirmed in the vicinity of Sinuiju, Sinanju, Namsan-ni, Taechon, and Pyongyang. Employing the airfields at Sinuiju, Uiju, Antung, Ta-tung-kou, and Ta-ku-shan to support night air operations, the Communists began a serious effort to use for their night defenses, a variety of day fighter aircraft including such jets as MIG-15's, Yak-15's, and Type-15's, Type-8's and such piston aircraft as LA-5's, LA-7's, LA-9's, Yak-9's, Yak-11's, and IL-10's. First damage to a UNC plane by Red night fighters occurred on 16/17 November 1951 when two interceptors caught a night intruder B-26 in a searchlight cone near Sunchon and sent it limping home with major damage. On 23 December 1951, when the 19th Bombardment Group attacked Uiju airfield with 8 B-29's in clear weather, the Reds demonstrated coordinated fighter-searchlight tactics. A majority of the bombers were illuminated, and two of them were damaged by enemy fighters.[170]

Fifth Air Force radar surveillance of the skies over North Korea nevertheless revealed that the Communists laid no quantitative stress on night air operations until June 1952, the same month during which it was noted that their coordinated day fighter defenses apparently went into operation.[171] After June 1952 the Reds effected an air defense of northwest Korea which was even more hazardous to UNC night air operations in that area than it was to the day air operations which have just been reviewed. As was the case in day operations, the MIG-15 was probably the meanest of the aircraft which UNC pilots met at night over the enemy territory. But, in common with the other day fighters which the Communists employed for night defense, the MIG-15 lacked airborne intercept (AI) radar. Either the Communists did not have this radar, or else they did not wish to jeopardize their EWP by employing it, but, whatever their reason may have been, the Reds never employed airborne intercept radar over North Korea. This meant that Red night fighter pilots had to visually identify a target at night before they could fire on it. Judged from performance comparisons with equivalent American equipment, the Communist CPS-6 type GCI radar at Antung had a capability to position a Red jet type fighter within 2 to 5 miles to the stern of a UNC bomber at a distance up to 70 miles out, but in order to make a kill the Red night fighter pilots had to follow through on a crash course until they could catch some glimmer from their target. Since this was manifestly very difficult, the Reds made few attacks against FEAF aircraft during the time in which these aircraft were dispersed enroute to or returning from targets. Instead the enemy pilots concentrated their defensive efforts in the space between the bombers' initial point and the target (usually some 40 nauti-

*See AHS-72, pp. 179-85.

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cal miles or 9 minutes for B–29's flying a shoran arc), at the target, and in the general area of the breakaway from the target. Lacking enough gun-laying radars and needing to use day fighters in night fighting roles, the Reds made extensive use of searchlights.[172]

Vulnerability of UNC Aircraft to Night Air Defenses: Flying generally at fairly low levels against diversified targets and enjoying the protection of dispersion and mountainous terrain, over which pursuit was hazardous, Fifth Air Force night-flying B–26's frequently sighted unidentified aircraft but were not too often molested by Communist night fighters. These light bombers were not routinely employed in the area north of the Chongchon River, and the night intruder crews were enjoined to maintain a constant alert against enemy night fighters, especially when flying at higher altitudes to and from their assigned reconnaissance and target areas. So far as was known, no B–26's were lost to enemy night fighters during the last year of Korean hostilities. As a matter of policy the light bombers attempted to avoid known flak traps and areas heavily defended by antiaircraft artillery, unless their assigned targets lay within such areas. Communist mobile automatic-weapons and small-caliber fire could be expected at almost any time over the main supply routes, and as a measure for conserving the light bombers against unnecessary loss the Fifth Air Force generally required them to maintain attacking altitudes of 4,000 feet and permitted only select night intruder crews to attack at lower levels.* Not even these restrictions could preserve the light bombers against enemy flak, and in the months of combat from July 1952 onward a total of 23 of them were lost due to enemy action.[173]

Unlike the light bombers, the B–29 medium bombers of the FEAF Bomber Command were vulnerable both to hostile antiaircraft artillery and night fighters and, during the last year of the Korean war, had no choice but to operate in a situation which lent almost every advantage to Communist night defenses. The most lucrative medium bomber targets remaining in Korea were in the northwestern extremity along the Yalu, where Red flak, searchlights, fighters, and radar facilities were the thickest. A combination of shoran techniques and the smallness of the target area negated any great possibility of deception. Medium bomber feints or other diversions designed momentarily to confuse hostile GCI had little potential value since the bombers would thereby have to spend more time over enemy territory, while the speed of MIG interceptors was such that they could be easily recalled from misleading vectors: a MIG, for example, could reach Pyongyang within 15 minutes after its takeoff at Antung. Geographical limitations also necessitated fairly fixed medium bomber routes and coast-in points over Korea, but these routes and points were changed as much as possible.

The stereotyped tactics possible with shoran added most to medium bomber vulnerability. Only one station pair of shoran arcs could be used for radar bombing in northwestern Korea, thus permitting a maximum of four arcs over a given target and even fewer arcs if the target lay near the Yalu. When the Reds became familiar with these shoran arcs they concentrated flak defenses along them, and quite frequently the Reds were able from their past experience to figure out what the target was going to be before the bomb run was much farther along than the initial point. Over northwestern Korea a combination of the service ceiling of the medium bombers and the altitude at which shoran pulses could be satisfactorily received allowed the medium bombers no great variation in bombing altitudes: with a full bomb load, a B–29 had a service ceiling of approximately 26,000 feet, and over Sinuiju dependable reception of shoran pulses could not be had below 23,000 feet. In the winter months, moreover, condensation of vapor trails formed at increasingly lower levels and acted as pointers exposing the locations of the medium bombers. In January and February 1953 the contrail level on some nights went down as low as 19,000 feet, so that there was no escaping these contrails. Over northwestern Korea in the last year of the war, any means of tactical deception available to the medium bombers was least possible in the very area of the most lucrative targets.[174]

Medium Bomber Losses to Red Night Defenses: For eight months after November 1951 the medium bombers utilized darkness and shoran techniques to operate over North Korea with near impunity, but on the night of 10/11 June 1952 the Reds demonstrated that their defenses had caught up with the change in B–29 tactics. On this clear

*See Chap. IV, pp. 110–11 and Chap. V, pp. 160–61.

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moonlight night, 11 B–29's of the 19th Bombardment Group were sent to bomb the railway bridge at Kwaksan, just west of Chongju. Searchlights locked on each successive B–29 of the 35-minute long bomber stream, while at least 12 MIG fighters prosecuted coordinated attacks, apparently under the guidance of a Red air commander who flew parallel to the bombers. One B–29 exploded over the target, a second went down from a fighter attack which hung on tenaciously through the breakaway, and a third received such major damage that it was forced down at Kimpo. The only B–29 in the stream which escaped the merciless glare of the searchlights had been the last one over the target, and it had employed electronics countermeasures (ECM).[175] Having drawn their first blood, the Red night fighters continued to be aggressive. On the night of 12/13 September, hostile fighters worked again with the searchlights to destroy a 307th Bombardment Wing aircraft over Sui-ho. On the night of 18/19 November the Communists revealed another tactic when they shot down a single 98th Bombardment Wing B–29 which had just bombed the Sonchon supply center: shortly after bombs-away an enemy aircraft, riding directly above the B–29, dropped a series of three flares, one each time the bomber changed direction. These flares enabled some 20 searchlights to lock on the bomber for fully four minutes, in which time four fighter passes so badly riddled the bomber that its crew abandoned it off Cho-do (island).[176]

During December 1952 and January 1953 the Communists made extreme efforts to drive the medium bombers out of the skies over northwestern Korea. The B–29's picked up searchlights almost everywhere north of the Chongchon, and there were fairly positive reports that two Russian night fighter units were keeping a standing patrol of seven or eight MIG's airborne between the Chongchon and the Yalu and that they augmented this patrol as necessary when the B–29's came on Red GCI scopes.[177] On the night of 30/31 December, when the moon was full and directly overhead and contrails were streaming at the 25,000-foot bombing altitude, three 19th Group B–29's were coned by searchlights as they attacked an ore processing plant at Choak-tong. While a propeller-driven aircraft flew above the bombers, flashing alternate red and white lights, Communist fighters came in to shoot down one B–29 and damage two others so badly that they were forced down at Suwon.[178] Bomber Command attributed these losses to the moonlight and to the contrails, but on 10/11 January 1953 a 307th Wing plane, in the dark of the moon but drawing light contrails, was illuminated by some 18 searchlights, hit by flak, and then shot down by fighters over its target area, the Anju marshalling yard.[179] Again on 12 January a lone 91st Reconnaissance Squadron RB–29 which was dropping leaflets along the Yalu was shot down. Not much was known of the details of this attack other than that the RB–29's radar track was intercepted by some 12 enemy fighters. On 28/29 January, again in the full of the moon but without assistance from either contrails or searchlights, enemy fighters shot down a 19th Group B–29 over Kompodong; apparently these fighters silhouetted the bomber against the moon and required no other illumination. On 30/31 January these same tactics were repeated against a 307th Wing mission which bombed the Unjong-ni supply area; some 10 aggressive Red fighters prosecuted attacks which sent one bomber badly damaged to an emergency landing in South Korea. The Communists had now demonstrated an ability to make effective attacks by moonlight, without the assistance of searchlights or contrails.[180]

The total number of these Red night attacks was not great: Bomber Command reported only 20 non-firing and 23 firing passes made against its aircraft in January 1953. But the loss of four B–29's in such short order indicated that the Communists were doing their best to force a reduction in medium bomber operations. Their coordination was good: they were using moonlight and contrails for visual identification and for follow-up attacks, controller aircraft for coordinating fighter passes, and GCI for vectoring the interceptors to the vicinity of the medium bombers. Although searchlights stood ever ready for the task, and flares had been put into use, the Communists were using moonlight for the identification of their air targets. In the two attacks at the end of January, moreover, the Reds had made their first confirmed use of aerial rockets, one report stating definitely that a MIG had launched six of these missiles from positions under its wings.[181]

To Bomber Command and to its commander, Brig. Gen. W. P. Fisher, January 1953 was a desperate month. "The air war," wrote General

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Fisher, "is getting tougher all the time from our viewpoint. We are using every bit of ingenuity and changes in tactics we can think of to get by without losses, but it is getting pretty tight." Shortly afterwards, General Fisher again described the situation which was facing the FEAF Bomber Command as its old B–29's operated over North Korea:[182]

> The Communists have developed their GCI capability extremely well. They have an abundance of well-trained, highly skilled night fighters; they have built up their searchlight defense considerably; and finally, they have developed tactics and techniques of using them very well. The only link missing needed to give them a really effective defense system is the reliable establishment of contact at the last moment to enable their fighters to accurately bring their armament to bear on our B–29's.

But the situation confronting Bomber Command was darkest in January 1953, and thereafter not another medium bomber would be lost during the Korean war. This was not going to be due to chance but would rather be "a demonstration of the results of close attention to planning factors learned by experience throughout the war and especially during the final seven months of the war."[183] Ever since Kwaksan, Bomber Command had been working diligently in search of tactics and equipment which would defeat the Red menace. Some of these tactics proved unsuitable, some were insufficient by themselves, but by February 1953 a combination of these tactics into a general "razzle-dazzle" bore fruit.

COUNTERING THE COMMUNIST NIGHT DEFENSES

Adjusting Attacks to Weather: For some time prior to Kwaksan Bomber Command had been seeking a means of reducing the advantages which the inflexible shoran arcs permitted to Communist defenses. Since Red night fighters lacked airborne intercept radar and since the Reds did not have enough gun-laying radars, the surest way to avoid medium bomber losses was to keep these vulnerable aircraft out of searchlight-defended areas except at such times as there was instrument weather or at least enough undercast to baffle the lights. Cognizant of the situation, FEAF gave the word on 28 June 1952 that the medium bombers would not attack heavily defended searchlight areas except on special order. The efficacy of timing medium bomber attacks to coincide with bad target weather was demonstrated on the night of 30 July 1952, when 60 B–29's in the largest medium bomber night strike against a single target in the Korean war destroyed the Oriental Light Metals Company, only four miles from the Yalu and eight miles from Sinuiju. The bomber stream reported some 87 sightings of hostile fighters and received 33 firing and 9 nonfiring passes, but a thin undercast at 12,000 feet baffled the hostile searchlights and all the B–29's escaped damage.[184]

But the dependence upon bad weather for covering B–29 attacks against searchlight defended targets did not promise complete satisfaction. Weather predictions were so frequently inexact that an airborne commander in a lead ship had to reconnoiter targets in advance of the main bomber stream. If there was not enough cloud cover, the airborne commander was hazarded, and even if there was enough cover to warrant bringing in the bomber stream the lead plane, having had to fly a longer mission, would have had to carry a reduced bomb load. Dependence on bad target weather for bombing, moreover, meant that only a fraction of Bomber Command's destructive potential could be exploited on a when and as needed basis. "Given 60 hour notification," stated Brig. Gen. Wiley D. Ganey, commander of the FEAF Bomber Command, in August 1952, "60 B–29 aircraft can be placed within 1,000 feet of any target within shoran range. To limit such a force to bad weather conditions indicates that targets remaining in North Korea either are not suitable for medium bombing or that the Air Force is at the mercy of a defensive tactic discarded as outmoded . . . five years ago."[185]

By October 1952, however, two missions had demonstrated that searchlight suppression was infeasible and tests had shown that Thunderjet day fighters could not escort night-flying B–29's;* thus it still appeared that the only way in which the medium bombers could attack sensitive targets on the Yalu was to time such attacks to coincide with instrument weather over the targets.[186] During October, General Weyland had been quite anxious to get medium bomber strikes laid against military targets in Sinuiju and on the airfield at Uiju, but he agreed to Bomber Command's proposal that

*See pp. 74–75.

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such strikes would have to be delayed until after mid-November, when the weather pattern was expected to change and the medium bombers could expect clouds over these heavily defended targets. But when, on 28 November, Bomber Command finally ran the delayed mission to Sinuiju, expecting to find predicted instrument weather at this target, the 44 bombers were instead met with a clear, bright night, with not a cloud in the sky and the moon at its zenith. Fortunately, Bomber Command had not solely relied upon the predicted bad weather but had worked other tactics into its mission plans: three bomber forces, separated by 45-minute intervals, were each directed to cross the target within five minutes (bucking the headwinds encountered, however, required 10 to 15 minutes over the target), while enough separate shoran aiming points were assigned to allow 10 separate initial points and approaches. All ECM equipment in the command was employed, both electronics jamming and chaff. The overall results were fortunate: despite a target defense of some 116 heavy guns, 94 of them controlled by radar, only two aircraft received minor flak damage. Although 40 searchlights probed the sky and nine enemy fighters tried to intercept, only one enemy firing pass was made and it was ineffective. After this mission to Sinuiju, Bomber Command recognized that the accuracy of forecasting required successfully to utilize weather cover could not be obtained, and it gave up further efforts to use weather predictions as mission planning factors.[187]

The phase of the moon and atmospheric conditions resulting in contrails were more predictable matters, and after the medium bomber losses in December 1952 and January 1953 were attributable to these causes, General Fisher took the problem to General Weyland. As the result of the agreement reached between these two officers, Bomber Command during February 1953 launched no attacks in the area between the Chongchon and the Yalu in periods of bright moonlight, nor were targets attacked which required a flight altitude at contrail forming levels. General Fisher disliked this policy, representing as it did a reduction in his force capability, but it paid dividends: that month only one 98th Wing B-29 was damaged, this occurring on 14 February and accomplished by a coordinated fighter and flare attack.[188] In March 1953 the contrail level began to lift and soon was no problem at medium bomber attack altitudes; the weather also began to worsen over northwestern Korea, and thereafter Bomber Command operated into this heavily defended area with more liberty. The factor of moonlight was nevertheless continued as a matter of consideration in planning medium bomber missions into the sensitive area.

Failure of Searchlight Suppression: Believing strongly that the Communist fighter-searchlight combination promised future bomber losses when important targets were attacked, General Ganey on 22 June 1952 requested and FEAF subsequently directed that the Fifth Air Force would discover a means of suppressing searchlights.[189] Bomber Command suggested that B-26 light bombers might orbit in a target area and use frag bombs and rockets against searchlights, or perhaps the B-26's might be able to lay smoke screens, creating artificial clouds over the target.[190] For its own part, Bomber Command asked permission to use the small HAIL or LAZY DOG weapons (free-falling, finned bullets, carried in great numbers in B-29 hoppers, and designed primarily for antipersonnel use) against searchlights, but FEAF was unwilling to relax its policy that this weapon would be used only against major enemy troop concentrations in conjunction with friendly or hostile ground offensives.[191]

The Fifth Air Force appeared unenthusiastic concerning searchlight suppression, mainly because at best it promised no more than partial success.[192] At General Ganey's urging, however, an experimental mission was run on the night of 12/13 September, when, in clear weather, the medium bombers made a follow-up attack against the Sui-ho hydroelectric plant. Six B-26's attempted to suppress searchlights: first an airborne command B-26 established a control and orbit point from which the second B-26 proceeded to the target with the first B-29 and the remainder of the light bombers attacked at 25-minute intervals thereafter. The Fifth Air Force had thought that the searchlights would be located around the outer perimeter of the target and that the guns would be inside this perimeter, but such was not the case at Sui-ho, and the B-26's were compelled to fly through the flak defenses. Under this circumstance the M-90 flares which the B-29's dropped to give the light bombers a ground reference did more harm than good, since they exposed

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them to ground fire. Altogether the light bombers destroyed only 8 out of 30 or more searchlights (a part of them were across the Yalu and out of bounds), and at no time did the guns or the lights leave the B-29's. Bomber Command, however, had not entirely depended upon the searchlight suppression: 6 ECM B-29's got through to take up orbits about 20 miles east of Sui-ho, where they jammed the hostile radars while 29 other bombers attacked the hydroelectric plant. The aircraft over Sui-ho met box-barrage flak, heavy and intense, this type of fire control evidently being used because of the ECM jamming. A number of the attacking bombers were damaged by flak, and the lead 307th Wing underwent fighter attack which exploded one of its planes over the target. After this mission was over, the Fifth Air Force noted that its searchlight suppression efforts had been "unsuccessful," but FEAF nevertheless concluded that a combination of ECM, chaff, and searchlight suppression had saved the medium bombers from much higher losses.[193]

Much the same tactics were again attempted on the night of 30 September/1 October 1952. In this mission 48 B-29's, including 3 which first suppressed flak and searchlights with frags and then established an orbit from which they jammed enemy radars, effectively attacked the Namsan-ni chemical plant near the Yalu. Seven B-26's managed to suppress 8 out of 40 searchlights, and the remainder of these lights were kept sweeping wildly by the ECM and made only five short lock-ons. Flak was heavy, moderate to intense, and accurate, and several bombers were damaged, but none of the Red night fighters in the area were able to make successful firing passes.[194] General Ganey expressed his personal appreciation for the searchlight suppression, but once again the Fifth Air Force reaction was that its B-26 effort amounted to no more than a harassment.[195] FEAF conceded that searchlight suppression had not been 100 percent effective but observed that "the missions were successful in that some of the searchlights were destroyed and others rendered less effective." Colonel E. B. LeBailley of the 3d Bombardment Wing considered that the missions were "substantially successful within the bounds laid upon the U. S. aircraft by higher authority," but such searchlight suppression tactics would not be again employed during the Korean hostilities.[196]

Fighter Support for the Medium Bombers: At the same time that the searchlight suppression experiments were being run, both the Fifth Air Force and the FEAF Bomber Command were investigating the feasibility of providing fighter support for the medium bombers. The Fifth Air Force possessed one squadron of night interceptors—the 319th Fighter-Interceptor Squadron, based at Suwon (K-13)—but this unit's F-94B aircraft had on board the latest USAF E-1 fire control system, and, rather than have this equipment compromised by the loss of an aircraft over hostile territory, USAF had dictated that these planes would be confined to use in local scrambles under positive GCI radar control and at no great distance north of the bomb line.[197] This restriction greatly limited the Fifth Air Force's capability, when, after June 1952, it set about providing night fighter combat cover in support of medium and light bomber attacks. The only aircraft which it could possibly use were conventional F7F's belonging to Marine Squadron VMF(N)-513, which had older, already theoretically compromised airborne intercept radar. Beginning in July 1952 this Marine squadron made available some four planes nightly for supporting the medium and light bombers. Bomber Command used these Marine night fighters to precede its bomber stream by about five minutes and to patrol the stream from the IP to the target. On other occasions the Fifth Air Force used these same planes to good purpose: the presence of the Marine night fighter cover, said the Fifth Air Force director of operations, was the prime factor in the success of light bomber rail reconnaissance attacks made in the seldom-visited northeast Korean coastal area during September 1952.[198]

Lacking a sufficient night fighter capability for the tasks presenting themselves, FEAF authorized Bomber Command and the Japan Air Defense Force to test the practicability of using day fighters for the support of medium bomber night operations. Already in an effort to destroy the Red airborne commanders who customarily hovered about the area where medium bombers were under attack, the Fifth Air Force had experimented unsuccessfully with a couple of F-84's, which had no airborne radar but depended on friendly GCI to place them in the same area with enemy night-flying aircraft.[199] During August

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and September 1952 the FEAF Bomber Command and the JADF utilized their 98th Bombardment and 31st Fighter-Escort Wings in a project called NO–GLO, designed to determine whether F–84G day fighters could escort medium bombers at night and perhaps knock out a few searchlights in the target area. A maximum of two F–84's did prove able to fly along with a single B–29 at night, but it was evident that such escorting day fighters "would be completely ineffective against enemy night fighters." Moreover, no effective flash suppressor equipment could be had for the guns carried by the F–84G's, and without such equipment the fighter pilots could not simultaneously strafe and retain their needed night vision. NO–GLO, in a few words, had no promise of helping the medium bombers.[200]

Despite the failure of NO–GLO and the fundamental limitations of the conventional F7F's (commander, 1st Marine Air Wing, called them "completely ineffective" for battling Red jet night fighters[201]), the Fifth Air Force remained highly interested in the support for bombing operations. In early November 1952, VMF (N)–513 secured 12 F3D–2 Skynight all-weather jets, which were available for use in North Korea: possessing an older type AN/APG–26 radar ranging system, these jets could make deep penetrations without the danger of compromising new equipment. These F3D's initially provided "barrier cover"—patrols 20 to 50 miles north of the attacking bomber stream—which was credited by General Fisher with "some small degree of success" since it turned back some enemy interceptors. This barrier cover also destroyed two enemy aircraft: on 3 November a Skynight pilot got the first night kill, jet versus jet, when he was vectored by GCI to shoot down a Yak–15 near Sinuiju, and on the night of 8 November northwest of Sonchon[202] another F3D shot down an aircraft believed to be a MIG–15.

During November 1952 the Fifth Air Force got permission to use its F–94's for deep penetrations into North Korea: presented with the problem while he was visiting in the theater, General Vandenberg personally authorized the Fifth Air Force to remove the restrictions on the employment of these all-weather fighters.[203] The 319th Squadron was accordingly directed to utilize a part of its strength in flying escort for the B–26 light bombers and for maintaining night screens between the Yalu and the Chongchon rivers.[204]

Successes of Red fighters against the medium bombers during January 1953 bespoke the need for increased friendly fighter support, but neither the extent of the friendly radar control nor the strength of night fighters allowed much expansion of the system. The Cho-do GCI was unable to control more than four interceptors at one time, and the number of all-weather fighters available to the Fifth Air Force remained pegged at 12 F3D's and something less than 25 F–94's. In January 1953 the 1st Marine Air Wing commander requested 12 additional "highly effective" F3D's to replace an equivalent number of "completely ineffective" F7F's, only to be informed by CINC Pacific Fleet that night air defense in Korea was primarily a USAF responsibility and that maintenance considerations would have to temper any immediate granting of the request.[205] The 319th Squadron remained continuously short on an average of 5 out of 25 authorized F–94's due to the critical shortage of these aircraft in the USAF; not until early July 1953, when it was necessary to build all units up to strength in order to be present and counted as the armistice went into effect, was the 319th Squadron brought up to strength.[206]

Although the potential in the form of aircraft needed for the performance of the night bomber support mission remained scanty, a joint conference at Fifth Air Force headquarters on 27 January 1953 devised joint procedures designed to get maximum cooperative results.[207] Since their radars could receive IFF emanations from the B–29's, the F3D's were assigned a close escort role. Earlier that month in response to a Bomber Command request for "overhead cover" the F3D's had begun to position themselves at the bomber IP and, holding an altitude 2,000 to 3,000 feet above the big aircraft, they followed the bomber stream to the target and through the target breakaway. If a bomber was coned by searchlights, the F3D's sought to cover its tail. Using these tactics, the F3D's got two kills, one each on the bright moonlight nights of 28 and 31 January 1953.[208] The Fifth Air Force conference determined that F–94's could best be employed in night barrier counterair patrols. On such a patrol on the night of 30 January 1953, Capt. Ben L. Fithian and his observer, Lt. Sam R. Lyons, shot down an LA–9 for

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the first kill by an F-94B in Korea; the victory was made in completely blind firing, at minimum airspeed and altitude, the F-94 firing by radar from 600 through 200 yards range.[209]

The procedures and tactics agreed upon at the Fifth Air Force conference were employed without especial change until the last weeks of the Korean war. Dispatched in numbers ranging from 4 to 6, the F-94's maintained counterair patrols under GCI direction at a point about 30 miles in advance of the medium bomber target. For the usual escort mission, 9 F3D's were scheduled, with 2 of them serving as spares, to accompany the bomber stream along the initial point-target-target breakaway route. These escorting aircraft employed either "racetrack" or "pacer" tactics, the former requiring them to orbit above and outside the bomber stream and the latter obligating them to keep pace with the bomber stream at spaced intervals above and outside of it. One or more F3D's additionally provided a "target CAP," orbiting the target in a combat patrol. Some 20 minutes prior to the bomber time on target, both escort and barrier aircraft were required to report to a controlling TADC, and they were vectored to intercept such hostile aircraft as might be within the area. After the bomber stream approached its target, however, the TADC did not vector escort aircraft away from its vicinity, unless the plane was in "hot pursuit" with an airborne intercept radar contact on a suspected hostile aircraft. In the last weeks of hostilities, when most B-29 targets were at or near the Yalu, the F3D's were additionally assigned such barrier patrols as could be flown in the restricted area of operations.[210]

How effective these escort and barrier fighter patrols were in shielding the medium bombers from hostile fighter attack could never be exactly determined. Both F3D's and F-94's demonstrated abilities to destroy enemy aircraft, and the 319th Squadron added to its initial kill with victories over high speed jet aircraft on 10 May and 12 June 1953.[211] Since the enemy's effort against individual bomber missions remained unknown, it was difficult to determine just how many enemy fighters may have been turned back by the presence of the all-weather fighter escort. Bomber Command nevertheless stated that: "numerous unidentified aircraft approaching the bomber stream were turned back by the escorting or barrier fighters, and although fighter escort did not prevent attacks, it was a great morale boost for the aircrews to know that there were friends out there in the dark as well as enemies." [212]

Compression of Bomber Streams: Of capital importance in the revised Bomber Command tactics was the effort to achieve a high degree of compression of the bomber stream in the time and space above its targets. The bomber stream which attacked Namsan-ni on 30 September, for example, took two hours to get over the target, a long enough period of time to permit the enemy to give each bomber his full attention. As a matter of highest precedence in October 1952, Bomber Command therefore emphasized compression of its bomber streams, reducing the planned lateral interval between individual bombers from three minutes to one minute. Whenever possible, moreover, the bomber stream was assigned as many as four shoran aiming points, so that several aircraft could attack simultaneously, if desirable, from different headings, each crew using the altitude hole of the AN/APQ-13 radar to assure that there was bombing clearance below. A kindred technique was to assign two or more shoran points as close together in a target complex as 500 feet which sections of the bomber stream, flying parallel shoran arcs, bombed simultaneously. This technique and the use of one minute time separation meant that within a space 1,000 feet wide by 8 miles long there could be as many as 9 strike aircraft, each giving mutual support to the other.[213]

Constant practice in compressing the bomber stream enabled the 98th Bombardment Wing to cut its bombing interval down to 1:15 minutes in February 1953; the same wing reported very good results in bombing separate shoran targets simultaneously: seven minutes was the maximum difference between all bombs away and in one case the two leaders of parallel formations bombed their targets only one second apart. The attainment of such close intervals of attack, however, was plagued by the high velocity, hard to predict, winter winds aloft over Korea, which varied with altitude so markedly that low aircraft could easily underfly higher aircraft. Winds aloft predictions, moreover, were so frequently in error that the average bombs-away time was 16 minutes off, early or late. In this situation, the 98th Wing used several techniques to ensure proper spacing between its

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strike aircraft: for east coast targets pre-IP radar positioning was used, for enemy targets in the southwestern portion of enemy territory the bombers flew navigation control problems using one of numerous conspicuous radar checkpoints as a control point, for northwestern Korean targets a spacer leg, commencing at a point approximately 10 minutes flying time from the briefed initial point, was flown.[214] These compression tactics continued in emphasis throughout the remainder of Korean hostilities and secured uniformly good results in the form of lower medium bomber casualties. FEAF later noted that: "During the Korean conflict, maximum compression of the bomber force was the outstanding device for reducing overall risk." [215]

Electronics Countermeasures: In the spring of 1953 Bomber Command operated over heavily defended targets in the dark of the moon and at altitudes not permitting contrails, always in compressed bomber streams. By these expedients it forced the enemy to depend principally upon his inadequate gun and searchlight control radars for locating the bombers, at the same time that compressed air attack permitted greater concentrations of electronics countermeasures, chaff and electronic jamming, in the target area. The electronics countermeasures (ECM) techniques used in Korea were not new, but many old lessons in their application had to be relearned.

During World War II electronics countermeasures reduced combat losses by as much as an estimated 25 percent, but by 1948 ECM had been largely forgotten and certainly neglected. Although a revitalization of ECM was well underway when the Korean war broke, the first phase of Korean hostilities posed no need for these activities, since North Korean flak and radar capabilities were negligible. But as the Communist defenses increased there was a requirement for ECM. Bomber Command attempted its first electronic jamming on 10 April 1951, and thereafter it accelerated its training program for ECM crewmen. Over Kwaksan in June 1952 the value of ECM was demonstrated when the only B-29 to use it was the only plane to escape hostile searchlights. After this, ECM became a matter of priority emphasis: chaff was first dispensed on the 12 September attack against Sui-ho and electronic jamming was greatly emphasized on this mission. Bomber Command's capability was also enhanced by a reorganization of ECM planning and using activities. A reconnaissance technical squadron facility was set up to evaluate, collate, and disseminate electronic data obtained by ferret aircraft. An additional enlisted crew member was added to perform ECM duties. Bomber Command's intelligence and operations functions were each augmented by qualified ECM officers.[216]

Even after the "go ahead" authorization was given to medium bomber crews to employ ECM there was a continous struggle to acquire an adequate supply of the necessary equipment. One problem was the fact that shoran equipment cut the aircraft power available for ECM about in half, with the result that the aircraft had to use limited power output sets, which, however, were generally sufficient for such precision type short range radar as the enemy used for controlling his guns and searchlights. Generally, a B-29's four available electronics racks carried an AN/APR-4 receiver and three jammer transmitters: an AN/ARQ-8 primarily useful against gun-laying radars, an AN/APT-1 primarily useful against GCI and height finder (HF) radars, and an AN/APQ-2 which was primarily used against searchlight control radars. Or a B-29 sometimes carried a receiver, two transmitters, and an AN/APA-11 pulse analyzer. The combinations of jammers usually carried gave each B-29 a capability to disrupt two or three frequencies simultaneously with 10 to 30 watts of limited power. This equipment was of World War II vintage: a few new AN/APT-9 jammer transmitters received by the 307th Wing in May 1953 represented the only postwar equipment used by Bomber Command in the Korean war. Bomber aircraft dispensed two types of chaff: the RR-3A/U rope type chaff supplemented electronic jamming against all low frequency gun-laying, searchlight control, and GCI/HF radars while RR-20A/U chaff provided the only protection against hostile S-Band gun-laying and GCI type radars, no electronic S-Band jammers being available. All aircraft carried at least one carton of RR-3A/D chaff for emergency dropping. The effectiveness of chaff was seriously impaired by excessive dispenser malfunction rates, running as high as 40 per cent, due mainly to deteriorated condition of the chaff tapes, but in the last two months of hostilities improvements in loading techniques, better dispenser maintenance, and increased supplies of

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rayon taped chaff gave a marked increase in effectiveness. The amount of ECM equipment in medium bomber wings remained short of authorized quantities, the R-54/APR-4 receiver and AN/ARQ-8 transmitter being particularly critical. This short supply of ECM equipment used in combat seriously handicapped training since very few sets were available for ground instructional purposes.[217]

To train and make available enough high quality enlisted ECM operators for the B-29 crews proved an all but impossible problem. Prior to September 1952 the 12 ECM operators authorized each wing were presumably competent but actually not all of them were experienced and the wings rarely possessed their authorized quotas. After September 1952 the majority of ECM filler replacements, now authorized at a rate of one per crew, were predominantly inexperienced radio operators and either inadequately or not at all trained in ECM, nor were all bomber units fully manned until just before the war ended. Extensive theater training was required before a filler could qualify as an ECM operator in a combat crew. The end results of the low level of ECM operator proficiency were such as to force competent ECM operators to fly an abnormal number of missions while the poorer operators were not able to execute tactics properly but rather maintained continuous pressure for permission to conduct unlimited barrage jamming, or else laid corollary requests on intelligence to specify the exact frequencies use by enemy radars which would be encountered on a mission.[218]

The tactical usage of ECM in Bomber Command aimed at providing the required protection while disclosing as little as possible of ECM capabilities. While over enemy territory bomber crews were charged carefully to monitor the frequency band from 65 mcs. through 220 mcs. and to accomplish spot jamming any time that a signal reached sufficient intensity to represent a hazard to the aircraft. When more than one dangerous signal was received, first priority was given to searchlight control radars provided enemy fighters were reported in the area or weather permitted effective use of the lights. When the fighter-searchlight combination was not a threat, first priority went to gun-laying radars. The last priority was assigned to GCI/HF radars. Since the policy was to use ECM only against immediate threats, no attempt was made to jam early-warning radars. Jamming of high frequency communications used in GCI-fighter direction nets, easily accomplished with a bomber's liaison set plus a special modulator, was allowed only on strikes along the Yalu River, but jamming of very high frequency GCI communications was never allowed, partly because it involved compromise of advanced techniques but mainly because of the priority assigned to intelligence functions monitoring these nets. Over the most sensitive targets continuous drops of chaff screened the bomber from the ground radarscope, a maximum B-29 load of four cartons lasting approximately 8 minutes when dropped continuously at a rate of 20 feet per minute. Emergency drops of chaff—dispensed at a high rate of 40 to 80 feet per minute—were employed only when electronic jamming failed to break searchlight illumination of an aircraft.[219]

As was true with each of the individual tactics adopted by Bomber Command it was impossible to assess exactly what part of the favorable results was due to electronics countermeasures. Compression of the bomber stream, for example, lent peculiar success to ECM since it permitted a much greater concentration of chaff and electronic jamming power in a sensitive target area. In the compressed bomber stream aircraft provided mutual protection, often being covered when experiencing ECM malfunctions. The ECM weaknesses of individual B-29's, such as the lack of a large chaff carrying capacity, the inability to jam more than 2 or 3 signals simultaneously, and the low wattage output of the jammers, were compensated in the compressed bomber stream. Simultaneous attacks along multiple shoran arcs to the same target complex also encouraged the use of continuous chaff drops. ECM nevertheless offered substantial demonstrable benefits, especially against searchlights: during the period 1 January to 27 July 1953, a total of 534 B-29 sorties sighted searchlights and 114 aircraft were illuminated, in which cases ECM caused the searchlights to fall off in at least 87 reported instances. In only 12 instances was ECM reported as ineffectual against searchlight lock ons, but in many of these cases the aircraft were flying in clear weather or drawing heavy contrails, which presumably enabled the searchlight operators to maintain visual contact with them.[220] FEAF concluded that

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ECM was most effective against searchlight control radar, almost as effective against gun-laying radar, and least effective against GCI. Without ECM the official FEAF thought was that the combat losses and damages to the B–29's would have tripled after 1 November 1951. Aside from keeping Bomber Command's losses low, concluded FEAF, one of the greatest benefits derived from the use of ECM in Korea was the re-education of unit commanders, unit staffs, and hundreds of bomber crews in the value and application of these countermeasures.[221]

Augmenting Medium Bomber Defense Capabilities: Concurrently with the devising of the tactics designed to thwart the Red's fighters, Bomber Command undertook other actions designed for a better defense of its individual aircraft. On 4 July 1952, as soon as glossy black paint could be gotten after Kwaksan, all units began to give their aircraft protective camouflage for passive defense. All aircraft in the command were supposed to have their undersides painted, but before the work could be completed a mission on 30 July 1952 demonstrated the value of the passive defense: aircraft not painted had searchlights lock on them from 2 to 5 minutes while those that were painted were locked on only up to 30 seconds. Tests run by the 98th Wing also demonstrated that a painted aircraft was some 30 percent harder to see when viewed under searchlight illumination from an intercepting fighter pilot's position in the air. These tests showed that there was no appreciable difference whether the B–29's were painted with glossy or flat black paint, it being practically impossible for a searchlight crew to track visually a camouflaged B–29 at 20,000 feet. At first there was a good bit of indecision as to whether it would be necessary to paint vertical stabilizers, but tests showed that these surfaces were frequently illuminated by searchlights, and on 1 December 1952 Bomber Command issued standardized instructions requiring that all aircraft be camouflaged with black gloss lacquer completely on the undersides up to the centerline of the fuselage and including the vertical stabilizer and propeller hubs. General Fisher felt so strongly on the subject of camouflaging all surfaces which could be illuminated by searchlights that he recommended that all SAC bombers be so painted before commitment to combat.[222]

Before Kwaksan, in recognition of the limited defensive capabilities of the B–29's at night (there were 13 machineguns in turrets but all sighting was visual) and through the belief that gun flashes would simply betray the bombers' position, medium bomber crews had been coached to fire only in last resort. On the morning of 11 June 1952—the morning after Kwaksan—General Ganey called FEALOGFOR asking for flash suppressors and within 48 hours he was furnished four different locally manufactured designs and one standard item. Best of the designs was for a slotted suppressor derived from an APGC paper on flash suppression, and this suppressor was speedily procured and all aircraft were completely equipped with it by the end of 1952. Beefing up of the B–29 armament by the installation of B–50 tail turrets was also expedited, such action progressing to completion in early September 1952.[223] General Ganey also placed an urgent requirement for APG–30 radar tail warning equipment for Bomber Command aircraft; when he took command General Fisher forcibly agitated the need for this equipment; but Bomber Command's priority was too low to get this needed radar and such had not been installed at the end of hostilities.[224]

The ability to exchange fire with enemy pilots greatly boosted the sagging morale of medium bomber crews, but after 24 July, when one B–29 crew shot several holes through another's bomb bay, decision had to be made that crews in bomber streams could fire only at fighters positively identified as hostile or actually attacking the bomber. The need visually to sight the enemy before firing on him greatly limited the effectiveness of B–29 gunnery. Some use was made of the altitude hole of the AN/APQ–13 radar to follow enemy fighter passes originating below the bomber, and friendly GCI could sometimes tell a bomber crew that a hostile fighter was on its tail, but firing contact remained visual, and, although he stressed techniques designed to build night visual acuity, General Fisher noted that in many cases gunners were unable to get a glimpse, or if they saw the enemy jets at all it was at a moment when the hostiles were already passing the bombers.[225] Over the Pyongyang area on 9 September two 343d Squadron gunners were credited with shooting down a Red propeller plane, but doubtless the main effect of the usual bomber fire was merely to blunt the

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ardor with which hostile pilots pressed attacks. This thought caused a reassessment of the policy toward tracer ammunition: it had been long thought that enemy pilots would more easily locate night-flying bombers if the latter used tracers, but a restudy of the matter by the 98th Wing in February, with experienced Marine night fighter crews observing, showed that a solid loading of one turret gun with M–21 headlight tracer would probably have a considerable value in deterring enemy attack. When fired at night the headlight tracer looked like the flash from a 20-mm. cannon with an extremely high rate of fire, and one Marine pilot said that such a burst in his face in the last moment when he poised for visual contact before firing would definitely impair his night vision. The gunners were therefore allowed to draw the headlight tracer ammunition.[226]

Experiments in the Strategic Air Command having shown that exposure to an intense light for only a minute fraction of a second could destroy a fighter pilot's night vision at ranges up to 2,000 yards, two other projects were designed to reduce the visual acuity of Red night fighter pilots. One project in the Far East involved modification of an M–8 pyrotechnic pistol to fire an M–112 photo flash cartridge at intercepting fighters. Nothing much was done with this idea, but concurrently the Wright Air Development Center was working on "Glow Worm," an experimental 500,000,000 candlepower light to be linked with an AN/APG–30 ranging and tracking radar which would track an enemy aircraft until it reached a critical range, at which time it would flash the light in the pilot's eyes, causing him temporary blindness for five or six seconds. This device promised much but it was not available for service test in Korea before the end of hostilities.[227]

Summary of the B–29 Experience: Although the B–29 Superfortress had been the premier strategic bomber of World War II, the "old war horse," used disadvantageously in a tactical role proved unable to operate in daylight against the opposition of modern MIG–15 jet fighters in Korea. Having lost six B–29's to MIG attack and one to flak in rapid succession in the period 22 October through 9 November 1951, Bomber Command had shown a commendable versatility in converting its effort to night-flying, highly accurate shoran attacks, which enabled it to continue to strike its designated targets without great loss of efficiency. The old and weary B–29's had proven unable to operate by daylight against jet interceptors: it appeared doubtful, moreover, that any propeller driven medium bomber could ever again be employed during daylight hours in less than total air superiority. Other than the loss of a 98th Wing bomber to flak on 29 February 1952, Bomber Command operated at night over North Korea with impunity until 10 June 1952 when the loss of two 19th Group B–29's over the not too important railway bridge at Kwaksan signalled that the enemy's fighter-searchlight defenses were becoming effective. Quite promptly, Bomber Command recognized the gravity of this challenge and began to devise countertactics, but these tactics, each valuable in itself, required time to meld and integrate, with the result that in the period 18 November 1952 through 30 January 1953 the Red air defenses were in the ascendency, costing Bomber Command five bombers destroyed and three others so badly damaged as to require depot reclamation.

After 30 January 1953 Bomber Command's firm adherence to well thought out planning factors effectively negated the ever growing Red air defenses and no more medium bombers were lost. Attacks were scheduled and timed as irregularly as possible; altitudes were varied, the bomber stream was compressed, and multiple shoran approaches were used. Contrail altitudes were avoided, and heavily defended targets were whenever possible attacked in the dark phases of the moon. The B–29's were camouflaged, and medium bomber crew defenses were augmented. Friendly night fighters flew barrier patrols and provided cover and escort for the bombers. Electronics countermeasures were employed constantly and with great success against enemy gun-laying and searchlight control radars. The amalgamation of these tactical developments represented a satisfactory adaptation of the B–29 air weapon to temporal conditions in Korea: they deterred hostile fighter attacks and rendered the medium bombers less visible to the eyesight of enemy pilots, who, lacking airborne intercept radar, had to see a bomber before they could make an effective firing pass. Here, of course, was the limiting weakness in Bomber Command's tactics: "If they [the Communists] ever crack that last link and get an all-weather capability of pressing an accurate firing attack," predicted General Fisher, "the B–29 business is really going to get rough."[228] The Reds, how-

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ever either did not possess an electronics equipped all-weather fighter, or did not choose to employ such an aircraft in Korea, and because of this providential unreality the old and weary B–29's weathered the crisis of the last year of Korean hostilities.

AIR DEFENSE OF SOUTH KOREA

Communist Air Menace to South Korea: Charged with the air defense of the Far East Command, commander FEAF had at the beginning of Korean operations charged the Fifth Air Force to maintain the air defense of so much of this area as lay within Korea and its adjacent sea frontiers. The commander, Fifth Air Force, thus served also as the commander, Korean Air Defense Region. Easily laid out in mission assignments, the air defense of Korea was more difficult to implement with radar, antiaircraft artillery, and aircraft, with the result that throughout the course of hostilities the Korean air defenses were marginal and represented a never comfortable calculation of the degree of risk attached to the likelihood of Communist air attack.

When the NKAF was easily destroyed in the first weeks of the war, the Fifth Air Force had little initial concern for any danger of hostile air attack in Korea and maintained no formal defense system. But when the CCAF was deployed against the UNC, the Fifth Air Force immediately began to build up its defenses. By the spring of 1952 the Korean air defenses were greatly improved but the Fifth Air Force and other UNC forces in South Korea were admittedly "vulnerable to enemy air attack." [229] Continued augmentations of the Communist air forces, especially the Chinese acquisition of IL–28 jet bombers, brought an increasing awareness of the dangers of air attack and a resultant strengthening of air defenses in the last year of the war.

Developments in Aircraft Warning Services: Available to the Fifth Air Force was the 502d Tactical Control Group whose duty it was to provide the communications, control, and warning facilities required to operate air power against the enemy. Subordinate units of the 502d provided the radar and communications network which spanned the entire peninsula. The brain of this network was the Tactical Air Control Center (TACC), operated by the 605th Tactical Control Squadron and located physically adjacent to the Fifth Air Force Joint Operations Center (JOC) in Seoul. Primarily the TACC provided current aerial information and coordinated the employment of fighter aircraft, antiaircraft units, and all other weapons allocated to the air offense and air defense. Feeding information to and receiving instructions from the TACC in June 1952 were three Tactical Air Direction Centers (TADC's) which were locally capable of performation of air surveillance and identification, directing strikes by electronic means, effecting ground controlled interceptions, and providing navigational assistance to friendly aircraft in distress. Operated by the 606th Aircraft Control and Warning Squadron was the TADC on a 430-foot mountain summit approximately one and a half miles northeast of Kimpo airfield (K–14). The 607th AC&W Squadron maintained another TADC on Kuksa-bong (mountain), approximately 25 miles northeast of Seoul. The third TADC, manned by personnel of the 608th AC&W Squadron, was situated on Hyangbyong-san (mountain), 35 miles northeast of Kangnung in eastern Korea. In addition to the standard CPS–5 heavy weight radars and related equipment in these TADC's, each AC&W Squadron utilized detachments manning light weight (LW) radars, sited where necessary to round out their surveillance. Each AC&W Squadron also possessed a Tactical Air Direction Post (TADP) needed for radar controlled strikes in support of UNC ground troops.* Providing equivalent air warnings and control services in the southern extremities of Korea were units of the 1st Marine Air Wing: Marine Tactical Air Control Squadron No. 2 operated a TACC at Togudong while Marine GCI Squadron No. 3 ran a TADC at Pochon, both of these stations being in the vicinity of Pohang airfield (K–3) on the southeastern coast of Korea. Marine GCI Squadron No. 1 operated another TADC near Kunsan airfield (K–8) on the southwestern coast of Korea. The Marine electronics establishment also included an early warning station at Cheju and a TADP which customarily occupied a blind-bombing support position to the rear of Marine ground troops on the battle line.[230]

*See Chap. VI, pp. 222–28.

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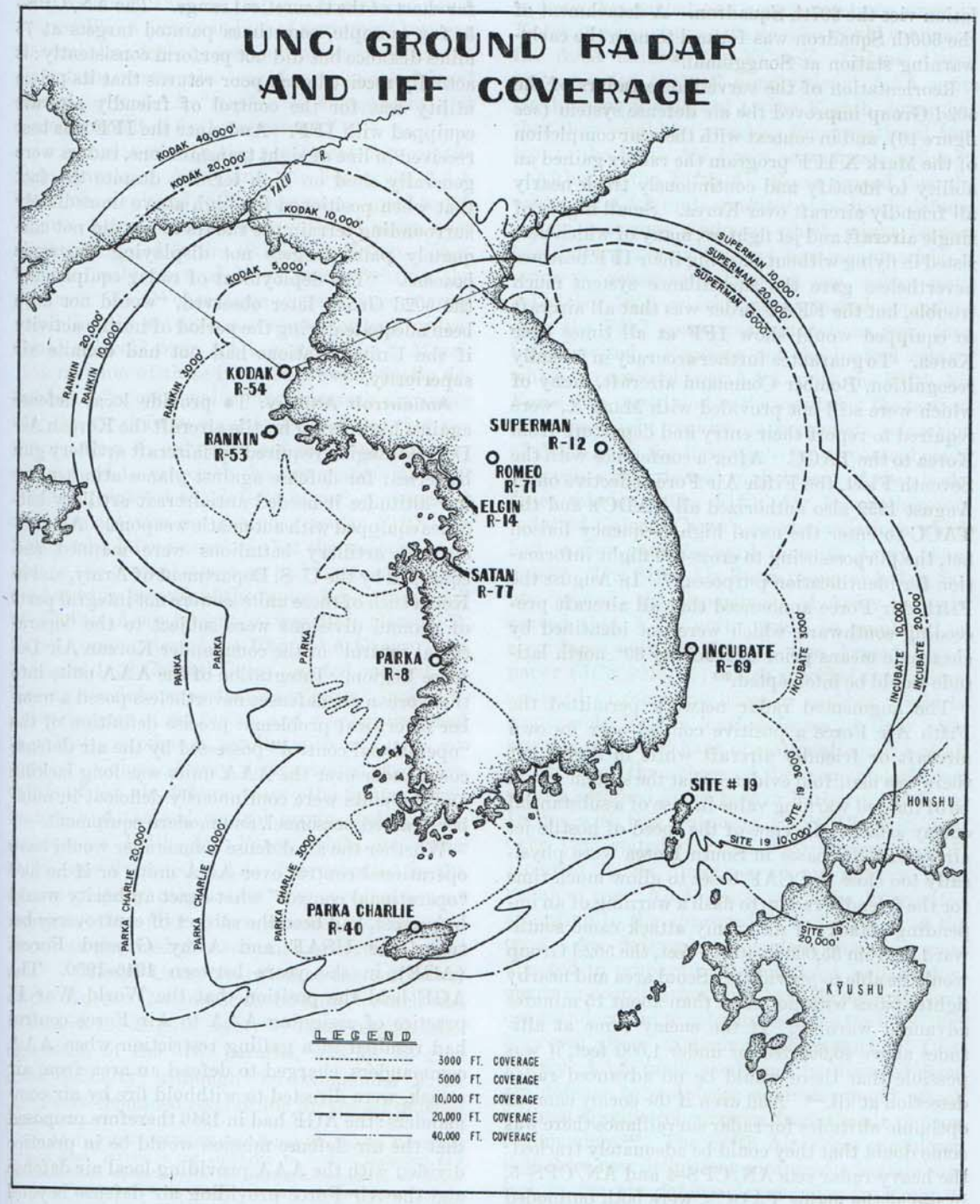

Figure 10.

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lation vice the 607th Squadron. A detachment of the 606th Squadron was formed to man the early-warning station at Songgumni.[236]

Reorientation of the surveillance radars of the 502d Group improved the air defense system (*see* figure 10), and in context with the near completion of the Mark X IFF program the radars gained an ability to identify and continuously track nearly all friendly aircraft over Korea. Small flights of single aircraft and jet fighters, many of which persisted in flying without showing their IFF beacons, nevertheless gave the surveillance system much trouble, but the FEAF order was that all aircraft so equipped would show IFF at all times over Korea. To guarantee further accuracy in friendly recognition, Bomber Command aircraft, many of which were still not provided with Mark X, were required to report their entry and departure from Korea to the TACC. After a conference with the Seventh Fleet, the Fifth Air Force effective on 11 August 1952 also authorized all TADC's and the TACC to enter the naval high frequency liaison net, the purpose being to cross-tell flight information for identification purposes.[237] In August the Fifth Air Force announced that all aircraft proceeding southward which were not identified by electronic means prior to reaching 39° north latitude would be intercepted.[238]

The augmented radar network permitted the Fifth Air Force a positive control over its own aircraft or friendly aircraft while in flight, but there was manifold evidence that the system would be of limited warning value in case of a substantial enemy attack. In view of the speed of hostile jet aircraft, UNC bases in South Korea were physically too close to CCAF bases to allow much time for the friendly radars to flash a warning of an impending attack: if an enemy attack came southward at from 35,000 to 40,000 feet, the 502d Group would be able to provide the Seoul area and nearby fighter bases with not more than about 15 minutes advanced warning. If the enemy came at altitudes above 40,000 feet or under 1,000 feet, it was possible that there would be no advanced radar detection at all.[239] And even if the enemy came at optimum altitudes for radar surveillance there was some doubt that they could be adequately tracked: the heavy radar sets AN/CPS-4 and AN/CPS-5, in use at the major TADC's, were both outmoded and sited primarily for the control of friendly aircraft. Actual "pick up" range for all radars fell far short of the theoretical range. The AN/CPS-5, for example, sometimes painted targets at 75 miles distance but did not perform consistently: it actually received such poor returns that its prime utility was for the control of friendly aircraft equipped with IFF. And since the IFF was best received in line of sight transmissions, radars were generally sited on high terrain, despite the fact that when positioned too high above immediately surrounding terrain the radars in use did not adequately paint targets not displaying electronic beacons. "The deployment of radar equipment," the 502d Group later observed, "would not have been adequate during the period of hostile activity if the United Nations had not had definite air superiority."[240]

Antiaircraft Artillery: To provide local defense against high-flying hostile aircraft the Korean Air Defense Region required antiaircraft artillery gun batteries; for defense against planes attacking at low altitudes it needed antiaircraft artillery batteries equipped with automatic weapons. All antiaircraft artillery battalions were manned and equipped by the U. S. Department of Army, and in Korea such of these units as were not integral parts of ground divisions were subject to the "operational control" of the commander Korean Air Defense Region. Integration of the AAA units into the Korean air defenses nevertheless posed a number of critical problems: precise definition of the "operational control" possessed by the air defense commander over the AAA units was long lacking and the units were continuously deficient in number, trained personnel, and modern equipment.

Whether the air defense commander would have operational control over AAA units, or if he had "operational control" what exact authority would he possess, had been the subject of controversy between the USAF and Army Ground Forces (AGF) in the years between 1946–1950. The AGF held the position that the World War II practice of assigning AAA to Air Force control had resulted in a galling restriction when AAA commanders, charged to defend an area from air attack, were directed to withhold fire by air commanders: the AGF had in 1946 therefore proposed that the air defense mission would be in practice divided with the AAA providing local air defense and the Air Force providing air defense beyond the range of ground weapons. No working agreement on this matter was reached until the Korean

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war demanded that the impasse be resolved: on 1 August 1950 a memorandum of agreement between Generals Vandenberg and Collins directed that the air defense commander would exercise operational control over AAA "insofar as engagement and disengagement of fire is concerned."[241]

In accordance with this agreement between the Departments of Army and Air Force, the AAA battalions deployed to Korea were assigned to the Eighth Army, and all nondivisional units were further assigned to the 10th AAA Group. During the early part of the Korean fighting the pertinent FEC operations instructions merely noted that the air defense commander had "operational control" over AAA units, but a 1 March 1952 revision of these instructions specifically defined this "operational control" in such a manner that the air defense commander had no other authority than to announce air raid warning conditions and to prescribe the fire control status.[242] First to point out the defects in such a command arrangement was not the commander Fifth Air Force, who later remarked that the serious weakness in the control structure had imposed no serious hardship because of the "splendid cooperation" of Eighth Army,[243] but it was Col. George B. Carey, commander of the 10th AAA Group. On 7 August 1952 Colonel Carey pointed out that the Korean air defense system was "loose," subject to grave dangers of confusion, and was not designed to achieve maximum results with available resources. Colonel Carey demonstrated that two-thirds of the air defense team—the fighter interceptors and tactical control group—belonged to commander Fifth Air Force, while the other third—nondivisional AAA—"participated in the system only by cooperation and coordination as it has not been allocated or attached to Fifth Air Force as required for essential operational control." Colonel Carey feared that the activation of the Korean Communications Zone,* which was to relieve the Eighth Army of most responsibilities south of the 37th parallel, was apt to give some difficulty: although the commander Fifth Air Force remained responsible for the air defense in both the combat and communications zones in Korea it was not too definite who would command the AAA units in the KComZ. Colonel Carey recommended that all nondivisional AAA units would remain assigned to the Eighth Army but that they would be attached for operational control to the Fifth Air Force as soon as possible.[244]

Although the Fifth Air Force agreed that the control of AAA units constituted in the air defense system a serious weakness which might become especially grave in time of paramount crisis, it made no recommendations on the matter until 5 October 1952, which time appeared opportune since the FEC operations instructions were then being revised. Pointing out the limited control which it possessed over AAA units, the Fifth Air Force then stated that in the event that the tactical situation might require an immediate relocation of AAA units the limitations on its control could seriously affect the accomplishment of the air defense mission. The Fifth Air Force therefore indorsed Colonel Carey's recommendations which had earlier gone forward through Army channels.[245] The Fifth Air Force proposal fell on fallow ground: the Department of Army had just agreed that AAA units would be employed in accordance with the Joint Action Armed Forces paper (JCS 2045/15) which specified that officers assigned to command bases or harbors would be responsible for the local defenses of their commands and would have operational control of all forces other than those of the commander's own service assigned to the base or harbor for defense. In line with this reasoning, CINCFE on 22 January 1953 stated that the "operational control" accorded in its directives to air defense commanders over AAA units would be interpreted according to the approved JCS definition of the term. Air defense commanders, however, were directed to prepare plans for AAA unit deployments in coordination with local Army and Navy commanders and to submit the plans for CINCFE approval prior to their implementation. Conversely, AAA units would not be diverted from air defense to a defense against ground attack without specific concurrence from the air defense commanders.[246] The Fifth Air Force considered that these new definitions conferred adequate control to the air defense commander in Korea.[247]

Similarly satisfactory arrangements were worked out relative to the responsibilities of

*On 10 July 1952, CINCFE established the Korean Communications Zone, giving it the authority to control logistical and administration operations in the southern two-thirds of South Korea to the rear of the Eighth Army's combat zone. Establishing a small headquarters at Taegu, the KComZ assumed its duties on 13 August 1952 (*See* FEC Comd. Rpts., July 1952, pp. 90-91 and Aug. 1952, p. 50).

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Eighth Army and KComZ to the AAA units. All Army nondivisional AAA units would remain assigned to Eighth Army and attached to the 10th AAA Group. Logistical support for AAA units in southern Korea would, if expedient, be supplied by KComZ, but the commander 10th AAA Group, who also served as AAA advisor to commander Fifth Air Force, would be responsible for all individual and unit training. The over-all mission given to the 10th Group was "to provide AAA defense, under operational control of commanding general Fifth Air Force, for United Nations installations in Korea in accordance with priorities coordinated and recommended by the commanding generals Eighth Army, Fifth Air Force, and KComZ and approved by CINCFE." [248] These instructions did not precisely state which headquarters would issue movement directives or initiate deployment plans, but the Fifth Air Force chose to let the system work without trying to tie it down too exactly.[249]

Although the control of AAA units in Korea thus lacked precise definition during much of the period of hostilities, commander Fifth Air Force, following the spirit of the FEC and FEAF operations instructions which made him air defense commander in Korea, chose to exercise a high degree of initiative and the Eighth Army accorded him complete cooperation, the purpose of both organizations being to secure the maximum defense of the most critical installations with the minimum of available antiaircraft artillery units. During 1951 when the Red air forces were growing and UNC air wings were establishing themselves at Korean bases, the Fifth Air Force had stated the requirement for nine automatic weapons AAA battalions and five gun AAA battalions, but in June 1952 only four of the desired automatic weapons battalions (the 50th, 76th, 865th, and 933d) and only four of the five desired gun battalions (the 68th, 78th, 24th, and the 1st Marine AAA Gun Battalion) were assigned. Although CINCFE repeatedly reminded the JCS that the AAA units in Korea were too few for an adequate defense, the Department of Army was unable to meet stated FEC requirements. Two battalions sent to the Far East late in 1952, moreover, departed the ZI with 75 and 78 percent operational readiness, the Department of Army explaining that the small percentage of trained personnel in AAA units within the ZI made it difficult to accomplish unprogrammed deployments and still meet extensive overseas replacement requirements.[250]

Following the tactical doctrine that a target which should be defended by AAA should be well defended, the medium battalions, equipped with 90-mm. guns, were stationed to defend the two major ports of Pusan and Inchon and the headquarters installations in Seoul, but the light battalions, equipped with quad mounted .50-caliber machine guns and 40-mm. automatic weapons, had been somewhat more split up, the idea having been at one time that each airfield required a minimum of two automatic weapons batteries, while single platoons of automatic weapons had been posted to Cho-do and Paengnyong-do to protect the radar installations.[251] Seeking a complete and realistic realignment of the scarce AAA units, a conference representing the Fifth Air Force, Eighth Army, and 10th AAA Group met on 25 June 1952 and drew up a list of the priority installations which needed AAA defenses. Only the first 5 of a total of 16 installations could be defended with AAA: namely, Kimpo airfield (K–14), Suwon airfield (K–13), the Pusan complex, Inchon harbor, and Kunsan airfield (K–8). Although the installations were accorded priorities fairly well down the list, the conference agreed that Cho-do and Paengnyong-do were so frequently harassed as to demand that they retain the AAA platoons which were there located.[252]

Subsequently ratified by the commanders concerned, this AAA agreement marked the first time that Korean airfields had been accorded higher priorities than the two major ports. The resultant deployment placed the 68th AAA Gun Battalion and the 865th AAA AW Battalion at Kimpo; the 78th AAA Gun Battalion and the 50th AAA AW Battalion at Suwon; the 1st Marine AAA Gun Battalion and the 24th AAA Gun Battalion at Pusan; the 933d AAA AW Battalion (less the one battery split between Cho-do and Paengnyong-do) at Inchon; and the 76th AAA AW Battalion at Kunsan.[253] This agreement held until October 1952, when the new air base at Osan (K–55), which would soon serve a Sabre wing of the fighter-bomber force, was nearing completion; the Fifth Air Force then requested and secured agreement from Eighth Army and KComZ to accord Osan the third defense priority

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and to locate there the newly arriving 773d AAA Gun Battalion and the 398th AAA AW Battalion. The 398th had been slated to join another battalion new to Korea—the 30th AAA AW Battalion, at Pusan, but there was more pressing need for it at Osan. When this deployment was approved by CINCFE, the 773d took up its station at K-55 in October 1952 and the 398th moved there in January 1953.[254] Because of the intensity of Red air attacks against the radar installations on Cho-do the Fifth Air Force in December 1952 secured permission and moved the platoon of automatic weapons from Paengnyong-do to Cho-do, thus concentrating all of Battery A, 933d AAA AW Battalion on this exposed island position.[255] This deployment of nondivisional AAA units remained in effect until the end of Korean hostilities.

The deployment of AAA units finally effected provided a minimum defense for the 6 highest priority installations out of a total of 17 requiring protection. Actually General Weyland was far from satisfied with the allocation of units even to the highest priority installations: in February 1953 he recommended to CINCFE that three additional AAA AW battalions were needed for station at Kimpo, Suwon, and Osan. At the bases which could not be afforded AAA protection the Fifth Air Force had expected to procure M-55 quad mounts and to get the 10th AAA Group to train USAF personnel to man these weapons, but it soon discovered that it could get only a part of the 52 quad mounts which it required for the purpose.[256] By December 1952, however, two or more quads were located on the airfields at Pusan (K-9), Taegu (K-2), Seoul municipal (K-16), Hoengsong (K-46), Chunchon (K-47), and at the TADC's in central and eastern Korea.[257]

Deficient in number, the AAA AW battalions were also hampered by obsolete weapons. In recognition of the fact that the old type .50 caliber and 40-mm. weapons had low range, low lethality, and inability to engage at night and in bad weather, these weapons were replaced in those AW battalions in the United States between March and October 1953 with new 75-mm. Skysweeper weapons, a radar-directed, automatic-loading weapon which fired 40 to 50 rounds per minute to a vertical height of about 18,600 feet.[258] In an effort to improve the results of the automatic weapons crews, who depended on visual sightings, the Fifth Air Force in December 1952 obtained 19 searchlights, placing 3 on Cho-do and 8 each at K-13 and K-14 airfields. In February 1953, General Weyland also informed CINCFE that the quad .50 caliber machine guns used both by USAF and AAA crews would lack effectiveness against low-flying jet aircraft unless they could be equipped with more modern M-18 reflex sights, which the commander of AFFE stated had already been requisitioned from the Department of Army without results.[259] In May 1953 the Fifth Air Force requested that Skysweepers be obtained for use against the low-flying Red planes which were heckling its forward bases nightly, and FEAF made this requirement known to CINCFE.[260] Neither the additional AW battalions nor the new Skysweeper weapons were obtained for use in Korea before the end of the war.

Passive Defense Measures: By November 1952 a considerable effort had been made to improve radar capabilities and to build up the combat readiness of AAA units, but General Barcus was still gravely concerned about the danger of a hostile air attack which, if it came, would obviously be directed against his aircraft and air bases. After reviewing the capabilities of the friendly radar early-warning system, the Fifth Air Force director of intelligence warned that "an initial, uninterrupted strike on the crowded airdromes at Kimpo and Suwon could destroy more than half of the . . . F-86's in Korea."[261] So concerned was General Barcus with this prospect that on 28 November he first issued a plan calling for the redeployment within a month of two Sabre squadrons to the rearward airfield at Pusan (K-1). Such a deployment would reduce the combat efficiency of the two Sabre wings but this was preferable to incurring prohibitive losses in a hostile surprise air attack.[262]

Before this deployment could take place, however, General Barcus stayed the movement of the two squadrons but ordered that the rehabilitation of K-1 airfield would continue and that the 4th and 51st Wings would prepare detailed plans for making such a dispersal on the shortest notice. On 23 January 1953, the Fifth Air Force announced a more comprehensive dispersal plan for the Sabres called "Doorstop": the airfields at K-1, K-2, K-3, K-6, K-8, and K-55 were designated as alternate F-86 bases which were to be provided with servicing and logistical installations required to replenish F-86's on short notice. Daylight alert

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commitments in the 4th and 51st Wings were increased so that 50 percent of combat ready aircraft were to be constantly on standby, readiness, or available status; the combat commitment of the two wings was reduced so that normally not more than 50 percent of combat ready aircraft would be committed to combat at any one time. The two F-86 wings were also ordered to insure that their pilots were qualified to supervise the servicing and arming of their aircraft and that during daylight hours sufficient pilots would be on the line to permit all combat ready aircraft to become airborne within a minimum time (15 minutes desired, 20 minutes maximum). Periodically F-86 flights were to be diverted to the alternate bases for purposes of training. By the end of January 1953 all major items of equipment were either on hand at the alternate airbases or were enroute there, and on 5 February the "Doorstop" plan was formally issued in an operations order which remained effective until 12 April, when the equipping of the 8th and 18th Wings with F-86F's was far enough along so that a new directive was in order. Accordingly the Fifth Air Force then directed the 4th, 8th, 18th, and 51st Wings to maintain the same readiness to deploy to alternate bases, the expanded plan now being renamed "Fast Shuffle." Though subsequent enemy air action never warranted the implementation of either of these dispersal plans, the Sabre wings from time to time diverted squadrons to the alternate bases for purposes of practice, and FEAF regarded them as high priority projects and urged all personnel to expedite and constantly to maintain readiness to execute the dispersal plans.[263]

Concurrently with the implementation of these plans for dispersing the Sabres, the Fifth Air Force brought into being other plans looking toward dispersion and continued operations in the face of an all-out enemy air and ground attack. Plans were kept in readiness for the withdrawal of Fifth Air Force headquarters and subordinate units southward in the event it became necessary to evacuate the Seoul area. The limited capability TADC's at Cho-do and Paengnyong-do were expected to take over if the regular TADC's were knocked out by hostile air attack, and equipment for an alternate TACC was procured and stored at a dispersed point in South Korea. Beginning in February 1953, the Fifth Air Force also moved some eight of its supporting units with 1,000 persons out of the Seoul area and set them up at bases further south.[264]

On 5 January 1953 General Barcus additionally ordered each of his base commanders to "implement every measure both active and passive, consistent with efficient conduct of operations, which will tend to minimize the adverse effects of enemy air activity." He especially desired each commander to take a personal interest to insure that his base defense program was current, realistic, and the best that could be effected within operational limitations.[265] Active air defense measures included such actions as emphasizing minimum time of scramble, and the Fifth Air Force defined and ordered "readiness" and "available" fighter alerts instituted at all Korean bases during dawn and dusk hours.[266] In recognition that passive defense, if overdone, would represent an undesirable diversion of money, materiel, and manhours from primary tactical missions, commanders were urged to effect the principles of passive defense to a reasonable compromise with the tactical situation.[267] Most base commanders built revetments for at least a part of their aircraft, camouflaged their fuel tanks, and provided personnel shelters.[268]

Korean Air Defenses in Operation: Except for some changes in terminology which kept pace with similar changes in the United States, the system which the Fifth Air Force employed to meld radar warning, fighter interceptors, and antiaircraft artillery fire in the air defense of Korea was not substantially changed from the organization first effected on 15 November 1951.* The Korean Air Defense Region, a subdivision of the Far East Command wherein the commander, Fifth Air Force, was responsible for air defense, was divided at 36° 30′ north latitude into a Northern Air Defense Area and a Southern Air Defense Area. Each of these areas was further divided into two sectors, the northeast and northwest, the southeast and southwest. Commander, Fifth Air Force additionally commanded the Northern Air Defense Area, using the senior controller on duty at the Seoul TACC as his working representative. Commander, 1st Marine Air Wing was in command of the Southern Air Defense Area. The Fifth Air Force TACC served as the control center for the northern area, and the Marine TACC had equivalent duties in the southern area. Each of

*See AHS-72, pp. 133–35.

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these control centers maintained continuous liaison with the other, monitored their subordinate TADC's, monitored the fire control status of AAA and issued fire control orders as necessary, diverted aircraft to defense missions as required, and passed identification information. The TADC's, one being responsible in each sector, performed surveillance, filtering, plotting, and identification. The TADC's passed the filtered information to their parent TACC's. They also initiated alert warnings, announced the fire control status of non-divisional AAA units, and managed ground controlled fighter interceptions of unidentified aircraft.[269]

The effectiveness of this defense system was never tested against the major Communist air attack for which it was designed, but from time to time the air defenses were employed against far more aggravating but much less damaging hostile light plane night heckling attacks. During World War II Russian pilots had extensively used small training biplanes, called PO–2's for low-level night sneak attacks in which they glided the little open two-seaters into a target area and dropped a few small bombs. In Korea, North Korean pilots (one of them was reported to be a woman) used these PO–2's and a miscellany of other trainers such as LA–11's and Yak–18's in night heckling work. These planes flew slowly down the moonlit valleys toward the Seoul area, presenting no targets on surveillance radars until they were about 12 miles out, and then circled about until they could pick up a target for an ordnance load which might include converted artillery shells, hand grenades, 3-pound thermite bombs, 55-pound antipersonnel bombs, or 220-pound general purpose bombs. These aircraft could operate from almost any level surface within 165 to 200 miles of their targets, and their slow speeds and poor radar reflecting surfaces (the PO–2 was canvas covered) made them hard to intercept and harder to shoot down. Beginning in June 1951, these heckling attacks continued in sporadic flurries until April 1952.[270]

In the autumn of 1952 the North Koreans again commenced to heckle UNC positions, at first the radar installations on the off-shore islands. In the early morning hours of 13 October, four PO–2's dropped some six bombs on Cho-do and made strafing passes: two Americans were wounded and five Koreans were killed. An F–94 and an F4U were sent to the area but neither could match the violent evasive actions of the Red light aircraft.[271] The Reds raided Paengnyong-do on the night of 12 November, inflicting no damage.[272] During December 1952 the enemy greatly increased his nuisance raids against Cho-do and began to operate over Seoul, Kimpo, and Inchon, and along the MLR. These December attacks caused negligible damages.[273]

Red air activity was slight until April 1953, when intensified sneak attacks began to give some trouble. At Cho-do low-flying planes attacked in conjunction with artillery shellings from the nearby mainland, which together produced five casualties and some damage to the AAA and radar installations. Several low-flying planes attacked Cho-do on the night of 15 April, killing two AAA gunners and destroying an automatic weapon.[274] Positions along the MLR were bombed on 18 April, and three days later the ROK I Corps was attacked by one or two light planes whose bombs wounded several enlisted men and killed a number of civilians in a nearby village.[275] On the night of 22 April a plane dropped two bombs at K–47 airfield, injuring a Korean civilian.[276] Early on the morning of 23 April a Red PO–2 pilot got over Kimpo to drop bombs and hand grenades and to leave behind five damaged RF–80 aircraft.[277]

After making a few more attacks early in May, the Red night raiders were quiet until the early morning of 27 May when a stream of six or seven light aircraft came down to Kimpo to drop general purpose bombs and converted artillery shells: these munitions slightly damaged two F–80's and one F–86, gutted two supply warehouses, and broke the oil pipeline between Inchon and Yongdungpo.[278] After this beginning, the Red light planes made all-out attacks against the Seoul area during June. On the night of 8 June, nine planes bombed Seoul City: one bomb landed in the street near the press correspondents' billets, breaking several windows and provoking no little newspaper criticism of the inadequacy of the air defenses. On the night of 15/16 June some nine Red aircraft again raided Seoul, shaking President Rhee's mansion with their bombs. On the night of 16 June, four Red planes made the most damaging raid of the war for their side when one of them fired the POL processing and storage dump of the 21st Port Battalion at Inchon, igniting over

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five million gallons of fuel.[279] This most successful attack was also the last successful Red sneak attack because, after 16 June, the UNC air defenses began to score on the hecklers and got the situation back into hand.

Against these Communist nuisance attacks, made by low- and slow-flying light aircraft, the Korean air defenses were not very effective, primarily because these defenses were designed to counteract the immensely more serious air attacks which could have been made by Red high performance aircraft which were poised at the Yalu. The AAA establishment could not effectively deal with these low-level sneak attacks: the altitudes of attack of the light planes were too low to be effectively engaged by the 90-mm. guns, and on the few occasions when these guns were loosed at Kimpo, falling fragments of their projectiles posed a distinct danger to friendly personnel. Because they were dependent upon visual sighting, the automatic weapons were not notably successful against the night raiders, even when the gunners were assisted by searchlights. Automatic weapons fire may have destroyed one Red aircraft over Cho-do on the night of 6 May 1953, although the wreckage of the plane could never be found in the nearby waters.[280]

The Communist light plane attacks also demonstrated a vulnerability in the UNC radar surveillance network: sited on high terrain features, the TADC radars were unable to spot the low-flying Red aircraft as they came down the Korean valleys, shaded by ground echoes. To meet this problem the Fifth Air Force in February 1953 obtained new AN/TPS-1D radar sets which were sited to back up the TADC radars and to cover the valley approaches to vital targets.[281] Procedures were also established whereby ground control approach (GCA) radar sets at K-13, K-14, and K-16 assisted in tracking unidentified aircraft through areas of ground clutter. And for a time AAA acquisition radars were also integrated into the warning network.[282] Even with these expanded radar facilities, however, identification of slow-moving plots as hostile gave no end of difficulty since in forward areas there were many friendly planes operating which did not have Mark X IFF. Army liaison planes and T-6 Mosquitoes, for example, did not have the identification radar, and these planes might be anywhere at any hour of the night. Some help to this problem came in January 1953 when corps fire control centers were tied in with communications to the TADC's and required to file flight plans on all Army aircraft which flew during the hours of darkness.[283]

Although high-performance F3D and F-94 all-weather interceptors occasionally destroyed Red light planes, neither type plane was very good for the purpose. These jets could not throttle down to maneuver with 80-knot Red aircraft, and their airborne radars could not cope with the ground clutter at low altitudes. On the night of 3 May an F-94 got down to 1,000 feet and cut its speed to 110 miles per hour to destroy a PO-2, but this F-94 was lost when it either collided with the Red plane or went into the ground. Thereafter, jet all-weather interceptors were restricted from attempting interceptions of enemy aircraft flying at less than 2,000 feet and slower than 160 miles per hour. Even with this restriction, another F-94, piloted by the 319th Squadron's commander, Lt. Col. Robert V. McHale, was lost on the night of 12 June, shortly after he was given permission to fire on an enemy aircraft at 5,000 feet altitude.[284] In attempts to intercept the Red light planes, a variety of slower-flying aircraft were used. Such planes included LT-6G's equipped with .30-caliber machine guns, which were unsuccessful when there was no illumination (radar blips on GCI scopes merged when the T-6's were a mile away from the enemy aircraft) or when cooperating with flare-dropping transports (the flares merely blinded the T-6 pilots). For these same reasons a B-26 kept at Kimpo achieved no positive results when it tried interceptions.[285]

In the effort to deal with the Red sneak attacks the Fifth Air Force also attempted changes in its air defense control procedures. After the Red air attack on the night of 23 April, the Fifth Air Force decentralized a large amount of the authority previously exercised by the TADC's. The base commanders at Kimpo, Suwon, and Chunchon (K-47) were informed that their bases would be gun defended areas and that they had the authority to declare air raid warning conditions and to place locally deployed automatic weapons on guns-free status. Instructions were issued that no aircraft between last and first light could enter the gun defended areas (defined as below 6,000 feet and within 5 miles radius of the airfield) except when cleared by the local radio control tower after coordination with the base operations and GCA.

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five million gallons of fuel.[279] This most successful attack was also the last successful Red sneak attack because, after 16 June, the UNC air defenses began to score on the hecklers and got the situation back into hand.

Against these Communist nuisance attacks, made by low- and slow-flying light aircraft, the Korean air defenses were not very effective, primarily because these defenses were designed to counteract the immensely more serious air attacks which could have been made by Red high performance aircraft which were poised at the Yalu. The AAA establishment could not effectively deal with these low-level sneak attacks: the altitudes of attack of the light planes were too low to be effectively engaged by the 90-mm. guns, and on the few occasions when these guns were loosed at Kimpo, falling fragments of their projectiles posed a distinct danger to friendly personnel. Because they were dependent upon visual sighting, the automatic weapons were not notably successful against the night raiders, even when the gunners were assisted by searchlights. Automatic weapons fire may have destroyed one Red aircraft over Cho-do on the night of 6 May 1953, although the wreckage of the plane could never be found in the nearby waters.[280]

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All nontactical flights over Korea were required to file IFR clearances and to keep above 6,500 feet. The Eighth Army was advised that its units could fire on any aircraft flying below 6,500 feet north of a line five miles north of and connecting K–14 and K–18 airfields, except in the K–47 area. VHF check-ins, approach instructions and routes, take-off corridors, and other related control procedures at the gun-defended bases were announced to provide maximum safety for friendly aircraft. The TADC's retained authority to initiate sector air raid warnings, to scramble interceptors and control interceptions, to issue instructions to MATCON when needed to divert nontactical traffic, to issue fire status instructions, and to monitor and if necessary to countermand base fire control instructions.[286]

The revised radar reporting and gun defense system made little appreciable contribution against the Red aircraft which continued to slip undetected and unintercepted into the Seoul-Inchon area. On 16 June, when the Reds made their successful attack against the area, the revised system broke down. On this night, TADC "Watchcase" at Kimpo was receiving surveillance plots from five early warning stations, plus the GCA's at K–14, K–13, and K–6, plus a number of AAA TPS–1D acquisition radars, and it simply could not filter all this information and still perform its primary mission. Control of the fire status in the area became lost: Watchcase, for example, scrambled an AD interceptor at 170100 hours which closed on a bogie over Inchon, only to be subjected to friendly flak at a moment after Watchcase had assured him that Inchon guns were tight; leaving this area and picking up another bogie near the Han River, the AD again pursued toward Inchon, again Watchcase said the Inchon guns would hold fire, but again the AD was fired on; Watchcase then directed the AD to return to K–14, which was supposed to be clear, and to land there, but when the Marine pilot turned on his landing lights over Kimpo he was picked up by searchlights and discovered that a "Red" alert was still on there. Meanwhile, the Fifth Air Force was swamped by telephone calls seeking information on the status of the situation. After this hectic night, the Fifth Air Force on 17 June relieved the base commanders at Kimpo and Suwon of their authority to declare "Red" alerts and to dictate the fire control status for automatic weapons and returned these duties to the TADC. To cut down on the number of unfiltered plots which had swamped Watchcase, the AAA acquisition radars, which could not distinguish IFF, were removed from the surveillance net and the GCA's were permitted to report only that traffic which entered the restricted areas around their airfields without proper clearance.[287]

These revisions in the control system cleared up confusion, and on 22 June the Fifth Air Force borrowed from Task Force 77 some aircraft and pilots that would be able to handle the slow-flying Red planes. To augment the two Marine AD's currently being used at Kimpo, four F4U5N aircraft and their pilots began operations there on 27/28 June. The Fifth Air Force also made arrangements to get a Firefly fighter from HMS *Ocean* as soon as this plane could be retrofitted with IFF. Navy F4U fighters, however, proved capable of meeting the problem: Lt. Guy Bordelon, on detached service from the *Princeton*, intercepted and destroyed two bogies which he identified as Yak–18's in the early morning hours of 30 June and shortly before midnight on 1 July he destroyed two more enemy aircraft which were believed to be either LA–9's or LA–11's.[288]* After mid-June the Fifth Air Force had also been giving much thought as to where the Communist night hecklers might be coming from: the only ground sightings of PO–2's in recent months had been at Sinuiju and it was obvious that these planes would require staging forward of that base in order to reach Seoul. The most likely staging base for the night hecklers was Pyongyang Main airfield, which had been cratered by the B–29's with 100-pound bombs several times during the spring of 1953 but had been just as persistently repaired. In mid-June this field had a 1,300-foot sod strip and a 2,500-foot concrete strip which were usable. Photo reconnaissance also revealed that several aircraft similar to Yak–18's were dispersed and carefully camouflaged at this airfield.[289] On the night of 3/4 July another B–29 strike, this time employing 500-pound bombs, all but obliterated Pyongyang Main airfield,† and, significantly

*On the night of 16 July up near Pyongyang, Lieutenant Bordelon destroyed a fifth hostile aircraft, said to have been a Yak–18. He thus became the first "Bedcheck Charlie Ace," and the first and only U. S. Navy ace of the Korean war (COMNAVFE Command and Historical Report, July 1953, sect. I, pp. 3–4).

†*See* Chap. IV, 138, 140.

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enough, there were no more "Bedcheck Charlie" heckling attacks against the Seoul area after 4 July 1953.[290]

These Red nuisance raids had been far more troublesome than damaging, but they had demonstrated that air defense systems could not guarantee absolute protection against all types of enemy air attacks and that there was a continued need for dispersed air facilities and for passive defense. Since the standard jet interceptors had been largely ineffective against low-flying enemy aircraft, FEAF thought that such planes might have to be dealt with by AAA defenses, at least until such time as airborne moving target indicator (MTI) was made an integral part of air intercept radar. Found worthwhile in Korea was the use of light weight radars to watch for low-flying planes and the integration of GCA radars into the aircraft control and warning system. Identification of aircraft had been a problem area: liaison and rotary wing aircraft would need to file flight plans at all times, AAA radars needed a capability to identify IFF signals, and there was a requirement for systematized liaison between TADC's and Air Route Traffic Control Centers in order to reduce unnecessary identification reports. The number of friendly aircraft allowed to operate in a restricted area at any one time required limitation in order that automatic weapons could be given "guns-free" as soon as possible.[291]

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Chapter IV

THE AIR PRESSURE CAMPAIGN

"Our side absolutely cannot consider under whatever circumstances any proposal of the so-called no-forced repatriation which would detain war prisoners," stated Communist chief negotiator Nam Il at the Panmunjon truce conference on 12 September 1952. Nam Il continued: "No matter what your side should do inside or outside of the conference, the Korean People's Army and the Chinese People's Volunteers will fight to the very end for the return of every single war prisoner."[1] At the United Nations on 10 November 1952, Soviet Foreign Minister A. Y. Vishinsky told the General Assembly's Political and Security Committee that Russia would "never budge" from its opposition to voluntary repatriation of Korean prisoners of war.[2] Just as adamant were statements by United Nations spokesmen that the UNC would never agree to forcible repatriation. "Our position," the chief UNC delegate stated at Panmunjon on 8 May 1952, "is one from which we cannot and shall not retreat." In a letter made public on 20 August 1952, President Truman stated that Red POW's who would "rather die than live under communism again" would not be forced to "return to their enslaved homeland" and face "almost certain death."[3] In a speech in London on 10 November 1952, British Prime Minister Winston Churchill said that he would not "purchase peace at the price of dishonor" by sending "helpless prisoners of war back by force to be massacred by a Chinese Communist Government that boasts that it has actually rid itself of two millions of its own people."[4]

When it was evident that the Communists would not accept the principle of voluntary repatriation of prisoners of war, the U. S. Joint Chiefs of Staff had directed the CINCUNC to apply and maintain against the Communists the maximum military pressure within the capability of his means and which could be justified by results. After less than a year of such pressure the Communists capitulated, and on 8 June 1953 the same General Nam Il, who had arrogantly boasted that the Communists would fight to the very end rather than to accept voluntary repatriation, signed the terms of reference for the Neutral Nations Repatriation Commission which decreed that POW's who did not want to go back to Communism would be freed as civilians after 120 days if a major political conference failed to solve their problem.[5] This complete capitulation on the part of the Communists resolved the last and bitterest issue of the truce negotiations, and on 27 July 1953 the signing of the final military armistice instrument terminated hostilities in Korea.

The United Nations obtained its objectives in Korea by the maintenance of a firm and unwavering line of diplomatic policy which refused compromise at the same time that its forces laid intense military pressure against the Communist armies in North Korea. This "military" pressure, moreover, was solely the crushing impact of American air power, brilliantly aimed against targets of military import in a manner calculated to make the continuance of hostilities as costly as possible to the Soviet bloc of nations. "The capability for . . . [maximum military] pressure, without unacceptable cost," General Clark informed the JCS on 27 August 1952, "lies in the air arm."[6] After October 1952 UNC ground forces in Korea undertook no offensive action, and UNC air attacks comprised not only the predominant but the only military pressure placed upon the enemy.[7] During the last year of Korean hostilities, American air power executed the dominant role in the achievement of the military objectives of the United States and of the United Nations.

In the achievement of these national military

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objectives, FEAF leaders had to pioneer beyond World War II concepts of tactical and strategic air operations. As it was developed through trial and experiment, the air pressure strategy would comprise two planes of air actions. Sustained air attacks would be prosecuted from day to day against such target systems as would make the war as costly as possible to the enemy in terms of equipment, supplies, facilities, and personnel. Quite soon, however, General Weyland would perceive that he could superimpose upon these sustained air attacks another plane of air actions, attained through concentrations of force at decisive times and places designed to affect the thinking and actions of Communist bloc nations. The story of the air operations of the air pressure strategy is thus in fact two parallel stories: the narrative of the air attacks which effected cumulative destruction upon the enemy and the narrative of the manner in which the timing, intensity, and locale of air attacks were regulated in order to effect psychological changes in the ranks of the enemy.

EXPANDING THE AIR TARGETS HORIZON

The Problem of Targets: Up until the middle of 1952, USAF doctrines had been generally concerned with "strategic" and "tactical" air operations, and it was not entirely easy for many of the FEAF leaders to tear themselves away from the incubus of history and to pioneer in new doctrines which would utilize air power as an instrument of national policy. Viewed in terms of existing doctrine, an air pressure strategy appeared to require "strategic" target systems, which no longer existed in North Korea. In the initial months of Korean hostilities the FEAF Bomber Command, then mustering a strength of five medium bomber groups, had destroyed most of the North Korean industries which were capable of supporting the hostile war effort. Although the JCS had suspended further strategic bombing after 25 October 1950, the initial medium bomber target attack plans had been quite sound and few "lucrative" targets remained in North Korea.

Viewing the requirements for the selection of targets for an air pressure campaign, FEAF target experts were frankly pessimistic as to whether the result of such an attack program would be commensurate with its cost. On 28 August 1952, Brig. Gen. C. Y. Banfill, FEAF Deputy for Intelligence, pointed out several limitations which he anticipated in implementing the new attack program. A part of these limitations were geographical. The area northwest of the Chongchon River was suitable only for occasional attacks under the most favorable conditions. Reconnaissance aircraft could penetrate there only with expensive fighter escort, rendering target development in that area extremely difficult. The area north and east of Manpojin was beyond the radius of most Fifth Air Force aircraft, was too dangerous for B-29 daytime attack, and lay so far outside of shoran range as to prevent B-29 night attacks. There were also operational limitations. Bad weather limited the attack capability of the Fifth Air Force, and good weather restricted Bomber Command attacks against those targets which had searchlight defenses. Heavy antiaircraft artillery concentrations in sensitive areas would keep UNC aircraft at high altitudes. Finally, enemy countermeasures promised to limit the program. The enemy was aware that he had a "safety zone" in the northwest and had moved industrial facilities into this area. He had moved many smaller targets such as munitions and clothing factories to underground locations. General Banfill concluded that: "Fifth Air Force and BOMCOM's earlier work, coupled with the recent destruction of the enemy's power system, has left Korea almost devoid of targets that are suitable in a strategic or economic sense." [8]

In terms of historical operations and established concepts of target selection there were in fact very few "lucrative" targets in North Korea, but when intensive target analysis was put to work on the problem it turned up a good many worthwhile targets. Some of these targets had been overlooked in the initial strategic target attack plans of 1950, some of them had recuperated from earlier bombings, and some new targets were discovered which might have escaped notice had they not been closely scrutinized in the light of an air pressure strategy. This whole experience led Brig. Gen. Don Z. Zimmerman, successor in the duties as FEAF Deputy for Intelligence, to point out a lesson that: "A dynamic and constant expansion of the target horizon . . . will always reveal that efficient employment of air power can be made

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regardless of the circumstances of the operation, the geographical location, the composition, deployment, and tactics of the enemy forces. It is the mission of the targets people to research and reveal the most effective ways of employing all our combat air strength."[9]

Development of Air Pressure Targets: During the year prior to July 1952, in which time FEAF aircraft had engaged in attacks against North Korean railways, targets had been fairly obvious and easy to identify since they were generally bridges, rail tracks, and such airfields as the Reds tried to rehabilitate. The FEAF operational policy directive of 10 July 1952, however, posed the need for a wide variety of targets in some 17 priority categories.* It was planned that the selection of individual targets for destruction was to be made with a consideration to the relative listings by priority, to the vulnerability of the particular target to air attack, and to the economy of air effort involved in a particular attack. The possibility of developing lucrative air targets when none otherwise existed was to be exploited: thus attacks against the enemy rail system would simultaneously assure that this system was not rebuilt to such an extent as to sustain an effective enemy ground offensive and would also develop concentrations of locomotives and rolling-stock for profitable follow-up attack.[10]

As the subordinate FEAF commands got to work selecting and nominating targets under the new operational policy directive, it was evident that the Fifth Air Force would not have much difficulty in finding the targets which it required. Located in Seoul at the forward echelon of Fifth Air Force headquarters, Air Targets Division, Directorate of Intelligence, was already a small assembly plant for the production of targets. The Air Targets Division was immediately regeared on a production line basis to collate and confirm target intelligence with photography, but there was still a need for the development of targets through photographic interpretation of the voluminous quantities of photo cover taken daily by the 67th Tactical Reconnaissance Wing. A targets section was therefore established within the 67th Reconnaissance Technical Squadron, and the findings of this activity were issued in the form of target special reports. The Fifth Air Force also made heavy use of Detachment No. 2, 6004th Air Intelligence Service Squadron,† which, in fact, proved to be its most important single collector of tactical air intelligence. This detachment collected information from agents, prisoners of war, and refugees, submitting between 600 and 900 air intelligence information reports to Fifth Air Force intelligence each month.[11] As was anticipated, the Fifth Air Force did not experience any great difficulty in finding targets for its aircraft: in early November 1952 that air force reported a backlog of 330 targets ready for attack, in addition to some 600 troop concentration targets. In the mill at that time were about 330 potential objectives, of which approximately one-third would prove suitable for air attack. Most of these targets were Communist headquarters, troop concentrations, supply dumps, and communications centers.[12]

Prior to July 1952 the Superfortress bombers of the FEAF Bomber Command had been concentrating their attacks against key enemy rail bridges, marshalling yards, and airfields, but the policy directive of 10 July required these bombers to attack communications centers, manufacturing facilities, supply concentrations, and other similar targets. Bomber Command now had a requirement for between 60 and 80 diversified shoran targets per month, a requirement which would be difficult to meet on two accounts.[13] Possessing a manning authority for only 19 officers and 15 airmen, the Deputy for Intelligence, FEAF Bomber Command lacked sufficient personnel to handle any large day-to-day quantity of targets. Such was recognized, but, instead of providing the necessary wherewithal to Bomber Command to permit it to maintain a capability commensurate with its responsibilitites, the FEAF Targets Directorate in July decided to "operate" and thus to augment Bomber Command's target selection agency in the research and preparation of target materials for individual B-29 targets.[14] Although this action appeared necessary at the time to expedite the air pressure strategy, its results were said to be dis-

*See Chap. II, p. 35.

†The 6004th Air Intelligence Service Squadron had been organized by FEAF at Tokyo on 2 March 1951 and was then charged with the mission of collecting information which, when evaluated, might indicate the war-making capabilities and intentions of possible enemy nations. Three detachments of this squadron served under the operational control of the Fifth Air Force in Korea: No. 1: Air Technical Intelligence; No. 2: Tactical Air Intelligence Information and Special Intelligence; and No. 3: Evasion and Escape.

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appointing: almost all of the FEAF Korean Targets Analysis Division's effort was diverted from its primary duty of maturing over-all target recommendations and priorities while it made at best a slight contribution to Bomber Command in view of the large quantity of targets which that organization required.[15] As the destruction operations progressed, the Fifth Air Force also turned over to the FEAF Bomber Command a good number of targets which were worth attacking but not suited for light bombers or fighter-bombers. Bomber Command's own targeting capability, moreover, was largely dependent upon the Fifth Air Force's 67th Reconnaissance Wing, whose reports furnished a continuous flow of information, either in the form of photo prints, from which photo interpretation studies were made at Bomber Command, or of completed reports and studies accomplished at Fifth Air Force. Another source of reconnaissance photography was the 91st Strategic Reconnaissance Squadron, which flew regular missions over east-central North Korea, and the 548th Reconnaissance Technical Squadron also provided medium bomber targets. There was no shortage of intelligence information, but Bomber Command's real difficulty lay in a shortage of personnel available for the intensive study required to locate and develop profitable medium bombardment targets.[16] Viewing Bomber Command's continuing targeting troubles in retrospect, the FEAF Deputy for Intelligence drew the lesson that: "If a command, through some limitation or inadequacy, is unable to fulfil a required function, the higher headquarters, rather than attempt to assist in the actual production, should instead provide the command with the necessary wherewithal to maintain a capability commensurate with its responsibility." [17]

A second major problem involved in targeting for Bomber Command was the fact that all of its targets, because of inaccuracies in existing Korean maps, had to be especially processed for shoran attack. Two methods were known whereby mapping errors could be eliminated. One method employed shoran reconnaissance photography, flown by a plane equipped with an APA–54 shoran recorder, but this method would not prove practicable.* The other method was a multiplex stereoplotting process which in effect justified maps against aerial mapping photography. Before July 1952 the 64th Engineer Base Topographical Battalion of the FEC had been providing the multiplexed coordinates which Bomber Command required, but its production capability was only about five sets of these coordinates a week.[18] Until FEAF could expand this capability, Bomber Command did the best that it could with too few multiplexed coordinates. Medium bomber bombing accuracy was therefore deficient: in September 1952, when supply targets near Pyongyang were attacked, the bombers had good bomb patterns but their main points of impact were not uncommonly 1,000 feet away from the mapped aiming points.[19] FEAF was working to expand its own multiplexing program: by August the 548th Reconnaissance Technical Squadron had assembled the necessary equipment at Yokota; early in September it sent men to engage in on-the-job training with the 64th Battalion; and by the end of the year all multiplex coordinates were being determined by the 548th Squadron.[20] In January 1953 this squadron could multiplex a maximum of 90 average-difficulty targets per month and could complete such coordinates on priority targets in three to four days.[21] By May, the 548th was additionally able to provide 30 multiplexed coordinates per month to the Fifth Air Force, and in this same month the publication of a new multiplexed-compiled 1:25,000 scale set of maps of North Korea, which was considered accurate for determining shoran target coordinates, was progressing rapidly. These maps would eliminate the necessity for multiplexing individual targets.[22]

Coordination of the FEAF Air Effort: With the single important exception that the UNC/FEC theater organization did not permit close integration of Seventh Fleet air capabilities in a routine day-to-day air effort, FEAF secured a maximum coordination of UNC air attack effort necessary to the economy of the air strategy in Korea. This coordination was the work of the FEAF Formal Target Committee.

Comprising representatives of the operations and intelligence functions of FEAF, the Fifth Air Force, and the FEAF Bomber Command, the FEAF Formal Target Committee met biweekly at Tokyo. Its usual agenda began with an intelligence briefing on such matters as the status of targets in North Korea, and then Bomber Command and Fifth Air Force representatives pre-

*See Chap. VII, pp. 245–46.

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sented statements of the general intent of their respective operations planned for the next two weeks. Constant attention was given to the elimination of competition for lucrative air targets. When necessary, a reverse from this procedure was followed: FEAF representatives outlined target systems of a desired line of air activity which was to be exploited and the other committee members took steps to implement the desired actions. After target committee recommendations were approved by General Weyland, they were distributed to the Fifth Air Force and Bomber Command for execution and to NAVFE for information.[23] Meeting of minds at these FEAF Formal Target Committee sessions insured that the fighter-bombers and the medium bombers alike received the targets which they could best handle and that targets developed as a result of a given attack would be followed up by other strikes. Old concepts that certain targets were "tactical" and others were "strategic" were abandoned, and, so far as FEAF resources were concerned, air power was undivided by artificial and unreal attempts to classify targets by types of aircraft.

Although FEAF intelligence agencies successfully targeted hostile objectives for pressure attacks and the FEAF Formal Target Committee insured an economy of effort, FEAF intelligence encountered one major problem which was never solved. Air intelligence could target physical objectives for attack and could calculate the physical damage done to an air target by an air strike, but it was not able to determine what significance a particular physical objective might have to the Communist regime nor could it project the effect of a given amount of destruction upon the hostile regime's primarily political decision to end the fighting. As General Zimmerman pointed out, land forces had always judged and portrayed their success by a line drawn on a map which showed the current position of the fighting front in relation to an enemy's territory, but the Air Force, which operated over the enemy's homeland, had no way of judging or portraying the effects of its decisive air attacks. There was need for new types of social and political intelligence. "Briefly stated," said Zimmerman, "the problem is to determine the effect of air action in war and then to present this effect in a simple, brief way so that it may be clearly understood and appraised."[24]

LAUNCHING THE AIR PRESSURE OPERATIONS

Air Operations in their Political Context: Between 28 April 1952, when the UNC made its final package proposal looking toward the resolution of the points of difference in the truce negotiations, and 8 October 1952, when the UNC recessed further talks at Panmunjom until such time as the Communist delegates might have a constructive proposal, the main effort of the United Nations and the United States was to budge the Communists from their obstinate refusal to accept a principle of voluntary repatriation of prisoners of war. During the period, the UNC had made its decision to utilize air pressure against the Communists as a lever for speeding their acceptance of the UNC terms offered at Panmunjom. As a concomitant to this decision, an effort was also made to key air operations in the Far East to developments both in Korea and within the Communist bloc of nations.

Such intelligence as came from behind the "Bamboo Curtain" indicated that the Chinese probably genuinely wanted an armistice: one report to CINCUNC from a "highly sensitive source" stated that on 28 June 1952 a conference between Soviet and Chinese diplomatic representatives was in session at Peking and was discussing the policy to be followed at Panmunjom.[25] During July the U. S. Department of State proposed that it might be well to seek the good offices of the Soviet Union for a settlement in Korea, but this proposition was laid aside in view of the strong objections of General Clark and of Ambassador George F. Kennan, the latter being the U. S. diplomatic representative in Moscow.[26]

Again in August 1952 there were evidences of some sort of troubles in the Sino-Soviet bloc, and on 17 August the Chinese Premier Chou En-lai arrived in Moscow for top-level talks. Although few pronouncements were forthcoming regarding the mission of the Chinese Communist delegation, the indications were that among subjects to be discussed would be the Sino-Soviet Treaty of 1950, military and economic aid for China, and Communist policy toward Korea.[27] From Moscow, Ambassador Kennan stated that he believed the Chou visit presented an excellent opportunity to

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obtain an armistice in Korea. He particularly proposed that anything the UNC could do at the time "to frighten" the Chinese and to increase their supply demands on the USSR would be all to the good. Desirably, such a military threat should be accompanied by some sort of conciliatory gesture which would indicate to the Soviets that it would not be hard to move toward a cease-fire. The USSR would thus have an easy alternative to accepting the Chinese demands.[28] On 19 August, a few days before the Kennan proposal reached CINCUNC, FEAF planners had been discussing possible measures for increasing air pressure on the enemy during the Moscow conference, and on 21 August General Smart directed the Fifth Air Force and FEAF Bomber Command to increase the tempo of their air attacks and desirably to attack targets in the far northwest area, such as Sui-ho, Sinuiju, the Namsan-ni Chemical Plant, and thus make a display of air power. Both Generals Clark and Weyland thought that at this juncture Pyongyang military targets could again be profitably attacked.[29] General Weyland also pointed out to CINCUNC that facilities at Kadena Air Force Base on Okinawa could accommodate a squadron of B–36 heavy bombers, and General Clark urged the JCS to dispatch such a squadron on a routine training operation which would produce a strong psychological effect on the Korean armistice negotiations. On 4 September, however, the JCS advised that operational considerations precluded the dispatch of a B–36 unit to the FEC at that time.[30]

The exact subjects of Sino-Soviet discussion at Moscow were never made known by the Communists, but on 16 September 1952 they issued a communique which stated that political and economic questions had been discussed, that decisions had been made for strengthening and developing Sino-Soviet friendship and cooperation, and that measures had been taken to strengthen peace and international security. The only specific announcements were that the Changchun Railroad in Manchuria would be returned to Chinese control by 31 December 1952 but that Soviet forces would continue to use Port Arthur until the USSR and Red China made peace with Japan.[31] At the Panmunjom truce talks the Reds remained as obdurate as ever, and finally on 25 September 1952 President Truman directed CINCUNC to make one last summarization of the UNC proposals in reference to the POW's on 28 September, and then, if the Communists had no constructive proposals on 8 October, to recess the truce negotiations. These instructions were carried out as ordered, and on 8 October 1952 the truce talks were indefinitely recessed.[32] At this juncture General Clark informed the JCS that he was "of the firm conviction [that] the basic, underlying reason for failure this far to achieve an armistice is that we have not exerted sufficient military pressure to impose the requirement for an armistice on the enemy."[33] As the negotiations were recessed, CINCUNC was under instructions from President Truman "not to lessen" the military pressure which was being so "effectively" applied against the enemy.[34]

Massed Attacks Against Pyongyang Military Targets: Believing that there were psychological benefits to be derived from punishing the enemy at the seat of the North Korean government, General Weyland during mid-May 1952 had requested permission to launch a massed air attack against a great number of military targets which had been pinpointed in the North Korean capital city of Pyongyang.[35] After coordinating his action with the senior UNC delegate at Panmunjom and securing approval from the JCS, CINCUNC on 5 July 1952 granted authority for such an attack, provided that only military targets would be bombed, that attacks would be made by either visual means or by shoran, that positive measures would be taken to protect a UNC POW camp located in the city, and that every effort would be made to avoid needless civilian casualties. FEAF was further authorized to request naval participation in a coordinated UNC air strike.[36]

Having gotten the necessary permission, FEAF on 11 July executed operation PRESSURE PUMP which sent three waves of 822 Fifth Air Force and Navy fighter-bombers against Pyongyang targets. That night, 54 shoran-directed B–29's hit eight targets which had been saved for them. UNC losses in this massive day's work were a single F–84 and two aircraft from Task Force 77. The aerial blow was quite successful against a complex of supply depots, factories, headquarters and troop billeting areas, railway facilities, and gun positions at the enemy capital. Examination of assessment photos showed that at least three out of 29 targets were completely destroyed and that all but two were heavily damaged, an excellent

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record considering the fact that many of the targets covered large areas and included numerous buildings. A CCRAK report stated that three truckloads of corpses were carried out of the completely destroyed underground offices of the North Korean Ministry of Industry, and a direct hit on an air-raid shelter used by other high-ranking Communist officials was reported to have inflicted 400 to 500 casualties.[37]

On 4 August a major Fifth Air Force fighter-bomber attack was launched against a military headquarters located just east of Pyongyang, and in this mission 284 participating aircraft destroyed 80 buildings, a fuel dump, and six gun positions and killed an undetermined number of enemy troops.[38] Pyongyang City was also restudied and retargeted, and, late in August, Generals Clark and Weyland agreed that a second massed attack against that city might have favorable repercussions at the Moscow conference. Photographic coverage showed heavy military activity throughout the city, and there were numerous agent reports of many troop and supply areas located in the built-up area. After careful planning and coordination, a total of 1,080 Fifth Air Force and Navy aircraft attacked a total of 45 target areas in the Pyongyang complex in three strikes on 29 August. Bomb damage assessment photographs revealed moderate to severe damage to 31 of the 45 targets in the city.[39]

In support of these massed air strikes against Pyongyang, FEAF implemented psywar plan BLAST. The day before the bombings, 150,000 of leaflet No. 1123 were dropped at Pyongyang, expressing the theme of "Bomb Warning." Five days after the attack 150,000 of leaflet No. 8281A, with the theme of "General Civilian Bomb Warning," were released in the same area. The written text of both of these leaflets urged civilians to stay away from military installations of any kind because all such military targets would be bombed.[40] The purpose of BLAST was to disrupt the Communist civilian order and to convince the people of Pyongyang of the hopelessness of the Red cause. Although such bold warnings should have alerted the Red defenses, the two massive strikes went off without excessive damages: Sabres and Meteors successfully covered both of them, and flak suppression aircraft among the fighter-bombers kept Communist antiaircraft artillery under control.[41]

After the massive strike on 29 August, FEAF decided that Pyongyang had been attacked enough, at least for the time being. The enemy had increased his defenses from 64 to 110 heavy and automatic weapons, which, together with the dispersed nature of most of the remaining targets, made the city a doubtful objective for fighter-bombers. Two targets in the supply area still needed attack and could have been practicably attacked by medium bombers, but the targets were too close to a UNC POW camp to take the chance.[42] Pinpoint attacks against specific objectives in the Pyongyang area would continue as necessary.

Light Bomber Attacks Against Communications Centers: Dissatisfied with the result that the B-26 night intruders were getting against night moving vehicular and rail traffic* and immediately motivated by the fact that the FEAF operational policy directive accorded a low priority to vehicles and railway rolling-stock, General Barcus on 20 July ordered the execution of a plan which was intended to deny the enemy the villages in which he was storing supplies while enroute southward. A joint Fifth Air Force-Eighth Army study of critical crossroads in North Korea revealed that there were a good number of vehicular repair areas, supply areas, and military personnel layover locations which could be attacked by light bombers. The destruction of these villages could be reasonably expected to result in a two-fold advantage to the UNC war effort: stored supplies, vehicles, and personnel would be destroyed and effective roadblocks would be established until such time as the enemy could clean up the debris. After attacking the villages, the B-26's could return southward over the MSR's and attack such vehicles as might be sighted during their withdrawal.[43] Although the light bombers were directed to begin these communications center attacks in night missions there was a recognition that such attacks could be more efficiently prosecuted in daylight, provided the targets were not too well defended, either by guns or by MIG's; the two light bomber wings were therefore instructed to regain a daylight formation-bombing capability.[44]

Originally 35 key supply centers and road junctions were targeted by the Fifth Air Force for light bomber attack but this target list was later

**See* pp. 100–11.

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revised to include 78 of these communications centers.[45] In support of these communications center attacks, FEAF recommended and the FEC psychological warfare agency implemented psywar plan STRIKE. Beginning on the night of 13 July, aircraft dropped FEC leaflet No. 1205 which showed a map of northwest Korea with the MSR's outlined in red and warned civilians that all military targets along these routes would be attacked. This leaflet, entitled "You Are Next," was directed at the 78 towns known to house Communist military installations and supplies. Prepared for dropping in an area after an air attack was FEC leaflet No. 1206, entitled "You Were Warned," and designed to impress civilians with the credibility of UNC leaflets.[46] It appears that the Fifth Air Force operations directorate was initially somewhat fearful that the psywar plan would stir up the enemy defenses against the vulnerable B-26's,[47] but General Barcus went even a step further than the psywar plan on 5 August and publicly announced the names of the 78 North Korean towns which were going to be attacked by the light bombers. Already the light bombers had attacked Sinchon and Yonan, and preparatory to the attacks the civilian population had been warned by leaflets and by radio broadcasts, which continued right up to the time of attack, that their villages were going to be bombed.[48]

As the light bombers began these communications center attacks, aircraft and crew capabilities dictated the tactics which they employed. Lacking a shoran capability for night operations, the light bomber wings utilized pathfinder and bomber stream tactics. In such an employment, an experienced combat crew departed the home base approximately 30 minutes in advance of the first aircraft of the bomber stream. The lead aircraft, or pathfinder, located the assigned target, marked it initially with flares, and then started fires with M-76 fire bombs and M-20 incendiary clusters. Once the target was lighted by burning buildings, the pathfinder called in the bomber stream of individual B-26's, spaced at 5-minute intervals and normally flying at 4,000 feet. These bombers dropped their loads of 500-pound M-76 fire bombs and M-47 incendiaries in synchronous bombing runs. The usual target was about one-fourth square mile in area, and B-26 crews put 50 to 60 percent of their bombs in these designated areas without much difficulty. The success of this pathfinder and bomber stream operation completely depended upon the skill and leadership of the pathfinder crew. The target designated for attack, moreover, had to be easily recognized under visual conditions during darkness. If a target lay south of the Chinnampo-Wonsan line and was not too heavily defended by antiaircraft artillery, the B-26's could attack it with a daylight formation. As employed after August 1952 these light bomber attacks did not differ greatly from conventional formation bombing: usually from 4 to 12 aircraft (varying in number with the size of the target) dropped their bombs on a lead bombardier from altitudes of 10,000 to 12,000 feet. Bomb strike photography and bomb damage assessment photography showed that approximately 50 percent of the bombs dropped in this manner struck in designated target areas.[49]

From their beginning on 20 July these light bomber fire attacks against hostile communications centers were successful. BDA on one of the first targets hit—the Namchonjom supply center—showed that it was 95 percent destroyed. Intelligence agents within the enemy's lines forwarded enthusiastic reports: at Changyon the light bomber strike caught a battalion asleep in the village and killed 276 North Korean troops; at Pomhwa-dong an entire company was wiped out while it was assembled for a meal.[50] In October a single fire bomb attack against Pyoro-ri resulted in the destruction of 180 buildings.[51] As conducted by the B-26's, however, the communications center attacks required targets which were not too heavily defended and which were readily identifiable at night. A peak month of such attacks in October 1952 fairly well exhausted the list of 78 villages, and by December the Fifth Air Force was having some trouble finding suitable targets for the light bomber streams.[52]

Cleanup of North Korean Industrial Remnants: A first order of business in early July 1952 was to complete the neutralization of North Korean hydroelectric facilities that had been so ably attacked by UNC air forces late in June.* Chosen No. 1 and No. 2 plants were still conceivably useful to the enemy, and on 8 July the 49th Fighter-Bomber Wing accordingly directed 41 F-84 sorties against the generators, transformer yards, and

*See Chap. II, pp. 31–32.

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penstocks at these plants.[53] Both Chosen plants were again attacked by naval aircraft on 19 and 20 July, and the No. 2 plant was bombed by 44 B–29's on the nights of 19/20 and 21/22 July.[54] These strikes appeared to put the Chosen plants out of order, but when more reconnaissance showed that No. 1 was at least capable of limited productivity with a minimum of repairs, this installation was attacked by 16 B–29's on 29 August and again by 50 B–29's on 1 September. Chosen No. 1 was now out of operation for the remainder of the war with all of its penstocks severed.[55]

During July UNC aircraft also began attacks against such North Korean industrial remnants as could still be found. Thus on 15 July, 171 Fifth Air Force fighter-bomber sorties in morning and afternoon strikes attacked the Sungho-ri cement factory and a locomotive repair shop located near it in an abandoned limestone quarry. This cement factory had been hit before (in November 1951), but by mid-April it had been repaired and was again operating.[56] During July, Bomber Command gave careful attention to the Oriental Light Metals Plant, which was near Sinuiju and only four miles from the Yalu. This target, which had been overlooked in the 1950 strategic strikes, was successfully attacked by 63 shoran-bombing B–29's on the night of 30/31 July. This was the largest medium bomber strike against a single target in Korea, and post-strike reconnaissance showed that the militarily important factory concentration was 90 percent destroyed.[57]

Just as the Superfortress attack informed the North Koreans that they had no safe haven for industry along the Yalu, Seventh Fleet air strikes let the Communists know that their industrial plants in northeast Korea were subject to destruction. On 27 July, the Sindok lead and zinc mill, a facility which reportedly shipped 3,000 tons of processed ore each month to Russia, was 75 percent destroyed by carrier-based aircraft.[58] On 2 August, carrier aircraft and a cruiser task unit pounded billeting and supply areas, an oil refinery, and other industrial targets at Chongjin. From the Navy viewpoint the most important maximum effort strike (the heaviest all-Navy attack of the Korean war) was made on 1 September against the synthetic oil production center at Aoji, a target only four miles from Manchuria and only eight miles from the Siberian border. Morning and afternoon deckload strikes of naval planes devastated the Aoji plant and took out the aboveground buildings of an important iron mine, gas and oil storage facilities, and assorted manufacturing facilities at nearby Musan.[59] The Aoji-Musan target complex had been deemed to be of such unusual importance that the JCS had been willing, on a one-time basis, to suspend its rule prohibiting air operations within 12 miles of Soviet territory.[60] At the other end of the Korean border on the night of the 18 August, 14 Bomber Command Superfortresses effected 60 percent destruction on the Nakwon Munitions Plant. This installation, located only four miles southeast of Sinuiju, was reported to be producing 1,000 antitank and 5,000 hand grenades daily.[61]

While these industrial remnants were being destroyed, air reconnaissance was keeping close tabs on a frantic Communist repair effort at their giant Sui-ho hydroelectric plant. After a good many pictures had been taken, photo interpreters finally concluded that two generators were possibly operating at Sui-ho.[62] In deference to the hazards of this area, General Weyland instructed the FEAF Bomber Command to complete the destruction of Sui-ho with a shoran-directed night attack,[63] and in view of the growing antiaircraft and searchlight defenses at this target, Bomber Command devoted a maximum amount of caution in planning the strike which it ran against Sui-ho on the night of 12/13 September.* Although one B–29 was lost to the enemy defenses, 32 bomb-carrying Superfortresses got over the target to drop 2,000-pound semi-armor-piercing and 500-pound demolition bombs. Post-strike photographs showed that the main powerhouse received five hits, four probables, and three near misses. At least 36 hits in the transformer and switching yards heavily damaged these installations.[64] Photo interpreters tentatively concluded that Sui-ho was neutralized,[65] but whether or not this was true continued to puzzle them. Despite superb photographs obtained by a 67th Tactical Reconnaissance Wing RF–80 on 12 October, the interpreters could not positively state that Sui-ho was not producing some power. Tailrace turbulence, at least one intact primary transformer, replacement of transmission lines, plus augmentations of AAA defenses, indicated that Sui-ho was either in limited operations or else the Reds were hoping to

*See Chap. III, pp. 73–74.

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use it as an elaborate flak-trap for medium bombers.[66]

In August and September, FEAF attempted to destroy as many North Korean mines, smelters, and ore concentration facilities as was practicable with air action. The Hoechang Ore Processing Plant, reported to be processing gold for shipment to Red China, was 90 percent destroyed by 20 B–29's on the night of 5 August.[67] Early in September FEAF notified the Fifth Air Force that it would be well to neutralize North Korean mines by destroying their hoists, compressor houses, machine shops, and transformer yards. The FEAF reasoning was that all of these minerals and ores were being sent to China and Russia in repayment for war costs, and their destruction would pose a drain on the whole Soviet economy.[68] During September, Fifth Air Force fighter-bombers hit a number of mines which produced gold, tungsten, and monazite for Soviet industrial and economic uses.[69] One of the largest of these mining enterprises was the gold mine and smelter at Soktal-li; this installation was targeted but could not be attacked because a POW collection point was somewhere in its immediate vicinity.[70] On the night of 30 September/1 October, 48 medium bombers almost completely destroyed the Namsan-ni Chemical Plant, an important industrial chemical target located on the banks of the Yalu near Sui-ho.[71] Namsan-ni was later described as the "last of the marginal strategic type targets in Korea."[72]

Attacks Against Communist Personnel and Supplies: The Fifth Air Force, Bomber Command, and the Seventh Fleet also devoted attention to concentrations of enemy personnel and supplies. On 4 July the Fifth Air Force sent a 70 sortie fighter-bomber attack against the North Korean Military Academy, which was near the Yalu and some 50 miles northeast of Antung. Despite air opposition from MIG interceptors,* the fighter-bombers destroyed 15 buildings. On 23 July, 214 fighter-bombers attacked a troop and supply concentration near Wonsan.[73]

In view of the growing dearth of other lucrative targets, the Fifth Air Force on 21 August announced an intention to inflict maximum destruction on Communist military personnel. In such attacks, it intended to give a preference to killing Chinese troops, since it believed that the North Korean military forces now had little influence on the course of the war. Any concentration of as few as 500 Chinese troops was eligible for attack.[74] Eighteen troop concentrations were accordingly targeted and attacked during the latter part of August, and during September the majority of fighter-bomber effort went into attacks against troop encampments and concentrations, military headquarters, boat concentrations, tank concealments, supply areas, artillery positions, and other such targets. A major part of the Fifth Air Force effort was devoted to strikes against the Chinese, with 47 separate attacks being directed against these people.[75]

During September a good share of these fighter-bomber attacks was made against personnel and supply targets in close vicinity to the Yalu border. On 9 September, 82 F–84's again attacked the North Korean Military Academy and again drew heated opposition from hostile MIG–15's. On 15 September, however, 24 F–84's got into Sinuiju to destroy hostile supply concentrations without any losses. That same month, Navy fliers of Task Force 77 raided the Korean border town of Hoeryong on 13 September, without any opposition other than small arms fire. On 17 September, Navy pilots pounded industrial, personnel, and supply areas at Tanchon and Pukchong.[76] Such strikes as these were designed to show UNC air power at the Korean frontiers.

As was the case with Fifth Air Force fighter-bombers, so also did Bomber Command's B–29 Superfortresses turn more and more to attacks against enemy personnel and supplies. Except for special industrial targets, the target planners were hard pressed in July to get objectives capable of satisfying the operational requirements of the B–29's. Early in July, FEAF air targets division people were so hardpressed to supply medium bomber targets that they flatly stated that the North Korean transportation system was "the only target system suitable for B–29's in North Korea."[77] During July, the FEAF Bomber Command therefore utilized aircraft not scheduled against special targets in attacks against the marshalling yards along the enemy's rail routes. Although this command made arrangements to get flash reports from the Fifth Air Force concerning significant aggregations of enemy rolling stock, its July marshalling yard strikes gave exceptionally small returns: assess-

*See Chap. III, pp. 54–55.

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ment of nine missions involving 71 B-29 sorties showed only 17 rail cars destroyed or damaged.[78] On 1 August FEAF operations therefore directed that the medium bombers would thenceforth be employed against enemy materiel, military personnel, and supplies.[79] The Fifth Air Force nominated a good many such targets which were especially suited for medium bombers (many of them were too well defended by antiaircraft artillery to chance a B-26 or fighter-bomber strike), and, beginning in August, the FEAF Bomber Command set its sights on hostile concentrations of personnel and supplies. Selecting its ordnance and committing aircraft so as to achieve a desired minimum destruction of 60 percent of these supply targets, Bomber Command began methodically to eliminate some 40 to 50 small dispersed targets each month in the enemy's rear areas.[80] In view of the lack of multiplexed shoran coordinates, the medium bomber bombing accuracy against these small supply concentrations was initially poor, but as the FEAF capability to furnish such correct shoran coordinates was augmented the B-29's got smaller CEP's. At a time that it was having particular trouble with shoran targeting, Bomber Command on 19 September chanced a risky daylight mission (the first since 27 October 1951) which sent 35 heavily escorted B-29's to bomb three supply and troop concentrations at Yonpo, Tongchon, and Chigyong, all being east coast targets in an area of infrequent MIG penetrations.[81]

Communist Reactions to Air Pressure: Enemy propaganda broadcasts and UNC agent reports from behind the "Bamboo Curtain" were sufficient to indicate that the initial air pressure operations were hurting the enemy without giving him a chance to retaliate. As was to be expected, Communist radio transmissions were heavily charged with claims of atrocity. Broadcasts from Peking on 11 and 12 August charged that the "new program of blanket bombing of civilians is not aimed at any military targets." *Pravda* stated on 12 August that the United States was trying to "force on the Korean peoples unjust armistice conditions" and promised that the North Koreans were determined to "break up the new monstrous provocations of the American interventionists" and to "conduct their struggle to a full victory." The best indication that the air attack program was causing the Communists considerable trouble was a reliable report of a Communist meeting which took place on 18 August to discuss the effects of UNC bombings. In this discussion, the Communists assumed that the United States was alone responsible for the air attacks. As a result of these attacks, the Communists noted that they had completely to reorganize their counterintelligence system in order to maintain tighter control over the civilian population. They agreed to dispatch special subversion control agents to those cities which had received the heaviest UNC air attacks.[82]

A CCRAK agent report assessed as from a "usually reliable" source, which General Clark forwarded to the JCS, indicated that the heavy bombing program was having a material effect on civilian morale in North Korea. Great numbers of civilians, who earlier in the war had left the farms and villages because of food and job shortages, were now deserting their war jobs and returning to the safety of farms and villages. There was said to be some concern in the North Korean government that, because of the air attacks, many civilians would join the remnants of the UNC guerrillas which were still operating in North Korea.[83]

Despite the official distrust of the U. S. Department of State,* the psywar warnings given to civilian populations prior to the bombing of military objectives were proving quite successful. General Harrison said that these warnings were cited in truce-table talks as an evidence that UNC air attacks were not directed against civilians. General Weyland reported that there was no evidence that leaflet drops in the 78 cities and towns had compromised air attack plans. The very audacity of the UNC warnings hurt civilian morale since it emphasized UNC control of the air over Korea and the inability of the Communist regime to ward off the announced blows. Reliable reports stated that whole villages and towns on the warned list were evacuated and that the Communists had to move in security troops in order to keep the civilian populations at work. Red security agents had diligently collected the warning leaflets and had issued threats of punishment to civilians who read them, but this procedure redounded to the credit of the UNC since the civilians now saw the

*See Chap. II, pp. 36–37.

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UNC as attempting to look after their welfare at the same time that their Red masters were trying to keep them in ignorance of impending disasters.[84]

INTENSIFICATION OF AIR PRESSURE

United Nations Debates on a Korean Armistice: When the truce negotiations were indefinitely recessed at Panmunjom, the arena of diplomatic discussions was almost immediately shifted to the General Assembly of the United Nations, which convened at its seventh session in New York late in October 1952. Before the General Assembly met, Mexico had proposed a possible solution to the prisoner of war difficulty whereby such prisoners as desired repatriation would be immediately exchanged at the signing of an armistice and the remainder of nonrepatriates would be ultimately disposed of by subsequent political negotiations. The U. S. Department of State had tentatively favored acceptance of this proposition, but the U. S. Department of Defense reasoned that "if the Communists did not accept our proposal on the POW's under military pressure, they undoubtedly would never do so without military pressure."[85] At the eve of the General Assembly meeting, the Joint Chiefs of Staff reiterated this same position: "It would be undesirable from the military point of view to conclude an armistice in which the disposition of nonrepatriates would be left for subsequent settlement."[86]

Shortly after the General Assembly convened, Soviet Foreign Minister A. Y. Vishinsky took the offensive, proposing on 29 October that the General Assembly should set up a new commission of nations directly concerned but not participating in the Korean war to take immediate measures for ending hostilities. On 10 November, Vishinsky told the General Assembly that Russia would "never budge" from its opposition to voluntary repatriation of Korean POW's.[87] Early in November, however, it began to be evident that the Communist Chinese were more interested in securing a Korean armistice than were the Russians. Thus on 17 November, when India introduced a resolution looking toward settlement of the POW impasse, the Indian ambassador to Peking gave out the report that the Chinese Communists really wanted a truce.[88] Somewhat later, Prime Minister Jawaharlal Nehru of India would reveal that Red China had approved the basic principles of the resolution before India submitted it to the United Nations.[89]

Strangely enough, the Indian resolution drew the support first of Great Britain and then, when satisfactorily amended, of the United States, but it continued to get bitter opposition from Vishinsky, who remained insistent upon the acceptance of the Russian plan, which he elaborated to comprehend an immediate cease-fire, a subsequent 11 nations committee for arriving at a political settlement in Korea, and forced repatriation of all POW's if necessary. On 27 November Soviet propaganda broadcasts made the unusual charge that the Indian resolution was "nothing but a slightly veiled American draft."[90]

The Indian resolution was approved by the General Assembly on 3 December 1952, by unanimous vote with the Communist bloc of nations abstaining from the balloting. As it finally passed, this resolution called for the establishment of a commission of four neutral nations which would handle the POW exchange and neither "prevent" nor "effect" the return of prisoners to their homelands. A subsequent Korean truce conference would take up all cases of POW's unrepatriated after 90 days. At the insistence of the United States, India had amended its original resolution to impose a further 30-day time limit for the disposition of remaining prisoners by the political conference. At the end of 120 days any prisoners not repatriated or otherwise disposed of were to be placed under the control of the United Nations for disposition in accordance with international law.[91] Vishinsky had already indicated that the only acceptable plan to the USSR would be the Russian plan, and in a Peking radio broadcast on 28 November Chou En-lai had declared that his nation would not accept any settlement which did not include the repatriation of all prisoners of war. On 16 December, Chou cabled a formal refusal to accept the General Assembly's officially-voiced solution for the Korean fighting: Communist China, he said, adhered to the principle of complete repatriation, and he additionally said that the General Assembly action had been "illegal"

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since Communist China had no representation on that body.[92] The Chinese Communists had evidently succumbed to Russian pressure.

Intensified Air Operations: In coordination with a UNC amphibious demonstration off the eastern coast of Korea, the Fifth Air Force and FEAF Bomber Command executed an intensified air attack program between 9 and 18 October 1952. This amphibious demonstration had been planned for several months, and now both it and the intensified air operations took place just after the 8 October recess of negotiations at Panmunjon.

The Koje amphibious demonstration had had its origin in a CINCFE order that one regimental combat team of the 1st Cavalry Division, serving in the defense of Japan under the U. S. XVI Corps, would be rotated to security duty in Korea. In August 1952, COMNAVFE suggested that the troop movement could very well combine realistic amphibious training with a demonstration off the east coast of Korea which would lure enemy troops out onto the roads for attack by UNC aircraft and naval fire. On 13 September, CINCINC issued an operations plan which envisaged a joint amphibious assault mounted by the XVI Corps in the Koje area, in conjunction with a two-pronged northward attack by the Eighth Army and an airdrop of the 187th Airborne Regimental Combat Team, the mission of the whole force being to encircle and destroy enemy forces and to prepare to attack northward to Wonsan. Prior to D-day, FEAF aircraft and Seventh Fleet planes and warships would bombard the amphibious objective area.[93]

Only top-level commanders knew that the operation was a hoax, and Joint Amphibious Task Force 77—the largest naval force assembled since World War II—bore down on the objective area with grim determination. The softening-up assault was so intense that on 12 October (D minus 3) Navy pilots broke their all-time Korean daily sortie record by flying 667 sorties. At 1400 hours on 15 October, after an agonized delay caused by unfavorable weather, the 8th Cavalry RCT was launched in landing craft, proceeded on course to a point 4,000 yards from shore, and then the landing craft reversed direction and returned to the transports. Generally well-planned and well-executed, and certainly a well-kept secret, the amphibious feint failed to provoke the expected large-scale enemy troop movements. Instead, intense Communist battery and flak fire took casualties from among the naval forces, including five naval pilots who bored into targets at risks which were excessive to any mere exercise. Commander *Bon Homme Richard* later protested that the Koje amphibious hoax had caused a great morale letdown among his pilots, many of whom had taken great risks in a mistaken belief that a real amphibious landing was to be made.[94] General Clark later stated that the "Wonsan demonstration . . . was enough to prove that the enemy was genuinely afraid of our amphibious threat," but that "it was also enough to prove that any assault on that beach would have been most difficult." [95]

In coordination with the Koje demonstration, the Eighth Army launched on the night of 13/14 October operation SHOWDOWN, a two-battalion limited objective attack designed to seize Triangle Hill and Sniper Ridge, northeast of Kumhwa in the IX Corps area. The attacking force successfully secured its objectives, but determined enemy counterattacks inflicted heavy UNC casualties, and, after a see-saw battle, the enemy ultimately recaptured Triangle Hill. When General Van Fleet proposed other similarly localized attacks in November, General Clark stated firmly: "We should not unless absolutely necessary initiate another action which may be a repetition of the bloody battle for Triangle Hill and Sniper Ridge." [96]

In support of the Koje demonstration, FEAF utilized its aircraft in a ten-day maximum effort. The 315th Air Division (Combat Cargo) carried out a four-day joint airborne training exercise with the 187th Airborne RCT at Taegu, and on 15 October flew a weather-delayed airborne feint near Chorwon.[97]* As its part of the intensification of air attack, Bomber Command was asked to increase its daily sortie rate from 14 to 18 aircraft. On 8 October, Bomber Command began its intensified effort by dispatching 10 B-29's of the 98th Wing on a daylight mission against enemy positions near Kowon. Coordinating this attack with the naval carrier forces which were working in the same area, the medium bombers had no difficulty in placing their VT-fuzed 500-pound bombs on their assigned targets. The plan for intensified B-29 operations scheduled shoran attacks against 49 small and diversified targets, but because of

*See Chap. VIII, p. 292.

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stepped up enemy action on the ground, three close support missions were required of the mediums each day from 10 through 16 October. As a result of this diversion, the medium bombers attacked only 43 separate targets, each with an average force of four aircraft. These targets were, for the most part, supply and personnel areas, and the effort was intended to harass the enemy.[98]

As laid out in planning concept, the Fifth Air Force's intensified air attack program required a 50 percent increase in programmed effort and strikes against some 50 priority fighter-bomber targets (mines, factories, radar stations, and military headquarters), 40 troop concentrations, 60 communciations centers, and 500 centers of military activity located along the MSR's. Four primary targets and 4 troop concentrations were to be attacked each day by 21 to 36 fighter-bombers; 48 centers of military activity were to be attacked daily by elements of 4 fighter-bombers; six key communications centers were to be attacked nightly by light bombers. Weather curtailed planned operations to some extent on seven out of the ten days and demands for close support from the IX Corps further cut into the available effort. The fighter-bombers nevertheless flew 2,938 sorties and the B–26's flew 791 sorties against preplanned targets, and nineteen of the main fighter-bomber targets, 37 of the troop concentrations, 37 of the key communications centers, and 274 of the military activity areas were attacked.[99] Fifth Air Force crews who participated in these intensified missions were generally enthusiastic and felt that more destruction had been inflicted on the Reds than in the previous several months. Bomber Command got in some good training looking toward a compression of its B–29 bomber streams. Other than this, FEAF was unable to assess the results of its intensified operations, and the FEAF Formal Target Committee, although it sought an answer, was never able to determine "just what was accomplished by this intensified dispersion of effort." [100]

Return to Sustained Air Pressure Operations: Following the mid-October intensified air operations, all FEAF units cut back their effort proportionately and returned to the operational schedules which they could sustain over the long run of time. Increasing emphasis was given to attacks against concentrations of enemy personnel and supplies, mainly because the number of "special" targets was getting scarce. The general pattern of Fifth Air Force daily fighter-bomber operations required a concentration of as many as 100 aircraft against one suitable target each day, while the remainder of the fighter-bomber daily capability struck enemy supply points and other similar targets in the area generally south of a line from Pyongyang to Wonsan.[101] On 25 October, Fifth Air Force B–26's and fighter-bombers coordinated their attacks against the Kumgang Political School. This institution was the most important school in North Korea for the training of North Korean Labor Party agents, men who were expected to accomplish subversion within the Republic of Korea. FEAF had targeted and ordered the attack and on 25 October the Fifth Air Force laid it on: a day formation attack by B–26 aircraft utilized 100-pound general purpose and fragmentation bombs in an initial attack, after which fighter-bombers bombed and strafed the area. Post strike photography of this mission showed that many fires had been started and that the installation had been almost completely destroyed.[102]

During November, the Fifth Air Force fighter-bombers varied the patterns of their attacks but continued relentless strikes. On 19 November a large troop concentration and supply area near Kanggye was attacked by 179 sorties in two waves, the effort marking a very deep penetration into enemy territory and emphasizing an ability to strike at will in North Korea. Again on 21 November the Oryong-dong target complex northeast of Chongju was plastered by 117 aircraft from the three F–84 wings.[103] In December the primary Fifth Air Force targets were troop concentrations, and important strikes were conducted on nine separate days against aggregations of the enemy in the Wonsan and Haeju areas.[104] In both November and December the Fifth Air Force continued to attack Chinese troops and enemy supplies in routine air pressure operations.

During October General Weyland was quite eager to get medium bomber strikes laid against military targets in the Sinuiju and Uiju areas, "mainly for the purpose of displaying our air strength in the sector." [105] In addition to their psychological importance, these targets repre-

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

sented heavy military values to the Communists. FEAF targets people had discovered that the Uiju supply and communications center contained a textile mill, a vehicle repair factory, an antiaircraft artillery school, an automobile technical school, and was reported to shelter the headquarters of the 37th Soviet Division; since the targets people could not discover the precise locations of these activities they had targeted the whole area. There was also a locomotive repair shop in Sinuiju, and Sinuiju and Uiju airfields were the only known locations of Communist aircraft in all of North Korea.[106] In view of the known flak and fighter defenses of the area, however, Bomber Command secured permission to defer a mission to Sinuiju and Uiju until such time as weather promised to blanket out the Communist defenses.*

While awaiting the promised bad weather which was supposed to come after mid-November, the B-29 medium bombers generally remained south of the Chongchon River line. Bomber Command during October generally attacked two targets each night, each with a force of six aircraft. In some instances such a force was insufficient to effect the desired degree of destruction on a target and the objective might have to be hit a second time, but the intention of this operational schedule was to achieve a maximum psychological impact.[107] In late October and early November the medium bombers gave a goodly amount of attention to the Sopo supply complex which lay a few miles north of Pyongyang. Within the villages of this area FEAF photo interpreters had plotted 106 separate supply targets, and the whole area was so well defended as to prevent fighter-bomber strikes.[108] Interspersed with the attacks against Sopo supplies, the medium bombers also made missions against such objectives as the Okung Lead and Zinc Mill, the Hokusen Cement Plant, and a few mining areas.[109] In these attacks against small objectives the shoran-bombing B-29's almost always employed 500-pound general purpose bombs. On 4 November, however, General Weyland suggested that Bomber Command and Fifth Air Force try incendiary attacks against supply concentrations; he thought that in the dry period before the snow fall these incendiaries would start fires which, feeding on underbrush and grass, would spread the work of destruction and consume dispersed dumps.[110] On 13 November, five B-29's accordingly used 500-pound M-120 incendiaries against a supply area at Sopo. The results were not too good (only 4.1 percent rather than a normal 60 percent of the target was destroyed) and after two more trials of the munition Bomber Command went back to a standard ordnance loading of 500-pound general purpose bombs.[111]

When target weather began to worsen over northwestern Korea after mid-November, the medium bombers moved promptly against sensitive targets. On 17 November they bombed the Choak-tong mine number three, just east of Sinuiju and within sight of the Yalu. On 18 November they attacked the Sonchon supply center on an unexpectedly clear night; this target was only 35 miles from Manchuria.[112] Having secured an erroneous prediction that the Sinuiju-Uiju defenses would be weather shrouded on the night of 28/29 November, Bomber Command laid on a maximum effort mission: although the weather was clear and the sky was illuminated by a bright noon, 44 B-29's successfully got over the area, in three forces at 45-minute intervals.† Without a single loss, the mediums bombed the airfield and locomotive repair shop at Sinuiju and the airfield and the supply and communications center at Uiju.[113] Only the supply and communications center was underbombed in this November strike, and, to complete the task, the 307th Bombardment Wing sent 14 B-29's back to Uiju on the night of 12/13 December. This time the bombers carried a mixed loading of 500-pound general purpose bombs and 500-pound M-120 incendiaries, and the combined weight of the two attacks left the Uiju center 50 percent destroyed. This was as much destruction as was desired at this time, and FEAF wrote the target off its list.[114] On other nights in December the medium bombers operated against a good many targets north of the Chongchon and thrice went against objectives in the XE grid just south of the Yalu: enemy fighter interceptors, however, were increasingly active and they destroyed a B-29 over the Choal-tong ore plant on the night of 30 December.[115] That the Reds were extremely cognizant of these Yalu attacks was evident on 10 December, when Krishna Menon, the Indian delegate to the United Nations General Assembly, who was obviously irked that the Chinese Reds

*See Chap. III, pp. 72–73.

†See Chap. III, p. 73.

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had backed down on his peace resolution, parroted the Communist line and charged that the United States had sabotaged the Korean peace by bombing along the Yalu.[116]

UTILIZATION OF INTERDICTION FOR PRESSURE

The Military Situation in Korea: When the FEAF leaders planned the air pressure strategy they had recognized a logical relationship of forces which went somewhat as follows: the UNC possessed air superiority and could therefore profitably exercise air pressure against the Communists; the Communists, however, possessed ground superiority and might profitably exercise ground pressure against the UNC. To negate this latter Red capability had been one of the planning objectives of the air pressure strategy. Although the FEAF operational policy directive of 10 July 1952 had marked a shift of emphasis from the all-out interdiction attacks of the previous year, this policy statement had directed that sufficient air attacks would be continued against North Korean transportation systems to prevent their being rebuilt to an extent permitting them to support a sustained enemy ground offensive. The directive also demanded that attacks against these transportation systems should be so managed as to develop concentrations of vehicles and rolling stock for follow-up air attacks.

Although FEAF did not intend to abandon interdiction attacks and was in fact planning an action against key North Korean river crossings at such time as flood waters would complement the bombing of bridge structures,[117] it had reduced rail line interdiction effort steadily after May 1952, and by early July the effort had dwindled to almost nothing. As a direct result of this reduction in air effort, the two key North Korean rail lines, "Able" from Sinuiju to Sinanju and "Baker" from Manpojin to Kunuri (*see* figure 11), gradually increased in serviceability for through traffic and were operational about 87 per cent of the time during August 1952.[118] Considerably fewer sorties were devoted to sighting and attacking enemy vehicles during July and August, with the result that Fifth Air Force claims of vehicle destruction fell from 1,199 in June to 431 in July and to 237 in August.[119]

On 28 August, General Banfill, speaking for FEAF intelligence, pointed out a direct relationship between the relaxation of railway attacks and a steadily improving enemy supply situation, which, he said, was detrimental to UNC ground forces. Hostile artillery fire, as Banfill saw it, had increased in direct ratio with the restored serviceability of the enemy's rail lines, and as this artillery fire had increased so also had UNC ground casualties increased. "Although rail interdiction may not prove decisive," Banfill stated, "statistical evidence indicates that immediate resumption of the rail interdiction program is warranted."[120] At the FEAF Formal Target Committee meeting on 2 September, the FEAF air targets representative repeated these same arguments and recommended that a portion of the air effort be reassigned to a rail interdiction program. He specifically suggested that at least one river crossing should be kept unserviceable on the "Able" and "Baker" lines.[121]

In response to the Banfill memorandum, General Smart demonstrated that the direct relationship claimed between rail serviceability and volume of hostile fire was "speculative in nature." The air pressure operations had elicited far more telling Communist propaganda outbursts than had earlier rail interdiction operations: hence it was not unreasonable to believe that the swelling volume of hostile fire was a retributive reaction to the air pressure operations. "Goading the enemy into eruption along much of the front with the possibility of generating truly remunerative air targets incident to a dynamic situation," said Smart, "is infinitely more conducive to . . . his defeat than allowing him to languish in comparative quiescence while we expend our efforts beating up supply routes." Had there been any conclusive evidence that the UNC interdiction program had deteriorated the Communist position to a point whereby it could be exploited without disproportionate UNC ground losses, interdiction could have been assessed as an enterprise profitable enough for continuation, but Smart said that such evidence had been "singularly lacking." Interdiction had accordingly been deemphasized but not prohibited in the new FEAF operations policy.[122] General Smart's representative at the FEAF target committee meeting on 2 September nevertheless agreed that a limited amount of air effort would have to

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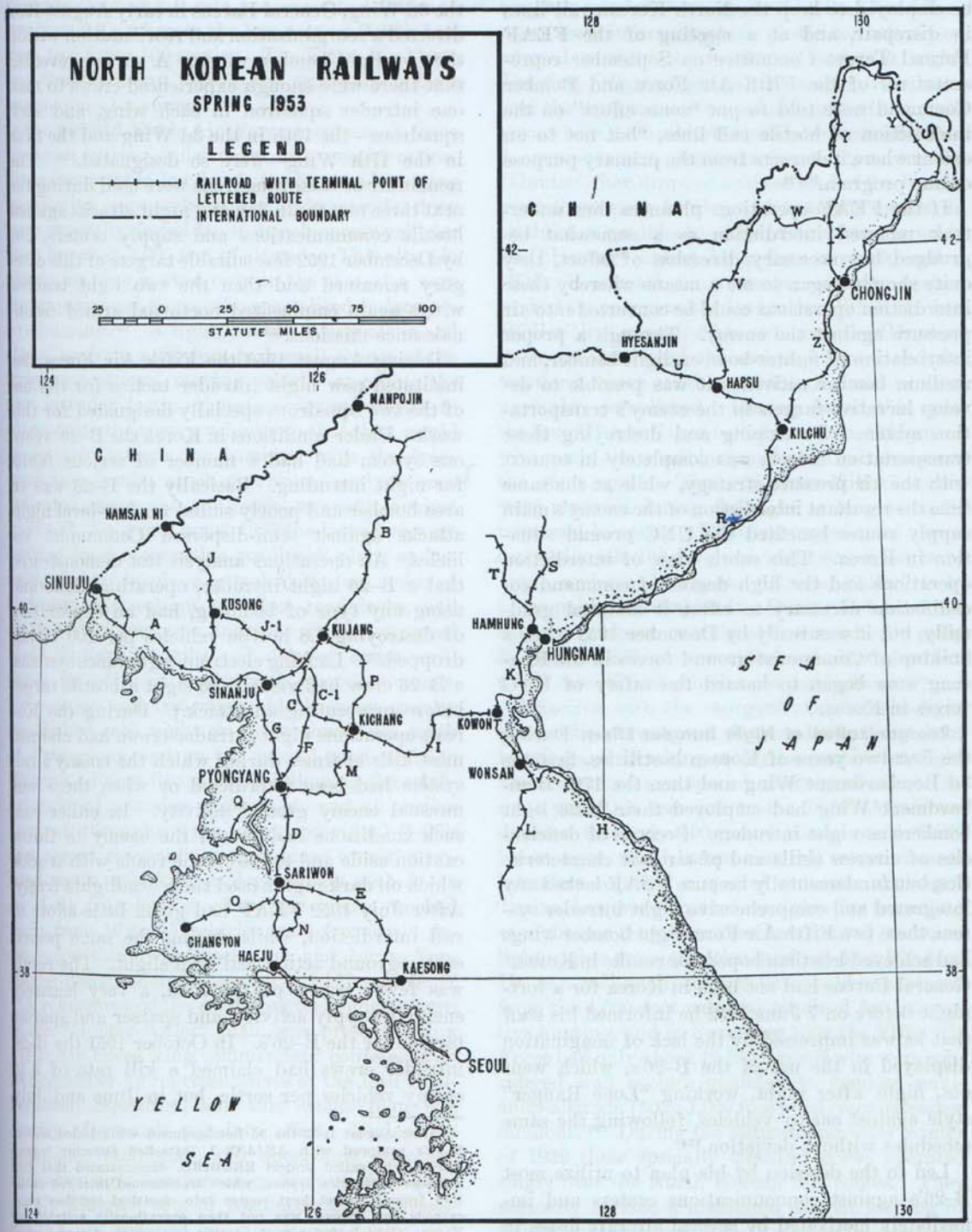

Figure 11.

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be employed to keep the North Korean rail lines in disrepair, and at a meeting of the FEAF Formal Target Committee on September representatives of the Fifth Air Force and Bomber Command were told to put "some effort" on the interdiction of hostile rail lines, "but not to an extent where it detracts from the primary purpose of our program." [123]

If the FEAF operations planners thus undertook renewed interdiction as a somewhat begrudged but necessary diversion of effort, they quite shortly began to see a means whereby these interdiction operations could be converted into air pressure against the enemy. Through a proper interrelation of fighter-bomber, light bomber, and medium bomber activities it was possible to develop lucrative targets in the enemy's transportation system. Developing and destroying these transportation targets was completely in context with the air pressure strategy, while at the same time the resultant interdiction of the enemy's main supply routes benefited the UNC ground situation in Korea. This subtle view of interdiction operations and the high degree of command coordination necessary to effect it matured gradually, but it was ready by December 1952 when a buildup of Communist ground forces in the Kaesong area began to hazard the safety of UNC forces in Korea.

Reorganization of Night Intruder Effort: During the first two years of Korean hostilities, first the 3d Bombardment Wing and then the 17th Bombardment Wing had employed their B–26 light bombers as night intruders. Because of deficiencies of aircrew skills and of aircraft characteristics, but fundamentally because USAF lacked any integrated and comprehensive night intruder system, these two Fifth Air Force light bomber wings had achieved less than hoped-for results in Korea.* General Barcus had not been in Korea for a fortnight before on 7 June 1952 he informed his staff that he was impressed by the lack of imagination displayed in the use of the B–26's, which went out, night after night, working "Lone Ranger" style against enemy vehicles, following the same schedules without deviation.[124]

Led to the decision by his plan to utilize most B–26's against communications centers and immediately motivated by several aircraft losses in the 3d Wing, General Barcus in early August 1952 directed a reorganization and reorientation within the two light bomber wings. A survey revealed that there were enough experienced crews to man one intruder squadron in each wing, and such squadrons—the 13th in the 3d Wing and the 37th in the 17th Wing—were so designated.[125] The remainder of these squadrons were used during the next three months in day and night attacks against hostile communications and supply centers, but by December 1952 few suitable targets of this category remained and then the two light bomber wings again emphasized nocturnal armed reconnaissance missions.[126]

During August 1952 the Fifth Air Force also instituted new night intruder tactics for the use of the two squadrons specially designated for this work. Under conditions in Korea the B–26 weapons system had had a number of serious faults for night intruding. Basically the B–26 was an area bomber and poorly suited for low-level night attacks against semi-dispersed Communist vehicles. An operations analysis test demonstrated that a B–26 night intruder, operating alone and using any type of bombing, had an expectation of destroying 1.8 hostile vehicles per 100 bombs dropped.[127] Lacking electronics guidance systems, a B–26 crew had visually to sight a hostile target before prosecuting an attack.† During the Korean operations night intruder crews had claimed most kills at times during which the enemy's rail system had been interdicted or when there was unusual enemy ground activity. In either case such conditions had forced the enemy to throw caution aside and to crowd the roads with trucks, which on dark nights used their headlights freely. After July 1952 FEAF had given little effort to rail interdiction, while during the same period enemy ground action had been slight. The result was fewer trucks on the road, a very leisurely enemy resupply activity, and sparser and sparser targets for the B–26's. In October 1951 the B–26 intruder crews had claimed a kill rate of 3.15 enemy vehicles per sortie, but in June and July

* *See* AHS–72, pp. 164–78.

†After August 1952 the 3d Bombardment Wing tested several B–26's equipped with AN/AAS–1 Infra-Red Detector radars. These tests, called project REDBIRD, demonstrated that this airborne electronics system, which transformed infra-red radiation from a target heat source into electrical impulses on a cathode ray viewer, was not then operationally suitable for Korean night intruder work because of its lack of target selectivity, short range of detection, and numerous maintenance difficulties.

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1952 the claimed kill rate per sortie had fallen to less than 0.97, whereas the loss rate of B–26's had risen to 2.6 per 100 sorties. The Fifth Air Force was thus "trading B–26's for trucks in a most uneconomical manner." [128]

The revised Fifth Air Force tactics took these weapons system deficiencies into consideration. Since loss rates in low-level attacks were becoming prohibitive, crews selected for night intruder duty were generally forbidden to attack enemy vehicles from less than 4,000 feet of altitude. This altitude restriction was waived only in the case of a very few experienced crews who specialized in locomotive hunting.[129] A light bomber, flying alone and attacking from 4,000 feet, had small chance of destroying scattered, moving vehicles at night; the new intruder tactics therefore devised means to concentrate the enemy vehicles so that they would be suitable targets for bombing with the fragmentation bombs which operations analysis tests indicated were the optimum weapons against trucks.[130] Late in August 1952 the intruders were assisted by a cooperative roadblock plan: at last light, fighter-bombers attacked certain selected highway intersections to effect roadblocks, and at first darkness two intruder B–26's dropped M–83 Butterfly bombs and delayed action ordnance on adjacent feeder and secondary roads. Two major and two minor blocks were usually established each night on the highway net south of Pyongyang and on the lateral road route to Wonsan. Forty-five minutes following the establishment of a major chokepoint, and at similar intervals throughout the night, individual B–26's flew armed reconnaissance missions over the isolated roads, attacking motor vehicles with M–18 or M–81 frag bombs. The new tactics worked well: from 10 to 25 vehicles were frequently destroyed within a roadblock area, and during September destruction claims rose to 2,167 vehicles.[131]

A refinement of the roadblock technique, known as the "Hunter-Killer" plan, was presented to a Fifth Air Force wing commanders' conference on 20 September by representatives of the 13th Bombardment Squadron, and this attack plan was shortly afterwards put into effect. Under this technique, intelligence and operations personnel of the two light bomber wings drew up three completely different sets of roadblock areas, encompassing all assigned reconnaissance routes and each numbered for convenient reference. Before a night's mission the "Hunter," "Killer," and flare crews were informed which particular set of preselected road blocks would be used that night. The first "Hunter" aircraft thereupon reconnoitered the assigned routes and determined the exact area where a roadblock would be most effective. A cross-trained navigator-bombardier in the "Hunter" then dropped a mixed load of fire bombs, general purpose bombs, and butterfly bombs to establish a roadblock. After the block was made the "Hunter" called in a flare aircraft and a "Killer" aircraft to prosecute attacks against backed-up enemy vehicular traffic. When the last "Killer" had expended his ordnance, the "Hunter" again reconnoitered the assigned routes and determined where another roadblock could be most profitably established. Having found this spot, the first "Hunter" then called in a second "Hunter" who made the roadblock and then recommenced the same cycle. These "Hunter-Killer" cycles were repeated during the night as long as traffic remained lucrative. Utilizing experienced crews, especially selected for good judgment, finest technique, and cool heads, the "Hunter-Killer" technique paid good dividends. During October 2,502 enemy vehicles were claimed destroyed. By early November 1952, moreover, the night intruders had a kill rate of 3.94 vehicles per sortie flown.[132]

Effective with the reorganization of the light bombardment wings in August 1952, the task of locating and attacking enemy locomotives at night was recognized as a special category of effort. In some part this was due to the Fifth Air Force decision that only 500-pound bombs could "kill" locomotives, which meant that rail reconnaissance intruders required a special ordnance loading.[133] Trains, however, required no lights for travelling at night and they were thus best hunted on moonlight nights from an altitude of not over 800 feet. Hence a well-qualified crew who could be excepted from the 4,000-foot rule was required for locomotive hunting, and in November 1952 the Fifth Air Force had only about 12 B–26 crews who were considered well enough qualified to conduct minimum-altitude (50 to 1,000 foot) rail reconnaissance missions.[134] During the autumn and early winter of 1952 these specially qualified crews operated singly over the North Korean rail routes. They normally carried a maximum combat loading of 500-pound parachute demolition bombs internally and M–47 fire bombs or flares on their wing sta-

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tions. Once a train was sighted, the B–26 crew attempted to stop it either with a 500-pound bomb or by strafing the locomotive. When the train was stopped its position was marked with a fire bomb or flare and it was then destroyed with 500-pound bombs.[135]

Fighter-Bomber Night Harassment: The renovation of B–26 night intruder tactics gave beneficial results in the situation which existed in September and October 1952, but the B–26's were so vulnerable that they were generally prohibited from proceeding north of the Chongchon River. As a result of this policy Communist truckers exercised few precautions so long as they were north of the Chongchon: B–29 leaflet dropping aircraft reported that truck traffic between Sinanju and Sinuiju was lined up bumper-to-bumper almost every night.[136] Early in the Korean hostilities the Fifth Air Force had tried and abandoned efforts to use day fighters in night interdiction missions,* but during October 1952 General Barcus directed each of his fighter-bomber wings to train two flights for night interdiction work.[137] Each of these wings prepared eight crews for night operations, and on the night of 9/10 November the 8th Fighter-Bomber Wing flew the first such mission.[138]

The scheme of employment favored by these night-flying day fighters was as follows: on moonlight nights they were individually dispatched at 10-minute intervals and were positioned by a TADC over an assigned MSR. The pilot cruised at about 15,000 feet with reduced power until he spotted truck lights in considerable density and then entered a shallow glide from which he released his bombs at altitudes of from 4,000 to 6,000 feet. Because of the rapidity and quietness of the attack, enemy convoys frequently did not extinguish their lights until the fighter's bombs fell on them, and for the same reasons these fighters seldom drew any hostile ground fire.[139]

On suitable moon and weather nights during November and December 1952 the Fifth Air Force employed some 16 of these night-harassing day fighters, mainly over the MSR's between the Chongchon and the Yalu. Viewed as a harassment, as the Fifth Air Force originally intended, the effort was undoubtedly successful, since it created both a real and psychological hazard to hostile vehicular traffic in North Korea.[140] In the spring of 1953, however, the night-flying fighter-bombers were prebriefed to cut bridges, to make roadblocks, and to destroy vehicles. In such a destructive mission the fighter-bombers, operating at night, had notable disadvantages. Their common ordnance loading was two 500-pound or two 1,000-pound general purpose bombs, or they could carry four 100-pound general purpose bombs or four 260-pound frag bombs. They could not carry the M1A2 or M–26 clusters of M–41 fragmentation bombs, which were recognized as the best type of ordnance for use against enemy vehicles. Fifth Air Force operations analysts calculated that a fighter-bomber, carrying 500-pound bombs at night, had an expected claim per sortie rate of only 0.262 vehicles. In night attacks against bridges the fighter-bombers had an expectation of scoring hits with 4 bombs per 100, less than half of what could be expected in daylight fighter-bomber attacks against the same objectives (8 to 10 bombs per 100 bombs). As a night intruder, the fighter-bomber was thus no substitute for the light bomber,† nor could it work as effectively against point targets by night as it could by day, but the night-flying fighter-bombers nevertheless posed one more deterrent and hazard to Communist vehicular traffic in North Korea.[141]

Beginnings in Coordinated Interdiction: After 9 September 1952 when the Fifth Air Force and Bomber Command were directed to put "some effort" on interdiction, both of these commands initially attempted to make interdiction incidental to other operations. As might have been expected, the results were meager. Bomber Command agreed to schedule rail bridges on the "Able" and "Baker" routes as secondary targets, when ordnance and fuzing of bombs for the primary so permitted. During most of September, however, the B–29's were not diverted from their primaries, and on the night of 27 September when 12 bombers were finally sent out on a primary mission against the bridge crossings at Yong-midong, Huichon, and Sanwang-dong they did no damage.[142] In

*See AHS–71, p. 45.

†In January 1953, in response to a USAF query, FEAF believed that it would be economically, logistically, and operationally desirable to devise a system whereby one squadron of fighter-bombers in each wing would serve as night intruders, the squadron to be specially trained and equipped for this function. The Fifth Air Force agreed that such a solution to the intruder problem was much to be desired, but it believed that there would be a continuing need "for an all-weather aircraft capable of detecting and attacking vehicular and rail traffic."

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September "a much greater portion" of Fifth Air Force effort was committed to rail interdiction, but the main portion of this effort was put on the "Item" line between Sonchon and Kowon, where 11 bridges were attacked on 18, 19, and 24 September.[143] When FEAF questioned why "Item" was attacked rather than the more important "Able" and "Baker" lines, the Fifth Air Force replied that the latter two lines were too heavily protected by hostile flak.[144] These incidental interdiction operations had one positive result: "Dog" rail line southward from Pyongyang to Sariwon, unserviceable since 1951 but now found to be repaired, was put out of operations by Fifth Air Force attacks launched on 5, 28, and 30 September.[145] The Communists speedily repaired this "Dog" line and moved in flak which jeopardized fighter-bomber reattacks. The Fifth Air Force accordingly requested that Bomber Command destroy the rail bridge which the Communists had repaired just south of Pyongyang. On 12 November six shoran-directed 98th Wing bombers dropped four spans of this bridge, and "Dog" line remained out of operation during the rest of this month.[146]

During the latter part of October, the Fifth Air Force began to think about interdiction in terms of its historical observations of enemy activity: when there was a significant break in the enemy's rail lines he employed trucks rather recklessly to supply his military forces. Photo reconnaissance on 19 October had shown that the Communists were building another rail bridge at Yongmi-dong, where "Able" line crossed the Taeryong River about 10 miles northwest of Sinanju. Since there were already three operational bridges at this crossing it was obvious that the Communists considered this spot to be a potential bottleneck in their main transportation route.[147] Proposing to keep the Yongmi-dong bridges out of operation for a month, General Barcus sent 114 fighter-bombers there on 1 November: this strike destroyed at least one span in each of the three bridges. But on 6 November, when 100 fighter-bombers went back for a second attack, these pilots discovered that the Communists had built up their AAA defenses; they lost one plane to flak and had negligible results in their bombing.[148] Some 200 tons of bombs and two heavy attacks put this rail crossing out of commission for only three days, and after 6 November the Yongmi-dong defenses were obviously too strong for fighter-bombers. Yet in some degree the Communists must have been intimidated since photography flown on 28 November showed that they had started building a fifth rail bridge at the Yongmi-dong crossing.[149] During December the Fifth Air Force continued to target bridges at Yongmi-dong and Sinanju for an attack at such time as their defenses might fall off, and it continued a moderate rail interdiction effort on the "Dog" and "Item" lines. Rail bridges were the usual objects of attack, but if these bridges were too heavily defended the fighter-bombers cut the rails or attacked tunnels.[150]

Although the Fifth Air Force rail attacks successfully tied up Communist rail traffic for no more than short periods of time, they quite probably contributed to the success of concommitant anti-vehicle campaigns. During November the Fifth Air Force obtained good results with a MSR interdiction plan called CHOKE. This plan coordinated fighter-bomber and light bomber strikes against road bridges: at last light the fighter-bombers attacked selected road bridges, shortly after dark roadblock B–26's hit similar objectives, and then during the night other night intruder light bombers reconnoitered and bombed the Communist vehicle traffic which stalled behind the blown-out bridges. Even though hampered by unfavorable weather, CHOKE was said to have been "highly satisfactory," and during November the Fifth Air Force claimed to have destroyed a total of 3,139 Red vehicles.[151] Early in December, the Fifth Air Force effected detailed "Truck-Killer" plans, whereby the fighter-bombers made road cuts at last light, the light bombers attacked vehicle concentrations during the night, and first light fighter-bomber sweeps sought out and attacked such vehicles as had not gotten under cover. Poor flying weather prevented the fighter-bomber sweeps from contributing much to this operation, but during December the Fifth Air Force claimed destruction of 2,321 vehicles, with the B–26's getting all but 157 of these kills.[152]

During November and December 1952 the cooperative employment of fighter-bombers and light bombers generally replaced the "Hunter-Killer" techniques which the B–26's had used in September and October. And during the last week of December 1952 another form of cooperative attack superseded the lone-wolf search-and-attack tactics which the specially trained locomotive-hunting

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B–26 crews had been employing. Tried and almost immediately abandoned was a plan by which a REDBIRD B–26, equipped with an AN/AAS–1 infra-red detector and carrying a full load of flares, sought to locate locomotives and keep them illuminated for attacks by a locomotive-busting B–26. Found more practical, and soon called project SPOTLIGHT, was a cooperative employment of 12th Tactical Squadron RB–26's and B–26 night intruders. In this employment, an RB–26 made a visual reconnaissance until it located a train; the RB–26 then called in a B–26 night intruder and lighted the target with flares for the attacking aircraft. When the locomotive was destroyed, the RB–26 took bomb damage assessment photographs. This project paid off almost immediately: on 30 December 1952 an RB–26 located five locomotives in one marshalling yard and two night intruders destroyed four of them and damaged the other one.[153]

Cooperative Attacks Keyed to Chongchon Estuary Bridges: During December 1952 more than 81,000 Communist vehicles were sighted moving by night in North Korea. This was the largest number of vehicles observed in any month since October 1951, when UNC aircraft had been interdicting North Korean rail lines as a major activity. Some part of the increase in December sightings might be attributed to the modest Fifth Air Force attacks on rail bridges, but there were also reports that the enemy was reinforcing and regrouping his forces to support a major ground offensive to be launched early in 1953. The sightings of December 1952 and early January 1953, moreover, showed a heavy pattern of enemy movements southward into the Haeju and Kaesong areas.[154]

Seizing the advantages of the shelter from UNC air action afforded them by the HOLY LAND demilitarized zone around Kaesong and Panmunjom, the Communists from the start of truce negotiations had made Kaesong a staging, resupply, and espionage center for the entire western ground front. At the same time that they crassly ignored the sanctity of the demilitarized zone, they protested a few actual and many alleged instances wherein UNC aircraft inadvertently flew over Kaesong or Panmunjom. Under the security arrangements, moreover, the Communists were permitted to run a daily supply convoy to and from Pyongyang and Kaesong without danger of UNC air attack. These daily convoys furnished courier service and resupply to a major military headquarters in the Kaesong area. With armistice negotiations recessed, CINCUNC saw no good reason why the Communists should continue to enjoy so many advantages: on 2 January 1953 the UNC military liaison officer at Panmunjom informed the Communists that occasional UNC flights could be expected over Kaesong and Panmunjom. No more did the UNC propose to accept the "picayune complaints" which the Reds had been registering on "every slightest pretext."[155] After CINCUNC had cleared the matter with the JCS, the UNC military liaison officer further informed the Communists on 15 January that, beginning on 25 January, they would be permitted to run convoys from Pyongyang to Kaesong on only one day each week. Instead of daily nine-vehicle convoys, immunity from air action would be extended each Sunday to one convoy of six trucks and three jeeps from Pyongyang to Kaesong and another similar convoy from Kaesong, provided these trucks were well marked with red panels, departed their starting point by 0700 hours, and reached their destinations by 2000 hours the same day. CINCUNC emphasized the fact that the UNC was ready to resume armistice discussions whenever the Communists expressed in writing that they were ready to accept one of the UNC proposals of 28 September 1952 or to offer a constructive proposal of their own which might lead to an honorable armistice.[156] These actions cut down on an otherwise free flow of supplies to the Communist military forces around Kaesong.

On 2 January 1953 General Barcus proposed cooperative Fifth Air Force and Bomber Command attacks against the Communist transportation system. First, he wanted to destroy all rail bridges in the Sinanju and Yongmi-dong complexes of the Chonchon River estuary, the key road bridge crossing the Taeryong River south of Pakchon, and the two road bridges crossing the Chongchon east of Sinanju. Subsequently, he wanted to destroy rail bridges on "Able" line west of Kwaksan, on "Jig" line at Namsi, on "Baker" line at Sinhung-dong, and on "George" line south of Opari. General Barcus thought it advisable to accomplish the initial attacks as quickly as possible: if any time was lost to darkness or bad weather he anticipated that the Communists would bolster the defenses of the bridge complexes. He

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therefore recommended that the FEAF Bomber Command should participate in the attacks. FEAF approved this operation and ordered the FEAF Bomber Command to take a hand in the cooperative attack.[157] In December 1952 Bomber Command had already declined an invitation to bomb the Yongmi-dong bridges on the grounds that the destruction of five dispersed bridges would require an excessive number of B–29's,[158] but now in January 1953 it agreed to use its bombers against the marshalling yards in the vicinity of Sinanju. These B–29 attacks were expected to destroy the rolling stock backed up by the destruction of the key rail bridges.

The Fifth Air Force fighter-bombers began to attack the designated key bridges in the Chongchon estuary on 10 January. Missing the next day because of weather, they concluded their bridge attacks on 15 January. In addition to the Chongchon bridges, other attacks were made as planned against bridges to the northwest on "Able" line, to the northeast on "Baker" line, and to the south on "George" line. In these six days of activity, Fifth Air Force fighter-bombers flew 1,166 sorties, 453 against bridge targets and 713 in flak suppression. Throughout the operation, light bombers and fighter-bombers made harassing night attacks against enemy repair activities. Sabres covered and screened, and between each strike reconnaissance aircraft darted in to get the pictures needed to keep flak maps current. On the nights of 9/10 through 14/15 January, formations of from four to six B–29's bombed the marshalling yards at Maenjung-dong, Sonchon, Anju, Pugwon, Happocham, Kwaksan, Chongju, Kunuri, and Chongnyong-ni.[159]

The principal positive achievement of these rail bridge attacks was the interdiction of hostile rail traffic on "Able" line for 11 days and on "Baker" line for 5 days. On the negative side, a good many things had gone wrong. The operation had consumed approximately 54 percent of FEAF's combat effort during the period it was laid on, and, in spite of the magnitude of the flak suppression effort, Red ground defenses shot down 7 fighter-bombers and inflicted major damage on 12 others. Over the Anju marshalling yard on the night of 10/11 January, Red night fighters shot down a B–29. For these bridge attacks the Fifth Air Force had relaxed its rule which fixed the minimum altitude for fighter-bomber bomb releases at 3,000 feet, and the lower attacking altitudes had no doubt contributed to higher than usual casualties. But, as General Barcus had predicted, the Reds had also made the most of the respites afforded by night and bad weather to augment their ground defenses. Around the key bridges they built up their antiaircraft artillery from 135 weapons (95 heavy and 40 automatic weapons) on 9 January to 214 weapons (139 heavy and 75 automatic weapons) on 21 January. While flak intelligence had made every effort to keep current, the enemy had constantly shifted his flak emplacements, with the result that many suppression sorties were aimed against positions no longer active. Quite disappointing was the fact that the B–29 marshalling yard attacks had not been very effective: although extremely heavy loadings had been noted in the marshalling yards, especially on "George" line between Sinanju and Pyongyang, these loadings had not begun to accumulate until three to seven days after the first bridge cuts. The B–29's had actually begun to attack the marshalling yards on the night before the first fighter-bomber attacks, and they had curtailed these attacks before accumulations of rolling stock had become really lucrative.[160]

Frenzied Communist repair activities at the Sinanju-Yongmidong bridges indicated that the coordinated rail attack had been aimed at a most vulnerable spot in their transportation system. First noted on 23 January was an amazing project which clearly demonstrated that the Reds stood in mortal terror of losing control of their rail lines where they crossed the Chongchon estuary. In order to bypass the Chongchon area, the Reds began the construction of a new 70-mile long single-track rail line (called "Jig–1" and "Charlie–1") connecting Kusong, Kunuri, and Sinpyong-ni. This project, when completed by 15 April, would connect the Namsan-ni and Chongju ("Jig") line to the Sinanju-Manpojin ("Baker") line. Additional bypass bridges were built at a number of other key rail crossings.[161]

During the week in which their principal rail lines were interdicted, the Communists had to employ vehicular resupply: for the week of 16 through 22 January sightings of Red vehicles totalled 34,383, establishing a new all time high for a week's sightings during the Korean war. Most significant was a large increase in traffic south of Pyongyang, leading into Haeju and Kae-

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song. "Such unusual enemy activity," said FEAF intelligence, "might normally be associated with a pending offensive," and such a conclusion was reported to CINCFE.[162] The heavy volume of enemy road traffic provided new opportunities to the B-26 night intruders, and the Fifth Air Force claimed 2,582 enemy vehicles destroyed in January and 2,850 in February.[163] During January a cover of snow over North Korea enabled the night intruders easily to pick out the well-travelled roads, especially on a moonlight night, and they put emphasis on roadblocks, the design of the effort being both to slow down the enemy vehicles and to force them to use their headlights. Several other changes in intruder tactics were made in January. Having examined claims records, operations analysts determined that B-26 intruders got maximum results when they made not more than four bomb releases during a pass over an enemy convoy; this detail was added to the intruder operating procedures. Since heavy enemy vehicular activity was met well south toward the battle line where attacks from enemy night fighters were relatively infrequent, use was again made of "Firefly" C-46 and C-47 flare aircraft of the 6167th Air Base Group* for searching out and then lighting targets for B-26 intruders during the dark phase of the moon.[164] This flare support was continued in February, but somewhat greater emphasis was placed on cooperative B-26 roadblock and attack tactics: one B-26 blocked a road and then diverted succeeeding aircraft to accomplish a maximum destruction of backed-up traffic. Early in March, "Road Block Buddy" tactics were used: two aircraft, each with an identical load of frags and flares, were dispatched at five-minute intervals to work the same road. One aircraft stayed high to provide illumination, while the other worked low and put in a roadblock. When the low ship had expended its ordnance, it climbed up to provide flare support for its buddy. "This system," reported the 3d Wing, "has proven to be only moderately successful." [165]

During January, when their rail traffic was disrupted, and February, when they evidently worked overtime to make up for lost supply, the Communists concealed their trains less cautiously than usual, and there were abnormally large sightings of Red trains on the west coast routes. "Spotlight" cooperation between RB-26's of the 67th Reconnaissance Wing and locomotive-hunting intruder B-26's continued to give excellent results: 33 Communist locomotives were claimed destroyed in January and 29 in February 1953.[166] Both light bomber wings worked to supplement and to replace the RB-26's with their own suitably modified aircraft, and several glassnose B-26C aircraft were modified to carry K-19 cameras and maximum loads of M-46 and M-120 flash bombs; through trial and error these intruder photo crews improved the usefulness of their photography, and by April the 3d Wing was employing two of its own photo aircraft each operational night.[167] Early in February the 17th Wing got good results against locomotives by dispatching a B-26C, followed at a 10-minute interval by a B-26B hardnose aircraft. Primarily the glassnose aircraft located and stopped trains for destruction by the hardnose plane. These tactics were peculiarly effective in the mountainous area of eastern Korea where the hostile rail lines had many tunnels. On being warned of the approach of the first B-26, a locomotive would usually run and seek refuge in a tunnel; quite frequently the locomotive was just emerging from its shelter when the second B-26 came along and destroyed it.[168] Such cooperative techniques worked well in January and February when there were a large number of train sightings, but beginning in March there were fewer locomotive sightings and fewer opportunities for attack, and it was too expensive in B-26 effort to continue to utilize pairs of aircraft in route searches against sparse objectives.

Operation SPRING THAW: Moderately apprehensive that the increased Communist vehicle movements might mean that the Reds were going to make a ground attack, CINCFE on 31 January 1953 requested FEAF to intensify its reconnaissance.[169] The Fifth Air Force accordingly concentrated its reconnaissance effort immediately behind the enemy's front lines back to some 20 miles to the rear of the front, and this effort gave very little evidence that the enemy was preparing to attack.[170] Since he had stated that he was not prepared to take excessive losses in rail interdiction, General Barcus used his fighter-bombers fairly cautiously: after the Chongchon estuary bridge attacks in January, for example, the fighter-bombers had some fair success in harassing enemy repair activities by dive-bombing them from re-

*See Chap. VI, pp. 228–29.

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lease altitudes of about 20,000 feet.[171] The Fifth Air Force also formalized and tightened up its procedures for reporting and attacking fleeting targets.[172] Toward the end of February, the enemy began to make some daylight vehicle movements, and on 26 February the Fifth Air Force accordingly instituted routine armed reconnaissance over the northwestern MSR's. This fighter reconnaissance, however, had modest results: during February the F–84's claimed the destruction of only 58 enemy vehicles.[173] Just as the redoubled reconnaissance indicated, the enemy's limited objective offensive, expected to occur during late January or early February, failed to materialize: enemy offensive ground action continued characterized by several company-sized and one battalion-sized probing attacks.[174]

As of the end of February 1953 the Far East Command estimated that the Communist ground armies had accumulated enough supplies to the rear of their front lines to permit them to undertake a 17- to 24-day offensive.[175] The Communists, however, had not mounted an all-out ground offensive during February, and for a period after mid-March any Red offensive would be hampered by the spring thaw. From early May until the first part of July would be the next period during which the Reds were likely to mount a ground attack.[176] Cognizant of these intelligence predictions, FEAF planners meant to undertake another coordinated attack, which timed to coincide with the spring thaw would disrupt Communist supply lines, destroy a goodly amount of their transportation capability, and force the Reds to use up some of their accumulated forward area logistical stocks.

One of the main deficiencies of the Yongmi-dong and Sinanju bridge attack campaign had been a failure to capitalize upon the accumulations of enemy supplies and equipment which had occurred when the bridges were cut. Early in March, FEAF planners therefore sketched an operation that would be executed later that month when the spring thaws mucked enemy supply routes. In concept, Operation SPRING THAW was intended to destroy enemy supplies and transport which would be backed up by severing the Yongmi-dong bridge complex. This time, Bomber Command was to initiate the operation by attacking and reattacking the Yongmi-dong rail crossings. Since it had the more flexible force, the Fifth Air Force would conduct intensified reconnaissance of the rail routes to the north and south in order to locate and to attack backups of supplies and equipment. Both Bomber Command and Fifth Air Force would stand prepared to conduct attacks against all lucrative backups, and the Fifth Air Force would also be prepared to help the medium bombers by cutting such of the Yongmi-dong bridges as the B–29's did not destroy.[177] During this operation the Fifth Air Force also meant to attack selected road bridges, initially along the Sinanju-Pyongyang MSR where there was little flak and later, if as anticipated the enemy moved in automatic weapons on this road, further to the north on this MSR. The fighter-bombers would attack such selected road bridges during the last hours of daylight; the intruders would attack resultant concentrations of vehicle road traffic; and just before daylight other roadblock B–26's would establish new obstacles which would stagnate vehicles for the benefit of early morning fighter-bomber sweeps.[178]

On 18 March 1953 the Fifth Air Force initiated the SPRING THAW operation against the "Red" supply routes (*see* figure 12) which ran southward of the line Pyongyang to Wonsan, and from 18 to 31 March preparatory attacks and subsequent armed reconnaissance and intruder missions by day and night were productive of a "partially to moderately successful operation." Prebriefed bridge strikes destroyed 37 road bridges, damaged 34, and cut the roads in 94 places, while armed reconnaissance and roadblock B–26's destroyed an additional 13 bridges, damaged 22, and made 40 road cuts. The planned cooperation between Fifth Air Force fighter-bombers and light bombers required a closeness of timing which was generally hampered by the poor navigational weather prevailing at the time: during March the Fifth Air Force claimed the destruction of 2,005 enemy vehicles, nearly half of the kills being accounted for during the SPRING THAW operations. The F–84 fighter-bombers, which were charged with early morning sweeps, claimed the destruction of only 114 enemy vehicles during the month. Sightings of enemy traffic nevertheless demonstrated that the Reds were forced to use their boggy secondary roads more frequently than usual, and the Fifth Air Force concluded that the effort "caused . . . a slow-down of vehicular traffic." [179]

The cooperative attacks which were keyed to the

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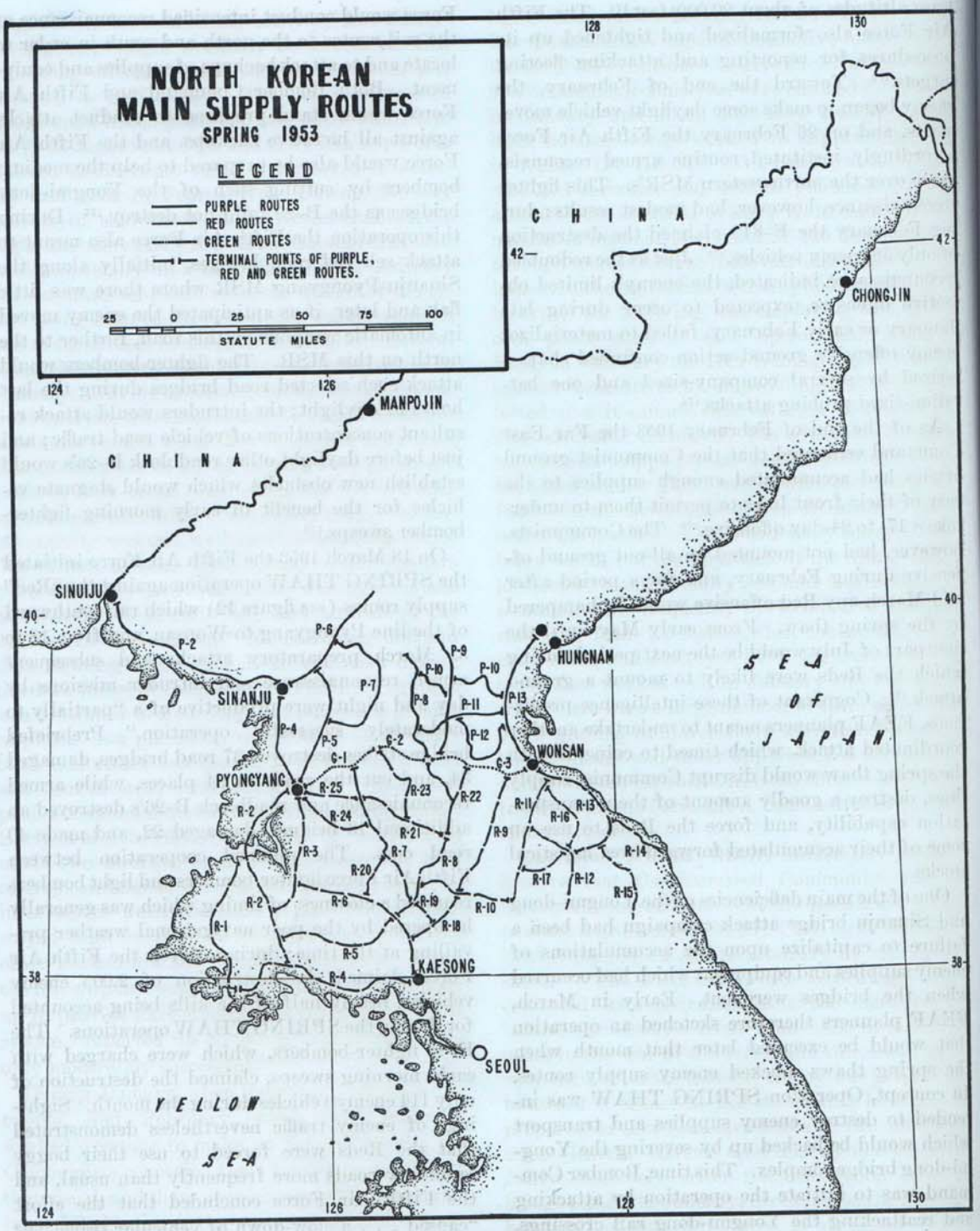

Figure 12.

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destruction of the Yongmi-dong rail bridges were less successful. On the night of 21/22 March, 18 B-29's knocked spans out of two of the principal bridges and made a third unserviceable with cuts on its approaches. On the night of 22/23 March, 8 B-29's returned to cut the damaged bridge, but while they were successful on this task they noted that the Communists had already repaired one of the bridges which the B-29's had severed the night before.[180] "We were able to hit the bridges pretty well," said General Fisher, but "the Communists were able to put one of them back into operation within twenty-four hours."[181] After these two attacks Bomber Command did not return to Yongmi-dong because it believed that "another attack might have been costly in terms of aircraft losses."[182] Just to be sure that it got prompt sightings of backed-up rolling stock, the Fifth Air Force had implemented a novel search plan: at the end of their first and third daily Yalu patrols, four flights of Sabres dropped down and swept homeward over the "Able," "Baker," "George," and "Jig" rail lines. These Sabres reported lucrative sightings to the JOC. Follow-up F-84 strikes, timed to coincide with the second and fourth Yalu patrols, were supposed to go out and attack the lucrative and fleeting traffic concentrations.[183] Almost immediately following the 21 March B-29 bridge cuts, some 15 trains were spotted, but poor flying weather permitted only one effective follow-up strike by the fighter-bombers. The bad weather also militated against successful Fifth Air Force attacks against a number of enemy supply buildups: the fighter-bombers could not get acceptable target weather and the B-26 light bombers lacked a shoran capability and could not attack these point targets during adverse flying weather.[184] These targets dissipated so rapidly that there was evidently not enough time to schedule them for medium bomber shoran strikes.

FEAF operational planners continued to believe that a cooperative air attack against selected river crossings employing medium and light bombers and fighter-bombers could be profitable, if it had the proper timing. They resolved to try the project again early in April in the dark of the moon, when the B-29's would not be so much hazarded.[185] The FEAF Bomber Command consequently issued an operations plan naming the three serviceable rail bridges across the Chongchon River north of Sinanju as targets for attack between 4 and 10 April; the first attack would be made against all three of the bridges and any of the bridges remaining serviceable would be reattacked on each succeeding night until all three were out. On the nights of 6/7, 7/8, and 11/12 April forces of 15 B-29's were thrown against these bridges; these medium bombers had good accuracy and made all three bridges unserviceable on the first strike, made them again unserviceable on the second strike, and made two out of three of them unserviceable on the third strike. But, as Bomber Command stated, the "ability of the enemy to repair bridges was just short of miraculous," and at no time were the bridges out of operation over 24 hours. Midway in the course of these attacks, FEAF strongly urged the Fifth Air Force to harass the bridge repairs with high-release fighter-bomber attacks and with nightly B-26 frag and butterfly bomb passes: the fighter-bomber harassments, however, evidently did not greatly hamper the Communist repairs.[186]

No lucrative targets apparently developed as a result of these Sinanju bridge attacks probably because of the exceptionally short time in which this crossing was interdicted. Early in April, however, the Fifth Air Force searches for trains and vehicles moved generally north of the Chongchon: the air action thus followed the spring thawing northward and avoided hostile flak increases which had as anticipated taken place south of the Sinanju-Wonsan line. The same tactics used in SPRING THAW were continued, and during the first half of April 423 fighter-bombers and light bombers destroyed 18 road bridges, damaged 38, and made 86 road cuts. During April a total of 2,732 Communist vehicles were claimed destroyed by Fifth Air Force pilots, more than half of them during the intensive reconnaissance operations in the first part of the month. The Fifth Air Force operations directorate believed that the increased vehicle destruction claims were due to an increasing level of skill among B-26 crews.[187]

During the operations timed to coincide with the spring thaws in Korea, the Fifth Air Force had generally emphasized attacks against enemy vehicles and did not stress night intruder locomotive hunts. During March the rail reconnaissance intruders were required to establish low-level roadblocks with their internal parademos before going on to reconnoiter rail routes. This

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policy meant that the B–26's had used up much of their ordnance before they sighted locomotives; the policy, moreover, was hazardous since low-flying B–26's drew hostile small arms and automatic weapons fire almost everywhere along the main supply routes. In April low-level roadblocks were discontinued. In March and April the "Spotlight" rail reconnaissance combinations of intruders and flare/camera B–26's were broken up, and the latter aircraft utilized their forward bomb bay loads of frags and their wing loadings of four M–64's, four M–47's, and two Mark–VI flares in normal anti-vehicular route reconnaissance missions, and only then became available at specific orbit points for photo verification calls.[188] As a result of the lack of emphasis on intruder rail reconnaissance and the sparse sightings of such sorties as were flown, Fifth Air Force claims of locomotive destruction were much reduced in the two months and totalled only 11 in March and 8 in April 1953.[189]

Attacks against Other Air Pressure Targets: During the period of December 1952 through April 1953, the Fifth Air Force devoted a principal share of its air capability to the interdiction of enemy transportation in Korea but from time to time it varied its pattern of operations with attacks against other air pressure targets. On 28 January, 48 fighter-bomber sorties attacked a troop concentration near Pyongyang, and next day 28 sorties followed up this attack. On 29 January, 46 sorties also attacked another troop concentration near Pyongyang.[190]

During February when interdiction was light, the Fifth Air Force gave a great amount of attention to hostile concentrations of troops and supplies. Among the more spectacular attacks this month was the two-day effort against the North Korean Tank and Infantry School west of Pyongyang on 18 and 19 February: in these two days fighter-bombers of the 8th, 49th, 58th, and 474th Wings dropped 541 tons of bombs on this school, destroying at least 243 dwelling-type buildings. Troop billets near Kyomipo were blasted by 96 fighter-bombers on 2 February and by 178 of the same type planes on 9 February. On this latter date, 94 other fighter-bombers left a storage area, locomotive shop, and munitions factory in Kyomipo in smoldering ruins.[191]

So far as the Fifth Air Force was concerned, however, its "strike of the month" during February was run against the Sui-ho hydroelectric plant. Although photo interpreters had been unable definitely to state that Sui-ho had been producing power, tailrace water indicated that two generator turbines probably were operating. Obviously fearful of a medium bomber attack, the Communists had deployed to Sui-ho some 141 heavy guns but they had unwisely reduced their automatic weapons to 26 pieces. Designing to exploit this Communist mistake, General Barcus on the afternoon of 15 February sent 24 F–84's of the 474th Fighter-Bomber Wing, each carrying two 1,000-pound semi-armor-piercing bombs, against Sui-ho's generator house and transformer yard. Screened and escorted by 86 F–86's which drew off 30 MIG's, 22 of the Thunderjets drove into Sui-ho using low-level and surprise tactics and put their bombs on their assigned targets. The anti-aircraft artillery defenses were evidently taken completely by surprise since the first four or five fighter-bombers saw no flak and that which subsequently was sent up was from heavy guns and did no damage. The fighter-bombers suffered neither loss nor damage and their bomb hits put a halt to power production at Sui-ho for several more months.[192]

In the first half of March, the Fifth Air Force employed squadron-strength fighter-bomber attacks against a number of hostile troop concentrations, and during the latter part of April it exerted its major efforts against troop concentrations. During the period 16–30 April, for example, there were 48 attacks on troop concentrations by 1,129 sorties. Beginning in mid-April the light bombers were again employed in bomber stream attacks against communications centers, and 10 such targets were attacked during the remainder of the month.[193]

During the first four months of 1953 the FEAF Bomber Command continued methodically to eliminate some 40 to 50 small dispersed targets each month in the enemy's rear areas. In November it had had some 200 of these supply and personnel areas targeted, and by April 1953 it had attacked 168 and had substantially destroyed 132 of them. Although this target list left "something to be desired," General Fisher reported increasing encouragement: while many of these targets appeared superficially to be nothing more than villages and civilian communities, the medium bombers set off so many secondary explosions

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and fires that it was quite apparent that the Communists were using these villages as troop billets and storage areas. "We have possibly found," wrote General Fisher early in March, "the last currently vulnerable link in the supply and distribution system for the Communist armies." [194]

In order to thwart the Red air defenses, Bomber Command varied its pattern of operations to conform to weather and moonlight. After losses of medium bombers in January 1953, Bomber Command made no more attacks north of the Chongchon River during periods of bright moonlight or when contrails were forming at the normal attack altitudes of its aircraft. Without reducing its monthly sortie rate, it began to schedule 18 aircraft at irregular intervals and gave up sending out 12 aircraft each night. This enabled Bomber Command to have minimum combat sorties scheduled during full moon period, and also permitted the wings to gain experience in flying larger forces.[195]

By mid-March 1953 the contrail level had lifted over northwestern Korea and was no longer a problem to the medium bombers; quite promptly these aircraft took on targets along the Yalu River. In a warm-up mission flown by 12 B-29's on the night of 13 March the housing areas at the Choaktong ore processing plant were destroyed; already the medium bombers had taken out the mine and processing plant at this installation near the Yalu. On the night of 17 March, 21 B-29's got to attack the Pungha-Dong industrial area complex which was located only three miles south of Sinuiju. In this target area were 304 single story, 8 two story, 15 barracks type, and 1 administration building. There were also several small factories in this area. In deference to the Red defenses, 4 B-29's each hit an 8-gun battery two minutes before the attacking aircraft arrived. To cause maximum confusion to enemy radars, the attacking bombers employed multiple approaches and maximum compression. Battle damage received over this sensitive target was light, and the bombers achieved 50 percent destruction in the target complex.[196]

Impact of Destructive Interdiction on the Communists: During the months of December 1952 through April 1953 the FEAF emphasis was on interdiction, but this interdiction was of a far different type from the comprehensive railway interdiction campaigns which had been conducted between August 1951 and May 1952.* Although the 1952–1953 interdiction effort undoubtedly slowed the movement of necessary Communist war material to the front lines, it was primarily aimed at the development of targets for air destruction. Rail and road bridges were attacked for the purpose of creating lucrative concentrations of vehicles, supplies, and materiel for subsequent attacks. Interdiction therefore became a secondary mission incidental to the general program of destruction.

Although the enemy continued to receive logistical support that was adequate for his limited ground operations, the flow of such support would not have been equal to the demands of expanded operations. Replacement of the transportation destroyed by UNC air action put a strain on the Red economy which was felt as far away as Moscow. Manchurian and Chinese rail development programs were brought to a standstill.[197] That the destructive interdiction effort was getting results was indicated by a change in the Peking propaganda line noted in March 1953. Whereas the previous propaganda broadcasts had played up the destructive potential of UNC "terrorist" air raids, the Chinese radio suddenly began to claim that the U. S. Air Force was not very effective in Korea. "Not half of the American claims are true, not 10 percent of the claims are true, not even 1 percent of the claims are true," said Communist correspondent Wilfred Burchett. Despite "fanatical" air efforts, said Radio Peking, the Korean railroad workers with heavy aid from Chinese People's Volunteer railway units "have resolutely maintained railway transportation." This commentary noted that 4,256 individuals had been awarded various medals of merit for their participation in rail maintenance work during "the course of the bitter struggle against the enemy aerial bombings during the past two years." The apparent willingness of the Communists to jettison the "mass destruction" line which had long been one of their major propaganda assets suggested that the effectiveness of UNC air attacks in disrupting the North Korean communications was sufficient to demand a propaganda about-face. The admitted wholesale dispatch of Chinese rail workers to North Korea and the references to the number of "merit" awards issued to those strug-

*See AHS-72, pp. 145–58.

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gling to effect rail maintenance in the face of "bitter enemy attacks" certainly gave the lie to Burchett's claim that UNC air power had failed to hamper enemy operations. The propaganda about-face suggested that enemy morale had been impaired to such an extent that the Communists felt it necessary to depreciate the effectiveness of the UNC air attack.[198]

What North Korea looked like after a year of destructive interdiction—air attacks which were intended primarily to destroy enemy materiel rather than to sever transportation routes—was well described by the captive General William Dean, who had a rare opportunity to observe his surroundings when he was moved about from one place of imprisonment to another in the spring of 1953. "The town of Huichon," he wrote later, "amazed me. The city I'd seen before—two storied buildings, a prominent main street—wasn't there any more. If it hadn't been for the river crossing I would not have believed this could be the same place." Dean further described what he had seen in these words:[199]

> For one thing, the railroads had been smashed but repaired. I think no important bridge between Pyongyang and Kanggye had been missed; and most of the towns were just rubble or snowy open spaces, where buildings had been. It gladdened my heart to see how much damage actually had been done—but I also noticed the countermeasures. For every bridge the Communists thought might be hit by our Air, another bridge was waiting, cached neatly against the day when they'd have to rebuild it quickly. I don't mean just piles of material. There were whole bridge sections all ready to be slipped into place. Sometimes duplicate highway bridges had already been thrown across the streams, so that a bomber would have to get both of them in order to stop traffic. The little towns, once full of people, were unoccupied shells. The villagers lived in entirely new temporary villages, hidden in canyons or in such positions that only a major bombing effort could reach them. . . .
>
> Although the few houses remaining in old villages were empty of people they weren't unused. Almost every one bulged with sacks and boxes of military supplies or food. Other supplies were carefully dumped in wild disarray, so that they'd look like junk in aerial photographs or to the pilots of planes.

General Dean's observations confirmed much that was already known to FEAF intelligence. There was one report, for example, that the Reds had evacuated every village south of the 39th parallel and had stored supplies under the cover of civilian dwellings, which they hoped would be free from air attack.[200] Intelligence had long known of the remarkable capability of the Communists to use forced labor gangs to repair the breaks which air attack made in their transportation arteries. It appeared to General Dean, who was thinking in terms of cutting off Communist transport, that the "enemy countermeasures were improving faster than our measures of destruction."[201] But General Dean, so long a prisoner that he knew nothing of the change in FEAF air strategy, failed to reckon with the fact that the Communists could have no effective countermeasure to the positive air destruction of their supplies and equipment.

General Dean's description of the Communist village supply dumps and the "snowy open places, where buildings had been," revealed the real impact of the destructive interdiction operations. It was this relentless destruction of these supply, personnel, and communications centers, which were the "backbone and support of the Communist armies," that was paying the great dividends. The destruction of these targets, already evacuated of their civilian populations and used solely for military purposes, was making the Communist task of maintaining and supporting huge ground armies "most difficult and expensive." Military equipment and trained soldiers, moreover, were valuable to the Communists, and both were jeopardized by the sustained pressure of the UNC air attack.[202] In April 1953, General Fisher, whose B-29 medium bombers had by this time destroyed 132 out of 200 designated supply and communications targets and were methodically eliminating more of them each night, was "firmly convinced that this program has made the support of the Communist armies so difficult and so costly in men, materiel and required dispersion, that the Chinese want no more of it."[203]

AIR PRESSURE PRODUCES A KOREAN ARMISTICE

Resumption and Conclusion of Truce Negotiations: Although both governments had refused to accept the United Nations resolution proposing a solution to the prisoner of war question, it was evident in December 1952 that Red China was much more eager to end the Korean fighting than was Soviet Russia. Chinese reluctance to continue the war was again demonstrated on 4 February

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1953, when Premier Chou En-lai called on the United States to return unconditionally to Korean truce talks at Panmunjom. Red China, he said, was ready to conclude an immediate cease-fire on the basis of agreements already reached. After such an immediate armistice the prisoner of war question could be settled at an eleven power peace conference. To the U. S. Department of State this offer was "old stuff." It was not a serious proposal but was instead nothing more than a restatement of earlier Soviet plans for ending the Korean fighting in a manner acceptable to the Communists.[204] On 19 February, however, the JCS directed CINCUNC again to propose an immediate exchange of sick and wounded prisoners of war, and General Clark made such a proposal in a letter delivered to the Communists on 22 February: this letter stated that the UNC remained ready immediately to repatriate such sick and wounded prisoners as were fit to travel and inquired whether the Communists were ready to do the same.[205]

While the Communists remained silent on the plan for exchanging the sick and wounded, the Soviet Bloc was shaken by an announcement that Premier Joseph Stalin had died on 5 March 1953. Shortly after returning home from attending Stalin's funeral, Chou displayed evidence that the Communists were willing to seek an end to their Korean venture. On 28 March, General Nam Il announced that the Communists agreed to exchange the sick and wounded and he further proposed that the armistice delegations should resume their meetings at Panmunjom. A settlement of the entire question of prisoners of war, he said, should be made to follow the sick and wounded exchange. Chou broadcast a proposal on 30 March to the effect that the nonrepatriate problem should be resolved by placing prisoners who resisted repatriation in the custody of a "neutral state," which would make final determination as to the disposition of these prisoners. Premier Kim Il Sung of North Korea seconded the Chou proposal on 31 March. CINCUNC accepted these proposals as being sufficiently constructive as to constitute a valid basis for the resumption of armistice delegation meetings following a show of Communist good faith in the exchange of the sick and wounded prisoners. When the military liaison officers had made the necessary arrangements, Operation LITTLE SWITCH, the exchange of sick and wounded prisoners of war, got underway on 20 April, and it ended on 3 May when a total of 6,679 Communist prisoners had been returned in exchange for 684 UNC prisoners of war.[206]

Early in April, before the Panmunjom truce negotiations had begun again, the FEAF Formal Target Committee discussed whether the air pressure operations should be continued during the coming peace talks. The committee recommended that application of the FEAF operational policy directive should continue because "the damage inflicted upon the enemy as a result of this application has been the only military pressure placed on the enemy during the past months and . . . is probably the force which has caused the Communists to . . . put forth new peace overtures." General Weyland promptly approved this recommendation.[207]

It was well that FEAF had decided to maintain the sustained air pressure upon the enemy for when the truce delegations resumed their discussions on 26 April 1953 the Communists were as intractable as ever. They had proposed that prisoners rejecting repatriation should be placed in the custody of a neutral state for a period of "explanations," but when negotiations were resumed the UNC found that the detailed Communist plans for implementing this neutral state proposal were unacceptable. The Communists demanded unlimited access to the prisoners for a period of at least six months in order to carry out a reindoctrination program. After the six months, prisoners still rejecting repatriation would be retained in custody of the neutral state pending final decisions as to their fate by a political conference. Coercion was inherent in this plan since the prisoners would be forced to choose between repatriation and indefinite detention. Early in May both sides made several concessions: the Communists agreed that the prisoners placed in neutral custody might physically remain in Korea, and the UNC agreed to accept a five nation Neutral Nation Repatriation Commission rather than a single state as the custodial agency. Czechoslovakia, Poland, Sweden, Switzerland, and India were to be represented on this commission. The two sides could not come to agreement on the length of the explanation period and on the matter of the final disposition of nonrepatriates. On 13 May the UNC presented a summarized statement of its proposals to the Communists in the form of terms of

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reference for the NNRC. When the Communist negotiators flatly rejected these proposals and used succeeding plenary sessions to make propagandistic tirades, the UNC recessed the negotiations from 16 to 25 May.[208]

Early in May, when he saw that the Communists were going to continue to obstruct the peace negotiations, CINCUNC approved several plans for FEAF attacks against sensitive targets in North Korea. On 2 May he gave approval for a medium bomber attack against the Yangsi target complex, which was 12 miles southwest of Sinuiju. "Continuing such attacks during present armistice negotiations," CINCUNC told the JCS, "is strong indication to the enemy that UNC operations have not been slowed down." A few days later CINCUNC authorized another attack designed to keep the Sui-ho hydroelectric plant inoperable. "This is military pressure which we should use," he said, "to convince the Communists that the UNC will continue, without let-up, its military operations until an honorable armistice is obtained."[209] The possibility that another indefinite recess in armistice negotiations was in the making prompted CINCUNC to outline his plans to the JCS on 14 May for applying further military pressure on the Communists. Once again, his principal military pressure would be air pressure. Immediately after another prolonged recess in negotiations CINCUNC said that it would be possible to continue air attacks against critical targets in sensitive areas, to breach by air action about 20 irrigation dams in North Korea,* to bring Kaesong under heavy air attack after first advising the Communists that their use of the town as a military concentration point violated security agreements, and unilaterally to release about 35,000 North Korean nonrepatriate war prisoners. In the fall of 1953 it would be possible to mount a limited-objective land and amphibious attack in the Kumsong area. On 21 May, in response to a request from General Weyland, CINCUNC agreed to waive the usual 48-hour advance notice required for attacks along the Yalu in order that FEAF might freely attack the Red airfields at Sinuiju, Uiju, Hoeryong, Chunggangjin, and Hyesanjin prior to the coming into effect of an armistice. When he notified FEAF that an armistice was imminent, said CINCUNC, the 48-hour notice for attacks against these airfields would be automatically waived. On 27 May, CINCUNC further authorized FEAF to make an attack against the previously unhit airfield at Chunggangjin.[210]

After revising its terms of reference to include final positions, the UNC delegates presented the proposal to the Communists on 25 May with the implication that no further concessions would be made. After this presentation the UNC delegation declared a week recess in the talks that was later extended, at the request of the Communists, until 4 June. On 27 May CINCUNC sent a letter to the ranking Communist military leaders which gave added weight to the implication that the UNC had made its final offer. The 25 May terms of reference provided for an explanation period of 90 days and for final disposition of the problem of remaining nonrepatriates by a political conference. These nonrepatriates were to be released after 120 days in neutral custody if, by that time, the political conference had not reached a decision. In the discussions prior to 25 May, the UNC had insisted that Korean nonrepatriates should be released to civilian status on the effective date of an armistice, but in the final proposal of 25 May the UNC yielded to strong Communist objections and provided for like treatment of Korean and Chinese prisoners. Dropping this demand roused violent opposition in the Republic of Korea.[211]

When the truce meetings resumed on 4 June the Communist senior delegate opened with the statement that his side "basically" agreed with the UNC terms of reference proposed on 25 May. The Communists, however, had made revisions, consisting largely of changes in wording but some of them involving changes in meanings sufficient to require additional negotiation. In the several days which followed both sides made compromises and at 1424 hours on 8 June 1953 the senior delegates signed the approved terms of reference for the NNRC. These terms marked a complete Communist capitulation and achieved the UNC objective of voluntary repatriation of prisoners of war: in effect the terms decreed that prisoners who did not want to go back to Red territory would be freed as civilians after 120 days if a major political conference failed to solve their problem.[212] After nearly two years of frustrating negotiations the Communist capitulation on the pris-

*See pp. 126–31.

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oner of war issue cleared the last major hurdle in the armistice talks. Staff officer meetings had already been discussing the demarcation-line problem, and at a plenary session on 17 June the delegations of both sides officially ratified the line of demarcation which the sub-group had worked out in give and take bargaining.[213]

Except for cleaning up the terminology of the draft armistice agreement, the work of the armistice delegations was finished, and all signs pointed toward an early signing of the armistice agreement. But on the night of 17/18 June, President Syngman Rhee of the Republic of Korea decided to take drastic action to prevent conclusion of an armistice which he had steadfastly opposed for nearly two years. In a secretly planned and carefully coordinated action, the ROK government permitted 27,000 anti-Communist Korean prisoners of war to escape from UNC prison camps between midnight and dawn. At the next plenary armistice session on 20 June the Communists demanded to know whether an armistice in Korea would include the "Syngman Rhee clique" and insisted that the UNC must immediately recover all of the released Korean prisoners.[214] Resolution of the difficulties caused by the surprise action of President Rhee would require more than a month of tedious negotiations.

As early as May, however, it had been evident that the Red truce negotiators were pacing their actions in accordance with some time schedule which remained unknown to the UNC. During May the Reds switched their ground effort from a defensive to a limited offensive, and launched company to regimental size attacks against outpost positions protecting the UNC main line of resistance. The Reds probably wanted to hold these positions at such time as the military line of demarcation was renegotiated. On 2 June CINCFE warned the JCS that a Communist attack of increased magnitude appeared likely, probably with the design of forcing the U. S. I and IX Corps back behind the line of the Imjin and Han Rivers. Such ground action would permit the Communists to sign an armistice at a time when they could claim a ground victory. After a gradual buildup of ground action, however, the Communist attack was launched on 14 June in the Pukhan valley of east-central Korea. This attack pushed Red positions some eight miles southward before it was contained.[215]

When the truce negotiations were disrupted by the "escape" of the anti-Communist Koreans, the Reds obviously groped for a new official attitude. They first attempted to secure a commitment that the UNC would use force to secure a ROK compliance with armistice terms. Although the armistice delegations began to meet again on 10 July, the Communists for 10 days persisted in haggling about the escape of the Korean nonrepatriates. While the Reds appeared not at all anxious to terminate the armistice discussions, they obviously desired to get such profit in the form of concessions as could be wrung from the issue. Quite suddenly on 19 July, however, the Reds dropped the Korean prisoner question and thereafter speedily wound up the negotiations. In exactly this same period a Communist ground offensive chastised the Republic of Korea. Beginning on 12 July the Reds threw battalion-sized attacks against the ROK II Corps in the hilly country between the Kumsong and Pukhan Rivers. Elements of five Chinese Communist divisions continued these attacks, and the ROK II Corps, behaving rather badly and retreating under too little pressure, was driven backwards in some disorder. In this critical juncture, General Weyland requested and General Clark approved medium bomber attacks against two more targets in the sensitive area of Korea near the Manchurian border. On 14 July FEAF asked permission to hit the Yongpong-dong target complex, where targets comprised factories, an ore processing plant, and workers' quarters, and on 15 July it requested authority to attack the Yongampo target complex, one of the Communists' main supply storage and supply transshipment points in northwest Korea. These attacks were scheduled for the nights of 16 and 18 July, but they had to be cancelled, and both Bomber Command and Fifth Air Force had to give all-out support to the ROK II Corps. Aided by virtually the entire force of UNC air power, the Eighth Army by 20 July stabilized a line and held it against diminishing enemy attacks.[216]

When the Communists perceived that their ground offensive had been stopped with considerable casualties, they appeared at the truce table on 19 July with an obvious determination to end the fighting as quickly as possible. At the conclusion of this session, CINCUNC alerted all commands that only administrative details remained

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to be resolved before the armistice agreement would be signed. Following some redrawing of the demarcation line to represent the recent Communist ground gains and the completion of a large number of last-minute tasks, the final armistice agreement was signed at Panmunjom at 1000 hours on 27 July. At midnight on 27 July 1953 military hostilities were officially terminated in Korea.[217]

Destruction of North Korean Irrigation Dams: During the last three months of Korean hostilities, General Weyland continued to employ FEAF air power in a manner calculated to motivate a Communist acceptance of UNC armistice terms. In this period no single air operation so gravely affected the Communists as the simple destruction of two agricultural irrigation dams, for this operation, too terrible to execute in its entirety, portended the devastation of the most important segment of the North Korean agricultural economy.

Had target selectors not been looking for air objectives in terms of an air pressure strategy it is doubtful that they would ever have noticed North Korean irrigation dams. While studying the activities of Communist security units in the spring of 1953, Far East Command intelligence officers noted that the locations of these units followed a seasonal pattern: during the growing season these security units were deployed in the interior of the rich rice producing provinces of Hwanghae and South Pyongan, but immediately after the harvest the units were deployed to the north and south in coastal defense and lines of communications guard duty. Given this one clue that the Reds attached great importance to rice production, FEAF and FEC intelligence officers soon determined the importance of the Korean rice production to the Red regime. In nearly two years of war, UNC air power had been exclusively directed against hostile military and industrial targets, but agricultural production had remained unscathed and was the single economic asset remaining to the Communists in North Korea. The better to control their last economic asset, the Communists had brought agricultural production under rigid police authority: "undesirable" farm families had been removed and their lands had been reassigned to "reliable" sympathizers, rigid production quotas had been placed on the farmers, and drastic in-kind agricultural taxes had been levied. Although most agricultural produce was thus seized by the Red government, these government stocks did not again reach the civilian economy: both farm worker and city dweller suffered from a shortage of food and clothing. The Red government's grain was instead used to feed Communist soldiers and an important share of it was exported to China, which had been suffering from crop failures and rice famine, in repayment for military materiel. Attacks against an enemy's food supply were a traditional form of warfare, and the destruction of North Korean rice production would turn this enemy region from a food-exporter into a food-importer. "We would not hesitate to try to destroy as much rice as possible . . . in transit," pointed out FEAF intelligence. "Under these circumstances, it is difficult to rationalize a reluctance to attempt to destroy rice . . . growing in the fields, which actually would accomplish much more denial of this food than would the already accepted method."[218]

Once the idea was grasped that the North Korean rice production ought to be destroyed, target researchers had little trouble figuring how this could be done by air attack. Approximately 70 percent of Korean rice lands required some form of controlled irrigation, and the Koreans customarily stored water in reservoirs for use in the April and May rice planting seasons. Within North Korea, most rice was produced in a belt extending along the western coast northward from the 38th parallel. On the Haeju peninsula, South Pyongan and Hwanghae provinces, given sufficient irrigation and normal rainfall, annually planted some 422,000 acres and produced approximately 283,162 tons of rice. A substantial portion of the irrigation water required to produce the Haeju rice crop was impounded behind earth and stone dams in only 20 reservoirs. The dikes of these reservoirs were vulnerable to air attack, and when they were breached a number of positive results would be obtained. The Reds would be denied the irrigation waters they needed for rice production. The released flood waters would destroy a year's rice planting in the lowlands, they would silt over or wash away valuable topsoil, and they would cause increased fertilizer demands since the leached soils would have to be rejuvenated. In several instances, moreover, the released floodwaters would destroy or damage Communist military installations, lines of communications, and airfields. Japanese horticulturists explained that there were two particularly critical periods in the rice grow-

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ing season: the first was in early May, at the end of the transplanting season, when flood waters would uproot or cover the young plants; the second was in early August, during the blooming season, when flood waters would destroy a large portion of the plants and thus the year's crop. After a May destruction the farmers could possibly replant, but attacks in this month would be materially and psychologically damaging. Moreover, attacks could be made in May and repeated in August if this proved to be necessary.[219]

The North Korean agricultural irrigation dams (*see* figure 13) provided an excellent air target system, which, if destroyed, would have had a shattering effect on the economy of the Soviet bloc. But the implications of air attacks against this system appeared too drastic. On 24 March 1953 the FEAF air targets representative first broached the subject of attacks on irrigation dams at a meeting of the FEAF Formal Target Committee. After explaining the significance of the reservoirs, he asked the Fifth Air Force and Bomber Command to explore the possibility of breaching all 20 reservoirs in the Haeju area simultaneously.[220] Pending this further study the FEAF Formal Target Committee made no recommendations on the matter, but when General Weyland was briefed on the proposed operations he was reportedly "skeptical of the feasibility and desirability of destroying the North Korean rice irrigation system."[221] On 7 April, moreover, several members of the FEAF Formal Target Committee expressed doubt as to the wisdom of such a drastic operation. The committee therefore recommended that the FEAF Deputy for Intelligence should prepare a presentation of facts for General Weyland's use either in making a decision on the matter or a recommendation to higher headquarters.[222]

The FEAF intelligence study that resulted emphasized the positive effects of the irrigation dam attacks which have already been noted, and it devoted equal attention to the potentially negative features of such operations. A major deterrent was that section of CINCFE's instructions to General Weyland which ordered that: "Every effort will be made to attack military targets only, and to avoid needless civilian casualties." Assuming that any activity in support of the Communist armed forces or the North Korean government was a military target, the enemy's rice crop and irrigation reservoirs were obviously military targets. The reservoirs, moreover, were in rural areas where there was small chance that air attacks would inflict needless civilian casualties. The Communists would undoubtedly put out propaganda that the UNC was denying food to women, children, and babies, but actually most of North Korea's rice production was going into military or international barter channels and little of it got to the civilian population. If the dams were destroyed in May the farmers would have time to plant another crop, and they would tend to blame the Red regime for their trouble. As for the feasibility of destroying the dams, the intelligence study believed (pending exact targeting) that the dams could be breached by upstream underwater blasts of conventional large-size bombs available in the theater. So far as FEAF intelligence could determine, attacks on the agricultural reservoir system of the Haeju peninsula would be suitable, feasible, and acceptable.[223]

The agricultural irrigation target system had been identified at a time when the armistice negotiations were being resumed, and neither General Clark nor General Weyland thought that the time was opportune for such a drastic operation as the destruction of the enemy's rice crop. Both believed, however, that the rice destruction operation would have utility as an ultimate in air pressure, to be used if the Communists broke off armistice negotiations. Had the situation been different, General Weyland wrote later, with specific reference to the irrigation dams, the policy of attacking only targets directly related to the military structure and its support might have been completely invalid.[224] While he was unwilling to authorize attacks against the rice crop, General Weyland knew no hesitancy in approving irrigation dam attacks where resulting flood waters would interdict hostile lines of communication.

About 20 miles north of Pyongyang and backing up waters of the Potong River into a three-mile long and one-mile wide reservoir, the Toksan irrigation dam loomed over the main Sinanju to Pyongyang ("George") rail line and dominated a main north-south highway as well. In order both to develop dam destruction techniques and to interdict the "George" rail line, General Weyland directed the Fifth Air Force to breach the Toksan dam. On 13 May four waves of 59 F-84 Thunderjets of the 58th Fighter-Bomber Wing attacked

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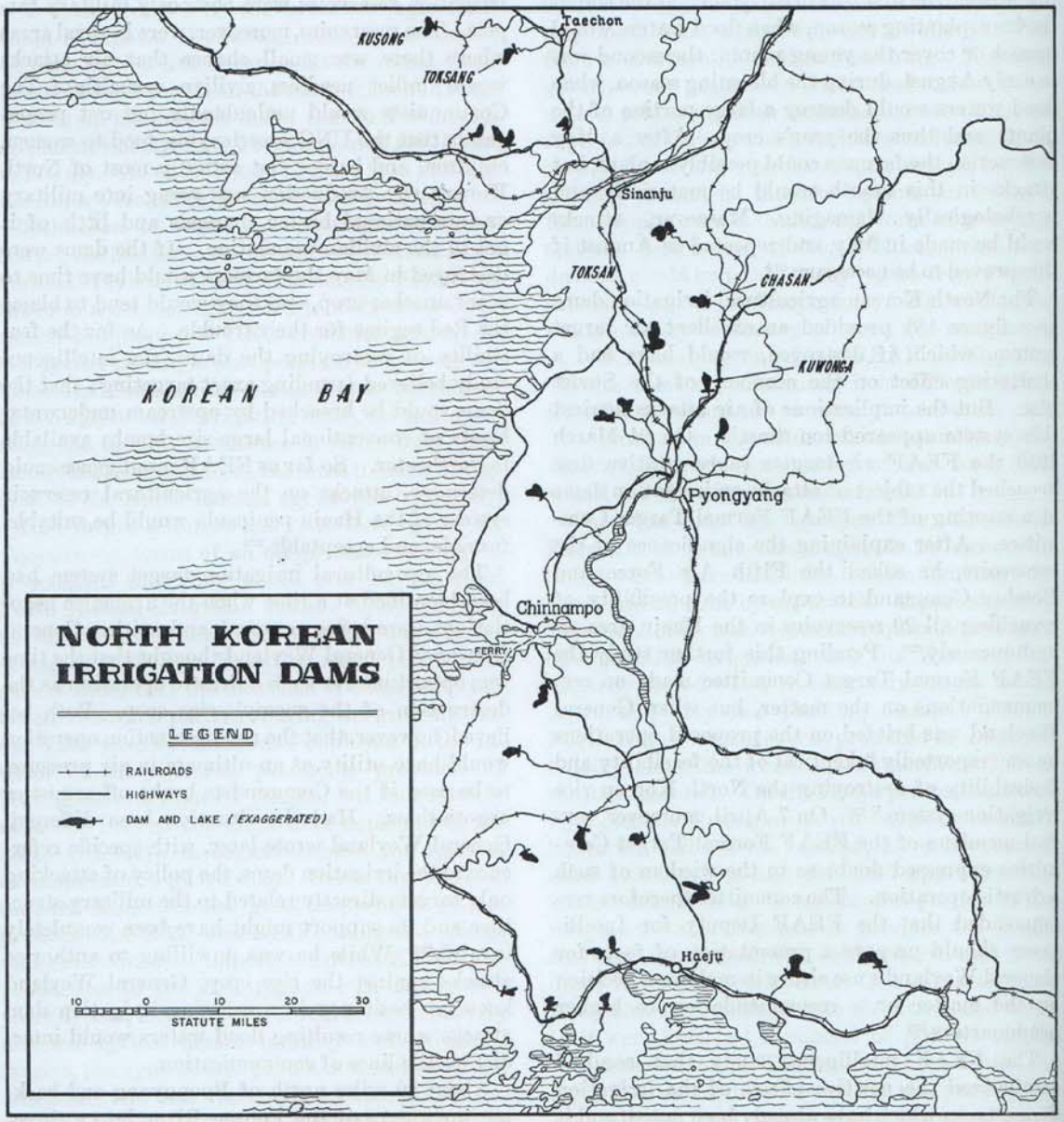

Figure 13.

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the 2,300-foot-long dam. In this pioneer effort, the first two waves, each of four aircraft, launched their 1,000-pound bombs from 300 feet altitude: the first four aircraft skipped their bombs into the face of the dam while the second four attacked the water side of the dam. A third wave of 12 aircraft attacked along the length of the dam, and late in the afternoon the fourth wave sought to destroy the dam by the hydraulic pressure of bombs dropped in the water near it. At last light on 13 May water was seeping down the dam's face from two craters on the top, but the dam was still intact. Sometime that night the impounded waters of the reservoir broke through the weakened dam, and when the fighter-bomber pilots returned to continue the attack on the morning of 14 May they found the reservoir empty.[225]

"The breaching of the Toksan Dam," General Clark jubilantly informed the JCS, "has been as effective as weeks of rail interdiction."[226] Photography showed that the results of the raging flood released at Toksan had been indeed fearful. Approximately six miles of the "George" rail line and five bridges had been destroyed or damaged. Some two miles of the main north-south highway, including five bridges, were either damaged or destroyed. Down the river valley 700 buildings were destroyed and 877 damaged. Sunan airfield, some seven miles south of the dam, was flooded, as were eight occupied antiaircraft artillery positions and an unidentified underground installation. The swirling floodwaters also scoured some five square miles of crop lands and washed out their web-like irrigation canals.[227] "The damage done by the deluge," said the Fifth Air Force directorate of operations, "far exceeded the hopes of everyone."[228]

Having made one of the two main rail lines into Pyongyang unserviceable, FEAF immediately scheduled two more dams for destruction which would immobilize the "Fox" rail line. Chasan dam was assigned to the Fifth Air Force and the Kuwonga dam to Bomber Command. Fifth Air Force fighter-bombers got to work immediately. Late on the afternoon of 15 May, 36 Thunderjets of the 58th Wing, each carrying 2 x 1,000-pound general purpose bombs, dive-bombed the Chasan dam but inflicted no significant damage. On 16 May three waves of 90 Thunderjets from the 58th and 474th Wings continued the dive-bombing attack, and the last attack of the day inflicted five direct hits in a pinpoint area to open a break which was pounded out by the hydraulic pressure of other bomb hits in the water just beyond the dam. Within four hours the impounded waters of the one and one-half mile long and one-mile wide reservoir poured through a 150-foot breach and surged southward to wash away some 3,050 feet of rails, 2,050 feet of embankment, and three railway bridges of the "Fox" line. Although the main "Purple-5" road suffered slight damages, 1,500 feet of secondary road was washed out and 53 buildings and 16 supply shelters were destroyed. The onrushing waters surged over field after field of young rice.[229]

When seven Bomber Command B-29's attacked the Kuwonga dam on the night of 21/22 May, their results with 2,000-pound bombs were less positive than those which had been scored by the fighter-bombers. This dam was earth-filled with stone facings, 290 feet long, 75 feet high, and 25 feet wide at its crest. Out of 56 bombs dropped by shoran aiming, four direct hits battered the crest of the dam, but there were no breaks. Now fully cognizant of the dangers posed by the dam attacks, the enemy reacted almost immediately and reduced the water level in the Kuwonga reservoir by 12 feet, thus increasing the thickness of the earth which had to be breached to some 90 feet. Again, on the night of 29 May, 14 B-29's attacked the dam with 2,000-pound bombs, and five direct hits tore out a crater 46 feet wide by 190 feet long. Had the water level in the reservoir been at its customary height, this attack would have doubtlessly breached the dam.[230] Although these two B-29 missions failed to secure the desired flood, they must have damaged the inner core of the dam. Before they could begin to rehabilitate the structure, the Communists were compelled completely to drain the Kuwonga reservoir.[231]

Even though the Communists displayed their usual fantastic rapidity in restoring destroyed and damaged rail lines to serviceability, the "Fox" and "George" rail lines had been so badly swamped that they were not usable until 26 May.[232] This experience demonstrated that the irrigation dams were valid as interdiction objectives. Early in June, moreover, General Weyland perceived that the flood waters of these dams might have an additional utility. At this time he was quite anxious lest the Communists get some air units into Korea just prior to the effective hour of the armis-

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tice.* Two major Red airfields at Namsi and Taechon had been bombed and were scheduled for continuing attack, but it was still possible that the Communists, benefiting from a period of bad weather, might make enough repairs so that these fields could receive MIG–15 fighters. General Weyland therefore asked permission to bomb and breach the Kusong and Toksang irrigation dams, whose impounded waters would flood these two airfields, wash out "Jig" rail line between Kusong and Chongju and damage the new "Jig–1" rail line between Kusong and Kunuri. On 11 June CINCUNC recommended that the attacks be made, and the JCS concurred in the proposal that same day.[233]

The Fifth Air Force began the attacks against Kusong and Toksang on 13 June. During that day 54 F–84's attacked Kusong and 40 F–84's struck Toksang, and the tactics employed against each objective were the same. Each force was divided into two waves, the first of which skip-bombed the center of each dam from the water side with 1,000-pound bombs and the second of which launched its bombs in the same manner but followed a reciprocal course to strike the face of the dam. On 14 June, 40 F–84's and 16 F–86 fighter-bombers reattacked Toksang, while 20 F–84's and 20 F–86's reattacked Kusong. That night 20 B–29's were scheduled against the two dams: the Kusong mission was scrubbed in favor of front-line support but the other 10 Superforts attacked Toksang with 1,000-pound bombs. Weather, which now began to deteriorate, prevented attacks against these dams on 15 June, and during this day of respite Communist forced labor battalions refilled a number of craters on both dams. On 16 June eight F–84's and 16 Marine Corsairs came close to breaching Kusong when three of their bombs cut across the crest of the dam, leaving only two crater ridges to hold back the water. The Communists responded to this threat by opening Kusong's floodgates and draining the reservoir. On 18 June eight F–84's and 16 Corsairs attacked Toksang, and that night 16 B–29's bombed it with 2,000-pound bombs. These cumulative strikes demolished the western end of the dam, but the Communists had been lowering the water level with each attack just enough to avert a breach and finally they completely drained the reservoir. Without the force of impounded water further attacks against Toksang and Kusong would obviously be fruitless, and such strikes were discontinued in favor of direct attacks against Namsi and Taechon airfields.[234]

In the course of Korean hostilities, FEAF's operational planning was often short range and lacking the detailed analyses which are required in a major war. Such short-range planning not infrequently gave scant consideration to potential enemy reactions to planned air operations.† Planning for the irrigation dam attacks had included an excellent estimate of obtainable results, but it had failed to consider the enemy's possible course of action in opposition to such attacks.[235] Failure to anticipate that the enemy could drain the Kuwonga, Toksang, and Kusong reservoirs, thus reducing the vulnerability of their dams to air attack, prevented FEAF from realizing the exact results which it desired. In some measure, however, the fault here lay not in planning but in the change from original planning: FEAF intelligence had originally urged that 20 selected dams should be breached in as short a time as possible, thus allowing the enemy little time in which to react and maximizing the shock effect of the attacks, but instead the strikes had been scheduled against individual targets over a time interval of several weeks. The Communists had been given adequate time in which to devise and disseminate countermeasures. These countermeasures prevented flood damages, but so far as rice production was concerned they were ill-advised: by draining their own reservoirs the Communists deprived themselves of the large quantities of irrigation water which they required in a very critical period of the rice farming cycle.[236] After Toksang and Kusong FEAF made no more irrigation reservoir attacks, but General Weyland kept an overall attack plan against this complex in mind just in case it might be needed as an ultimate punishment for the Communists.[237]

At the end of the Korean fighting, General Weyland remarked that two particular fighter-bomber strikes stood out in his mind as "spectacular on their own merit." One was the hydroelectric attacks of June 1952 and the other—"perhaps the most spectacular of the war"—was the breaching of the Toksan and Chasan dams in

*See pp. 135–39.

†*See also* AHS–72, p. 155.

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May 1953.[238] To the average Oriental an empty rice bowl is symbolic of starvation, and the vitriolic propaganda indictments made against the United States immediately following the destruction of these two dams showed that the Communists were deeply impressed. Vengeful propaganda broadcasts gave the impression that dozens of irrigation dams and the entire Korean rice crop had been destroyed, the obvious propaganda goal being to mobilize world opinion against any additional reservoir attacks. Fully realizing what air attacks on the other dams would mean, Communist propagandists used every trick in their trade to forestall them. Heavily stressed was the charge that the dams "were not military targets" and that, in destroying them, "the Americans were trying to spoil the vast fertile soil and drown several scores of thousands of farmers." Some indication of the enemy's desperate straits was also shown in the vigor with which he approached the task of restoring the vital dams and washed-out rail lines, highways, and bridges. UNC air observations showed that over 4,000 laborers were immediately dispatched to Toksan, where work was carried on around the clock with little regard for delayed-action bombs strewn about in the area. In a prideful, postwar broadcast Radio Peking said that 200,000 man days were required to close the gap in the Toksan dam. Since this task was not accomplished until 14 August, rice production on the 7,500 acres said to have been normally irrigated from Toksan's waters must have been quite limited. A CCRAK agent who had been in the area at the time of the attack said that the local population felt that this had been the greatest damage caused by any single UNC air attack.[239] Compounded 20 or 30 times such damages as were inflicted at Toksan would have been disastrous to the Communist cause in Korea, and the Reds, recognizing their precarious situation, were not going to argue much longer about the disposition of the prisoners of war.

Air Attacks Against Sensitive Targets: Since 16 December 1952, when the target had been initially assigned to Bomber Command, both FEAF and the FEC had been keenly interested in the destruction of Radio Pyongyang. The target, however. was a most difficult one: it was located in several concrete-reinforced caves near Pyongyang and was about 42 feet below ground. The radio station itself was a pinpoint target, and, to make matters worse, some buildings only 750 feet northwest of it had at one time been marked as a UNC prisoner of war camp. Bomber Command did not foresee much success in a mission against such an objective since its 2,000-pound general purpose bombs, even when fuzed for maximum penetration, would only reach a depth of approximately 30 feet, but on the night of 17 January 1953 it had put 11 B–29's over the objective. These planes scored 15 hits in the target area, but the transmitter did not go off the air. After this there was some thought that the target might be worthwhile for a few 12,000-pound Tarzon bombs which remained in the theater, but FEAF had no airplanes suitably modified to carry these large missiles and this project was obviously too costly. On 15 February, however, the Pyongyang Radio went off the air at a time when B–29's were striking the nearby Pingjang-ni communications center, and strike photography revealed that power lines leading from the area had been damaged. FEAF therefore suggested that the Fifth Air Force examine the possibility of denying electric power to the Pyongyang Radio.[240]

While there was very little possibility that the destruction of power lines would keep Radio Pyongyang off the air for anything more than a short time, the Fifth Air Force decided to exploit a psychological attack against this broadcasting station. On 1 May it accordingly devised a surprise package designed to dampen the enemy's May Day festivities and to disrupt his propaganda broadcasts, which would be at a peak on this Communist holiday. Although the radio station was in one of the most heavily defended areas in North Korea, General Barcus took advantage of the tactical flexibility permitted by his new F–86F fighter-bombers. While the 4th and 51st Wings screened off the area, General Barcus personally served as airborne commander as other 8th and 18th Wing Sabre fighter-bombers flew at high altitude as if proceeding to the Chongchon or the Yalu for a sweep, made a sudden letdown at an initial point, dived into the target area, released their bombs, and then swept away on the deck until they were out of the range of the flak batteries. Only one aircraft sustained major damage, and its pilot brought it safely home to K–13. After this mission and while he was still hovering above Pyongyang, General Barcus broadcast on a frequency known to be monitored by the Reds his

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promise that: "We will be back every time you broadcast filthy lies about the Fifth Air Force." Although this daring attack against a heavily defended target represented a loss of face to the Reds,* it was not successful in silencing the Pyongyang radio.[241]

Beginning in May 1953 FEAF also initiated a program designed to insure that such rehabilitation effort as the Reds had expended on their hydroelectric generating facilities would be nullified prior to a truce in Korea. On 2 May, General Weyland accordingly asked permission to undo Red repair efforts at Sui-ho. CINCUNC initially replied that the state of the truce talks was not right for such attacks, but within a few days he changed his mind and informed the JCS that Sui-ho would be attacked unless they specifically disapproved. The JCS gave approval on 8 May, and on 10 May eight 474th Fighter-Bomber Group F-84's went in low under heavy Sabre cover and put at least three delayed action bombs through the roof of Sui-ho's power house. Although none of these planes were lost, one of the pilots on the mission said that the flak was "the most intense in all of North Korea."[242] Tailrace activity continued at Sui-ho, indicating that at least two generator turbines must be working. On 30 May General Weyland therefore asked CINCUNC to grant a blanket authority whereby FEAF would continue to attack this target as often as necessary to put it out of business, but, while CINCUNC was willing to approve another attack, he was unwilling to grant this authority for continuing attacks against a sensitive target.[243] Quite cognizant of the heavy flak defenses at Sui-ho, the Fifth Air Force now exploited the surprise possible with an all-Sabre attack: according to a carefully coordinated operations plan, the 4th and 51st Fighter-Interceptor Wings on 7 June provided 66 Sabres for a Yalu and backup patrol while eight F-86F fighter-bombers of the 8th Wing, flew integral formation with 12 other 51st Wing Sabres to a proper point over Sui-ho, where they dropped out of formation and rolled into their bomb run. Since the Sabres often used Sui-ho as a checkpoint in their patrols, the eight Sabre fighter-bombers got down to the target so quickly that the Red gunners were not alerted. These Sabres scored a number of hits on the northern quarter of the Sui-ho generator house (where the two operational generators were believed to be located) and then swept away on the deck, unscathed by enemy ground fire.[244] Cloud cover on reconnaissance photography obscured the exact results obtained by the 1,000-pound semi-armor-piercing bombs which the Sabres dropped, but for several days there was no tailrace turbulence. Subsequent photography, however, revealed that the tailraces of what should have been No. 6 and No. 7 turbines had started up again, and the photographic interpreters once again had to assume that Sui-ho plant had been repaired enough for some limited production. Until target experts could establish the exact location of the generators in the long, narrow, bomb-resistant powerhouse, there was not much sense in risking pilot's lives at Sui-ho. Shortly before the end of hostilities, Fifth Air Force intelligence was trying to get some indigenous agents into the area at Sui-ho to try to find out what was going on under the roof of the reinforced-concrete powerhouse.[245]

Just to be on the safe side and to be sure that the North Korean hydroelectric facilities were freshly bombed before the end of hostilities FEAF desired in June 1953 to schedule some attacks against the Kyosen and Fusen facilities. Due to demands for air support of ground operations, however, these strikes were delayed, and in July CINCUNC was hesitant to approve them lest they complicate armistice negotiations.[246] But as hostilities ended a last minute reconnaissance of the enemy's hydrolectric facilities revealed that nearly all of them were out of operation. Only two of the power plants were in a partially serviceable condition: Sui-ho with possible serviceability of two turbines and Chosen No. 1, which had one generator that was possibly serviceable. The three Chosen, four Fusen, and four Kyosen power plants were unserviceable.[247]

Complying with CINCUNC's standing instructions that he be notified prior to any air attacks against sensitive areas, General Weyland on 11 April expressed the intention of attacking a target complex at Yangsi with B-29's on the night of 15/16 April. This complex of buildings, warehouses, and barracks was located 12 miles southeast of Sinuiju. It was adjacent to the main Antung to Sinanju railway and was bisected by a main north-south highway. This target looked lucrative to Bomber Command, whose intelligence

*See Chap. III, p. 57.

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officers had developed it, and it met General Weyland's requirement for continuing B-29 activity in the Sinuiju area. CINCUNC authorized the attack and so informed the JCS, but this body, pointing out that one of the LITTLE SWITCH convoys was supposed to move through the area, desired the attack postponed.[248] On 1 May CINCUNC advised the JCS that, following the exchange of the sick and wounded prisoners of war, he intended to permit a FEAF attack against the Yangsi complex on the night of 10/11 May.[249] On this night, 39 B-29's attacked Yangsi without great difficulty and effected 63 percent destruction of the complex, or a total of 652 buildings. On the night of 18/19 May, 18 B-29's went back to Yangsi, this time to destroy 166 buildings in the barracks area which were used for the storage of highly critical war materials. These actions completed the practicable destruction of "one of the last large lucrative targets remaining in North Korea."[250]

After finding Yangsi, Bomber Command had requested photographic surveillance of the entire main supply route between Sinanju and Sinuiju in the hope of discovering other lucrative complexes. Apparently this reconnaissance turned up a good number of worthwhile targets which were far enough north for their destruction to be impressive to the Communists and not so far north as to be "sensitive" and thus require a CINCUNC clearance for attack. Bomber Command attacked as many of these complexes as it could manage. On the night of 19/20 May, 14 B-29's destroyed a total of 117 buildings in the Unsan-Dong complex, about eight miles due west of Sinanju and probably used by the Reds both for billeting coastal defense troops and as a stopover point for motor transports. On the night of 7/8 June, 14 B-29's attacked the Unhyang-po supply area, located about 20 miles southeast of Sinuiju. This area contained fuel storage, a large supply dump, and warehouses, and it was apparently used as a transshipment depot and a refueling stop for trucks. The bombers destroyed 250 buildings, or more than half of the structures in the complex.[251] In this same XE grid area, Bomber Command targeted for attack two more significant installations—a factory complex at Yongpong-dong and a storage and transshipment point at Yongampo—but the requirements in June for close support of friendly ground troops used up the medium bomber capability. Early in July, FEAF got CINCFE to clear attacks against Yongpong-dong and Yongampo, both of which were in the sensitive zone, but once again the medium bomber effort had to be diverted to ground support. Had the war continued, Bomber Command would have attacked these two targets early in August.[252]

Interdiction of Communist Ground Forces: Although the resurgent Communist ground offensives of May, June, and July 1953 at once demanded and rewarded destructive interdiction operations, relatively fewer sorties could be flown against hostile personnel, transportation, and supplies because of the increased requirements for close support of friendly ground troops. Thus in May 25 percent, in June 49 percent, and in July 43 percent of the total FEAF combat effort was expended in close-support missions.[253] During the course of his offensives, however, the enemy once again had to expose troops and vehicles to air attack, and at such times as it felt that the ground situation permitted it to do so FEAF continued to emphasize air pressure operations against Communist buildups to the rear of the ground battle line.

During the period of the LITTLE SWITCH prisoner exchanges, General Weyland accepted some "temporary loss of effectiveness of air operations against normal Communist troop and supply movements" but he nevertheless directed the Fifth Air Force to intensify its armed reconnaissance missions to insure that the Communists did not take undue advantage of the POW convoys to ship troops and supplies to the front. As Weyland had expected, the Communists displayed a reluctance to divulge the details of the prisoner convoy movements, but the Fifth Air Force aerial surveillance effort revealed no definite indication that traffic over the agreed convoy routes was other than normal.[254] During May and June, as the nights got shorter and Communist ground effort increased, the Fifth Air Force maintained a continual daylight reconnaissance over the area from the bombline northward to the chief Pyongyang to Wonsan "Green" main supply routes. Direct communications between aircraft of the 67th Tactical Reconnaissance Wing and fighter-bombers on armed reconnaissance were emphasized, with the result that as little as three minutes delay frequently elapsed between the time of discovery of enemy day movements to the time of fighter-

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bomber attack.[255] Daylight sightings continued to be relatively small, with the exception of 16 June when the enemy, probably needing supplies to support a flareup of fighting in the Kumhwa-Chorwon area, took a chance and exposed a convoy to air attack. This proved to be a costly choice for out of 500 odd vehicles sighted by Fifth Air Force fighter-bombers, 312 were brought under attack, with the result that 56 of them were destroyed and nearly 100 damaged.[256]

During May and June, when CINCUNC was apprehensive that a Red ground attack would be launched in western Korea against the I and IX Corps, FEAF aircraft maintained steady pressure against enemy personnel, supplies, and transportation routes in northwestern Korea. Fighter-bombers flew strikes to cut rail bridges on the northwestern rail routes, and additionally released the impounded waters of the Toksan and Chasan dams to flood the rail routes into Pyongyang.[257] Both Bomber Command and the Fifth Air Force gave attention to supply areas and troop billets. In May the B-29's flew 35 strikes against such targets, and in June they bombed 12 of these objectives. Both Fifth Air Force fighter-bombers and light bombers gave increased attention to attacks against supply and personnel areas, concentrating the area of their attack towards the western end of the ground battle line. Marking increased emphasis on this mode of attack, the light bombers in May flew 15 bomber stream attacks against targets consisting mainly of airfields and troop concentration areas. During May the 17th Bombardment Wing, which had been designated to recapture a shoran capability, utilized this method of air attack in a consistent effort which in June was applied to marshalling yard targets. The light bombers also were utilized when necessary in concentrated daytime attacks: thus on 15 June, 37 aircraft from the 3d Wing and 24 aircraft from the 17th Wing flew group formation daylight strikes against a large troop concentration area in front of the II ROK Corps area. This strike was called "successful," but the B-26's suffered five major damages and 24 minor damages from intense and accurate enemy flak.[258]

Required to fly ground support missions when inclement weather along the battle line precluded normal fighter-bomber close-support strikes, the B-26 light bombers had a reduced capability for night intruder missions during May and June. Out of 1,775 sorties flown by the light bombers in May, only 858 were armed reconnaissance sorties along the MSR network of North Korea; and out of a total of 2,300 sorties flown in June, only 569 were armed reconnaissance sorties against vehicular supply routes and 71 were rail reconnaissance sorties. Although the fewer intruder sorties flown inevitably reduced the total destructions of enemy vehicles, the two light bomber wings claimed 2,239 destroyed in May and 1,029 in June. Nine locomotives were claimed destroyed in May and six in June. The only new tactical employment attempted in the night intruder work was a use in the 3d Wing of proximity-fuzed 260-pound fragmentation bombs for attacking vehicles. The wing reported an increased effectiveness with this ordnance but because this loading reduced the number of available bomb drops per sortie the Fifth Air Force did not favor the practice. Although the Fifth Air Force noted that the proximity-fuzed frag bombs were effective in silencing hostile automatic weapons positions near the MSR's and enabled the intruder crews to make better bomb runs against vehicular traffic, it still considered M1A2 frag clusters to be the basic ordnance loading for night intruder operations against vehicular traffic in Korea.[259]

While little effort was made to coordinate these various interdiction attacks during May and June, the Fifth Air Force had neither lost its interest in the Chongchon estuary bridges nor given up its belief that concerted FEAF attacks made against this potential bottleneck would successfully tie up Communist rail traffic in northwestern Korea. At a meeting of the FEAF Formal Target Committee on 23 June the Fifth Air Force representatives therefore proposed that the medium bombers should attack the Sinanju rail crossings about once every three days, with a view toward keeping these bridges out of operation for an appreciable period of time. The Fifth Air Force would simultaneously schedule attacks against the Yongmi-dong rail bridges, and its night-flying day fighters and light bombers would harass Red repair activities at both Sinanju and Yongmi-dong. Bomber Command agreed to institute the desired attacks early in July, when the moon phase would be favorable to sustained operations in this area.[260] The Fifth Air Force also asked Task Force 77 to schedule rail

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bridge attacks against the "Roger," "King," and "Item" lines which lay behind the eastern side of the ground front.[261]

Poor to marginal weather resultant from the beginning of the summer rains delayed the initiation of the Chongchon estuary attacks and had both positive and negative effects on the operations once they were begun. Beginning on the night of 10/11 July, 16 Superforts of the 98th Wing attacked the Sinanju bridges and on the following night the same number of 307th Wing medium bombers attacked at Yongmi-dong. Fifth Air Force fighter-bombers cleaned up the bridges which remained at both complexes, but on 11 and 12 July they placed most of their effort against highway bridges crossing the Chongchon all the way up its course from Sinanju to Huichon. After the first two nights, the B-29's were either diverted to ground support or else had to give attention to priority airfield targets and did not return to the bridge targets, but the Fifth Air Force, although weathered out on 13, 14, and 15 July, returned to renew the attack on the Sinanju to Huichon bridges on 16 through 20 July. Night-flying day fighters harassed the bridge repairs as often as the weather permitted, while other fighter-bomber attacks against bridge-span assembly points in Huichon and Sunchon further impeded the repair of the bridges. Although summer rains prevented followup attacks against rail stock backups on the rail lines adjacent to the Chongchon bridges, these same rains swelled the river and undoubtedly hampered Communist repair efforts. The combined effect of the concerted destruction, continued harassment, and the flooded river made for an extremely effective and long lasting interdiction of the key Chongchon estuary bridges. As of 22 July the bridges were still unserviceable, blocking all through traffic via the "Able" and "Baker" lines into Pyongyang. On the last photography flown prior to the military armistice, three bridges were still unserviceable and one not observed at Sinanju, and six bridges were unserviceable and one was serviceable at Yongmi-dong.[262] Against eastern front railways, Task Force 77 initiated limited-scale interdiction against selected railroad bridges commencing on 10 July, but it reported that adverse weather made the results of this effort rather unimpressive and prevented sustained interference with the flow of enemy supplies.[263]

During July armed reconnaissance, flown both by day and by night, was greatly hampered by the generally poor flying weather. Although the enemy permitted day sightings of 1,620 of his vehicles, mostly in small groups in the area where the II ROK Corps was under attack, the fighter-bombers were able to claim only 46 of these vehicles as destroyed.[264] Out of a total of 2,119 combat sorties, the two B-26 wings were able to fly only 453 armed reconnaissance sorties over the enemy's main supply routes. These sorties, however, were apparently quite efficient for 20 percent and 26 percent of the vehicles attacked by the 3d and 17th Wings were claimed as destroyed. As a result of this efficiency in operations, the two wings claimed the destruction of 1,379 enemy vehicles during July. Although greatly increased enemy rail activity was observed during the month, marginal to nonoperational weather allowed only 37 rail reconnaissance missions and only one locomotive was claimed as destroyed.[265]

Neutralization of North Korean Airfields: After it had established air superiority over North Korea in the initial weeks of hostilities, FEAF had been able without too much difficulty to thwart each Red effort to reconstitute an air force in the area. "The airfield neutralization program in North Korea," stated a FEAF intelligence report, "was like shooting sitting ducks."[266] Since the Communists, using an immense quantity of coolie labor, could always repair a runway within a few days, the time required for the task being in no way proportionate to the number of bomb craters, FEAF found it most advisable to employ timely and modest air attacks, scheduled as often as photographic surveillance showed that an airfield was almost ready for use. Although FEAF assigned to the Fifth Air Force the general responsibility for keeping the North Korean air facilities neutralized, the FEAF Formal Target Committee usually coordinated attacks against these facilities, and the actual attack against airfields were made as necessary by aircraft of the Fifth Air Force, Bomber Command, and Task Force 77.[267]

After November 1951 the Communists, evidently recognizing that they could not use airfields in an area dominated by UNC air superiority, made little observable effort to rehabilitate North Korean air facilities, but they continued to do just enough work to keep the fields in a condition which would permit rapid repairs just before the

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conclusion of a military armistice. They demonstrated some interest in keeping the airfields at Uiju and Sinuiju operational, both of these fields being just across the Yalu from Antung. On the night of 28 November 1952, when its B–29's were sent on a maximum effort strike against a number of targets in the Sinuiju area, Bomber Command used a few planes against the airfields at Sinuiju and Uiju. Subsequent photo cover showed that the Reds had repaired Uiju by 4 December and Sinuiju was considered serviceable on 26 December. During December 1952 the Communists also repaired Pyongyang Main airfield well enough to sustain light aircraft operations; in the following few months this airfield was thrice attacked by B–29's and thrice repaired by the Communists.[268]

Communist activities at the North Korean airfields were negligible until the end of March 1953, but during April Fifth Air Force reconnaissance planes noted a marked increase of Communist repair efforts at many fields: runways were being repaired at Sinmak, Haeju, Pyongyang East, and Hamhung West, all of which had been heavily cratered and had been long out of use. Other repairs were gotten underway at Namsi, Taechon, and Pyongyang Main. This effort was quite obviously keyed to the truce negotiations: although the matter remained tentative, a broad agreement had been reached in the negotiations to the effect that during a military armistice neither side would be able to bring into Korea any military equipment except as replacements for items which were destroyed, damaged, worn out, or used up. The Communists now evidently assumed that the truce negotiations were going to succeed. To get ready for the armistice they intended to repair as many airfields in North Korea as possible and then, in the last hours before the truce took effect, to rush in a maximum number of aircraft, thus establishing an air order of battle in North Korea when the armistice became effective.[269]

Correctly assessing the Communist intentions, General Weyland on 3 May 1953 listed 30 North Korean airfields which had to be kept unserviceable; he assigned 9 of these airfields to Bomber Command, 15 to the Fifth Air Force, and asked NAVFE to assume responsibility for 6 of the fields. A few other airfields would be added to the list, so that in all 35 fields would require continuous surveillance and neutralization when appropriate. The desired degree of neutralization was that which would keep all usable runway surfaces shorter than the 3,000 feet required for landing a MIG–15 fighter. Listed by FEAF priority and command responsibility, the airfields were as follows (*see* figure 14):

FEAF Priority	*Responsible Command*	*Target Airfield*
1	FEAF Bomber Command.	Uiju
2	do	Sinuiju
2A	do	Sinuiju NE
3	do	Namsi
4	do	Taechon
5	do	Pyongyang Main
6	do	Pyongyang East
7	do	Saamcham
8	do	Pyongyang Downtown
9	do	Sinanju
-----	do	Pyongyang South
10	Fifth Air Force	Pyong-ni
11	do	Sunan No. 2
12	do	Hwangju
13	do	Kandong
14	do	Onjong-ni
15	do	Sinmak
16	do	Anak
18	do	Yongyu No. 2
23	do	Yongdang-dong
24	do	Haeju
25	do	Ongjin
26	do	Sariwon No. 2
28	do	Pyonggang
29	do	Kanggye No. 2
30	do	Chunggangjin
17	NAVFE	Chongjin
19	do	Sondok
20	do	Wonsan
21	do	Yonpo
22	do	Hamhung West
27	do	Hoemun
-----	do	Hoeryong
-----	do	Hyesanjin
-----	do	Kilchu

Because the Communists had demonstrated a capability to repair airfields very rapidly, the success of this joint airfield attack program would hinge on an accurate forecasting of the time at which the armistice was going to be signed.[270] The six airfields near the Korean border—especially the fields at Sinuiju and Uiju and to a lesser extent the fields at Hoeryong, Chunggangjin, and Hyesanjin—were particularly important, and since these airfields were "sensitive" targets CINCFE would normally be expected to give the JCS 48 hours' advance notice before attacking them. Fearing that this advance notice period might hamper the

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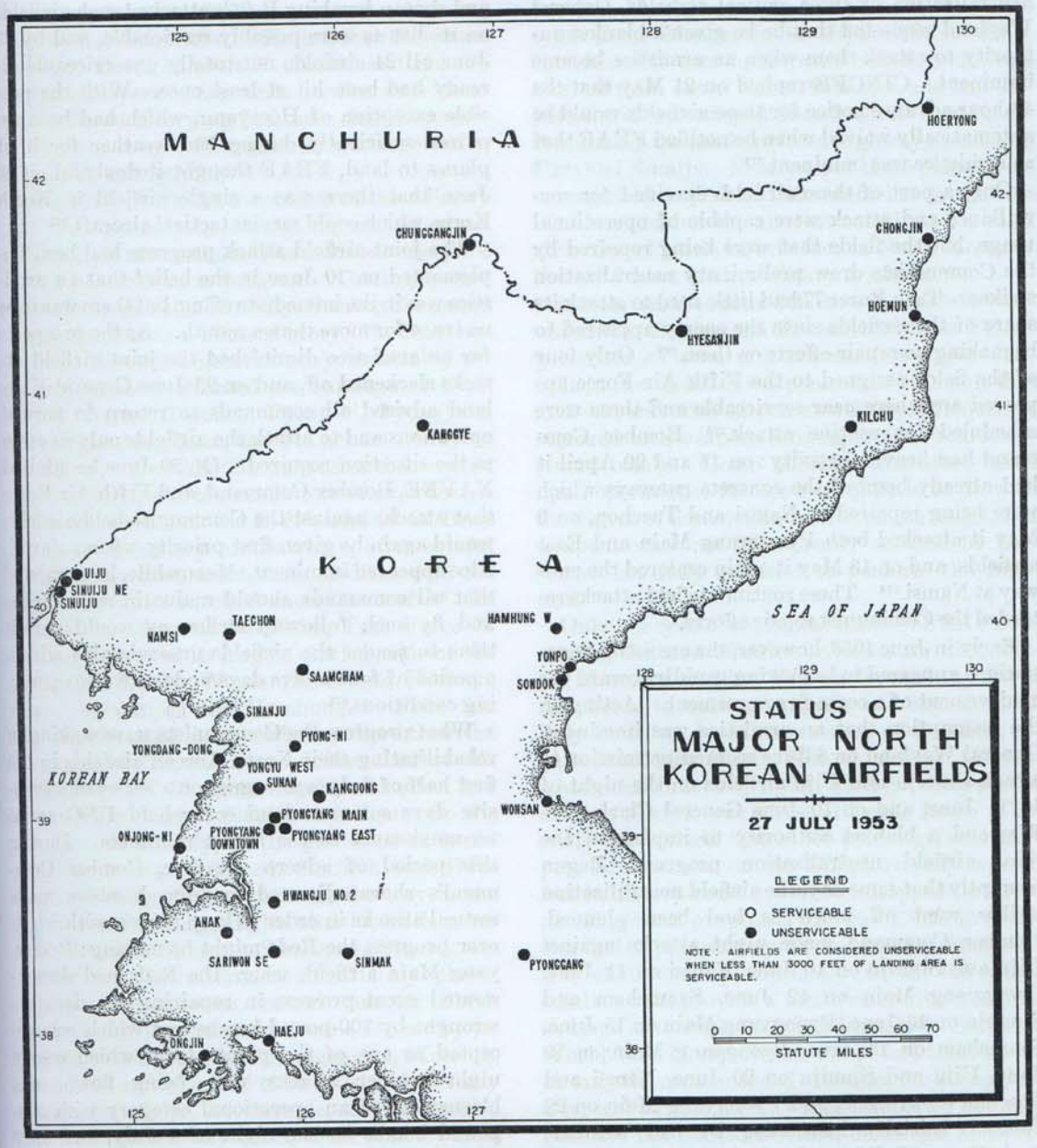

Figure 14.

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neutralization of these critical airfields, General Weyland requested that he be given a blanket authority to attack them when an armistice became imminent. CINCFE replied on 21 May that the 48-hour advance notice for these airfields would be automatically waived when he notified FEAF that an armistice was imminent.[271]

Only a part of these airfields specified for surveillance and attack were capable of operational usage, but the fields that were being repaired by the Communists drew preliminary neutralization strikes. Task Force 77 had little need to attack its share of the airfields since the enemy appeared to be making no repair efforts on them.[272] Only four of the fields assigned to the Fifth Air Force appeared anywhere near serviceable and these were scheduled for routine attack.[273] Bomber Command had heavier activity: on 18 and 20 April it had already bombed the concrete runways which were being repaired at Namsi and Taechon, on 3 May it attacked both Pyongyang Main and East airfields, and on 13 May it again cratered the runway at Namsi.[274] These routine airfield attacks retarded the Communist repair efforts.

Early in June 1953, however, the armistice negotiations appeared to be moving rapidly toward the achievement of a cease-fire agreement. Acting on the assumption that an armistice was imminent, General Weyland on 8 June secured permission to attack Sinuiju and Uiju airfields on the night of 10/11 June, and on 10 June General Clark gave Weyland a blanket authority to implement the joint airfield neutralization program. Begun promptly that same day, the airfield neutralization strikes went off much as had been planned. Bomber Command made night attacks against Uiju and Sinuiju on 10 June, Namsi on 11 June, Pyongyang Main on 12 June, Saamcham and Sinanju on 13 June, Pyongyang Main on 15 June, Saamcham on 18 June, Pyongyang Main on 19 June, Uiju and Sinuiju on 20 June, Namsi and Taechon on 21 June, and Pyongyang Main on 22 June.[275] Initially hamstrung by bad weather, Task Force 77 did not begin its attacks until 13 June but that day 117 sorties cratered the runways at Hoemun-dong, Hoeryong, Chongjin, and Wonsan, and next day 95 sorties attacked Sondok, Hoeryong, Hyesanjin, Chongjin, and Wonson. At mid-June these airfields and also Hamhung West, Yonpo, and Kilchu were all unserviceable.[276] Simultaneously Fifth Air Force fighter-bombers and shoran-bombing B-26's attacked such airfields on its list as were possibly serviceable, and by 23 June all 24 airfields not totally unserviceable already had been hit at least once. With the possible exception of Hoeryong, which had been repaired sufficiently during bad weather for light planes to land, FEAF thought it doubtful on 23 June that there was a single airfield in North Korea which could service tactical aircraft.[277]

The joint airfield attack program had been implemented on 10 June in the belief that an armistice was in the immediate offing, but there was to be no truce for more than a month. As the prospects for an armistice diminished the joint airfield attacks slackened off, and on 23 June General Weyland advised all commands to return to normal operations and to attack the airfields only as often as the situation required. On 29 June he advised NAVFE, Bomber Command, and Fifth Air Force that attacks against the Communist-held airfields would again be given first priority when an armistice appeared imminent. Meanwhile, he suggested that all commands should maintain surveillance and fly such followup strikes as would permit them to render the airfields unserviceable within a period of four to five days under adverse operating conditions.[278]

What progress the Communists were making in rehabilitating their North Korean airfields in the first half of July was vague: on a series of successive days summer cloud cover held UNC aerial reconnaissance to the barest minimum. During this period of adverse weather, Bomber Command's shoran-directed medium bombers made several attacks in order to keep in step with whatever progress the Reds might be making: Pyongyang Main airfield, where the Reds had demonstrated great prowess in repairing the damages wrought by 100-pound bombs and which was accepted as one of the points from which enemy night heckler attacks were being flown, was blasted out of an operational category with 500-pound bombs on the night of 4 July, and on 9 July, the B-29's again pounded the runways at Namsi and Taechon.[279] But when the weather cleared enough for photography, the Reds could be seen to have made a large amount of progress. Photographs taken of Uiju on 17 July revealed frantic activity: some 5,500 feet of sod surface paralleling the runway was in use and approximately 43 MIG-15 aircraft had been flown in to

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occupy revetments. Other revetments were being built with a design that indicated that they were to shelter IL–28 bombers.[280] Namsi and Sinuiju were again operational, while smaller airfields at Pyong-ni and Hoeryong had more than 3,000 feet of usable runway. Chungganjin was reported to be possibly serviceable.

On 20 July, with the conclusion of the military truce now actually imminent, General Weyland called on all air commands to reinstate the joint airfield neutralization program. Getting underway on the night of 20/21 July, Bomber Command "ended the war in a blaze of glory." [281] Now employing 500-pound general purpose bombs, the medium bombers attacked the runways at Uiju, Sinuiju, Namsi, Taechon, Pyong-ni, Pyongyang Main, Pyongyang East, and Saamcham. Only on 21/22 July, when 18 B–29's went after the revetted MIG's at Uiju, was the medium bomber ordnance varied: in this attack the B–29's used M–26 frags and M–20 incendiary bombs which, after careful bomb damage assessment, were credited with the destruction of 36 revetted enemy aircraft.[282] In the final five days of hostilities, Task Force 77 conducted three of its largest carrier raids of the war against Sondok, Wonsan, Hoeryong, Hoemun, Yonpo, Hyesanjin, and Hamhung.[283] Fifth Air Force fighters and light bombers policed their list of enemy airfields, and in an additional effort this air force sent F–86 fighter-bombers to effect last minute destruction at Sinuiju and Uiju. On the afternoon of 27 July, in the period of 12 hours after the truce was signed, the 58th and 474th Fighter-Bomber Groups flew all the way to the Yalu to bomb Chunggangjin airfield, while other planes attacked Kanggye, Sunan, and Sinmak airfields.[284] On the afternoon of 27 July photographic reconnaissance showed that all North Korean airfields were unserviceable for use by jet aircraft, but Chongjin, Chunggangjin, Hoemun, Saamcham, and Uiju had to be listed as "partially serviceable." Uiju, for example, still possessed a 6,000 x 60 foot taxiway which could possibly have received aircraft after last light on 27 July.[285]

Although the joint airfield neutralization effort was a technical success, it did not prevent the North Koreans from establishing an air order of battle on Korean soil. Later intelligence revealed that the Reds prior to 20 July had taken advantage of the inclement weather and intense ground fighting (which diverted UNC aircraft to ground support) and had flown some 200 aircraft of various types from Manchuria to Uiju airfield. Once these aircraft were in Korea, the Reds had towed most of them out of the airfield area and had dispersed and camouflaged them in the hills and cornfields along the hard-surfaced highway connecting Uiju and Sinuiju. Nearly all of these planes were damaged by collisions with obstacles on the side of the roads, but the aircraft constituted a valid air order of battle in existence in North Korea at the conclusion of the military armistice.[286]

A Note on Weapons Selection for Airfield Neutralization: During the Korean hostilities FEAF permitted its lower unit commanders a great latitude in the choice of weapons, with the result that airfields, and other targets as well, were frequently attacked with weapons ranging from 100- to 2,000-pound bombs. Bomb selection was often based upon operational factors having little to do with the degree of destruction desired on the target, and weapons were not infrequently selected by personnel not fully qualified to perform the function.[287]

Only one special study was made in FEAF concerning the most effective ordnance for neutralizing Korean airfields. This study, made by Fifth Air Force operations analysts and issued on 30 July 1951, was based on a survey of the effort required to rehabilitate Kimpo airfield (K–14), which was bombed by B–29's during a short period of time when it was occupied by the Reds. This study determined that a 500-pound general purpose bomb crater on the Kimpo runway was 35 feet in diameter and 8 to 10 feet deep, while a 100-pound general purpose crater was 25 feet in diameter and approximately 7 feet deep. Its conclusion was that five appropriately fuzed 100-pound bombs would provide a total crater area 2.5 times as large as a single 500-pound bomb.[288] Based on World War II experience, 100-pound bombs were already the recommended ordnance for use against a typical airfield target which comprised not only runways but parked aircraft, buildings, and personnel.[289] Bomber Command was doubtless pleased with these findings since its planes could carry more 100-pound bombs and get a better hit probability with them: although bomb loadings varied with such factors as distance to the target, a B–29's stations could load something on the order of 39 x 500-pound GP bombs, 62 x 250-pound GP bombs, or 144 x 100-pound GP bombs.[290] As

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a matter of routine, Bomber Command employed 100-pound GP bombs as its standard ordnance for neutralizing airfields.

The fallacy in this line of thought was not apparent until the late spring of 1953, chiefly because FEAF had no agency whose specific duty was to study the physical vulnerability of North Korean targets and to make weapons recommendations. What was true at Kimpo, a fairly well-constructed airfield by USAF standards, with good drainage and numerous buildings, turned out not to be true at the Red airfields in North Korea, with the single possible exception of the built-up base at Sinuiju. Most Red airfields in North Korea had been hurriedly built with little regard for drainage: most of them were laid out on low flat land bordering rivers where the water table was extremely high. Under such circumstances, a 500- or 1,000-pound bomb would penetrate deeply enough to strike the water table, and the resultant crater would fill with water. On the other hand, the usual 100- or 250-pound bomb crater usually remained dry and was easily refilled by coolie labor. Apparently Fifth Air Force photo interpreters first noted this situation while studying Pyongyang Main airfield which, between January and early May 1953, was thrice bombed by B-29's with 100-pound bombs and was each time very easily repaired by the Communists. Given the idea, further research into the histories of typical enemy airfields showed conclusively that the Reds repaired small, dry craters with obvious facility but that in many cases only a single attack with heavier ordnance resulted in water-filled craters which in some cases were sufficient to discourage attempts at rehabilitation and in all cases gave the Communists much difficulty.[291]

The relative merits of the 100-, 250-, and 500-pound general purpose bombs for use against North Korean airfields were discussed at a meeting of the FEAF Formal Target Committee on 12 May 1953, and the outcome was that Bomber Command agreed to experiment with 500-pound ordnance, which would give it fewer hits but probably longer-lasting craters.[292] During June, Bomber Command used the varied types of general purpose bombs against airfields, and the Fifth Air Force photo reconnaissance division came through with the opinion that the 500-pound bombs were the optimum ordnance. In the July airfield attacks, Bomber Command and the Fifth Air Force accordingly employed 500-pound general purpose bombs to crater runways. This ordnance, said the Fifth Air Force director of intelligence, caused "extensive damage" and, as predicted, the 500-pound bomb craters rapidly filled with water.[293] While this evidence was persuasive, FEAF nevertheless did not believe that it was sufficient to justify any firm conclusions, and it noted simply that: "There was no apparent, significant difference between the repair time required for damage done by a bomb load of 500-pound bombs versus a bomb load of 100-pound bombs when the craters were in sod," but it observed that: "A comparison of the repair time for concrete runways seems to indicate that bomb load for bomb load, the 500-pound bomb was more effective." [294]

Although the conclusion as to what types of bombs would have been best for neutralizing North Korean airfields was indefinite, it was nonetheless evident that the long indecision regarding the matter was a clear indication of a need for valid weapons recommendations based on target vulnerability studies. On 17 July 1953 the FEAF Deputy for Intelligence established a vulnerability division with a mission to provide effective and economical weapons recommendations. Had this division been earlier established it would have undoubtedly benefited the FEAF war effort. "Good target research," stated the final FEAF report on the Korean war, "must include physical vulnerability studies and weapons selection recommendations." [295]

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Chapter V

ADJUSTMENT OF AIR MEANS TO AIR PRESSURE

The United Nations Command strategy of continous air pressure greatly expanded the responsibilities of FEAF, whose striking power, measured as it was in terms of medium bomber, light bomber, and fighter-bomber sorties, was always quite small when compared with the tasks presented to it. Although FEAF in mid-1952 was promised some modernization of its fighter-bomber force, it could not afford to live beyond its means, and the allocation of its air effort to targets had to be equated in terms of expected losses and damages. There were many facets to this problem. Because the UNC strategy required sustained and unrelenting air pressure, air planners had to determine a rate of operations that could be supported when it was flown day after day. Each air unit had to effect a high standard of maintenance which could not only sustain a maximum daily rate of operations but which would keep a substantial proportion of its aircraft always in operational order for use against any tactical emergency which might arise. Tactics had to be implemented that would minimize losses and damages; this was necessary in order to conserve the air means and also in order to deprive the Reds of their single effective method of retaliating against the air strategy, that method being to destroy UNC aircraft. Under the concept of the air pressure strategy each UNC aircraft which the Communists shot down not only reduced air capabilities but boosted the morale of the Red combat forces, who, having destroyed planes, might at least hope that they could, by some extreme effort of their own doing, rid themselves of the intolerable weight of the air pressure attacks. Training in combat skills had to be constantly emphasized in order to insure that each scarce sortie would put its ordnance on an assigned target. Organizational concepts had to be examined to determine that tasks were done efficiently by the least expenditure of scarce equipment and personnel. Better air facilities had to be provided both to speed the accomplishment of a maximum sortie effort, to increase the ordnance which each sortie could carry, and to conserve air strength against operational wear and tear and operational losses.

During the last year of the Korean hostilities, good management in all of its many aspects was thus a factor of supreme importance, and, in the final analysis, it was the factor of management which permitted FEAF to employ its limited resources in an air pressure campaign which humbled the Reds and brought about a termination of the Korean hostilities.

BOMBER COMMAND INCREASES ITS EFFECTIVENESS

The unit strength and the medium bomber aircraft allotment of the FEAF Bomber Command remained unchanged; yet by vigorously prosecuted management and training the units of Bomber Command markedly increased their combat effectiveness. Through an adherence to mission planning factors, these units met and overcame the threat posed to their obsolete conventional B-29 bombers.* Although monthly sortie rates were not greatly increased, the B-29 units increased the destructivity of each shoran-directed sortie, with the result that the same number of sorties and the same sized striking forces effected an increasingly large proportion of destruction at the hostile targets which they at-

*See Chap. III, pp. 72–81.

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tacked. By good management Bomber Command magnified the combat capability of its medium bomber striking force.

The FEAF Bomber Command, although it was in theory only an operational command, worked to effect organizational homogenity and efficiency in the three medium bombardment units entrusted to its operational control. Two of these units were assigned to the USAF Strategic Air Command: in August 1950 the 98th and 307th Bombardment Groups, Medium, had been deployed from the United States to Yokota Air Base on Honshu and to Kadena AFB on Okinawa, supposedly for a short period of temporary duty. As the war was prolonged, these groups remained at Yokota and Kadena, where after July 1952, pursuant to a SAC action that eliminated the combat group headquarters in its wings, they were reorganized as the 98th and 307th Bombardment Wings, Medium.[1] The third medium bomber unit, the 19th Bombardment Group, Medium, was a unique organization: assigned as it was to FEAF's Twentieth Air Force, it was the only medium bomber unit in the USAF which was not controlled by the SAC. When the Reds had attacked in Korea, the 19th Bombardment Wing had been based on Guam, but FEAF had directed an expedited movement of the 19th Group from Guam to Kadena: four B–29's made their first strike from Kadena on 28 June 1950 and within the next several days the whole combat group settled down there. Headquarters and other organizations of the 19th Wing remained on Guam, and to perform maintenance and support for the 19th Group at Kadena the Twentieth Air Force organized the 6332d Air Base Wing from table of distribution allotments.

The anomalous organization of the 19th Group was a matter of continuing concern to the FEAF Bomber Command: while it had the same mission directive as other medium bomber units in the theater, its commander did not control his supporting units. "Our experience," stated Brig. Gen. Wiley D. Ganey, commanding Bomber Command, on 3 October 1952, "has clearly established that the combat and direct support units of a Wing are mutually dependent; sustained effective bombardment operations cannot be conducted unless these elements are combined in a single self-sufficient organization under centralized control." Therefore, General Ganey "strongly recommended" that the 19th Group should be reorganized as the 19th Wing, under the tables of organization authorized for SAC medium bombardment wings.[2] Both FEAF and USAF within the next several months approved the plans to reorganize the 19th Wing, but such an action could not be immediately programmed. Effective 1 June 1953, however, the 19th Bombardment Wing and its support units were moved, less personnel and equipment, to Kadena AFB, and here the wing was simultaneously reorganized according to the organizational plan of a SAC medium bomber wing.[3] The actual reorganization came too late to make much of a contribution to the Korean war, but certain preliminary steps which had been taken looking toward the reorganization benefited the combat capability of the 19th Group during the spring of 1953.

In February 1953 a rather simple organizational development had a substantial impact upon the operational effectiveness of the medium bomber units located on Okinawa. Owing to the distances involved, bomber missions flown from Okinawa to Korea were always several hours longer than those from Yokota, and in the course of these long missions Kadena-based B–29's not infrequently ran short of fuel, developed mechanical trouble, or sustained combat damages that forced them to make emergency landings either in Korea or in southern Japan. When their planes were thus forced down, the Okinawa units had to transport emergency maintenance crews and equipment to the site of the forced landing. The time lost in such a procedure necessarily reduced the in-commission rates and the combat capability of these Okinawa units. In February 1953, Bomber Command Detachment No. 1 was accordingly organized at Itazuke Air Base on Kyushu. Manned by personnel of Bomber Command, the 19th Group, and the 307th Wing, this detachment provided servicing and maintenance and messing and housing for the B–29's and their crews which were unable to return to their home base after a combat mission. This detachment accomplished its duties in a commendable manner during the remainder of the war, and it was credited with a measurable contribution to the combat capabilities of the 19th Group and the 307th Wing.[4]

In deference to the whole requirements of its global responsibilities, USAF in May 1951 had fixed the aircraft strength of the FEAF Bomber Command at 99 B–29's (30 unit equipment, plus 3

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command support planes per wing or group) counting aircraft out of commission but repairable in the theater and pipeline factors. The SAC was charged with the responsibility for providing combat attrition replacements. Actually, however, the conversion of SAC units to more modern aircraft released enough B–29's so that the FEAF Bomber Command did not have to be charged with pipeline factors: unit strength of each squadron was computed at 31 B–29's, and each squadron accepted 2 B–29's as a maintenance-acceptable overage. In the last year of the Korean war, Bomber Command actually possessed an average of 105.6 B–29 medium bombers.[5] The ceiling on its authorized aircraft strength, however, remained unchanged, and Bomber Command's combat capability in terms of aircraft was dependent upon its maintenance and supply support, the two factors which determined the aircraft in-commission rate of its 99 unit-strength B–29's. In June 1952 FEAF had supply support for B–29 medium bombers programmed at an anticipated sortie rate of 16 sorties per month per aircraft, but in August 1952 USAF felt itself able to announce an intention of increasing theater B–29 stock levels to support a 50 percent increase in the medium bomber sortie rate.[6]

Following the USAF decision to increase the medium bomber supply support, theater stock levels built up somewhat slowly; but, as a general rule, the materiel support for the B–29 units was very good. The 307th Wing, for example, did not have a single aircraft out of commission for parts (AOCP) for a period of 130 days commencing on 15 May 1952, and in the months of July, August, and September 1952 the Bomber Command AOCP rate was less than 1 percent. The aircraft not fully equipped (ANFE) situation was not quite so good, but FEALOGFOR developed a procedure whereby ANFE items preventing the medium bombers from flying combat missions received a priority processing akin to that employed on AOCP requisitions. A major factor which kept the AOCP rate low was the squadron flyaway kit, which the two SAC units had brought with them to the Far East and which had been subsequently provided to the 19th Group. Since these emergency supplies were designed to keep the SAC wings mobile, SAC policy officially frowned on the use of a flyaway kit items until local resources had been exhausted, but FEALOGFOR took a somewhat opposite viewpoint that operational requirements could not be jeopardized for the sake of maintaining the flyaway kits. As a result, the bomber squadrons, particularly those at Kadena, drew freely upon their kits to prevent AOCP's, with a consequent reduction of the levels of supply in these kits. In January 1953, however, FEALOGFOR agreed to rebuild the flyaway kits, and when supplies began to come in more freely as the result of expedited orders the FEAF Bomber Command was able to close the kits as of 6 March 1953. While there had been some apprehension that such action might result in a rising AOCP rate, such was not the case. Although the AOCP rate stood somewhat higher in the first half of 1953 than had been the case in the latter months of 1952, Bomber Command noted that FEALOGFOR's 6400th Air Depot Wing "understood the needs of the tactical units and expeditiously processed parts and equipment requests." In most instances supply items available in the theater were sent to the operating unit which requisitioned them within 24 hours after the requirement was known at the depot. Lack of some critical items of equipment did hamper the Bomber Command mission, but most of these items were in critically short supply throughout the whole USAF.[7]

During the summer of 1952 aircraft maintenance in FEAF Bomber Command units was sufficiently good to keep the command's aircraft in-commission rate above the 70 percent which was considered to be acceptable. Favorably affecting maintenance were the results of a program which, implemented in the months of March through June 1952, had rotated some 30 combat-weary B–29's to the United States for depot reconditioning. These aircraft had been among the original planes which had come to the Far East in mid-1950; with 2,000 to 3,000 hours of airframe time, these planes had been "maintenance hogs." Prior to 1 September the remaining four B–29's in the command with airframe times in excess of 2,000 hours were rotated to the United States.[8] On the negative side of the maintenance-capability ledger, however, was a declining level of experience among the maintenance personnel of the bomber units; within two years in the 19th Group, for example, the level of experience of aircraft maintenance technicians had fallen from an average of six years experience to less than two and one-

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half years experience. Such a decline in personnel experience levels was by no means unique in the 19th Group but was felt in the other medium bomber wings and in Fifth Air Force wings as well. The 19th Group, however, was peculiarly hard pressed because it alone of the medium bomber organizations still employed the old crew chief maintenance system whereby a single assigned crew maintained a single B–29 aircraft: thus what top-notch crews there were devoted all their talents to their own individual aircraft.[9]

Other factors besides maintenance were partly to blame, but after August 1952 the 19th Group's aircraft in-commission rate fell below Bomber Command's desired standard of 70 percent, and, in doing so, dragged the whole Bomber Command rate below this desirable figure. This fact, together with impending plans to reorganize the 19th Group to SAC standards, led to a decision that the 19th Group would have "to discard the antiquated crew chief system and start the transition to operation under SAC Manual 66–12, the specialized maintenance Bible." Beginning on 12 January 1953 the 19th Group therefore provisionally organized a periodic maintenance squadron and an armament and electronics maintenance squadron, which by the end of the month were in full operation. "Die hards," said the group commander, "were skeptical," but the new system was eminently successful. With dock maintenance in use the few available top-notch crews were no longer devoted to single aircraft but were available to all aircraft in the group: this leaven of experienced men meant much in the spring of 1953 when, of 105 airmen performing dock maintenance, only 24 had more than one year of military service. In the five months following the institution of specialized dock maintenance, the 19th Group showed a lower abort rate, a higher aircraft in-commission rate, and a higher rate of flying time per aircraft. Aborts decreased from 7 in January to 3 in May 1953; aircraft in-commission status increased from 65 percent in January to 74 percent in May; flying time per aircraft increased from 55 hours in January to 60 hours in May. Benefiting from the improved maintenance, the 28th Bombardment Squadron in March and April 1953 flew a total of 71 consecutive sorties without an air or ground abort—thus turning in a new USAF record of 50 days of 100 percent effectiveness.[10]

In January 1953 the FEAF Bomber Command's aircraft in-commission rate returned to the desired 70 percent figure and it gradually inclined upward to reach 75.7 percent in July 1953.[11] General inspections of the three medium bomber organizations, made during the spring, reported that aircraft maintenance varied "from satisfactory to very good."[12] Only one organizational detail continued to concern Bomber Command: field maintenance, which includes such functions as engine buildup and reclamation of aircraft, was well recognized to be an essential element of the centralized maintenance system in a SAC wing, but at Yokota and Kadena field maintenance shops and engine buildup services were provided by base maintenance support organizations of the Japan Air Defense Force and the Twentieth Air Force. Reorganization plans designed to correct this deficiency were drawn up, but because of manning restrictions the FEAF Bomber Command wings continued to depend upon base maintenance support organizations for their field maintenance until after July 1953.[13]

The supply and maintenance support situation in the FEAF Bomber Command permitted each of its three medium bomber units to fly an average of 1,800 hours per month in the last year of the Korean war. Figuring the average length of a combat sortie at something more than nine hours, Bomber Command thus had a sustained operational capability of approximately 20 sorties per day.[14] While all of this capability could have been utilized in all-out combat, Bomber Command perceived such a need for crew training that it required its wings individually to use some 500 hours of their monthly capability for training and evaluation purposes. Such training effort was not entirely wasted to the war effort, however, because evaluation and proficiency flights were frequently flown during dark of the moon phases against targets at which earlier combat raids had not done as much destruction as was desired. In the last year of the Korean war each wing actually averaged 1,307 combat hours per month, and Bomber Command aircraft accordingly flew an average of approximately 16 combat sorties per day.[15] By a reduction in training hours, Bomber Command could, of course, increase its number of daily combat sorties. As a part of the October 1952 intensified air attack program, General Weyland asked Bomber Command to increase its daily sortie rate

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to 18 sorties, and in the period of 9 through 19 October Bomber Command launched 20-odd sorties each night.[16] Such a level of combat activity was exceptional, and Bomber Command preferred not to sacrifice the theater training which its crews required to attain and maintain a high degree of operational proficiency.

From the outset of such bombing in Korea, the shoran bombing system was accurate enough to permit a large enough force of medium bombers to destroy practically any target presenting itself for attack, but such tactics were obviously uneconomical and, in view of the relatively small number of B-29's in the theater, were manifestly impracticable. Instead of saturating targets with large numbers of aircraft, Bomber Command continuously attempted with the fewest number of aircraft to effect a desired degree of destruction to its assigned targets. With the growth of Communist night air defenses in the winter of 1952–1953, moreover, the fewer planes concentrated in any one area the less likelihood there was of combat losses. As a planning objective, Bomber Command announced in August 1952 that, unless otherwise directed, it desired to obtain at least 60 percent destruction of area targets.[17] Attaining such a degree of destruction would have been relatively easy had Bomber Command sent most of its available medium bomber sorties against a single target each night, but General Weyland preferred that the medium bombers should when possible attack at least two targets each night. This rule increased the psychological impact of the medium bomber attacks, but it reduced the size of individual medium bomber strike forces, often with the results that targets were under-bombed. Thus in December 1952, Bomber Command aircraft attacked 50 targets (exclusive of MPQ targets), and the average degree of destruction effected at each of these targets was only 35.5 percent.[18] Such a low percentage of target destruction was unacceptable to Bomber Command, and it had already instituted a series of interrelated remedial actions, which, continuing into the spring of 1953, would bring about a significant improvement in the amount of destruction which the medium bombers would do at the targets which they attacked.

In mid-summer of 1952 the FEAF Bomber Command initiated a program of mission analysis as a joint responsibility of its targets intelligence and combat operations directorates. The purpose of the program was to enable the command intelligently to evaluate the effectiveness of each individual strike made by its bomber units. In the process of the mission analysis, each phase leading up to and including the actual execution of the attack was critically examined. In general, the target intelligence people accomplished bomb damage assessment, while the combat operations people reviewed all available information concerning the strike, such as the plan of the mission, the conduct of the mission as varying from the plan, the status of shoran reception, and the effects of winds and weather. Following an accumulation of mission data, representatives of the two directorates met and, in effect, reconstructed the bomb run flown by the attacking unit. Conclusions drawn from the bomb damage assessment and the operations analysis were written up and presented to the commander of Bomber Command; when he had approved them, the mission analysis and the BDA report were reproduced for distribution to the bomber units and other interested agencies. The information contained in these reports served as a valid basis for much of the corrective action which was responsible for the high degree of B-29 shoran bombing effectiveness during the final seven months of the Korean conflict.[19]

Quite early in the course of its work, Bomber Command's mission analysis program revealed a pressing need for improvements in the shoran bombing system. One field for improvement, which has already been noted,* lay in more exact targeting for shoran attacks, and through the expansion of multiplexing capabilities, gross bombing errors attributable to inexact target locations decreased materially in November 1952. By early February 1953 General Fisher commented that: "we are almost eliminating target location errors." In this same period that the multiplexing capability was being increased, Bomber Command secured a means for more rapidly obtaining shoran computations. During most of 1952, Bomber Command obtained its shoran targeting computations through the Fifth Air Force and from the computations section of the 1st Shoran Beacon Squadron in Korea. The length of time required to process requests for computations and the resultant computations through so many channels was four or five days, and transmission garbles

*See Chap. IV, p. 96.

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and security compromisals were likely. As a result of a FEAF study of this matter, Detachment 10, 1st Shoran Beacon Squadron, manned by shoran bombing computers, was established at Yokota Air Base in October 1952. Working under the operational control of the 548th Reconnaissance Technical Squadron, this detachment was able to provide all the shoran computations which Bomber Command desired, on short order if necessary, and routinely without the delays and difficulties earlier incurred when requests and computations were routed to and from Korea.[20]

A major problem area in the FEAF Bomber Command shoran operations and a problem never solved to the complete satisfaction of the medium bomber commander involved the command assignment of the 1st Shoran Beacon Squadron: although the medium bombers were long the exclusive users and always the principal customers of the shoran bombing system, the 1st Shoran Beacon Squadron and its ground stations were assigned to the Fifth Air Force and to its 502d Tactical Control Group. Headquarters and the computations section of the 1st Shoran Beacon Squadron moved from Seoul to Pyongtaek Airfield (K–6) in the autumn of 1952, and from this location the squadron controlled five shoran station detachments: "Able" on Tokchok-to, "Baker" on Kuksa-bong, "Charlie" on Paengnyong-do, "Dog" on Hwangbyong-san, and "Easy" at Kaya-san. The "Able" and "Charlie" stations were safely located on islands off the western coast of Korea, but "Baker" and "Dog" were on mountains so close behind the battle line that there was likelihood that they would have had to be moved had the enemy made a determined ground offensive. To serve as an extra facility, "Easy" was therefore installed at Kaya-san, a mountain some 90 miles south of Seoul, and became standby operational on 25 June 1952. During October, however, "Easy" was put into some tactical use and was paired with either "Dog" or "Charlie," depending on the location of the target.[21] In February 1952, shoran station "Easy" was moved to Songgum-ni, and the move was considered to be the first step in a Fifth Air Force plan to simplify logistical support of outlying detachments by consolidating shoran and radar sites. In its new location "Easy" backed-up the "Baker" station; and, when such was wanted, it gave the medium bombers a better coverage of the Haeju peninsula area and of targets closer to the bomb line. But shortly after "Easy" was moved, General Weyland notified the Fifth Air Force that he was greatly concerned about any further movements which might disrupt B–29 shoran attacks; he enjoined the Fifth Air Force to take especial care before changing the location of any other stations. There were no more movements of the shoran stations while hostilities continued.[22] In the conduct of its shoran operations, Bomber Command aircraft made primary use of the station-pair beams of "Baker" and "Charlie," but they relied on "Able" and "Dog" for a coverage of secondary targets.[23]

When the shoran equipment in its bombers malfunctioned, Bomber Command was able to correct these defects, but when the shoran ground stations worked unsatisfactorily, Bomber Command was unable to undertake direct remedial action in units which were assigned to a laterally coequal command. Successful execution of a shoran bombing mission depended upon a proper functioning of the shoran ground stations, but there was no very safe or sure means whereby an air commander could communicate with a shoran ground site. Because of the directional characteristics of a shoran ground station's antenna, aircraft received their best shoran reception when an antenna was aligned to bear on their target. If aircraft were simultaneously scheduled to attack targets in two widely separated areas, there was a fair possibility that one aircraft would not receive both stations. This problem was met by staggering target attack times. In the last half of 1952, however, an air commander frequently reconnoitered searchlight-defended primary targets, and when these targets were not cloud shrouded he diverted the bomber stream to a secondary target. In such a diversion the air commander had to convey the information to the shoran ground stations in order that they would reorient their antennae to bear on the secondary target. Under these circumstances, an omni-directional antenna for shoran ground stations would have been invaluable; antenna reflectors were removed for a short time to see if the shoran signal strength would be strong enough to carry to both primary and secondary targets, but such was not the case and the reflectors were replaced. In August 1952 the air commander was directed to call changes of targets in to the 502d Tactical Control Group via high frequency radio, but this procedure did not prove

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satisfactory because of communications delays. Air commanders were therefore permitted to call shoran stations directly over the high frequency channel and to request necessary reorientation of antennas; this privilege, however, was as sparingly used as possible since it involved the hazard of breaking radio silence over enemy territory.[24]

During January 1953 unsatisfactory reception of the shoran ground signals was a major problem to the medium bombers, and these reception difficulties reached a grave level on the night of 1 February when nine crews of the 98th Wing reported multiple pulsing on the "Baker-Charlie" station pair and when nine other crews from the same wing, flying later that night, got no reception at all from "Baker" station. After a careful check, the 98th Wing concluded that all of its airborne shoran equipment had been working normally, but the shoran ground stations also reported that they had no evidence that their ground equipment had been out of order.[25] There was some thought that the enemy might be attempting to jam the shoran beacons,* but there was no evidence then, or at any other time during the Korean war, that the Communists attempted to interfere with shoran reception. The 1 February episode nevertheless indicated that the air commanders needed some means of determining whether a shoran station was operating: in the event that the first three crews in a bomber stream could not receive a shoran station, Bomber Command directed that the formation leader would institute a query to the appropriate TADC, which would relay the question to the shoran station.[26]

Whatever their cause may have been, the shoran reception difficulties bespoke an inadequate coordination between the shoran bombers and the shoran ground station operators, and, to seek solutions, Bomber Command sponsored a bilateral conference held at Yokota on 7 March 1953. As soon as this conference was over, a team of shoran experts, drawn both from FEALOGFOR and the FEAF Bomber Command, visited each of the shoran stations in Korea. Here the bomber representatives suggested several improvements: a compass rose was manufactured and installed at the base of each ground antenna in order to facilitate the accurate alignment of antennas with bombing targets. Bomber Command, moreover, added the bearing of the target from each shoran ground site to its daily operations order. The bomber representatives also attempted to raise the morale of the shoran operators by pointing out to them the value of their equipment and by stressing the part that they were playing in the war.[27] A Radio Corporation of America technical representative and the FEALOGFOR technicians gave each shoran ground station a thorough going over, and FEALOGFOR undertook to provide the sites with better supply support. Following this field trip, medium bomber reception of shoran signals markedly and almost immediately improved.[28] In July 1953 new joint procedures were instituted for the intercommunication of the medium bombers and the shoran ground stations: as the bomber stream entered a TADC area of responsibility, the TADC was charged to notify the air commander via VHF radio of the status of shoran ground stations. When the air commander determined that a shoran ground station was not operating satisfactorily he was charged to notify the TADC, which relayed the information to the shoran station. When necessary to expedite air-ground coordination, the air commander was permitted to call the shoran station directly via high frequency radio.[29] As a result of close monitoring of the shoran ground stations, better supply support for them, improved air-ground communications, and accurate beaming of shoran transmissions, medium bomber shoran reception over North Korea reached an all-time peak effectiveness of 95.4 percent in July 1953.[30] Effective coordination thus transcended the command barriers between the shoran ground stations and the shoran bombers, but General Fisher remained firm in his belief that the primary using command should have controlled the shoran ground stations. "If SAC has any plans to do shoran bombing anywhere else," he wrote, "it is most desirable that the shoran squadrons which operate the ground stations and do the target computations be under SAC command and control."[31]

Although mission analysis and improvements in the shoran bombing system contributed, achievement of the Bomber Command goal of increased effectiveness depended directly upon the proficiency, morale, and determination of the people who made up its combat crews, for these

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were the men who put bombs on the target. In the beginning in Korea, the medium bombers had been flown by USAF career officers of the highest type, but as the war had continued it had been necessary to rotate the original crews back to the United States. The Strategic Air Command had assumed responsibility for providing replacement crews and key personnel for all Bomber Command units, and six months' combat tours had been prescribed for service in the Far East. The responsibility for providing replacements bore heavily upon the SAC, which was not a large organization and which had both to maintain the striking power of its existing combat wings and to manage the manning of a number of newly activated wings. SAC could not denude its combat ready wings to supply replacement crews for the Far East because this would have weakened the force which was the major deterrent to world-wide Communist aggression. In this situation, there had been no solution but to call upon USAF reservists or "recallee" personnel. Thus during the first and most general rotation in March 1951 FEAF Bomber Command units had experienced a nearly complete turnover of aircrews, and the majority of the replacements had been recalled reservist personnel.[32] After this initial wholesale rotation, replacement schedules had been staggered and by spring of 1953 the reception of five or six replacement crews each month satisfied Bomber Command's need for medium bomber crew rotation. As was understandable, many of the replacements received by Bomber Command units in 1951 and 1952 lacked operational proficiency when they arrived in the theater; moreover, as the 19th Group observed in April 1952, "a certain amount of dissatisfaction exists in the average officer on combat status partially based on his 'recall' status and also influenced by lack of motivation." [33]

The FEAF Bomber Command strongly emphasized training, but the periodicity of replacement cycles had an effect upon the bombing accuracy of the command, as was well illustrated by fluctuations in the command's circular probable error (CEP)* scored with shoran bombing techniques. During the summer of 1951, when Bomber Command had first begun to use the shoran technique as an adjunct to daytime visual bombing, the shoran CEP of the command as a whole had averaged approximately 485 feet, but during the period 1 October through 18 November 1951, when the medium bombers were beginning to use shoran as the primary bombing technique, the shoran CEP reached 1,220 feet in attacks against Namsi, Taechon, and Saamcham airfields and was assessed at 640 feet against other targets. The principal cause of the regression in bombing accuracy was attributed to a large periodic rotation of combat-skilled crews, compounded by some degree of mapping errors and the hazards of enemy air defenses protecting the three airfields. All-out emphasis on shoran training led to greater accuracy: from February through April 1952, Bomber Command claimed an average CEP for scored bombs of 639 feet, and for the period of April through July 1952 it quoted a command shoran CEP of 450 feet. Skilled crews demonstrated 350-foot CEP's, and Brig. Gen. Wiley P. Ganey in May 1952 was expecting to realize an average shoran CEP of 300 feet. "I feel," he stated, "we have already obtained bombing accuracy with our night shoran tactics that approximate our previous visual daylight formation standard, and with increased experience and development of the shoran method we will produce results in Korea that will surpass those obtained during daylight operations." [34]

The 450-foot shoran bombing CEP, said an ARDC task group after an investigation of night-bombing systems in the Far East, was "as good a CEP as could be expected" under circumstances prevailing in Korea, but this group noted that this circular error quotation did not include gross errors. Including gross errors, the CEP's scored by the 19th Group in the months of April, May, June, and July 1952 had been respectively 508, 599, 510, and 800 feet.[35] The 450-foot CEP, moreover, had been recorded during a period in which relatively large numbers of B-29's had attacked single shoran aiming points along the same shoran arcs, and, as is the case in scoring circular probability errors, it counted only the best 50 percent of the bomb falls. In October 1952 and thereafter, when small numbers of B-29's attacked small targets or else attacked larger targets in larger numbers but used separate shoran arcs and aiming points, the FEAF Bomber Command mission analysis people got a closer look at individual crew performances. This more exacting analysis

*Circular probable error is the probable bombing error expressed in terms of the radius of a circle centered on the desired mean point of impact of a bomb fall and containing half of the expected bomb fall, excluding gross errors.

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revealed that about one-half of the B–29 crews were doing most of the accurate bombing in the command.[36] To increase the rate of destruction of assigned targets, General Fisher promptly instituted remedial training designed to improve the shoran bombing proficiency of those crews already flying in units that revealed insufficient shoran bombing skill. General Fisher, moreover, did not quote CEP's as indications of bombing proficiency (except in the case of individual crews) but instead emphasized the percentage of destruction effected at Bomber Command targets.

By the autumn of 1952, Bomber Command began to be aided in its struggle to achieve maximum target destruction with minimum commitments of medium bomber sorties by developments which had been taking place in the United States. When Bomber Command had first begun to use shoran bombing techniques, the USAF had had no shoran training program, and such shoran bombing training as medium bomber crews received had been given to them in the Far East. Based upon combat verifications of the estimate that a shoran bombardier and his crew required at least 35 releases in which to establish proficiency, Bomber Command had sacrificed its combat potential to provide shoran practice drops. Eventually, Bomber Command had been able to give its shoran operators some 20 practice drops, but this was a maximum sacrifice of combat effort and the crews had had to get the other 15 releases which they needed to establish proficiency while on combat missions over North Korea. In the last half of 1952, however, training establishments in the United States began to catch up with the added burden imposed by the Korean hostilities: as a result of more ordered training procedures, B–29 crews who arrived in the Far East displayed higher morale and some shoran bombing proficiency. In mid-1952 USAF stated new policies as to the quality of personnel that would be allowed to enter the B–29 combat crew training program conducted by the Crew Training Air Force at Randolph AFB. Airplane commanders were furnished by a quota levied by USAF against all major commands. The majority of the pilots were no longer reservists, but were recent graduates of multiengine pilot schools. Observers were either recent school graduates or were reservists, but after May 1952 only voluntary reservists were eligible for the B–29 crew training program. Enlisted crew members were either volunteers or recent school graduates. Upon completion of the crew training, the graduates from Randolph were assigned to the Strategic Air Command, which gave replacement training and committed the best of these crews to FEAF. Prior to mid-1952 this replacement training had been given in a number of SAC wings, but in June the replacement training function was concentrated at Forbes AFB, Topeka, Kansas, where, under the direction of SAC's 21st Air Division, the 90th Strategic Reconnaissance Wing began to prepare to give shoran training to FEAF replacements. On 1 August 1952, the 90th Wing assumed responsibility for the operational training of all FEAF B–29 replacement crews.[37] These developments at Randolph and Forbes had favorable results in the FEAF Bomber Comand: the 13th and 14th increments of replacements which departed Forbes at the end of July and August 1952 displayed good morale and, having had up to 20 shoran practice drops, they arrived in the theater "with a shoran bombing capability equal to that of previous crews after three weeks training with their Bomber Command units." One other development had a substantial impact upon Bomber Command aircrews: as was the case in other USAF commands, reserve officers assigned to Bomber Command units were given an opportunity to decline or accept a permanent reserve commission, and those who declined (a number which included some 10 aircraft commanders, 9 pilots, and 45 observers) were relieved from duty in February and March 1953.[38] After 1 April 1953, FEAF Bomber Command crews were all either career officers or volunteer reserve officers. "Their attitude, interest and incentive seem much better," said General Fisher. "They are more anxious to do a job and are not so much in a big hurry to get back home."[39]

Arrival of the shoran-trained replacement crews beginning in August 1952 lightened Bomber Command's training load but did not eliminate the need for further crew training in the theater. Bomber Command, for example, would have liked for its replacement crews to have received 30 shoran practice drops at Forbes, but equipment was limited and 20 shoran releases was the maximum training that would be possible at Forbes. Replacement crews, moreover, did not move directly from Forbes to the Far East: survival training, authorized leave, and transit times were suf-

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ficiently long as to dull the bombing proficiency of most of the newly arriving crews. As a result, some three to four weeks of theater training was needed before a replacement crew could establish its combat proficiency: this period also included standardization board rides, a few missions with older crews, and intensive shoran training.[40] Theater shoran training, moreover, was required to maintain the combat proficiency of already-assigned aircrews, many of whom were found to be in the autumn of 1952 less proficient in shoran bombing than were the newly arriving Forbes-trained replacements.[41] Because of these requirements, the FEAF Bomber Command did not reduce the approximately 500 hours of flying time which it allocated to each wing or group for training purposes. In the spring of 1953, when the command's shoran-bombing proficiency was quite high, Bomber Command began to give some increased emphasis to other attack techniques which would be required for possible operations outside of Korea. Top priority was still accorded to the development and maintenance of the shoran bombing capability and to the maintenance of pilot proficiency, but attention was directed to the development of a reasonable radar bombing (APQ-13) capability and some emphasis was given to visual bombing. In April 1953, for example, the 98th Wing allotted 50 percent of its training time to shoran bombing, 20 percent to pilot proficiency, 20 percent to radar bombing, and 10 percent to visual bombing. Except for general supervision, General Fisher preferred to leave the details of training to his wing commanders. When a general inspection report noted in May 1953 that the 98th Wing and 19th Group sent combat crews on single-ship combat bombing missions for evaluation and training purposes whereas the 307th Wing made combat checks on actual command missions in the bomber stream, Fisher disagreed with the recommendation that a single command policy on the matter should be stated: he explained that each method had its advocates and that such individuality maintained a healthy competitive spirit in the bomber units, which he desired to encourage.[42]

Other Bomber Command personnel actions rewarded meritorious aircrews and penalized those who lagged in the performance of their duties. On 15 December 1952, General Fisher defined a combat tour governing the rotation of combat crews as being from five to seven months, in which time a crew would normally be expected to fly from 25 to 30 combat missions. Depending upon the wing or group commander's judgment as to its performance of duty, individual crews that had performed their missions exceptionally well were considered for early release after five months, but the least effective crews could be retained to a maximum of seven months.[43] Bomber Command actually continued to compute its crew replacement requirements on the basis of a six months' tour, but the new statement of policy promised to reward meritorious service. Under this and earlier statements of policy, Bomber Command did not care to state an exact number of combat missions which would qualify a crew for rotation. Although its policy did not automatically reward a crew for some arbitrary number of effective missions, Bomber Command insured mission effectiveness with a standing operating procedure that carefully emphasized the fact that once a mission was scheduled and launched it would proceed to its completion, regardless of the enemy opposition, provided the airplane and its equipment were operating properly. In April 1953 when an aircraft commander of the 19th Group aborted a mission in the Sinuiju area without sufficient cause (his plane was illuminated by searchlights and the flak ahead of him was very heavy), General Fisher first relieved this officer as an aircraft commander and subsequently directed his court-martial for misbehavior before the enemy.[44] Unit rivalry and esprit, properly channeled by personally interested and aggressive unit commanders, contributed immeasurably to the degree of effectiveness with which individual aircrews performed their assigned tasks.

In the autumn of 1952 the FEAF Bomber Command believed that the higher quality of its replacement crews and its own theater training program would reduce the combat CEP's of its bomber units. Although Bomber Command stopped quoting CEP's as evidences of command bombing proficiency, there were evidences of an improved bombing capability: in April 1953 the 93d Bomb Squadron of the 19th Group claimed a CEP of 340 feet for the month, a figure which was helped by three "Shacks" or zero circular errors scored by extremely proficient crews.[45] Other factors besides accuracy improved bombing effectiveness: the number of gross errors dwin-

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dled, and the abort rate on combat missions (a factor indicative of both maintenance and crew morale), which stood at a Korean high of 6.7 percent in September 1952 tapered downward so sharply that it averaged out at only 2.5 percent for the last year of hostilities, the lowest annual rate during the three years of the Korean war.[46] Beginning in January 1953, the medium bombers displayed their increased effectiveness by scoring an increasing percentage of destruction upon the targets which they attacked. Targets in this period were quite similar: most of them were accumulations of hostile supplies. There was no change in ordnance nor increase in size of the individual striking forces. But with all factors relatively constant, Bomber Command increased the average percentage of target destruction to 46.5 percent in January, to 51.3 percent in February, to 51.1 percent in March, to 63.8 percent in April, and to 69.3 percent in May 1953. Whereas in December 1952 forces of seven to nine B-29's had attacked 50 targets and had inflicted an average of 35.5 percent destruction at each target, in May 1953 similar-sized forces attacked 44 targets of similar nature and effected an average of 69.3 percent destruction to each of them.[47] Although Bomber Command turned its attention to enemy airfields during June and July 1953, thus preventing further destructivity comparisons, its bombing accuracy remained high during the last two months of the Korean war.

In the last year of the Korean war the FEAF Bomber Command virtually doubled the combat effectiveness of its medium bomber force. This substantial improvement was attributed to several factors: mission analysis study, intensive training and competition between the bomber units, better target location by multiplex, better reception of the shoran ground stations, the improved attitude of volunteer air crews, and the personal interest and aggressiveness of each unit commander.[48]

AUGMENTATION OF FIFTH AIR FORCE RESOURCES

Adaptation of Tactical Air Capabilities: The maximum combat capability which FEAF units could sustain in Korea was, as has been seen,* a derivative of the number of their possessed aircraft in terms of an operational planning factor representing logistical support and aircrew availability. According to FEAF operational planning factors, the Fifth Air Force in May 1952 had a capability to sustain a daily average of 115 F-86 sorties, 186 fighter-bomber sorties, and 63 light bomber sorties. During the heat of combat in May 1952, however, the Fifth Air Force far exceeded these programmed capability figures and actually flew some 173 F-86 and 243 fighter-bomber sorties daily. What happened when the rate of sorties flown exceeded programmed planning factors soon became apparent in the Sabre interceptor force: the Fifth Air Force had indicated that it anticipated a sortie rate of 22.2 per aircraft per month; FEAF had based its programmed support on a sortie rate of 25 per aircraft per month; the Fifth Air Force had actually flown at a sortie rate of 38.51 per aircraft per month. This wide variance between expected and actual operations immediately resulted in a shortage of replacement engines and threatened a shortage of replacement crews.[49]

After this experience in May 1952 the Fifth Air Force, as it was required to do by the strategy of continuous air pressure, resolved to pitch its operations at a sortie rate which, in context with supply and maintenance factors, would permit its units to maintain a minimum level of 75 percent of their assigned aircraft in a combat ready status. This program, which was formaly implemented in September 1952, had many aspects. It required units to fly a fairly constant rate of combat and training sorties so as to insure that the logistical and personnel pipelines were always prepared to sustain the combat effort. Whenever combat sorties fell below the programmed effort, the difference would be made up by increased training sorties. In this way, tactical aircraft and crews would fly a predetermined number of hours per month and all support and maintenance actions would be geared to these standards.[50] The manner in which the Fifth Air Force closely adhered to its planning factors in the last year of the Korean war is shown in figure 15.

Although the Fifth Air Force was promised continued augmentations of F-84 Thunderjets and a replacement of its obsolete F-51 and F-80

*See Chap. I, pp. 22–23.

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FIFTH AIR FORCE ADHERENCE TO PLANNING FACTORS

1 July 1952—30 June 1953

Type aircraft	Sortie rate per month		Sortie duration		Actual combat hours per aircraft per month	Actual non-combat hours per aircraft per month
	Actual	Prog	Actual	Prog		
B-26	14. 18	15. 40	3. 44	3. 60	48. 79	20. 15
F-84	16. 90	16. 65	1. 68	2. 10	28. 40	13. 71
F-86 (FB) [1]	30. 37	24. 57	1. 15	1. 50	34. 92	10. 29
F-86 (FI)	21. 18	29. 60	1. 46	1. 40	30. 92	7. 20
F-94 [2]	19. 40	20. 00	1. 71	1. 75	33. 18	12. 41
LT-6	22. 76	16. 40	2. 39	2. 60	54. 40	9. 55
RB-26	13. 38	19. 23	2. 83	3. 00	37. 87	9. 77
RF-80 [2]	23. 74	21. 70	1. 37	1. 33	32. 52	4. 74
RF-86 [3]	7. 78	21. 58	1. 32	1. 40	10. 27	4. 90

[1] F-86 fighter-bomber figures are for the period 1 May 1953 through 30 June 1953. Programmed sortie rate and sortie duration were based on F-80 planning factors.

[2] F-94 and RF-80 figures are for the period 1 January 1953 through 30 June 1953.

[3] Only five RF-86 aircraft were authorized and an average of three of these aircraft were possessed during the period.

SOURCE: Fifth Air Force Programs Book, 9 August 1953, p. 23.

Figure 15.

fighter-bombers with new F-86F fighter-bombers, General Barcus in July 1952 was confronted with the fact that, for several months, the Fifth Air Force had been losing more aircraft to enemy action than the USAF could replace. Even more serious than the loss rate was the high damage rate which the fighter-bombers had been sustaining in combat, a rate which posed an extreme problem to maintenance. An operations analysis study revealed that in the period 1 January through 30 April 1952 a total of 828 Fifth Air Force planes had been destroyed or damaged by hostile ground fire, a figure representing a loss and damage rate of 21.6 aircraft per 1,000 sorties. This study also showed that 50 percent of assessable ground-fire hits on aircraft was received at or below 2,500 feet of altitude.[51]

After May 1952 the sudden change in UNC air targets from the enemy rail lines to the more diversified target system of the air pressure strategy greatly complicated Communist defenses and reduced Fifth Air Force loss and damage rates. The Communists nevertheless displayed a good ability to shift their flak defenses, and on 10 July during the attacks against Pyongyang the Fifth Air Force lost 1 aircraft and sustained major damage to 8 and minor damages to 14 aircraft. Shortly after this incident, General Barcus fixed a minimum recovery altitude for fighter-bombers at 3,000 feet.[52] On 10 August, after the 3d Bombardment Wing lost three aircraft in rapid succession north of the bomb line, General Barcus took the wing off operations for a period of intensive training and subsequently prescribed a light bomber attack altitude of 4,000 feet: only select crews were permitted to attack at lower levels.[53] Other regulations prescribed minimum operating altitudes for tactical reconnaissance aircraft.* As a general rule, aircraft were limited to one pass for each type ordnance carried, and strafing passes were curtailed, except at very lucrative targets. Fighter escort for both the fighter-bombers and reconnaissance aircraft was substantially increased.[54] These minimum altitudes could be raised or lowered in context with known flak emplacements, and they were waived at times of tactical emergency: between 12 and 26 June 1953, when the Communists were waging a major ground attack, General Anderson waived the 3,000-foot minimum recovery altitude for fighter-bombers.[55] Disturbed by the same growing order of enemy flak which had bothered General Barcus, Task Force 77 followed the Fifth Air Force lead and in August 1952 ordered its carrier air units to use dive bombing instead of glide bombing, to pull out at a minimum altitude of 3,000 feet, and to increase their flak suppression sorties.[56]

That the diversification of targets under the air pressure strategy and the 3,000-foot dive-bombing recovery altitude resulted in a substantial reduction in Fifth Air Force losses and damages was revealed in an operations analysis study which covered the period 1 September 1952 through 30 April 1953. In this period 771 aircraft were lost or damaged because of hostile ground fire for a rate of 11.1 per thousand. A 19 percent decrease in the number of hits on aircraft per sortie was attributable directly to the minimum recovery altitude restriction. A further decrease of 32 percent in the number of hits on aircraft per sortie could probably be attributed to the diversified target program which confused enemy defenses.[57] During the two weeks in June 1953 when the Fifth

*See Chap. VII, pp. 257–58.

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Air Force waived its 3,000-foot minimum altitude, it lost 12 of the new F-86F fighter-bombers to enemy ground fire. Nine of these planes were shot down while they were flying armed reconnaissance missions at fairly low altitudes. Owing mostly to the reduction in minimum attack altitudes the Fifth Air Force lost a total of 18 aircraft to enemy ground fire, the highest such monthly total during the last year of the war.[58] Although the general adherence to a safe minimum altitude for dive-bombing recovery reduced loss and damage rates, it forced pilots to release their bombs from higher altitudes and thus carried a virtually automatic reduction in bombing accuracy. General Barcus recognized that the minimum altitudes, which he had effected for the sake of conserving his force, would be accompanied by an "appreciable price paid in bombing accuracy," but he expected that increased training and more careful mission planning would preserve bombing accuracy.[59] This expectation would not be realized.*

In the 13 months of air pressure operations between 1 July 1952 and 27 July 1953, Fifth Air Force combat aircraft flew 180,205 effective combat sorties against the Communist enemy. Except for periods of increased activity in October 1952 and again in June and July 1953, the Fifth Air Force pattern of air attack was regular and sustained, varying from day to day only in context with vagaries of the weather. Such an adherence to supportable rates of combat effort, coupled with vigorously prosecuted maintenance, enabled the Fifth Air Force successfully to maintain an average of 76 percent of its combat aircraft in commission during the period, a figure which would have been higher except for difficulties encountered with the obsolete F-51's and F-80's in the several months while they were being replaced with modern F-86F fighter-bombers. In the year ending 30 June 1953, an average of 76 percent of possessed B-26's, 79 percent of possessed F-84's, and 77 percent of F-86 fighter-bombers and fighter interceptors had been kept in a combat ready status. Benefiting from adherence to planning factors which conserved aircraft already on hand and from the acquisition of new and more modern aircraft, the Fifth Air Force ended the 13 months of sustained air pressure operations with a greater combat capability than it had possessed at the beginning of the campaign. On 31 July 1953 Fifth Air Force units possessed 128 B-26's, 218 F-84's, 132 F-86 fighter-bombers, and 165 F-86 fighter interceptors. Computed in terms of the planning factors shown in figure 15, the daily potential combat capability of the Fifth Air Force at the end of the war was on the order of 85 B-26 sorties, 181 F-84 sorties, 171 F-86 fighter-bomber sorties and 143 F-86 fighter interceptor sorties. While such an application of all available flying hours to combat sorties was theoretically possible, the Fifth Air Force was never able to neglect training and other needed flying, with the result that the actual sustained combat capability was somewhat less than its maximum potential capability. Computed again in terms of the planning factors, the actual daily combat capability of the Fifth Air Force was 60 B-26 combat sorties, 123 F-84 combat sorties, 133 F-86 fighter-bomber combat sorties, and 116 F-86 fighter interceptor sorties. Compared with the capability figures noted for May 1952, the B-26 light bomber and the F-86 interceptor capabilities in July 1953 were relatively unchanged: the B-26's were old aircraft and the Fifth Air Force had done well to maintain the light bomber capability; the relatively unchanged F-86 interceptor capability was attributable to the fact that the Fifth Air Force chose to use support programmed for the F-86 interceptors to swell the sortie rate of the F-86 fighter-bombers. Had circumstances been different the F-86 fighter-bomber support and the F-86F fighter-bombers themselves could have been employed in all-out counter-air operations. The most marked increase in Fifth Air Force combat capability was in its fighter-bombers, which in May 1952 had had a sustained capability of 196 daily sorties and which in July 1953 had a sustained capability for 256 daily sorties.[60] The various factors which increased the combat capability of the Fifth Air Force will be discussed below: while new model aircraft helped, no small part of the increased capability came from good management and efficient use of forces in Korea.

Buildup of Tactical Aircraft: At the end of 1951 the USAF had stated that: "The Korean war has had first priority in every respect and has been equipped to our poor best at the expense of SAC, the Air Defense of the United States, and our overseas deployment program." [61] There was no

*See pp. 165–66.

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doubting the truth of this statement, but FEAF had nevertheless been compelled to employ many obsolete aircraft in Korea, simply because the whole USAF had been in 1950, as General Vandenberg had expressed it, "a shoe-string Air Force." Starting from a by no means modern 40-odd group Air Force in 1950, the aircraft production effort of the United States did not hit its stride before the spring of 1953.[62] Thus in June 1950 FEAF had called for more jet fighter-bombers, but USAF, which then possessed fewer than 2,500 jet aircraft of all types in its inventory,[63] was unable to deliver jets and instead sent World War II Mustangs to Korea. During the last year of the Korean war increased U. S. production permitted a buildup of the Fifth Air Force and the conversion of its units to more modern aircraft.

The changing complexion of the Fifth Air Force in terms of aircraft after May 1952 was revealed in its inventory of light bomber and fighter-bomber aircraft possessed in units, which was periodically as follows:[64]

	B–26	*F–51*	*F–80*	*F–84*	*F–86**
31 May 1952	102	44	83	97	0
31 December 1952	128	51	79	206	0
31 July 1953	128	0	0	218	132

*F–86 totals include only fighter-bomber models.

As revealed in this chart, the Fifth Air Force was able to bring its light bomber wings up to authorized strength, to phase out obsolete F–51 and F–80 fighter-bombers, to build up its F–84 wings to their authorized strength, and to reequip two of its fighter-bomber wings with F–86F fighter-bomber aircraft.

Although augmented in numbers, the Fifth Air Force's light bomber wings remained equipped with obsolete B–26 aircraft. Before the outbreak of Korean hostilities, the USAF had possessed no aircraft suitable for night interdiction operations, and when such a requirement had been met in Korea the Fifth Air Force had been compelled to use the B–26 light bombers of the 3d Bombardment Wing for night intruder work. In June 1951 still more night intruders were required, and the 17th Bombardment Wing (then designated the 452d Wing) had been added to the night interdiction force. In the spring of 1951 a board of USAF senior officers selected a modification of the British Canberra for production as the USAF B–57: this light jet bomber was designated as the replacement for the B–26 but the B–57 was not even expected to be ready for service before 1954. Since the B–26 was no longer produced, USAF encountered extreme difficulties in providing the Fifth Air Force with the number of these aircraft which it required, especially in configurations whose specifications were frequently changed. But, lacking any better replacement aircraft, the USAF remained committed to a B–26 program that was replete with parts shortages and modification difficulties.

Although he well recognized that the B–26 was not fitted for night interdiction, General Weyland long urged USAF to bring the two light bomber wings up to war-strength authorizations, and finally in the autumn of 1951 USAF offered to increase shipments of B–26's to Korea, provided the Fifth Air Force was willing to take a number of these planes which did not entirely meet desired specifications. Not even this emergency action would be able to build up both Fifth Air Force wings to the unit equipment strength of 24 aircraft per squadron that FEAF wanted, but in the spring of 1952 a final action allocated 24 B–26's to each squadron of the 3d Wing and 16 B–26's to each squadron of the 17th Wing. The total Fifth Air Force authorization was thus set at 120 B–26's, and 60 other B–26's were established as an authorized theater reserve. In September 1952 the two light bomber wings reached their authorized strength in aircraft.*

Once they had gotten the two Fifth Air Force light bomber wings up to their authorized strength, neither USAF nor FEAF was willing or able further to change the B–26 program, even in the late summer of 1952 when the B–26 failed in its intruder tasks and had to be used for other purposes. During the course of the B–26 program the Fifth Air Force had made many changes in its desired configuration specifications, and in August 1952, when it deemphasized night intruder tactics in favor of bomber streams, the Fifth Air Force requested that B–26 replacements should be of glass-nose bombing types. FEAF was unwilling to suggest still another modification to be performed in the ZI, but it authorized local removal of nose guns and gun-pods.[65] Again on 19 October the Fifth Air Force suggested that it be given glass-nose B–26C's as replacements so far as

*B–26 problems in the 1950–1952 time period summarized here are presented in AHS–72, pp. 84–86 and 164–78.

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possible and in first priority, but FEAF replied that USAF inventories demanded that the Fifth Air Force take B–26 replacements in a ratio of 1 hard-nose strafer to each 2 glass-nose bombardier-position aircraft.[66] In November 1952 the Fifth Air Force asked for permission to raise the unit equipment aircraft strength of the 17th Wing to 24 aircraft per squadron, but USAF disapproved the request because of a shortage of potential B–26 replacements in its dwindling inventory.[67] In short, by the autumn of 1952 the B–26 light bomber program had reached an impasse: there was very little for the Fifth Air Force to do under these circumstances but to make the most acceptable tactical usage of its available B–26 forces.[68]

As promised by USAF, deliveries of F–84 Thunderjet fighter-bombers to the Fifth Air Force swelled in volume and, with the notable exception of one model, improved in performance. Designed in 1944 and first flown in April 1947, the F–84 Thunderjet was a standard straight-wing jet fighter which used a relatively low-thrust J–35 engine; it had demonstrated in Korea that it was not quite fast enough to engage a MIG–15, but it had nevertheless proved to be a good fighter-bomber.[69] The first model of the Thunderjet to see combat in Korea was the F–84E, and operational and maintenance commitments were programmed in terms of this model aircraft. The F–84G was the designated successor to the F–84E (the F–84F being a swept-wing model), but production difficulties delayed deliveries of these aircraft, with the result that the Fifth Air Force learned in February 1952 that it was going to have to take, over the next five months, some 102 F–84D (Modified) aircraft. The F–84D was an outdated development of the basic production model of the Thunderjet. "We do not want those aircraft," General Everest informed his staff on 20 February, and tests run during March at Itazuke Air Base showed good reason why the F–84D would be both operationally and logistically disadvantageous to the Fifth Air Force: the F–84D carried less internal fuel and had 100 miles less range than the F–84E; it had less speed than the F–84E with the result that the two planes could not effectively fly in the same formation; a limited interchangeability of F–84D and F–84E components would increase maintenance man-hours and warehousing requirements.[70]

Despite its objections, the Fifth Air Force had to take the programmed F–84D aircraft, and General Everest in April 1952 directed that the planes would be concentrated in the 58th Fighter-Bomber Wing (then designated as the 136th Wing), his reasoning being that this wing was slated to return to the ZI at the conclusion of hostilities, at which time the F–84D's could possibly be used for equipping the ROKAF.[71] In May 1952 the wing converted to F–84D's and transferred its F–84E's to the 49th Fighter-Bomber Wing. Most of the D-model aircraft received were in relatively poor condition, and, as had been anticipated, they were accompanied by higher AOCP rates. In August, when the loss of two of the F–84D's broke the wing's record of 150 days without a casualty, the commander of the 58th Wing grounded all F–84D aircraft, and in September 1952 the last of these unfortunate planes were sent back to FEALOGFOR for final disposition.[72]

Deliveries of new model F–84G's to the Far East, beginning in August and swelling in volume in September 1952, accelerated the phase-out of the troublesome F–84D's. Two shipments of these planes were flown across the Pacific and a third arrived by aircraft carrier.[73] The F–84G was not a radically new airplane, but, instead, it was essentially a conventional F–84 which had been specifically designed to be a fighter-bomber: major differences between the F–84E and the F–84G were a better engine, an automatic pilot, and in-flight refueling devices in the latter model. Although some of the new planes arrived without various items of needed equipment, they were available in sufficient numbers by September 1952 to permit the Fifth Air Force to bring its F–84 wings up to unit equipment strength for the first time in over a year. According to the conversion plan, the 49th Wing was to receive all new F–84G's, the 58th was to continue temporarily with F–84E's and G's; and the 474th Wing was to receive all excess F–84E's. Beginning in August 1952 and completing in October 1952, the 49th Wing successfully transitioned to all F–84G's, but slower than anticipated deliveries after September delayed the planned one-for-one phase-out of F–84E's from the 58th Wing, with the result that the three squadrons of this wing did not completely convert to F–84G's until December 1952. This meant, in turn, that the programmed transfer of F–84E's to the 474th Wing was delayed. Most

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of the E-models destined for this wing, moreover, required prior overhaul at FEALOGFOR, and all further scheduled shipments of F-84E's to FEAF were cancelled after November 1952. All these factors combined to keep the 474th Wing at reduced strength. In December 1952 the 49th Wing's 9th Fighter-Bomber Squadron was permanently transferred to the Japan Air Defense Force to prepare for a special mission, and this movement took 25 F-84G's out of Korea. In the spring of 1953, however, the 474th Wing (redesignated the 49th Fighter-Bomber Wing on 1 April 1953*) was able to begin a slow conversion to F-84G's: by June 1953 the 8th Squadron had been equipped with these planes but the 7th Squadron still required a few more to fill out its unit equipment. Complete reequipment of the 7th Squadron was not managed before the end of the war.[74]

The changes in Thunderjet models complicated supply and maintenance, but the troubles in the three F-84 wings were by no means as grave as those in the 18th and 8th Fighter-Bomber Wings, which were still equipped with obsolescent F-51's and F-80's. According to USAF programming for Fiscal Year 1953, announced in April 1952, the two squadrons of the 18th Wing and its attached 2d South African Air Force (SAAF) Squadron and the three F-80 squadrons of the 8th Wing were scheduled to convert to F-86F fighter-bombers. When this announcement was first made, FEAF's initial reaction was that the F-86F would probably not prove too successful as a fighter-bomber, and it asked that three of these squadrons should instead be converted to F-84's. USAF did not agree.[75] Tests flown by the 4th Fighter-Interceptor Group in May 1952 served to allay the FEAF fear that the F-86 might not be a good fighter-bomber: in four dive-bombing missions, the Sabres carried one 1,000-pound bomb on wing pylons opposite a filled wing tank and dropped the ordnance satisfactorily from altitudes of 20,000 feet down to 5,000 feet. When carrying a maximum load of 2 x 1,000-pound bombs, an F-86E Sabre had a safe radius of action of only 138 miles, but when it carried one bomb and one wing tank it could extend its radius to 187 miles. Despite these range limitations, the F-86 fighter-bomber possessed advantages: since they could defend themselves, flights of four Sabres enjoyed a great freedom of action; the F-86 proved to be a desirable gun platform; and the Sabre had one decided advantage over other fighter-bombers in that it could sustain prolonged high-angle dives without exceeding its critical mach number.[76]

Scheduled as first to convert to F-86F fighter-bombers was the 18th Wing, whose Mustangs were on their last legs. The Fifth Air Force planned that this conversion would begin at the new airfield being built at Osan-ni (K-55), on or about 15 November 1952; given this initial date, the squadrons were to become combat ready on or about 20 November, 20 December, and 20 January 1953.[77] Pending receipt of Sabres, the 18th Wing was expected to keep its old Mustangs going, if necessary by cannibalization. The wing did keep the F-51's flying, but shortages of radiators, spark plugs, brake assemblies, and hydraulic fluid contributed to an AOCP rate which varied from 20 percent to a high of 40 percent in December 1952.[78] Slippage in programmed deliveries of the Sabre fighter-bombers delayed initiation of the 18th Wing's conversion: on 26 December 1952, however, the 18th Wing moved from Chinhae Airfield (K-10) to the new base still under construction at Osan-ni, and on 11 January 1953 the 18th Group came in from Hoengsong Airfield (K-46). First to stand down from combat was the 12th Squadron, and shortly thereafter the 2d SAAF Squadron flew its F-51's to Japan and returned to K-55 for transition training. On 15 January the 67th Squadron flew its Mustangs to K-55 where it continued combat flights with these planes until 23 January, at which time logistical considerations indicated that this last Mustang squadron might as well stand down.[79]

Converting a flying organization from one type of aircraft to another is a difficult proposition under optimum conditions, but the task facing the 18th Fighter-Bomber Wing was tremendous. It moved to an unfinished airfield in the middle of the winter, where construction of maintenance shelters had not even commenced and where, with the exception of concrete flight surfaces, the whole area was "one big mud hole." The 18th Group's pilots, moreover, were mostly air reservists, none of whom were jet qualified. Only a handful of seasoned Sabre pilots were transferred to the wing from the 4th and 51st Groups. Airmen who had been maintaining conventional Mustangs had to

*See pp. 170–71.

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be trained for more complicated jet aircraft; both the training and the jet maintenance had to be done in the open under conditions of severe cold which sapped vitality and caused illness. In the maintenance training, however, an F-86 mobile training detachment was of great assistance: beginning on 7 January this detachment held classes eight hours a day, seven days a week. On 28 January the 18th Wing received its first three Sabres, and pilot training programs, beginning on 3 February, confronted the task of providing transition for 56 USAF and 28 SAAF crews. On 25 February the 18th Group was able to fly its first combat mission with Sabres, a four-plane flight which joined a Yalu sweep. But by the end of February only 8 percent of 78 combat crews was combat ready. Dissatisfied with the progress displayed, the commander of the 18th Wing now secured authority from the Fifth Air Force to take action, and on 4 March he reassigned 30 pilots who were not displaying the necessary aptitude for the Sabres. Receipt of ZI-trained pilots and continued transition training subsequently built up the wing's crew strength: as of 30 June, 82 percent of 127 assigned pilots were qualified for combat in Sabres.[80] Actually, the assignment of Sabre aircraft lagged more than did crew production: the 12th Squadron did not reach unit equipment strength of 25 aircraft until 31 March, and the 67th Squadron finally reached its authorized aircraft strength on 7 April 1953.[81]

In the 8th Fighter-Bomber Wing F-80C aircraft continued to do yeoman service up to the very end, but the old Lockheed Shooting Stars, the first of the USAF's operational jet fighters and long out of production, were combat weary and increasingly scarce: beginning in September 1952, the 8th Wing had fallen below its authorized aircraft strength.[82] The Fifth Air Force had planned that the 8th Wing would not begin converting to Sabres until the 18th Wing achieved its unit equipment plus 10 percent, but the slippage in initial F-86F fighter-bomber deliveries put the two wings into transition at approximately the same time. Sabre training got underway at the 8th Wing's base at Suwon (K-13) when the 36th Squadron stood down on 22 February. On 14 March the 35th Squadron also quit combat and began to train with the new planes. First the 35th and 80th Squadron, and then the 80th Squadron alone, continued to perform the missions assigned to the 8th Wing with the old F-80's: these planes continued to fly in combat until 31 April when the last F-80 fighter-bomber strikes were flown in Korea. On 1 May, the 80th Squadron officially stood down and within two weeks it was operational with Sabres. Meanwhile, the other two squadrons of the 8th Wing had begun to fly Sabres in combat: four pilots of the group flew the first combat mission on 7 April when they joined a sweep to the Yalu. Completion of the 8th Group's conversion program was greatly delayed when aircraft earmarked for the 80th Squadron arrived in the theater equipped with ultra high frequency (UHF) radio, but on 4 June 1953 this squadron received its last authorized F-86F, bringing the 8th Wing up to its proper Sabre strength.[83]

Because of the various delays in the conversions, the Fifth Air Force cut short a transitional period wherein the 8th and 18th Wings were supposed to fly fighter-interceptor missions.[84] Dive-bomb training was accordingly begun in the 18th Wing on 1 April, and the 8th Wing integrated dive-bomb practice into its conversion period. On 13 April pilots of the 8th Group flew their first Sabre fighter-bomber mission against an enemy troop concentration, and on 14 April the 18th Group made its first combat attack against a similar target. On 27 April the 18th Group flew the first close-support mission with the new Sabres.[85]

Evaluation of the F-86 as a Fighter-Bomber: Before Sabres were regularly employed as fighter-bombers, many pilots had been pessimistic. Frequently heard were such statements as: "It's much too fast," or "It's bound to be unstable at those altitudes," or "It mushes too much on dive recovery," or "They tried it once and it didn't work." But pilots of the 8th and 18th Wings proved the pessimists wrong: not only was the F-86F successfully employed as a fighter-bomber, but it had definite advantages over any other fighter-bomber aircraft in the theater.[86] After a month's combat operations, General Weyland informed USAF that he believed that the F-86F would prove to be a good fighter-bomber. "I consider it a particularly desirable improvement in our tactical force," he said, "because of its versatility in accomplishing the three phases of the tactical air force mission: that of gaining and maintaining air superiority, interdiction, and close air support."[87] Everyone knew, however, that the Sabre could

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defend itself in the air, and the real question was whether the Sabre could deliver ordnance against ground targets. At the end of Korean hostilities, when the final combat evaluation of the Sabre fighter-bomber was written up, General Anderson stated: "It is concluded that the ability of the F-86F to destroy tactical targets is equal to that of any other USAF aircraft employed in the role of a fighter-bomber in Korea." [88]

After four months of combat, the Fifth Air Force described the Sabre as the most suitable fighter-bomber used in the Korean theater: it had displayed an ability to survive superior to any other USAF fighter, it was a stable gun and bomb platform, it had no airfield or operating area problems not peculiar to other jets, its high-altitude stability with external ordnance and fuel tanks was satisfactory.[89] One of the chief advantages of the F-86F as a fighter-bomber was its high mach and speed capabilities; during dive-bombing runs, pilots did not need to divert their attention to the airspeed indicators for fear that they might exceed structural limitations. With external tanks and ordnance, the allowable speed far exceeded the speeds gained on dive-bomb runs, even when the roll-in altitude was as high as 20,000 feet. Use of speed brakes permitted very steep diving angles, which contributed to bombing accuracy and reduced vulnerability to ground fire, while, at the same time, the braking action kept speeds in ranges where target tracking was not too difficult. Dive angles ranged from 50 to 70 degrees, and, with speed brakes extended and throttles retarded, the Sabre's airspeed stabilized at approximately .87 mach, giving a constant airspeed to the release point. Carrying 1,000-pound bombs and external fuel tanks, the Sabres possessed good takeoff characteristics, and they retained excellent maneuverability in the air with these loads.[90]

The tactical doctrines under which the 8th and 18th Wings employed the Sabre fighter-bombers were devised to capitalize on the characteristics of these aircraft. Aircraft taxied to the runway in scheduled flight order and took off with a 3-second interval between elements. Separation between flights depended on the nature of the target: offense in depth was frequently employed in order to increase bombing accuracy, to avoid saturation of the airspace over the target, to present less of a target to enemy ground fire, and to avoid the smoke and clutter which, in larger strikes, obscured targets. This offense in depth was managed by separating flights by one to three minutes on takeoff, and this same separation was found beneficial for weather penetrations and for instrument let-downs after missions were accomplished. If the target was so well defended as to demand a minimum time of attack, the Sabre formation marshalled on the runway and maintained 3-second intervals between flights. Join-up was made on course, the procedure being that the flight leader retarded his power to 92 percent until element or flights joined position, and then the whole formation initiated a normal climb to cruising altitudes.

The flexibility and lack of restriction on the operation of the Sabre fighter-bombers gave operations officers great freedom to plan the most effective dive-bomb missions. In selecting tactics, they gave first consideration to the nature of the target and to its defenses. Heavily defended targets required a minimum time in the area: against such targets the Sabres commonly stacked up flights in echelon, and all aircraft entered their bomb runs simultaneously from altitudes above the effective range of flak. In such case, each pilot attacked a separate prebriefed aiming point. Pinpoint targets were attacked from an offense-in-depth formation, in which the separation between flights ensured each pilot an opportunity to make an individual bomb run. Before they reached the target area, the Sabres usually let down and reduced power, for, by such a procedure, they arrived over the target at desired bombing entry altitudes without alerting the enemy defenses. Dive-bombing entry altitudes were usually between 12,000 and 20,000 feet, and, with speed brakes extended and throttles retarded, dive angles ranged from 50 to 70 degrees. Typical bomb-release altitudes ranged at about 6,000 feet.

Armed reconnaissance missions were usually flown at 8,000 to 10,000 feet, and once a target was located one Sabre element initiated a dive-bomb run or high-angle strafing attack, while the second element performed necessary flak suppression. On these reconnaissance sweeps, the Sabre elements scissored for evasive action and kept approximately line abreast formation. When a potential target was sighted, they usually found it best to over-fly it and then to return a few minutes later and initiate the attack from a different direction, thus ensuring surprise. Unless handled intelligently, these armed reconnaissance missions

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posed extreme hazards: as has been seen, in the period of 12–19 June 1953 (when the 3,000-foot minimum altitude restriction was relaxed) 9 out of 12 Sabres lost were shot down on armed reconnaissance missions. Several of these losses were attributed to the fact that the flights had unwisely attempted second attacks against the same target.

Close-support scrambles usually employed four Sabres under the lead of an experienced and well-briefed pilot. Tactics used in such missions were much the same as for other fighter-bombers,* and a survey of opinion among Mosquito controllers established that most of them favored the F–86 over the F–84 for close-support work, principally because of the Sabre's steeper dive angle and more accurate bombing. The F–86, however, could not stay in the target area as long as an F–84, and it orbited at such high altitudes that it required more time for proper target identification.

In the course of a napalm or skip-bombing attack, the Sabre fighter-bombers maintained a cruising altitude to the target area, where, after identifying the target to be attacked, they proceeded to a point about 10 miles away and then let down for low-level runs. They planned their attacks so that the aiming point was always in sight, and while still two or three miles out the pilots lined up on the target fairly exactly, thus preventing major corrections in course at the last minute. At airspeeds of over 500 knots, the Sabre pilots successfully made single releases of 750-pound E–74 fire bombs and 120-gallon napalm tanks: in such cases they usually experienced a slight wing roll, but this was easily corrected. To save time on skip-bombing runs, the Sabres usually flew line abreast in flights or elements and made simultaneous drops. In all low-level attacks, the Sabres strafed as a countermeasure to small arms fire.

Aircraft characteristics and tactics which exploited them made the F–86F an outstanding fighter-bomber, but in its existing configuration the plane met some difficulties. The chief shortcoming was its limited range: carrying two 120-gallon external fuel tanks, which were retained except in emergencies, the F–86F had an ordnance-carrying radius of action of slightly more than 200 miles. Cognizant that more range would be occasionally needed, the Air Materiel Command had procured a limited number of 200-gallon external tanks, and, when carrying two of these tanks and two 1,000-pound bombs with conical fins, the F–86F had a radius of action of approximately 360 nautical miles. These radius calculations allowed 15 minutes for target identification, additional time for join-up after a strike and for orbiting before landing, and provided for a retained reserve of 500 pounds of fuel. By a reduction of these safety factors, the Sabre's radius of action could be stretched as much as 50 miles. Sabres equipped with solid leading edge wings had a slightly greater range than those equipped with slats, and, although this configuration caused a very low angle on takeoff when ordnance and external fuel were carried, the solid leading edge Sabres had otherwise equal capabilities on all fighter-bomber missions. Operationally, the external fuel tanks presented little difficulty. The 120-gallon tanks were stable in flight, but the 200-gallon tanks produced a controllable porpoising tendency at high altitudes. Although not ordinarily jettisoned by the fighter-bombers, external tanks could be dropped without damage from level attitudes at speeds ranging between .75 and .85 mach. When stuka-type fins were installed on them, the 200-gallon tanks had better dropping characteristics. Although technical orders cautioned care in recovery pull-outs with external tanks, the Sabres made repeated recoveries at forces exceeding 7 G's without sustaining damage.

As was true with other Fifth Air Force fighters, the Sabre fighter-bombers experienced difficulties with the existing gun-bomb-rocket sighting systems.† The F–86F wing station configuration also gave trouble. Since outboard pylons had no arming devices they could be used only for carrying fuel: modification was deemed necessary to permit the Sabres to carry munitions on all pylons against short-range targets. The stationary inboard bomb pylons were not satisfactory because they restricted the mach of the aircraft: needed were flush-mounted or droppable pylons which, by reducing drag, would increase range and air-to-air fighting capabilities. Inboard bombs, moreover, could not be manually jettisoned without dropping outboard fuel tanks, a feature which was detrimental in combat. Rocket adapters for the Sabre's pylons were not available in Korea,

*See Chap. VI, pp. 216–17.

†See Chap. III, pp. 64–66.

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and lack of suitable bracket and rod safety devices prevented the F-86F's from carrying proximity-fused bombs. In its final combat evaluation of the F-86F fighter-bomber, the Fifth Air Force recommended that all of these deficiencies should be corrected. It also recommended that an investigation be made to determine whether additional ordnance-carrying pylons could be installed on the wings of the airplanes.[91]

Tactical Aircrew Problems: During the first years of the Korean hostilities, the experience level of Fifth Air Force aircrews had been relatively high, but the quantity of tactical air crews had been scarce. In sharp contrast, during the last year of the Korean war the number of crews on hand in the Fifth Air Force became excessive and the experience level of the individual crew was lower than desirable. Deficient proficiency of light bomber crews adversely affected the operations of the light bombardment wings, while an influx of excessive numbers of inexperienced fighter pilots put a severe burden upon the Korean fighter wings. The Fifth Air Force posted the following periodic statement of average combat crews possessed versus crews combat ready:[92]

	B-26	*F-51*	*F-80*	*F-84*	*F-86**
May 1952					
Possessed	172	102	111	219	215
Combat ready	126	78	92	159	151
December 1952					
Possessed	183	86	127	313	266
Combat ready	111	72	107	213	196
July 1953					
Possessed	184	0	0	381	498
Combat ready	132	0	0	227	410

*Includes F-86 fighter-interceptor and fighter-bomber crews.

During the course of the entire Korean war, the Fifth Air Force never obtained that quality of B-26 crews which it desired and required for the proper performance of a light bomber night interdiction mission. Fundamentally, this problem derived from the fact that even in 1950 the B-26 was obsolete and the only light bomber unit in the USAF that had possessed this type aircraft was the 3d Wing. To provide replacement crews, USAF had established a B-26 combat crew training school at Langley AFB, Virginia, late in 1950, and it had drawn upon reserve ranks to secure the initial allotments of personnel for the recalled 452d Bombardment Wing (later the 17th Wing) which was dispatched to FEAF. Lacking adequate bombing and gunnery ranges and physically incapable of much expansion, the Langley Combat Crew Training School's output of B-26 crews frequently failed to meet Korean attrition and rotational requirements. When this was the case, USAF levied on ZI commands for casual personnel, who were formed into crew elements for further training in the Far East. Although certain qualifications were established for B-26 replacement crews sent to Korea, the Fifth Air Force noted that the spirit of these regulations was often violated: "Instead of getting the highest qualified individual for this type of flying," noted a Fifth Air Force officer, "we have frequently received . . . the man who can be spared easiest."[93] Even in the last year of the Korean war, when ZI training programs were generally satisfactory, both FEAF and the Fifth Air Force were dissatisfied with the B-26 crews which came from Langley. For one thing, these replacement crews arrived in the theater at an average of 55 days after graduation from the training school: in such a length of time they had already forgotten part of their training and their proficiency was "poor to not acceptable."[94] Under such circumstances, each new crew received by the 3d and 17th Bombardment Wings required an average of 25 hours of flying training before it could be placed in combat, and these two wings customarily flew one out of four hours of their capability in training. About 10 hours of this total represented theater indoctrination training, but about 15 hours of it represented proficiency training which could have better been given somewhere in the United States.

In night intruder work two tactical employments of aircraft are permitted: the crews could get down on the deck and strafe targets or else they could bomb these targets from medium and low altitudes. Against targets of opportunity encountered at night, the Fifth Air Force recognized that strafing had a higher inherent kill probability than did bombing, but a series of B-26 losses in August 1952 convinced General Barcus that his intruder crews, as a whole, were incapable of low-level night strafing attacks. "We'd like to be able to strafe," said a Fifth Air Force spokesman, "but with the crews we are getting—and we think we have now about the average that we can logically be expected to receive—we don't feel that we will have the capability to strafe as a tactic that every crew could employ."[95]

The other tactic possible to night intruder crews

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was to bomb targets of opportunity from low and medium levels. But the status of bombardier-qualified observers in the Korean light bombardment wings had always been unsatisfactory. Qualified bombardiers were in short supply in USAF skill-inventories and the SAC had naturally been given a priority for such of these officers as were available. In recognition of the fact that night intruders were "lone wolf" aircraft, each light bomber crew was authorized two observers, one with navigator qualifications and the other a bombardier, but, beginning in March 1952, USAF had been compelled to reduce the flow of replacement observers to the Korean light bomb wings from two to one per crew. As a result by August 1952 the 3d Wing had only 63 percent and the 17th Wing only 70 percent of their authorized observers. In September, when diversion of the light bomber replacement crew flow through a two weeks' survival course in the ZI threatened further to reduce observer strength, the Fifth Air Force had temporarily to raise the minimum combat mission tour for observers from the standard 50 to as many as 55 or 60 missions. Not only were these observers possessed in short supply, but the Korean wings had very little success in their efforts to qualify such of their observers as were supposed to be bombardiers: the Fifth Air Force expected its bombardiers to display a CEP of 250 feet from 6,000-foot bombing altitudes, but tests conducted in June 1952 revealed that the CEP's of new crews were approximately 500 feet. These tests also showed that the average replacement crew did not attain the required standard CEP until it had flown 38 combat missions out of a 50-mission combat tour.[96] Allied tests demonstrated that the destruction of a vehicle required hits within 50 to 75 feet of it; and such precision attacks were obviously impossible from crews who could not even meet the standard 250-foot CEP.[97]

By August 1952 it was evident that the state of skill of the average light bomber crew was not sufficient either for low-level strafing or for precision bombing, and the Fifth Air Force had no choice but to direct a change in the employment of its light bomber effort. Surveys indicated that there were enough skilled crews to man two intruder squadrons, crews who could safely attack at night from low altitudes. The majority of light bomber crews, four squadrons of them, had to be diverted to more conventional light bomber attacks: day formation raids and night bomber-streams, both of which would use bombing tactics from reasonably safe 4,000-foot altitudes. This change in tactics was reluctantly made: "We diverted . . . to a straight light bomb role, both day and night, only to fully utilize what capability we had," stated the Fifth Air Force director of operations. He added that: "We'd like to get back to 100 percent utilization of what B–26 capability we have in individual night work . . . if we had crews qualified to do it." [98]

The change to conventional bombing tactics permitted some alleviation of the shortage of B–26 observers. In October 1952 the Fifth Air Force stated that observers would be allocated to the light bomber wings on a ratio of one per crew, but two observers were still authorized for lead and deputy lead crews in day formations and for the control crew in a night bomber stream. Even this change in tactics and authorizations found the Fifth Air Force still short of bombardiers: in October it therefore made arrangements to borrow some 18 qualified bombardiers from the FEAF Bomber Command for 60 to 90 days of temporary duty.[99] In November, USAF directed that all observer personnel on flying status in the grade of major or below would be assigned to appropriate crew duty regardless of grade authorizations.[100] And in February 1953 the Fifth Air Force permitted the light bomber wings to place flight mechanics on flying status in lieu of unfilled authorizations for aerial observers. These emergency actions, plus some output of newly trained observers from ZI schools, provided some alleviation to the pressing shortages, and by February 1953 the Fifth Air Force was able to cancel its requirements on Bomber Command for temporary duty bombardiers. There was, however, no return to a standard B–26 crew composition of one pilot, two observers, and one gunner.[101]

Not serious enough to warrant changing from optimum tactics as was the case with the light bombers but still productive of difficulties was the supply of replacement fighter pilots to the Fifth Air Force. In the first year of Korean hostilities Korean fighter pilots were generally of a high standard of proficiency as was expected of USAF career officers, but the fighter units in Korea, manned during 1950 at peacetime levels, had possessed only a limited number of these individually well-qualified crews. Effective in May 1951, more-

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over, FEAF began to rotate crews who had fought in Korea from the beginning of the conflict: in the same number as replacements were received, wing commanders were permitted to rotate fighter pilots after a normal minimum of 100 combat missions and light bomber crews after a minimum of 50 combat missions.[102] To support this rotational program, USAF established and where possible expanded fighter pilot combat crew training schools. An F–51 Combat Crew Training School (CCTS) located first at Nellis AFB, Las Vegas, Nevada, and later at Luke AFB, Phoenix, Arizona, turned out 14 crews every two weeks. In June 1951 the jet fighter pilot CCTS was divided between Nellis and Luke, and in combination these two schools turned out about 45 pilots every two weeks. Virtually all personnel graduating from these schools were assigned to units in the Far East, and when these sources provided inadequate numbers of replacements USAF filled FEAF quotas by levying upon ZI commands.[103]

During 1951 the average replacement fighter pilot received in Korea was either an air reservist or a regular Air Force pilot with some background experience, but in this same year USAF accelerated its training programs, and, increasingly after early 1952, the major problem concerning Far East fighter pilot replacements was one of excessive numbers and limited levels of personal experience.* Many of these recently graduated pilots needed strong direction in combat until they themselves became seasoned, but by the autumn of 1952 the flow of field-grade pilot replacements to the Fifth Air Force became deficient. Shortages of experienced pilots were first noted in the Thunderjet wings in October 1952 and they became more serious each month. The Fifth Air Force first attempted to meet the situation by assigning field-grade Sabre pilots to Thunderjet wings but, because of this action, the supply of experienced Sabre pilots, previously satisfactory, also became a problem area.[104] By March 1953 the experience level among fighter pilot replacements was so low that the Fifth Air Force stated a number of emergency requirements for field-grade replacements, and it further requested that it be provided one well-qualified first lieutenant or captain for each seven newly graduated second lieutenants. USAF had already directed the Air Training Command to provide replacement pilots with a minimum of 40-hours flying time in the aircraft they would operate in Korea; in view of its low experience level, the Fifth Air Force asked that this minimum flying time be increased to 80 hours.[105] In response to these requests, USAF allocated emergency shipments of a limited number of field-grade replacements, but it reiterated that the majority of jet pilot replacements would necessarily continue to be recently graduated officers.[106] Fortunately, the Fifth Air Force got some temporary relief to this problem when experienced flight and element leaders volunteered for extensions of their combat tours, and an increase in field-grade replacement crews was evidenced in the personnel flow during June 1953.[107]

During the last year of the Korean war the Fifth Air Force adhered quite closely to programmed planning factors (*see* figure 15). Such an adherence to an orderly program of operations should, at least in theory, have facilitated a similarly ordered requisitioning, reception, and utilization of combat crews. But to be sure that combat replacements would be on hand when they were needed, they had to be requisitioned several months in advance of the time when they would be needed, and in the time interval between the requisition and the reception of the combat crews, any number of variable factors, including adverse weather, could have changed Korean sortie rates. In view of these many variables, FEAF considered that a deviation of as much as 20 percent from manning standards was not unreasonable in Korea.[108] Through a combination of miscalculated personnel actions and adverse flying weather, Fifth Air Force Sabre and Thunderjet wings were flooded with a surplus of replacement pilots during the winter of 1952–1953.

The problem of excessive aircrews was most serious in the Sabre wings because the personnel flow into these units was affected both by bad flying weather and by unanticipated slippages in the conversion of the 8th and 18th Fighter-Bomber Wings. In requisitioning Sabre crew replacements, Fifth Air Force personnel assumed that the two F–86 interceptor wings would fly sorties as programmed during the latter part of 1952, but unfavorable flying weather compelled the 4th and 51st Wings to fly fewer sorties than had been programmed. Since the crew sortie rate was

*See Chap. III, p. 60.

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cut at the same time that replacements arrived in undiminished flow, both wings by December had accumulated an excessive number of aircrews. Too many crews on hand lowered unit morale and flying efficiency: in the 4th Wing the monthly sortie rate per combat ready crew declined from 22.4 sorties in October to a low of 15.5 in December, with the result that the crews had to face longer combat tours and that they actually did not get to fly the number of combat flights each month which they required to maintain efficiency.[109] Early in December, Fifth Air Force personnel officers took actions designed to provide replacements for the 8th and 18th Fighter-Bomber Wings: the flow of F–80 and F–51 crews was discontinued and two new flows of F–86 replacement pilots were scheduled for the 8th and 18th Wings beginning in January 1953. Through some lapse in liaison, Fifth Air Force personnel officers had assumed that the F–86 pilots earmarked for the 8th and 18th Wings would have been trained in fighter-bomber tactics. Actually, however, the Sabre fighter-bomber CCTS at Nellis AFB did not graduate its first class until 31 January, and thus all Sabre pilots who arrived in Korea during January and February were specialists in fighter-interceptor tactics.[110]

In view of the existing crew overages in the 4th and 51st Wings, the Fifth Air Force during January diverted incoming F–86 interceptor pilots into the 8th Fighter-Bomber Wing, where they could, for the time being, fly F–80's. Failing to get fighter-bomber trained Sabre pilots, the 18th Wing during January and February attempted to give transition training to a number of inept Mustang pilots who ultimately would have to be washed out.[111] At the end of February, the 8th Wing also began its transition, but neither of the two wings made as much progress in their conversion programs as had been planned, owing chiefly to delayed deliveries of aircraft. Already with excessive numbers of pilots on hand, the Sabre wings were thus increasingly overmanned by undiminished replacement flow schedules. During April 1953, for example, the Fifth Air Force received 121 F–86 pilots, 54 more than it needed during this month. Most of these replacements, moreover, were recently graduated pilots who possessed an average of 340 to 350 total hours of flying time, with 50 to 60 hours in Sabres.[112]

By April the four Sabre wings had so many surplus pilots that they were confronted with lowered individual flying proficiency, swamped training facilities, and actual housing shortages. The wing replacement training units were unable to accommodate all of the newcomers, with the result that many of them had to sit around and lose much of the proficiency they had when they arrived in the theater. Lack of maintained flying proficiency showed its effect in a rising number of aircraft accidents. One solution to the problem would have been to phase out pilots at mission levels short of the 100 mission combat tour, but this was impracticable because of shortages in experienced pilots. Seeking a better solution, the Fifth Air Force in April requested USAF to cut back its scheduled replacement flows for June and July; to get immediate relief it authorized the 4th and 51st Wings to reassign 35 extra pilots to the 6147th Tactical Control Group. The flow of crews could hardly be diverted on as short an order as the Fifth Air Force desired, and the May input of both F–86 and F–84 crews exceeded requirements for them. The number of crews on hand was still excessive in June, but markedly increased combat sortie rates in June and July gave employment to more pilots. Effective in July and August, moreover, USAF greatly reduced the flow of replacements, with the result that the pilot inventories began to approach more normal proportions. At the end of the war the Fifth Air Force instituted a combat crew phase out program which soon reduced its strength to authorized crew levels.[113] In search of a lesson from this experience, FEAF noted that vagaries in the weather had caused much of the trouble, but it stated that the Sabre crew experience well illustrated "a need for accurate scheduling to coordinate the arrival of aircraft and personnel to man and maintain the aircraft."[114]

Under normal circumstances in any combat theater, newly arrived aircrews require theater indoctrination training before they can be counted as combat ready. Because of marked variations in the proficiencies of the crews which they received, Fifth Air Force fighter wings had not only to give this theater indoctrination training but they also were compelled to use a large proportion of their available flying hours in establishing acceptable individual flying proficiency. Except

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for the issuance of broad directives, the Fifth Air Force chose to vest responsibility for flying training in its combat wings. Each of these combat wings therefore operated provisional training flights, which invariably were commanded by a combat experienced pilot of at least flight-leader caliber. The provisional training flights were usually located at the bases in Japan where the wings conducted their rear echelon maintenance. How much training an individual pilot replacement received in these training flights depended upon his individual background: pilots with over 200 hours in the type plane they would fly in Korea, for example, got only brief training necessary to indoctrinate them in the conditions peculiar to the theater; less experienced pilots got so much of the whole flying training course as the training flight commander considered that they needed to establish them as "combat ready" pilots. One pilot might be declared combat ready after a very few training flights, while another might be put through twice as much training. The wing training programs were thus flexible, and each differed somewhat from the other, but each accomplished the same general objectives. As an illustration of a full training program, the course of instruction used by the 474th Fighter-Bomber Wing in the latter half of 1952 may be noticed: this program included detailed instruction on operational and emergency methods in F-84 Thunderjets; briefings on survival problems in North Korea, the geography of Korea, and on ground force operations and techniques; and finally flying training which included pinpoint navigation, location of camouflaged enemy targets, and mock-bombing and strafing runs on bridges and marshalling yards. At the end of a course of instruction, two instructor pilots and two trainee pilots worked together in a four-plane strike over enemy territory against a target especially selected in an area where enemy flak was light and Red jets were not to be expected. Although this training was undoubtedly necessary, it became more and more burdensome toward the end of the war when most replacements were of a generally low level of experience. In the last year of the war, as may be seen in figure 15, the Korean fighter wings used over 20 percent of their capability in noncombat flying, most of which represented training requirements.[115]

Once the replacement pilot became "combat ready" and reported to a squadron, his training was not ended because each of the Fifth Air Force combat wings emphasized continuation training. As a matter of routine this continuation training concerned such matters as the establishment of proficiency for leading or flying close-support missions, for flying night combat missions, or for flying combat missions north of the Chongchon River.[116] In the autumn of 1952, however, General Barcus ordered all fighter-bomber wings to implement a major dive-bombing continuation training program. The requirement for such a program was first indicated in the June 1952 fighter-bomber attacks against the North Korean hydroelectric plants, for photo interpreters at FEAF noted that the status of bombing accuracy in these missions had not been too good. On 17 July, Brig. Gen. Jacob E. Smart, FEAF deputy for operations, passed this information to General Barcus, with the suggestion that the latter would do well to put the dive-bombing ability of his fighter-bomber crews under special scrutiny.[117] At about this same time, General Barcus raised minimum altitudes for dive-bombing pullout to 3,000 feet, and, while he recognized that this action would have some costs in reduced bombing accuracy, he hoped that increased training would preserve bombing accuracy.[118]

By a personally signed command letter written on 25 August 1952, General Barcus directed his wings to conduct special continuation dive-bomb training for all fighter-bomber pilots during the course of which every pilot would be expected to qualify as an expert under the standards specified in Air Force Manual 355-25. One flight of five aircraft in rotation from each fighter-bomber squadron would be withdrawn from combat and maintained on a training status, and this flight would fly bombing missions against the two scorable ranges at Naktong and Kunsan. Each group would designate an experienced pilot, selected for his demonstrated proficiency in dive-bombing, to teach proper bombing techniques. All pilots who failed to qualify in the expert class after nine practice missions would be returned to a group's replacement training flight for further training, and, after a reasonable number of missions in the replacement training flight, a pilot who still could

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not qualify was to be reclassified and assigned other duties commensurate with his abilities.[119]

During the period of August through October 1952 the four Fifth Air Force fighter-bomber wings implemented the continuation dive-bombing training program as ordered. All parties recognized that the conditions under which this training was undertaken were vastly different than those met north of the bomb line: only two small and easily identifiable ranges were available and flight patterns at each of them were rigidly controlled—down to a 90-degree turn off the base leg at Naktong. The program nevertheless made for some beneficial standardization of bombing techniques, which had previously been lacking, even within wings: each wing selected the dive angles and attack techniques which were best suited to its aircraft, and all pilots were drilled in these techniques. Although experienced pilots displayed only slight improvements in bombing accuracy, the less experienced men benefited from the additional opportunity to practice. Bombing results, moreover, were generally good: out of 3,499 bomb drops by 298 pilots, the combined circular probable error was 225 feet. Most bombs were released at altitudes between 4,500 and 5,500 feet, and the operations analysis study which reported the results of the training program doubted that any group of USAF pilots could do much better than the 225-foot CEP when they released bombs from such altitudes.[120]

The bombing results scored during the continuation training program seemed reasonably accurate, but the Fifth Air Force thought that competition among the fighter-bomber squadrons might result in an eventual betterment of the 225-foot CEP. Unfortunately, however, dive-bombing accuracy in combat did not improve but instead worsened. An assessment of the combat accuracy of Fifth Air Force fighter-bombers issued in December 1952 indicated that the fighter-bomber CEP against pinpoint combat targets was 340 feet. In the spring of 1953 fighter-bomber accuracy degenerated still further: assessed results in May through July 1953 indicated that the CEP against pinpoint targets had risen to 514 feet. At the conclusion of the Korean hostilities, the Fifth Air Force operations analysis office demonstrated the general decline in fighter-bomber accuracy with the following statistics:

	Line Targets		Pinpoint Targets	
	50 percent distance in feet	*Percent of hits*	*Radius of 50 percent circle in feet*	*Percent of hits*
1951	75	8.1	------	-------
1952	125	7.2	340	11.2
1953	219	5.8	514	3.9
Over-all	115	7.4	390	9.3

Since there was no great change in operating conditions between the autumn of 1952 and the spring of 1953, the operations analysts could only suggest that the marked decline in bombing accuracy during the latter period might be attributable to "the scarcity of good pinpoint targets and the general character of a static war."[121]

The decline of bombing accuracy in the Fifth Air Force fighter-bomber wings over the several years of the Korean war is explainable in terms of the growth of enemy opposition, both air and ground, which compelled crews to bomb from higher altitudes and to employ dive-bombing instead of glide-bombing tactics. But the marked decline in fighter-bomber crew effectiveness during the last year of the Korean war, as evidenced by the less accurate bombing, is difficult to evaluate. In this same period of time, and state of the war, the medium bomber crews increased the effectiveness of their strikes. It would appear that the objectives of the air pressure strategy were never clearly communicated within the Fifth Air Force. Many fighter-bomber pilots must have lacked adequate motivation and thus failed to give their best in what they considered to be a "static war." "This is indeed a strange war," stated one fighter-bomber group commander in August 1952, "where patience and planning are as important as courage and ability. Primarily the American airman is an aggressive as well as a skilled warrior, and the relatively casual pace of the Korean conflict is against his inbred nature."[122] The minimum altitude restrictions, which accepted lowered bombing accuracy, were distasteful to some pilots: "If it is worth being here at all," one of them commented, "it is for the damage we can inflict on the enemy."[123] Another fighter-bomber squadron historical officer, writing in September 1952, made a penetrating comment which went far in explaining the difference in outlook between fighter and bomber crews: "A fighter outfit," he wrote, "is a

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peculiar organization which, to a very great extent, runs on spirit. . . . A fighter pilot can be ordered into the air but nobody is going to be with him in the cockpit to see that he makes a determined effort to put his bombs on the target, which, in the case of a fighter-bomber, is the reason for existing of the pilot and airplane." [124]

Development of REMCO Activities: During the winter of 1951–1952 most Fifth Air Force combat wings, drawing upon the flexibility of the wing-base organizational plan, had established rear-echelon maintenance detachments at air bases in southern Japan. The reasons lying behind these actions were simple. Korean airfields possessed few of the shops and warehouses which were available and otherwise unused at bases in southern Japan. The amount of heavy equipment and supplies required by a tactical wing was so tremendous in volume and in weight that no wing had ever gotten completely into operation in Korea. Aircraft, supplies, and skilled technicians were limited and had to be utilized in the most efficient manner. And finally, the maintenance records of the first two wings which employed the rear-echelon detachments were so much better than those of the wings that moved entirely to Korea as to give a striking object lesson as to the value of the somewhat unorthodox procedure.*

Taking all these factors into consideration, the Fifth Air Force on 18 August 1951 had directed the establishment of rear-echelon maintenance detachments for all F–80 and F–84 aircraft at Tsuiki and Itazuke airfields. At Itazuke Thunderjet maintenance was accomplished by detachments of the 49th and 136th (58th) Fighter-Bomber Wings. Detachments of the 8th and 51st Wings performed rear-echelon maintenance on F–80 aircraft at Tsuiki until November 1951, when conversion of the latter wing to Sabre aircraft caused the 8th Wing detachment to move to Itazuke, thereby freeing Tsuiki for the establishment of 4th and 51st Wing rear-echelon F–86 maintenance. During November 1951 the 3d Bombardment and 67th Tactical Reconnaissance Wings sent detachments to Miho, where the 452d (17th) Bombardment Wing already conducted rear-echelon maintenance. In its formative period the rear-echelon maintenance system thus required two or more wings, which used like type aircraft, to operate rear area maintenance detachments at the same Japanese airfields. These detachments comprised personnel and equipment withdrawn from a wing's maintenance, supply, and tactical squadrons, and each detachment thus constituted a somewhat involved problem in administration. There was no clear-cut command supervision of the rear area maintenance activities, and, since each detachment belonged to a different wing, each commander followed his natural tendency to maintain unit integrity and to retain control of all personnel and equipment: the result was much duplication of supply accounts, motor pools, equipment, and maintenance shops. It was easy to see that better control and efficiency could be secured if the maintenance functions were operated by one local commander with appropriate manning documents and equipment lists.[125]

Rear-echelon maintenance combined operations (REMCO) was the developmental solution to the duplication and confusion which accompanied the operations of the initially separate wing rear-echelon detachments. On 4 April 1952 the REMCO system was initiated at Itazuke when the 49th and 136th (58th) Wings decided to try complete integration: at this time the 136th Wing assumed command of the 188 men equally assigned at Itazuke by both wings. A forward control office was established at Taegu to monitor the flow of F–84's to and from the Itazuke REMCO, and, while at Itazuke, both airmen and aircraft lost organizational identity, thus precluding any favoritism in their work.[126] In April the 3d, 452d (17th), and 67th Wings also consolidated their detachments at Miho, but this B–26 REMCO was again reorganized in June 1952 pursuant to a Fifth Air Force directive which placed it under the command of the 17th Wing. At this time the three wings undertook to furnish a total of 28 officers and 820 airmen, proportionately figured according to their respective share of the expected workload, and wing property required to perform all major and second intermediate inspections was shipped to the Miho REMCO for accountability.[127]

After somewhat divergent beginnings, the Fifth Air Force REMCO concept was generally standardized to include such aircraft field maintenance, major inspections, engine buildup, and engine minor repair as was appropriate to the type of aircraft handled. The 58th Wing operated the F–84 REMCO at Itazuke, and after the imple-

*See AHS–72, pp. 100–104.

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mentation of the service test of the reinforced wing on 15 March 1953* the 58th Maintenance and Supply (M&S) Group was based at Itazuke to handle the function. Detachment No. 1, 8th Fighter-Bomber Wing managed another REMCO at Itazuke which serviced F-80, F-94, and T-33 aircraft, to which nearly all Korean wings furnished small increments of personnel.[128] In cognizance of the conversion of the 8th Wing to Sabres, Detachment No. 1, 67th Tactical Reconnaissance Wing, took over the F-80, RF-80, and T-33 REMCO at Itazuke on 16 March 1953.[129] The 17th Maintenance Squadron, augmented with personnel assigned by the 3d and 67th Wings, handled inspections and repairs at the B-26 REMCO.[130] The 4th and 51st Fighter-Interceptor Wings continued separate rear-echelon detachments at Tsuiki during most of 1952, but in September planning was begun for a Sabre REMCO which would accommodate four F-86 wings. On 15 November 1952 the 51st M&S Group assumed responsibility for the REMCO at Tsuiki, and effective 16 February 1953 the establishment was expanded to include the 4th, 8th, 18th, and 51st Wings. The 51st M&S Group continued to serve as the parent organization, with all participating wings assigning personnel to fill pro rata shares of the F-86 REMCO manning documents.[131] At most of these REMCO bases the Japan Air Defense Force, as the host command, provided normal base support in the form of supply requisitioning, storage and issue, motor pools, and base shops, all such support being clearly outlined in joint responsibility agreements. The exception was Tsuiki, where the JADF had only a small detachment responsible for maintaining existing facilities and preparing construction programs.[132] Here the 51st M&S Group, augmented by participating wings, was required to man and operate the base as well as to perform the REMCO duties.[133]

The detailed organizational structure varied at each REMCO because of differences in available facilities and the number of wings supported. Except for variations resulting from jet engine repair, the basic functions were nevertheless quite similar. Under the REMCO concept all maintenance personnel over and above those required to perform preflight and postflight inspections, emergency engine changes, one-time repair of battle damages, and simple components replacements at the Korean bases were concentrated at the REMCO where, together with similar specialists from the controlling wing's maintenance squadron, augmented as necessary by other participating wings, they comprised a periodic maintenance section. Tools and equipment necessary to the REMCO were mostly drawn from TO&E authorizations of the wings, although some special issues were made. The employment of specialized dock, production line, or crew maintenance at the REMCO depended upon the availability of space and facilities, personnel qualifications, and the volume of work, but production line methods were found to be well adapted to periodic maintenance. Since the purpose of logistics was to support operations, maintenance planning was carefully based on operational projections, which, translated into flying hours, indicated the number of major inspections to be expected. A planning section at REMCO consolidated all of the inspection requirements submitted by the forward combat units and drew up a master schedule showing the number of aircraft to be delivered to REMCO per day. Each tactical unit received an individual schedule indicating the exact days on which its aircraft should be delivered to REMCO. While this scheduling was critical to successful rear-echelon maintenance, production control was rightly considered to be the nerve center of the REMCO. This unit not only monitored the maintenance effort status on each aircraft, but its work order planning unit made forecasts of parts and materials, based on individual aircraft records, in order that needed supplies would be on hand for technical order compliances and for components changes. Projected in advance, these parts were already on hand when the aircraft arrived at the REMCO. Projections were also made on aircraft engine consumption, so that enough built-up engines were always on hand.

Upon arrival at the REMCO from the forward base, aircraft were immediately given a shakedown inspection in an effort to find work that was needed but had not been included in the scheduled routine inspection. The inspector's work sheet was coordinated with production control while the aircraft was being cleaned on the wash rack. Production control then released a work order for the aircraft and made up instruction

*See pp. 169–72.

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slips for necessary shop work. All work on the aircraft was recorded against this work order number. Minor field maintenance and repair of minor battle damage was accomplished during the inspection. An aircraft requiring major repair of battle damage or excessive shop work, however, was transferred to the field maintenance section of the REMCO. As soon as the work order was released, another unit of production control—materiel control—started to position that aircraft's needed components at the assigned dock position, or along the production line, and to obtain the materials needed for such other special requirements as had been noted in the shake-down inspection. The whole effort at the REMCO was so designed that, as in any efficient production line, parts, components, and materials would arrive at the place and time that they would be needed by skilled technicians.[134]

For much the same reasoning as lay behind the centralization of maintenance activities, the Fifth Air Force centralized Air Force supply activities at the Miho, Itazuke, and Tsuiki REMCO establishments. In the winter of 1951–1952 the supply of parts and equipment for Thunderjets and Sabres became very critical. The major reason for this AOCP/ANFE situation could be attributed to USAF provisioning for new type aircraft under peacetime rather than wartime factors, but some instances were noted where Sabres were AOCP at one station for over a month when the needed items were in stock at an adjacent station. The major remedy for the problem area was the purchasing of war-level provisions for the new jets, but the Fifth Air Force also revamped its stock control and distribution system.[135] As a first step in this direction, it centralized base supply for F–84's at Itazuke and for F–86's at Kimpo, and as a safety precaution the latter stocks were transferred to Tsuiki in July 1952.[136] Each REMCO was subsequently assigned the responsibility for providing all aircraft spare parts and supplies peculiar to the aircraft it serviced. All such aircraft spares and supplies were taken from the base supply accounts and turned over to the REMCO base supply, which was charged with the responsibility for maintaining a 45-day stock level plus a pipeline requirement to the depot. To insure uninterrupted operations, however, it was necessary to have another level of supplies at the operating K-site. This responsibility was assigned to the organizational service stock, which maintained a 15-day stock level with a 10-day pipeline requirement for all items needed to support the particular aircraft assigned. Aircraft spares and items peculiar to the specific common stocks were obtained from the base supply of the base on which a unit was stationed. If an item causing an AOCP was not available in local stocks at the K-site, the service stock officer submitted a priority requisition to the REMCO base supply officer. If the item was not in stock at REMCO, a priority requisition was there submitted to the FEALOGFOR depot. The depot shipped the item to the REMCO base supply by priority transportation and it was there reshipped to the Korean base by priority transportation.[137]

Even as eventually perfected, the REMCO system possessed certain disadvantages. To some commanders the whole REMCO system was repugnant since it denied them control over their maintenance. The time lost in ferrying aircraft to and from the REMCO, especially when extended by bad weather, detracted from the combat availability of pilots and aircraft. Concentrations of maintenance and supply at three bases offered lucrative targets to enemy air attack. It would also appear that personnel assigned to REMCO duty had difficulty establishing any esprit de corps. A morale study of the 8th Wing REMCO noted that officers and airmen felt little pride when they stated: "I belong to REMCO, Detachment #1, 8th Fighter-Bomber Wing." Instead, a current thought in this detachment was: "How the hell did I get in this outfit?" This same study, issued in November 1952, called attention to the fact that the bulk of assigned REMCO personnel were young men fresh from technical schools who failed to understand the importance of their jobs: all they could see was an endless flow of aircraft needing repairs and maintenance, and if they hurried and completed one job another aircraft would be along to take its place. Bitter disputes between REMCO personnel, who served 11 to 12 months' tours in the theater, and JADF personnel, who served 30 months at the same base, contributed to ill will, but this difficulty was eventually resolved when REMCO people were placed on the same rotational status as other airmen based in Japan. The assignment of personnel from several organizations afforded each unit an opportunity to reassign untrained, incompetent, or

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undesirable personnel to the REMCO.[138] The 4th Fighter-Interceptor Wing noted a certain reluctance on the part of its tactical squadrons to contribute enough people to the REMCO. The squadrons in this wing complained that the concentration of experienced mechanics and specialists at the rear echelon deprived newly assigned men in the tactical units of the benefits of association with seasoned technicians.[139]

The system whereby aircraft supplies were controlled and stocked at the REMCO was not without its faults. Since the K-sites carried a slim level of supplies, good communications facilities for requisitioning and dependable air transportation for delivering critical shortages were prerequisite to a smoothly operating resupply system. Communications, however, were poor and handled priority supply matters with difficulty. Since approximately 95 percent of all aircraft support items consigned to organizations in Korea were shipped by air, Fifth Air Force supply was at the virtual mercy of events taking place in the 315th Air Division (Combat Cargo). Each time the 315th Air Division was assigned a theater priority task, or when a portion of its transport aircraft was grounded,* the closely figured Fifth Air Force supply system suffered. To an Air Materiel Command observer this state of affairs indicated a requirement for an air logistics airlift, probably assigned to FEALOGFOR, which would not have been subjected to withdrawal for other purposes.[140] Because of lags in communicating and transporting, the K-sites not infrequently had a slightly higher AOCP rate than did the REMCO stations. Held to a high operational rate in June 1953, and requiring three to four days to get AOCP requisitions from Tsuiki, the 8th Fighter-Bomber Wing had to resort to excessive cannibalization of aircraft parts at Suwon. In July 1953 the over-all Fifth Air Force AOCP rate rose from 2.9 percent in June to 3.69 percent, mainly because the grounding of all C–124 aircraft forced special requisitions to move by rail within Japan at the same time that local floods there hindered rail transportation.[141]

The advantages of the REMCO system of support to tactical operations nevertheless outweighed the disadvantages. Mobility of the forward "staging" bases was increased: had the combat wings been forced to move, they would have been burdened only by a 15-day level of spares and a limited amount of maintenance equipment. Although the REMCO establishments presented potentially lucrative targets, security was actually enhanced by the system because heavy equipment, base supply stocks, and aircraft undergoing work were at some distance from the active combat area in Korea. The mechanical condition of combat aircraft improved, at the same time that maintenance work was done more quickly, more thoroughly, and more consistently. Increased maintenance output, derived from more efficient working conditions and better supporting facilities, meant a greater number of potential flying hours per aircraft. Consolidation of the technicians supporting the same type aircraft allowed closer supervision of the supply of critical parts, and logistic support requirements in the forward areas were reduced. Finally, the rear area establishments made good use of mechanically qualified Japanese personnel. At the end of the Korean conflict FEAF logisticians nevertheless recognized that REMCO had succeeded in no small part because of locally applicable circumstances: "Under the combat conditions existing in Korea," FEAF reported, "the REMCO system of support of tactical operations resulted in a more effective method of maintaining combat aircraft." Whether it would prove applicable in other overseas theaters would depend upon the local situation which prevailed at such time and place as the REMCO concept might be utilized.[142]

Service Tests of a Reinforced Tactical Air Wing: As the culmination of post-World War II organizational planning, the USAF in June 1947 had published Air Force Regulation 20–15 which described the wing-base plan of unit organization. This wing-base plan, which was subsequently implemented throughout the Air Force, was designed to attain a standardization and stabilization of USAF organizations and to establish a centralized authority and a direct chain of command whereby one responsible wing commander would have supervision and control of the administration, logistical, and combat elements required by his mission. When the war began in Korea, the Fifth Air Force had been the first USAF command to test the new wing-base plan in combat, but for various reasons the Fifth Air Force never exactly followed the organizational dictates of AFR 20–15. Because it continued to have responsibili-

*See Chap. VII, pp. 296–97.

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ties in Japan, the Fifth Air Force initially chose to leave its regular table of organization wings at Japanese bases and to transfer the tactical group to Korea, where these combat groups were supported by table of distribution tactical support wings. Under the wing-base plan, the Fifth Air Force should have done just the opposite: it should have moved the table of organization wings to Korea and, to provide services in Japan, it should have organized table of distribution wings. On 1 December 1950, when it was obvious that the Korean fighting would continue somewhat longer than had been earlier anticipated, the Fifth Air Force corrected its earlier action by redesignating the tactical support wings in Korea as table of organization air wings, and it simultaneously organized table of distribution air base wings to operate the Japanese air bases.[143]

After December 1950 the Fifth Air Force made conscious efforts to follow AFR 20–15, but a variety of situational factors prevented its exact application in Korea. The wing-base plan, for example, contemplated that one wing would be located on one base, but available airfields in Korea were so scarce that two or more wings generally had to locate on one base, with somewhat diverse deployment and organizational patterns. The 4th Fighter-Interceptor and the 67th Tactical Reconnaissance Wings endeavored to set up operations at Kimpo more or less completely, on opposite sides of the runway. At Kunsan the 3d Bombardment Wing operated the base as a parent wing, and the 474th Fighter-Bomber Wing occupied a tenant status. In another variation, the 49th and 58th Fighter-Bomber Wings operated from the same side of the airstrip at Taegu, and the 49th Wing served as the parent at Taegu and the 58th as parent at the rear-echelon base utilized by both wings at Itazuke. All combat wings conducted most of their maintenance activities at rear area bases in southern Japan. By June 1952, Brig. Gen. E. K. Warburton, deputy commander of the Fifth Air Force, was able to state that the USAF wing-base plan had proven inadequate for tactical operations in Korea. The existing wing-base plan contained too much command structure for the tactical effort in the wing, and tables of organization were relatively inflexible, requiring an excessive amount of time to modify them to meet changing conditions. The tactical situation in Korea required that wings operate from two bases, one in the rear and one forward. One wing, however, did not have the capability for sustained operations from two bases without non-table of organization augmentation. It was possible almost to eliminate this requirement for special augmentation if the maintenance efforts of two wings with the same aircraft were consolidated at one rear base. Such a consolidation of F–84 maintenance was in progress at Itazuke, but most of the other rear maintenance detachments still retained their allegience to individual wings. Some simpler organization was required that would get the maximum utilization of available personnel and equipment and reduce the indirect support effort at the forward and exposed air bases. On 22 June, General Warburton proposed that the Fifth Air Force would service-test a reinforced wing plan. General Warburton proposed that wing headquarters and maintenance activities would be deployed to a rear base and that two augmented tactical groups, each accompanied by an especially formed air base support squadron, would be deployed at one or two forward Korean airfields.[144]

Much additional study and amendment followed the Warburton proposal, and the service tests of the reinforced tactical air wing would not begin before the late spring of 1953.[145] By this time, moreover, the course of events caused significant changes in the organization outlined in the Warburton plan. In January 1953 FEAF proposed to transfer the 49th Fighter-Bomber Wing, less the tactical group and two squadrons, from Taegu to the Japan Air Defense Force for station at Misawa.[146] The Fifth Air Force secured an abatement of this action so long as hostilities continued in Korea, but the 49th was nevertheless slated for transfer to the JADF at such time as it could be released in Korea. The Fifth Air Force was mindful of the projected transfer of the 49th Wing as it began to effect the organization of the reinforced wing at Taegu during March 1953. On 11 March it organized the 6156th, 6157th, and 6158th Air Base Squadrons, which were assigned respectively to the 58th Group, the 49th Group, and the 58th Maintenance and Supply Group. That same day the 58th M&S Group was moved with the 6158th Squadron from Taegu to the rear echelon station at Itazuke. On 15 March the 58th Fighter-Bomber Wing (Reinforced) took command at Taegu. After remaining on standby

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status for 15 days, the 49th Fighter-Bomber Wing and the 7th and 8th Squadrons were reassigned to Kunsan (K–8) vice the 474th Fighter-Bomber Wing, the 474th Fighter-Bomber Group, and the 428th, 429th, and 430th Fighter-Bomber Squadrons. Most of these transfers were paper transactions, in which existing units traded designations, but the 430th Squadron was physically moved from K–8 to K–2, this on 16 April 1953. The other paper transfers were announced effective 1 April 1953, at which time the 49th Wing was reassigned to the JADF with continued station at Kunsan. The 474th Wing and its units were reassigned to the Fifth Air Force.[147]

As established at Taegu, the 58th Fighter-Bomber Wing (Reinforced) comprised the 58th and 474th Fighter-Bomber Groups, each with three squadrons of F–84 aircraft, the 58th M&S Group, and the 6156th, 6157th, and 6158th Air Base Squadrons. All other table of organization units were put on a standby status, but later the 58th Medical Group was made active to operate the base dispensary at K–2. Since the location of the wing headquarters and two tactical groups was not in accordance with General Warburton's original plan, it was necessary to decide how the two air base squadrons which supported the two tactical groups would be employed. For the sake of maintaining some semblance of mobility, the two air base squadrons remained attached to the two tactical groups, but it was nevertheless decided that the two air base squadrons should divide the air base functions: thus one squadron performed all food service, air installations, and air police activities at Taegu while the other performed all motor vehicle, supply, and communications functions. This reinforced wing organization represented savings of personnel spaces: instead of the 4,650 officers and airmen required by two separate tactical air wings, the reinforced wing was manned by 3,754 officers and airmen. Although hostilities continued only during the first four months of the test, this was enough time to indicate that the reinforced wing possessed operational advantages: whereas the two separate wings at Taegu had flown 1,986 effective combat sorties in February, the reinforced wing flew 2,165 in March 1953.[148] In the three months of April, May, and June 1953 the reinforced 58th Wing flew 10,442 effective sorties, and indicated its maximum capability when it twice mounted over 400 effective sorties on 15 and 16 June 1953.[149] This phase of the service test thus indicated that a greater amount of aerial firepower could be delivered by a single tactical air wing, reinforced to have two tactical groups, than by two wings which each had one tactical group.

The mobility of the 58th Fighter-Bomber Wing (Reinforced) was never tested in combat, but there was ample evidence that the movement of one of the combat groups and its attached air base squadron to a separate airfield would not have been feasible. The existing division of base functions between the two air base squadrons at Taegu made for nonhomogenous units, which could not support a tactical group at an advanced air base, and which when operating at Taegu, fractionated any unified command of base functions there. On 20 October 1953 the 58th Wing therefore abandoned the idea of mobility and deactivated the 6156th and 6157th Air Base Squadrons, whose personnel and equipment were used to form the 58th Air Base Group, comprising the 474th Supply Squadron, the 58th Motor Vehicle Squadron, 58th Installations Squadron, 58th Food Service Squadron, 58th Air Police Squadron, and 6156th Operations Squadron. The 58th Air Base Group was directly assigned to the 58th Wing, and the 58th and 474th Fighter-Bomber Groups were relieved of responsibility for their own housekeeping. As reorganized, the 58thWing now required 3,834 personnel spaces and still represented personnel savings from the totals required by two separate wings. Sacrifices were also made of organizational test principles at Itazuke: the capability of the 58th M&S Group to accomplish its mission as a self-sufficient wing element at a separate base was not fully tested since the JADF's 6160th Air Base Wing remained responsible for much housekeeping support there, and most personnel of the undermanned 6158th Air Base Squadron was assigned for duty with functional elements of the 6160th Wing.[150]

After the reorganization of October 1953 the service test of the 58th Wing (Reinforced) was continued to a final reporting date of 11 March 1954, and, in this period, the test evidenced a more efficient and economical utilization of USAF resources and developed more tactical effect than two wings located on the same base. The major result of the testing was to devise an organization which would satisfy the problem of operating two wings

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on the same base, but in the course of the testing certain subsidiary conclusions were noted. With relatively small augmentations to the wing staff, the command structure of a tactical wing was proven adequate to direct and control the base support activities of a forward base, the combat effort of two tactical groups operating from that base, and the requisite maintenance and supply support located at a rear area base. When one tactical wing operated two assigned tactical groups from the same forward area base, it effected economies in the utilization of air resources and gained operational efficiency. The optimum deployment was to locate both tactical groups on the same side of the airstrip: such a deployment admittedly increased the vulnerability of the base, especially to atomic attack, but with twice as many aircraft the wing commander had augmented defense forces at his disposal. Exposure to enemy attack, moreover, was inherent in tactical air employment. The assignment of an air base squadron to a tactical group permitted the group commander to do his own housekeeping but it impeded him in the exercise of his primary tactical missions. When two tactical groups, each with an integral air base squadron, operated from the same side of an airstrip at a forward area base, there was a split control of base support functions which resulted in confusion, dissension, delayed actions, and waste. Experiences in Korea had shown that medical elements should be assigned as needed: in Korea, a hospital group was required at a forward area base, and this was especially true at a reinforced wing base. These were conclusions incidental to the service test. The major conclusion was that the 58th Fighter-Bomber Wing (Reinforced) had demonstrated efficiencies in management and in combat. On 11 March 1954, when he recommended discontinuation of further service tests, Col. Arthur C. Agan, Jr., commander of the 58th Wing, urgently requested that the reinforced wing be continued and preserved. "The present organization of the 58th Fighter-Bomber Wing (Reinforced)," he said, "is an eminently superior one for the employment of tactical air in a theater of operations." [151]

CONSTRUCTION OF AIR FACILITIES IN KOREA

Of all the requisites to the conduct of tactical air operations during the first two years of the Korean war, the construction and maintenance of air facilities had been most deficient. The lack of adequate facilities in Korea during the first two years of the Korean war had had a serious impact upon every phase of air operations. When they were required to fly from crude flight surfaces, the combat groups had been unable to carry the maximum ordnance loads which their aircraft were capable of lifting from adequate runways. Take-offs and landings from rough surfaces damaged and wore out combat aircraft, thereby posing an inordinate maintenance, supply, and replacement load upon the combat wings and the tactical air force.

The deficiency of air facilities in Korea sprang directly from a weakness of the engineer aviation capability, a matter over which USAF had slight control since such units were SCARWAF (special category Army personnel with Air Force) and were trained, manned, and equipped by the Department of Army. Because of notable failures of engineer aviation effort in the early months in Korea, USAF had established an Engineer Aviation Force under its Continental Air Command on 10 April 1951. This force provided centralized direction for the operational training of aviation engineer units, and its work bore good fruits in the spring of 1952, but the matter of integrating engineer aviation troops into the USAF hung fire through the Korean hostilities.

In the first 12 months of the Korean hostilities, FEAF had concentrated every engineer aviation unit it possessed in Korea: two engineer aviation groups—the 930th and 931st—and five engineer aviation battalions—the 822d, 811th, 802d, 808th, and 839th—and one engineer aviation maintenance company—the 919th. By stripping other ZI units of critical equipment and getting limited amounts of equipment from current production, the Engineer Aviation Force had sent the 809th Engineer Aviation Battalion and 622d Engineer Aviation Maintenance Company to Korea in September 1951 while the 1903d Engineer Aviation Battalion followed in November 1951. In May and June the last of the principal units to be committed to Korea arrived: the 417th Engineer Aviation Brigade, the 934th Engineer Aviation Group, and the 366th, 840th, and 841st Engineer

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Aviation Battalions. The 733d Engineer Aviation Supply Point Company arrived for assignment to the 417th Brigade on 9 March 1953. Not until June 1952—two years after the initiation of Korean hostilities—did the Fifth Air Force possess the engineer aviation capability which it required in Korea.

Arrival of the 417th Engineer Aviation Brigade for attachment to the Fifth Air Force on 17 May 1952 represented the filling of a long-standing need for some agency which could adequately supervise the construction of air facilities in the combat zone. In ordering, directing, requesting, and specifying requirements for construction, the Fifth Air Force through its Director of Installations represented USAF as the owner of the facilities. The engineer aviation brigade, acting in a parallel position of an architect-engineer firm, was responsible for checking all preliminary data, performing additional ground reconnaissance, preparing detailed plans and specifications, and issuing construction directives to the engineer aviation units. All plans and specifications prepared by the brigade were reviewed and approved by the Director of Installations before their issuance. The engineer aviation groups under the brigade acted in a parallel manner to civilian construction corporations, calculating quantities, preparing construction schedules, performing field and office engineering, staking out lines and grades, and maintaining a continuous inspection of all construction work being performed under their direction. Finally, the engineer aviation battalions performed field and office engineering as required in their duty of constructing directed projects.[152] The 417th Brigade made a subdivision of effort among the three groups as follows in the last year of the war: the 930th Group was responsible for new construction or maintenance operations at K-1, K-2, K-3*, K-4*, K-5*, K-6, K-8, K-9, and K-37 airfields; the 931st had equivalent duties at K-13, K-14, K-16, K-18*, K-46*, K-47, and K-53 airfields; while the 934th remained continuously responsible for building the new air base at Osanni (K-55).[153] Engineer aviation battalions were shifted between groups as necessitated by the workload.

During the first year in Korea a lack of engineer aviation effort had permitted the Fifth Air Force to do no more than give rudimentary rehabilitation to old Japanese airfields, these improvements amounting in most cases to a resurfacing of existing flight surfaces with pierced steel plank (PSP), often with no consideration at all to the subgrade conditions. At best, the building of air facilities had been peculiarly difficult since the predominantly hilly to mountainous terrain is cut frequently by numerous braided streams which, narrow in the uplands, broaden to coastal flats only on the south and west coasts. Stream valleys and other reasonably flat terrain have been terraced and irrigated during centuries of rice culture, resulting in a high water table which makes subsurface drainage a major engineering problem. Thus available engineer capability could do no more than prepare and maintain minimum air facilities with a life expectancy of no more than six months. Not until April 1951 was the engineer capability great enough to expand construction programs and begin to build facilities designed to last as much as two years. On 28 June 1952 the first adequate flight surface to be completed in Korea, a 9,000-foot concrete runway at Taegu (K-2), was opened to all aircraft.

In June 1952 air facilities in Korea were thus still gravely deficient, and most of the existing flight surfaces were of such a polygenous composition, representing old Japanese surfaces as patched up and extended by various temporary expedients, that constant heavy maintenance was required. According to USAF concept engineer aviation battalions should be employed in new and heavy construction, which when completed is turned over for ordinary base maintenance to an air installations squadron integral to a tactical wing. Such, however, was seldom possible in Korea where more often than not battalions had to work continuously in maintaining and expanding the same airfield.[154] In the year following June 1952 and the completion of the buildup of aviation engineer forces in Korea, the Fifth Air Force nevertheless made substantial progress at its principal Korean airfields (*see* figure 16).

In the Seoul airfield complex were Kimpo (K-14), the Seoul municipal airfield (K-16), and Suwon airfield (K-13). As a result of remedial action begun earlier, a project of the 802d Battalion whereby Suwon's 9,068-foot runway was resurfaced with hot-mix asphalt was completed in June 1952.[155] Kimpo (K-14) had been the only pass-

*These airfields were dropped from 417th Brigade responsibility in 1953, many of them being put in standby status.

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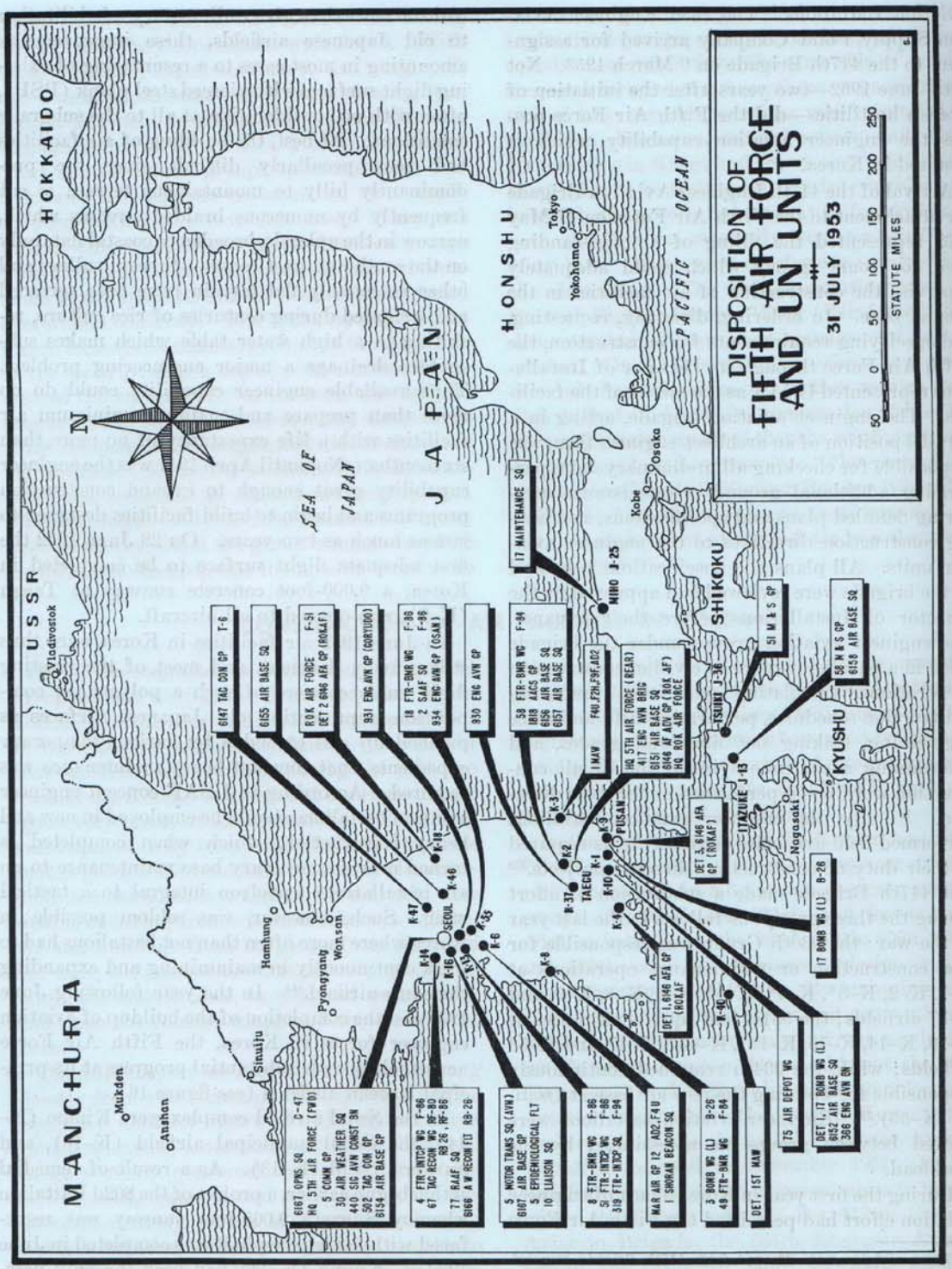

Figure 16.

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ably modern airfield in Korea when the war began, but two years of hard usage, combined with periods of Communist captivity and consequent UNC bombings, had left it in shambles. Only the longer of an original two runways survived, and its surface was so broken up and patched that at last it had to be completely resurfaced: beginning early in August and completing the task on 8 September 1952, the 811th Battalion resurfaced the old Kimpo runway with a 4-inch layer of hot-mix asphalt, working on half of the width of the strip at a time so that it was never closed to combat flying. So close was the tactical operation to the engineer work that aircraft wingtips sometimes clipped warning flags on construction equipment, but there were no accidents.[156] Although scant extension of the 6,000-foot runway was possible, directives were issued in early 1953 requiring construction of an 1,000-foot hot-mix extension at the northwestern extremity and the addition of 600-foot cement concrete overruns at each end of the runway. Although earthwork was complete in June 1953, these extensions would not be surfaced before the end of hostilities.[157] The Seoul municipal airfield (K–16) was located on the Han River flood plain just across from Seoul; here an original grass strip had been resurfaced with PSP and in the spring of 1952 the field was heaviest used by transports of the 315th Air Division (Combat Cargo). Between 29 July and 2 August Han River floods put the field out of operation. Already decision had been made to resurface the K–16 runway with asphaltic concrete with a design capability for supporting C–124 type aircraft. The 811th Battalion therefore first converted an existing taxiway into a temporary runway and then rebuilt and resurfaced the main strip with hot-mix asphalt, extending it in length from 4,500 to 5,650 feet in the process. This project was completed on 27 October 1952.[158]

In the mountains of east-central Korea the Fifth Air Force utilized Kangnung (K–18), Hoengsong (K–46), and Chunchon (K–47) airfields. Like other small fields in central Korea these had been originally scraped out as advanced fields where transports delivered supplies to Eighth Army in the spring of 1951. Kangnung (K–18) now served the ROKAF with its F–51 Mustangs. Its 5,600-foot PSP surface required a welding project handled by elements of the 811th Battalion in July 1952, and in October 1952 an augmented company from the 809th Battalion rehabilitated the runway and taxiway, filling in weak spots in the base course, applying a dust palliative of rice bags sprayed with MC–3 asphalt, and replacing the PSP.[159] When the 6147th Tactical Control Group (Mosquito) moved up to Chunchon (K–47) airfield in the spring of 1952 its T–6 aircraft required some additional facilities. Although work was greatly hampered by 12 inches of rain in July 1952, the 809th Battalion completed rehabilitation of the 4,190-foot landing strip on 16 July 1952 and had a taxi strip ready on 17 August. These facilities were first surfaced with a tack coat of MC–3, upon which small stones or "fines" were spread and rolled, and then they were covered with PSP, the whole project being completed on 6 December 1952. The result was a satisfactory facility for T–6 aircraft, although it was recorded that the PSP became somewhat slick in wet weather.[160] Hoengsong (K–46) airfield was the advanced operating base of the 18th Fighter-Bomber Wing's Mustangs, and as such served the whole 18th Group during the latter half of 1952. After heavy rains and floods in July and August 1952, the original asphaltic surfacing displayed both cracks and base failures. In August 1952 the 809th Battalion had to move in and commence patching up the 4,800-foot runway at this "diminutive field," and this maintenance was completed on 26 November 1952 when the final seal coat was put on the runway. Early in 1953 Chunchon was placed in the hands of the 6155th Air Base Squadron which served as a caretaker after the departure of the 18th Group.[161]

On the south and southwest coasts of Korea were Pusan (K–1) airfield, Pusan East (K–9) airfield, and Kunsan (K–8) airfield. During 1951 Pusan (K–1) had been occupied by elements of the 1st Marine Air Wing, and when these Marine units moved to Pyongtaek (K–6) in the spring of 1952, the Fifth Air Force needed to keep K–1 for dispersal purposes in the event of increased hostilities. The principal project was to rehabilitate the old Japanese runway which had been hurriedly resurfaced with PSP in the spring of 1951. Removal of the PSP and renovation of the base course was handled by the 1903d Battalion, after which the 366th Battalion completed an asphaltic concrete paving job on the 7,000-foot runway on 27 September 1952. By this time another project of the same battalion was nearing completion in the rehabilitation of existing buildings, facilities, and utilities.[162] No sooner was this work at K–1

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completed than the facility was needed, because at Pusan East (K–9) the original PSP surfacing, laid on an old Japanese airfield in the late summer of 1950, was badly deteriorated. The 17th Bombardment Wing moved its flight operations to K–1 on 30 September, and two weeks later the 366th Battalion began laying a 6,015-foot hot-mix asphalt runway and a 100 x 3,000-foot parking apron at K–9. The new runway was opened to traffic on 21 December 1952, and on the next day the 17th Wing returned to K–9. After approximately 30 days of operations, however, the runway surfacing at Pusan East began deteriorating so badly that it had to be closed several hours daily for patching. Close to 75 percent of the runway was eventually patched, so that in June 1953 it was necessary to lay a new 3-inch cover of asphalt over the entire runway. Although delayed by periods of rain and all-out light bomber operations, this task was nearing completion on 30 June.[163] At Kunsan (K–8) airfield arrival of the 474th Fighter-Bomber Wing from Japan necessitated construction in July 1952 of some 42 new hardstands by the 808th Battalion. A construction directive was also issued for a 9,000-foot cement concrete runway, but the work could not be undertaken for over a year because of a shortage of earth-moving and rock-crushing equipment. Finally, in September 1953, the 808th Battalion got to work and the new runway was opened in December 1953.[164]

Movement of Marine Air Group 12 to Pyongtaek (K–6) airfield in the spring of 1952 necessitated construction at this old Japanese airfield since the 4.950-foot PSP strip which had been serving T–6 Mosquitoes was insufficient for Marine aircraft. The 1903d Battalion was directed to build an 8,000 x 150-foot cement concrete runway, with 500-foot overruns, together with a parallel taxiway and aprons. In the course of this effort five villages had to be relocated and paddy soil up to 15 feet deep in places either stabilized or replaced. Sufficient grading had been completed to permit the beginning of cement work on 31 October 1952, and at the end of December approximately 5,500 feet of the runway had been completed under cold weather precautions for batching and curing the cement. Since Kunsan (K–8) was crowded and F3D jets equipping VMF–513 seriously deteriorated the asphalt paving there, this all-weather Marine fighter squadron was moved to the new concrete facilities at Pyongtaek effective on 2 June 1953. At the end of June 1953 the new runway and taxiway at Pyongtaek were 94 percent complete, and an expected completion date of 15 August was posted for the accomplishment of the whole project, including appurtenances such as bomb dumps and interior roads.[165]

During the Korean war only one major air base was built from the ground up, the other major bases representing rehabilitation and expansion of old Japanese facilities. The entirely new project was accomplished at Osan-ni (K–55) in the valley of the Chinwi-chon (river), about 40 miles south of Seoul. Here, in an agricultural region dotted with farm dwellings and small villages (four of which would have to be relocated), the Fifth Air Force directed construction of a two fighter wing base.[166] In December 1951 the 839th Battalion had begun building access roads, and at the arrival of the new engineer aviation units the 934th Group was placed in charge, with the 839th, 840th, and 841st Battalions assigned for duty, the last of them getting into place around 1 July 1952. Unlike any other base in Korea Osan-ni was to be built from a master plan to include: a 9,000 x 150-foot cement concrete runway with two 1,000 x 300-foot graded earth overruns eventually to be treated; a 9,000 x 75-foot concrete parallel taxiway; two 700 x 255-foot parking aprons; four diamond-shaped dispersal areas each with 20 hardstands; three 500 x 250-foot maintenance aprons; a warehouse area; a railroad line with two spurs; POL facilities for two jet wings; a road net; a surface drainage and dike system; two wing cantonments; and utilities to include sewage disposal, water supply, and electrical distribution.[167]

The site at Osan-ni consisted of paddy land with underlying clay and silt saturated to a depth of at least 15 feet, the original surface being incapable of supporting heavy construction equipment. Since the site was quite level, drainage was difficult, but between December 1951 and March 1952 Korean contractors used hand labor to ditch and build flood dikes. On 28 July 1952, however, the Chinwi-chon flooded and backed up water to the runway grade, necessitating suspension of earthwork while new ditching and flood-gates were built. Construction of the runway and taxiway was assigned to the 839th and 840th Battalions, which had hardly gotten earthmoving under way before heavy rains required the evacuation of

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equipment to high ground. Work was recommenced on 4 August, but excessive rains and much deadlined equipment slowed its progress. All three battalions were now given various assignments on the runway and taxiway, each supporting the other with whatever equipment and operators they had available. The lack of spares, inexperience of operators, great amounts of precipitation, and the unstable subgrade made Osan-ni an unusually difficult project, but the battalions displayed high morale and an unbeatable willingness to cooperate. Paving started on 10 August 1952, work which progressed at one end of the runway while earth compaction went on out ahead of the pavers, and on 9 October the last cement was poured on the runway. After a slight delay for earthwork, paving of "C" and "D" dispersal diamonds began on 8 November, with work continuing against a deadline of 26 December when the 18th Wing was due to arrive. Cold weather required that batching water be heated and that calcium chloride be added to hasten the initial set, and after an area was paved it had to be draped with tenting and heated for the first 48 to 72 hours of curing. Under these emergency conditions the first two dispersal diamonds were completed on 24 December 1952. Two days later, on 26 December, Osan-ni (K–55) was officially occupied by the 18th Fighter-Bomber Wing, and in January 1953 the wing began transition to its new F–86F fighter-bombers.[168]

Continued construction at Osan-ni was seriously impeded by extremely cold weather during January 1953, but late in the latter month early spring thaws softened road surfaces, which were churned into mud by vehicles and construction equipment. Weather conditions in March and April were very favorable, permitting completion of a good share of the work on service aprons and "A" and "B" dispersal diamonds before rain at the end of June again curtailed construction. Housing and other base facilities progressed rapidly in May and June, although certain electrical and plumbing material shortages held up housing projects. Where possible quonsets were substituted for tropical shell buildings, the latter being in short supply.[169] Although much work remained to be done, Osan-ni (K–55) airfield was progressing toward completion at the end of Korean hostilities.

Looking toward the eventuality of moving to a more secure area outside Seoul where its entire headquarters could be concentrated, the Fifth Air Force in February 1953 directed rehabilitation of a former Japanese army compound at Yong-san, an installation which had been rather severely damaged by shellfire and ground fighting. The 840th Battalion, augmented by one company of the 809th, took charge of this rehabilitation effort, letting much of the masonry and roofing work to Korean contractors. At the end of June 1953 most of the building repairs were nearing completion, and an estimated completion date for the entire Yong-san project was set for 30 September 1953.[170]

Although in the course of Korean hostilities flight safety was increased by the addition of length and overruns at the Korean airfields, jet aircraft continued to be lost when they overshot runways in landings and had difficulties in take-offs. Of 29 such accidents between 1 October 1951 and 31 August 1952, 14 were due to an inability to check the landing roll and 15 by failure to become airborne. The solution of this problem appeared to be some sort of an arresting barrier on the overruns, similar to those used on aircraft carriers. FEAF officers therefore visited the aircraft carrier *Princeton* in September 1952, noting that a version of the Davis barrier would probably be most suitable to their purposes. On 25 September 1952 FEALOGFOR was accordingly directed to devise such a barrier for service testing, and the pilot model was tested at Johnson Air Base on 6 and 7 February 1953. After its representatives viewed these successful tests, the Fifth Air Force directed that barriers be set up at K–2, K–13, K–14, and K–55. As built, these crash barriers comprised retractable stanchions which held the barrier in place, while heavy anchor chains (each link weighing 67 pounds) laid along the ground alongside the runway to provide the decelerating inertia when an aircraft struck the barrier. Such barriers were first installed near the ends of the short Kimpo runway and they successfully engaged two runaway RF–80's on 25 April 1953. In late April and early May similar barriers were built at the other fields. Study of costs versus results soon indicated the value of these installations: as built at Taegu (K–2) the two barriers cost together $17,364 and in the first two weeks of their existence they saved three $200,000 F–84 aircraft. On 16 May a bombed-up F–84 had a flat tire on take-off, hit the barrier at about 140 m. p. h., and was stopped with negligible

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damage. By December 1953 the barriers had been used 36 times by planes which had struck them at speeds of from 10 to 165 m. p. h.; 8 planes received no damage, 21 minor damages, and 7 major damages; one pilot was seriously injured and one received minor injuries. FEAF subsequently recommended that USAF install such barriers at its world-wide fighter bases.[171]

The flight surfaces at these Korean airfields were the critical facilities, dictating the combat load which could be carried by each airplane and having much effect upon aircraft maintenance, but they were only a part of the installations necessary to an operational air base. Since a jet fighter wing in combat operations consumed as much as 125,000 gallons of fuel daily and it was desirable to maintain a 5-day supply level on base, petroleum, oil, and lubricants (POL) facilities were a major consideration in Korea. The distribution of aircraft fuel from port to airfield was managed in the Seoul area by a pipeline from a terminal at Inchon, installed and operated by the Eighth Army's 82d Engineer Petroleum Company. While this pipeline was the most efficient conveyor of fuel in Korea, consumption at K–13 and K–14 not infrequently exceeded the supply, the controlling difficulty apparently being a shortage of terminal storage facilities at Inchon.[172] Coastal airfields, including K–8, K–10, K–1, K–9, and K–18, depended upon water shipments for their fuel and their levels became critically low at times when tankers were delayed by mechanical failure or stormy weather. Inland airfields, including the major two wing base at Taegu (K–2) were served by rail shipments of POL; here it was found that it was impossible to maintain a maximum effort in excess of three days with the amount of railway tank-car support available.[173]

POL storage facilities at terminals and at airfields were provided by 10,000-barrel bolted or 40,000-barrel welded tanks, the former proving acceptable for airfield use but too small for terminals. These tanks and POL equipment generally were in short supply, usually had to be back-ordered to the ZI, and often arrived incomplete or in nonstandard designs: during three years of hostilities, FEAF stated that the depots never received sufficient POL construction materials needed to meet all requirements.[174]

Dispensing facilities for POL on the Korean airfields were greatly varied, for the most part comprising mobile refueling equipment but including two experimental portable hydrant systems. As received in Korea these hydrant systems were expensive and complicated: they cost $250,000 per squadron set as delivered and were composed of a large combination of bolted tanks, unitized pumps and filters, and aluminum pipe sections. Once installed semipermanently above ground, the system was not highly mobile. Base commanders at both K–13 and K–14 raised serious objections to the installation of such systems at their bases, alleging that they had no requirements (existing truck-trailers already could refuel aircraft faster than ordnance and oxygen could be serviced), that the systems were fire hazards and highly vulnerable to accidental damage, that adequate manning was not provided, and other such similar reasons.[175] For purposes of service test, however, one of these systems was ordered installed at Taegu.[176] As the 822d Engineer Aviation Battalion began installing the system in September 1952 it was greatly handicapped by a lack of trained POL personnel, and aluminum pipes were often found to have been dented at their ends in transit (a simple wooden plug would have prevented these shipping damages). When the system was first checked on 1 November it leaked so badly, principally at joints where aluminum pipes met cast iron fittings, that it had to be torn down and reassembled. Difficulty was next met when water drain valves froze and cracked, but the first system was turned over to the 49th Wing Air Installations Officer (AIO) on 24 December 1952.[177]

Actual operations of the hydrant refueling system began at Taegu with a test run on 12 January 1953: with a hydrant and hose cart at each parking slot, an attendant had only to plug in the hose and turn on the fuel and could thus replenish a jet fighter in approximately 8 minutes from the time it was parked. Some difficulty was nevertheless met in clearing the hydrant system of water used in testing the lines, culminating on 30 January when the automatic water drain mechanisms froze, segregators did not function, and water was pumped into aircraft, forcing the 49th Wing to stand-down for two days. After this, the 49th Wing used its system for flight-line refueling of tank trailers, whose strainers and separators could be expected to operate effectively. By March 1953, however, the system was judged to be "proving highly successful" with the exception that rubber

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hosing was deteriorating in less than 40 hours usage and would have to be replaced with neoprene hose with a metal core which could sustain considerable pressure.[178] Final FEAF thoughts on the subject of the hydrant refueling systems were that they could quickly compensate for their high initial costs by savings in personnel and mobile refueling equipment; they were relatively safe and speedy in operation; lines and segregators, however, were subject to freezing. Fundamentally the system was not portable once it was installed, and FEAF recommended that the hydrant systems, as then designed, be installed and used only at semipermanent air bases.[179]

For troop housing and shelter in Korea the Fifth Air Force utilized several different types of construction: tents, indigenous-contract built buildings, tropical-shell prefabs, and quonsets. The locally constructed buildings erected by indigenous labor contracts were generally 20 x 48-foot theater of operations structures with stucco or plaster sidings, roofed with corrugated steel or tar paper. These buildings were cheap and quick to build but they had a short life expectancy and required much maintenance. Large numbers of tropical-shell buildings were prefabricated in Japan: the basic building kit comprised a wooden frame, with corrugated iron or wooden sidings, and a corrugated iron roof. These prefabs could be erected in various configurations and could be winterized with a kit which contained insulation and plywood. These tropical-shell buildings were successfully used as barracks, mess halls, administration buildings, shops, and latrines, but, designed for a two-year life expectancy, they required considerable maintenance. The 934th Engineer Aviation Group noted that the lumber used in them was of such inferior quality that it was "a well-known fact that in erecting a block of tropical shells the first buildings to be constructed are in dire need of repair on completion of the last building on the same block." Quonsets, or steel prefabs, were extensively used in Korea; with a life expectancy of five years, these buildings required less maintenance than tropical shells but permitted of the same uses.[180] In the last year of the war, the Fifth Air Force found in storage at Okinawa, Guam, Clark Field, and Tachikawa a number of Butler hangars, and although their canvas was somewhat deteriorated one or more of them were erected at Taegu, Kunsan, Suwon, Kimpo, and Osan-ni.[181]

Providing utilities at the Korean airfields was a matter much vexed by insufficiency of local resources and a wide variety of equipment used to make up these deficiencies. Sources of commercial electrical power in South Korea were limited and not dependable, requiring all bases to have standby facilities and K-55 to generate all its power. Average power consumption at most Korean airfields was from 300–500 kilovolt-amperes (KVA), more than could be readily furnished in a theater of operations. Generators were supplied in a variety of types and models, and this lack of standardization required a large and varied stock of replacement parts.[182] The average air base area also demanded approximately 300,000 gallons of water each day, and again the major problem was the wide variety of pumps furnished by engineer procurement. At Kimpo water problems were always acute since, in addition to normal base consumption, the photo laboratories of the 67th Tactical Reconnaissance Wing pushed the average daily water requirement up to 500,000 gallons a day, the 67th Reconnaissance Technical Squadron alone, when working at top capacity, requiring 128,000 gallons a day. For its water Kimpo depended on the Noryong-Jim Pumping Station on the Han River, whose ancient pumps had been installed as early as 1926. Periodic breakdowns lowered water pressure and hampered photographic development, and only a partial solution was had when special storage tanks were erected to permit the 67th Wing an emergency supply. This solution proved practicable during the Korean hostilities, but it represented a calculated risk, a fact demonstrated in August 1953 when the Noryong-Jim station was flooded and put completely out of operation. During a period in August before repairs could be made water was brought to Kimpo by truck and was available only for drinking, cooking, and sanitary purposes.[183]

That the problem of SCARWAF aviation engineer personnel was so acute in the first two years of the Korean war as to severely limit the air mission has been seen,* and again in the last year of the war unit effectiveness was still considerably reduced by the shortage of adequately qualified engineer aviation personnel. The year tour of

*AHS-71, pp. 4, 18; AHS-72, pp. 89–98.

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duty in Korea necessitated a constant flow of replacement personnel, but this flow was never maintained at an adequate or uniform rate, nor were the replacements adequately trained prior to their departure for overseas duty. "This deficiency," noted the commander of the 417th Brigade, "was the major deterrent to satisfactory operations within the Engineer Aviation units." [184]

In the latter half of 1952 engineer aviation personnel losses ran greater than replacement gains until the end of December when the 417th Brigade received an influx of basic trainees with very limited experience, less than 2 percent being in the first three enlisted grades. Thus on 28 December 1952 the 417th Brigade was at 111 percent of authorized strength but had only 75 percent of its officer strength and only 36 percent of its authorized noncommissioned officer strength. The high proportion of basic soldiers (between 1 July and 31 December 1952, 86 percent of replacements were privates) and the lack of qualified noncoms made effective control and utilization of engineer aviation personnel very difficult. Within officer ranks there was a parallel lack of experience: as of 31 December a total of 293 lieutenants were assigned, representing 65 percent of the total proportion of officers assigned. Received as officer replacements in December were 110 second lieutenants, the majority being recent school graduates with no practical experience.[185]

A slight remedial action was authorized by USAF on 21 November 1952 when FEAF was permitted to assign an absolute minimum of USAF air installations officers to engineer aviation units, especially to the maintenance companies which lacked the trained personnel they needed to keep machines operating. When the situation did not improve through Army resources, USAF on 11 February 1953 allotted 65 of its officers to fill the shortages, 48 of them arriving in the theater on 28 February.[186] In February USAF also allotted 623 airmen in the construction career field, the first increment of these men coming through the personnel pipeline to the 919th Engineer Aviation Maintenance Company in April. "Generally, these airmen had received excellent training," stated the 417th Brigade, "and . . . they performed well on engineer equipment." [187] In response to a Fifth Air Force appeal for more experience in the form of one colonel, three lieutenant colonels, 30 majors, and 93 captains, USAF successfully obtained from the Corps of Engineers two lieutenant colonels, three majors, 10 captains, and 10 warrant officers for shipment on 27 April 1953.[188] These emergency actions alleviated but by no means assuaged engineer aviation personnel problems: as of 28 June 1953 the 417th Brigade was at 96 percent of authorized strength and had momentarily 94 percent of its authorized officer strength, but company commanders were generally second lieutenants instead of authorized captains. The noncom strength in the first three grades was only 29 percent of that authorized, and this was by far the most seriously felt personnel shortage. Most enlisted replacements received in the first half of 1953 had possessed limited skills and very limited experience.[189]

As a consequence of these engineer aviation personnel difficulties the 417th Brigade had no choice but strongly to emphasize training. Continuous on-the-job training programs were conducted for vehicle and equipment operators, mechanics, surveyors, and other such skilled jobs, and wherever possible understudies were designated for platoon and section leaders. As soon as the men became familiar with fundamentals and the routine of their job assignments, and became a safe risk where safety hazards were involved, they were placed on their own further to qualify themselves on job assignments. Several specialized training courses of short duration were established to supplement on-the-job training (OJT). An engineer equipment mechanic (1319) course was established at the 622d Engineer Aviation Maintenance Company, while the 919th conducted diesel repairman (3013) and engine parts supply (1583) courses. The 822d Battalion ran a tractor scraper operator (3359) and a grader operator (3359) course. Every possible source of qualified personnel was tapped for training in these courses, until in June 1953 units were having difficulty filling their quotas, even though such training was sorely needed. These training activities assured units of having at least partially qualified personnel in most key positions, but the short tour in Korea after time in the pipeline was subtracted, the time consumed in placement and determining capabilities, the time required for training, and excessive wear and tear on scarce equipment almost precluded a justification for training engineer avia-

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tion personnel in the theater. By the time the new replacements were becoming skilled and proficient they were due for rotation.[190]

Deficiencies in engineer aviation personnel skills were particularly noticeable in the operation and maintenance of heavy and costly equipment; thus local equipment and spare parts requirements in Korea ran far in excess of normal at the same time that the supply of engineer equipment and supplies was generally less than an acceptable normal. In the early part of the Korean war engineer equipment difficulties sprang from the large amount of World War II equipment still in units; beginning in early 1952 modern items were dispatched to Korea directly from ZI production lines; the net result was that neither category of equipment was adequately supplied with replacement parts and there were many models of equivalent items in use.* Compounding these supply difficulties was rough handling by untrained operators and lack of proper periodic maintenance by semiskilled mechanics, all of which added up to abnormally high deadline rates. Issuance of nonstandard items of equipment greatly complicated both maintenance and supply. Each make required different maintenance procedures and tools, maintenance manuals, and stock lists. While the supplies required to repair equipment of a single manufacture were large in themselves, the stocking problem was multiplied to impossible proportions when several different makes and models of equivalent equipment had to be supported.

Supply procedures on engineer items, even in the spring of 1953, were slow: emergency requisitions, reported the 417th Brigade, could secure delivery normally within 3 days provided items were available in the theater, but normally requisitioned delivery of items in theater stocks required from 30 to 40 days and the time stretched out to 160 to 180 days if the items had to be backordered to the ZI. Considerable administrative difficulty was met in coordinating Air Force and Army procedures. In the ZI, SCARWAF units normally utilized Air Force supply procedures and stock numbers in requisitioning Engineer or Ordnance equipment and construction materiel. Procurement from Army sources was negotiated on the base and not the unit level. In Korea, SCARWAF units initiated requisitions utilizing Army procedures and Army stock numbers. From time to time, however, the Fifth Air Force requested reports of equipment and materiel under Air Force stock numbers, necessitating a tedious task of conversion.[191] Recurring changes in supply procedures frequently compelled re-requisitioning of supplies with attendant delays, and the requisitions, making the long and tortuous journey from battalion to engineer depot, met different handling priorities at each echelon.[192] In many instances personnel had to travel about the theater to find parts needed to keep equipment operational.[193]

The engineer aviation supply problem was well illustrated by a situation which became acute in the winter of 1952–1953. Available as prime movers for earthmoving equipment were D–8 Caterpillar tractors and LeTourneau Tournadozers. Both by their nature and employment were subject to frequent strain and breakdown, and the latter had so many "delicate mechanisms" in the form of electric motors and switches as to be highly vulnerable to neophyte operators.[194] These machines had been frequently deadlined for want of spare parts throughout 1952: in April 1952, for example, the 839th Battalion successfully operated only 4 out of 9 D–8's and only 9 out of 15 Tournadozers.[195] At Osan-ni on 2 November 1952 only 18 out of 45 Tournadozers were operational, 17 of the total being deadlined for want of parts not available in the Far East.[196] And in early February 1953, over 65 percent of the Caterpillar tractors and Tournadozers were deadlined due to the lack of parts in the theater.[197]

Since the entire airfield construction program planned for the spring months of 1953 was now jeopardized by engineer parts shortages, principally for earthmoving equipment but also for pavers, the Fifth Air Force sent representatives to the Columbus General Depot, Columbus, Ohio, to make an emergency requisition of engineer supplies. During April this project CRASH brought approximately 65 percent of the needed spare parts to Korea; those spares which did not arrive were delayed due to their purchase from manufacturers.[198] At the end of June 1953 the earthmoving capability was augmented by receipt of 30 additional Tournadozers, 14 to be applied to command shortages and 16 to replace repairable items.[199] Cognizant that a lack of maintenance

*At one time the 808th Battalion had 2-cubic yard shovels made by Lima and Bucyrus Erie and compressors made by Ingersoll Rand (2 models), Joy, and Davay.

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was running up the deadline rate on the engineer aviation equipment, USAF also took action establishing an Air Training Command course for ground equipment maintenance officers, supplemented by special training on Tournadozers, beginning on 1 May 1953. The 36 SCARWAF officers comprising the first class were to be dispatched to Korea on an expedited basis after completing the 40-day training course.[200]

In the performance of its base facilities mission the Fifth Air Force ultimately required 10 engineer aviation battalions, or a ratio of one construction battalion to one Air Force combat wing in Korea. By earlier standards this engineer force commitment appeared extravagant, but these standards had been rendered obsolete by modern aircraft. Gross aircraft weights had more than doubled since 1945, and jet aircraft tire pressures had increased from a former maximum of 80 to some 200 pounds per square inch. Existing design curves had anticipated an average of 3,000 landings on an airstrip per month, yet one Korean airfield averaged nearly 10,000 such landings in such a period. When the air was hot and thin, heavily loaded jet fighter-bombers demanded either long runways or jet-assisted takeoff (JATO), and a FEAF study established that "logistically and from a cost standpoint the extension of runways to 9,000 feet would be far more economical than to use JATO." [201]

The new requirements lengthened the time required to build air facilities. To construct a 9,000-foot runway required about 4.5 battalion-months, compared with the World War II average of 1.5 battalion-months needed to build a 4,000-foot fighter runway. To build runways, taxiways, and parking aprons for a jet fighter group required 8 to 10 battalion-months, the building of a complete airfield thus requiring over twice the construction effort needed for the runway. If a runway was to be used by fighters, bombers, and transports, as was the case at most major Korean airfields, construction time was considerably increased over the 4.5 battalion-months required to build the simpler fighter facility.[202]

Having utilized pierced steel plank, cement concrete, and asphaltic concrete runways at its major bases, the Fifth Air Force had obtained valid cost factors associated with each of these surfacings. When the 9,000-foot cement concrete runway was finished at Taegu, the 49th Fighter-Bomber Wing, which had also operated its F-84's from the old PSP strip there, made a careful analysis, noting: that the tire consumption was over five times as great on PSP as on concrete; that structural damage to aircraft, particularly wrinkled wings, damaged spars, and damaged leading edges, was less likely to occur on concrete; that a concrete runway presented less of a policing problem and reduced foreign object damage to jet engines; that concrete presented better traction for takeoffs, braking, or accelerating. In terms of cost, the initial construction of a cement concrete runway was less than that for PSP and required fewer man-hours for maintenance, but used-PSP could be salvaged and PSP could be more speedily repaired in case of bombing. In time, the construction of a fully operational cement concrete strip and a fully operational PSP strip was relatively equal, but a minimum operational PSP strip took some two weeks less time to build. Operationally, the cement concrete facility at Taegu fully justified itself: in July 1951, operating on PSP, the F-84's delivered 310 tons of ordnance in 625 sorties; in July 1952, from the cement concrete runway, they delivered 1,595 tons in 1,713 sorties. Extremely hot weather and heavy ordnance loads still necessitated some use of JATO in July 1952, but while it had cost $2,976 in JATO to deliver a ton of ordnance against the enemy in July 1951 it cost only $649 per ton of ordnance in July 1952.[203]

Much the same comparison between PSP and asphaltic concrete was made by the 17th Bombardment Wing in a study covering its operations of B-26 light bombers off the PSP at K-9 from 1 February through 30 September 1952 and off the asphalt runway at K-1 from 1 October through 20 December 1952. Although the PSP was in notably bad repair and the asphalt runway was just completed, and the cost comparison of an aging asphalt runway could not be computed, this 17th Wing stated that no structural damage to its aircraft could be attributed to runway conditions at K-1 whereas on the PSP at K-9 it had experienced tire blowouts, nose wheel collapses, and main gear failures. The wing averaged 48 landings per tire on asphalt as compared with 12.7 landings per tire on PSP. This factor was of special importance since the wing had experienced during 1952 a number of AOCP's due to lack of tires and on one instance in July 1952 tires had been airlifted from the ZI to alleviate an especially critical

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situation. The 17th Wing study highlighted the fact that the asphaltic concrete runway represented savings in tire consumption, structural damage to aircraft, and in aircraft accidents.[204]

Further comparison of cement concrete and asphalt concrete runways demonstrated that the former, especially in an aging situation, had notable advantages. Asphaltic concrete offered a positive load-bearing capacity, its surface was durable, elastic, and easy to keep clean. Asphaltic concrete hot-mix, however, could not be laid in cold or wet weather, and specialized plant and paving equipment was needed. It was subject to deterioration by jet engine blast and fuel spillage, and if there was sub-surface failure asphaltic concrete would crack and rot. The asphaltic concrete runways at Kunsan and Pusan East (K–9) had been expensive to maintain, due chiefly to base faults and their having been laid in adverse weather. Cement concrete offered a positive load bearing capacity, was easily cleaned, weather resistant, was not damaged by jet blast or fuel spillage, and required minimum maintenance. Cement concrete could, with proper precautions, be poured at lower temperatures than asphalt could be laid. On the debit side, cement concrete required 21 to 28 days to cure before it could be used.[205]

At the end of Korean hostilities FEAF recognized as a major lesson that initial underestimation of airfield life expectancy need had resulted in excessive and often continuous reconstruction and rehabilitation costs. The result was that many of the engineer aviation battalions had not been efficiently employed on new and heavy construction projects but had rather remained in place maintaining and improving one airfield, thereby obscuring the intended delineation between the air installations and engineer aviation functions. Of all airfields in Korea, only Osan-ni (K–55) had been logically developed from an initial comprehensive lay-out plan. The lack of comprehensive planning and frequently changing priorities had greatly complicated the engineer work in preparing bills of materials and in concentrating labor and equipment where needed.

FEAF therefore stated the following lessons relative to a logical and orderly progression of construction effort in a theater of operations: prior to the initiation of construction of combat airfields consideration had to be given to the preparation of adequate sub-base and base courses regardless of the type of surface to be used. Master plans for the construction of new airfields had to include provisions for siting the facilities so as to enable runways to be lengthened and the airfield to be expanded to meet requirements arising with new aircraft or a changing tactical situation. When there was a pressing operational necessity for a runway in the shortest possible time or when logistical support did not permit the mobilization of cement concrete equipment, PSP would be best utilized, provided always that recognition was given to the fact that PSP was a surfacing and required equivalent base courses as did asphalt or cement runways. For sustained jet operations, recognition should be directed to the fact that PSP runways would not be suitable. When time permitted, or as soon after completion of minimum PSP facilities as possible, runways should be built of cement concrete. When a runway had to be resurfaced and remain continuously operational, however, asphaltic concrete should be used, provided that warm-up aprons and runway ends should be of cement concrete.[206]

The Korean experience also demonstrated that the Air Force had a vital need for engineer aviation forces, which were not combat engineers nor construction engineers but specialists in the art of building airfields. Engineer aviation battalions were rich in equipment provided they were not overburdened with a conglomeration of makes and models as in Korea. The selection of equipment for assignment to an engineer aviation unit had to be made with a view to standardization upon types not only best suited for the work objective but which could be logistically supported. As specialists, the engineer aviation troops had to be given training designed both to sustain individual and unit proficiencies. More emphasis had to be placed upon the training of engineer aviation personnel destined for assignment to a combat theater, the training to be accomplished in the United States and designed to cover the operation and maintenance of the types of equipment in the unit to which the personnel would be assigned. Desirably, factory representatives would accompany major items of engineering equipment overseas. Absence of training on complex equipment and shortages of properly qualified engineer aviation personnel, FEAF noted, were the principal causes of engineer aviation ineffectiveness in Korea.[207]

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Chapter VI

AIR-GROUND ACTION IN KOREA

"During the entire time I was in command in the Far East," wrote General Mark W. Clark, "the frontline infantry units and tactical air support units worked closely together in Korea, and understood and respected each other's problems. When the foot soldier needed close air support, he got it."[1] Speaking at a press conference in August 1953, General Clark stated: "I have nothing but admiration for the air support that we obtained, not only from the Fifth Air Force but also from the long-range bombers . . . as well as the Navy carrier-based aviation and Marine wing that we had over there."[2] These Clark statements were reminiscent of those of his predecessor, General Douglas MacArthur: "I would say," MacArthur had told inquiring Senators in 1951, "the support that our tactical air has given to our ground troops in Korea has perhaps never been equalled in the history of modern war."[3]

Statistical records of the Korean war reveal that never before in American military annals were ground troops accorded such lavish air support as was provided to them in Korea. During the three years of Korean hostilities, Far East Air Forces planes flew a total of 461,554 combat sorties, of which 92,603 (20 percent) were close-support sorties.* The 1st Marine Air Wing—employed under Fifth Air Force coordination control primarily in a close support role—flew an additional total of 107,939 sorties of all types, of which 37,385 (35 percent) were close-support sorties. Although similar comprehensive figures are not available, NAVFE carrier air groups and friendly-foreign RAAF, SAAF, and ROKAF fighter squadrons also employed a substantial proportion of their effort in the close support of ground troops. In the last two years of the Korean war, years in which UNC ground forces were engaged only in a defense of fortified ground positions, FEAF, Marine, and friendly foreign aircraft flew 23,416 close support sorties between 1 July 1951 and 30 June 1952, 48,823 such sorties between 1 July 1952 and 30 June 1953, and 7,532 close support sorties in July 1953.[4] General Weyland estimated that during these two years of ground stalemate in Korea some 30 percent of all UNC combat air sorties were flown in close support, as opposed to roughly 10 percent used in the same endeavor in the bitterly fought European campaigns of World War II.[5]

AIR SUPPORT TO THE DEFENSIVE GROUND BATTLE

In the first year of the Korean war, when ground battles had been hard pressed, UNC close-air-support strikes had been extremely lucrative in terms of personnel casualties and material damages inflicted upon the Communist enemy. When the Korean truce talks had begun in July 1951, however, both UNC and Communist ground forces had assumed a defensive posture. Recognizing that they had to protect themselves against UNC air power, the Communist frontline troops had constructed heavy bunkers, underground supply centers, trenches, tunnels, and well-protected artillery and mortar positions. Against a dug-in enemy, UNC air action along the front lines became less and less remunerative. Continuous support along

*As used in Korea, the definitions of "close support" and "general support" were those prescribed by the U. S. JCS for joint usage. A "close support" sortie was flown under the direction of a tactical controller, either ground or air, and in support of frontline troops. A "general support" sortie was an interdiction effort flown against targets designated by the ground forces in an area outside the bomb line.

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such a static front demanded dispersed and sustained firepower against pinpoint targets and permitted no opportunity to the air forces to exploit their mobility and firepower against worthwhile concentrations. In such a static situation close air support was an expensive substitute for cheaper and more accurate artillery fire. The air pressure strategy which FEAF followed after July 1952 recognized the futility of expending large quantities of the scarce air capability against Communist front line entrenchments; it also appreciated the fact that UNC ground troops, who were fighting a defensive action from prepared positions, required a minimum of close air support. Yet, even though he recognized the diminished utility of air support in the stalemated ground situation, General Weyland was determined not to stint in his support of the friendly ground troops. "FEAF and Fifth Air Force," said Weyland, "leaned over backwards to provide more than adequate close air support when ground forces became actively engaged, and at other times maintained a rather high level of effort on close support in order to maintain the air-ground teamwork and know-how in a state of well-oiled proficiency." [6]

In the summer of 1952 both the Communists and the UNC ground forces maintained what was described as an "active defense" of their existing front-line positions. In June 1952 the Eighth Army at the western end of the battle line staged several hard-fought local attacks at which wrested several forward positions from the enemy. The Red reaction to these limited-objective UNC probes was prompt and vigorous, and the Communists invariably launched counterattacks against the newly won UNC outpost. Action on the central and eastern fronts in this month was characterized by increased UNC patrols and raids, and, on the part of the enemy, by determined resistance and scattered probing attacks against UNC outposts. Captured enemy personnel almost invariably maintained that their units were charged with defensive missions, but during June the Reds moved forward three of their armies which had been previously supporting the battle line. Desiring to determine whether these Communist troop movements represented reinforcement or rotation, General Van Fleet secured CINCUNC approval for an offensive plan, known as BUCKSHOT 17, which was designed to capture enemy prisoners in the area west of the Nam River. Made by a reinforced ROK infantry battalion, this raid was repulsed on 11 July after it had sustained substantial casualties and had been unable to take prisoners. Elsewhere during July, ground fighting was marked by small but fiercely contested local actions. In the first half of the month, action flared up on the central and eastern fronts where the Reds launched several local attacks, amply supported by artillery, against UNC outposts. In the latter half of the month, the heaviest fighting shifted to the west-central sector of the battle line. There, on 17 July, the enemy began a series of heavy attacks against the U. S. 2d Division's forward positions on "Old Baldy" (Hill 266), and after taking and losing control of this hill the Reds finally ended up in possession of it on 22 July. After 25 July heavy rains brought ground actions to a virtual standstill.[7]

While these intensified battle actions of June and July 1952 caused no major changes in the line of ground contact, the Communist battalion- and regimental-sized attacks marked the sharpest ground fighting so far that year. This increased tempo of the ground war demanded augmented close air support, and in June and July FEAF aircraft flew 1,910 and 2,057 close-support sorties. Marine aircraft flew 897 close-support sorties in June and 731 in July, and friendly foreign aircraft flew 114 and 98 close support sorties in the two months.[8] Many of these supporting missions had to be conducted under difficult flight conditions because the weather began to go bad in the middle of June and progressively worsened thereafter. Fortunately the Fifth Air Force was equal to the emergency: stationed behind each of the U. S. I, IX, and X Corps it had in operation three tactical air direction posts (TADP's) which manned MPQ-2 or MSQ-1 bombing-director radars, and these TADP's—or "Tadpoles"—enabled aircraft to render all-weather close support.* During June the three TADP's controlled aircraft on 779 bomb runs and directed 1,606 tons of bombs on enemy frontline positions. On 24 June they controlled 24 B-29's with 215 tons of bombs in close-support attacks; and, during the period 0600 hours on 29 June to 0600 hours on 30 June when prevailing adverse weather grounded the fighter-bombers, the Tadpoles controlled 128 B-26's in a

*See pp. 222–28.

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268-ton "around the clock" close-support operation. Flying singly above the overcast and using radar-controlled bomb drops, the light bombers were able to provide close support to friendly ground troops.[9] In July, when low clouds continued to blank out the front lines, the Tadpole controllers worked day and night to guide 1,221 bombing runs and 2,388 tons of close-support bombs. The bulk of these missions were made by B-29's and B-26's operating at night, but during the month F-51 fighter-bombers of the 18th Fighter-Bomber Wing did effective daytime radar bombing through the overcast: they flew in formations of fours and salvoed their bombs when told to do so by the ground controller. The ebb and flow of the battle for "Old Baldy" required a great number of these radar-directed bombing missions, and during July "Hillbilly" TADP which supported the U. S. I Corps put the greatest part of the 1,104.03 tons of bombs which it controlled upon this battle ground.[10]

During August 1952, in support of ground action generally characterized by numerous clashes of troops of up to battalion size and by a successful UNC recapture of "Old Baldy," air force planes provided 1,836 effective close-support sorties, while attached Marine and foreign units flew an additional 1,466 sorties, to swell the monthly total to 3,302 sorties.[11] At the end of July, when flooded roads were complicating Eighth Army logistics and presumably were having similar effects upon the Communists, General Van Fleet had proposed that the time was opportune for an all-out Tadpole bombing effort against the enemy. Neither General Weyland nor General Barcus considered that the tactical opportunity was sufficiently favorable as to justify the diversion of a maximum number of B-29's from scheduled destruction targets to close support, as General Van Fleet desired,* but General Weyland nevertheless made three B-29's available for TADP missions for several days and General Barcus allocated a maximum B-26 night-bombing effort to the front of the U. S. I Corps.[12] This Tadpole bombing effort early in August contributed to that month's total of 1,078.14 tons of bombs dropped under this control medium, but with improving weather the bulk of close-support effort was again performed by fighter-bomber aircraft.[13] Beginning in August, COMNAVFE put naval carrier-based pilots back in the close-support business, and, primarily for training, these crews flew an average of 12 ground support sorties daily at the eastern end of the battle line.[14]

In September 1952 the principal ground actions took place on Capitol Hill and Finger Ridge, where UNC forces remained in control. In this month air force planes flew 1,871 close-support sorties while the Marine, ROKAF, and SAAF aircraft flew 1,797 close-support sorties, to bring the monthly total of such effort to 2,888 sorties.[15] Early in September, COMNAVFE proposed that his carrier air groups should be used to provide close air support as requested across the entire Eighth Army front; he further stated that limited numbers of carrier aircrews should fly close air support for training purposes with Marine ground controllers. This proposition was quite agreeable to FEAF, which directed the Fifth Air Force to let naval aircraft work with Marine controllers wherever possible. Despite this increasing NAVFE interest in close support, the commander of Carrier Division 3 nevertheless cautioned that close air support had to be considered primarily as being for pilot training and had to be kept to a minimum.[16]

Although the close-support effort afforded by UNC aircraft during the summer of 1952 was substantial in volume, it was seldom directed against particularly lucrative air targets. The Communists habitually launched small but bitterly pressed attacks under the cover of darkness and nearly always completed their actions before dawn, by which time all enemy troops got back under the cover of their tunnels, caves, and bunkers. Along the Eighth Army front the Communists were quite careful to offer no sizable troop concentrations which might have been profitably attacked by UNC air power.

Much more spectacular and certainly more lucrative in terms of effort expended was the quantitatively small close support which the Fifth Air Force gave to friendly Korean guerrillas during the summer and autumn of 1952. At this time the 8240th Army Unit, operating under CCRAK, controlled partisan forces whose job was to operate at the left flank of the battle line and to divert enemy troops away from the main line of resistance. This force also defended and supported the

*See p. 225.

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defense of such strategic off-shore islands as Paengnyong-do, Sok-to, Cho-do, Kanghwa-do, Kyodong-do, and other adjacent smaller islands. The Fifth Air Force customarily helped these guerrilla units with supply, agent, and team drops; the Eighth Army provided equipment, rice, ammunition, and clothing to these forces; and the Navy gave protection to the island bases and provided air and artillery fire support against mainland targets.[17] And when enemy buildups reached worthwhile proportions, the guerrillas notified CCRAK and the Fifth Air Force laid on air strikes.

Early in July 1952 friendly guerrillas began to report a marked increase of Chinese Communist Forces (CCF) 42d Army troops in the villages in the BT and YC grid areas, and within two weeks these enemy concentrations were getting so extensive as seriously to interfere with the mission and resupply of the friendly partisans. On the morning of 20 July the friendly guerrillas pinpointed five of these troop concentrations in as many villages, and that afternoon 49 F-84's of the 49th and 58th Fighter-Bomber Wings, armed with 1,000-pound bombs and napalm tanks, attacked the briefed targets. After this strike the guerrillas reported on-the-spot observations of 550 enemy casualties, mostly killed, and the destruction of the supplies and equipment of a CCF company. On 23 July the friendly guerrillas fixed the location of six more troop concentrations in the same grid areas, and late on the afternoon of the next day 48 F-84's and F-80's of the 8th and 49th Fighter-Bomber Wings hit five of the prebriefed village targets with varied loads of napalm, 1,000-pound bombs, 500-pound frag clusters, and 100-pound general purpose bombs. Guerrilla observers in the vicinity of three of the targets in the BT area reported over 700 troop casualties and substantial destruction of hostile weapons and equipment.[18] Strikes such as these forced the Reds to scatter their security garrisons and to emphasize passive defense, but by the middle of September 1952 the friendly partisans reported that the Chinese were again concentrating against them in the YC area. Early on the morning of 19 September, the Fifth Air Force accordingly diverted 16 F-80's to attack four village targets in this area: at one target the Reds were caught at breakfast and 150 of them were slaughtered, and at two other targets some 100 CCF men were recorded as killed. These strikes also destroyed several artillery pieces and trucks.[19]

When the guerrilla-reported personnel concentrations were inland, the Fifth Air Force sent prebriefed fighter-bomber strikes against them, but enemy concentrations nearer to the shorelines of western Korea were attacked in accordance with as much of the regular close support procedure as could be applied under the local situation. To work with Wolfpack guerrillas in the BS area, the Fifth Air Force on 15 July sent to Kanghwa-do Island an officer and two airmen with complete tactical air control party (TACP) equipment. This TACP selected targets in coordination with Wolfpack headquarters, and where practicable it marked targets for air strikes with white phosphorous spotting charges fired from a 75-mm. recoilless rifle. Poor operational weather greatly reduced the number of supporting missions flown in this area during the last half of July, but the party, prior to its withdrawal on 11 August, directed 81 fighter-bomber sorties against artillery and mortar positions and troop and supply concentrations in the area. Seventeen of these sorties were aimed at prebriefed targets too far inland to permit visual control by the Wolfpack TACP.[20] Between 8 and 25 October, the Fifth Air Force conducted operation RED COW against targets in this same BS area and got good results against Communist troops who had long felt themselves safe from air attack because of their proximity to the Kaesong restricted area. In this operation, Mosquito controllers flying in T-6 aircraft directed flights of fighter-bombers which attacked enemy positions close to the main line of resistance (MLR) or to the neutral zone. Elsewhere the fighter-bombers hit prebriefed targets designated for them by guerrillas. A total of 164 sorties were flown, and results were reported as excellent. The 41 sorties controlled by the Mosquitoes killed approximately 174 troops and destroyed or damaged 110 buildings, 29 supporting shelters, and 21 artillery positions.[21] Up towards the northern end of the island chain which the UNC held off western Korea, Fifth Air Force fighter-bombers used another type of close-support procedure to beat back sporadic enemy attacks. Strikes against enemy targets along the coasts, such as the Red artillery pieces which periodically fired on Cho-do, were controlled by a naval vessel, called a "Sitting Duck." In these missions, the "Sitting Duck"

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controller orally described the target for the fighter leader and the fighters usually attacked individually and corrected their aiming points on observations of the preceding pilot's bomb blast. Occasionally, the "Sitting Duck" would have the flight reconnoiter an area that was hidden from his view by hills and other terrain features and report new buildups or other special hostile activity for attack.[22]

Although the air strikes in support of CCRAK guerrillas well illustrated the effectiveness of air power while working against suitably exposed enemy concentrations, the vast majority of Fifth Air Force close-support effort continued to be allocated to the Eighth Army battle line. Along this main line of resistance the tempo of the land war was increased when, in coordination with the CINCFE amphibious demonstration off the eastern coast of Korea,* the Eighth Army executed operation SHOWDOWN on the night of 13/14 October. This attack, mounted in the U. S. IX Corps area, sent one battalion each from the U. S. 7th and ROK 2d Divisions to seize critical high ground on Triangle Hill and Snipers Ridge, northeast of Kumhwa. The two battalions seized their objectives against stubborn enemy resistance, but the operation soon degenerated into a see-saw contest. Other heavy fighting took place during the month at White Horse Mountain, whose crest changed hands several times before it was occupied in force by the ROK 9th Division.[23] In preparation for the intensified ground fighting which had been anticipated, General Weyland made up to three B–29's available nightly for Tadpole missions in the period of 10 through 16 October.[24] During the month, moreover, the air force and its attached units flew a total of 4,488 close-support sorties, of which 2,217 were in support of the IX Corps.[25] On 21 October the commanding general of this corps messaged his "grateful thanks" for the Fifth Air Force's magnificent help." "The courage of the flyers and the effectiveness of their combat action against enemy ground targets," he said, "were manifest to those of us who observed them." The air support rendered, he stated, was timely and effective.[26] In preparation for the amphibious demonstration, Task Force 77 hit upon a scheme of air employment which utilized massed carrier air strikes in general support of the UNC battle line, and on 9 October it initiated what were called "Cherokee" strikes, or prebriefed air strikes against specific targets in front of friendly ground positions. Targets for these missions were designated by Eighth Army units and usually consisted of supply storage, personnel bunkers, artillery positions, or any exposed activity of the enemy. They differed from close-air-support strikes in that they were prebriefed and not directed by ground controllers, although a Fifth Air Force Mosquito was usually assigned to assist the naval aircraft in locating their targets and to perform post-strike damage assessment. These Cherokee strikes were at first conducted within the bombline, but it was difficult properly to control a flight of more than eight planes and the policy was soon established whereby such strikes were conducted beyond the bomb line.[27]

Operation SHOWDOWN was the last Eighth Army offensive, for General Clark saw no need to stir up such bloody battles.† The Communists, however, had no compunction against expending the lives of their ground soldiers in indecisive combat, and early in November they pressed attacks which ultimately recaptured Triangle Hill. Toward the end of November only scattered Red probing actions were reported, but the volume of air support continued high during the month: during November the air force planes flew 2,374 close-support sorties and attacked units flew an additional 1,172 such sorties. Almost 50 percent of all combat effort flown by Task Force 77 was used for close air support and Cherokee strikes.[28] In the first week of December, Communist squad- and platoon-sized attacks, supported by up to 6,000 rounds of artillery and mortar fire each day, kept UNC outposts on Sniper Ridge under almost constant attack. In view of this activity, the Fifth Air Force concentrated a "considerable" close-support effort against the Sniper Ridge area, and in the period of 2 through 7 December it obtained the services of three B–29's nightly to deal with hostile artillery. Assisted by the strong air effort, UNC ground troops turned back enemy attacks against Sniper Ridge positions, but before dawn on 11 December a two-battalion enemy force, attacking in the western battle sector, wrested Little and Big Nori hills from the ROK I Division.[29] During

*See Chap. IV, pp. 105–06.

†See Chap. IV, p. 105.

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December the air force and attached units flew 3,003 close-air-support sorties, and Task Force 77 continued to emphasize Cherokee and close-air-support strikes. Three large Cherokee strikes were launched daily, using approximately 75 percent of the available propeller striking force when two carriers were on the line and 50 percent when three carriers were operating.[30]

In the last half of 1952 the Eighth Army and Communist ground forces had very infrequently engaged in combat with troops larger than a battalion, but the Far East Air Force's and attached units had flown a total of 20,139 close-support sorties. Ground officers testified that this air support gave a "tremendous lift" to the infantry: on 5 November, for example, the commander of the 2d Division, whose forces were generally inactive during that day, reported that his men were "pleased and happy" to see a 58th Group close-support strike in a low-level napalm attack destroy a "Chinese 50-caliber gun." He reported that his men were heard to say: "It takes real guts to go in and do that job."[31] In mid-December 1952 a Fifth Air Force representative informed a FEAF assemblage that from 40 to 60 percent of that air force's total effort was being devoted to close or general support of UNC ground forces. The question was whether this allocation of effort was the most profitable employment of available air power, and, if it was not, how could the effort be made more profitable. The Cherokee experiments of Task Force 77 had demonstrated that squadron-sized fighter-bomber strikes had a good expectation of doing maximum damage to support targets and of escaping excessive casualties to enemy ground fire: by December a Cherokee strike group commonly comprised eight F4U's, eight AD's, and eight to 12 F9F's. The Navy, however, had found that it was practically impossible to put such a large formation through the tedious close-support control procedures which were designed to protect friendly ground troops and still get the strike on and off of the target in an acceptably short period of time. In late November and early December, when Fifth Air Force planners desired to increase the size of the air striking forces which were being sent against frontline targets they met this same control problem. A close scrutiny of the existing Eighth Army bombline showed that some alleviation of this control situation was feasible: the bomb line was spread out as far as 10,000 meters in front of the friendly ground forces. This meant that air attacks far out in front of the Eighth Army had to go through the formalities of the close-air-support procedure even though there was next to no danger that friendly troops would be erroneously attacked. At the suggestion of the Fifth Air Force, the Eighth Army agreed to move this line to a position approximately 3,000 meters beyond its front line positions. In a concommitant action, the line separating "general support" for "interdiction" was moved to a position approximately 25 miles beyond the bombing.[32] Following these changes, the Fifth Air Force emphasized prebriefed general support strikes made by 24 to 36 aircraft against hostile personnel and supply areas lying outside the 3,000 meter line but generally within 20,000 meters of the front lines. In all, some 1,891 of these general support sorties were flown during December, and the Fifth Air Force found that these massed attacks, accomplished in a minimum time, appeared to be effective and highly demoralizing to the enemy with little cost of aircraft.[33]

After appraising the tactical situation, FEAF operations planners early in January 1953 requested the Fifth Air Force further to review its close-air-support effort with a view toward applying more of this effort to more lucrative and more vulnerable enemy targets in the forward areas.[34] This recommendation was based upon an appreciation of intelligence and reconnaissance reports which indicated that the Communists were reinforcing and regrouping their forces, perhaps to support a major ground offensive early in 1953. These same reports set off a substantial FEAF interdiction campaign which began with attacks against the key Chongchon estuary bridges on 10 January.* The recommendation was also in context with the tempo of ground fighting for from mid-December until the last week of March 1953 there was a general lull in troop combat across the entire front. During January and February 1953, Fifth Air Force fighter-bombers shattered Communist troop concentrations and supply accumulations behind the bombline.[35] Task Force 77 flyers also emphasized Cherokee strikes against hostile troop and supply concentrations in a zone from 10 to 30 miles behind enemy lines. Eighth Army unit commanders credited these general

*See Chap. IV, pp. 114–16.

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support strikes with disrupting evidently planned enemy offensives.[36] Although the UNC air emphasis was on general support, far more than a mere routine effort was accorded to close air support: in the period of January through March 1953 FEAF aircraft flew 3,873 close-support sorties, and the 1st Marine Air Wing flew 2,938 close-support sorties, and the friendly foreign fighters provided an additional 854 close-support sorties.[37]

Early in March UNC ground reconnaissance patrols everywhere across the front met increasingly sharp enemy resistance, but ground engagements were mostly desultory. Between 23 and 29 March, however, the Communists initiated several limited objective attacks aimed at "Old Baldy" and "Outpost Vegas." FEAF immediately diverted aircraft from interdiction and general support to the support of friendly ground troops; during this week of combat Fifth Air Force fighter-bombers flew 483 close-support sorties while the light bombers provided 87 and the medium bombers made 11 Tadpole bombing sorties. Altogether, FEAF units dropped 398.4 tons of bombs into the active area of ground fighting during the week, and the Navy and 1st Marine Air Wing added another 77 tons of bombs and 66 tanks of napalm to this figure.[38] In April the enemy continued active on the ground, and in May UNC outposts all along the battle line were subjected to enemy pressure at one time or another. Most of these assaults were made by platoons or companies but some of them involved Red battalions. Outposts were lost and regained, but, as in the previous months, there were only nominal changes in the battle line. FEAF, Marine, and friendly foreign aircraft provided a total of 3,965 close-support sorties in April and 5,824 close-support sorties in May. Because of unfavorable weather at the front increasing use was made of B–26 light bombers in radar-directed close support: in April the 3d Wing flew 10 percent and the 17th Wing flew 11 percent of their combat effort in close support, and 14 percent and 19 percent of their total combat effort in general support of Eighth Army ground units.[39] In April and May Task Force 77 continued to emphasize Cherokee attacks, and in an April innovation its planes began to take a single logistical target under attacks for up to three days. Navy flyers found that such sustained attacks not only effected heavier damages on the enemy but that they also had utility in that the enemy was seldom able to sustain his flak defense of a given area for more than two days straight running.[40]

As early as 27 May aerial reconnaissance indicated that the enemy was making preparations for a major offensive, and in preparation for the emergency FEAF and NAVFE aircraft mounted strong general support strikes against enemy logistical buildups, which, being often shrouded by cloudy weather, had frequently to be attacked with TADP radar assistance. Tadpole control, which Task Force 77 flyers had first tried on 23 May, ripened into a regular operational use with the naval pilots between 4 and 14 June when foul weather curtailed visibility: in this period carrier-based planes flew 470 Tadpole sorties. On 3 June the FEAF Bomber Command was required to divert its entire B–29 effort to Tadpole support of friendly ground troops, and on each of the following three nights 19 B–29's were airborne over the front lines and made radar controlled bomb drops.[41]

Beginning on the night of 14/15 June 1953 the Communists attacked the ROK II Corps in force near Kumhwa. This was the largest Red offensive in more than two years, and the momentum of the assault carried it eight miles down the Pukhan Valley. Recognizing that the UNC ground situation was potentially perilous, General Anderson called for a maximum air effort against the enemy and he further waived the 3,000-foot minimum attacking altitude* which had been designed to reduce fighter-bomber casualties.[42] The Reds had evidently counted on getting weather cover for this offensive, but there was a temporary break in the weather on 15 June, the very day on which the Reds broke through the main line of resistance near Kumhwa. At this crucial time both the Fifth Air Force and Task Force 77 mounted a maximum effort in support of the Eighth Army. The day of the attack 859 of the 1,148 sorties flown by Fifth Air Force planes hit enemy positions at vital points along the front line; Task Force 77, with four aircraft carriers on the line, broke records to fly 532 combat sorties; and west coast carriers and land-based Marine fliers topped their records with 478 sorties.[43] Following these maximum air attacks, General Taylor messaged that:

*See Chap. V, p. 152. The 3,000-foot minimum attack altitude restriction was reinstated on 26 June 1953.

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"The frontline troops of the Eighth Army join in praise of the magnificent support they received today from the planes of the Fifth Air Force." [44]

The entire Fifth Air Force fighter-bomber effort remained committed to battle line support until 19 June, and by this time the Eighth Army had gotten the break in its lines under control. The amount of aviation employed in support of the Eighth Army, whether directed by day by TACP's or Mosquito controllers or by night or in bad weather by Tadpole controllers, remained at high level, and it was especially large on the 15th, 16th, 26th, and 30th of June. On these days the close-air-support control system received so many aircraft that it was saturated, and some aircraft, which could not remain on station until the forward air controllers found targets for them, had to make free drops behind the enemy lines.[45] When weather conditions demanded it, TADP controllers put fighter-bombers on their targets, and night close support made heavy demands on the Tadpole system: such radar-directed sorties during June constituted 66 percent of the combat effort of the two light bombardment wings, and for the second time during the month all B–29's were again diverted to close support for three nights following 28 June. During June the TADP's of the 502d Tactical Control Group exceeded all their previous records and successfully controlled 2,124 bomb runs which effected the delivery of 6,947.46 tons of high explosive.[46] Altogether in this month of maximum close support, FEAF aircraft flew 7,023 close-support sorties, the Marine air wing flew 1,348 close-support sorties, and friendly foreign aircraft provided an additional 537 such sorties.[47]

As the Communist mid-June offensive abated, Fifth Air Force planes immediately began armed reconnaissance flights which were designed to profit from targets brought out into the open by the Red ground attack, but early in July heavy rainfall and low ceilings kept the biggest part of Fifth Air Force planes grounded for six consecutive days, and under the cover of the clouds the Reds prepared for an attack which was to be even larger than the one that they had made in June. Using elements of an estimated five enemy divisions, the Reds struck and overran the ROK II Corps near Kumsong on the night of 12/13 July. All air commanders again reacted vigorously to the Red ground offensive. On 14 July the Seventh Fleet committed its maximum effort to the control of the JOC in Korea, and, as the JOC requested, it used its conventional aircraft in close support and put its jets on either Cherokee or route reconnaissance missions. The intensity of the Fifth Air Force close-support effort was shown by the fact that its fighter-bombers flew nearly 3,400 such sorties in July, while its light bombers provided 1,300 close-support sorties, 800 during hours of darkness and 500 in daylight hours. The 1st Marine Air Wing provided 1,497 close-support sorties, and the medium bombers of the FEAF Bomber Command, which were directed to give especial emphasis to the support of the ground forces on the nights of 13/14 through 19/20 July, flew 100 nocturnal sorties in support of the Eighth Army during July.[48]

Generally unfavorable flying weather during the first two days of this July attack and marginal weather on occasions thereafter handicapped the UNC supporting air effort, and once more great reliance had to be placed upon the TADP radar bomb control system. Altogether during July the 502d Group TADP's successfully directed 2,247 blind bombing runs with 6,899 tons of bombs, but with all commands competing for the services of the Tadpole controllers on 14 and 15 July and at intervals thereafter the TADP system was inevitably saturated with more aircraft than it could handle. At times, the TADP supporting the heavily engaged U. S. IX Corps could do nothing better than to direct some of the planes which reported to it to positions immediately behind the bombline for "free drops." [49] In an effort to lighten the load which had been thrust upon the Tadpoles, the Fifth Air Force on 15 July started targeting some close-support targets for shoran attack, and 120 of these targets were attacked, 85 by medium bombers and 35 by B–26's of the 17th Bombardment Wing. At this time the 17th Wing still had only a limited number of shoran-equipped light bombers, but such of these planes as had the shoran gear led other B–26's to the assigned targets for formation drops.[50]

After the initial two days of reduced visibility, clearing weather and the extra maintenance which had been performed by units during the lull in operations early in July enabled FEAF to mount a maximum daily effort until the Communist

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SORTIES BY TYPE FLOWN BY FEAF, MARINE, AND FRIENDLY FOREIGN AIRCRAFT

July 1952—July 1953

		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
	Close support	2, 057	1, 836	1, 797	2, 980	2, 400	1, 690	1, 204	1, 490	1, 179	2, 602	3, 844	7, 023	5, 806
	ID/AR	4, 598	5, 576	5, 490	6, 816	5, 658	5, 937	5, 843	4, 889	4, 229	5, 271	4, 682	3, 449	3, 561
U	CA/IN/ES	2, 628	2, 904	3, 613	4, 281	2, 606	3, 519	3, 501	2, 912	3, 690	4, 902	4, 801	4, 157	2, 996
S	Cargo	5, 153	5, 486	5, 163	5, 851	5, 074	4, 762	5, 216	4, 545	4, 545	4, 765	4, 822	4, 513	3, 614
A	Other	2, 767	3, 184	3, 632	4, 081	3, 264	3, 834	3, 804	3, 401	4, 237	5, 369	4, 917	4, 542	3, 489
F	Noneffective	282	310	341	264	237	302	265	150	161	185	197	224	204
	Total	17, 485	19, 296	20, 036	24, 273	19, 239	20, 044	19, 833	17, 387	18, 041	23, 094	23, 263	23, 908	19, 670
M	Close support	731	1, 406	1, 023	1, 351	904	971	1, 402	736	800	1, 016	1, 318	1, 348	1, 062
A	ID/AR	1, 301	1, 618	1, 412	1, 773	1, 307	1, 803	1, 094	947	1, 314	1, 175	1, 226	1, 275	669
R	CA/IN/ES	136	194	190	51	21	25	35	6	17	33	202	282	281
I	Cargo	------	------	------	------	------	------	------	------	------	------	------	------	------
N	Other	201	261	273	381	206	359	373	272	399	501	454	526	624
E	Noneffective	83	117	116	106	70	89	106	67	87	69	122	121	128
S														
	Total	2, 452	3, 596	3, 014	3, 662	2, 508	3, 247	3, 010	2, 028	2, 617	2, 794	3, 322	3, 552	2, 764
F	Close support	98	60	68	157	268	342	293	308	253	347	662	537	400
O	ID/AR	747	1, 133	982	1, 334	863	691	680	353	567	805	788	525	359
R	CA/IN/ES	52	98	223	152	200	287	272	163	16	115	64	105	77
E	Cargo	109	208	181	206	256	257	140	184	165	147	158	155	153
I	Other	18	39	8	46	71	79	10	54	38	58	77	39	19
G	Noneffective	18	25	7	21	11	27	13	11	21	30	14	46	52
N														
	Total	1, 042	1, 563	1, 469	1, 916	1, 669	1, 683	1, 408	1, 073	1, 060	1, 502	1, 763	1, 407	1, 060

LEGEND:
ID/AR = Interdiction/Armed Reconnaissance
CA/IN/ES = Counter Air/Interception/Escort
Other = Reconnaissance, Rescue, Strategic, Tactical Control, and Miscellaneous

SOURCE:
FEAF, Statistical Digests, Jan. 1953, p. 1 and July 1953, p. 1.

Figure 17

ground attack was at last contained on 20 July. What had been the enemy's purpose in making these June and July offensives was not entirely clear,* but the tactical emergency which had faced the Eighth Army in these months had been grave and for a time the only UNC force which had been in position to oppose the enemy advance southward was the combined weight of UNC air power. Whether air power could be credited with stopping the enemy's exploitation of the punctured battle line, or whether the enemy ground actions were limited objective thrusts, could only be conjectured, but FEAF reckoned that the curtain of fire laid into these breaches by air power must have raised serious doubts in Communist minds as to the desirability of further moves to the south.[51] After the July assault was contained the Communists made no significant ground moves during the last seven days of hostilities, but a part of FEAF's aircraft continued to support the Eighth Army. And at 2136 hours on 27 July 1953, a 3d Bombardment Wing crew dropped the last bombs of the Korean hostilities upon the enemy in the course of a radar-controlled-close-air support mission.[52]

By the way of summary, the monthly totals of close-support sorties flown by FEAF, Marine, and friendly foreign aircraft in the period of 1 July 1952 through 27 July 1953 are shown in figure 17. These monthly totals reveal that FEAF provided a substantial quantity of routine close-air-support, even in the months of the slackest ground activity, and that it gave all-out emphasis to

*See Chap. IV, p. 125.

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ground support in periods of resurgent ground attack. Thus in July 1953, when Communist attack routed the ROK II Corps, 43 percent of FEAF's combat effort and 45 percent of the Marine Wing's total effort was employed in close support of UNC ground troops.[53] One may therefore state without equivocation that extremely generous quantities of close air support were provided to UNC ground forces in Korea, but it is more difficult to evaluate the effect of this expenditure of air effort. Close air support undoubtedly benefited the morale of UNC ground troops and it simultaneously degraded the battle proficiency of Communist combat troops. It closed the gaps in the UNC battle line in June and July 1953. But for the most part of the last year of the Korean hostilities the hostile targets presented for close-support attack were completely unsuited to profitable air strikes. A tabulation of the estimated results of Mosquito-controlled fighter-bomber close and general support strikes in the period 1 July 1952 through 27 July 1953 is shown in figure 18. These results confirm General Weyland's observation regarding the futility of expending large quantities of air effort in routine close support during a period in which the ground front was stalemated and the enemy was completely dug-in and under cover. From the tabulated assessments made by Mosquito controllers it would appear that the most frequently attacked close-support targets in the last year of the Korean war were bunkers, artillery and mortar positions, personnel shelters, and caves, all of which were dispersed pinpoint targets and were poorly suited to air attack. It appears doubtful that the routine close-support air strikes as they were conducted for the majority of the time in the last year in Korea inflicted any great material damages upon the Communist enemy.

TARGETS IDENTIFIED BY MOSQUITO CONTROLLERS AND DAMAGED OR DESTROYED BY CLOSE-SUPPORT FIGHTERS.

1 July 1952—27 July 1953

Nature of target	Destroyed	Damaged
Troops	1, 418(KIA)	40(WIA)
Bunkers	650	9, 425
Artillery positions	11	1, 713
Artillery pieces	44	40
Mortar positions	147	3, 545
Mortar pieces	14	5
Automatic weapons positions	4	965
Automatic weapons pieces	45	14
Self-propelled gun positions	----------	9
Self-propelled guns	11	8
Antiaircraft artillery positions	----------	8
Antiaircraft artillery pieces	1	1
Tanks	31	30
Vehicles	94	70
Buildings	381	178
Personnel shelters	3, 474	3, 779
Houses	235	108
Revetments	27	43
Caves	150	1, 628
Observation posts	13	11
Command posts	5	3
Tunnels	3	25
Road cuts	2	203
Bridges	13	47
Ammunition dumps	6	----------
Supply stacks	624	335
Boats	----------	5
Supply shelters	----------	4
Parapets	----------	7
Firing bays	----------	118
Rail cuts	----------	4

Secondary explosions—3,410
Fires observed—738
Total flights directed—7,472

SOURCE: Hists. 6147th Tac. Cont. Gp., July-Dec. 1952, pp. 25-26, Jan.-June 1953, pp. 23-24, and July-Dec. 1953, p. 30.

Figure 18.

TRAINING AND TESTING IN AIR-GROUND OPERATIONS

Eighth Army Discontent with Tactical Air Doctrine: "While the close air support in Korea has been highly successful," General Van Fleet had written on 20 December 1951, "it is capable of much further development and improvement."[54] From the beginning of Korean hostilities, FEAF had made constant efforts to develop and adapt close-air-support procedures to the local circumstances of Korea, but it was unwilling to believe that the doctrinal and organizational lessons derived from the much more extensive experience of World War II were to be overthrown by situations obtaining in the peculiar Korean conflict. The approved USAF-Army doctrine relative to air-ground operations had had its conceptual beginnings in the land campaigns in North Africa, had been

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tried and tested in Italy, and had been elaborated and perfected in the battles of Europe, the most extensive air-ground fighting of World War II. Following this war, a board of senior air and ground officers had drawn up Field Manual 31–35, *Air Ground Operations* (August 1946) and the broad outlines included in this doctrinal manual had been expanded in a subsequently published Army Field Forces-Tactical Air Command, *Joint Training Directive for Air-Ground Operations* (1 September 1950). This approved and battle-tested doctrine recognized that air and ground forces were separate and coequal, but it required a tactical air force and a field army to work intimately for the defeat of opposing enemy air and ground forces. To this end it was desirable that the headquarters of air and ground forces should be close together, and it was necessary that air and ground operations would be integrated in a joint operations center. Three tasks would normally be performed by a tactical air force: (1) maintenance of friendly air superiority, (2) interdiction of the battle area, and (3) close support of friendly ground troops. Targets which could not be neutralized or destroyed by weapons organic to the surface forces were considered to be suitable objectives for close-support air strikes. This USAF-Army system was economical of essentially scarce air effort and was suited for large-scale air-ground campaigns in a major ground theater of operations.

In the light of its experience in the South and Central Pacific theaters of operations of World War II the U. S. Marine Corps had devised for air-ground operations another organizational concept which was especially suited for the short and intensive amphibious invasions practiced against island objectives.* Marine amphibious landing forces had gone ashore with limited amounts of organic artillery, and Marine commanders envisioned aviation as a means for making up the deficiency. Since high-performance naval carrier-based aircraft maintained air superiority and interdicted the movement of enemy forces, Marine pilots would practice close support as a primary mission. These arrangements were formalized at the end of World War II when Marine air and ground forces were organized primarily to perform amphibious tasks. Each Marine division was then given its own integral air wing, the latter being in effect a small tactical air force with its own control squadrons and combat aviation. Each Marine ground battalion was accompanied by a forward air observer, who could call down supporting aircraft from a flight normally kept on station over the battle area. This system was admittedly expensive of always-scarce air effort, but it could be justified in view of the exceptional requirements of short but intensive amphibious operations.[55]

One of the fundamental philosophical differences between the USAF-Army and the Marine systems of close air support was the degree of reliance placed on the supporting fires of integral artillery. Army commanders had preferred to rely on their own artillery for the neutralization or destruction of hostile targets within the first 1,000 yards of the front. They had nevertheless desired that the air should possess a capability to supply close-air-support strikes within 1,000 yards of friendly positions when critical situations or defiladed targets demanded it. On the other hand, Marine ground commanders could normally expect only the supporting fire of flat trajectory naval guns or of their own light guns, and they therefore required routine close air support in the first 1,000 yards ahead of their lines. Since they so used air support as a substitute for artillery, the Marines had to send forward air observers with each of their battalions. To assure an air strike within 5 to 10 minutes against hostile targets in such close proximity to their front lines, they had to keep aircraft on station overhead virtually all the time. The Army, on the other hand, preferred to utilize air against targets which could not be attacked by its integral artillery. Such targets, even if they were moving forward, could not normally be expected to reach friendly positions for a period of time and were often too far distant for the visual observation of a ground observer. In a normal situation there was adequate time in which the Army could call for and receive a call-type air support strike which was much more conservative of always-scarce air power than were air alert missions. There was also utility in an airborne tactical air coordinator who could locate and call air strikes upon supporting targets outside the visual range of a forward air controller on the ground.[56]

While the Marine system of close support was designed to meet a specialized type of intensive

*See AHS–86, Close Air Support in the War Against Japan, pp. 17–29, 33–44, 132–207, 238–45.

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ground fighting quite dissimilar to a campaign on an army or army-group front, the peculiar war in Korea exaggerated the positive advantages of the Marine system and minimized its limitations. In the period of September through December 1950, when it provided integral air support to the U. S. X Corps at Inchon and Wonsan, the 1st Marine Air Wing had been able to base its squadrons on escort carriers or on airfields quite close to the ground fighting. Had the Communists possessed an air attack potential at this time they could have prevented the small escort carriers from operating with such freedom. Hostile jet fighter opposition or a substantial antiaircraft artillery establishment would also have played havoc with the conventional F4U Corsairs, in which Marine airmen orbited for long periods over the battle area before they were called in for air-support strikes. Benefiting from these unreal and exceptional situations, Marine air support in this period was both immediate and generously given. An Army study dated 1 February 1951 stated that the average time required to obtain a close-support strike was 35 minutes from the Fifth Air Force and 5 to 10 minutes from the Marines. More than 95 percent of Air Force strikes were air controlled; more than 90 percent of Marine strikes were ground controlled. The average distance between an air support target and friendly troops was 0.9 mile for the Marines and 3 to 4 miles for the Air Force. Fifth Air Force close support of Eighth Army divisions averaged 12 sorties per division per day, whereas the 1st Marine Division, while operating as a part of the X Corps, had received an average of 37 sorties per day.[57] Although the accuracy of these figures (which were drawn from an often confused period of fighting) may be suspected of some error, it is nevertheless possible to observe that they were not inconsistent with the degree of reliance which Army and Marine units accorded to integral artillery fire. But in this respect the Korean war was again peculiar, and at no time during these hostilities did the Eighth Army possess what it considered to be an adequate amount of artillery. During the summer and autumn of 1950 ground division commanders freely admitted that they used air support as another form of artillery because they lacked field guns and ammunition.[58] "I do think," stated General J. Lawton Collins, Chief of Staff, U. S. Army, "that it is true that our troops, perhaps in the early phases of the operation particularly, got to relying on air when they could have used artillery."[59] And in April 1953 General Van Fleet told Senators about a continued inadequacy of Eighth Army artillery: "In Korea," he said, "we have only 25 percent, approximately 25 percent or less, the number of guns we had per division in France."[60]

After December 1950 the U. S. X Corps was integrated into the Eighth Army battle line and the 1st Marine Air Wing began to operate under the orders of the Fifth Air Force Joint Operations Center (JOC) in much the same manner as did other Air Force tactical wings. Flying call-type air-support missions from bases in South Korea, Marine pilots could no longer perform a requested strike within 5 to 10 minutes. After July 1951, moreover, when the truce talks stalemated ground fighting and UNC air began a comprehensive rail interdiction program, General Van Fleet agreed to limit routine requirements for close support across the Eighth Army front to 96 sorties per day. Such a reduction evidently caused some resentment among division and corps commanders of the Eighth Army, many of whom felt that such an amount of close support was inadequate to their needs.[61]

By December 1951 General Van Fleet, explaining that the "continuing demands of the subordinate echelons in the Eighth Army" had built up against him, visited Lt. Gen. F. F. Everest, the Fifth Air Force commander, to discuss the air support problem. Van Fleet stated first that he was appreciative of the all-out support which the Fifth Air Force had given to him whenever he had requested extra effort. He next described the organization of the army, in which the corps was the basic fighting unit of the surface forces. The corps commander had a great deal of latitude in employing his forces as long as he stayed within the army plan; he controlled his artillery, engineers, communications, and everything else within his area of responsibility. The only thing which the corps commander could not control was the allocation of his air support. Van Fleet then proposed that some air—how much he was not exactly sure, but in the order of one squadron of fighter-bomber aircraft—be assigned to each corps. Such an assignment would not be made immediately, but possibly it would be effected in the spring of 1952, if the fighting broke out again. In or-

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der to give immediate support, this squadron should be located on an airfield in the vicinity of the corps headquarters. Such an assignment as this would eliminate what Van Fleet called the "continual competition between divisions and corps for close support." Each corps commander would have a given amount of air power to use according to his own plan, and all that Van Fleet and Everest would have to do was to monitor the employment of this squadron by the corps commander.

General Everest immediately pointed out the inflexibility of such a system and asked Van Fleet how he meant to meet a situation in which one corps might need a large amount of air support. Van Fleet replied that either he or Everest could shift the effort from corps to corps, but normally on a day-to-day basis, thus assuring that the corps commander could still have his own squadron available. When Everest pointed out that three squadrons along the Eighth Army front would provide far fewer sorties than the Eighth Army had been furnished during the prior six months, General Van Fleet replied that this reduction in effort would be more than made up for by the satisfaction of the corps commanders in having something they could count on and run themselves. When Van Fleet had finished talking, General Everest told him frankly that he did not believe in the soundness of putting air units under the operational control of a corps commander and that he had no personal authority so to depart from established principles of air employment. He suggested, as the friendly conversation broke up, that the battleground for such an interservice argument was in Washington, not in Korea.[62]

General Everest thought that the normally enthusiastic and direct Van Fleet had not had his heart in the proposition which he had orally advanced, but three days after the conversation, on 20 December 1951, General Van Fleet forwarded his proposal to CINCFE by official letter. He now proposed to utilize Korea as a testing ground to determine whether the current organization and command for the joint employment of air and ground forces was sound. Specific deficiencies in the existing air-support system, as Van Fleet saw them, were attributable to several factors: an insufficient number of air sorties were available for close support; an insufficient number of airfields were located laterally across Korea immediately behind the main line of resistance; the retention of centralized control of aircraft at the JOC was imposing administrative delays that unnecessarily reflected in the elapsed time between the request and delivery of air support; an excessive amount of time was required to put an aircraft on the target after the plane arrived in the target area; an insufficient number of TACP's were in the field and a doubtful reliance was being placed upon tactical air coordinator or Mosquito airborne control; TACP's were initially inexperienced when reporting for duty and served a relatively short tour in the field; and finally USAF had failed to develop special aircraft and armament capable of providing more effective close support to ground forces.

After such an introduction, General Van Fleet approached the heart of the matter: he thought that the advantages of decentralizing control of an army front to the component corps had been well demonstrated, and he predicted that the advent of atomic warfare would probably accelerate this decentralization. In order to decentralize tactical air to corps commanders' control, Van Fleet proposed to take three squadrons of Marine aircraft under the operational control of the Eighth Army, which he would further decentralize by placing one squadron under each of his three corps commanders. These squadrons would operate from advanced bases located, where possible, in close proximity to a corps headquarters. Their aircraft would be used for close air support along the army front, and they would also attack close interdiction targets, lying within 20 to 40 miles beyond the front lines. Air strikes would be controlled by army personnel, and maximum use would be made of field artillery forward observers in the this function. Requests for close air support from divisions would be processed at corps headquarters and would be normally filled from aircraft under the operational control of each corps. The Eighth Army, however, would divert aircraft from one corps to another when necessary, and when army plans did not require the maximum use of all immediately available corps airplanes, they would be made available to the use of the Fifth Air Force, just as it was anticipated that the army would receive additional support from the Fifth Air Force during periods of major ground activities. The Air Force would continue to accomplish photography, reconnais-

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The CINCFE Paper on Air-Ground Operations: While he had served as chief of the Army Field Forces, General Clark had, to some extent, been involved in the "burning issue" relative to "the control and adequacy of close air support for the infantryman." In a published article in 1950 he had described the kind of air support that the Army wanted and had visualized an "ideal" air support aircraft. As the theater commander in the Far East, however, General Clark had the over-all responsibility for successfully prosecuting the Korean war, and he recognized that each force component assigned to the theater "contributes its own specialized capabilities to the attainment of the . . . over-all mission and in so doing assists the other components; however, no single service exists solely or primarily for the support of another." Clark later explained that he had not come out to the Far East to aggravate any differences of opinion between the Army and the Air Force. "With a specific job to do," he said, "I had to maintain an air-ground team working as efficiently as possible." [67]

Having studied the particulars of Eighth Army dissatisfaction with its air support, CINCFE on 11 August 1952 issued a "considered opinion" that no far-reaching or drastic changes or experiments which were contrary to existing close-air-support procedures and doctrine should be attempted, based solely on the often unusual conditions which had prevailed in Korea. He recognized that extant doctrinal procedures were far more fitted for general hostilities than had been the case in Korea. "The doctrine and procedure in the Joint Training Directive for Air-Ground Operations, dated 1 September 1950," CINCFE stated, "was established only after the most comprehensive and exhaustive joint deliberation. It was based on a vast reservoir of experience data amassed on all fronts in World War II. It also represents in the Armed Forces the composite view of senior members who had the longest and most responsible experience in close support during World War II."

"After careful study," CINCFE stated, "I consider that much of the criticism of the present system is not fully justified—principally because the criticism is based on factors that are entirely unrelated to the system itself." The first of these factors was a general lack of understanding that air-ground operations in the combat zone were a direct result of policies arrived at in consultation and enunciated by the Air Force and Army commanders. Second, there was a tendency on the part of ground officers, at all levels, to give the Air Force credit for greater capabilities than it possessed. Failing fully to recognize the limitations and capabilities of the air arm, these ground commanders were disappointed in air results and

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"After careful study," CINCFE stated, "I consider that much of the criticism of the present system is not fully justified—principally because the criticism is based on factors that are entirely unrelated to the system itself." The first of these factors was a general lack of understanding that air-ground operations in the combat zone were a direct result of policies arrived at in consultation and enunciated by the Air Force and Army commanders. Second, there was a tendency on the part of ground officers, at all levels, to give the Air Force credit for greater capabilities than it possessed. Failing fully to recognize the limitations and capabilities of the air arm, these ground commanders were disappointed in air results and

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leveled their blame at the system which controlled air operations. In this regard CINCFE pointed out that: "The normal supporting weapons in divisions and corps should be fully utilized as a matter of first priority. Calls for close air support should be made only when available ground weapons are fully employed and cannot furnish the required support." Third, the majority of officers at corps level and below did not appreciate the fact that the Fifth Air Force was assigned air missions of greater scope than normally assigned to a tactical air force. Few of these officers appreciated the "very limited means" at the disposal of the Fifth Air Force, FEAF Bomber Command, and Navy air elements for furthering the theater commander's over-all mission by exploiting throughout North Korea the intrinsic capabilities of air forces. The UNC air forces had to continue to throw the full weight of air attacks against all major resources important to enemy operations, while simultaneously maintaining an ability to meet unforeseen emergencies. Enemy offensive air capabilities had to be neutralized and kept neutralized. The CINCFE recalled that there had never been any difficulty in determining a proper allocation of air effort at the Eighth Army-Fifth Air Force command level: during the CCF offensives in the spring of 1951 "every plane that the Fifth Air Force could get airborne and that possessed a close support capability was on that mission. The full weight of FEAF Bomber Command was also thrown against the enemy." When the ground front had stabilized in July 1951, a transportation interdiction program had been instituted with the complete concurrence of the Eighth Army commander, and with his full knowledge that aircraft to be made available for close support would be in limited numbers. "If we disregard for a moment the front line commander who can never get enough support, either artillery or air," said CINCFE, "and get back to the Tactical Air Force-Army level where the decision on allocation of available effort to type missions is made, there appears to be no problem existing in jointly selecting the mission desired by both commanders." Fourth, any comparison of the Army and Marine system of close air support was faulty in its very premise because the two systems were designed for completely different types of ground operations and necessarily had entirely different allocations of artillery and supporting air. The Marine system was too expensive in personnel and equipment and its requirement for aircraft was too great to permit its adoption in tactical air force-army use where 60 to 100 divisions might be employed. Fifth, CINCFE suggested that the tactical air force had probably been its own worst enemy in expressing its mission as tasks, which were: to gain and maintain air superiority, to isolate the battlefield, and to provide close support of ground forces. Army officers often incorrectly assumed this statement of missions to mean that air support was a third priority effort. CINCFE further suggested that this mission might be better expressed "by indicating that the Tactical Air Forces has but one mission, which is: IN CONJUNCTION WITH SURFACE FORCES TO INFLICT MAXIMUM DAMAGE THROUGH AIR ACTION ON ENEMY AIRCRAFT, MATERIEL AND INSTALLATIONS, AND PERSONNEL." Such a mission could be accomplished by three types of action: anti-air, anti-materiel and installations, and anti-personnel. In cooperation with army commander, the tactical air force commander would engage the enemy with a combination of these actions depending on the over-all tactical situation. Sixth, the deficiencies noted in the close-support system employed in Korea—an excessive length of time required to get air ordnance to the target and the accuracy of delivery of such ordnance—could and had to be countered by constant cooperative training between air and ground forces.

After this introduction to the problem, CINCFE instructed his force commanders to re-examine their positions and to direct their efforts "toward perfecting the present system." To this end he proposed 13 steps to be immediately undertaken to increase the efficiency of the existing close-air-support system in Korea:

1. Insuring that appropriate commanders and key staff officers are indoctrinated in the capabilities and limitations of the respective services in effecting their missions, and in the principles and approved procedures of air-ground operations.

2. Increasing the attendance of Eighth Army and Fifth Air Force personnel in the air-ground operations school, currently being conducted at Johnson Air Base, Japan.

3. Preparing individual tactical air force pilots with an opportunity of becoming better acquainted with the tactical situation and with Army personnel on the ground and on the front line, by spending a minimum of four days with a front line unit.

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4. Recommending improvements in and maintenance of the signal equipment utilized in the air-ground operations system.

5. Increasing the utilization of Army personnel in the air-ground operations system, either by utilizing Army personnel for tactical air control parties at battalion level, which would operate under general supervision of the forward air controller of the Air Force TACP at regiment, or by making more efficient use of forward observers and the First Support Coordination Center (FSCC) in close air support missions.

6. Resolving the question of what constitutes an appropriate target for an air attack, especially those targets for MPQ-2 strikes.

7. Developing quicker and more efficient means of designation and identification of targets, especially in the utilization of smoke by the ground units and the picking up of these targets by the pilots.

8. Developing faster means of processing close air support requests by utilizing the complete system as prescribed in the Joint Training Directive for Air-Ground Operations.

9. Developing further the ability to locate grouped enemy personnel and/or other remunerative area targets in close proximity to the front lines for utilization of medium bombers in MPQ-2 strikes; and developing means of better evaluating the results of these strikes.

10. Developing a procedure to insure that in critical ground situations the ground commander who has the best over-all knowledge of the immediate situation has full responsibility for the selection of the target to be attacked by the allocated air effort.

11. Developing better means of delivering air strikes with greater accuracy and surprise.

12. Developing procedures that will not require the lifting of artillery and mortar fire prior to an attack.

13. Developing ground techniques to insure the immediate ground attack following a close air support strike.

In addition to these 13 steps which were to be given immediate study and action, CINCFE outlined a proposed experiment in air-ground operations which would keep the air-support system continuously under study and would provide functional data which might lead to its improvement. "The proposed experiment," stated the CINCFE paper, "is submitted on the premise that the current system of close air support is sound, but that any system should be continuously under study for improvement." To this end, the paper outlined three phases of effort, which might well be carried out simultaneously or overlapped as required for best results. Phase I contemplated the establishment, in conjunction with the already operating Air-Ground School at the headquarters of the Fifth Air Force, of a small joint Eighth Army-Fifth Air Force travelling team, constituted from personnel experienced in the existing air-ground operations system. This travelling team would be expected to present an analysis of the air-ground operations system at each army corps, division, and regimental headquarters in Korea. Its instruction was to be planned for the sole purpose of informing commanders, key staff officers and personnel in the air-ground operations system of the current factors affecting the situation and to answer questions which pertained to the operational procedures utilized in air-ground operations. Phase II of the proposed experiment contemplated a tactical exercise in which each front line battalion commander would call for an air-support strike against a target which could be viewed by personnel of his battalion. Such exercises would be conducted by corps, with the Fifth Air Force allocating 50 to 100 sorties for JOC alert and the participating corps being designated to receive all of these JOC on-call missions during the time its units were conducting the experiment. These support strikes would be processed in a normal method, and it was supposed that this process should result in a battalion getting response to its request by proper ordnance delivered on target within 30 minutes from the time of the request. A second demonstration would be run utilizing aircraft on an air alert status. A third demonstration would test whether or not faster action could be obtained when close support requests went over a division tactical air request net directly from battalion to division to JOC, with regiment and corps monitoring. During phase II the Fifth Air Force would be expected to insure that every pilot had an opportunity to spend a minimum of four days on the front line as a guest of a battalion commander, preferably of the battalion which the pilot's unit would later support. In phase III of the proposed experiment, the JOC would be expected to allocate to a corps FSCC the "mission control" over one or more fighter-bomber squadrons for a definite period of time. The period of time would desirably coincide with the anticipated duration of either an assumed or an actual attack. During such a period, the corps commander, operating through his FSCC, would have final authority as to the targets selected for air attack as well as for the actual allocations of the available air effort to any subordinate unit within his command. This phase of the experiment would serve to test the feasibility of delegating mission control of an air

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unit during a planned operation to a headquarters below the army-tactical air force level.[68]

In order to perfect the air-support system in Korea, CINCFE thus expected his subordinate force commanders to accomplish three different sets of actions. Many of the 13 steps and the first phase of the proposed operational experiment dealt with training in air-ground operations. The remainder of the 13 steps concerned specific improvements which were to be made in the extant operations system. The second and third phases of the operational experiment proposed certain deviations from established doctrine which were to be tested in an effort to "improve" the existing system.

Air-Ground Operational Training: Both FEAF and the Fifth Air Force had long recognized that the one-year tour of combat duty in Korea was productive of an extremely rapid turn-over of experienced air and ground personnel in that theater. As early as 26 March 1951 a joint Eighth Army-Fifth Air Force board had recommended that a joint school should be established in Korea to indoctrinate personnel who were participating in the air-ground system, as many current ground commanders as was possible, and future unit commanders as they reported for duty in Korea. The board further recommended that the school should support a travelling team which would conduct an instructional program in each division when the tactical situation permitted. At this time the Fifth Air Force had expressed a willingness to establish this joint air-ground school, but the Eighth Army had stated that such a school would be impracticable in Korea because of the number of instructors which would be required and the difficulty which would be encountered in obtaining combat unit commanders as students. The Eighth Army recommended that training objectives could be adequately met by periodic army-air team visits to frontline units.[69]

While Fifth Air Force air liaison personnel made efforts to disseminate a sound understanding of the principles of air-ground operations, these officers in the autumn of 1951 reported that the Eighth Army replacement turnover had brought in more and more new people who were unfamiliar with close air support and who had never experienced combat conditions which actually required all-out air support.[70] On 17 September 1951 the Fifth Air Force had accordingly instituted what it first called a "routine familiarization course" and, after June 1952, an "air-ground operations course." As initially laid out this three-day program was made available to air and ground officers, with quotas for each class established at one air officer from each tactical wing and three ground officers from each corps. The curriculum included the training film "Control of Tactical Air Operations"; briefings on the Fifth Air Force's mission and capabilities, G-2 Air and G-3 Air organization and functions, naval air operations in Korea, and the tactical air control system; and field trips or visits to the JOC and TACC, the 67th Tactical Reconnaissance Wing, and the 51st Fighter-Interceptor Wing. The Air Liaison Division of the Fifth Air Force Directorate of Operations was responsible for this familiarization course, and from time to time when Eighth Army divisions were inactive this division also gave special presentations in the field.[71] Because of the limit on the number of available Air Force billets in Seoul, this course had a maximum capacity of 70 students per month, but prior to the autumn of 1952 the course was never this well attended. The two courses conducted in February 1952, for example, had a total enrollment of only six air officers and 24 ground officers. The instructional teams which made special presentations in the field seldom succeeded in securing the attendance of key people at their briefings.[72]

Although this Fifth Air Force indoctrination training benefited those officers who attended it, the enrollment was much too small to provide a leaven of knowledgeable men in the combat theater. After visiting Korea in January and February 1952, representatives of the U. S. Joint Tactical Air Support Board noted that: "The most outstanding discovery of the tour was the quite apparent lack of indoctrination within both Army and Air Force units in the fundamental principles and concepts of Tactical Air Operations."[73]

In Japan at Johnson Air Base, the Japan Air Defense Force had been conducting an abbreviated air-ground operations course in conjunction with the XVI Corps, and in February 1952 (possibly motivated by the U. S. Joint Air Support Board criticism) CINCFE directed that this training would be expanded into a Far East Air-Ground Operations School (FEAGOS).[74] This FEAGOS was established under staff supervision of the

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JADF at Johnson Air Base, where on 19 May 1952 it opened to an initial class of 15 army and 15 air officers. The course of instruction, which comprised lectures and demonstrations, was five and one-half days in length. In accordance with the CINCFE directive that the attendance of Eighth Army and Fifth Air Force personnel at this school would be increased, the FEAGOS conducted weekly courses after 27 October 1952. Enrolled in larger quotas after August 1952, 174 Eighth Army and 105 Fifth Air Force officers attended the school during 1952. The Fifth Air Force, which made a conscientious effort to insure that its quotas were filled by key officers from units directly engaged in air-ground operations, reported that the FEAGOS training was "of great value . . . particularly in the fighter-bomber wings where it has the greatest applicability." [75]

While there was some difference of opinion regarding the details of the augmented air-ground training which was to take place in Korea, all parties agreed that a further and concerted effort would have to be directed toward educating key personnel. The immediate result of the CINCFE paper was to increase the enrollment of officers in the Fifth Air Force air-ground operations course: two of these courses were conducted in September 1952 with an enrollment of 93 officers, including 6 general officers. Pilot indoctrination visits to frontline units began on 15 September, and thereafter 15 pilots were sent to the front each Monday and Thursday. In order to avoid an undue burden to the frontline units, these pilot visits were limited to three days, an amount of time which General Van Fleet thought adequate for the purpose.[76] Commenting on the first phase of the CINCFE operational experiment as they were required to do, General Van Fleet generally concurred in it and suggested that the travelling team should be set up as a section in a permanent air-ground school at Fifth Air Force headquarters; General Barcus had no objection to the proposed travelling team although past experience indicated to him "that its activities will probably meet with little success since it is difficult to insure attendance by the proper people" at travelling presentations; General Weyland stated that the first phase was an "excellent idea," but he had some doubts about the practicability of travelling about Korea with bulky training aids and suggested that an increased enrollment of carefully selected personnel in the existing schools offered more probability of achieving fruitful results.[77] In view of the general acceptance of the first phase by all who were concerned, CINCFE directed on 16 October 1952 that it would be implemented as indicated in his air-ground operations paper.[78]

Assisted by Eighth Army instructions designed to assure an appropriate attendance at their presentations, the joint Eighth Army-Fifth Air Force Indoctrination Team got better results than had been initially anticipated. This team made its first presentation in the field on 29 October, and when it completed its tour on 19 November it had made 15 presentations to 530 key command and staff officers of the Eighth Army's subordinate units. The subject matter covered in the team's presentations included a briefing on the doctrine applicable to control of tactical air operations; the mission, capabilities, limitations, and functions of the Fifth Air Force and its assigned, attached, and affiliated units; the functions and operations of Eighth Army G-3 Air and the operational procedures utilized in air-ground operations in Korea; and the techniques of reconnaissance and targeting. The team reported that its course of instruction was received with much interest by attending army personnel, and when the results of the CINCFE air-ground operations experiment were written up on 16 March 1953 it was evident that such periodic presentations were highly desirable. General Barcus and Lt. Gen. Maxwell D. Taylor, now the commander of the Eighth Army, therefore agreed that the travelling indoctrination team would continue to visit and to make its presentations at each U. S. infantry division and corps at least once every four months.[79]

Air-Ground Operations "Experiments": While all of the key commanders in the Far East agreed upon the need for augmented training provided for in the CINCFE paper on air-ground operations, they had many objections to the second and third phases of the proposed CINCFE operational experiment. This proposed experiment had been submitted on the premise that the doctrinal system of close air support was sound, and yet certain provisions of the third phase of the experiment were in deviation from this established doctrine. Oddly enough the CINCFE paper proposed to "develop" the extant doctrine and procedures by testing procedures which were in themselves deviations from the extant doctrine.

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As outlined in the CINCFE paper the second phase of the operational experiment proposed to allocate 50 to 100 air sorties to the three corps in turn for their use in a series of demonstrations. General Van Fleet generally concurred with this proposition, but he pointed out that the Fifth Air Force had been allocating 80 to 94 close-air-support sorties each day for use across the Eighth Army front and he desired that such timely support would be continued during the experimental period in which one corps would be getting the 50 to 100 special sorties. To General Barcus it appeared that the training which a ground battalion would receive in witnessing air strikes "would be at considerable cost, measured in terms of ordnance expended, aircraft flying time consumed, battle damages, and losses sustained." Since in the period of April through July 1952 the Fifth Air Force had been losing one aircraft to hostile ground fire in every 382 close-support sorties and had had one aircraft damaged by hostile ground fire in every 26 close support sorties, it seemed to General Barcus that the ground battalions would very likely witness nothing more substantial than a demonstration against a target of little importance at the same time that the Fifth Air Force would suffer not only unnecessary damages and losses but also a substantial diversion from its offensive role. General Weyland also stated that the "value received in return for the effort expended" in these demonstrations would be "questionable." There were 109 battalions in the Eighth Army each of which would require a demonstration, and the 100 sorties which were spoken of as an especial allotment to a single corps represented 30 percent of the Fifth Air Force's normal daily fighter-bomber sortie capability. As for a special air alert demonstration, Weyland pointed out that airborne fighter-bombers were frequently diverted by the JOC to close-support targets; to include in the experiment one demonstration including air-alert fighter-bombers to prove that there was an appreciable reduction in elapsed time between this type of strike and an on-call strike appeared to be wasteful. Based upon actual experience, the time differential could be very well computed for any given tactical situation without conducting a costly experiment.

The third phase of the CINCFE experiment, wherein the "mission control" of one or more fighter-bomber squadrons was to be allocated to a corps for a definite period of time, met strong objections. General Van Fleet concurred in this phase, but, strangely enough for a man who had earlier urged some such arrangement, he posed three hazards which had to be considered when allocating mission control of an air unit to the FSCC of a corps. Nonoperational weather at the designated squadron's home base might keep it grounded when it was needed: in order to minimize the effects of base weather, the current policy was to allocate JOC-alert flights to the various fighter-bomber groups in Korea. Van Fleet also pointed out that if a corps had mission control over an air squadron it would have to have direct communications between the corps FSCC and the squadron airfield. Finally, Van Fleet cautioned that aircraft damage and loss expectations were major factors to be considered before placing a squadron under the mission control of a corps. Aircraft losses on close-support missions were being incurred at a higher rate than in other tactical air missions; and if one squadron was required to take these losses, even over a short period of time, the squadron would probably lose its operational effectiveness. General Barcus pointed out that the term "mission control" was unfortunate since it included weather information, radar and communications facilities, and current knowledge of enemy and friendly air activities which were beyond the capabilities of a corps FSCC. Such an arrangement whereby air units were placed under ground control, moreover, would negate the principle of centralizing the control of all air elements in a tactical air force, a principle which ensured a capability to bring a maximum air striking force to bear when and where required. General Weyland additionally demonstrated that such allocations of air units to ground units had already been tested and found disastrous in American operations in North Africa during World War II. "Phase III of the proposed experiment," Weyland informed CINCFE, "is considered a regression which is contrary to established doctrine." [80]

In view of the Air Force objections to some of the phases of the proposed operational experiment, CINCFE on 16 October directed that General Weyland, in conjunction and in agreement with General Van Fleet, would recommend by 1 November a series of practical experiments which would provide ground and air personnel with the experience they required to conduct air support in

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a manner prescribed in current doctrine. As has been noted, CINCFE at this time ordered that the training phase of his proposed experiment would be implemented at once. FEAF promptly instructed the Fifth Air Force to hold discussions with the Eighth Army and to recommend experiments which would meet the CINCFE objectives.[81]

By 27 October, Fifth Air Force and Eighth Army representatives worked out a modified air-ground operations experiment, and they presented their proposed program on that day for review by higher authority. As a preliminary phase of the new experiment a joint travelling indoctrination team would make three presentations in each corps, first at corps headquarters, then at a division headquarters, and finally at a regimental headquarters. Following this indoctrination, three experiments would be conducted, all on a much more modest order than those originally planned in the CINCFE paper. In the first experiment, approximately 24 fighter-bomber aircraft would be committed to each corps in turn. Targets for a massed close-support strike would be selected by the corps, and when this was done the air commander of the committed unit would visit the corps and be briefed on the proposed targets. After such personnel as the corps commander desired to witness the strike were in place, the corps would call for the strike and it would be conducted. In the second experiment, approximately eight fighter-bombers would be committed to each corps in turn. These aircraft would be held on a strip alert, without benefit of prebriefing, and they would be scrambled by the JOC on request from the corps, again after personnel who would witness the strike were in place. The pilots would be given their targets while airborne and after reaching the corps or division control. In the third experiment, four fighter-bombers would be placed on an air alert and allocated to each corps. Targets would again be selected by the corps or some subordinate unit, and the targets would be called out to the fighter-bomber commander while the planes were airborne.[82] CINCFE approved this proposed joint Fifth Air Force-Eighth Army air-ground operations experiment on 24 November, and at that time he directed that reports containing evaluations, comments, and recommendations would be submitted to him upon the completion of the experiment.[83]

Beginning on 26 December 1952 and concluding on 14 February 1953, the Fifth Air Force conducted the planned operational experiments with each U. S. infantry division in Korea, following this schedule:

Date	Corps	Division	Wing
26 December	X	40th	8th FBW
8 January	IX	25th	8th FBW
25 January	I	7th	58th FBW
7 February	IX	3d	58th FBW
7 February	X	45th	8th FBW
14 February	I	2d	474th FBW

In the course of each of these exercises there were three phases of effort: a planning phase, a briefing phase, and a mission phase. The planning phase included the planning for target selection, ground action, artillery participation, selection of observation posts, display of ground panels, communications and control facilities (to include both TACP's and Mosquitoes), scheduling of participating fighter-bomber units, selection of proper ordnance, and designation of the persons who were to observe the missions. The briefing phase was conducted primarily for key air personnel at the division two days prior to the mission phase. Attending the briefings were the fighter-bomber group commander, the group operations officer, mission leaders, Mosquito pilots, forward air controllers, air liaison officers, and a representative of the combat operations section of the JOC. Commanders and key staff officers from the division, corps, and from Eighth Army also attended these briefings, whose subject matter included the friendly and enemy situation, the plan of ground action, description and location of air targets, plans for artillery flak suppression and target marking, proposed timing of air strike, recognition signals, and ground marking panels. Preparatory to the prebriefed air mission, the mission leaders were given annotated photographs and maps for study, and the leaders of these missions were shown their targets either from ground observation posts or from aloft in liaison-type aircraft. The mission phase consisted of the deployment of the controller equipment, deployment of observers, the controlling of the strike aircraft, and the execution of the individual strikes.

The various type missions were conducted much as had been planned. The preplanned 24-aircraft

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missions attacked their targets at scheduled times with a planned ordnance loading selected for the particular target. Prior to these missions, all aircrews had been thoroughly briefed and had made a detailed study of annotated maps and photographs. In view of the detailed prebriefing, most of these strikes had less difficulty in identifying their targets and in prosecuting an attack against them, but it was nonetheless difficult to orbit a large formation of aircraft on a close-support target and still retain the close formation which was needed for attacking the target, this within an acceptably short period of time. Most of the fighter-bomber wing critiques also pointed out that pilots could hardly expect to get such elaborate prebriefings at a time of fluid ground operations. The 8-aircraft strip alert missions were conducted by crews who were put on an alert during a specific period of time. These crews received a general briefing but they were not informed of the description or exact location of their targets. At the time desired, the division initiated a request for an immediate air strike through army request channels. The JOC processed this request and scrambled the aircraft, and in this interval the target information was passed from the division to the Mosquito controller or TACP who was to control the strike. When the fighter-bombers arrived they were controlled to their targets by the Mosquito or TACP, and a final post-strike visual reconnaissance was made of the target by a Mosquito. In the 4-aircraft air alert mission, the fighter-bomber strike force was placed on an air alert over a corps area at a specific time, again without foreknowledge of the target to be attacked. At its arrival over the corps, this flight was advised to stand by for a call from a division controller. The Mosquito controller was then given the target, and he made a prestrike reconnaissance. When the division desired the strike, the Forward Air Controller (FAC) contacted the fighter-bomber flight and directed it to the target area. The fighter-bombers then rendezvoused with the Mosquito and the attack was coordinated, controlled, and assessed in the same manner as the strip alert mission.[84]

These air-ground operations experiments produced next to nothing of any value looking toward an improvement of the existing air-ground operations system. The planning phase had been normal everyday routine work for air personnel, and while the briefing phase had been handled in an exemplary manner in all divisions the air officers believed that such elaborate, frontline briefings were not actually required in order to conduct a satisfactory mission. Nothing new was developed in the strip alert and air alert missions. The Fifth Air Force had hoped to get some positive results with the novel 24-aircraft massed close-support attacks, which could be reasonably expected to be effective and highly demoralizing to the enemy. The maximum effectiveness of such attacks, however, depended in getting all aircraft on and off the target in the shortest period of time: if an air attack took longer than three minutes it obtained little shock effect, and, if a ground attack was planned to follow such an air strike, no time could be wasted. The conclusion was that fighter-bomber units would have further to refine their tactics and formations in order to reduce their time on target. In all types of missions it was brought to the attention of observing ground personnel that near misses in mountainous terrain did little or no damage to pinpoint targets. It was again made evident that fighter-bomber attacks could be controlled much more effectively in such terrain by Mosquito controllers than by a forward air controller on the ground.[85]

During the course of the experiments several air officers had occasion to comment on the inadvisability of such an endeavor which exposed personnel to an unnecessary risk of life.[86] One of these experiments—the socalled operations SMACK—drew adverse comment in American newspapers and was the subject of a congressional investigation. Operation SMACK was the air-ground operations experiment conducted by the 7th Infantry Division, with the support of the 58th Fighter-Bomber Wing, on 25 January 1953. To add reality to the exercise, the division commander decided to conduct a daylight raid on "T-bone" hill with the objective of capturing prisoners, and, as customary in maneuvers, the 7th Division issued a stiff-backed, mimeographed operations order and time schedule, which it labeled a "scenario." In the attack, two infantry platoons were supposed to jump off in coordination with tank artillery fire and air strikes, but because of such factors as the slowness of the infantry in launching the attack, failure of the platoons to close vigorously with the enemy, loss of the shock effect of the air strike, and inability to secure prisoners the operation was

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not considered successful. Friendly losses were 3 men killed and 61 wounded. The Department of Army explained the circumstances of operation SMACK to a congressional committee, but the operation nevertheless precipitated a violent reaction in the American press, which unfairly emphasized stories that American lives had been lost in a needless demonstration viewed by high-ranking officers.[87]

Despite the adverse publicity of operation SMACK and the fact that the air-ground operations experiment had produced nothing of value looking toward an improvement of the existing air-ground operations system, Generals Barcus and Taylor determined that the interest engendered by the demonstrations had been worthwhile. An added interest had been created in the subject of air-ground operations, and the personal contacts developed between air and army personnel were valuable. They therefore decided that at least once in each four months each U. S. infantry division would conduct a joint air-ground operation to include formal planning conferences and briefings of interested air and ground officers. The air effort required for such training, however, was to come from the normal JOC-alert commitments.[88] The Barcus-Taylor report of the joint operations experiment was apparently never formally approved by General Clark, but his successor as CINCFE, General John E. Hull, on 20 October 1953 approved this report, which had been tendered by Generals Barcus and Taylor on 16 March 1953. At this time General Hull observed: "It is worthy of note that the Air-Ground Operations Experiment in Korea proved of considerable value in reaffirming the basic principles set forth in established doctrine." He further noted that a "demonstrated improvement in operation efficiency [had been] accomplished by the thorough orientation of air and ground commanders and staffs." [89] *

Although much discussed over a long period of time, the CINCFE air-ground operations experiment was productive of little more than training values, but the attention which these tests focused upon the air-ground operations system gave rise to a smoother functioning of the close-support system. General Barcus went on record with the statement that: "Advancements of marked significance for future warfare were made in the theory and practical use of aircraft for close support of ground troops." [90] How the air-ground operations system was developed in the last year of the Korean hostilities will be seen below.

DEVELOPMENTS IN THE JOINT AIR-GROUND OPERATIONS SYSTEM

Expansion of the Joint Operations Center: Parallel levels of command for air and ground forces within a theater of operations require a coordination of effort which is achieved at the army-tactical air force level through the agency of the joint operations center (JOC). Such a JOC is composed of army personnel who form the air-ground operations section and air personnel who form the combat operations section. The primary function of the JOC is to unify the efforts of air and ground forces, while major sub-functions include the exchange of battle information and the direction of day-to-day operations. The JOC is thus the hub or center of air effort, into which flows information, intelligence, and air requests, and most tactical air activity is a result of decisions reached and directives issued in that agency.

In its organization and functioning the JOC established in Korea generally followed the doctrinal dictates of the *Joint Training Directive for Air-Ground Operations*, but in the Korean theater special modifications had to be made in recognition of the presence of Marine and Navy air units whose employment had not been contemplated in the doctrinal lessons of World War II.

The 1st Marine Air Wing operating in Korea, after a few months of semi-autonomous activity in the autumn of 1950, was very effectively and smoothly integrated into Korean air activities, but certain procedures were nevertheless adopted in recognition of the fact that the Marine wing was a balanced task organization, capable of independent operations, and would desirably maintain its integrity and capabilities for independent air task force actions. Although this wing was under the coordination control of the Fifth Air Force, wherever possible the Fifth exercised its

*General Hull desired that air-ground tests should be continued "for the purpose of further exploring the broader utilization of artillery forward observers and air observers and air observation posts, as well as the improvement of artillery methods of shifting fires for target identification and flak suppression." *See* p. 215.

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control over subordinate Marine wing units through the commander of the wing. Only in one circumstance did Fifth Air Force officers deal directly with Marine air units: because these Marine wing units were split between two widely separated bases in South Korea, the JOC scrambled Marine strip alert flights to execute immediate close-support missions without going through the wing commander. Preplanned Marine air missions, however, were handled as follows: each morning the 1st Marine Air Wing forwarded a daily wing intention schedule to its liaison officer at Fifth Air Force headquarters, and later in the day the Marine liaison officer presented these intentions at the daily Fifth Air Force planning conference. At this time the Marine wing intentions were approved or altered as necessary to conform to the over-all tactical air plan, and the resultant decisions were published as a Marine annex to the tactical air force daily operations order.[91]

Navy air operations were not satisfactorily integrated with those of the Fifth Air Force in the Korea JOC until the last few weeks of the Korean hostilities. In August 1950, after some initial confusion, a Navy liaison group had been established at the Fifth Air Force, its duties being to coordinate the effort of naval forces with that of the Fifth Air Force in support of the Eighth Army. The primary mission of this naval liaison group was to provide methods for the rapid interchange of information and the processing of various requests for desired naval air actions. The liaison group, for example, kept the Fifth Air Force and naval forces afloat conversant with each other's planned operations and passed these activities' requests upon each other for air-sea rescue, target and rescue cover, reconnaissance, and other forms of support. With the Army G–2 Air and G–3 Air, the naval liaison group coordinated close and general support strikes which were to be made by naval aircraft and exchanged target information, photo interpretation reports, and general intelligence. While this liaison with Task Force 77 was said to have permitted the JOC to "cope with situations as they arose," [92] the senior naval liaison officer did little more than to pass information and requests from the Fifth Air Force or Eighth Army, and he had no authority to commit the fleet to a desired action. The Fifth Air Force was frequently hard pressed to make up supporting air strikes which were accepted and then suddenly cancelled by Task Force 77, and the JOC seldom received on the results of naval air strikes the kind of detailed reports which it needed to be conversant with the tactical air situation. The continuous wave (CW) radio communications between Task Force 77 and the JOC were frequently uncertain and, at best, unable to handle more than one-tenth of the volume of traffic that was needed.[93]

During the first two years of Korean hostilities, Seventh Fleet reluctance to participate wholeheartedly in the work of the JOC most likely stemmed from an expressed feeling that it had to hold itself constantly ready to execute its primary missions and that "diversions such as supporting the air forces or Army effort must be subordinated to a category of 'as feasible.'" [94] When supporting ground forces in the early months of Korean hostilities, Task Force 77 had displayed an inclination to work directly with the Eighth Army rather than to participate in the JOC.[95] To some extent this tendency to bypass the combat operations section of the JOC continued until a reformation in late June 1953. The Eighth Army G–2 Air Target Branch, in coordination with G–3 Air in the JOC, for example, submitted general support of Cherokee targets directly to the Navy, without any consultation with the Fifth Air Force. "Coordination of target selection between the Army, Navy, and the Air Force," stated the final joint air-ground operations report for the Korean hostilities, "was not satisfactorily achieved prior to the integration of Navy air operations in the JOC and the daily planning conferences toward the end of hostilities in Korea." [96]

Late in June 1953 the commanders of the Fifth Air Force and the Seventh Fleet determined that the air combat operations of both services had to be integrated in order to inflict maximum damage upon the enemy with greater efficiency and economy of force. At this time the Seventh Fleet accordingly granted the JOC a positive control of close-air-support assignments and of Cherokee target selection. To effect this change of policy, the fleet established a naval member of the JOC (NMJ) whose stipulated duties were analogous to those of the director of operations of the Fifth Air Force. The NMJ was specifically charged with the selection of targets for naval aircraft in support of the Eighth Army, and he was further

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charged to institute such naval air operations as were necessary to insure an effective combat coordination of naval air with the operations of the Fifth Air Force. The NMJ mainly discharged his responsibilities for target selection and assignment in concert with the representatives of the other services at the JOC daily operations planning conference, held each day at 1300 hours. Here targets were allocated, missions laid out, and numbers of aircraft committed. The commander of Task Force 77 provided the NMJ with his operations intentions each day, 24 hours in advance, and the NMJ notified the task force commander daily, 12 hours in advance, of the assignment of aircraft to immediate and preplanned missions in the enemy forward areas. He further provided the task force commander with information concerning fleeting targets as they were located. The NMJ was assigned the additional duty as senior naval liaison officer with the Fifth Air Force, and, as such, he operated a naval air operations center which maintained current information concerning the movements of fleet naval aircraft, the location of naval surface units, and functioned as a local fleet message center.[97]

The action whereby the Navy liaison section became an integral part of the JOC was hailed by FEAF as "the final step in creating the centralized control so necessary to successful tactical air operations," but FEAF also observed that "it came too late to have any real effect on the course of the war."[98] The final joint report on air-ground operations in Korea, prepared by representative Army, Air Force, Marine, and Navy officers, recommended that on appropriate occasions in future conflicts there would be a definite requirement for "the integration of all services in a manner similar to that accomplished in the last month of the Korean War." This board also recommended the establishment of an approved and official joint doctrine for air-ground operations which would facilitate the training, organizing, and equipping of all three of the military services.[99]

In the last month of Korean hostilities, when the Navy had agreed to participate integrally in the work of the JOC, belated efforts were made to establish adequate communications between the JOC and Task Force 77. During most of 1950 the JOC had possessed no direct communications with the naval task force, but late in that year, when Task Force 77 had agreed to get into communication with the JOC, efforts had been made to arrange a radio teletype circuit between the Fifth Air Force and the fleet. Navy representatives, however, had discounted the practicability of a radio teletype circuit, and, as a result, a manual continuous wave (CW) radio circuit had been established between Task Force 77 and the Fifth Air Force in January 1951. The JOC also had voice communications channels with the Seventh Fleet and Task Force 77 through the JOC liaison net. In July 1952, however, the senior naval liaison officer at Fifth Air Force had stated that communications between himself and the forces afloat were "severely handicapped." The air administrative net was incapable of meeting traffic demands, and communicating delays and signal lapses occurred frequently in both the CW and the voice nets.[100] If these communications channels were insufficient for the functioning of a naval liaison officer, they were clearly inadequate for the work of the NMJ, and thus, effective 12 July 1953, an AN/GRC-26 radioteletype circuit with on-line cryptographic facilities was opened between the Fifth Air Force and Task Force 77. Early tests on this circuit were not satisfactory, but by the end of the month, after antenna installations and frequencies had been changed, the circuit was judged to be reliable for approximately 70 percent of a 24-hour period. In August, depending on propagation conditions, the circuit was reliable for approximately 18 to 20 hours each day.[101] At a special meeting on 15 September 1953, Fifth Air Force and Navy communications officers outlined the communications requirements between naval and tactical air force units in combat air support of land campaigns. They established the need for one duplex radio teletype circuit between the JOC and the naval task force, which would be expected to be reliable from 12 to 18 hours each day. In addition to this radio teletype circuit, which would handle the bulk of traffic when it was operational, one manual CW circuit was needed as a back-up facility. For the broadcast of general information and operational traffic to naval units, one high frequency CW broadcast circuit, operating simultaneously on three frequencies, was needed. Finally, one high frequency voice radar reporting circuit was required in order to relay radar information between units of the tactical air force and the naval

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task force. The radio teletype, CW broadcast, and manual CW circuits would need to have a capability for reaching any naval unit operating within a 1,000 mile radius from the JOC. Such communications facilities, which far exceeded anything available during the fighting in Korea, were judged to be "essential to insure satisfactory communications" between air force and naval units.[102]

The Tactical Air Operations System: The tactical air operations system employed by the Fifth Air Force provided the tactical air commander with the organization and equipment required by him to plan, direct, and control air operations. The highest echelon in this system was the combat operations section of the JOC which was an integral part of Fifth Air Force headquarters and operated under the direct supervision of its director of operations. The 5th Communications Group provided the "hot lines" and other communications channels through which the JOC possessed immediate communications with all tactical air wings assigned or attached to the Fifth Air Force.

The 502d Tactical Control Group provided the necessary in-flight control of aircraft utilized in the tactical air effort and furnished radar surveillance of the Fifth Air Force area of responsibility. The group's 605th Tactical Control Squadron operated the Tactical Air Control Center (TACC),* which was physically adjacent to the JOC in Seoul, while the group's 606th, 607th, and 608th Aircraft Control and Warning Squadrons operated Tactical Air Direction Centers (TADC's) at Kimpo, Cho-do, Kuska-bong, and Kangnung. The primary function of these TADC's was aircraft control and warning within their areas of operational control. Assigned to each of these AC&W squadrons was one detachment which operated either MSQ-1 or MPQ-2 bombing director radars, and one of these Tactical Air Direction Posts (TADP's) supported each of the American corps in Korea. A Marine TADP was customarily employed in support of the 1st Marine Division.†

The most forward elements of the tactical air operations system were the Tactical Air Control Parties (TACP's) and the Tactical Air Coordinator, or Mosquito functions. When the fighting had begun in Korea the Fifth Air Force had expected to provide the visual control of supporting air strikes through the agency of the Forward Air Controller (FAC) in the TACP, and it had expected that the FAC would operate from some visual vantage point on the ground, as had been the case in World War II. Korea, however, was so mountainous that a controller on the ground was frequently unable to find a suitable observation post for directing air strikes, and in July 1950 the Fifth Air Force had begun to send out airborne tactical air coordinators in T-6 trainer aircraft, which were popularly designated as "Mosquito" control planes. To handle both the TACP and the Tactical Air Coordinator functions, the Fifth Air Force on 25 April 1951 had established the 6147th Tactical Control Group (Provisional) which included the 6148th and 6149th Tactical Control Squadrons (Air) and the 6150th Tactical Control Squadron (Ground). The first two squadrons handled the Mosquito controller function; the last squadron provided the TACP's. On 20 June 1953 the 6150th Squadron was discontinued and replaced by the regularly constituted 942d Forward Air Control Squadron.[103]

The Fifth Air Force also provided an Air Liaison Officer (ALO) for each corps and division headquarters. These ALO's were experienced pilots, and their principal duties required them to serve as the direct representative of the Fifth Air Force commander at their places of assignments and to advise the local ground commanders and their staffs as to air operational procedures and the capabilities and limitations of air power. In Korea these ALO's were also required to exercise operational control over the TACP's which assisted the ground units wherein the ALO's served. This anomalous and time-consuming additional duty was changed effective 20 September 1952, at which time the 6147th Tactical Control Group designated a Flight Commander Forward Air Controller for each of the three American and

*Although certain changes in joint air-ground operations terminology were made in the U. S. armed services during the course of the Korean hostilities, these changes were not effected in Korea until 30 August 1954. The following changes in terminology took place at that time: the tactical air control center (TACC) became the air control center (ACC); the tactical air direction center (TADC) became the control and reporting center (CRC); the tactical air direction post (TADP) became the target director post (TDP); and the tactical air control party (TACP) became the air control team (ACT).

†*See* p. 222.

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two Korean corps in the battle line. These flight commanders relieved the ALO's of logistic and administrative responsibilities for the TACP's, thereby permitting the ALO's to serve in their doctrinal capacity as air advisors to corps and division ground commanders.[104]

Most of the general air support communications facilities in Korea were provided by the 502d Tactical Control Group. Radio, principally very high frequency/frequency modulation (VHF/FM), proved to be the most satisfactory means of transmitting the tremendous volume of messages involved in the air support function, and approximately 95 percent of the traffic load was handled by means of various types of radio equipment. The number of circuits and the terminating points employed within the 502d Tactical Control Group approximated those for any typical tactical control group. The somewhat unusual employment of TACP's and tactical air coordinators in Korea, plus the mountainous terrain which interfered with VHF radio transmissions and receptions, nevertheless demanded communications which were adapted to the local situation. Between Fifth Air Force and the JOC and the 6147th Group base at Chunchon were one teletype circuit and one telephone circuit, both provided by the Eighth Army through its local switching central in Chunchon. The telephone and teletype circuits were backed up by a high frequency voice radio net in which the TACP's attached to corps and divisions were included.[105] Because of frequent outages and overloadings of normal communications channels, however, an additional radio network was provided for handling immediate operational messages between a FAC or tactical air coordinator and the JOC: during all daylight hours, the 6147th Group kept a radio relay C-47 on station approximately 20 miles behind the front lines, which immediately forwarded transmissions from an airborne coordinator, or FAC, or a fighter-bomber flight directly into the TACC in Seoul. Forward air and ground units were required to report vital flight and strike information through this radio relay team, and the JOC also depended on it for relaying its orders or information to units at the scene of action.[106] This VHF channel served well to expedite communications between the front lines and the JOC, but it was realized that the C-47 relay aircraft would have been very vulnerable to enemy air attack.[107] Air liaison officers normally used common user communications facilities at regimental, division, and corps levels. In emergencies and instances of inoperative circuits, they possessed high frequency radios for communicating with the TACC and with adjacent ALO's.[108]

The Air-Ground Operations System: By doctrine the air-ground operations system comprises army personnel with necessary equipment for participating in air-ground operations at all echelons of army command and at the airfields of tactical air units. The highest echelon in this system was the Air-Ground Operations Section of the JOC, which was staffed by a G-2 Air and a G-3 Air, who, together with their Air Force counterparts, comprised the Operations and Intelligence Branches of the JOC.* The principal task of the air-ground operations section in the Korea JOC was to present Eighth Army requirements for offensive and reconnaissance air support. This section also supervised the activities of the Ground Liaison Officers (GLO's), one of whom was attached to each tactical air group in Korea.[109] These GLO's assisted in briefing pilots prior to their departure on missions and interrogated them on points of interest to the ground forces on their return from missions; they kept army personnel in the JOC informed of information obtained from returning pilots.

The personnel and functions of the field agencies of the air-ground operations system generally conformed to doctrine. In infantry battalions and regiments an Assistant S-3 (Operations) officer served additionally as S-3 Air. The corps and divisions, however, had primary duty G-2 Air and G-3 Air officers, and the place of duty of these officers was normally in division and corps Fire Support Coordination Centers (FSCC's). To request an immediate air strike, the battalion S-3 normally dispatched a message over organic communications to the division G-3 Air, who consolidated these battalion requests and forwarded them over the air request net directly to the JOC. At the corps FSCC, the corps G-3 Air monitored all immediate air strike requests, indicating his approval by maintaining silence. Preplanned air strike requests went up from battalion, through regiment, through division, and through corps,

*See Chap. VII, pp. 253-54 for a discussion of the establishment of a reconnaissance branch in the JOC.

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being evaluated and consolidated at each echelon before arriving at the JOC.

The status of Eighth Army communications and the static nature of the Korean fighting had their peculiar effects upon air support request procedures. The *Joint Training Directive for Air-Ground Operations* contemplated that the division G–3 Air, the regimental S–3 Air, and the battalion S–3 Air officers would be provided "special radio equipment" for the transmission of air support requests within the division. As early as March 1951 a joint Eighth Army-Fifth Air Force air -ground operations board had recommended "that a separate air request net be established to handle air requests between the front lines and the division FSCC and that the use of the VHF Tactical Air Direction Net between the Regimental TACP, Mosquito, the Division TACP, Mosquito Mellow [the radio-relay C–47], and the JOC be used only as an emergency measure." The Eighth Army had cautioned its subordinates that the tactical air direction (TAD) net could be used only for emergency requests of air strikes. Apparently a few division tactical air request (TAR) nets of the type contemplated by doctrine had been set up, but it was said that their operation was made frequently uncertain by local Chinese voice jamming and by terrain obstacles.[110] Shortly after the air-ground operations board recommended that the division tactical air request nets should be established, the Eighth Army wired itself in for a period of static ground operations coincident with the truce talks, and it was apparently decided that these regular wire communications could be used for requesting close-support missions. These wire communications were frequently overloaded with administrative traffic, with the result that battalion S–3 officers not infrequently met delays when they attempted to call for an immediate air strike. In compliance with step 8 of the CINCFE program for the improvement of air-ground operations, several divisional tactical air request radio nets were established with locally available SCR–193 and AN/GRC–9 radio sets. It was decided, however, that quantities of organic equipment and personnel were insufficient to permit the operations of these division air request nets. Most units, moreover, believed that separate TAR nets within the division were unnecessary, since existing wire and radio communications could be used for the purpose.[111]

The Eighth Army air-ground request net, which passed requests for air strikes from divisions, through corps, to the Eighth Army communications center in Seoul, utilized radioteletype sets AN/GRC–26, which, in the case of the lower echelons, were physically located in the division and corps FSCC's. The necessity for encoding and decoding the messages transmitted over this AN/GRC–26 net necessarily slowed the passing of immediate air requests, but in a remedial action demanded by the CINCFE program this difficulty was somewhat mitigated in the winter of 1952–1953 by a supplemental installation of Signin equipment.[112] Another defect in this air-ground request net was not so easily overcome: the Eighth Army communications center was located approximately five miles from the JOC, and into this center came requests from the various division and corps FSCC's, each on a separate teletype machine, and these requests had to be transmitted from the communications center to the JOC on one machine. This bottleneck greatly slowed traffic and raised a further problem of transmission priorities among the various corps requests.[113] The Eighth Army air-ground request net should have been backed up by direct voice communications, including a direct telephone circuit between the JOC and the several corps FSCC's.[114]

The inadequacy of Eighth Army air-ground request communications, stated the final Korean air-ground operations board, "produced a completely false and misleading system" for handling immediate air support requests. In order to equalize the traffic load on the G–3 air nets, ground units were required to submit requests for immediate strikes on a prescribed schedule starting at 0100 hours each morning. The result was that few of the targets submitted were legitimately "immediate" and most of them could have been better handled as preplanned targets. Such targets as caves, personnel and supply shelters, mortar and artillery positions, which might or might not have been occupied at the time, were considered acceptable as immediate targets. And while approximately one hour elapsed between the time a request for an air strike was submitted to the A–3 duty officer in the JOC and the time on target of the fighter-bombers, as much as 17 hours might have elapsed between the time that a battalion originated the request and the time that the target was actually attacked. Since the ground front was

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generally static these delays did not trouble ground units too greatly, and during times of genuine ground emergency, or when fleeting targets at the front needed attack, the FAC or the TAC in the forward area used his VHF control radio to call the target directly to the TACC, through the airborne Mosquito relay aircraft. In such event, the JOC diverted airborne planes to the attack. This procedure held two serious faults: it overloaded air control channels with air requests which should have been handled by army communications, and the channel of communications was potentially subject to interruption due to the vulnerability of the unarmed C-47 Mosquito relay aircraft.[115]

Beginning in June 1952, in recognition of the static ground front, the Eighth Army undertook to emphasize the more efficient preplanned close-air-support missions. The Eighth Army and its corps and divisions developed targets for this program, and a G-2 Air Target Branch was established in Eighth Army headquarters to provide a processing agency for the preplanned air targets. Each day G-2 Air Targets prepared an army priority list, which, together with annotated photos, was passed to the Air Force target division, where it was incorporated into the target recommendation sheet presented at the daily planning conference. Some of the initially adopted procedures and techniques proved detrimental and had to be corrected. At the beginning of the program, emphasis was put on quantity and not quality of targets, and the corps were allowed to submit an unrestricted number of targets for preplanned support missions. In December 1952, the procedure was changed, and the corps were allowed to submit only as many targets as the G-3 Air at the JOC authorized. As a result of this artificiality, targets submitted became more lucrative. At first, the corps were instructed to say whether they wanted a target to be attacked by day by fighter-bombers, or to be destroyed by a TADP-controlled attack, or to be harassed by a TADP-controlled attack, but it was recognized that the corps did not have personnel qualified to make these decisions, and in the last months of the war a new procedure was instituted whereby the corps submitted targets and the Fifth Air Force determined the method of attack and the ordnance to be employed against them. The rigidity of administrative procedure involved in this process, although acceptable in view of the static ground front, made it less responsive to changes in the ground situation than was desirable: after target priorities had been assigned and an operations order had been drawn up it was difficult to reschedule these preplanned air missions to take cognizance of a rapidly changing tactical situation. There was some possibility, however, that these problems could have been met by a wider dissemination of target files and folders to attack and control units, thus providing them with alternate targets which would have permitted speedy changes in air plans.[116]

Tactical Air Control Parties: By doctrine, tactical air control parties (TACP's) are teams especially organized and equipped to control close-air-support strikes to their targets in the vicinity of forward ground elements. As constituted in Korea, these parties comprised a pilot who served as forward air controller (FAC), one radio operator, and one radio mechanic. Until October 1951, Fifth Air Force tactical wings had furnished pilots to serve as FAC's on 60-day detached service tours, but after this time the two Mosquito squadrons of the 6147th Tactical Control Group provided these controllers from their own resources. Under the new system, the FAC's usually flew a number of Mosquito missions before being assigned to an 80-day tour with a TACP, after which tour they returned to the Mosquito squadrons to complete a flight tour. Rotation of the airmen serving with TACP's depended upon the availability of personnel, but the 6147th generally sought to relieve them after 60 days in the field.[117]

Prior to the autumn of 1952 the Fifth Air Force, charged by doctrine to allocate TACP's on the basis of legitimate need, allotted one TACP to each U. S. corps, division, and regiment, one to each British division and brigade, one to the Turkish brigade, and one to each ROK corps and division.[118] Such an allocation to the units of the ROK army was admittedly inadequate, but in the earlier days of the Korean fighting the TACP's with ROK troops had not infrequently been deserted when these units retreated in disorder before enemy attacks. In October 1952, when ROK discipline had improved, a second TACP was assigned to each ROK division. In the autumn of 1952 the 6147th Group also trained three Korean TACP's and sent them out for on-the-job training in the field with the ROK I Corps. An effort was made to secure personnel for two additional

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ROKAF TACP's, but delay was met due to the requirement for a speaking knowledge of English and a general disinclination of ROKAF pilots to serve as FAC's. The total number of TACP's in the field at one time varied with the commitment of ground units in the Eighth Army line, and in the last year of the war the number of these parties actively engaged averaged between 48 and 60.[119]

The generally mountainous terrain of the Korean battleground and the characteristics of the communications equipment available to the TACP's in good part determined their tactical employment. Despite some little experimentation with other type vehicles, the jeep had remained best fitted to transport the TACP radio equipment. During the several years of the Korean fighting, however, the modifications of these radio jeeps progressed from the Mark I with 4 channels of VHF communications, to the Mark II with 10 VHF channels, to the Mark III and the Mark IV with 16 VHF channels, and the later models of these jeeps had a remote control system which theoretically allowed a FAC to control air strikes from observation posts on the front slopes of hills while his jeep was parked in the shelter of a rear slope.[120] In actual practice, however, the TACP jeep was at no time a satisfactory vehicle for front-line radio control work in Korea: it was rough on fragile electrical equipment, frequently out of order for mechanical reasons, and at once too small for the paraphernalia of a control party and too large to approach forward observation posts in rugged terrain. What the FAC's actually required for controlling air strikes from forward observation posts was a portable VHF set which had a minimum of 10 channels of communications. Completely cognizant of the need for such a portable radio, the 6147th Group obtained AN/TRC-7 radio sets in July 1951, but these portable sets were found to be totally inadequate: they had only two VHF channels, which had to be preset and pretuned at some rear echelon of maintenance. One of these channels had of necessity to be set on the reporting-in-and-out (RIO) frequency which was common to all fighter-bomber wings, and this left only one channel on which a fighter-bomber strike could be worked. In April 1951 the Fifth Air Force requisitioned enough MAW-8 VHF portable radios to equip all TACP's, but these Marine sets were found to require crystals which were not available for the frequencies used by Fifth Air Force aircraft. Although operational requirements were stated for the needed portable VHF radio, the Fifth Air Force did not obtain suitably modified MAW-1, 10-channel sets, until April 1953, and these sets were not put into field use until July 1953 because of an additional delay met in securing crystals for them. Reports from the TACP's in July 1953, moreover, indicated that the MAW-1 sets were not as desirable as expected because of troubles arising from power sources and inferior crystals.[121]

Since their radio equipment did not permit them to work at frontline observation posts, the TACP's were commonly located at the fire support coordination center (FSCC) of the ground unit to which they were attached. The corps TACP was stationed at the corps artillery FSCC, where it could work with the G-3 Air and the G-2 Air. The division TACP was stationed at the division artillery FSCC, and the regimental TACP was normally stationed at the regimental command post, which was usually near the regimental fire control center. At these fire direction centers, the FAC could use the ground communications lines to forward army units and to the forward artillery observation posts, and from such a point of vantage the FAC could arrange for artillery cooperation, including flak suppression and the marking of close-support targets with smoke shells. When supporting air strikes came in, these several TACP's handled them in the following manner: the TACP at the corps FSCC funneled the fighter-bombers to the appropriate division for further instructions; the TACP at the division FSCC determined whether the air strike could be controlled by a regimental TACP or by a Mosquito. If the strike was to be controlled by a Mosquito, the division TACP gave this airborne controller all the pertinent information he needed; if the regimental TACP was to control the strike from a ground observation post (in this case the regimental TACP would have left the regimental command post and have gone forward to work with a battalion) the division TACP directed the fighter-bombers to the proper regimental area. When a critical ground situation necessitated it, either the corps or division TACP, acting as instructed by the local ground commander, could divert supporting flights to the highest priority targets in its sectors. If the strike was to be controlled by a Mosquito, the regimental TACP arranged

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an artillery marking round and flak suppression and then monitored the mission. In this case, the TACP would have previously furnished the airborne Mosquito controller with information as to the exact target location and its description, the exact location of the nearest friendly forces to the target, and other necessary flight information. If the strike was to be controlled by the regimental TACP, this party usually went forward to a battalion, arranged for artillery marking rounds and flak suppression, and then visually guided the planes to their targets. The TACP also directed all visual reconnaissance of specified areas within the bomb line, such reconnaissance being made at the discretion of the Mosquito after having evaluated enemy defenses and flak hazards.[122]

Because of terrain and communicating problems, Mosquito tactical air coordinators actually directed the vast majority of strike aircraft to their close-support targets in Korea: during these hostilities some 93 percent of close-support missions were directed by Mosquito controllers whereas only 7 percent were directed by the FAC of a TACP. Many individual forward air controllers were said to have spent their entire three months tour with frontline units without visually controlling an air strike. On 12 March 1953 the Fifth Air Force stipulated that each FAC must control at least one close-support strike per month in order to maintain proficiency, and in the period of 1 April through 30 June 1953 the forward air controllers controlled a total of 149 close-support strikes, many of them against training-type targets.[123]

During the extensive European ground campaigns of World War II, the U. S. Army Air Force had allocated air-support parties only to corps and divisions, except for armored divisions in the Third Army which were given an air-support party for each more or less independently operating combat command, organizations which were approximately comparable in size to regiments. In World War II, the control party attached to a division had customarily remained at the division command post, a central location at which the position of frontline troops was generally known and from which communications were available to frontline infantry and artillery units. In such circumstance, the air controller could not visually direct close-support strikes, but he was able to notify the supporting artillery of an approaching air mission and to get the artillery to mark the target with smoke. Statements from generals commanding ground units during World War II had indicated that no deficiency existed in such an allotment and employment of air control parties.[124] Having observed the 1st Marine Division, which in Korea had an allocation of one integral TACP for each battalion, the Eighth Army in the autumn of 1950 developed and thereafter tenaciously clung to the position that a TACP should be provided for each infantry and tank battalion in infantry, armored, and airborne divisions, and for each regiment and division of these types of forces. This meant that the Eighth Army wanted from 13 to 15 TACP's attached to each infantry division, instead of the 4 which the Fifth Air Force provided in Korea.[125] The Eighth Army also desired close-support strikes to be visually controlled by a battalion TACP located at a forward air observation post, and one of its evaluation reports said that the "weakest spot in the control system in Korea" was the frequent inability of forward air controllers to undertake visual control of air strikes.[126]

Although the Fifth Air Force rebutted each argument offered by the Eighth Army as to why it needed 13 to 15 TACP's per division,* it was quite willing to enter any cross-servicing agreements which promised to improve the operational capability of control party equipment. The problem of maintaining TACP vehicles and signal equipment at a distance from other air force units was quite difficult: travelling 6147th Group maintenance teams visited the parties at the front as often as they were able, and, where possible, each TACP was accompanied in the field by a back-up radio jeep. Early in 1952 a team representing the U. S. Joint Tactical Air Support Board visited Korea and concluded that simplified maintenance of TACP signal and vehicular equipment would result if the Army furnished all such equipment and enlisted technicians to operate it. This board contemplated that the Air Force would continue to provide the forward air controller in each of the TACP's. Such a delineation of responsibility was acceptable to the Chiefs of Staff, U. S. Army and USAF, who on 2 July 1953 notified their subordinates of a realignment as follows: the U. S. Army would be responsible for furnishing, maintaining,

*See AHS-72, pp. 202–205.

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an artillery marking round and flak suppression and then monitored the mission. In this case, the TACP would have previously furnished the airborne Mosquito controller with information as to the exact target location and its description, the exact location of the nearest friendly forces to the target, and other necessary flight information. If the strike was to be controlled by the regimental TACP, this party usually went forward to a battalion, arranged for artillery marking rounds and flak suppression, and then visually guided the planes to their targets. The TACP also directed all visual reconnaissance of specified areas within the bomb line, such reconnaissance being made at the discretion of the Mosquito after having evaluated enemy defenses and flak hazards.[122]

Because of terrain and communicating problems, Mosquito tactical air coordinators actually directed the vast majority of strike aircraft to their close-support targets in Korea: during these hostilities some 93 percent of close-support missions were directed by Mosquito controllers whereas only 7 percent were directed by the FAC of a TACP. Many individual forward air controllers were said to have spent their entire three months tour with frontline units without visually controlling an air strike. On 12 March 1953 the Fifth Air Force stipulated that each FAC must control at least one close-support strike per month in order to maintain proficiency, and in the period of 1 April through 30 June 1953 the forward air controllers controlled a total of 149 close-support strikes, many of them against training-type targets.[123]

During the extensive European ground campaigns of World War II, the U. S. Army Air Force had allocated air-support parties only to corps and divisions, except for armored divisions in the Third Army which were given an air-support party for each more or less independently operating combat command, organizations which were approximately comparable in size to regiments. In World War II, the control party attached to a division had customarily remained at the division command post, a central location at which the position of frontline troops was generally known and from which communications were available to frontline infantry and artillery units. In such circumstance, the air controller could not visually direct close-support strikes, but he was able to notify the supporting artillery of an approaching air mission and to get the artillery to mark the target with smoke. Statements from generals commanding ground units during World War II had indicated that no deficiency existed in such an allotment and employment of air control parties.[124] Having observed the 1st Marine Division, which in Korea had an allocation of one integral TACP for each battalion, the Eighth Army in the autumn of 1950 developed and thereafter tenaciously clung to the position that a TACP should be provided for each infantry and tank battalion in infantry, armored, and airborne divisions, and for each regiment and division of these types of forces. This meant that the Eighth Army wanted from 13 to 15 TACP's attached to each infantry division, instead of the 4 which the Fifth Air Force provided in Korea.[125] The Eighth Army also desired close-support strikes to be visually controlled by a battalion TACP located at a forward air observation post, and one of its evaluation reports said that the "weakest spot in the control system in Korea" was the frequent inability of forward air controllers to undertake visual control of air strikes.[126]

Although the Fifth Air Force rebutted each argument offered by the Eighth Army as to why it needed 13 to 15 TACP's per division,* it was quite willing to enter any cross-servicing agreements which promised to improve the operational capability of control party equipment. The problem of maintaining TACP vehicles and signal equipment at a distance from other air force units was quite difficult: travelling 6147th Group maintenance teams visited the parties at the front as often as they were able, and, where possible, each TACP was accompanied in the field by a back-up radio jeep. Early in 1952 a team representing the U. S. Joint Tactical Air Support Board visited Korea and concluded that simplified maintenance of TACP signal and vehicular equipment would result if the Army furnished all such equipment and enlisted technicians to operate it. This board contemplated that the Air Force would continue to provide the forward air controller in each of the TACP's. Such a delineation of responsibility was acceptable to the Chiefs of Staff, U. S. Army and USAF, who on 2 July 1953 notified their subordinates of a realignment as follows: the U. S. Army would be responsible for furnishing, maintaining,

*See AHS-72, pp. 202–205.

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and commanding the equipment and personnel (less the forward air controller) of tactical air control parties. The communications equipment involved was to be compatible with and possess the same channel spacing as that used in aircraft. The USAF would be responsible for providing the forward air controllers, for directing aircraft through the forward air controllers, and for allocating the frequencies which would be employed in close-air-support communications. The effective date of this transfer of functions was established as 1 January 1954.[127]

This USAF concession which agreed that the Army would own and control all of the personnel and equipment of the TACP with the exception of the forward air controller was of extreme significance because of the TACP was one of the air facilities which was useful to an air commander in placing bombs on a target. This agreement, moreover, did not settle the probdem as to how many TACP's would be assigned to an army division. This matter continued in dispute in Korea and when a joint board considered the record of close air support at the close of these hostilities it filed a split opinion on the matter.[128]

When the final Korean air-ground board report was written, Army, Navy, and Marine Corps representatives recommended that TACP's (with FAC's) should be provided for each infantry and tank battalion in infantry, armored, and airborne divisions, and for each regiment and division of those types of forces. Their reasoning was that the U. S. Army had to be organized, trained, and equipped for prompt and sustained combat operations on land. The Army's combat effectiveness, they said, depended on the state of training of its battalions, and the effectiveness of the battalion-team demanded that all elements of this team be integrated and trained together. These men urged that a forward air controller could be integrated into the functioning of a battalion only when he was continuously present in the battalion. "It is not believed that this training can be achieved to a satisfactory degree," they said, "with the forward air controller being assigned on other than a full time basis." The forward air controller, they stated, "must be a part of the battalion, and he must understand his importance to that battalion, in order to achieve for it the highest degree of effective close air support."

The Fifth Air Force representatives on this joint board conceded that the Army might be warranted in maintaining TACP's, less forward air controllers, in such battalions as were in reserve: such a decision might be justified by a need for organizational integrity and in recognition of the problems which arose when delicate radio equipment had to be shifted from one location to another over rough roads. The assignment of forward air controllers to inactive units, or even to all battalions, however, presented an entirely different problem. The board had agreed that a forward air controller was most desirably a fighter-bomber pilot of flight leader capabilities. Given this qualification as a prerequisite, the Fifth Air Force representatives demonstrated the waste of highly skilled personnel that would result if Army demands were met. In Korea, for example, the Eighth Army was posing a requirement for the assignment of 364 forward air controllers, an unrealistic requirement when compared to the Fifth Air Force's total combat authorization for only 525 fighter-bomber pilots, of whom approximately 140 might be supposed to be qualified to lead flights and thus to serve as forward air controllers. These figures were even more revealing when it was considered that, in a normal situation, approximately one-third of the forward air controllers would be assigned to units in the reserve. The Fifth Air Force representatives therefore concluded that the Army requirement for TACP's was "unrealistic and has not been established on a realistic basis."

During the Korean hostilities a frequent ground criticism had been that forward air controllers were insufficiently versed in ground force tactics and served too short a tour to become properly indoctrinated in such tactics and techniques. Demurring to the truth of this charge, the Fifth Air Force had pointed out that the FAC was supposed to provide the experience and understanding of a combat pilot while his ground force counterpart—the S–3 Air officer—was supposed to provide the experience and understanding of a ground officer. The Fifth Air Force had nevertheless extended the tours of forward air controllers from 21 days, to 60 days, and then to 80 days, the latter length of temporary duty having been put into effect when the two Mosquito squadrons of the 6147th Group began to furnish the forward air controllers.[129] By requiring the 6147th Group to supply all forward air controllers, the Fifth Air Force

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had simplified the administration of this program, but, in good part, the pilots who had been assigned to the Mosquito squadrons and who had also served tours as forward air controllers had had very little experience in fighter-bomber work.* Thus in August 1953 all representatives on the air-ground operations board admitted that the experience level of forward air controllers had not been of the desired fighter-bomber flight leader category. The board therefore recommended that in the future forward air controllers should be provided from fighter-bomber wings on a temporary duty basis. It further suggested that the Navy could legitimately furnish a proportionate share of forward air controllers, thus increasing the availability of such controllers and integrating personnel from all air services into the operational system.[130]

During the course of the CINCFE air-ground operations experiments and thereafter, the Fifth Air Force made continuing efforts to "make more efficient use of [artillery] forward observers and the fire support control center in close air support missions." An air SOP, implemented by Eighth Army instructions, required artillery observers to render assistance to fighter-bomber pilots over the joint scene of action frequency.[131] During the course of these experiments, no one had questioned the proposition that a forward air controller had to be an experienced pilot. On 20 October 1953, when he gave his approval to the report of the air-ground operations experiment, General Hull nevertheless desired that "additional tests be conducted in Korea . . . for the purpose of further exploring the broader utilization of artillery forward observers and air observers and air observation posts."[132] FEAF questioned whether this somewhat vague language meant that air strikes were to be controlled by artillery forward observers, and the FEC J-3 Staff indicated that such was indeed the intent of General Hull.[133] Since this proposal was not only in violation of doctrine but also contravened a long established policy that a forward air controller had to be an experienced pilot, FEAF informed the Fifth Air Force that any proposed test which required artillery observers to control air strikes needed FEAF's prior and explicit approval. "In any air-ground operation, either routine or special test," FEAF stated, "it is imperative that the controller, either ground or airborne, be a qualified fighter-bomber pilot."[134]

Mosquito Tactical Air Coordinators: Under the exceptional circumstance of friendly air superiority in Korea, the Mosquito tactical air coordinators gave yeoman service, and they were in fact the principal means of directing supporting fighter-bombers to their targets at the front lines. The origin and early functioning of the Mosquito squadrons has been told elsewhere,† and in the last year of the war the 6148th and 6149th Tactical Control Squadrons (Air) were authorized a total of 52 LT-6G aircraft, 78 pilots, and 26 Army observers for this airborne control function. In this last war year, pilots assigned to these two squadrons were fresh from the zone of interior and without prior experience in Fifth Air Force tactical air units. After an intensive five-day classroom course in the 6147th Tactical Control Group, the new pilots were checked out in an LT-6 and then returned to their Mosquito squadron where they flew a minimum of six tactical Mosquito missions with a combat tactical instructor pilot and eight more such missions with a senior Army observer. On his fifteenth mission, the trainee pilot was given a combat proficiency check ride by an instructor pilot, and if he completed this test the trainee pilot was assumed to be combat capable. After his 20th mission, the pilot was dispatched for an 80-day tour as a forward air controller, and after the completion of this temporary duty he returned to a Mosquito squadron, where he was rechecked, and then flew the remainder of his 100 combat missions. The aerial observers were supplied on temporary duty by Eighth Army combat units. These observers attended ground school with trainee pilots, flew six missions with a combat instructor pilot, eight missions with an experienced combat pilot, and received their combat capability checks during their fifteenth mission. Each observer was given combat capability rechecks every 20 missions during the remainder of his Mosquito tour.[135]

Early in the Korean war hostile air and antiaircraft artillery opposition had been slight and enemy troops had revealed a reluctance to fire at a Mosquito lest they give away their positions. In these months unarmed T-6 aircraft had roamed the front lines at treetop height and had pene-

*See p. 217.

†*See* AHS-71, pp. 25-26; AHS-72, pp. 191-195.

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trated far within enemy lines with relative impunity. During the truce talks, however, the enemy built up flak along its front lines and posed hazards to air operations in this sector. In context with the enemy's defenses in the last year of the war, the T-6 Mosquitoes were required to maintain a 6,000 foot altitude, except for such time as was needed to mark targets and assess the results of a fighter-bomber strike. They were not allowed to fly beyond a line drawn approximately two miles north of and parallel to the bombline. In spite of these operational restrictions, the Mosquitoes continued to furnish valuable services. During daylight hours five Mosquitoes were regularly kept on station, one in front of each army corps. In fluid situations many more Mosquitoes went on station: on four or five occasions on 17 July 1953 up to 28 Mosquitoes were airborne at the same time. The first Mosquito took off 30 minutes prior to sunrise, and the last sortie for the day left a corps area when ground objects were no longer distinguishable because of darkness. Missions were normally two and one-half hours long, and the number of missions flown in any one day depended on the number of daylight hours. Upon arriving on station at a corps area, each Mosquito crew reported in to the TACP at the corps headquarters for a subsequent working assignment to a division TACP. Each Mosquito also made a visual reconnaissance of possible enemy targets along the front lines, either on its own volition or as requested by a division TACP. When directed to do so by the TACP with which it worked at the front, and such was usually the case, the Mosquito undertook the "seeing eye" direction and control of fighter-bomber close-air-support strikes.[136]

The methods which the Mosquito used in controlling the fighter-bombers and identifying their targets necessarily varied with weather, types of targets, terrain features, target location, and the type of the fighter-bomber. The first concern of the Mosquito was to locate the target and to make observations as to its nature, its position in relation to friendly elements, its position in relation to prominent land marks, obstructions to its approaches, and other factors incidental to its destruction. After the Mosquito had located and confirmed the target and had so informed the TACP, he was ready to control a strike. His next problem was to make a rendezvous with the fighter-bombers. Ordinarily a TACP coordinated this rendezvous: if the target was beyond the vision of the forward air controller, he normally instructed the fighter-bombers to proceed to a prominent landmark near the target. Before leaving the vicinity of the TACP the fighter pilot made radio contact with the Mosquito controller and informed him of the azimuth of approach. Ordinarily the fighter-bombers orbited at 15,000 to 18,000 feet higher altitude than the Mosquito, both while making rendezvous and when receiving special attack instructions. After the rendezvous was made, the Mosquito described the target in brief and concise terms. Communicating with an appropriate FSCC through the local TACP, the Mosquito gave the signal on which friendly artillery fired a smoke shell to the vicinity of the target. These artillery shells did not usually fall on the target itself (in such case there would be a prima facie case that an air strike was unnecessary) but they provided a visual reference through which further adjustment to the target could be made. If positive identification of the target could not be made by verbal description or smoke shell reference, the Mosquito carried 2.25-inch or 3.5-inch marking rockets (the latter was found to be superior[137]), and he was required to place several of these smoke rockets on the target in one single pass. Once again, the smoke rockets did not have to be put precisely on the target but only near enough to provide visual reference points. If the target was still not successfully marked, the Mosquito was permitted to make a pass on the target, accompanied in close proximity by the flight leader of the fighter-bombers, who fired his machineguns through the pass for flak suppression. When the target was positively identified by the striking force, the Mosquito observed the attack by the fighter-bombers, calling out aiming corrections in clock positions and distances for the benefit of the successively attacking planes. When the strike was completed, the Mosquito reconnoitered the target and made a post-strike damage assessment.[138]

In directing offensive fighter strikes under the conditions met in Korea, the Mosquito tactical air coordinator had a considerable advantage over a TACP. In a condition where most targets were on distant slopes of mountains or hills, a TACP could neither accurately direct close-support strikes nor assess their results. Although mobile,

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the TACP frequently could not keep abreast of ground movements, particularly in a fluid battle situation. During the enemy push in July 1953, for example, land communications were disrupted, and the Mosquitoes were the only forward control elements which could furnish fighter-bombers and the JOC with immediate and on the spot information about enemy and friendly positions. The orientation capabilities of TACP's were quite slow in comparison with fast moving and short range jet fighter-bombers: because of terrain obstacles, low clouds, and haze restrictions to visibility, a forward air controller on the ground was sometimes so slow in locating and identifying approaching fighters that these jet aircraft were forced to depart the scene of action without striking. Finally, the Mosquito had much less trouble with radio malfunctions than did the TACP, whose jeep movements over rough terrain damaged electrical equipment.[139]

The Mosquito control function, however, was not without its difficulties and deficiencies. The training aircraft used for the purpose, the conventional LT-6G trainer, afforded a very poor observer vantage point and it lacked the power and rate of climb needed fully to exploit the potentialities of air controlling work. Lacking such operational advantages as self-sealing fuel tanks, the T-6 was highly vulnerable to enemy ground fire. Realizing the deficiencies of the LT-6G aircraft, FEAF in May 1953 asked USAF for enough modern T-28 trainer aircraft to fill the Mosquito function, but this request could not be approved because of continued engine support difficulties met in the T-28 program.[140] The weaknesses of the T-6 as an airborne control plane were so evident in the limited war in Korea that it was quite apparent that this obsolete aircraft would be completely ineffective in such a function in future hostilities.

In all fairness to the Mosquito squadrons it must be emphasized that these organizations maintained a high standard of personnel morale which derived from a sound indoctrination regarding the importance of the airborne control function, but it must nevertheless be admitted that the quality of pilots assigned to the squadrons was not as high as the desired standard for a tactical air coordinator. Most pilots assigned to the 6147th Group had never flown a fighter aircraft, and more than three-fourths of them had never served in a tactical air force unit. In the spring of 1953, moreover, some 35 pilots, who represented an overage in the Sabre wings, were assigned to the 6147th. Such circumstances as these led many new Mosquito assignee pilots to believe that they were being placed in a "catch all" organization. While, with few exceptions, the Mosquito pilots soon grasped the importance of their work, the fact remained that most of them did not have the requisite initial proficiency equal to that of a fighter-bomber flight leader; this a tactical air coordinator required for a satisfactory performance of his duty.[141] In other words, the average Fifth Air Force Mosquito controller did not have an experience background of at least 30 fighter-bomber combat missions (or 50 fighter-bomber tactical training missions) which he required in order to be able to direct other fighter-bomber pilots on a close support mission.[142] As for the observers who served as the second member of the Mosquito crew, the Eighth Army not infrequently sent men to the 6147th Group to serve as observers primarily because of some previous flying experience. Such officers did not necessarily possess that degree of knowledge about Army movements and weapons that was so vital to the Mosquito team.[143]

A serious tactical defect in the Mosquito control procedure was the fact that the enemy, observing a T-6 orbiting in their vicinity, immediately effected passive and active ground defense measures. Cognizant of this factor, as well as of the fact that a hovering aircraft could not expect to live against hostile enemy air opposition, but still faced with the proposition that a forward air controller on the ground could not direct strikes against a target which he could not see, the Fifth Air Force asked FEAF in May 1952 to look into the prospect of obtaining some kind of close-support radar equipment for use in Korea. It was known that USAF was developing a radar set AN/MPX-6 (or AN/GPX-16) which might be suitable for that purpose.[144] What the Fifth Air Force had in mind was a radar which would give the forward air controller a simultaneous visual reference both to the fighter-bombers and to the ground target. Col. James R. McNitt, Director of Communications of the Fifth Air Force, believed that this close control function might be accomplished by use of:[145]

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a small radar, preferably one which can be truck mounted and which has range of approximately 40 miles, altitude coverage to 12,000 feet, a very narrow beam for high azimuth definition and a high PRF [pulse recurrence frequency] for good range definition. By video insertion the ground picture could be put into the scope face. If this proved to be impractical a sufficient picture could be drawn on the face of the scope to provide the ground reference. The position of the attacking aircraft could be automatically shown thus providing the TACP controller with visual simultaneous reference to both fighter bomber and ground. Ground targets could be marked on the scope and the attacking aircraft guided with a certain degree of accuracy to the target. This guidance whenever possible would be range tracking for greater accuracy.

Pursuant to the FEAF request, USAF allocated five of the first AN/GPX-16 sets which were to come off production lines for field testing in Korea. Although the Fifth Air Force made all the necessary preparations to receive and test these new radars, the sets did not arrive in time to see service during the Korean hostilities.[146] Had this radar been obtained and successfully utilized, it would have eliminated the requirement for the vulnerable Mosquitoes and it would have undoubtedly speeded the accomplishment of a close-support strike.

In mid-1952, when the vulnerable Mosquitoes were forbidden to operate more than two miles beyond the bombline, the Fifth Air Force had to devise some system for guiding fighter-bombers to targets beyond the safe operating limits of the Mosquito yet near enough to friendly troops as to demand positive target identification. Such a system was also required in order to attain the advantage of surprise and to negate the advantages of the enemy's growing flak defenses. As a result of these requirements, the "Pathfinder" method of target attack was introduced on 20 July 1952. For this type of mission—which was said to be somewhat on the order of a combination of a close-support mission and an interdiction mission—the general tactics of an interdiction mission applied, with the exception that a pathfinder element was dispatched 10 minutes ahead of the main effort. This pathfinder flight, made up of two aircraft flown by the most experienced pilots in a tactical wing, reconnoitered and pinpointed the target. Upon reaching the target area, the pathfinders located the target from as high an altitude as possible and from as great a distance as possible, in order not to alert the enemy of the impending attack. At this time the pathfinders obtained a radar fix from a TADC, thus positively determining that there was no danger of an erroneous attack against friendly ground troops. Having established the objective, the pathfinder flight returned to a predetermined rendezvous point and intercepted the main fighter-bomber force. Assuming the lead in the fighter-bomber force, the pathfinder took the formation to the target, where the lead pathfinder peeled off and marked the target with his bombs. Ordinarily the number two man in the pathfinder flight stood by, and if the pathfinder leader missed the target with his bombs the number two man either verbally directed the remainder of the formation to the target with reference to the miss distance and direction of the first marking bombs, or else he went in himself and properly marked the target. After making his initial attack, the pathfinder leader returned to altitude, whence he corrected the bombing of successively attacking aircraft.[147] During the air-ground operations experiments in January 1953, the 8th Fighter-Bomber Wing got good results when it used a pathfinder to lead its 24-plane close-support strikes. After a mission on 17 January, this wing reported that the use of a pathfinder to identify the objective and to lead the main effort onto the target had been "highly effective," had speeded the mission, and had minimized the possibility of bombing friendly positions. This wing recommended that pathfinder aircraft should be used in all large close-air-support strikes, and that, in such an event, the Mosquito should stand by to monitor the attacks, to relay information to ground controllers, and to mark targets if requested to do so by the pathfinder.[148]

In Korea a general consensus of opinion acknowledged that Mosquito contribution to close air support was a major factor in the successful air-ground operations, but everyone who commented recognized the essential hazard of depending so heavily upon the Mosquito control system. General Van Fleet, in his criticism of close air support on 20 December 1951 suggested that an insufficient numerical assignment of TACP's to ground units had necessitated "undue reliance upon control by Mosquito aircraft, a practice that may prove unworkable against an enemy who can challenge our complete mastery of the air over the battlefield." In commenting on Van Fleet's sug-

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gestion, the Fifth Air Force agreed that the T–6 trainer, without armor or armament, had to be eliminated from the battle front, but it believed that an airborne tactical air coordinator would continue to be a requirement for close air support. It suggested that tactical reconnaissance pilots, flying high-performance aircraft, might perform a tactical air coordinator function.[149] The final Korean joint air-ground operations board recognized that there would be a requirement for tactical air coordinators in future air-ground operations. Noting that the Korean experience had proved that high-performance aircraft were "highly satisfactory" for airborne control, this board recommended that airborne controllers, flying high-performance aircraft, should operate from the fighter-bomber wing bases. In such an employment, the board believed that day-to-day problems could be more effectively coordinated and that more highly experienced personnel could be utilized for the airborne control work. Seasoned men, such as flight leaders and possibly flight commanders, could be fed periodically into control duties, thereby bringing into the control system the advantage of combat experience. Such a plan would admittedly place a greater load upon the ground liaison officers at the fighter-bomber airfields, who would have to collect and disseminate the full body of ground intelligence which these fighter-bomber airborne controllers would require for a satisfactory performance of their duty.[150]

Artillery Flak Suppression for Air Support Strikes: Prior to 23 July 1952 in Korea, "Plan Negat" curtailed friendly artillery fire during air support strikes in the forward battle area, and once fighter-bombers had reported into the front line area, division air liaison officers habitually restricted practically all artillery fire within a 25,000-yard radius of the target for the air strike. Only two exceptions were allowed: a friendly gun could mark the target with a smoke or white phosphorous round, and, in the short interval between the time that the Mosquito cleared the target area and the fighter-bomber strike, some flak suppression fire was laid on known hostile antiaircraft artillery positions. "Plan Negat" was satisfactory to neither air nor ground forces. After the completion of the short interval of flak suppression, hostile antiaircraft artillery and infantry troops could man their weapons and deliver unimpeded fire against the striking aircraft in the target area. During 1952 and 1953, moreover, the Communists habitually concentrated flak at any area in which they planned a significant ground attack. Machinegun fire from organic infantry weapons got heavier, and the enemy customarily put up a barrage of fire over targets which were marked by the Mosquitoes, forcing the attacking fighter-bombers to fly through a curtain of flak. As a result of these developments, close-air-support missions were increasingly hazardous to aircraft and aircrews: in mid-1952 the Fifth Air Force anticipated the loss of one aircraft for every 380 close-air-support sorties and damage to one aircraft for every 28 such sorties. Plan Negat also deprived friendly ground units of their artillery support in a circular area almost three miles in diameter for the 8 to 45 minutes in which a close-support strike was being executed. Such a restriction was a serious detriment to the friendly infantry on those occasions when they needed both air and artillery support. Plan Negat sometimes deterred the ground forces from requesting close-air-support strikes at critical junctures when this support would have been of great value.[151]

Plan Negat was intended to insure that friendly supporting aircraft were not endangered by friendly artillery fire, but apparently it represented a practice which had been instituted without any particularly definite information as to the nature of the extent of this hazard. During World War II the artillery had employed varying systems of limiting fire concurrently with air strikes, without making any definite analyses of the problem. There were, for example, varying opinions as to the horizontal and vertical dimensions of the areas from which friendly artillery projectiles had to be excluded and on the duration of these exclusion periods. There were no definite studies or analyses from which reasonable conclusions could be drawn as to the likelihood of friendly aircraft activating on-the-way proximity-fused artillery missiles. No one had evaluated the proposition that enemy ground fire, if unneutralized by continuing friendly artillery fire, might present a greater danger to friendly aircraft than would the continuation of friendly artillery fire.[152] That friendly artillery could destroy friendly aircraft, however, had been demonstrated in Korea on 3 June 1951 when a confused Mosquito controller had led a formation of supply-dropping C–119's into an artillery barrage

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and two of the cargo planes had been destroyed.*

As long as Fifth Air Force fighter-bombers made treetop height close-support attacks, Plan Negat had a definite utility, but, disturbed by an unnecessarily high ground-fire inflicted loss and damage rate to his fighter-bombers, General Barcus in July 1952 set 3,000 feet as the minimum recovery altitude for all dive-bombing attacks,† and this policy presumably cleared the way for the relaxation of some of the restrictions upon artillery fire during a close-support strike. After a meeting between air and ground officers on 23 July, the Eighth Army issued a new directive which superseded Plan Negat: VT-fused projectiles and high-angle fire were still prohibited, but restrictions on artillery fire during close-support strikes were eased and these restrictions were to be limited to the minimum time period needed by an air mission. A need for further improvements led to the issuance of the Eighth Army's "Plan Suppress" on 6 August, which was designed to provide increased uniformity and effectiveness in counter-flak artillery fire. Division and corps artillery were instructed to maintain plans for the neutralization of all known and suspected antiaircraft artillery positions within effective range of air strike targets. The limitations of the 23 July directive were maintained under Plan Suppress, but the plan definitely detailed how it would work: after making rendezvous with the fighter-bombers, the Mosquito would inform the appropriate FSCC of its need for flak suppression in a specified number of minutes; the FSCC prepared to deliver fire on call and informed the TACP which was in contact with the Mosquito of the general line of fire, the maximum ordinate, and the proposed duration of the fire; the flight-leader transmitted to the Mosquito controller, who relayed it to the TACP, his plan of attack during or immediately after the flak suppression; the fire was delivered when the fighter-bomber flight leader was ready for it; and the FSCC informed the TACP when the last flak-suppression round was fired. Fighter-bomber flight leaders were permitted a choice as to whether to use or to decline flak suppression.[153]

There was need for further experimentation in the use of artillery during close-support strikes, and accordingly, beginning on 25 September, a 30-day test was run in the IX Corps area. This test included prestrike flak suppression, and, in addition, all friendly artillery was allowed to fire while the close-support strikes were in progress. VT-fused fire was emphasized in the prestrike suppression of hostile flak, but it was prohibited while the fighter-bombers were attacking their target. After firing its last round of flak suppression, the artillery fired an additional marking round of white phosphorous or colored smoke to indicate that the area was clear of VT-fused rounds. As the fighter-bombers pounded their target, the artillery continued firing high-explosive rounds on known antiaircraft artillery positions, varying the volume of this fire from a maximum to a rate of one round every three minutes during the length of the air strike. The experiment was "decidedly successful." During the 30-day period in which 1,816 fighter-bomber close-support sorties were flown for the IX Corps, only one fighter-bomber was lost to enemy ground fire and only two major and 11 minor damages were sustained from the same cause. This significant drop in flak losses and damages occurred in spite of a three-fold increase in hostile antiaircraft artillery positions in the IX Corps area during the month. Not a single friendly fighter-bomber was lost or damaged by the friendly artillery fire, which included missiles from 105-mm. howitzers, 155-mm. howitzers, 155-mm. guns, and 8-inch howitzers. As a consequence of these favorable results, the Fifth Air Force requested and strongly recommended that a similar flak suppression plan should be implemented across the entire Eighth Army front.[154]

The flak suppression technique was extended across the entire Eighth Army front by regulations published by the Eighth Army on 29 November and by the Fifth Air Force on 2 December. The new system, effective on 6 December, encompassed a few changes from that used in the IX Corps test. Under the new procedure a Mosquito led the fighter-bombers to their assigned target, which it either marked for them with smoke rockets or with an artillery-fired smoke shell. When all fighter-bombers pilots had positively identified the target, the Mosquito orbited them out of the flak suppression area, and then, when the fighter-bomber leader was ready, he requested flak suppression. The Mosquito immediately relayed this request through a TACP to the FSCC, and received back a reply that flak suppression

*See AHS–72, p. 238.
†See Chap. V, p. 152.

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would commence in a given number of minutes. At this time the friendly artillery fired one VT-fused projectile per piece on all known enemy flak weapons within a radius of 2,500 yards of the target, and at the conclusion of the VT-fused fire the artillery fired one round of white phosphorous or colored smoke, which again marked the target and signalled that proximity-fused fire was completed. Without delay, the artillery then changed to fuse quick and continued flak suppression against known hostile positions for three minutes. When the phosphorous or smoke round was fired, the fighter-bombers immediately began their strike, and they desirably completed it within the three minute period of continuing flak suppression. If some delay in the execution of the air strike necessitated it, the FSCC would be requested to prolong the three minutes of flak suppression.[155]

In December 1952 the Communists continued to reinforce their frontline flak, but the new flak suppression techniques reduced the effectiveness of the hostile ground fire. On close-support strikes during this month only one aircraft was lost for every 917 such sorties flown, and battle damage was sustained by only one aircraft in 153 sorties. Varying by corps area, the average of flak suppression fired per fighter-bomber sortie was from 5 to 30 rounds. This loss and damage rate for fighter-bombers was not as good as it had been during the September-October tests, but the expanded system still had some flaws which would have to be worked out. The fighter-bombers, for example, were not always in a position to begin their attacks as soon as prestrike flak suppression was completed, and unless additional flak suppression was requested the last aircraft in the mission quite frequently were on the target too late to benefit from the 3-minute flak suppression. Air strikes had to be so rapidly executed that a Mosquito had very little time in which to correct errors in the aiming of the fighter-bombers. The Fifth Air Force was nonetheless confident that as more interest and experience were gained more effective flak suppression would be fired and combat crews would better utilize this suppression fire.[156]

During the spring of 1953 the Communists continued to augment their frontline flak, and, taking advantage of the shelter furnished by cloud cover, they concentrated weapons along those sectors of the front where they intended to make ground attacks. Thus, prior to making their attack against the Kumsong salient, the Reds established 20 antiaircraft guns and 43 automatic weapons in the IX Corps sector and 20 guns and 57 automatic weapons in front of the ROK II Corps. A record high of 250 automatic weapons in frontline areas was observed on 22 July.[157] Continued emphasis of artillery flak suppression kept fighter-bomber losses in close-support strikes at a minimum, and on 9 June 1953 the Fifth Air Force thought so well of the procedure that it directed all fighter-bomber leaders to call for flak suppression as a matter of routine on all close-support missions.[158] Benefiting from the friendly flak suppression, the Fifth Air Force lost only 17 aircraft and had only 147 damaged in close-support missions in January through June 1953.[159] During late March and early April, when ground action along the front was stepped up, the Fifth Air Force out of a total of 2,981 close-support sorties, lost only one aircraft and had four damaged. This extremely favorable ratio was bettered in May,[160] and in June out of 5,126 close-support sorties only four aircraft were lost, only 9 suffered major damage, and 43 suffered minor damage. Some part of these increased damages was believed due to a temporary relaxation of the 3,000-foot minimum altitude rule during this month.[161] During the combat operations of July 1953, the Fifth Air Force flew 12,122 combat sorties, of which almost half were in close support of ground troops. Although an exact breakdown of losses on type missions was not available, only 8 aircraft were lost to hostile ground fire and only 45 were damaged from the same cause during this month.[162]

At the end of the Korean war the joint air-ground operations board which met at Seoul stated that flak suppression for fighter-bomber close-support attacks had been "highly successful." The program had demonstrated that ground artillery fire did not need to be lifted during close-support strikes, unless the fire was very heavily concentrated or unless proximity fuses were employed.[163] In its analysis of the value of friendly artillery flak suppression, the final FEAF report on the Korean war found it difficult to assign a realistic value to the fact that the two opposing land forces had been long operating on a stabilized, well-established front. Both of these forces had more weapons available, better offensive and defensive positions, and more intelligence on each

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other's activities than could normally be anticipated in a fluid tactical situation. "Nevertheless," stated this report, "the conclusions are undeniable that friendly artillery, fired for flak suppression purposes during the conduct of close air support strikes in Korea, did reduce aircraft losses by a considerable amount and constituted only a minimum hazard to the attacking aircraft." [164]

Radar-Directed Close-Support Bombing: During the Communist offensives in the spring of 1951, the three MPQ–2 radars which were posted, one behind each of the three U. S. corps in Korea, had contributed mightily to the success of the UNC ground battle. On night after night, these tactical air direction post radars (or "Tadpoles") brought in B–29 Superfortresses, loaded with proximity-fused 500-pound general purpose bombs, to decimate Red ground troops at those intervals when they left shelter and gathered together for attacks against UNC ground positions.* In June 1952 the 502d Tactical Control Group was operating three of these TADP's: the two supporting the U. S. I and IX Corps had newer model MSQ–1 radars, and that which lay to the rear of the U. S. X Corps still had the older MPQ–2 radar. For safety's sake, the two MSQ–1 radars were backed up by the old MPQ–2 sets which they had replaced. Marine Air Support Radar Team One operated an AN/MPQ–14 radar in support of the 1st Marine Division. This same deployment was to continue in effect during the remainder of the Korean hostilities. Each of these radars was a modification of the old SCR–584 gun director radar. The AN/MPQ–2 had automatic tracking in azimuth and elevation only, while the newer AN/MSQ–1 also had provision for automatic tracking in slant range. The MSQ–1 also had a longer theoretical range than the older set, but the mountainous terrain of Korea fairly well cancelled this advantage. Accuracy of the MSQ–1, however, was somewhat better and its computer was more refined and faster than that of the MPQ–2. Each of these radars enabled a TADP controller to direct a bomb run and a bomb release against suitable targets under conditions of zero visibility or at night.[165] Both the MPQ–2 and the MSQ–1 sets were commonly referred to as "MPQ radars," and the blind-bombing system which employed these radars was called "MPQ bombing."

*See AHS–72, pp. 65–66.

Whether the equipment used was the MPQ–2 or the MSQ–1, the tactical employment of the Tadpoles was the same. The truck-mounted radars possessed a theoretical mobility but they remained in fixed positions during the last two years of the Korean war. They were each surveyed in at points as close as was safe behind the front lines, and their exact positions were determined from bench markers located to second order survey accuracy (1:10,000). Designation of targets for the Tadpoles was normally handled by the particular corps to which they were attached. Utilizing all sources of enemy information available to him, each Corps G–3 Air officer screened out potential targets and plotted them on a target work map. To request a mission against one of these targets, the G–3 Air established two pairs of eight-digit Universal Transverse Mercator (UTM) grid coordinates on an appropriate FEC emergency first edition 1:25,000 scale map: these pairs of coordinates marked the beginning and the end of the best straight line bombing run across the given target. The maps used in such calculations had been produced by multiplex stereoplotting and were considered to have an accuracy on the order of 50 feet; such maps were available to cover a distance to approximately 60 miles behind the front lines. The Corps G–3 Air sent the coordinates to the JOC for an approval of the mission, and if favorable action was there authorized they were passed back down through the TACC to the TADP. After this transmission, the TADP's usually checked the target coordinates directly with the Corps G–3 Air in order to insure that they had not been garbled. As soon as he had received these target coordinates, the TADP controller made the necessary parallax computations for both pairs and was then ready to control an air mission.[166]

The TADP controller could handle any type of aircraft that he could pick up on his narrow-beam radar equipment, but B–29 medium bombers and B–26 light bombers were the principal users of the system. The B–26's usually bombed from 12,000 to 14,000 feet and the B–29's came in higher at 16,000 to 18,000 feet. A B–26 normally exhausted its combat load of 10 x 500-pound bombs in a single run, but a B–29 usually made four such runs, dropping 10 x 500-pound bombs on each run. Except for these differences, the Tadpole radar bomb control technique was much the same for

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both type bombers. The bomber assigned to work with a Tadpole first reported to a TADC, which vectored it into a proper course on which it could be picked up by the narrow-beam TADP radar. The Tadpole controller made VHF contact with the pilot and located the aircraft on his radarscope. From the pilot, the controller obtained data covering the altitude of the plane and the type of bombs carried, and, using this information, coupled with a radar check on the ground speed of the aircraft, the controller computed intervalometer settings required to cover the assigned target and worked out the bombing problem. All the while this information was being passed, the aircraft was positioned and kept on course by the TADP and brought to a predetermined initial point, where the controller advised the pilot to open his bomb-bay doors. As the aircraft neared the proper release point, the controller began a count-down, and at "zero" the bombs were released. The pilot was subsequently informed when he was over the ground target in order that the crew might check its results visually by fire or smoke. As a safety factor to friendly ground troops, bomb runs were made as nearly parallel to friendly lines as possible, and no targets could be bombed within 1,000 yards of friendly troops unless in an emergency and after explicit approval by the JOC.[167]

Working at top speed and under conditions of maximum continuous operations, the controller-pilot combination in June 1952 was said to have been able to complete a Tadpole mission from initial VHF contact to bombs-away in an average of 11.5 minutes. During this month, the Fifth Air Force fed B–26's into the TADP at 20 minute intervals and B–29's (which made four runs per aircraft) at intervals of one hour and five minutes.[168] But in a period of a subsequent time study between 30 June and 15 October 1952 (when there was no need to expedite runs) some 200 B–26's completed their Tadpole runs in an average of 21 minutes, and 47 B–29's averaged 20.6 minutes in single runs over a Tadpole target. Each additional run over the same target by a B–29 required an average of 13.1 minutes.[169]

Tadpole bombing was first used exclusively for night operations, but in June and July 1952, when weather shrouded Communist troop and supply concentrations near the front lines, Mustang fighter-bombers of the 18th Wing began to make radar-directed bomb drops. In September 1952 these same Mustangs flew 63 combat MPQ sorties.[170] In November 1952, when hostile automatic weapons buildup around many front line close-support targets became too hot for fighter-bombers to handle, a system employing Tadpole-directed, daytime B–26 attacks had utility: in these missions, a B–26 formation, flying at an altitude above the effective range of hostile automatic weapons, was vectored onto a target run by a TADP, and when the lead bombardier sighted and positively identified his target the bomb run was continued visually.[171] In the spring of 1953, when the Communists timed their ground offensives to coincide with periods of bad weather, fighter-bomber Tadpole attacks were frequently employed. In such missions the Fifth Air Force employed flights of four to eight aircraft, and the flights flew a close fingertip formation, the second flight following very close and stacked either down or up. Following a steer given to him by a TADC, the fighter-bomber leader made contact with the Tadpole controller, who assigned him an altitude (10,000 to 15,000 feet) and airspeed and put the formation on its bomb run. The Tadpole controller notified the fighter-bomber leader when he was on the final approach, alerted the flight when it was time to arm its bombs, and then, about 15 seconds away from drop time, began a count-down cadence. At "zero" all members of the flight released their bombs, checked each other for hung ordnance, and then returned to their home base.[172] Utilizing these same tactics which had been pioneered by the Fifth Air Force fighter-bomber wings, the 1st Marine Air Wing began day and night Tadpole bombing on 8 March 1953. Seventh Fleet carrier-based aircraft first tried the MPQ technique on 23 May 1953, and they made extensive use of the radar bombing technique during June and July when foul weather prevented visual operations along the bombline.[173]

Under the conditions of Korea the Tadpole missions were generally "no sweat" operations. Since the Communists had very few radar controlled guns on their front lines, the B–29's and B–26's were often ordered to make fairly long and leisurely target approaches, parallel to the front lines and over enemy territory, to hold their air speeds constant, and to make no more than small corrections in course.[174] In a short period in early December 1952, however, the 3d Wing lost three

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This Page Declassified IAW EO12958

aircraft to hostile flak while working with the same TADP, and thereafter the TADP's were directed to vector B–26's onto their bomb runs at the minimum distance possible from the bomb release point. At this time, the B–26's were additionally limited to a single run against a given Tadpole target.[175] All VHF radio transmissions incident to Tadpole control were in the clear, and occasionally an enemy voice, pretending to be a controller, would come on the channel to give an erroneous steer or to ask about the accuracy of the flak. Some unwary pilots are reported to have replied to these questions and then suddenly to have found flak bursts all around them.[176] Although naval aircraft utilized the technique without aircraft loss, carrier pilots thought that the Tadpole bombing was apt to become dangerous. The commander of the *Philippine Sea* stated that conventional carrier-based aircraft should not be employed for MPQ bombing missions unless the entire run could be accomplished above or in a solid overcast. The relatively low altitude, slow speed, and steady course employed on these missions, he said, rendered propeller-driven aircraft extremely vulnerable to visually directed enemy antiaircraft fire when the planes went through breaks in the cloud cover. Navy pilots, who were also apprehensive about radar controlled flak, strongly recommended that the initial course and speed should be given to them by code or shackle.[177]

From the beginning of the employment of the technique, Tadpole night bombing met the especial favor of UNC ground commanders in Korea.* As employed in April and May of 1951 against enemy troop concentrations night-bombing B–29's had undoubtedly quenched several enemy offensives before they had gotten started. Such a continuing employment of B–29's against close-support targets, however, became standing operating procedure, and late in 1951, when the Communists had dug-in and dispersed along the battle front, the Fifth Air Force vice commander reported that "all ground units now expect at least a part of one aircraft load in their sector every night regardless of the degree of contact with the enemy." [178] More or less as a matter of routine, the FEAF Bomber Command therefore employed a B–29 on TADP-directed close-support missions (B–29 crews called them "Primer" missions) along the Eighth Army front, and when there was evidence of enemy activity to warrant it additional numbers of B–29's and B–26's were so employed.

At the same time that the radar-controlled close-support effort was generously provided to UNC ground troops in Korea, both FEAF and the Fifth Air Force became increasingly more skeptical as to the value of such effort against such targets as the Eighth Army was designating in the existing stalemated ground situation. Because most Tadpole missions were conducted under conditions of limited visibility against obscure targets in mountainous terrain, there was very little opportunity to observe the actual damage of such missions to the enemy. FEAF operational planners could nevertheless obtain some idea as to their potential effects on the enemy by analyzing the potential bombing accuracy of the Tadpole bombing system. In May and June 1952 the Fifth Air Force therefore conducted a controlled experiment which paired two 67th Wing RB–26's (which bombed and made strike photographs by daylight) with both MSQ–1 and MPQ–2 stations. Under the most favorable circumstances possible, the two RB–26's in 113 drops with MSQ–1 scored a CEP of 1,123 feet and in 58 drops with MPQ–2 scored a CEP of 1,223 feet. The CEP for the Tadpole system thus averaged out at 1,177 feet. Such an average circular error was reasonable considering the experience level of the radar operators, the condition of the equipment, and the practice of controlling the plane by voice. This study—called "Project Pinpoint"—concluded that the TADP radars constituted a valuable aid in the direction, location, and coordination of aircraft in all tactical support operations and noted that these radars were capable of directing an effective area bombing effort. Under the demonstrated accuracies, however, a single stick of 10 x 500-pound bombs had very little chance of destroying pinpoint targets, such as artillery pieces, which Eighth Army units frequently nominated for Tadpole attack. The study recommended that area type targets, of a size consistent with the demonstrated accuracies, should be chosen for future operations.[179]

The conclusions of Project Pinpoint were valid and pertinent, but the major difficulty in implementing them lay in the fact that Eighth Army units selected and designated the targets for Tadpole missions. Lacking a capability for develop-

*See AHS–72, p. 66.

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ing targets along the front lines, the Fifth Air Force assumed no responsibility for evaluating such targets or for recommending the proper weapons to be used in harassing attacks against them. It merely received and passed on the target coordinates of areas which the Eighth Army desired to be attacked. Fifth Air Force target experts did not see any targeting photography for such missions, and Eighth Army requests seldom characterized such targets in definite descriptive terms. Fifth Air Force operations officers nevertheless observed that the army not infrequently fed back into the Tadpole target system some targets which had been turned down in the JOC as unsuited or not valuable enough for fighter-bomber close-support attacks.[180] On 5 July 1952, moreover, an Eighth Army operations research organization, which had been studying the historical experience in MPQ-2 night bombing during the maximum effort of May and June 1951, concluded that only 50 percent of the Tadpole targets which had been recommended by the Eighth Army in this period could be classified as valid, while 28 percent were probably valid, and the remaining targets had been nonexistent. This study estimated that the MPQ bombing effort had attained only one-third of its possible effectiveness, and it noted that an improper selection of aiming points had contributed materially to this wastage of bombing effort. It recommended that a more accurate means of determining MPQ targets and selecting aiming points should be developed. In reviewing this study, the USAFFE commander found its conclusions to be open to question, since 31 percent of the bombs on which the study was based were classified as "missing," but he stated a belief that proper selection of aiming points and accurate bomb releases would at least double the effectiveness of MPQ close-support bombing.[181] Asked to comment on the report, FEAF stated that the small sampling of bombs used in the evaluation precluded acceptance of the study's conclusions and recommendations without a further detailed investigation of the whole problem.[182]

Although FEAF recognized that Tadpole bombing was not very effective against the scattered and pinpoint targets which were being designated for such attack, it made no objections until early August 1952, and then it acted in response to a request from General Van Fleet that a maximum B-29 effort be flown in front of the U. S. IX and the ROK II Corps on the nights of 31 July and 1 August. No especial ground fighting was underway, but Van Fleet alleged that such an allocation of effort was needed for four reasons: many "known remunerative targets" were available; unfavorable weather was hampering fighter-bomber close-support strikes; the enemy was undoubtedly aware that floods were complicating Eighth Army logistics and he had the capability to make numerous probes and limited objective attacks; presumably the enemy had also been hampered by heavy rains and his troops would be out in the open repairing flood damages and would be more vulnerable than usual, and, at any rate, such attacks would increase any difficulties which the enemy might be experiencing.[183] General Clark replied that any diversion of B-29 effort, except on genuine emergency missions, was not favorably considered, and he further informed General Van Fleet that neither FEAF nor the Fifth Air Force believed that available targets justified such a diversion of B-29's from their scheduled missions to Tadpole close-support strikes. In response to this CINCFE message, however, General Van Fleet insisted that lucrative Tadpole targets existed in great numbers: the Eighth Army, he said, had 173 targets suitable for B-26's and 110 suitable for B-29's. Van Fleet further explained that the Communists had been hurt by recent heavy rains and were more vulnerable than at any time for the past several months.[184]

In the round-robin of messages and discussions which followed the Van Fleet request for a maximum B-29 Tadpole effort, General Barcus, while disagreeing as to the suitability of some of the Eighth Army's targets, allocated a maximum B-26 effort to the IX Corps front, and General Weyland agreed to make three B-29's available for daily Tadpole employment during a test period. After a conference with General Weyland, General Clark informed Van Fleet that he was of the definite opinion that both Generals Weyland and Barcus were objective in their thinking and desirous of supporting the Eighth Army in every possible manner. He especially enjoined Van Fleet to work closely with General Barcus in the selection of "suitable" B-29 close-support targets.[185] This episode was thus settled, but it had revealed a serious divergency between Eighth Army and Fifth Air Force views as to what constituted an appropriate Tadpole target.

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Although General Van Fleet had spoken of great numbers of "known remunerative targets," a Fifth Air Force representative on 5 August declared that "except for training and heckling purposes the MPQ-2 effort at this time is completely wasted."[186] As has been seen, CINCFE, in his paper on air-ground operations issued on 11 August, directed his subordinates to resolve "the question of what constitutes an appropriate target for an air attack, especially those targets for MPQ-2 strikes."

In August 1952 the FEAF Bomber Command flew 37 Tadpole sorties and dropped 1,271 bombs. Although the medium bomber crews made diligent efforts to secure scorable strike photography which would permit bomb damage assessment, no evaluation of the results of these missions could be made because of a lack of proper prestrike photography. The Bomber Command commander believed that these MPQ attacks had had psychological effects, both on enemy and friendly forces, but his opinion was that they resulted in "insignificant destruction of enemy resources."[187] A Fifth Air Force assessment of the bomb damage photography of 54 B-26 radar-controlled bombing runs, made at about this same time, came to the conclusion that: "MPQ-2 operations are not very efficient." This assessment revealed that within an assumed target strip 100 feet wide only 16 hits were scored in an excess of 500 bombs dropped. This analysis further disclosed that many of the targets coordinates furnished by army units were not accurately located and that some of the radar controllers had not been using an optimum axis of attack against many of the strip targets.[188] These reports, coupled with the findings of Project Pinpoint, enabled Generals Barcus and Taylor to inform CINCFE in March 1953 that: "With the inherent effort of the MSQ-1 and MPQ-2 equipment only relative large area targets such as supply and personnel areas are suitable." In order to assist ground units in selecting and preparing MPQ targets, the Fifth Air Force drew up a single, nontechnical document which treated such matters as target vulnerabilities and concentrations, limitations of aircraft bombing accuracy and control, optimum locations of aiming points, optimum length of bomb runs, and other such kindred information needed for a proper understanding of an air target selection process.[189]

The Tadpole strikes undoubtedly benefited the morale of Eighth Army ground units and in some measure harassed the Communists. For this reason the Fifth Air Force used its light bombers liberally in such attack, and on special occasions in the static ground war the FEAF Bomber Command upped its routine allocation of one MPQ bomber to three MPQ bombers per night: such occasions were 10 through 16 October, coinciding with the ground activity accompanying the amphibious demonstration off the east coast of Korea, and 2 through 7 December, when the IX Corps was prosecuting an artillery duel along Sniper Ridge.[190] The 500-pound general purpose bomb remained the standard ordnance for Tadpole attacks, but FEAF was tolerant in substituting such other weapons as the ground forces desired for harassing the enemy. In January 1953, after ground officers had suggested that heavier bombs might be profitably used, FEAF had the B-29's drop 2,000-pound general purpose bombs, fused .1 nose and tail, against entrenched troops and bunkers. Even though this was not the most effective weapon for Tadpole bombing, FEAF saw some good in its use since there was an oversupply of these bombs in the theater and it was better to use them than to let them deteriorate in storage.[191] At the request of Eighth Army, the light bombers for the first time on 25 May 1953 dropped M-29 antidisturbance, or "Butterfly," bombs in certain areas across the front lines. Such bombs had been previously banned for Tadpole employment near the front lines for obvious safety reasons, but the Eighth Army, which kept careful account of where they were dropped, thought that they would be valuable for denying enemy use of active supply points and similar areas. Employed extensively during the Communist offensive in July 1953, the Tadpole-directed Butterfly bombs were later reported by Eighth Army intelligence to have been highly effective: POW's said that they were greatly demoralized when they encountered these antidisturbance bombs at night.[192] In front of the ROK II Corps in July 1953, the medium bombers dropped some 4,000-pound air-bursting general purpose bombs. There was no conclusive evidence regarding the results of the use of this ordnance, but FEAF felt that nothing was lost since there must have been some definite psychological effect on the enemy, who probably had become more or less accustomed to a lower order of explosives.[193]

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If FEAF thus tolerantly attempted to give the Eighth Army what it wanted in the way of harassing radar-directed bombing attacks, it nevertheless attempted to increase the destructivity of Tadpole attacks, and the measures which it employed toward this end proved effective when the Communist ground offensives during June and July 1953 bared the types of area targets which were best suited to Tadpole attacks. Although the BDA effort was hampered by a continuing lack of prestrike photography, both the FEAF Bomber Command and the Fifth Air Force made determined efforts to evaluate their Tadpole bombing accuracy.[194] The results of this sustained scrutiny were well illustrated by improved B–26 accuracy with this radar bomb direction system: during the period of January through March 1953, when 48 B–26 blind-bombing strikes were assessed, it was found that the light bombers had scored 1,420-foot CEP's, but in the period of April through July 1953, when 73 B–26 strikes were assessed, the light bombers were shown to have put 50 percent of their bombs within 804 feet of their aiming points. In the latter period, all personnel involved had made especial efforts to improve the accuracy of this type of bombing.[195] During the final three months of the war it was at last possible to make a calculation of the accuracy of B–29 ground radar controlled bombing: on the basis of complete data on 101 single B–29 strikes, the medium bombers scored an average Tadpole CEP of 1,300 feet. The operations analysts who computed this "unexpectedly large" CEP value suspected that poor target coordinates arising from inaccurate and unreliable map data might have been a major contributing factor to its magnitude,[196] but some part of the unfavorable comparison of B–26 and B–29 Tadpole circular errors must have been due to the fact that the medium bombers bombed from higher altitudes, which magnified endemic equipment and personnel errors.

During most of the Korean war the Fifth Air Force assumed very little responsibility for target evaluation and weapons selection of those Tadpole targets which the Eighth Army recommended for harassing attacks, but early in May 1953 the Eighth Army stated that such attacks were intended to destroy rather than to harass their targets. The Fifth Air Force promptly followed up this statement, and pointed out that the targeting of destructive Tadpole strikes became an Air Force responsibility since, to achieve destruction, consideration had to be given to ordnance, fusing, force requirements, and other related operational factors. The Fifth Air Force accordingly undertook the necessary Tadpole targeting for all missions, except for four to six B–26's which were set up each night for training, harassment, and to give corps commanders additional support for night patrols.[197] This procedural change, whereby the Fifth Air Force assumed responsibility for evaluating MPQ "force requirement" targets, proved salutary. During the Communist offensive against the ROK II Corps, for example, the Fifth Air Force accomplished first priority photography of the battle area, located targets on the photography, and dispatched these targets to appropriate air units for attack, before the Eighth Army could come in with requests for attacks. This excellent close-support targeting capability benefited both MPQ attack and preplanned fighter-bomber support strikes.[198]

As employed in Korea, the TADP's with their MSQ–1 and MPQ–2 radars insured that Communist front line troops received 24-hour air attacks, in all kinds of weather. The night and all-weather bombing capability which the TADP's permitted to FEAF aircraft meant much to the UNC war effort because the Communists habitually maneuvered and launched their ground troops in attacks during hours of darkness or in other conditions of limited visibility.

At times of critical ground operations, when the Communists offered area targets of sufficient density, TADP-controlled radar bombing was exceptionally lucrative. Thus on the nights of 20 and 21 May 1951, when a Red ground offensive was in progress, MPQ-controlled medium bombers launched proximity fused 500-pound bombs to destroy a regiment and a battalion of hostile troops on the front of the U. S. X Corps.[199] In June and July 1953 when Red ground offensives, timed to coincide with adverse flying weather, twice punctured UNC ground battle lines, the MPQ technique enabled UNC aircraft to pour enough air-delivered ordnance into the breaches to stop the enemy offensives. But in the static conditions of ground warfare which prevailed during most of the period of the truce talks, the bombing accuracy permitted with MSQ–1 and MPQ–2 was insufficient for effective attacks

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against the low density and pinpoint targets which were frequently scheduled. Because of the relatively large circular error bombing values achieved with these ground radar bombing director systems, the Fifth Air Force operations analysis office recommended that a pattern bombing procedure, using multiple aircraft, should be employed whenever practicable when this blind-bombing system was used.[200]

The joint air-ground board which summed up Korean operational experiences noted that increased enemy ground activities at night and during inclement weather had emphasized the value of tactical air direction posts. This board stated that it would be highly desirable if more TADP's could be provided across an army front, spaced in such a manner as to furnish a half-range overlap on each adjoining unit. Through such a procedure, all areas along the front line would be effectively covered by two TADP units, and two aircraft would be able simultaneously to work targets in the same general area. The procedure would also provide an emergency back-up for any given area in the event of equipment failure at a TADP. Thinking in terms of the combat operations during June and July 1953, this board also stated that there was a definite need for the assignment of a tactical medium bombardment wing to each tactical air force commander. Since a TADP had a limited working capability, it was obvious to the board that much greater ground coverage, especially of area targets, could have been effected under Tadpole control by a given number of B-29's than was accomplished by the same number of B-26's or formations of fighter-bombers.[201]

Flare Support for Ground Operations: While seeking a practical means of illuminating targets for night intruder attack late in December 1950, the 3d Bombardment Wing had demonstrated that a C-47 could transport large numbers of naval-type paraflares which could be launched through a "stove pipe" chute in the cargo door. The C-47 aircraft which were so modified for flare-dropping soon proved to be too vulnerable to illuminate the targets deep within North Korea which the B-26's desired to attack, but the unarmed transports nevertheless displayed great utility along the ground battle line. During the enemy offensives of January 1951, the illumination provided by airdropped flares permitted friendly UNC artillery to zero-in on enemy targets, and the light from the flares proved exceptionally demoralizing to the Communist infantrymen who habitually fought under the cover of darkness. Many UNC ground commanders initially mistrusted the illumination of their positions, but the "Firefly" aircraft were immediately popular with the ground soldiers. When unit commanders gained familiarity with an illuminated front, they began to request flare missions in increasing numbers. The C-47 Firefly aircraft also afforded illumination for low-level night air attacks against moving targets just behind the enemy's front lines. And in the spring of 1953 the Fifth Air Force also paired flare aircraft with interceptors in a generally unsuccessful attempt to break up the heckling Red air attacks against the Seoul-Inchon-Kimpo area. Although the flare aircraft thus had several potential tactical employments, the Fifth Air Force accorded a first priority claim to the task of illuminating the Eighth Army front lines.[202]

Originally organized as the Tactical Flight Section, 3d Air Base Group, the Firefly function long sought a proper administrative lodging in the Fifth Air Force. In early May 1951 this section was transferred to the 67th Tactical Reconnaissance Wing, where it remained attached to various wing units until 14 May 1952 when it was finally transferred to the special air missions section of the 6167th Air Base Group at Seoul Air Base (K-16).[203] At this base the Firefly function was integrated in Flight "B" of the 6167th Operations Squadron. For a mission which required it to perform psywar, clandestine, and flare flights, the 6167th Squadron was authorized 10 C-47's and 4 C-46's, and in recognition of the probability that such a number of aircraft would be insufficient to fill flare requirements in a renewed ground offensive the 315th Air Division (Combat Cargo) was required to modify 10 C-46's for emergency flare dropping. Each month in the spring of 1953 the 315th Troop Carrier Wing sent four C-46's to Seoul to assist Flight "B" with the added illumination requirements laid on it during each full-moon phase.[204]

The combat employment of the Firefly aircraft was carefully controlled in a manner befitting their capabilities and scarcity in number. Each Firefly transport was equipped to carry 150 Mark V or Mark VI naval type parachute flares, and they usually remained on station for three or four

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hours. Unless otherwise instructed, missions were normally flown at 10,000-foot altitudes, and the flares were primed in the aircraft and set to go off at approximately 1,000 to 1,500 feet below the plane. Each million-candlepower flare, drifting down to 2,000 feet, would there light an area of approximately one square mile.[205] Since the demands for flare aircraft steadily increased, the Fifth Air Force effected procedures necessary for their most efficient employment. All requests for flare aircraft had to be submitted to the JOC, and, when high priority targets appeared, the JOC was authorized to divert flare aircraft already airborne to handle them. Ordinarily, Firefly planes were held on a strip alert for a JOC scramble, but when friendly preplanned actions or anticipated enemy actions required it they were scheduled in the operations orders for airborne alerts. When flare aircraft were scheduled in support of Eighth Army units, they reported as directed by the JOC scramble order or the daily Fifth Air Force operations order to a predetermined orbit point and there contacted a designated TADC for instructions. After receiving these instructions, the Firefly pilot normally contacted a TADP for a steer to the position for its first flare drop, and having arrived there he dropped his flares as directed by the local TACP. The number of flares dropped on each run was at the discretion of the using agency, but the Firefly normally liked to set up an orbit which would permit successive drops just prior to the time that a flare burned out. After the first flare ignited, the ground controller instructed the Firefly where to drop additional flares, using the position of each flare as a reference point for the next drop. Since the usual Firefly orbit put it in a position to release flares every three to four minutes, it was quite important for the TACP to give the flare crew a release direction at such intervals. If the ground controller delayed in assigning flare release points too long, previous flares would burn out and reference points would be lost. Individual flare drops continued as long as needed, and the flare aircraft commander advised the using agency when he had 45 minutes fuel or flare supply remaining.[206] Because the C–46's and C–47's used for the work were slow and vulnerable, flare operations had to avoid areas of heavy flak concentrations, both enroute or returning from their targets and while over the target areas.[207] In deference to the operational characteristics of the two aircraft, C–46's were used as much as possible for flare operations.[208]

"The practice of employing flare aircraft in support of infantry night operations," concluded the Korean air-ground operations board in August 1953, "has proved basically sound . . . Army requests for flare aircraft utilization have been generally met in a satisfactory manner."[209] Flare operations were naturally heaviest in periods of special ground activity. Thus on the night of 29 March 1953 some 1,004 flares were dropped to assist ground troops defending "Old Baldy," and during July 1953 a total of 101 flare missions illuminated the battle front.[210] In normal operating procedure, the joint air-ground operations board admitted that flare aircraft were best employed when they were kept on a strip alert and ordered out to fly missions where and when they were most needed. This procedure, however, made for a lag of some 45 minutes before a plane could comply with a request for flare support. This delay was principally caused by the slow speeds of the C–46's and C–47's used for flare dropping, but some part of the elapsed time was attributable to delays in positioning of the aircraft for the release of its first flare. As an emergency measure, when flare requirements were immediate, most UNC divisions employed their liaison aircraft to drop flares, and this measure was satisfactory as a stopgap until the regular Firefly could get to the scene of the action. The air-ground operations board nevertheless recommended that some means should be used in future flare employments to assist a TADP in positioning the flare aircraft for its initial drop: it specifically suggested that ground-fired illuminants or searchlight reference points would help prevent an overloading of the TADP's and would generally expedite the initial positioning of a flare aircraft.[211]

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Chapter VII

RECONNAISSANCE, AIR TRANSPORT, RESCUE, AND WEATHER

The air pressure operations mounted by UNC fighter-bombers, light bombers, and medium bombers in the last year of the Korean war forced the Communist aggressors to accept military armistice terms which were suitable to the United Nations. Simultaneously with this air offensive, UNC ground forces maintained an active defense along their battle line. These combat operations—the air pressure offensive and the ground defensive—were directly supported by UNC air reconnaissance, air transport, air rescue, and air weather services. Without the sustaining effect of these several air activities, the air strategy which brought the Korean hostilities to a successful termination would have been impossible. While some of the operational accomplishments of these air activities have been noted, each of them had functional developments which were worthy of note.

RECONNAISSANCE

The Role of Air Reconnaissance in Korea: In the Korean hostilities aerial reconnaissance proved to be of even greater value than in any previous conflict, and it was by far the most valuable means available for obtaining intelligence of enemy activities. To the outnumbered UNC ground forces aerial reconnaissance was of critical importance. "It is the one positive means by which we are able to study the enemy's back yard," said an Army representative. "Its relative importance cannot be over-rated—we have to have it."[1] According to one survey made shortly after the end of the fighting, air reconnaissance accounted for approximately 44 percent of all intelligence produced by ground units, and in certain cases it provided as much as 95 percent of ground intelligence.[2] The information obtained from air reconnaissance was on countless occasions instrumental in denying the enemy ground forces the advantage of surprise.

To the UNC air forces photographic intelligence proved invaluable. It provided a means of ascertaining the enemy's air order of battle, both within North Korea and at the Manchurian airfields along the Yalu. Constant surveillance of North Korean airfields was maintained, and air strikes were made against them only when photographic interpretation revealed that they were nearing conditions of serviceability, thus permitting an economy of force. Oblique photos of Antung and Ta-tung-kou airfields, shot from the Korean side of the Yalu, provided a wealth of information about hostile operating characteristics. One set of dicing photos covered a flight of MIG's from the beginning of the take-off roll to its completion and provided positive answers to the long-debated question as to what length of runway a MIG–15 required.[3] Continuous surveillance permitted the accurate plotting of hostile antiaircraft artillery movements in North Korea, and photographic reconnaissance furnished some 80 percent of the information which was secured relative to the specific locations of enemy flak positions. The air pressure campaign demanded large numbers of diversified targets, selected with a view that their destruction would be costly to the enemy: photographic reconnaissance provided the basic information used in the compilation of air objective folders and target dossiers used in this major aerial effort. Finally, bomb damage assessment

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photography afforded air units a means of evaluating the success or failure of their offensive air campaign and its air actions.[4]

With smaller aircraft complements, UNC air reconnaissance units provided more reconnaissance than had been given by similar type units during World War II. The reconnaissance missions of the Ninth Air Force, which supported the air-ground campaigns in Europe, can be compared with those of the 67th Tactical Reconnaissance Wing which supported the air-ground campaign in Korea. Comparable time periods were July through December 1944 in Europe and October 1952 through March 1953 in Korea. The percentage breakdown of reconnaissance mission requests was approximately the same: in Europe 70 percent of the requests originated with Army units; in Korea 67 percent. In Europe 26 percent of reconnaissance requests came from the tactical air force; in Korea 31 percent. In Europe 2 percent of reconnaissance mission requirements originated in higher headquarters, and in Korea the same 2 percent so originated. In Europe 2 percent of requests came from miscellaneous originators. This comparison reveals that the several users requested about the same proportion of reconnaissance mission capabilities in Korea as had been the case in Europe. But when a comparison is made between the performance records of the 67th Wing with either the top-performing Ninth Air Force reconnaissance group, or a composite group average of the four groups in the Ninth Air Force, these proportions take on added significance. The highest number of sorties flown in any month by a single reconnaissance group in the European campaign was 1,300 in April 1945, and in Korea the 67th Wing flew 2,400 such sorties in May 1952. From D-day to VE-day in Europe the average reconnaissance group sortie rate was 604 per month, but in a similar 12-month period from April 1952 through March 1953 in Korea the 67th Wing averaged 1,792 sorties per month. In these same comparable periods the photo group which supported the Third Army in Europe made 243,175 negatives and the 67th Wing made 736,684 negatives. Furthermore, World War II negatives were generally 9 x 9 inches in size whereas more than 90 percent of Korean negatives were 9 x 18 inches. Taking into consideration this size difference, the photographic accomplishments of the 67th Wing may be said to have been approximately six times that of a similar unit which had supported the Third Army in Europe.[5]

The magnitude of the accomplishments of UNC air reconnaissance units in Korea will appear even greater when, as will be told below, the difficulties under which these units labored are considered. Had these difficulties not been met (and many of them could have been avoided if USAF reconnaissance programs had been kept in step with other air programs between the two wars) air reconnaissance accomplishments in Korea would have been even greater. Yet, despite these difficulties, the Korea air reconnaissance units had provided substantially more reconnaissance than had similar units in World War II, and it would be logical to assume that they should thereby have met or even exceeded the mission requests made upon them. Such, however, was not the case: from July 1952 through May 1953 the number of mission requests made upon the 67th Wing in Korea was 65 percent greater than the maximum capability for which the wing was programmed. Thus, while the reconnaissance units in Korea flew more sorties and accomplished more photography than did similar units in World War II, a still larger amount of reconnaissance was requested. FEAF thought it to be "highly doubtful that our resources could provide this scale of reconnaissance support for a global conflict."[6]

FEAF Reconnaissance Organizations: The FEAF air reconnaissance mission was beset with many difficulties, most of which were endemic to USAF reconnaissance programs. As has been seen in earlier studies, the FEAF reconnaissance capability had been quite small when the war began in Korea. There had been few advances in reconnaissance equipment and techniques since World War II, and reconnaissance aircraft and equipment had not kept pace with the jet air age. Because of a dubious economy which had severely curtailed reconnaissance aviation between wars, FEAF had been forced to rebuild a reconnaissance establishment during the first and most critical year of the Korean hostilities.*

Viewed in terms of visual and photographic requirements posed by military operations in Korea, the UNC air reconnaissance establishment which FEAF had in July 1952 was still both small and inadequately equipped. The Fifth Air Force pos-

*See AHS–71, pp. 97–101 and AHS–72, pp. 221–234.

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sessed the 67th Tactical Reconnaissance Wing, which was based at Kimpo (K–14) airfield. The flying squadrons of this wing were the 12th, 15th, and 45th Tactical Reconnaissance Squadrons. The 6166th Air Weather Flight was attached to the 12th Squadron for administrative and logistical support. At this time the 67th Wing possessed 27 B–26's and RB–26's, 21 F–51's and RF–51's, 36 F–80's and RF–80's, and 5 RF–86's.[7] In its laboratories in temporary buildings at Kimpo, the 67th Reconnaissance Technical Squadron provided quantity processing of film, quantity production of photographic prints, and photographic interpretation services. The Fifth Air Force additionally possessed coordination control over Marine Squadron VMJ–1, whose 10 F2H2P Banshee photo-jet aircraft were based at Pohang (K–3) airfield. When engaged in high priority photography, these Banshees customarily landed at Kimpo at the conclusion of their missions and gave their film to the 67th Reconnaissance Technical Squadron. Lower priority missions returned to K–3, where the film was processed by a Marine lab and forwarded to the Fifth Air Force.

Under the operational control of the FEAF Bomber Command and based at Yokota Air Base in Japan was the 91st Strategic Reconnaissance Squadron, Medium, Photo. In July 1952 the 91st Squadron possessed 13 RB–29's, and its capabilities were augmented by two detachments: Detachment No. 2 with 2 RB–45's and Detachment No. 3 with 4 RB–50's. In December 1952, Detachment No. 5 was attached to the 91st Squadron; this unit comprised B–29 aircraft and crews from the 581st Air Resupply and Communications Wing and was specifically charged with dropping psywar leaflets over North Korea.[8] The 548th Reconnaissance Technical Squadron, based at Yokota under the operational control of the FEAF deputy for intelligence, provided photographic, photographic interpretation, cartographic, and lithographic services to FEAF and FEC, and direct photographic technical support to the FEAF Bomber Command and its 91st Squadron.[9] As will be seen below,* FEAF also controlled several strategic reconnaissance weather squadrons which provided synoptic weather data in the Pacific and Far East.

In a normal delineation of responsibilities, the 91st Strategic Reconnaissance Squadron would have performed the long-range and strategic missions required to support the FEC, the FEAF, and the FEAF Bomber Command, and the 67th Tactical Reconnaissance Wing would have provided the tactical air reconnaissance required by the Fifth Air Force and the Eighth Army. Such a delineation of responsibilities is practical when the operating characteristics of reconnaissance aircraft are such that they can meet an enemy's defense in some degree of safety. During the Korean war, however, FEAF never possessed a reconnaissance plane which could safely expect to outrun, evade, or overcome the enemy's air defenses, most notably the MIG–15 jet fighters. Hence both the 67th Wing and the 91st Squadron had combinations of strategic and tactical missions, and both organizations performed the tasks which their aircraft could do and still live.

Because its aircraft were badly outclassed by the Communist defenses, the 91st Squadron generally avoided actively defended areas in Korea. Its RB–29's flew visual sealane surveillance missions off the eastern coast of Korea and the Russian maritime provinces and its RB–50's flew electronics reconnaissance patrols in the same area. Because of the MIG hazard, FEAF in October 1951 had restricted daytime RB–29 sorties to operations east of 127° East in Korea. Over these relatively safe areas, RB–29's continued to fly day photographic missions. The RB–45 jet bomber type photographic aircraft possessed by the 91st Squadron had more speed and somewhat more freedom of action than did the RB–29's but several narrow escapes from MIG interceptors showed them to be potentially vulnerable to Communist defenses. Even the slightest rip, tear, or battle damage hurt the RB–45's operational characteristics. To minimize the probability of their encountering hostile fighters, the RB–45's generally limited their day photographic activities to the eastern coastal section of Korea south of the 41st parallel. Although the 91st Squadron limited its day photographic excursions to the east-central section of Korea for safety reasons, the missions into this area possessed utility since the Fifth Air Force reconnaissance planes seldom got so far north and east.[10]

The Fifth Air Force's 67th Wing provided visual and photographic, and, to a lesser extent, electronics and weather reconnaissance. Visual

*See pp. 304–05.

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reconnaissance maintained a constant surveillance of the front lines, secured detailed information (with photographic verification) relative to enemy activities in the zone lying up to 50 miles behind the bombline, adjusted long-range field artillery and naval artillery, and searched out and identified targets beyond the bombline for fighter-bomber attack. For the Fifth Air Force, 67th Wing photographic reconnaissance was flown as required, and the requirement usually included airfield surveillance, rail line and marshalling yard surveillance, bomb damage assessment, targeting, flak analysis, and area basic cover missions. Photo services provided to the Eighth Army included front line cover, front line obliques, rear area mosaics, and photo verifications of visual observations. To the FEAF Bomber Command the 67th Wing provided targeting, bomb damage assessment, flak and searchlight location photography. Although charged with electronic reconnaissance to include the interception, identification, and location of hostile radar installations, the 67th Wing had a negligible electronic capability. The wing also flew weather reconnaissance missions over North Korea and the water area to the west of the peninsula.[11]

Problems of Day Reconnaissance: During the course of the Korean hostilities, FEAF reconnaissance units displayed commendable ingenuity in adapting obsolete aircraft and deficient equipment to the combat situation in Korea. This ingenuity was displayed in an amazing number of theater modifications of aircraft and equipment and in the devising of tactics which permitted inadequate aircraft to perform the mission. Lacking the advantages of a comprehensive reconnaissance system, wherein aerial vehicles and items of equipment were mutually supporting, theater ingenuities often worked against themselves. Thus tactics designed to insure survival—higher altitudes and faster speeds—could not be fully exploited because of the limitations of such items of equipment as cameras and illuminants. Quite frequently, moreover, reconnaissance units were put in a position of doing, not what the reconnaissance mission required, but what was practicable with their inadequate reconnaissance aircraft and equipment.

Stated bluntly, the FEAF reconnaissance aircraft problem was one of inadequate aircraft, possessed in scarce numbers.

Of fighter-type, day-photographic aircraft the Fifth Air Force had owned one squadron of RF-80A aircraft when the Korean war began. This squadron was the 8th Tactical Reconnaissance, which on 25 February 1951, coincident with the organization of the 67th Wing, was redesignated as the 15th Tactical Reconnaissance Squadron. The RF-80A aircraft was a reconnaissance version of the Lockheed jet fighter, in which a slightly longer, thicker, and blunter nose section contained cameras instead of guns. This plane was red-lined at Mach 0.8 (565 miles per hour at sea level), and this red-line speed was only 50 to 60 miles per hour faster than its cruising speed, which limited the plane's maneuvers in the event of an interception. It was some 200 miles per hour slower than a MIG-15.[12] The standard RF-80A camera installation was the K-38, 24- or 36-inch focal length camera, plus a K-12, 12-inch focal length secondary camera. As a vertical installation, the K-38 camera had some advantages: its 9- by 18-inch plate format gave a good coverage for producing mosaics or for photographing line targets, and, in view of the fact that the RF-80A lacked a viewfinder, the large format also allowed a pilot a greater margin for error in lining up to photograph point targets. This standard installation was found in approximately 90 percent of the F-80's, but a few F-80's had other special camera installations needed to perform tri-metrogon, obliques, and continuous strip photography.[13] The standard installation of vertical cameras posed operational difficulties to the RF-80A's because these cameras and their associated magazines had been designed for the speeds of conventional aircraft. With the A-8B-type magazine, the maximum cycling speed for the K-38 camera was three seconds per cycle, which meant that to obtain pictures at a scale of 1 : 6,000 with the necesary 60 percent forward overlap for stereoscopic viewing an RF-80 had to throttle its speed down to approximately 400 miles per hour. As the scale size increased, the ground speed of the photo plane had to be further decreased. This condition compelled RF-80's to remain in sensitive areas an overlong time and increased their vulnerability to flak and fighters.[14]

When RF-80 pilots encountered MIG-15 interceptors, their standard tactics was to turn inside the faster enemy plane and avoid its field of fire. Having done this, they got as low as possible as

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soon as possible and headed for home, thus forcing the pursuing MIG to use up its fuel and get further and further away from its own base. Using such tactics, the reconnaissance pilots generally escaped, but in so doing they were almost always compelled to abort their assigned target. These evasion tactics, moreover, worked best when the RF-80 pilot first sighted the enemy plane, but this was not always easy, especially during a period of concentration on a photo run. In the autumn of 1951, moreover, the MIG's began to carry external fuel tanks which got them as far south at Sariwon. To meet this situation, the 15th Squadron felt compelled to begin sending wingmen on all photo missions north of Pyongyang. These tactics abated surprise but used up the photographic capability, and the MIG's still proved able to box-in the photo flights and then to prosecute attacks against the helpless photo planes at their leisure. By the spring of 1952 the MIG threat was so severe that at least 12 Sabres had as a matter of routine to fly close cover for the photo planes when they went to targets north of the Chongchon River. By April 1953 FEAF estimated that fighter interceptor effort equivalent to at least two squadrons of Sabres (and possibly a whole wing) was routinely being diverted to the escort of reconnaissance aircraft.[15]

At the outset of the Korean war the Fifth Air Force had possessed no formal visual reconnaissance capability, but T-6 Mosquito aircraft had soon begun to carry a substantial proportion of this burden. Although the Mosquito planes would continue to provide some visual reconnaissance along the front lines until the end of the war, the Fifth Air Force on 3 September 1950 had been able to activate the 45th Tactical Reconnaissance Squadron. This squadron was equipped with RF-51 aircraft, the reconnaissance version of the conventional Mustang fighter, and was charged with the performance of a visual reconnaissance mission. These RF-51's got into action in December 1951, and thereupon began to cover the zone of enemy territory lying up to 50 miles beyond the bomb line. In this area the "Hammer" aircraft (the visual reconnaissance planes were so called after an early radio call sign) seldom encountered MIG's, but their liquid-cooled power plants were highly vulnerable to small-arms and automatic weapons fire. To meet this hazard, the 45th Squadron began in April 1951 to dispatch two ship flights whenever possible, and in February 1952, after five RF-51's were lost in short order to enemy ground fire, the 45th Squadron set a minimum altitude for visual reconnaissance at 6,000 feet.[16]

During the first two years of the Korean hostilities the RF-80A's and the RF-51's had been obsolete but they had managed to perform the tactical reconnaissance mission. By April 1952, however, it was apparent that USAF would not much longer be able to support the combat operations of these long-out-of-production aircraft. Natural attrition and battle losses had taken a toll of them, and replacements were slowing to a trickle. The 15th Squadron had 27 RF-80A's, all overdue for depot inspection and repair, and in the foreseeable future this squadron could expect only 15 more replacement aircraft of this type. As an interim measure pending availability of designated RF-84F replacements at some uncertain future date, possibly in the spring of 1953, USAF had already authorized FEAF to modify six F-86A aircraft for photo reconnaissance,* and these planes could bolster the declining RF-80A capability. The aircraft status in the 45th Squadron was even worse than that of the photo-jet squadron: the 45th was down to 23 RF-51's, and, although a few more replacements of this type plane could be expected, there was no plan for re-equipping the squadron with more modern aircraft. Since the 45th Squadron had to have more planes, the Fifth Air Force made an improvisation. Conversion of two fighter wings to other type aircraft had released a number of F-80C aircraft, some of which were not completely war-weary. These planes could be fed into the tactical reconnaissance wing, where they could fly the wing position with the RF-80A's and could possibly perform visual reconnaissance. In a theater action effected in May 1952 the composition of the 45th Squadron was accordingly established at 5 RF-80A's, 5 F-80C's, and 20 RF-51's, and that of the 15th Squadron was set at 22 RF-80A's, 5 F-80C's, and 5 RF-86A's.[17]

The decision to use F-80C fighters for reconnaissance was an expedient born of a need for increasing the capabilities of the 67th Wing, not with the best type of reconnaissance aircraft but with available planes which might be able to do

*See pp. 235–38.

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reconnaissance work. The expedient actually worked out better than was initially expected. The 45th Squadron paired up F-80C's, which could mark targets with its guns, with RF-80A's, which could provide the necessary photo verification of visual targets. Compared with the RF-51's, the F-80's were less vulnerable to ground fire, had better visibility, and jet flight characteristics permitted pilot-observers to give less attention to flying the plane and more to visual observations.[18] In the 15th Squadron the F-80C's were assigned to wing positions in two-ship flights; since the wingman did not usually take photographs, this procedure worked very well. When a dicing mission was run, moreover, the F-80C accompanied the photo plane through the low-level pass and fired its guns for flak suppression. Experimentation in the 67th Wing soon showed that it was possible to install a single 12- or 24-inch focal length K-22 camera in an F-80C in place of its guns and without changing the basic structure of the aircraft. In September 1952 USAF accordingly approved such a modification of 40 surplus F-80C's, and, after delays in getting critical items, these modifications were completed over a period of several months by the 67th Maintenance Squadron, assisted by a team from FEALogFor. The photo-modified F-80C's (they were formally redesignated as RF-80C's on 2 April 1953) were used as replacements for the ailing RF-51's and to make up for shortages in RF-80A's. On 16 February 1953 all RF-51's were finally transferred to Japan, and the 45th Squadron became an all-jet unit.[19]

Originally the 15th Squadron had been charged with day photo reconnaissance and the 45th Squadron with day visual reconnaissance, but in the autumn of 1952, with the enemy well dug in along the static battle front, very little intelligence could be gathered from a purely visual mission. Quite frequently, however, the photo squadron got more work than it could handle. In cognizance of this situation, the 67th Wing instituted photo and visual cross training in the two squadrons; beginning in October 1952 it charged the 45th Squadron with approximately one third of its photo sorties, and by the end of 1952 both day tactical reconnaissance squadrons were performing substantially the same composite visual and day photo reconnaissance missions. In the spring of 1953 the 67th Wing's authorization of RF-80A's and RF-80C's was divided equally between the 15th and 45th Squadron, but the 15th Squadron was authorized five RF-86's in lieu of a like number of RF-80A's.[20]

Recognizing the operational limitations of the RF-80A photo aircraft, USAF in 1951 had planned to replace them with the RF-84F Thunderflash plane, a reconnaissance version of the swept-wing Republic F-84F fighter. But F-84F production programs encountered complications and were delayed,* and the planned arrival dates of these planes in the Far East were postponed. Actually the RF-84F would not arrive during the Korean war, nor for a year thereafter.[21] As an interim expedient designed to give the Fifth Air Force a high-performance photo aircraft capable of operating in MIG-15 territory, USAF in the summer of 1951 approved FEAF's proposal to modify six F-86A's into a reconnaissance configuration in the theater. As FEAF got about this work in October 1951 the controlling question was: "What camera can we get into this aircraft?" There was little recognition of the more pertinent question: "What type of camera is best suited to obtain the photography we need?" In the pilot modification of this effort, called "Project Ashtray," a pair of K-24 (5- by 5-inch format) cameras were installed in the Sabre's nose section for split vertical photography, but, when flown on a test mission over North Korea on 8 December 1951, the pilot model proved tactically infeasible: to get necessary scale and overlap with the small format cameras, the RF-86 had to fly at a hazardous 6,000 feet and throttle down to 250 miles per hour. Another K-22 (9- by 9-inch format) camera mounted in the nose of this pilot model aircraft functioned splendidly for forward oblique work, but it was immediately evident that some other arrangement was needed for vertical photography.[22]

At an RF-86A requirements meeting held in January 1952, 67th Wing representatives urged that the best installation would be two K-22 cameras installed in a split-vertical configuration which would give in effect a desirable 9- by 18-inch format, but a representative of the Air Materiel Command (AMC) urged that such an installation would require close to a year to engineer, fabricate, and install. The Air Research and Development Command (ARDC) had reported that a single K-22 camera with a 36-inch focal length cone could be installed parallel to the longitudinal

*See Air Materiel Command, Case History of the F-84F Airplane (November 1949 through November 1954).

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axis of the aircraft and could utilize a mirror arrangement to secure vertical coverage. Since this installation bore the indorsement of the ARDC, FEAF accepted it in the anticipation that it would produce high quality photographs, even though the area coverage would be reduced to one half of the 9- by 18-inch format desired. Five "Ashtray" RF-86A aircraft were so modified and put into service in the spring of 1952. Once these aircraft were in operation, the ARDC-recommended camera installation proved initially unable to secure photography which was acceptable for intelligence purposes. One notable defect lay in the mounting of the mirror separately from the camera, thus permitting the mirror and the camera lens to vibrate at different rates and causing picture blur. Some alleviation to this problem came when the mirror was physically attached to the camera, and this, and other "debugging" solutions, allowed the RF-86's to take vertical photography described as being of "marginal quality." The single K-22 vertical camera, as had been foreseen, gave trouble in other ways: pilots not infrequently missed their targets because of the narrow angle coverage of this installation at the 40,000 foot altitudes flown by the RF-86's.* The 9- by 9-inch format of the single K-22 camera was inefficient when mosaics were flown because the RF-86 had to fly twice as many flight lines and sorties as did the RF-80A's or F2H2P Banshees which carried K-38 (9- by 18-inch format) cameras. The nose oblique camera installations in the Ashtray RF-86's posed no especial difficulty: a K-22, with either a 24-inch or 36-inch cone, could be installed, and in operations this installation provided excellent dicing photography. In such work the RF-86 was easier to maneuver on low-level passes than was the RF-80A, and its superior speed was a distinct advantage when it met ground fire. One of the original six Ashtray planes was nevertheless destroyed by hostile ground fire on 27 June 1952 when its pilot made a 500-foot-high run over the Chosen hydroelectric plant. This, however, was the only RF-86 lost to enemy action. In July 1952 the considered judgment of the 67th Wing relative to the new photo plane was as follows: "The RF-86 at best is a poor reconnaissance aircraft, its only assets being its ability to penetrate a defended area (this can be of paramount importance) and an excellent nose oblique installation (for which there is only a small requirement)." [23]

Despite their inadequacy as photographic aircraft, the RF-86's possessed one compelling advantage: flying by two's for mutual support and timing their flights to take maximum advantage of the regular Sabre barrier patrols, these RF-86A's could penetrate to targets north of the Chongchon River without fighter escort. If the target was very sensitive, the RF-86A could reach it by flying close formation with four Sabres. The fact that these Sabre photo planes could penetrate to the Yalu, live in the air and take pictures there, and then return unscathed meant much to the Fifth Air Force in August 1952, when redoubled enemy interceptions of other photo planes signified a grim Communist determination to prevent UNC aerial reconnaissance in northwestern Korea. Learning informally that promised deliveries of RF-84F's would probably again be delayed, the Fifth Air Force on 3 September 1952 informed FEAF that it was willing to accept more Ashtray RF-86's: "Its demonstrated ability to penetrate well defended areas, obtain photography and return without a large escort," said the Fifth Air Force, "overshadows its known limited photo capability." A representative of the North American Aviation Company had told Fifth Air Force operations officers that his company could modify 12 Sabres to an improved Ashtray configuration and have them ready within six months; this possibility greatly appealed to the Fifth Air Force, and it requested that arrangements be made so to modify 15 F-86F Sabres on a crash basis. If necessary, the Fifth Air Force was willing that these planes should be taken from its F-86F allocations.[24] An Air Materiel Command study, however, indicated that North American would require at least nine months to turn out these photo-modified aircraft, and USAF disapproved the

*In May 1953 the Fairchild technical representative attached to FEAF stated that there was a definite possibility that the camera in the Ashtray RF-86's was not taking a true vertical picture. He estimated that the optical axis of the field of view of this camera was four degrees off vertical to the right of the line of flight. Such a small unknown angle, at a 40,000 foot operational altitude, could cause a pilot to miss his target completely. A thorough check of the angular characteristics of this camera installation showed that not only was there an off-angle but that the optical axis of the field of view was three degrees off the vertical and to the right of the line of flight. The apparent reason for this condition was that the first three installations had been an urgently prosecuted "cut-and-fit" project. Usual design procedures, such as preliminary layouts, had never been accomplished, and, instead, the drawings which were produced as the modification progressed were used in the modification of subsequent RF-86's. *See* FEAF Comd. Rpt., May 1953, pp. 14-16.

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project.[25] FEAF was nevertheless able to get permission to remove two of the Ashtray kits from the RF-86A's and to install them in two of the newly arriving F-86F fighter-bomber models. In early March 1953 these first two RF-86F planes reached the 15th Squadron, and, except for imperfections in the Japanese-manufactured mirrors, these higher-performance aircraft worked as well as was possible with the Ashtray configuration.[26] By April 1953 these photo-modified Sabres were being used to accomplish approximately one-third of the 67th Wing's photographic reconnaissance sorties.[27]

For nearly a year the 67th Wing had been employing aircraft with improvised photographic capabilities in the expectation that new RF-84F's would arrive in a relatively near future which got progressively more distant with each postponement. Early in 1953 USAF was again compelled to postpone projected deliveries of RF-84F's to FEAF—this time until February 1954. Again, the Fifth Air Force set about to try to patch up its photo capabilities: on 21 March it asked FEAF for 12 RF-86F's, and late in the month FEAF directed FEALOGFOR to convert three additional F-86F's to the Ashtry configuration. This, however, would be the last of the Ashtray project because it would use up the kits installed on the two remaining RF-86A's and one more from local storage.[28] One thought was that it might be possible to bring the RF-80C's up to a legitimate RF-configuration. A few of them were therefore provided with an extensive modification comprising a split-vertical 24-inch installation, with further provision for a 36-inch K-38 camera and an oblique installation. The 36-inch vertical cameras, however, required extensive modification at the FEAMCOM depot, and in view of the workload at the depot it was agreed that this installation should not be attempted in the near future.[29]

Faced with the uncertain prospect of providing additional RF-86's which the Fifth Air Force had to have to maintain its high-altitude, high-performance photo capability until the RF-84F's came in, FEAF planners in May 1953 made a fresh appreciation of the whole Ashtray experience. Flashing their thoughts back to the summer of 1951 when the problem of modifying Sabres for reconnaissance had first come up, these FEAF planners now recognized that the Sabre photo installations would have better been done right at the start. To keep requirements for depot work to a minimum, the Fifth Air Force had been willing to accept such cameras as technicians could install without making substantial structural changes. Such a decision had saved time and money when the initial modifications had been made, but in the long run it had cost the Air Force a substantial sum of money in terms of wasted flights, wasted film, wasted chemicals, wasted photo paper, and wasted time in all photographic activities from ground crews through to photo interpreters.[30] Photographs made by the cameras in the Ashtray aircraft had "never equalled the quality produced by other reconnaissance aircraft," and from the very first the 67th Wing had insisted that it was the mirror arrangement which gave all the trouble. To prove this, wing personnel had fixed a camera so that it pointed out of the access hatch and a pilot had rolled the aircraft 90 degrees to take a satisfactory vertical picture under the same operational conditions in which the Ashtray planes got blurred photography. The 67th Wing had also insisted that split-vertical K-22 cameras with 40-inch focal length lens cones (which it had desired as the photo installation from the first) could be installed in a Sabre's nose: early in 1953 wing technicians got a nose section of a burned-out F-86 and made a mockup of this installation. The mockup required on each side of the nose a blister or protrusion in the skin which might be aerodynamically unsound, but the wing technicians, after viewing their first efforts, believed that there was a good chance that the size of these blisters might either be reduced or possibly eliminated after more study. Benefiting from this review of the problem, FEAF intelligence on 22 May 1953 recommended that efforts be made to improve the photographic capability of the RF-86F by the installation of long focal length, large format cameras in a split-vertical position, so eliminating the need for mirrors.[31] On 6 June FEAF anticipated USAF approval and directed FEALOGFOR to institute "Project Haymaker," which was the vertical installation of twin K-22 cameras, with 40-inch cones, plus another K-17 camera with a 6-inch cone for use in plotting, in a pilot-model RF-86F. In the event that the Haymaker installation proved successful, FEAF stated that an additional seven F-86F's would be so modified and then the Ashtray planes would be retrofitted

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to the new configuration.[32] This Haymaker project would result in the modification of high-performance Sabres with cameras suitable for photo reconnaissance, but the project had been ordered too late for the Haymaker planes to be of assistance in the Korean fighting.*

As a part of the Ashtray modification, kits were installed in the bodies of the K–24 cameras which increased their cycling speed to one and one-quarter seconds. The RF–86's were for this reason not compelled (as were the RF–80A's) to reduce their speed over a target in order to secure the forward overlap needed for stereoscopic viewing. But another problem, which also had its incidence in the same simple fact that jet speeds exceeded the design capabilities of existing cameras, affected both RF–80's and RF–86's: both of these planes were of sufficient speed so that the motion of the image across the camera's focal plane was great enough to detract from the quality and consequent usefulness of the resulting photograph. According to USAF standards, the maximum circle of confusion acceptable for good photography is 1/250th inch. For an RF–80 to secure such resolution on a photograph of the usually desired 1 : 5,000 scale required tactics which were unsound and infeasible: the maximum shutter speed of the K–38, 36-inch focal length camera with an A–8B (non-image-compensating) magazine was 1/150th of a second, which meant that to get a 1 : 5,000 scale photo of acceptable resolution the RF–80 had to cross its target at an airspeed not in excess of 155 knots. When a number of RF–80 pilots tried to secure such photographs under such conditions and were badly shot up in the process, the Fifth Air Force had to serve notice that it would refuse missions at such scales rater than to suffer excessive losses of hard-to-replace photo aircraft.[33] The USAF had no image motion compensating magazine which could be used with the 9- by 18-inch format K–38 camera, but two such magazines—the A–14 and the A–18—were available and were tested on the 9- by 9-inch format K–22 camera. These magazines presented much maintenance trouble, and principally for this reason their use was largely abandoned. Unable to conquer image-motion, FEAF finally noted that: "Slightly blurred photography had to be accepted in lieu of none."[34] Quite late in the war, however, an interim-fix for image-motion blur was brought to FEAF by naval reconnaissance personnel who had worked it out on the aircraft carrier *Philippine Sea*. This compensating device was a simple mechanism which oscillated the camera in a controlled arc along the longitudinal axis of the aircraft. Twenty-five of these devices were constructed by FEALOGFOR under "Project Swing" for installation in RF–80A aircraft. Although the 67th Wing did not have them in use for a long enough time to permit extensive combat tests, the device made operations with the K–38 camera possible at scales and speeds exceeding all previous limits. It indicated great promise for use in day jet reconnaissance aircraft.[35]

Inherent in all photographic reconnaissance work is a demand for the highest standards of pilot navigational skills. In Korea, the navigational problem was peculiarly difficult: reconnaissance pilots, flying at high altitudes and boring through weather to conserve jet fuel, were frequently required to arrive at point targets after a long period of dead reckoning. Visual checkpoints, needed to align mosiac flight lines, were scarce at best, and it was particularly difficult for pilots to secure mosaic cover of the MIG-hazarded area between the Chongchon and the Yalu. The area was some 150 miles from Kimpo; hence the jet reconnaissance pilots arrived there already short on fuel and then had to waste precious time locating check points, aligning their aircraft for runs, killing drift, and making other such necessary but time-consuming preparations. Photo pilots might expose an excessive amount of film in an effort to cover properly a poorly distinguished target; they might also get excessive overlaps, short strips, or holidays which would require that the mission be reflown. Any radar control system which would vector reconnaissance planes precisely to their targets would be of great utility. The MPQ system had some promise for such control, but these radars had limited range and did not see single jet aircraft very well at any great distance. The 67th Wing therefore

*Quite early in the Haymaker modification it became evident that the plane would have fuselage bulges. ARDC-conducted test flights of a Sabre with such bulges revealed no instability or porpoising at speeds up to 0.9 Mach but severe vibrations set in at speeds of 0.93 Mach and above. Even with this Mach 0.93 limitation on a Mach 1.1 aircraft, Haymaker represented a considerable improvement on any photo aircraft in the theater and FEAF accepted the limitation. During January 1954 tests flown with a Haymaker RF–86F yielded good photography at 20,000- to 40,000-foot altitudes: FEAF could now state that it possessed a capability to perform special reconnaissance missions in MIG-defended areas with an acceptable degree of risk and a reasonable expectation of satisfactory quality photographs. *See* Hist. Deputy for Intel. FEAF, Jan. 1954, pp. 3–6.

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reasoned that the airborne beacon AN/APN-60 would be required if the MPQ system was to provide control for reconnaissance aircraft: this beacon transmitted radar signals of sufficient amplitude to give a continuous return to a ground radar station from extended ranges. In February 1952 the 67th Wing secured authority for a depot installation of two AN/APN-60 beacons, one in a RB-26 and the other in a RF-80. Testing of this equipment got off to a slow start because "Project Vector" met equipment installation delays.[36] While awaiting the beacons, however, the 67th Wing made increased use of MPQ "skin-tracking" missions. Such control was limited to relatively short ranges—approximately 25 miles for fighter-type aircraft and 50 miles for light bomber types—but it proved quite worthwhile when the photo targets were near the front lines. The percentage of coverage of radar-controlled mosaics greatly exceeded that of similar visually flown mosaics. Against point targets, radar control increased photo effectiveness by some 51.2 percent. During February 1953 an APN-60 equipped RF-80 finally began experimental flights, which continued throughout the spring. The final report on the RF-80 phase of "Project Vector" was submitted on 12 July 1953, and at this time the 67th Wing concluded that an airborne beacon offered positive advantages when incorporated in reconnaissance aircraft: the beacon had extended the MPQ range to 140 statute miles when the RF-80 was at 24,000 feet and to 186 statute miles when it was at 27,000 feet. Using MPQ control, the beacon-equipped RF-80 had successfully secured pinpoint photographs, photo strips, and mosaics at MPQ ranges of up to 128 statute miles. The AN/APN-60, however, was not a satisfactory piece of equipment for use in an RF-aircraft, and the 67th Wing specified that a satisfactory beacon for such use would meet the following requirements: light weight, compactness, coded signals to safeguard against jamming, pressurization for high altitudes, a controlled power output great enough for a 200-mile range, system stability, and visual indication to the pilot of radar contact.[37]

Problems of Night Reconnaissance: Night reconnaissance requirements in the FEAF fell into three general categories. The Fifth Air Force required a reconnaissance capability which, through visual and photographic techniques, could seek out enemy activities which took place under the cover of darkness. The FEAF Bomber Command, unable to operate its strategic reconnaissance aircraft over northwestern Korea during the hours of daylight, wished to regain a capability to secure its own targeting and bomb damage assessment photography by operating its photo aircraft at night. Both the light bombers of the Fifth Air Force and the medium bombers of the FEAF Bomber Command, operating over Korea as they did at night, needed a night strike photographic capability. While night reconnaissance, both visual and photographic, proved to be of great value to UNC forces fighting in Korea, the experience in this field of endeavor made it evident that existing night reconnaissance systems needed further and more comprehensive development.

The Fifth Air Force requirement for a night reconnaissance capability had brought the 162d Tactical Reconnaissance Squadron (Night Photo) to Korea in an expedited movement in August 1950. Coincident with the activation of the 67th Tactical Reconnaissance Wing, this squadron was redesignated as the 12th Tactical Reconnaissance Squadron (Night Photo) on 25 February 1951, but the creation of the expanded reconnaissance establishment in Korea had changed neither the mission nor the capabilities of the night reconnaissance squadron. During hours of darkness, the 12th Squadron was expected to collect information relative to enemy activities, to make visual searches and perform route reconnaissance, to perform targeting and bomb damage assessment photography, to determine the accuracy of shoran coordinates. In emergencies, the 12th Squadron was expected to assist the two day visual and photo reconnaissance squadrons. As will be seen,* the 12th Squadron had certain other responsibilities relative to meterological and electronics reconnaissance.[38]

The usual night reconnaissance mission flown by the 12th Squadron was a route surveillance, laid out where possible so as to enable the RB-26 crews to take photographs on prebriefed objectives along the way. In the summer of 1952 the RB-26's covered the three main supply routes of the enemy each night: one route on each coast and one in the center of the peninsula.[39] Special night

*See pp. 248–51.

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photo missions were also flown against prebriefed targets at which some particular enemy activity was suspected; on occasions the night photo planes photographed targets that for some reason could not be covered during daylight: in August 1952, for example, the RB-26's photographed the Sui-ho dam and Simpungdong marshalling yard after enemy opposition had prevented RF-80's and Banshees from covering these targets.[40] For the success of its mission, an RB-26, operating alone and at night, required precise navigation, and its crew comprised a pilot and two navigators. One navigator, who also acted as bombardier, rode in the nose; the other rode in the rear compartment and operated a loran set and, when practicable, the shoran equipment. Both navigators carefully plotted a prebriefed course prior to a mission, and they plotted course simultaneously while en route to a target. During route reconnaissance missions, the nose navigator plotted visual sightings of enemy activity and flashed "hot" targets to predesignated TADC's or to night intruders in the area.[41]

The equipment complement of the 12th Tactical Reconnaissance Squadron necessarily influenced its performance of mission. The squadron was authorized 27 RB-26's, but it seldom possessed so many planes and several of the authorized aircraft were B-26's modified for electronics reconnaissance. The RB-26 aircraft was admittedly obsolete, but its designated replacement—the RB-57—was not expected to come off production lines before October 1953.[42] For navigational assistance, the RB-26's carried shoran and loran; for photography, the standard RB-26 configuration was two 9- by 9-inch format, 12-inch focal length cameras mounted in a split vertical installation in a section aft of the bomb bay. Either K-19 or K-37 cameras were successfully used for night photography, but the RB-26's usually carried K-37 cameras.[43] Night photography required artificial illumination, and the acquisition of satisfactory illuminants had complicated the work of the RB-26's from their first days in Korea.

While moving to Korea in 1950 the RB-26's had been equipped with new A-3 cartridge-ejection illumination systems which employed A-14 magazines and M-112 flash cartridges. The first lots of flash cartridges received in Korea had had a high dud rate, and when more dependable consignments were received the increased use of the system brought wear malfunctions in the magazines. What was even more important, however, was the fact that the cartridge system was designed for low altitudes: the optimum level for the M-112 cartridge was 3,125 feet, which, in view of terrain hazards and increasing enemy ground fire, was too low in Korea. In May 1952 the A-3 system was abandoned, and all of the equipment was returned to the FEALOGFOR.[44] From the beginning of their operations in Korea the RB-26's had made use of M-46 photoflash bombs in lieu of the malfunctioning A-3 system, and as the war progressed the M-46 bombs became the standard night illuminant. The combination of the M-46 illuminant and the split-vertical K-19 or K-37 cameras produced good results at flight altitudes of 7,000 to 8,000 feet: at such levels the cameras got the scale of photography desired for photo interpretation and the M-46 provided sufficient light for good exposures. At higher altitudes, however, the M-46 did not produce sufficient illumination. The major difficulty with the use of these bombs was their size: although the RB-26's could carry 50 M-112 cartridges they could carry only 6 to 12 of the M-46 photoflash bombs, depending on the individual configuration of the plane. Since each exposure required a separate flash bomb, the number of photo targets which an RB-26 could cover was quite limited. The RB-26's also needed to carry flares, both to identify their initial points and to verify visual sightings. Seeking a solution to both of these problems, the 67th Wing instituted "Project Highlight," which by July 1952 showed that bomb bay modifications and the addition of wing racks would enable an RB-26 to carry a maximum of 30 M-46 photoflash bombs and Mark-VI paraflares, 16 internally and 14 on two wing racks.[45] These increased illuminant loadings had some positive results: more photoflash bombs meant more pictures, and the flares proved handy. In September 1952 the RB-26's stepped out of character and set up a bucket brigade of flares in support of UNC troops battling for White Horse Mountain, which, according to General Van Fleet, enabled his artillery to decimate attacking Chinese columns.[46] This flare capability also permitted successful "Spotlight" cooperation of

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RB-26's and B-26 intruders against hostile railway traffic.*

Dependence upon the combination of 12-inch focal length cameras and the M-46 illuminant gave optimum results in terms of 1:6,000 to 1:7,000 scale photography, but it compelled the RB-26's to fly at 7,000- to 8,000-foot altitudes and consequently made for very little flexibility of operations. The operating levels were not high enough to be safe from hostile automatic weapons nor were they high enough for an effective reception of shoran waves, which ranged upward from about 9,200 feet at the MLR to 20,000 feet at the Yalu. Although the RB-26's were equipped with shoran, their crews were unable to derive the navigational benefits of this system but instead had to depend upon less accurate loran, dead reckoning, and pilotage. The 67th Wing admitted frankly that its night-flying crews were unable to photograph many deserving objectives simply because they could not locate them.[47]

As long as the RB-26's depended upon M-46 photoflash bombs their operating ceiling was about 8,000 feet, but by August 1952 combat expenditures had all but exhausted USAF stocks of these bombs, none of which had been produced since 1945. In preparation for such an eventuality the USAF had developed and procured a more powerful M-120 photoflash bomb, which gave enough light for effective night photography from altitudes up to 25,000 feet.[48] Operations people in the Fifth Air Force had known some anxiety as to whether the M-120 could be used by the RB-26's because of its high candlepower and fast peak of light, but the 12th Squadron tested it in August and "produced photos akin to daylight."[49] The "Highlight" project people immediately got to work and designed modifications which permitted a RB-26 to carry a maximum of 24 of these M-120's, 16 in its bomb bays and 8 more on wing racks.[50] With the more powerful illuminants, the RB-26's could operate at higher altitudes—14,000 feet was the objective—but they could not take satisfactorily scaled pictures until they had obtained a longer focal length camera which would be suitable for night work. In September 1952 the 12th Squadron therefore obtained two modified K-22, 24-inch focal length cameras which were equipped with capping curtains instead of standard shutter curtains. To compensate for image-motion during the relatively long exposure required to get enough light on the negative (approximately 1/25th second), the cameras were provided with A-18 image-motion compensation magazines. Beginning on 11 September the modified K-22 camera was test flown, and, with the illumination furnished by M-120 photoflash bombs, it produced from 14,000 feet what were said to be very satisfactory results. This installation solved problems of exposures and scales, but the achievement of satisfactory photography with it demanded tricky flying: ground speeds and altitudes had to be exactly set on the A-18 film magazine and adhered to in flight; the aircraft had to remain level during the 1/25th second exposure lest the photo show lateral image motion; and any degree of crab would produce an oblique image motion.[51] For the sake of the capability which they gave, these two modified K-22 cameras were installed in two RB-26's, but FEAF later reported that the experiment "did not produce satisfactory results."[52]

When the RB-26's were assigned to photograph objectives in the vicinity of the front lines, they customarily utilized the services of the MPQ system which could put them on their photo targets with the same "skin tracking" technique used with the light bombers. As has been seen,† the 67th Wing desired to test the possibility of extending the MPQ range further into North Korea by the use of the AN/APN-60 airborne beacon in RB-26's and RF-80's and accordingly, in February 1952, obtained permission to implement "Project Vector." The RB-26 phase of this project progressed much faster than did the RF-80 phase, and testing of the pilot model beacon-equipped RB-26 was finished in October 1952. At this time the 67th Wing reported that: "Results obtained . . . have been highly satisfactory and have proven conclusively that increased range and consequent increased capabilities for night tactical reconnaissance are assured with the use of the AN/APN-60 radar beacon." Based on this finding, the 67th Wing asked for and got three more beacons for installation in an equal number of RB-26's.[53] But in order to get extended ranges with the MPQ-beacon combination, the RB-26's had to operate at high altitudes, altitudes at which their cameras

*See Chap. IV, p. 114.

†See pp. 238–39.

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were ineffective. Since the camera capability of the squadron continued to demand medium altitude operations, the APN-60 beacons were not useful, and in July 1953 the 12th Squadron secured permission to remove them from its aircraft.[54]

Performance records reveal that the 12th Squadron well utilized its photographic capabilities: the squadron, necessarily hampered by weather, covered 65 percent of its assigned targets in February and 73 percent of them in March 1953.[55] But it was nevertheless true that the aircraft-camera-illuminant capability of the 12th Squadron did not permit a wholly adequate accomplishment of the squadron's mission. Despite the benefits of "Highlight," the squadron's RB-26's remained dependent upon the limited number of photoflash bombs which they could carry: at most 24 photographic exposures could be accomplished per mission whereas 80 to 120 photographs per mission would have been a desirable capability.[56] Limited in illuminants, the RB-26's were unable to provide night mosaic photography of areas of suspected enemy activity; at best they could provide strip coverage of such areas.[57] The 12th Squadron's equipment, moreover, did not permit it to accomplish one phase of its mission: the responsibility for determining the accuracy of shoran grid coordinates. The 12th Squadron used two AN/APA-54 shoran recorder equipped RB-26's in day flights on a shoran grid project covering the area between 38° 30′ and 39° during the late summer and autumn of 1952, but finally, in December 1952, it was compelled to admit defeat. "A re-evaluation of this project," stated the 67th Wing, "indicates that the RB-26 aircraft is unsuitable for the project if flown at 20,000 feet due to sluggish operation of the aircraft, difficulty aligning the cameras for crab and balance, and lack of sufficient oxygen to permit operation at the prescribed altitude for periods in excess of one and one-half hours."[58] There was more to this failure than was indicated in this explanation, as would be clearly revealed when the RB-29's were also unsuccessful in their attempts to establish shoran grid coordinates with the APA-54 recorder apparatus.*

The problems of the 12th Tactical Reconnaissance Squadron were minor when compared with those of the 91st Strategic Reconnaissance Squadron, which throughout the latter half of the Korean hostilities made strenuous but futile efforts to develop a night photographic capability. After the autumn of 1951 MIG depredations forced medium bomber aircraft to operate over northwestern Korea only at night, and the 67th Tactical Reconnaissance Wing had assumed the burden of providing the photography which Bomber Command required in the MIG-defended zone. Such a load of extra work bore heavily upon the 67th Wing's resources, but as a whole the task was satisfactorily accomplished. The arrangement, however, was by no means entirely suitable for the most efficient medium bomber operations. Bomber Command's medium bomber wings needed to know their mission results as soon as possible after they made a strike: if the B-29's did not do the requisite damage to a target, Bomber Command could then repeat the strikes before the enemy bolstered his defenses. If a target suddenly appeared that was suited for B-29 attack, or if a target was inaccurately located with reference to the shoran grid, Bomber Command required a photographic reconnaissance capability to act at once. Because of the great number of requests laid on it, the 67th Wing, especially during periods of marginal flying weather, was frequently unable to fill Bomber Command reconnaissance requests as rapidly as was required. Many times the B-29's had to attack targets without the aid of current surveillance photography and in some cases BDA photography was not received until weeks after a strike was made. In March 1953, for example, Bomber Command did not get bomb damage assessment (BDA) photos of the Taeyudong ore processing area until a month after its attack.[59] Committed wholly to shoran bombing operations, Bomber Command required a shoran targeting capability which would ascertain accurate shoran coordinates without the time-consuming multiplexing process.[60] These were some of the reasons why Bomber Command made determined efforts to get its 91st Strategic Reconnaissance Squadron equipped and capable for night photography.

The 91st Strategic Reconnaissance was equipped for day reconnaissance, and in January 1952, when it was directed to convert to night operations, the squadron was confronted with several simultaneous problems. Quite early it was evident that the

*See pp. 245–46.

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RB-45's were not suited for night photography,* hence the RB-29's would have to perform the mission. Located in its aft pressurized section, the RB-29 had three camera stations that served several different types of cameras, all of which took pictures through glass windows in the belly or side of the plane. This set-up was ideal for day photography, but it would have to be modified for night photography. Some means by which the photo crew could accurately locate its target at night was required: this would most practicably be done by shoran, which would permit the reconnaissance crew to use the same positioning technique as was employed by the medium bomber crews. APN-3 shoran equipment was accordingly installed in the RB-29's. Illuminants were a requisite for night photography: until April 1952 the only available light source would be the M-46 photoflash bomb but after this time M-120 photoflash bombs were going to be available. The scale of the photography taken by the RB-29's would have to be suitable for photographic interpretation: a scale of 1/6,000 was desirable but a scale of 1/10,000 could be used, provided it had a resolution factor not greater than five or six lines per millimeter.

Each of these several problems appeared to be individually solvable, but when they were met in a system they reacted each with the other to produce new difficulties almost in geometrical progression. To get adequate shoran reception the RB-29 had to operate over northwestern Korea at altitudes above 20,000 feet, and at these levels the standard K-37 and K-19 night cameras did not have focal lengths long enough to secure photography of a scale desired for photographic interpretation. At such altitudes, moreover, the M-46 photoflash bomb did not give enough illumination, but the M-120 would be marginally acceptable at heights of 25,000 feet. Not even the M-120, however, equalled the intensity of natural illumination, and this gave trouble in two ways. The camera windows in the RB-29 at best absorbed approximately 17.2 percent of the available illumination and they were wont to become dirty or frosted in flight; even if they remained clear they often gave off from the light of the photoflash bomb an optical glare which spoiled pictures. Because of the reduction of illumination from natural intensities, all cameras would need at least a 1/25th second "time exposure." During such a length of lens opening, all movement factors—including pitch, roll, yaw, ground speed, crab, and especially vibration—could produce unacceptably blurred photography. Activation of lens shutters gave additional difficulty: photoelectric cell trip units worked too slowly to take advantage of the relatively weak illumination from the M-46 or from the fast peak of illumination of the M-120. A method was accordingly devised whereby camera lens shutters were in the "open" position at the time of the bomb flash and were closed by the photoelectric cell trip unit. When such an "open" or "capping" type shutter was used, however, the negative picked up streaks of light from ground fire and searchlights, which were of sufficient intensity to blur the negative but not strong enough to trip the shutter.[61]

During nearly all of 1952 the 91st Squadron worked on what it called "Project Able": the adaptation of available photographic equipment to night operations. The squadron tested different combinations of day and night cameras and interchanged lenses, shutters, and cones in an effort to secure acceptable results. By April 1952 the squadron had tested modified K-37, K-22, and K-38 cameras with short (12- or 24-inch) lens cones, the idea being to solve such problems as were met before taking up the final problem of focal lengths.[62] Arrival of substantial numbers of the new M-120 photoflash bombs in July 1952 helped the photographic effort, and by August the squadron reported that a modified K-37 camera with a 12-inch focal length was giving "excellent" results. But because of the altitudes at which missions had to be flown pictures taken by this camera were of too small a scale for adequate BDA. This K-37 installation was nevertheless used during the remainder of the war when considerations of timeliness of its photography outweighed its scale disadvantages.[63] In this same period, the squadron also tried every combination of trail and burst altitude within the light capabilities of the M-46 and M-120 flash bombs. It was concluded that at altitudes between 20,000 and 30,000 feet, one-half burst altitude and approximately 10 degrees behind the camera acceptance angle gave the best results in mountainous terrain, and one-third burst altitude with the same trail gave good results in flat terrain. The one-third

*See AHS-72, p. 223.

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burst altitude gave more light on either target area, but shadows in the mountainous areas made one-half burst altitude desirable.[64]

By August 1952 the 91st Squadron was ready to progress to longer focal length cameras, which could be expected to provide the scale required for photo interpretation. In that month a representative of the Wright Air Development Center, working with squadron technicians, modified two K–22 daylight cameras (selected for long focal length) for night work, and these two cameras were affixed in a split vertical configuration to a gyro-stabilized mount in the RB–29 camera compartment. This camera installation was promising, but it, like other cameras in the compartment, encountered glare and other blurs from the camera windows. While it was equipped with an image motion compensation (IMC) magazine and affixed to a gyro-stabilized mount, the K–22 split-vertical arrangement nevertheless encountered much vibration, which could not be dampened despite utmost efforts of squadron technicians.[65] Although initially reported as being successful, this K–22 installation never produced acceptable photography.

Early in November 1952, the photo technicians of the 91st Squadron began a new line of attack on their problems. They had never been able to dampen camera vibration although they had tried elaborate straps and trunnions. Possibly American cameras were too light for high-altitude night photography: during World War II, the Germans were said to have obtained good results with massive and heavy cameras which resisted excessive vibration. The camera windows were a major problem area. Camera equipment, moreover, was often moved from plane to plane, and it was possible that slip-shod and inaccurate work on the part of maintenance technicians who made these changes, often on short notice to meet pressing schedules, might be giving trouble. All of these problems were discussed at a conference with the commander of the FEAF Bomber Command on 18 November 1952, and at this time the technicians of the 91st Squadron got approval for "Project Charlie," which was expected to overcome most of them. Briefly described, this project would be as follows: on a standard B–29 cargo rack would be mounted in tandem split-vertical position two modified K–22, 40-inch focal length cameras with A–19 IMC magazines, and each camera would be stabilized with an A–28 gyromount. The whole "pod" would be hung by chains from the bomb shackles in the bomb bay of an RB–29. This pod installation promised much: the gyrostabilizers were expected to keep the cameras in a desired vertical position in spite of the normal pitch and roll of the aircraft; except for the brief period of time when the bomb bay doors were opened to take pictures, camera lens would not be exposed to fouling by dirt or moisture, and, of course, the problems connected with the camera windows would be eliminated; the whole pod could be speedily and easily transferred from one plane to another without disturbing the cameras or other equipment.[66]

The work on "Project Charlie" was started without delay during November 1952 and it was test flown in the latter part of the next month. As was later stated with the advantage of hindsight, the pod was "doomed from the start" because its own vibrations were aggravated by the flow of turbulent air into the RB–29 when the bomb bay doors were opened.[67] But an earlier diagnosis, made in January 1953, attributed excessive ground motion blur in its photography to the slowness of the closing time of the shutters on the K–22 cameras. This delay was permitting the exposed film to pick up blurs from the dying glow of the M–120 flash bombs. A reconnaissance team which arrived from the Strategic Air Command late in February thought the pod to be the soundest possible approach to high-altitude night photography. The officer in charge of the SAC team devised an entirely new "in between the lens" louvre-type shutter which permitted an almost instantaneous closing action. But neither the new shutter, nor other improvements, enabled the "Charlie" installation to give satisfactory photography. Refined mounts were used to attach the pod to the aircraft, missions were planned so as to take advantage of the most favorable winds, and the squadron's senior photographer rode in the bomb bay with the pod to make necessary inflight adjustments. At times the pod cameras produced fair photography, but at other times the photographs were hopelessly blurred. Successes with the installation were sporadic and unpredictable, and exhaustive tests failed to establish any reasons why vibrations should be excessive at one time and not at another, even on the same mission, with the same power settings, and similar atmospheric con-

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ditions.[68] By June 1953 it was apparent that "Project Charlie" was a failure, and on 6 July General Carmichael stated that: "The 91st Squadron has no night BDA capability."[69]

"With equipment available within this organization," stated the commanding officer of the 91st Squadron, "the capability to take high-altitude large-scale night photography with consistently acceptable results does not exist."[70] He did not believe that consistently acceptable high-altitude night photography would ever be accomplished by RB-29's as long as time exposures were required: to produce the desired results a more efficient type shutter, faster lenses, faster film speeds, and increased illumination would be needed. General Carmichael, however, was less pessimistic: "We must become self-sufficient in BDA," he said, and, after he had gone over the record of the past failures, he expressed confidence that "we can design a front bomb bay installation that will work." His plan was to mount modified K-22 cameras in tandem on a platform which would be bolted to the airframe. To avoid turbulence which had occurred when the bomb bay doors were opened, Carmichael planned to cut windows in the front bomb bay doors. A project incorporating these ideas was put in work by FEALOGFOR on 24 July 1953, too late to be of any assistance in the Korean hostilities.[71]*

Shortly after it had begun to rely upon the shoran bombing technique, the FEAF Bomber Command recognized a major requirement for the development of a new technique for determining shoran target coordinates independent of often-inaccurate mapping data.[72] With the beginning of the diversified target system of the air pressure operations, Bomber Command's need for an exact establishment of shoran coordinates was even more pressing than it had been. Frequently there was not enough time to get map coordinates checked by multiplexing, and areas near the Manchurian border were not covered by mapping photography and therefore could not be multiplexed.[73] A new technique for checking map coordinates was theoretically possible in a system which employed in a suitable reconnaissance aircraft the AN/APN-3 shoran equipment, an AN/APA-54 shoran reconnaissance recorder camera, and a vertical reconnaissance camera. Using such equipment, the reconnaissance aircraft would be directed along a shoran arc to a target, whose location had been computed from existing geographic data. While over the target, the reconnaissance crew would make photographs in rapid sequence, and simultaneously with each vertical exposure the APA-54 camera would record the shoran data which was displayed at that moment. Subsequent computations, utilizing the point on the ground vertically beneath the reconnaissance camera (the nadir point) as a reference, could easily correct such errors as might exist in shoran coordinates derived from inexact mapping data. To be useful for economical shoran bombing, however, this system would have to be able to locate a target with a tolerable error of plus or minus 50 feet.[74]

In August 1952 the 67th Tactical Reconnaissance Wing was engaged in checking the accuracy of shoran grid coordinates in the area between the battleline and the 39th parallel,† but Bomber Command wanted to do the same at targets deep within North Korea. For this reason, the 91st Strategic Reconnaissance Squadron borrowed an APA-54 recorder from the Fifth Air Force in September and set about implementing "Project Baker." The RB-29 designated as the flight vehicle for this project would have to work at night and it was going to use M-120 flash bombs and a K-37 night reconnaissance camera. Much depended upon the establishment of an exact nadir point, which could be thrown off by any degree of camera tilt, and the K-37 camera would therefore be fixed to an A-28 gyro-stabilized mount. An arrangement would also have to be worked out whereby the same photoelectric-cell impulse which tripped the K-37's shutter would trigger the APA-54 recorder camera. All these modifications took time, with the result that the "Project Baker" RB-29 did not fly its first test mission until December 1952.[75]

As early as August 1952, while "Project Baker" was being planned, an ARDC team in the Far East studying tactical bombardment systems had offered cogent reasons why the shoran recorder system was not going to work. This team predicted that there would be no accurate, operation-

*Because of its obvious importance, this project was continued after the cessation of the Korean hostilities. The special installation was first test flown on 7 February 1954 with moderately successful results. In March and April 1954 further test flights indicated that the 48-inch focal length cameras were out of focus. After the cameras were recalibrated, another test flight in May 1954 showed a decided improvement of photo quality. *See* Hist. FEAF Bomber Command, 1 Jan.–18 June 1954, I, 65–66.

†*See* p. 242.

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ally feasible method for determining the nadir point of the reconnaissance aircraft. The A–28, which was the best stabilizing mount available, could maintain a vertical accuracy to one-half degree one-half of the time and to one degree the remainder of the time. From the altitude at which the shoran plane would have to work to get adequate shoran reception—say 25,000 feet—the basic inaccuracies of the A–28 gyrostabilizer would mean that the nadir point would be located within an accuracy of 225 feet half of the time and within an accuracy of 450 feet the remainder of the time.[76] The technicians of the 91st Squadron recognized this problem but they thought that they could circumvent it. They mounted a specially made spirit level on the K–37 camera and installed a second synchronized recording camera where it would photograph the spirit-level bubble. They reasoned that if there was camera tilt, this arrangement should reveal its extent and direction.[77] But from the very beginning, the 91st Squadron got consistently disappointing results with the shoran recorder system. Because of failures in the relays used to synchronize the several cameras "it was almost impossible to obtain an exposure of the ground and the APA recording at the same time."[78] On one test mission in January 1953 all equipment functioned successfully, but the resultant APA–54 computations were in error because of camera tilt. Additional test missions which followed had the same fault: so much camera tilt that the nadir point could not be accurately located. This tilt, however, was relatively constant in one direction, which led the 91st Squadron to suspect that some error had been made in the original installation of the A–28 camera mount. Lacking anyone experienced enough with the A–28 mount to attempt remedial action, the squadron requested a technical representative from the United States. This man arrived at the end of June 1953, but the war ended before any equipment changes could be made.[79]

In the autumn of 1951 when they began to operate exclusively at night, the FEAF Bomber Command wings recognized a pressing requirement for strike photography. All Strategic Air Command units customarily emphasized a vigorous assessment of mission results, to include strike photography, and now, with the bombers operating at night, there was an additional need for strike photographs owing to the fact that the bomber crews could no longer visually observe and report the results of their missions. Strike photographs were also valuable for maintaining morale because the medium bomber crews had a keen desire to know just what each mission accomplished. In what appears to have been a generally uncoordinated wing-level action, the bomber wings first made efforts to use K–22 cameras in conjunction with the illumination furnished by M–46 photoflash bombs. These cameras produced pictures of a desirable scale, but since they were used in "open flash" photography the cameras usually took pictures which displayed much image motion. First to recognize that large scale was not as important in strike photography as clear pictures was the 98th Wing, which during January and February 1952 pioneered in the use of K–37 night cameras, whose photoelectrically controlled shutters were tripped by the light from M–46 photoflash bombs.[80] Although all wings continued to be diligent in their efforts, strike photography taken during the summer of 1952 was generally poor in quality. One trouble was the deficient illumination of the M–46. The 98th Wing began to use M–120's in June, but these more powerful flash bombs were not available to the 19th Group and 307th Wing at Okinawa for several more months. Many of the cameras were loosely mounted, and vibration ruined many photographs. The 307th Wing, moreover, continued to use modified K–22 cameras with poor over-all results.[81] During August 1952 an ARDC task group noted all of these problems which were contributing to poor medium bomber strike photography, and in September 1952 Bomber Command undertook remedial actions whereby all wings were provided with K–37 night cameras and a supply of M–120 photoflash bombs.[82]

But Bomber Command had hardly undertaken this wholesome standardization of strike photography equipment and techniques before a major change in night attack tactics posed a problem to photography which was never completely solved. To speed the accomplishment of shoran attacks all wings were required to emphasize the compressibility of their bomber streams over the target,* and, as the bombers hit the target at intervals of a few minutes, photoflash bombs dropped by one plane not infrequently activated the photo-

*See Chap. III, pp. 76–77.

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electric cells in several of the planes which followed. Although the bomber wings undertook a controlled modification program designed to overcome this situation, the commander of the 98th Wing said in May 1953 that "there has been little improvement mainly because the equipment was not designed for this type of operation." [83] Something more than unsatisfactory equipment was doubtlessly to blame for the fact that night strike photographic efforts did not produce "consistently satisfactory results." A report of a general inspection of the 307th Wing, although at a loss to pinpoint the causes for unscorable strike photography, nevertheless observed that "closer supervision of the maintenance and operation program would eliminate some of the possible causes for poor [strike photography] results." [84]

Even though medium bomber strike photography was obtained in neither the quantity nor the quality that was desired, the wings were able to use strike photos to good advantage. They were no substitute for large-scale bomb damage assessment photography, but they provided an immediate means for estimating the effectiveness of a bombing strike and the proficiency of an air crew. In cases where BDA photography was not rapidly accomplished, the strike photos often indicated what amount of damage had been done to a target and enabled the medium bomber Wings to determine rapidly whether a followup strike was required.[85]

The B–26 light bombers of the Fifth Air Force's 3d and 17th Bombardment Wings had an even greater need for strike photography than did the medium bomber wings, this because of the nature of their targets. Most medium bomber targets were fixed and could be photographed on the day following the attack; most light bomber attacks were made against fleeting targets such as hostile trucks and trains which, even though destroyed or damaged, were generally moved to shelter before dawn. But the light bombers had very little capability for accomplishing strike photography. The results of low-level attacks were practically impossible to assess: gun cameras could not be used, strike photography could not be taken during glide-bomb attacks, and the B–26 crew was seldom able to fix its position to that degree of accuracy required to get a post-strike RB–26 to the scene. During level-bombing attacks, the B–26's could have taken strike photos but to have carried flash bombs would have entailed an undesirable reduction of high-explosive ordnance.[86] Still, the light bomber wings badly needed to know just what their crews were accomplishing: a detailed analysis of the Fifth Air Force night intruder system made in the late summer of 1952 demonstrated that the lack of an ability to assess the results of night attack had occasioned an uneconomical expenditure of light bomber effort.*

Begun late in December 1952, the cooperative "Spotlight" attacks which paired a 67th Wing RB–26 with a B–26 of the 3d or 17th Wing, marked the first achievement of successful BDA photography for the night intruders. Learning a new technique from this experience, the 3d Bombardment Wing modified several of its B–26's to carry K–19 or K–19B cameras. Using either M–46 or M–120 flash bombs, but more generally the latter, these photo B–26's got increasingly better results as their crews gained experience. They soon found that the optimum altitude which gave a large enough scale for determining damage to small targets was 4,000 feet. Experience also demonstrated that this photo capability could be had with an acceptable reduction in the offensive power of the photo B–26. By April 1953 these photo planes were carrying six M–120 photoflash bombs in their rear bomb bay, eight M1A2 frag clusters in their forward bomb bay, and a normal route reconnaissance wing rack loading of four M–64's, four M–47's, and two Mark–VI flares. Thereafter during the war the 3d Wing dispatched several of these photo B–26's each operational night, first to work over a specified armed reconnaissance route and then to proceed to a specific orbit point within the wing's area of responsibility to await some other light bomber's call for a damage assessment.[87] Because of many of the same factors which bedeviled night photography, plus a general inexperience of the operational and maintenance crews with this work, FEAF later noted that B–26 strike photography was "generally of poor quality." [88] The techniques which the 3d Wing worked out in the last six months of the war, however, appeared to be valid and utilitarian; at least they provided the wing with some means of measuring the accomplishments of its low-level attacks.

*See AHS–72, pp. 173–174.

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Tactical Electronics and Weather Reconnaissance: In tactical air force operations the most effective countermeasure against an enemy ground electronics system is the destruction of hostile early warning (EW) and ground control interception (GCI) radars. Without these warning radars, enemy air defense systems are blind and gun-laying and searchlight-control radars are reduced in effectiveness. To accomplish this destruction, current electronics intelligence is mandatory. To obtain this current intelligence two distinct tactical electronics functions are necessary: the one is to perform general electronics surveillance and the other is to locate accurately the radar installations. Since electronics surveillance must be maintained on a 24-hour basis, this function can be economically performed during routine weather reconnaissance flights if proper equipment is installed in the weather aircraft. The precise pinpointing of hostile radars for destruction requires specially equipped ferret-type aircraft.[89]

Apprehensive about the Communist electronic control and warning system which was being built within North Korea, the Fifth Air Force constantly sought permission during 1951 not only to jam the enemy radars but to destroy them. "Allowing enemy radars to direct AAA gun fire, to perform ground controlled intercepts, and to alert rear-area defenses," the Fifth Air Force admonished on 19 August 1951, "is allowing the enemy to wield a weapon of increasingly destructive power, without taking the obvious action to deprive him of that weapon."[90] But from a larger point of view which looked toward an all-out world conflict, electronics countermeasures (ECM) was a delicate subject: there was much to be learned from the enemy's radar system; there was much to be disclosed of USAF capabilities by an active ECM employment. The FEAF policy on ECM was one of reconnaissance, jamming when absolutely necessary, and deception, and such measures were to be employed only in current and anticipated operations.[91] Enemy gun-laying radars, however, could be attacked and destroyed whenever they were encountered. During October 1951 the Fifth Air Force twice urged a reconsideration of FEAF policy because of increased enemy interceptions of its aircraft by day and by night, and on 28 October 1951 FEAF issued a revised policy which recognized that attacks on enemy radar sites were "extremely desirable in order to disrupt his present effective capability for GCI and radar controlled AAA." Such attacks would be carefully planned and conducted on a mass scale; prior to releasing the radars for attack, FEAF wanted to see large-scale dicing photography covering some 21 hostile radars which had been generally placed in North Korea.[92] A continued buildup of Communist electronics capabilities, which came of age in May 1952 when GCI-positioned MIG's began to attack Sabres through the overcast, lent urgency to the project of destroying enemy radars.[93] And, as has been seen,* the air pressure strategy effected by General Weyland on 10 July 1952 recognized that hostile electronic equipment well met the criteria for a destruction target: it was vital to the enemy's war effort, was vulnerable to air attack, and represented a significant cost to the enemy in terms of scarce skills and materiel. In the 10 July operational policy directive, radar equipment was accorded the fourth priority in a listing of hostile target categories.

Although the Fifth Air Force always possessed a striking force which was easily capable of destroying all Communist radars in North Korea, it never possessed a reconnaissance capability that could precisely locate these small and widely dispersed installations. In July 1951 when it became concerned about the hostile radars, the Fifth Air Force had had only one aircraft with any electronics reconnaissance potential. This was a B-26B aircraft, called "Buster," which belonged to one of the light bomber wings: this plane had been equipped to home on and destroy captured U. S. VHF ground radio equipment. This plane was ordered to Kimpo airfield where it was attached to the 67th Tactical Reconnaissance Wing; and, beginning in October 1951, it was used to fly every-other-day radar plotting search missions. Lack of radar navigational equipment meant that this plane had to operate under conditions permitting visual navigation. Although it was well recognized than an electronics reconnaissance crew worked best when it was a tightly knit unit, crewing arrangements for "Buster" were informal: since there was no manning authority for a regular crew, the plane was flown by personnel from the 12th Squadron. The best ECM observer in the Fifth Air Force was assigned to its Directorate of Intelligence, and this officer usually flew as the

*See Chap. II, p. 35.

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ECM operator in "Buster."[94] Finding enemy radars with the "Buster" equipment was not an easy task: many radars could be located within an area of about 25 square miles, but exactly to pinpoint them was a more complex matter. Aerial photography of pertinent areas was scanned by photo interpreters, but the radars were very small and, most important to PI work, their antenna masts cast next-to-no shadows.[95] In February 1952 efforts were made to use an F–82 all-weather fighter for radar detection, but on the second such mission against a hostile target the F–82 suffered flak damage and required extensive repairs.[96]

In April 1952 the 67th Wing was directed to train a crew for "Buster" in techniques for homing on and destroying hostile radars, but a few practice missions with the Cho-do EW/GCI station revealed that this plane's electronics equipment had so badly fallen into disrepair that the plane had to be sent to the FEAMCom depot for overhaul. "Buster" apparently returned to Korea for a brief time, but in June it had to go back to Japan, this time for extended mechanical repairs.[97] Although the departure of this plane left the Fifth Air Force with no electronics reconnaissance capability, the Intelligence Directorate drew upon agent and POW reports and photo interpretation to target six hostile radars in the Haeju and Sariwon areas. On 13 July 1952, 94 fighter-bombers attacked these targets with bombs and napalm. But two weeks had elapsed between targeting and attack, and post-strike photography revealed that during this period of grace the enemy had moved four of the six radars. Another lesson was demonstrated: hostile radars were mobile and their successful destruction demanded that they be targeted and attacked with a minimum interval of delay.[98]

"Electronics reconnaissance," said the Fifth Air Force Director of Intelligence at the end of 1952, "limped along, full of enthusiasm and interest but still short of equipment."[99] At the request of the Fifth Air Force, FEAF in August 1951 had already approved a plan calling for electronics modification of two B–26 aircraft at the FEAMCom depot, and this project was subsequently increased to provide a total of four such modified aircraft to the 67th Wing. The project badly bogged down from a variety of causes; the installations were experimental and three separate configurations were at last ordered, but the major holdup was a fifth class priority assigned to the work. This work priority was apparently improved in mid-1952 after the Fifth Air Force Director of Intelligence strongly emphasized that electronics reconnaissance was "as important as F–86's, F–84's or any other aircraft presently assigned to the Fifth Air Force," but the first two of the new ferret-modified B–26's did not reach the 67th Wing until November 1952. A third arrived in December 1952. The first two aircraft (Nos. 909 and 825) had identical installations: for navigation they carried AN/APQ–13 radar; for electronics reconnaissance they carried one item each of an AN/APR–4 search receiver, an AN/APA–11 pulse analyzer, AN/APA–17 direction-finder (D/F) equipment with low- and high-frequency antennae, an AN/ALA–2 panoramic indicator, an AS–38A mast antenna, and an AT–45 cone antenna. A single ECM operator's position had been built into a bomb bay compartment. These planes were expected to perform radar surveillance and to locate hostile radars by direction-finding bearings. The third B–26 (No. 231) was equipped with APN–3 shoran, plus an AN/APA–54 shoran recorder. Its electronics gear included an SCR–720 airborne intercept radar and an AN/APR–4 search receiver. It was planned that the ECM operator in this plane would vector the aircraft on course with a hostile radar and that the shoran navigator would obtain a position fix. By repeating this procedure on various headings separated by more than 200 degrees, a series of converging line-plots should indicate the exact location of the enemy radar. The fourth plane (No. 250) included an equipment design drawn up at FEAF, and it would not be ready for service during the Korean hostilities.[100] At about the same time that the 67th Wing got its new ferrets, Marine Composite Squadron No. 1 received six AD-type aircraft with electronics reconnaissance installations. The type of equipment in these planes and the plan for their employment was similar to that noted for the B–26 ferrets Nos. 909 and 825.[101]

Preparatory to the reception of the B–26 ferrets, the 67th Wing organized an electronics reconnaissance flight in the 12th Tactical Reconnaissance Squadron, and the Fifth Air Force laid out an elaborate plan for electronics reconnaissance tests. Before they could be tested, however, the ferrets required equipment calibration, and this work, conducted in Japan in flights against friendly

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JADF radars, progressed very slowly. These shakedown flights developed the need for many slight modifications, each of which had to be referred to higher headquarters. As a result of these delays the two direction-finding ferrets were not employed in Korea until April 1953: No. 909 began combat flights on 3 April and No. 825 on 19 April. In their calibration flights these two ferrets had indicated an ability to locate radar sites to an average radius of three miles from the true sites. This was approximately the same degree of accuracy as claimed for the AD aircraft of Marine Composite Squadron No. 1, but subsequent events showed that any expectation that hostile radars could be fixed to within three to five miles was quite optimistic. Direction finding proved to be very difficult in Korea. The Communists used radar in quantity and had it deployed in depth. Many of the sites went on and off the air at irregular intervals, and others used a very slow sweep. Whether caused by Red cunning or equipment malfunctions, these practices hindered direction finding. The mountainous terrain of Korea also deflected radar signals, thereby decreasing the accuracy of direction-finding cuts. Finally, to plot an accurate location of a radar site from airborne D/F equipment, the aircraft's position had to be exactly known. As an example of the problem, one Marine AD crew obtained a single, clear, and continuous hostile signal for 26 minutes but when its bearings were plotted they enclosed a triangle approximately 20 miles long on two sides and eight miles long on the third side. This triangle enclosed a mountain, at some point on which it could be assumed that the radar was sited. Exactly where it was not ascertainable.[102] The B-26 ferrets were similarly able to locate enemy radars in general areas, and in an effort precisely to locate the enemy radar sites special photography was flown and studied, but for the most part this work was unremunerative because photography scales were large and most enemy radar equipment was well concealed.[103]

The third of the new B-26 ferrets (No. 231) flew a few combat missions in Korea before the end of hostilities. This plane was equipped to home on hostile radars in the "L" and "S" frequency bands, and it carried shoran equipment in order to establish its exact position while taking bearings. In eight missions against enemy radars, however, only one doubtfully accurate homing run was accomplished, the principal cause for failure being that the enemy invariably shut down his radar each time that the ferret headed directly toward the site. The shoran equipment, moreover, could not yield accurate fixes because of the low altitudes at which the ferret operated. Tests of this configuration against friendly radars were little more satisfactory: direction-finding cuts were unreliable, and when the plane homed on the radar it could lose the radar signal. In such a case the ECM operator could not tell whether he was directly over the radar and was encountering aural null, or whether the radar had shut down, or whether the ferret had flown out of the radar beam. This ferret so clearly failed its operational suitability tests that the 67th Wing in its final report on the tests (called "Project Bird Dog") recommended that No. 231 be returned to FEALOGFOR for reconfiguration with direction-finding equipment.[104] There was one possibility which might have permitted the homing apparatus to give some positive results: in March 1953 one of the AN/AAS-1 equipped B-26's* of the 3d Bombardment Wing had sought in tests flown against friendly installations in Japan to home on the heat generated by the radar's power units. These tests had failed because the "Redbird" B-26 had been unable to distinguish the radar among numerous heat sources surrounding the installation.[105] In August 1953 Fifth Air Force intelligence officers wanted to pair the electronics reconnaissance homing B-26 with a "Redbird," their reasoning being that the "Redbird" could follow the ECM plane and could continue on to the hostile radar set, even after it closed down, by homing on its still-hot generators. This project had some theoretical merit, but the tests were not made because the three "Redbird" B-26's were due to be returned to Japan for modification.[106]

Although the 67th Wing never gained a feasible capability for electronics reconnaissance, the thoughts about this problem were fruitful in terms of an organization for such a mission. Because both flew B-26's, the 6166th Air Weather Reconnaissance Flight and the electronics reconnaissance function were variously assigned or attached to the 12th Tactical Reconnaissance Squadron. The 6166th was a table of distribution organization which was authorized six WB-26's, but ac-

*See Chap. IV, p. 110.

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tually only three of its aircraft had synoptic weather instrumentation. The 6166th was attached to the 12th Squadron until 15 December 1952, at which time it was transferred to the control of 67th Group operations. The electronics function, however, was provided for from organizational allotments of the 12th Squadron, with a consequent reduction in the squadron's capability for its primary night visual and photographic reconnaissance mission. A Fifth Air Force reconnaissance conference held on 12–13 August 1952 noted that the organizational structure for electronics and weather reconnaissance was inadequate; it recommended that a separate squadron be activated to accomplish the two missions.[107]

In December 1952 FEAF proposed to submit a formal requirement for an electronics reconnaissance squadron, but the thinking at this echelon was colored by the existing inexactitudes of the navigation art in Korea. Until radar direction-finding equipment and techniques were perfected to the degree permitting a ferret aircraft to locate precisely an enemy radar site for subsequent attack by other aircraft, FEAF reasoned that a combined detection-destruction aircraft would be required. This new squadron would therefore be an electronics attack squadron, and it would most logically be assigned as a fourth squadron to one of the light bombardment wings. When direction-finding and navigational equipments were perfected, the squadron could be recognized as an electronics reconnaissance squadron and would then be assigned to the 67th Wing.[108] The Fifth Air Force concurred in the need for an electronics squadron, but it disagreed as to the proposed development of a "hunter-killer" squadron. Aircraft equipped with critically-short electronics gear could not be exposed to regular combat attrition; combat-equipped light bombers and fighter-bombers were capable of more destructive missions than were dual-mission aircraft; and the electronics reconnaissance and destruction functions were not related either in unit support or in training. The Fifth Air Force accordingly recommended that the new squadron would be organized and equipped for an electronics reconnaissance function.[109] Actually, however, the new squadron was going to combine the weather and the electronics reconnaissance functions in recognition of the economy which could be realized when weather aircraft undertook electronics surveillance in the course of their routine flights. During February 1953 FEAF authorized the installation of electronics surveillance equipment in WB–26 aircraft, and as the Korean war ended two such aircraft were so being configured.[110] Early in April 1953 FEAF further informed the Fifth Air Force that it had secured authority to reactivate the 11th Tactical Reconnaissance Squadron during the second quarter of fiscal year 1954. As unit equipment, this squadron would be authorized nine electronics RB–26's and nine WB–26's, and the squadron would be assigned to the 67th Wing. The 6166th Flight would be deactivated. These actions were taken as planned, and effective 18 September 1953 the Fifth Air Force reactivated the 11th Tactical Reconnaissance Squadron and simultaneously deactivated the 6166th Flight. The new squadron was subsequently redesignated as the 11th Tactical Reconnaissance Squadron, Electronics and Weather, effective 25 November 1953.[111]

Photographic Technical Services: During the first two years of the Korean war the major deterrent to the successful accomplishment of the tactical reconnaissance mission had been in the photo technical facilities required to reproduce, interpret, and distribute the masses of reconnaissance photography to requesting or requiring agencies.* In the last year of the hostilities, however, the major deterrent was no longer the photo technical facilities but the lack of a suitable photographic reconnaissance vehicle and camera capability. In the first two years, photo aircraft had not flown at a sortie rate equaling reasonable operational planning factors because of the deficiency of reproduction facilities; in the last year, the photo technical facilities had grown to an extent wherein they possessed more capability than could be satisfied by the tactical reconnaissance squadrons.

During World War II the Army Air Forces had handled mass production of photographic prints required by the Army, but in 1946 it had been realized that this burden was too great for a single reconnaissance technical squadron. In 1948 an agreement between the Departments of Army and Air Force had provided that the Air Force would fly the photography which a field army required, would develop the film, and would

*See AHS–72, pp. 226–228.

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furnish the field army with negatives and two prints of each negative. This new system was subsequently described in detail in the *Joint Training Directive for Air-Ground Operations*, issued on 1 September 1950. This directive visualized the establishment at the reconnaissance airfield of a joint air photo center comprising army and air force aerial photographic production, interpretation, and distribution facilities. A reconnaissance technical squadron was the air force contribution to the joint center; an engineer photo reproduction and distribution organization and photo interpreter teams were the army components of the joint air photo center. The army units were expected to receive developed film and to interpret, reproduce, and distribute the aerial photographs required by ground units. While cognizant of its responsibilities, the Eighth Army was unable to provide any personnel to a joint photo center before February 1951 and then only in detachments strengths. Despite urgent requirements laid upon the Department of Army, the 98th Engineer Aerial Photo Reproduction (APR) Company did not arrive in Korea until June 1952.[112] This company became operational in Seoul in mid-July 1952. Lack of an adequate water supply for photo processing at Kimpo airfield* was the apparent reason why this army unit settled in Seoul instead of at the reconnaissance airfield. Although justified by local circumstances, the physical separation of the units of the joint photo center resulted in losses of time, which necessarily effected the immediateness of reconnaissance. This loss amounted to at least 30 minutes per mission flown because this was the length of time required to carry film from Kimpo to the engineer company in Seoul. Furthermore, the courier service of the Signal Corps, which delivered bulk photography to using units, was located 20 minutes driving time from the Engineer APR Company, a fact resultant in still more lost time.[113]

Before the arrival of the prescribed army component of the joint air photo center, air force personnel, augmented by a detachment of 86 army technicians, had been responsible not only for the processing of all aerial film but for print reproduction for both army and air force units. This burdensome mission had been accomplished by a concentration of all available technicians into two laboratories: personnel from the unit photo labs of the three tactical reconnaissance squadrons formed AF Photo Lab No. 1, which processed aerial film and made two contact prints; personnel of the 67th Reconnaissance Technical Squadron and the army detachment formed Photo Lab. No. 2, which handed mass production of prints required by the Fifth Air Force and Eighth Army.[114] With the arrival of the 98th Engineer APR Company, the workload of the 67th Reconnaissance Technical Squadron, so far as army photography was concerned, changed from print reproduction to film processing. A return to a more normal scheme of operations was accordingly effected during the last year of the war. Beginning in November 1952 the 67th Squadron commenced to transfer personnel back to their tactical squadrons so that they could do their own first phase processing and production, but various difficuties—including shortages of water at the unit photo labs—delayed a full accomplishment of this transfer of responsibilities until April 1953.[115]

In the summer of 1951 when the 67th Tactical Reconnaissance Wing moved northward from Taegu to Kimpo the Fifth Air Force had been forcibly impressed by the lack of mobility of the 67th Reconnaissance Technical Squadron. Equally cognizant of the immobility of its technical labs, the 67th Wing early in 1952 set afoot a project called "Trailer Camp." In compliance with an approved request, FEAMCom prepared a complete mobile photo technical laboratory using 11 vans and 2 large water trailers. These vans were shipped by water to Pusan and arrived at Taegu Airfield (K–2) somewhat damaged in transit; they were repaired and were set up for operations by 16 June 1952.[116] The trailer installation at K–2, like the laboratory at K–14, had a potential for the mass production of 25,000 prints in a 24-hour period, and the plan was that the K–2 facilities would handle routine air force print reproduction.[117] While located at K–2, however, the mobile photo lab did not perform satisfactorily, partly because of design problems and partly because of the increased time required to convey negatives there and then return the prints to using agencies. When only 6,000 prints were produced in September, the 67th Wing began to urge that the trailer installation be brought to Kimpo where it could be closer observed.[118] After

*See Chap. V, p. 179.

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much difficulty with rail transportation, including problems of tunnel clearances and bridge weight limits, the trailers arrived at K–14 on 28 January 1953. During February the trailers were remodeled, and on 18 March one of them was loaded with representative photographic equipment and pulled to K–47 airfield and back again. Such a minimum of damage was incurred in this 200-mile trip that the conclusion was drawn that the trailers were roadworthy. Beginning on 2 May, a 30-day sustained operational test of the trailer installation showed that it had a capability for producing 7,000 negatives and 15,000 photographic prints in a 24-hour period. As this capacity was somewhat short of the desired capability of 25,000 prints per day, the 67th Squadron requisitioned four more trailers and made added modifications in the equipment installations in those on hand. When these actions had been completed, all laboratory facilities were moved from the buildings at Kimpo to the trailer project on 20 June 1953, and by mid-July film processing and print production in the trailers were judged to be systematic and efficient. The 67th Reconnaissance Technical Squadron had so gained a desired measure of mobility, but just to be safe against the eventuality of an enemy air attack the 67th Wing built up a store of standby equipment at Taegu (K–2). These alternate facilities, designed as a safeguard against some disaster at Kimpo, were capable of operating by 26 July 1953.[119]

Allocation of Reconnaissance Capabilities: In June 1952 many of the procedures and the organization which controlled Fifth Air Force reconnaissance represented improvisations which had had their origins early in the fighting. The system for the control of tactical reconnaissance effort, and the gradual evolution of it, has been noted in an earlier monograph;* suffice it here to say that this reconnaissance system worked because the people concerned were familiar with it, but, as a progression of events showed, it had not been completely efficient. During July 1952 two factors demanded a review of the reconnaissance control system. The one was that the Eighth Army, having tardily provided itself with photo reproduction facilities, now desired to receive a larger volume of aerial photography. The other was that the new FEAF air pressure policy directive demanded large quantities of reconnaissance targeting effort. There was a need for the most efficient employment of the scarce available reconnaissance effort; there was also a requirement that existing misconceptions as to the capabilities and limitations of tactical air reconnaissance should be corrected. Desiring to accomplish both of these objectives, the Fifth Air Force on 12 and 13 August 1952 sponsored a joint air-ground reconnaissance conference which was held at Kimpo with the 67th Wing serving as host to representatives from FEAF, the FEAF Bomber Command, Fifth Air Force, the 1st Marine Air Wing, and the Eighth Army. A total of 21 problems were presented at the conference.[120] After each problem was discussed the conference made recommendations looking toward its alleviation.

As the discussions at the reconnaissance conference progressed it became evident that many of the problems could best be solved by the establishment of a reconnaissance branch in the Joint Operations Center, a branch which would include a reconnaissance operations element, a reconnaissance intelligence element, and a G–2 Air reconnaissance element. Such a reconnaissance branch was recommended in the *Joint Training Directive for Air-Ground Operations*, but the need for such an agency had never been formally appreciated in Korea. The Directors of Operations and of Intelligence of the Fifth Air Force, after attending the conference and participating in the discussions, both concurred in the recommendation that a JOC reconnaissance branch should be established. Working in close coordination, these two key staff officers soon evolved an agreement as to the duties and functions of the reconnaissance branch, and, after approval by the commanders of the Fifth Air Force and the Eighth Army, plus some physical alterations in the JOC facilities, the JOC reconnaissance branch began to function early in September. Operating under the supervision of the Fifth Air Force Director of Combat Operations, the JOC reconnaissance branch was made responsible for the coordination and allocation of all Fifth Air Force tactical air reconnaissance effort and for its photo laboratory and photo interpretation effort. With a few unimportant exceptions, all contact on matters pertaining to reconnaissance with the 67th Wing had to be made either by the commander of the Fifth Air Force or by the JOC reconnaissance operations officer. All requests for

*See AHS–72, pp. 225–228.

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reconnaissance missions were to be submitted to the JOC reconnaissance branch, normally by 1100 hours each day. All requests for bomb damage assessments were transmitted directly to the reconnaissance operations element, but other air force requests went first to the reconnaissance intelligence element which prepared them into a daily reconnaissance plan. The G-2 Air reconnaissance element received reconnaissance requests from the Eighth Army and incorporated these requests into another daily reconnaissance plan.[121]

Most of these functions which became the duties of the JOC reconnaissance branch had previously been exercised by various staff officers in the headquarters of Eighth Army and Fifth Air Force, but the bringing together of the functions and the men responsible for them into an operating level agency had a salutary effect. From its inception, the JOC reconnaissance branch eliminated waste time and effort in the reconnaissance system, and it provided solutions for many of the problems discussed at the joint air-ground reconnaissance conference. Such a relatively minor innovation as a current JOC reconnaissance map eliminated duplicate coverage; for example, targets of air force interest could be seen to fall within a block of photography being flown for the Eighth Army. Prior to the establishment of the reconnaissance branch, the 67th Wing had not always been notified when scheduled air attacks had been canceled and had flown useless BDA missions; such was no longer true. The Fifth Air Force had never published an outline for photographic print distribution, and the absence of such instructions caused delays when the 67th Wing had to go through notices to airmen, operations orders, operations plans, and radio messages to determine where to send particular lots of finished prints. The reconnaissance branch solved this problem neatly in an order issued on 30 September which established a distribution code and required that code designators should be included immediately following the coordinates of the photo targets listed in the daily operations order. The Fifth Air Force operations order, moreover, was lengthened in order to give more information to the pilots who flew the reconnaissance mission and to the photo interpreters who analyzed the resultant photography.

There had been no system within the Fifth Air Force for formally reviewing outstanding target lists and recurring target lists at periodic intervals. The JOC reconnaissance branch issued a new recurring target list on 30 September, and thereafter it kept this list under periodic review. In response to such a review, the FEAF Bomber Command agreed in October to delete its requirements for periodic surveillance photography of airfields, marshalling yards, and communications lines. Outstanding targets which were scheduled but were not immediately flown because of some such factor as adverse weather were reviewed weekly with a view to their cancellation if no longer needed. A control sheet was also devised in order to permit the reconnaissance branch to inform interested agencies when, if, and on what sortie their photography had been taken. Another saving resulted from a consolidation of Eighth Army and Fifth Air Force photo reference libraries into a single jointly-manned library which became the responsibility of the Fifth Air Force Photo Reconnaissance Division. Prior to this action, both the Fifth Air Force and the Eighth Army had been maintaining identical but separate photo libraries.[122]* Most of these changes were not spectacular, but the JOC reconnaissance branch, which figured the initial cost of each photo to be $10, reckoned that the elimination of duplicate photography through better management meant considerable savings to the taxpayer.

At the joint reconnaissance conference and within the subsequently created JOC reconnaissance branch, Eighth Army officers made known their needs for reconnaissance and Fifth Air Force officers informed their army counterparts of the air capabilities for reconnaissance. Both actions looked toward a more efficient use of available effort. At the conference, the air representatives pointed out that night visual reconnaissance employments had become somewhat stereotyped: the 12th Squadron RB-26's flew coverage of the same three routes to the Manchurian border each night, and since these routes had not been changed in more than a year there was some thought that the need for this coverage should be reviewed. Air

*This action eliminated one duplicate photo library, but two of such libraries were still maintained: one at Fifth Air Force and the other in the 67th Reconnaissance Technical Squadron. At a tactical reconnaissance symposium held at Shaw AFB on 2 through 6 November 1953, the Fifth Air Force representatives urged that the reconnaissance technical squadron should be assigned to the headquarters of a tactical air force, thus among other improvements eliminating duplicate film libraries. *See* Report of Tactical Reconnaissance Symposium, 1953, 1 Dec. 1953.

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representatives suggested that some of the RB–26 visual effort could furnish night photography support along the bombline. Ground representatives were divided in opinion on this offer: they wanted the night photography but they were fearful that the flash-bomb illumination would jeopardize their night patrols. Air representatives also called attention to the fact that daytime visual reconnaissance, or "Hammer" flights, was too much used for vague area searches, which, in the static ground situation, generally revealed little enemy activity. The air representatives suggested and the army officers agreed that the "Hammer" flights would be employed in more specific search missions. The ground representatives also agreed to use the "Hammer" aircraft as much as possible for high priority army spot photography: requests for such missions would be passed directly to an airborne "Hammer" flight, and information of such requests would be signalled to the JOC reconnaissance branch. In the several months following the August conference all of these recommendations were implemented with generally wholesome results. Once they had sampled night support photography, Eighth Army forward units sent in more requests for it than could be satisfied by the RB–26 squadron. Night RB–26 visual route reconnaissance was rescheduled to cover only those MSR's south of 39°30′ that were not being worked by night intruder aircraft. Discontinued along with patterned night reconnaissance was the old practice of placing 12 visual reconnaissance aircraft per day in each corps sector; visual reconnaissance was put on a specific mission, preplanned basis. Although at first opposed by the corps headquarters, this new plan gave a maximum benefit to requesting units and represented savings in day visual reconnaissance effort. In October the Eighth Army G–2 Air further designated a series of geographical blocks beyond the front lines for expediting the ordering of visual searches: one of these blocks was scheduled for intensive area search when some particular enemy activity was reported to be taking place in the area.[123] In the months following the reconnaissance conference, the Fifth Air Force also urged the Eighth Army to make more use of "Hammer" aircraft for adjusting long-range artillery fire; not many such cooperative missions were flown with army artillery batteries, but the naval surface forces in the Wonsan area requested and received a number of gunfire adjustment missions in January and February 1953.[124] The patterns of visual reconnaissance employment worked out at the August conference and elaborated in the months which followed proved satisfactory to both the air force and to the army. The only difficulty reported was one of maintaining radio contact between the "Hammer" aircraft, working in front of a corps sector, and the Corps G–2 Air. Line of sight characteristics of VHF radio waves and the custom of locating corps fire support coordination centers (FSCC's) behind hill masses at some distance behind the front lines contributed to this problem.[125]

In addition to its need for visual reconnaissance, the Eighth Army had a substantial requirement for photographic reconnaissance. As a matter of policy, the Eighth Army attempted to cover its requirements for photo reconnaissance with commitments of capability from the Fifth Air Force. Once the Fifth Air Force had committed itself to accomplish a requirement, the Eighth Army expected it to do so, and it regulated the number of requests that its subordinate units could make for photo missions in terms of these stated air capabilities, reckoned at so many sorties or photographic negatives to be accomplished for the army each day. This mechanical concept of air operational capabilities utterly ignored changes in reconnaissance schedules which had to be made in context with enemy opposition and vagaries of the weather. Such rote computations of capability were also detrimental to the accomplishment of the reconnaissance objective. In May 1951, for example, the Eighth Army published a letter to its subordinates which erroneously informed them that the 67th Wing had a capability for flying only 25 photo sorties a day, of which 5 to 10 sorties were available to fulfill army requests. At this time the wing was actually flying from 30 to 40 sorties per day, but the Eighth Army units were discouraged from submitting requests for reconnaissance because of the small amount of capability which was thought to be available for army purposes.[126] The only limit on photographic capability in this period was in the Eighth Army's inability to provide mass reproduction and interpretation services, and when this misconception was cleared up the Eighth Army agreed that, until such time as it could secure its own facilities for this work, it would limit its photographic requirement to 1,229 negatives and 5,000 photo prints per

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day. In mid-1952 upon the arrival of the 98th Engineer APR Company, however, the Eighth Army increased its requirement for photo support. This company had a planned capability for handling 5,900 negatives and for making 25,000 prints per day. In view of the static ground situation, it would not be necessary to use all of this maximum capability, but the Eighth Army desired to receive daily frontline cover, additional surveillance cover to the extent of 350 square miles per day, and certain other special photographic cover. In order to provide such an amount of photographic coverage, the Fifth Air Force would have to provide the Eighth Army with a total of 3,600 photographic negatives each day.[127]

The bulk of the Eighth Army's requirement for photo reconnaissance comprised periodic surveillance photography which was specifically vertical, mosaic, stereo-quality photography of a sufficient scale and resolution to permit photographic interpretation. In a war of fluid ground movements it was generally accepted that frontline cover, or the surveillance of the enemy territory to a depth of 15 miles behind the front lines, should be flown daily, as should deep cover of approximately 10 percent of the army's area of responsibility. At the August reconnaissance conference, Eighth Army representatives requested that such an amount of surveillance coverage be flown, but representatives of the Fifth Air Force explained that the 67th Tactical Reconnaissance Wing lacked the capability to fly so much surveillance photography. The limiting factor was the extremely long front held by the Eighth Army: this front was virtually equivalent in length to an army group front, and an army group would have normally been supported by three tactical reconnaissance wings. In recognition of the limited photo reconnaissance capabilities and of the static condition of the ground war, the reconnaissance conference worked out a sensible compromise. Frontline cover to a zonal depth of 15 miles into enemy territory would be flown weekly. Each Eighth Army corps was additionally interested in a deeper area that extended to a depth of 30 miles beyond the front lines: corps area photo cover would be flown three times monthly. And the Eighth Army itself, concerned with the grand scale of the ground battle, considered that its area of interest included everything from the front lines to the Yalu, but it was generally willing to limit its attention to the area of hostile territory between the front lines and the main supply route connecting Pyongyang and Wonsan. The Fifth Air Force agreed to cover the latter area as often as practicable, which turned out to be once each 90 days.[128] These time intervals represented an estimation of hostile abilities for ground movement. Enemy forces committed to the front could launch limited-objective attacks but could not sustain a drive without reinforcements. If the enemy launched a major attack he would have to bring up rear-area reserves, whose movement would be noted in the 10-day periodic corps cover. Actually, enemy reserve troops south of the Pyongyang-Wonsan line probably could have reached the main line of resistance in some six days, but it was believed that checking their positions each ten days gave a reasonable chance of detecting mass movements. The decision, however, was a calculated risk, necessitated by a shortage of reconnaissance capabilities.[129] One other expedient was employed, both in recognition of the fact that the 67th Wing could not as a matter of practice fly all of a given type of surveillance photography on a single day and that some sections of the front lines were more vulnerable to enemy attack than were other sections. For these reasons and for purposes of systematic scheduling, the 30-mile-deep zone of enemy territory ahead of the Eighth Army positions was subdivided into first 26 blocks and later (after December 1952) into 27 blocks, each approximately 15,000 meters square. Each of these blocks could normally be photographed by a single RF-80 sortie at a scale of 1:6,000 or 1:7,000. The order of priority in which the blocks were covered was determined in the JOC by the G-2 Air, who made his decisions in context with current enemy activities.[130]

In addition to its requirement for periodic surveillance cover, the Eighth Army had a requirement for special photographic cover. When some enemy activity merited a closer look, it required large-scale photography, or mosaic, stereo-quality photos at scales of 1:2,000 or smaller. Since enemy installations located at the bases of reverse hill slopes very frequently did not show on vertical photographs, the Eighth Army required oblique photography at a scale of about 1:3,000. The Eighth Army also had a seasonal requirement for a limited amount of camouflage detection photog-

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raphy and a routine requirement for night photography, the latter at scales of from 1:5,000 to 1:7,000.[131]

Following the discussions in August, the G–2 Air in the JOC on 3 September 1952 summed up Eighth Army requirements for photo reconnaissance: during the period of static ground operations, the Eighth Army would require a daily average of 3,600 photographic negatives, including 300 large-scale negatives, 100 camouflage detection negatives, and 100 night photographic negatives. The special photography would be in the scales noted above. This statement of Eighth Army requirements was defective on its face: the 3,600 negative figure was the same daily total which the Eighth Army had earlier said would include daily frontline cover plus 350 square miles of rear-area cover. In the August reconnaissance conference, all representatives had agreed upon less frequent surveillance photography. The G–2 Air, moreover, forgot to include the Eighth Army's requirement for oblique photography. Despite these discrepancies, however, the assistant chief of the Fifth Air Force reconnaissance operations on 6 September informed the G–2 Air that the Fifth Air Force was able to meet the Eighth Army's stated reconnaissance requirements.[132]

The period of good feeling relative to reconnaissance between the Eighth Army and Fifth Air Force was not long lived. Trouble first arose concerning the matter of photographic scales. All requirements for surveillance cover had been computed on a basis of 1:7,000 scale photography. Although this was the standard scale for such work, the RF–80's quite frequently accomplished reconnaissance surveillance photography at scales of 1:6,000, which was the same scale employed for air force target photography.* With existing photographic equipment such 1:6,000 or 1:7,000 scales of photography represented an optimum employment, and 6,250 negatives would cover all 26 of the surveillance blocks. But, because of image motion blur, photography taken by jet aircraft in Korea at scales of 1:6,000 and smaller actually lacked sufficient line resolution to permit detailed photographic interpretation: where detail was important to recognition in such photography, an interpreter usually could not correctly identify objects of dimensions less than 15 to 20 feet. Inexperienced photo interpreters incorrectly believed that larger image sizes would improve their visual acuity, and thus there were demands in September 1952 for surveillance photography at scales as large as 1:3,000. Such large scales were operationally infeasible: to fly the corps and frontline cover at a 1:6,000 scale required about 30 percent of the Fifth Air Force's photographic effort; to have flown it at a scale of 1:3,000 would have required about 60 percent of the available effort. The latter scale would have produced some 25,000 negatives (instead of 6,250), a number which would have been beyond the Eighth Army's capability to produce and interpret.[133] This dispute as to the scale of army surveillance photography was not laid to rest until November 1952, but at this time the air and ground commanders agreed upon a compromise: frontline cover would normally be flown at a 1:7,000 scale, but every fourth week it was flown at a 1:5,000 scale; corps cover was also normally flown at a 1:7,000 scale, but once a month it was also flown at a 1:5,000 scale.[134] The 1:5,000 scale increased the number of RF–80 sorties which had to be flown, but it had sufficient detail to be acceptable for Eighth Army interpretation purposes.[135]

Confronted by a loss and damage rate that was high for reconnaissance aircraft, General Barcus in October 1952 stated the rule that reconnaissance operations would not be conducted at altitudes below 9,000 feet within 30,000 yards of the main line of resistance nor below 12,000 feet over any heavily defended target. Since army objectives for large-scale and oblique photography were almost invariably located within the friendly artillery range (20,000 yards from the MLR) these flight rules, designed to safeguard the exceedingly scarce photo planes, precluded nearly all low obliques and ruled out 1:3,000 vertical photography. A limited number of high-level obliques could still be flown by the Marine F2H2P's, which could mount a 24-inch oblique camera. On 1 November the Fifth Air Force accordingly informed the Eighth Army that only "in rare instances . . . with ample justification" would it accept requests for 1:3,000 scale photography or low-level obliques in the area within 30,000 yards of the front lines. On 13 December the Fifth Air Force further defined its operating policies in reference to photographic scales. It

*In the spring of 1953 considerations of safety compelled the Fifth Air Force to raise the scale of air force target photography from 1:6,000 to 1:8,000.

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would accept requests for scales of 1:5,000 or 1:6,000 consistent with its capabilities; it would accept requests for scales of 1:4,000 in limited amounts, depending upon the purpose for which the photography was requested and enemy antiaircraft defenses; it would not ordinarily accept requests for scales larger than 1:4,000; and it would not accept requests for oblique photography that would require flight altitudes of less than 9,000 feet. In the event of a future ground emergency, the Fifth Air Force promised to revise these policies in accordance with the gravity of the emergency, the status of hostile antiaircraft artillery defenses, and the state of its reconnaissance capabilities. Although the Eighth Army G-2 Air tacitly accepted these necessary restrictions, he took formal exception to the idea that the Fifth Air Force would have any authority to inquire into the purpose or the need and urgency of a reconnaissance mission requested by the Eighth Army.[136]

Unanticipated growth of enemy antiaircraft defenses prevented the Fifth Air Force from giving the Eighth Army the scale of photography which it wanted, and during the autumn of 1952 unfavorable photographic weather reduced the Fifth Air Force's photographic capability. Unlike other types of aviation, which either possess all-weather capabilities or at least are able to operate in marginal weather, photographic reconnaissance demands clear target weather. Bad weather in July 1952 considerably hampered all reconnaissance operations, and throughout August abundant cumulus clouds were ever present. Most of the weather in September was good, and October had 25 days of completely operational weather. During September, however, a substantial portion of the RF-80 effort had to be used to the accomplishment of backlogged requests for missions which had been postponed from the previous month. And in October, although the weather was good, the seasonal light effects decreased the length of the photographic day to four, or at most five hours per day. There was just not enough RF-80 capability to get everything done in such a few hours. During November there were only 11 days of completely operational weather and in December the bad weather continued, with the result that all periodic reconnaissance cover got behind. Despite the adverse weather conditions, 10,220 effective sorties were flown in these six months, delivering 483,925 satisfactory photographic negatives.[137] This was a substantial amount of photography, but, with army requirements computed at 3,600 negatives per day, it did not even equal the Eighth Army's demands for photography. Believing that the Eighth Army should share in the reduction of the reconnaissance capability, the Fifth Air Force on 1 November 1952 explained its problem and requested the Eighth Army to reduce its aerial photo requirements to approximately 2,400 negatives per day. The G-2 Air of the Eighth Army somewhat tartly replied that the Eighth Army's requirement was for 3,600 negatives per day during the static ground operations and this was the minimum amount of photography required for satisfactory intelligence: the requirement could not be reduced, but, of course, the Eighth Army was willing to accept the fact that the Fifth Air Force could not provide it with more than a daily average of 2,400 negatives.[138] For "purposes of planning," the Fifth Air Force thereupon reduced the number of negatives to be flown for the Eighth Army to 2,400 per day. That this figure was sound was demonstrated in November reconnaissance records which revealed that an approximate daily average of 2,000 acceptable negatives was delivered to the Eighth Army, excluding photographs of targets of opportunity taken for the corps by visual reconnaissance planes.[139]

Looking back on this experience in November 1952, with the advantage of hindsight, it was obvious to the Fifth Air Force that "negatives per day" did not provide a valid yardstick for measuring photographic capabilities and requirements. During certain periods of ideal conditions reconnaissance units could fly more photography than in other periods. It was thus reasonable to believe that there would be periods when the Eighth Army would require more photography than could be flown; but it was just as reasonable to believe that there would be periods in which the Eighth Army would not require great numbers of photo negatives. On 10 November 1952, the Fifth Air Force therefore stated its belief that "limitations can only lead to frustration on the part of persons who may have a vital and urgent requirement for photography." Although requests should be screened by the various echelons of command in the Eighth Army, the requests would not be disapproved simply because too many negatives had

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been requested. The army should be encouraged to disregard any past limitations that may have been made on photography; it was the business of the JOC to equate requests for photography in terms of air capabilities to provide the reconnaissance.[140] Much this same point of view was expressed for FEAF's Deputy for Intelligence later in November, after the Eighth Army had carried its dissatisfaction to the Assistant Chief of Staff, G-2 FEC, and he had reported the matter to FEAF. The Deputy for Intelligence of FEAF commented that aerial reconnaissance capabilities and requirements should be settled by the commanders of the Eighth Army and Fifth Air Force, but in a memorandum for record he recorded the belief "that if Eighth Army will submit their valid and justifiable requests for aerial reconnaissance to the JOC without regard to any 'number of negatives' limitations, the Fifth Air Force will be able to satisfy these requests."[141]

The result of these discussions was an agreement between the Fifth Air Force and the Eighth Army that no limitations would be placed upon the number of daily requests for reconnaissance. Although the Eighth Army would continue to evaluate the requests submitted by its subordinate units, final acceptance or rejection decisions would be the responsibility of the JOC reconnaissance branch. While this agreement relieved the Fifth Air Force from the responsibility for providing the Eighth Army with any arbitrary number of negatives each day, the Eighth Army quite consistently continued to request more photo sorties than the Fifth Air Force had the capability to fly for it. And the G-2 Air also continued to submit requests for low oblique photography: although he said that he knew that the air force could not fly such missions, he did not wish to discourage field commanders from requesting a type of photography which they needed.[142] But even though the Fifth Air Force was unable to meet the full extent of the ground demands for reconnaissance, it was impossible to deny that it gave the Eighth Army an exceptionally large amount of photography. Benefiting from the longer days and clearer weather during the early months of 1953 that to some extent compensated for the bad flying weather in June and July 1953, the 67th Wing in the first seven months of 1953 flew 10,771 effective sorties and delivered a total of 395,009 satisfactory photographic negatives. Although exact figures are not available, some two-thirds of these photographic negatives went to the Eighth Army.[143]

The magnitude of the Fifth Air Force's photographic support for the Eighth Army was illustrated by production records for March 1953: in this month the Eighth Army received 64,657 photographic negatives, which, according to G-2 Air figures, amounted to 75 percent of the total number of negatives which had been requested. Most of these negatives were mosaics and each covered a ground area of approximately 1 mile by 2 miles: thus in the 11,000 square mile area of Eighth Army responsibility these March photographic negatives represented a repeated coverage which totaled up to 129,314 square miles of Korean soil.[144] During the ground crises of June and July 1953, moreover, the Fifth Air Force outstripped the substantial totals of reconnaissance which it routinely provided to the Eighth Army each month and turned in outstanding support records: of 495 reconnaissance sorties flown during the period of 12–19 June, 319 or 65 percent of the total were flown at the request of the Eighth Army. Had the bombline weather not been so bad, this Eighth Army support would have been even larger. In the four operational days between 13 and 20 July the 67th Wing flew 116 photo sorties and 75 visual sorties for the Eighth Army.[145]

In the last year of the war the 67th Tactical Reconnaissance Wing operated at its peak of capability to provide substantially more reconnaissance than similar units had provided in World War II, but the amount of reconnaissance flown never equaled the requests for reconnaissance. Viewed philosophically, it was not surprising that there was more need for reconnaissance than there was capability. To have denied this would have been to have said that complete knowledge of the enemy was possessed, and such could never be true.[146] Viewed practically, aerial reconnaissance forces represent an expenditure of the resources of the nation, and this expenditure must be balanced with other expenditures in the national weapons system. During the static ground warfare in Korea, the Eighth Army had maintained that it required a minimum of 3,600 photographic negatives per day. Had the Korean ground fighting become fluid, the Eighth Army indicated that it would have needed 4,900 negatives per day.[147] At the end of the Korean War, Eighth Army representatives

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indicated that requirements for reconnaissance would be even heavier in future hostilities. Calculating requirements on the basis of a normal 75-mile army front and 1:5,000 scale photography, these Eighth Army men stated that in defensive situations a field army would require a total of 5,000 negatives per day. In offensive actions the requirement of the field army for photography would increase to 6,000 negatives per day.[148] After examining these requirements, FEAF doubted that the national resources would be able to provide such a scale of reconnaissance support in a future global conflict. It believed that some higher level of authority was going to have to determine whether such additional expenditures for reconnaissance would enable the United States to accomplish its armed force mission with a reduction of other forces equaling the cost of the additional reconnaissance. In other words, would one more dollar spent for reconnaissance in support of ground forces save the ground forces one dollar's worth of expended effort?[149]

THEATER AIRLIFT

The Concept of Flexible Air Transport:* From their embryonic origins early in World War II, troop carrier and air transport aviation had always been accorded separate command status. Troop carrier was concerned with such matters as airborne assault and air-dropped resupply, and air transport had been charged with air-landed movements of cargo and personnel. That troop carrier and air transport functions could be successfully combined had been at least indicated in the campaigns in Burma and in the Southwest Pacific during World War II but the first forceful demonstration of the idea took place during the spring of 1950 when joint Army and Air Force maneuvers, called "Exercise Swarmer," were held in North Carolina.†

In the course of "Swarmer" the participants learned much regarding large-scale combinations of troop carrier and air transport functions, and the seminal thinking from this exercise was brought to the Far East by Maj. Gen. William H. Tunner and his staff officers, who were especially summoned from the United States to organize, effective 26 August 1950, the FEAF Combat Cargo Command (Provisional). This provisional command was replaced by the 315th Air Division (Combat Cargo) on 25 January 1951 and the command of it devolved successively upon Brig. Gen. John P. Henebry (8 February 1951), Col. Cecil H. Childre (26 February 1952), and Brig. Gen. Chester E. McCarty (10 April 1952), but the basic organizational concept of the theater airlift effort did not change. This basic concept was: given direct responsibility to the theater air commander and continuous centralized control over subordinates, a single airlift command with one fleet of aircraft could successfully carry out all airlift missions—airborne assault, air-drop supply, air-landed supply, air evacuation of sick and wounded, personnel transport, air movement of tactical ground and air units, and special air missions, together with all of the activities allied to such operations. Flexibility of airlift was the practical answer to good air transportation.

Establishment of the FEAF Combat Cargo Command as a major subordinate command to the FEAF relieved the Fifth Air Force of the bewildering responsibility for controlling the theater airlift. At this same time, however, General Tunner insisted that the responsibility for allocating theater airlift capability was a function of the theater commander and the responsibility could best be exercised through a joint committee representing the Army, Navy, and Air Forces in the theater. A FEC Joint Air Priorities Board was accordingly established, and this board, receiving a weekly forecast of airlift capabilities through FEAF from the cargo command, allocated tonnages to the various using services. The proviso that airlift capability was to be allocated in the form of tonnages was a rebuttal to the efforts of certain groups, particularly in the Army, who wanted the theater board to allocate cargo aircraft in blocks or in units for specific transport usages.[150] The deliberations of the theater air priorities board were influenced primarily by the strategy of the theater commander and by the exigencies of the existing tactical situation, and in a crisis the board could conceivably allocate the entire airlift

*Most of the information presented in this introductory section is given in greater detail in AHS-71, pp. 100-106 and AHS-72, pp. 234-47.

†*See* AHS-80: Air Force Participation in Joint Army-Air Force Training Exercises, 1947-1950, pp. 16-31.

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capability to one using service. Generally, however, the theater allocations were equitable.

Located at the headquarters of the FEAF Combat Cargo Command and its successor 315th Air Division were liaison officers of FEAF and the Eighth Army. These officers were collectively called the Joint Airlift Liaison Control (JALCO), and this informal organization was sometimes incorrectly described as the "working body" of the joint air priorities board. Actually, however, these liaison officers were responsible to their respective commands. From these commands they received specific requests for air movements and decided what was to be moved at what time and in what priority, keeping their consolidated requirements within the tonnage allocations granted to their commands by the theater air priorities board. When a coordination officer received requests which totaled up to more than his command's allocation, he usually approached the other coordination officer to determine whether or not he might be able to borrow some of that officer's allocation. If the needed tonnage could not be borrowed, the coordination officer could request the 315th Air Division to exceed its stated capabilities for a short period of time. The 315th was sufficiently flexible to manage slight extensions for short periods. If, however, the extension requested was substantial, the 315th required the coordination officer to take his case to the theater air priorities board, which might be willing to declare an emergency and authorize the 315th to fly a maximum effort.

Under the control system established in August 1950 and continued throughout the war, the 315th Air Division was not concerned with the allocation of its airlift capabilities nor with the designation of priorities for the movement of individual shipments. Yet if the theater board and JALCO determined the tasks it would perform, the 315th Air Division zealously maintained its own responsibility for determining how it would most efficiently execute its assigned tasks. In the spring of 1953, when the Joint Air Priorities Board attempted to skirt division operational responsibilities and to direct the movement of combat cargo aircraft to meet commitments, General McCarty issued point-blank orders that no such directives would be honored unless they were issued by General Weyland.[151]

Within the headquarters of the FEAF Combat Cargo Command and the 315th Air Division, the Transport Movement Control (TMC) Section functioned as a nerve center which directed the movement of transport aircraft in the Far East. Although other sections of the headquarters assisted it in planning and ordering missions, the TMC monitored and controlled all airlift operations. In the event that a day's operations did not go as planned, the TMC duty officer was empowered to make decisions changing the plans. In cases where all scheduled cargo could not be carried, because of unforeseen circumstances such as unfavorable weather, the TMC duty officer contacted the coordination officer concerned to determine what particular cargo carried the highest priority. The TMC maintained status boards revealing up-to-date information concerning the location and condition of all aircraft of the command. When necessary, it possessed communications whereby aircraft might be diverted in flight from one point to another. In short, no aircraft in the 315th Air Division moved without the knowledge and control of the Transport Movement Control Section.

Organizational actions in the 315th Air Division varied according to the transport mission being performed, but all transport missions were closely scheduled, controlled, and reported. The predominant task of the airlift was to deliver air-landed supplies, all of which were requisitioned by using agencies in type and quantity. Management of a typical air-landed resupply mission progressed as follows: the Eighth Army G-4 in Korea notified the Army airlift coordination officer that a given quantity of supplies was needed at a forward Korean airfield. The Army coordination officer checked the supply depots in Japan to locate the required supplies and ordered them delivered to an air terminal detachment. The Army coordination officer then passed a request to the 315th's TMC to move the supplies to Korea. This request would be one of a number of a day's requests, all of which were generally turned in at the TMC before 1400 hours. At this time representatives of the 315th's Traffic Section and the TMC met and prepared an operations order for the following day. While this operations order was being mimeographed, the transport wings were notified by telephone of their next day's commitments, which were later confirmed in the courier-delivered operations order.

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Procedures for handling air-dropped supplies were similar to those used for air-landed cargo but more planning was required prior to the execution of this type of transport task. In this case, an Eighth Army troop unit that desired to secure a given quantity of air-dropped supplies communicated this information to the Eighth Army's G-4 air transportation officer, who passed the essential information both to the Army coordination officer at JALCO and to the 315th's liaison officer at Eighth Army. The 315th's liaison officer effected the necessary coordination with Fifth Air Force, arranging for such details as fighter escort or for Mosquito tactical air coordination, and telephoned or radioed all necessary information to the 315th's Operations Plans Section, which was responsible for handling air-dropped supply requests. The Army coordination officer in the meanwhile had checked with the 8081st Army Unit, which was responsible for air supply packaging and was located at Ashiya Air Base, to determine what of the required supplies were on hand and when the unit could begin to load them. The Army coordination officer then made a request to the 315th for the air-dropping mission and he supplied Operations Plans with precise information on the supplies to be dropped. When all this data was at hand, the 315th's TMC and Traffic Sections took over and proceeded with the ordering and scheduling of the supply drop mission. Usually C-119 aircraft, which were best suited for the function and were based at Ashiya, were used for supply dropping, but when necessary C-46's from Brady were sent to Ashiya and there loaded with the supplies to be dropped in Korea. At Ashiya, the 8081st Army Unit loaded the supplies and provided the trained "kickers" who ejected the cargo over the drop zones in the forward areas.

As developed within the 315th Air Division, the air evacuation of troop casualties was wherever possible made a concomitant of cargo hauling, but, when necessary, especially scheduled aircraft were dispatched empty to Korea to evacuate casualties. Air evacuation was the responsibility of the 315th Air Division's surgeon, while actual handling was done by the 801st Medical Air Evacuation Squadron. Scheduling was accomplished by the 315th's Air Evacuation Operation Section: daily at noon, the Eighth Army's medical evacuation officer notified the 315th's surgeon of the number of patients to be moved the following day. Supplementary data from the 801st's liaison officer at Taegu gave types and numbers of cases to be moved to Japan and the number of aircraft needed for the next day's evacuation of patients from forward airstrips. For intra-Japan movements similar information came from the Army hospital regulating officer. When all of this information was received the 315th's surgeon then submitted to the TMC a consolidated request, including aircraft types needed, pick-up points, destinations, and loading times. The TMC integrated these requests into the airlift schedule for the following day. Whenever possible, the 315th arranged to accomplish these evacuation requests by adding the necessary medical apparatus, flight nurses, and medical technicians to in-bound cargo flights that would deliver their loads and then out-load medical evacuation cases. This procedure was simplified by intra-Korea concentrations of evacuees: patients were picked up at forward airstrips by C-47's and lifted usually to Taegu (K-2) or Pusan (K-9) where field hospitals were located. From K-2 or K-9 patients requiring hospitalization in excess of 30 days or specialized treatment were airlifted to Japan. Within Japan, shifts were made by air from station to general hospitals.

The concept of flexible air transport stood the 315th Air Division in good stead when it managed the transport tasks presented to it during the Korean hostilities. The changing character of the battle virtually dictated the task that was to be emphasized at any one period, and the 315th's operational procedures were sufficiently fluid as to allow it to shift its capability from one task to another without a pause. Thus, during periods of fluid ground operations, the Eighth Army required large amounts of air-dropped supplies but smaller amounts of air-landed supplies. When the battle situation stabilized, few air-dropped supplies were delivered and the capability of the 315th was shifted to air-landed cargo and personnel. During the period of active ground fighting many air evacuation casualties had to be lifted; when the tempo of the ground fighting lulled this out-bound space was occupied by battle-weary personnel who were given rest and recreation (R & R) leaves in Japan.

The real test of the 315th Air Division concept of flexible airlift came when it handled airborne assault missions. Prior to Korea most thinking

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relative to airborne assault operations, predicated as it was on World War II experiences, had held that the successful accomplishment of such a mission demanded the centralized direction of a joint airborne headquarters, comprised of Army and Air Force personnel, which would maintain operational control over attached airborne and troop carrier units. Such a concept, which advocated that air and airborne units should live, train, and operate together for long periods of time, was too expensive of scarce air transport effort and of personnel to be employed in Korea. Instead of following this concept, the organizational structures and procedures of the FEAF Combat Cargo Command and its successor 315th Air Division were laid in a broad enough fashion to manage both the continuing day-to-day airlift operations and the two airborne assaults that were made in Korea. The successful management of airborne assault missions was primarily attributable to an always harmonious relationship between the 315th Air Division and the 187th Airborne Regimental Combat Team. A permanent exchange of liaison officers interconnected the two headquarters, but more significant than this in maintaining harmony and unity of action was the manifest desire of both the air and airborne commanders to get the job done and leave controversies to higher levels of command.[152]

In the execution of the two airborne assault operations which were employed in Korea—the first at Sukchon-Sunchon in October 1950 and the second at Munsan-ni in March 1951—the FEAF Combat Cargo Command and the 315th Air Division displayed a facile ability to redirect their forces from air transport to airborne assault tasks. For such a redirection of force the 315th Air Division required 72 hours' advance notice prior to the execution of a regimental-sized airborne assault. In this period the C–119's and such other C–47's and C–46's as were needed to drop the paratroopers and their equipment were stood down for maintenance and then were marshalled at a forward airfield in Korea from which the airborne operation was staged. Within this same period, staff planners of the 187th RCT and the 315th Air Division held planning sessions and drew up the necessary operations orders. The 315th also arranged for such combat support as was required from the Fifth Air Force. Since only a part of its aircraft were needed to implement an airborne operation, the 315th was able to continue its C–54's and C–124's on air tranport tasks during the several days that were needed to launch and resupply the 187th RCT. Although the experience with airborne operations was limited to the airlift required to lift, drop, and resupply a single airborne RCT (a task which could be accomplished by a little more than an augmented C–119 group), the 315th Air Division was confident that its flexible procedures could be "successful where airborne units of army size and a considerable number of transport groups are employed." [153]

To the officers who guided the destiny of the 315th Air Division it was ever apparent that their real objective was to develop the utmost in airlift capability through a maximum utilization of the fewest possible aircraft. Such an objective recognized that the USAF could not economically invest in transport aircraft which were not fully utilized. It also recognized that excessive numbers of transport aircraft in a combat theater cluttered the airspace, crowded forward airfields, and generally impeded the accomplishment of priority air combat missions. Within the 315th Air Division constant introspection and sound management practices in every facet of its activities produced dividends in the form of airlift capability which was present when and where it was needed.

Deployments of Troop Carrier Units: Fundamental to the accomplishment of an airlift effort is the possession of an adequate number of transport squadrons, equipped with efficient type aircraft and based where they can load their cargoes of men and goods with the least waste effort. Because of the urgency of the tactical situation during 1950, however, a somewhat heterogeneous collection of troop carrier units had joined FEAF's own 374th Troop Carrier Wing in Japan. Many of these units had come for what was supposed to be a short period of temporary duty, but most of them were still in the theater in 1952. On 30 June 1952 the transport units assigned or attached to the 315th Air Division occupied bases as follows: Located at Tachikawa Air Base on Honshu was the 374th Troop Carrier Wing, with the 61st and 374th Groups. The 61st Troop Carrier Group had two squadrons of C–54 aircraft with it at Tachikawa, and the 374th Troop Carrier Group had one squadron which was in process of converting to C–124's and another squadron which,

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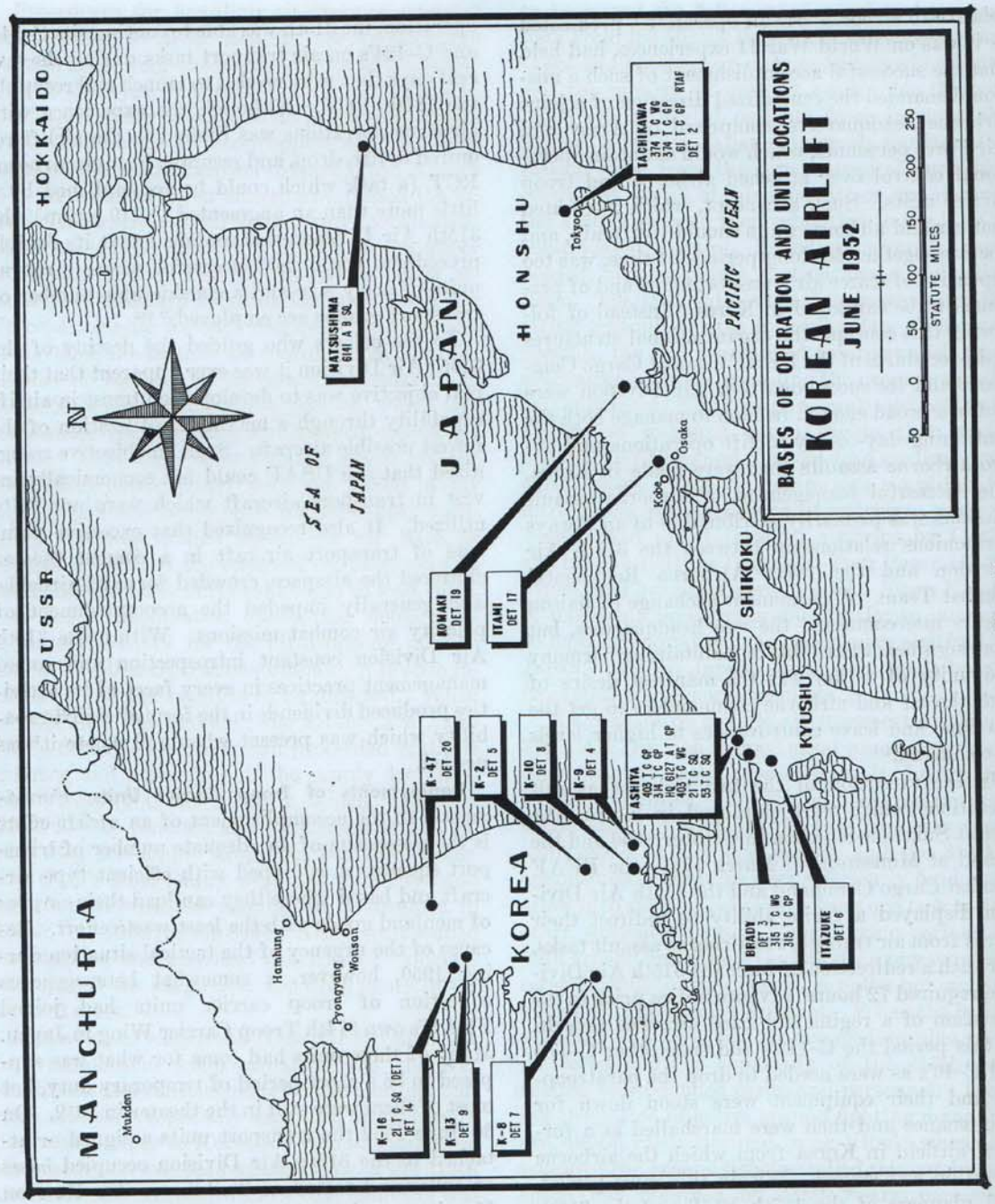

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although slated to convert to C–124's, still possessed C–54 aircraft. Also at Tachikawa was the Royal Thai Air Force Detachment with three C–47's and a detachment of Civil Air Transport (CAT) leased or contract service C–46 aircraft. Tachikawa's importance to the airlift effort lay in the fact that it was the primary aerial port of embarkation for priority supplies, equipment, and personnel which poured into the port of Yokohama and into Haneda Airfield and for other supplies and equipment stored or repaired in the military depots in the Tokyo-Yokohama area. Since Tachikawa served the FEALOGFOR as well as the 315th Air Division its base facilities would not accommodate all of the heavy transports which needed basing there: transport aircraft stationed elsewhere frequently had to be staged to Tachikawa to provide additional airlift to Korea.

Located at Ashiya Air Base on Kyushu was the 403d Troop Carrier Wing, which served two groups—the 403d and 314th—each of which had three squadrons of C–119 aircraft. Here also were located the 53d Troop Carrier Squadron with C–54 aircraft and the rear echelon of the 21st Troop Carrier Squadron, two squadrons which belonged respectively to the 61st and 374th Groups. Also at Ashiya and attached to the 21st Squadron was the Royal Hellenic Air Force (RHAF) Detachment which had five C–47 aircraft. Although the 21st Squadron and the RHAF Detachment counted Ashiya to be their home base, the flight echelons of both of these C–47 units was at Seoul Municipal (K–16) Airfield in Korea. Established at Brady Air Base on Kyushu was the 315th Troop Carrier Wing, with a group of the same designation and four squadrons of C–46 aircraft. These southern Japanese bases were near the Kokura general depot from which large quantities of combat materiel were airlifted to Korea. They were also near the 187th Airborne Regimental Combat Team's home station. From Seoul (K–16) the C–47 aircraft could handle priority movements of personnel and supplies into frontline airfields.[154] This deployment of troop carrier units is shown in figure 19.

This June 1952 deployment of 315th Air Division troop carrier units was less than desirable on two counts: groupings and aircraft were not homogenous and not all aircraft were based near the source of their cargoes. At this time, however, the last of a number of 315th Air Division redeployment programs was underway, and the key to the accomplishment of this program was the modernization of the 374th Wing with the new and huge C–124 Globemaster transport aircraft. As soon as the 374th Wing had converted two squadrons to C–124's, FEAF had promised USAF that it would allow the 61st Group to return to the United States with two of its C–54 squadrons. In order to provide a third squadron for the 374th Wing and to keep one C–54 squadron in the Far East, one of the 61st Group's three C–54 squadrons was to be redesignated as the 21st Squadron. At such time as this happened, the old 21st Squadron, which had flown C–47's since the early days of the war, would be redesignated and reorganized as a table of distribution unit. Under this plan, two squadrons of C–124's and one squadron of C–54's would be based at Tachikawa, all C–119's would be located at Ashiya, all C–46's would continue to be based at Brady, and the C–47 assault squadron would move to Seoul Airport (K–16).[155]

This conversion and redeployment program was accomplished substantially as scheduled. Although an operational test of the C–124 aircraft had been conducted in 1951, General McCarty piloted the first operational Globemaster flight from Japan to Korea on 3 July 1952, and by 25 August these planes were scheduled on a one-per-day basis from Tachikawa to Korea. At the end of September 1952 the 374th Wing had on hand 26 C–124's, which number represented its authorized unit equipment plus 10 percent command support allocation.[156] On 1 November the 61st Group commenced to phase its C–54's out of the airlift operations, and the air echelon of the group began its return flight to the ZI on 15 November. Effective on 21 November the 61st Group and its 15th and 53d Squadrons were relieved from attachment to the 315th Air Division. The 14th Squadron remained at Tachikawa, where, effective on 1 December, it was redesignated as the 21st Troop Carrier Squadron. At this time the designation of the 14th Squadron was returned to the ZI, and the 6461st Troop Carrier Squadron was simultaneously organized at Ashiya to receive the personnel of the old 21st ("Kyushu Gypsy") Squadron.[157] These changes were accomplished without any reduction in over-all airlift capability of the 315th Air Division, but, as will be seen, the 61st Group

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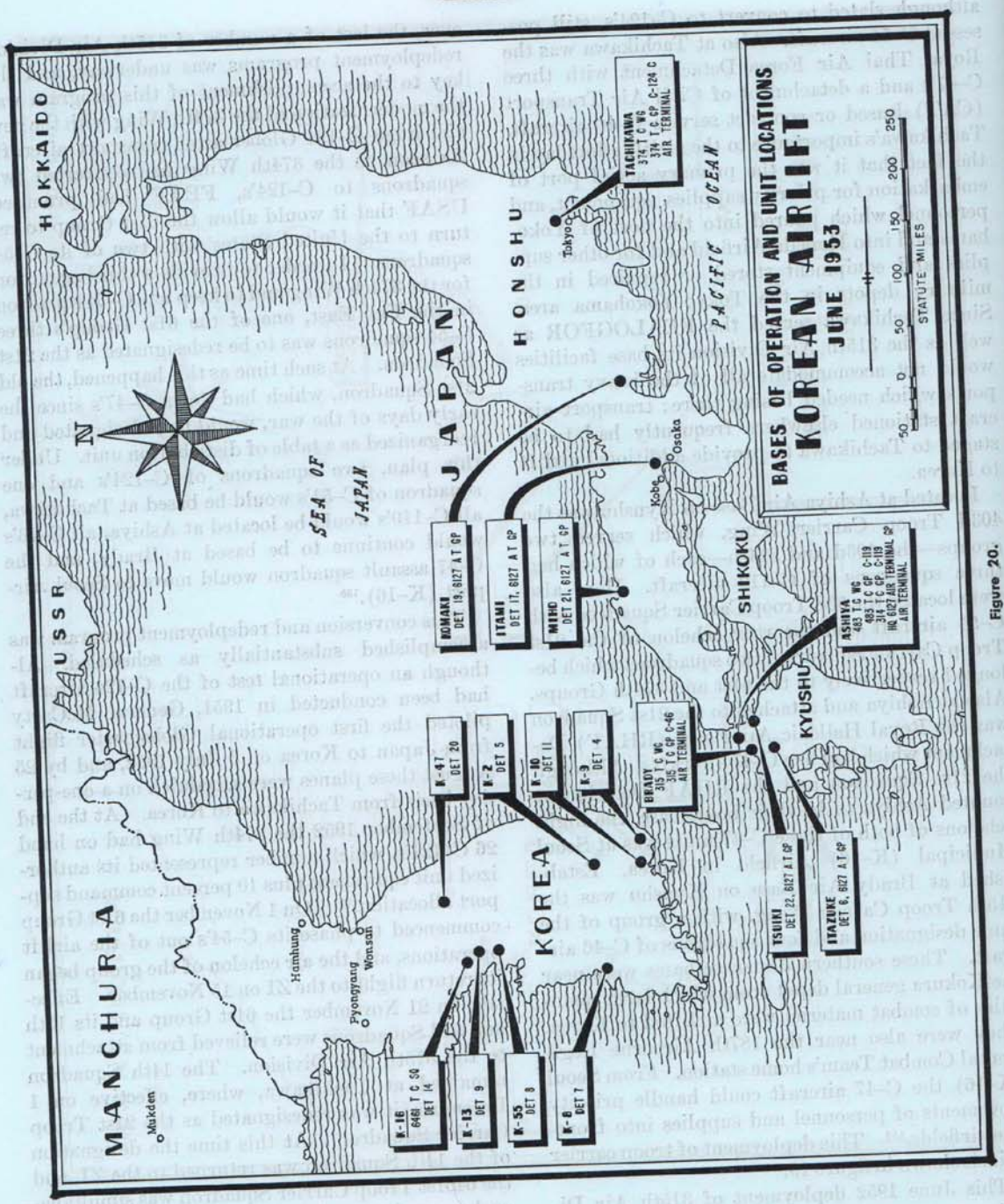

Figure 20.

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was actually released a little too early to permit the Globemasters to take over the full burden of cargo movements out of Tachikawa.

In the winter of 1952–1953 a few other organizational changes were made among the 315th Air Division's subordinate units. Because of increased on-loading requirements resulting from the movement of the Fifth Air Force personnel processing center from Iwakuni to Tachikawa the 315th Air Division had to move one C–46 squadron (the 344th Troop Carrier Squadron) from Brady to Tachikawa. This change of station was completed on 15 December 1952 and the 344th Squadron was attached to the 374th Wing three days later. Although this action spoiled the homogeneity of aircraft at Tachikawa and crowded that base's housing facilities, the C–46's were needed to provide airlift for some 200 Fifth Air Force replacements and returnees who moved between central Japan and Korea each day.[158] Another change, this one a paper transaction, relieved the 403d Troop Carrier Wing (M) and its subordinate units from active military service effective 1 January 1953, returned this slate of designations to the USAF reserve, and simultaneously activated the 483d Troop Carrier Wing (M) with typical units of the same numerical designation and the 815th, 816th, and 817th Troop Carrier Squadrons.[159] The 6461st Troop Carrier Squadron remained attached to the 483d Wing, but effective 1 February 1953 it moved its main strength to Seoul (K–16) and left a detachment at Ashiya.[160] From this deployment, which is shown in figure 20, the 315th Air Division completed the Korean war.

Problems of Aircraft Utilization: Given possession of troop carrier wings based conveniently for the performance of their tasks, 315th Air Division staff officers figured weekly airlift projections on the basis of five planning factors. Two of these were situational factors: airways and airfield limitations and the variety of the air routes which had to be flown. These factors did not vary much from week to week. The other three factors had to do with aircraft utilization rates: the number of qualified crews assigned, the volume of replacement parts available, and the number of maintenance personnel per assigned aircraft.[161] To arrive at the command's airlift capability, these several factors had to be calculated in terms of each aircraft type which the command employed.

When the 315th Air Division had requested that it be assigned two squadrons of C–124A Globemaster aircraft it had indicated a willingness to pioneer into the unknown. This giant aircraft was designed for a gross take-off weight of 175,000 pounds, but no airfields in Korea and only one airfield in the theater (Kadena) possessed design criteria adequate for handling such loads. The Globemaster had been designed for inter-theater long-range airlift, but the maximum distance between Tachikawa and any airfield in Korea (Osan) was only 752 miles. Operational suitability tests flown in the theater in the autumn of 1951 nevertheless indicated that the 315th Air Division would use the C–124's to some advantage: in short-range flights between Ashiya and Kimpo the C–124 tested demonstrated efficiency of operations with average cargo loads of 34,400 pounds. The aircraft could also handle massive pieces of equipment: one of these test trips hauled an entire GCA unit consisting of two large van trailers. Equally versatile with cargo, personnel, or air evacuation cases, one C–124 with its greater speed and cargo capacity had in theory four times the lift capability of a C–54. Use of this plane in the Far East could be expected to relieve congestion on the ever-crowded airways and airfields. Actually, however, the C–124 would not be able to haul maximum cargo weights to Korea because the Fifth Air Force, apprehensive as to the effect of this plane upon its runways, was willing to clear only Taegu (K–2), Kimpo (K–14), Seoul (K–16), and Chunchon (K–47) for Globemaster landings. Even on these better than average airfields the Fifth Air Force specified that a Globemaster's landing weight could not exceed 160,000 pounds.[162]

In spite of these weight restrictions which would have to be observed if the Globemasters were to operate into Korea, the 315th Air Division calculated that the conversion of two of its C–54 squadrons to C–124's would increase its airlift capabilities: given five hours daily utilization of each possessed C–124, daily airlift capabilities would be boosted by approximately 480 patients, 1,200 passengers, or 130 tons of cargo. To the 315th Air Division the Globemaster flight tests indicated that these planes could and should be used on airlift missions in the Far East, and General Henebry asked that the conversion of two squadrons of the 374th Wing to C–124's be begun on 1 May 1952. USAF had tentatively planned to reequip these two squadrons sometime in the

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second quarter of fiscal year 1952 (October–December 1952), but since FEAF urged the acceleration USAF agreed to dispatch six C–124's to the Far East on 1 May 1952 and to send out increments of six planes each six weeks thereafter until the 374th Wing had 24 unit equipment and 2 other command support aircraft.[163] Based on this schedule the 315th Air Division reckoned that the two C–124 squadrons would have been completely equipped with aircraft and qualified aircrews by the end of August and that, shortly after this time, the 61st Troop Carrier Group could be released to return to the United States.

Actual deliveries of the Globemasters progressed as scheduled in May and June 1952, and most of these planes were used to equip the 6th Troop Carrier Squadron. Beginning in July, however, the replacement program slipped, and as a result of these unanticipated delays the 374th Wing did not get its full complement of 26 C–124's until the end of September 1952. Meanwhile, on 24 August, one of the 6th Squadron's planes undershot a runway at Komaki while on a training flight: there were no casualties but the plane was badly damaged and was not replaced. It was obvious that the slower than anticipated deliveries of the new transports would delay the time at which the 22d Troop Carrier Squadron would become fully operational with Globemasters, but a conference held at 315th Air Division headquarters on 30 September tentatively committed this organization to release the 61st Group on 15 November 1952.[164]

In all of its planning relevant to the Globemaster program, the 315th Air Division expected to secure five hours operating time from each of these aircraft each day. Such a utilization rate had an important bearing on the 315th's total airlift capabilities but it bore even more directly upon the command's ability to provide requisite airlift tonnages on Channel 2, Tachikawa to Korea. FEAF had specified that 120 tons per day was the minimum acceptable airlift capability on Channel 2, and, since the C–54 squadron of the 374th Wing would be used for scheduled flights, the two C–124 squadrons would be expected to perform the daily projected airlift on Channel 2.[165] Seeking to program supply support to sustain such a rate of C–124 operations, FEAF sent a team of officers to the Air Materiel Command in July 1952. On this trip, the FEAF team learned that USAF had contracted for spares for the first 156 C–124's it had purchased on the basis of a planned utilization rate of one hour each per day. This rate was quite limited in itself, but it was further reduced when the original C–124 purchase order was increased to 226 aircraft without additional provisioning for spare parts. The FEAF team also learned that the major portion of C–124 spare stocks would not be delivered by the manufacturer until November 1952. Because of these circumstances, USAF was unable to program FEAF's Globemasters for the desired utilization rate of five hours per day before January 1953.[166]

Although it recognized that supply support would be limited, the 374th Wing had expected that each newly arriving C–124 would bring with it a table of supplies and the special handling equipment which it required, but in almost every instance the aircraft arrived in advance of its supply support. And when the automatic shipments of C–124 parts began to come in, the 374th Wing discovered that a large proportion of the items were tailored to fit the earliest production model Globemasters and could not be used on the later production models which it was assigned.[167] Not only were these initial tables of supply inadequate but the 315th Air Division was forced by circumstances further to aggravate the C–124 supply problem: in order to balance the loss of the capability of the two squadrons of 374th Wing C–54's that were converting to C–124's, the 315th had to program the operational C–124's for approximately 2.5 hours of utilization each day, an amount of flying that greatly exceeded the 1.2 hours which available supplies would support at that time.[168] As a result of these supply factors, the C–124 AOCP rate zoomed upward to 39.9 percent in August 1952, and without remedial action it promised to go higher.[169]

On 25 September 1952 General McCarty officially informed General Weyland of the Globemaster supply situation which would, of course, gravely affect the 315th's airlift capability at the departure of the 61st Group. After reviewing the problem, McCarty outlined three alternative actions: FEAF could accept the reduction in theater airlift capability; or it could ask USAF for permission to retain the 61st Group's C–54's until 1 January 1953; or it could request USAF to increase the C–124 utilization rate to 2.5 hours per day until 1 November and to boost the rate to 5

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hours after 1 November 1952. Even though he recognized that Globemaster supply support was scantily programmed, McCarty believed that a high precedence for FEAF would deliver the supplies which it required for two squadrons of C–124's.[170] General Weyland was unwilling to request retention of the 61st Group beyond the agreed upon return date of 15 November, but he requested USAF to exert every effort to provide FEAF with the logistical support needed to sustain a C–124 utilization rate of five hours per day per aircraft beginning on 15 November rather than 1 January 1953.[171]

The attention focused upon the Globemaster supply situation had wholesome results. Although USAF was unable to authorize the five-hour rate before 1 January 1953 it did program the FEAF Globemasters for a daily rate of 2.85 hours beginning on 1 October 1952. During October a C–124 programming conference representing FEALogFor, the 315th Air Division, the 374th Wing, and the Douglas Aircraft Corporation took measures to expedite air shipments to the Far East of many of the deficient items which were causing the high out-of-commission rates. The conference also drew up realistic listings of spare stock requirements based on valid consumption data. As an emergency expedient, the 374th Wing practiced controlled cannibalization, and the FEAMCom depot expeditiously repaired defective items almost as fast as they came off aircraft. These actions brought the C–124 AOCP rate downward to 19.31 percent in November and to 13.61 percent in December.[172]

Benefiting from the higher C–124 in-commission and operating rates, the 315th Air Division was able to weather the crisis presented in November when the 61st Group's two C–54 squadrons departed from the theater. The Globemasters handled all of the loads that they could on Channel 2. Civil Air Transport planes took over a part of the scheduled flights out of Tachikawa and permitted the 21st Squadron C–54's to fly some daily airlift to Korea. Since the C–124's and C–54's still could not handle all the tonnage that was supposed to move on Channel 2, the amount that was excessive to the airlift capabilities was sent by rail express from Tachikawa to southern Japanese bases where it was picked up and airlifted to Korea on Channel 3.[173] Thus the 315th Air Division successfully accommodated itself to the loss of the two squadrons of 61st Group C–54's; there was no reduction in the overall airlift capabilities but there was some temporary loss of capability on airlift Channel 2 out of Tachikawa.

Beginning in January 1953 supply support for the Globemasters was greatly improved: whereas the AOCP rate for these aircraft had averaged 23 percent per month in the last six months of 1952, it averaged 7.16 percent per month during the first six months of 1953. Many of the items which contributed to the Globemaster AOCP rate in the spring of 1953 were items—such as R4360 engines, cylinder assemblies, and fuel booster pumps—which were common to a number of USAF aircraft and were in critical status worldwide. The decreased AOCP rates, however, were unfortunately not accompanied by a proportionately higher Globemaster in-commission rate. Because of a variety of maintenance difficulties, which will be discussed below, the average in-commission rates for C–124's increased from 46.1 percent in the latter half of 1952 but only to 61.2 percent in the first half of 1953. And, under these circumstances, the 315th Air Division was unable to obtain the five hours per day utilization rate which it desired from the Globemasters: for the last six months of 1952 the command's C–124's averaged collectively 45.7 hours of utility per day, and in the first six months of 1953 the C–124 fleet provided an average of 61.9 hours of flying time per day.[174]

In December 1952 Globemaster supply support was just beginning to get on its feet when the 374th Wing encountered unanticipated maintenance problems. Early in the month, several of the Globemasters assigned to the 22d Troop Carrier Squadron developed leaks in their fuel cells: on 6 December the first C–124 stood down for fuel cell modifications. Subsequent checking showed that all 13 aircraft in the squadron either had leaking tanks or else they were going to develop leaks, and by 30 December all of these planes had to be grounded. The difficulty was caused by lighter gauge web metal which had been used in the later produced C–124's to save weight and which under the stress of flight buckled and cracked. A top priority modification program was immediately organized, and expedited work got three of the planes back in service by 20 January, two more on 27 January, and the entire fleet was back in commission on 17 February.[175] For-

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tunately for the airlift capability, the older C–124's assigned to the 6th Squadron were not affected by the fuel cell trouble, and, in order to maintain its capability, the 374th Wing concentrated all its C–124 crews, maintenance personnel, and parts supply behind the 6th Squadron's planes. Using 12 over-manned aircraft, each of which was flown 5.8 hours a day, the 6th Squadron successfully carried the entire workload of the 22d Squadron in addition to its own projected load. These 12 aircraft, in fact, hauled more tonnage in January than the entire fleet had transported in December.[176]

The Globemaster fleet gave good service during March, April, and May 1953—the first months in which both squadrons were completely operational. Everything seemed to be going well, when on 29 May a C–124 of the 22d Squadron experienced a fire in its number two engine shortly after it took off from Tachikawa. This plane made a successful emergency landing and an accident investigation board determined that the fire had begun in a generator. On 11 June another faulty generator fired the number four engine aboard a 22d Squadron Globemaster, and again the crew successfully extinguished the fire and made an emergency landing. While potentially serious, both of these generator-induced fires had been successfully controlled. General McCarty on 13 June asked the Air Materiel Command to send out a team to investigate generator problems, but in the meantime the Globemasters continued in operation. All aircraft commanders, however, were briefed to feather an engine as soon as its fire warning light came on.[177]

No one realized it but the two generator fires in late May and early June portended what was going to be history's worst air disaster. On the evening of 18 June on its block time of 1600 hours, Globemaster No. 51–137 of the 22d Troop Carrier Squadron taxied away from its parked position bearing 7 crewmen, 122 R & R passengers,* and 9,284 pounds of cargo. It was cleared under instrument flight rules from Tachikawa to Osan-ni (K–55). After a pause while two balky engines were revved-up and cleared of fouled spark plugs, No. 51–137 took off through the light rain and fog which blanketed the field at 1631 hours, and, as it was briefed to do, began making a hard turn to the left to clear the area. Midway through this turn and about four miles out, the aircraft commander notified Tachikawa GCA that he had feathered one engine and was returning for an emergency landing. The GCA operator thrice heard the pilot call for more power, and then the operator lost the plane from his scope. At this time—approximately 1635 hours—other observers on the ground saw the Globemaster stall, go into a flat spin, and then crash into the ground. All persons aboard were killed. When the wreckage of the plane was analyzed, the primary cause of the accident was fixed upon the failure of a generator drive shaft in the number one engine. Having lost this engine, the Globemaster had not possessed a sufficient margin of power in its other three engines to permit it to maintain altitude and airspeed in a 180 degree turn. Some degree of pilot error was also probably to blame for the accident: the exhaustive investigation of the air tragedy revealed that the aircraft commander had made a poor showing in transitional training, especially in written examinations pertaining to cockpit procedures and aircraft performance characteristics, and that he had on other occasions failed to brief his crew as to who would be specifically responsible for handling emergency power.[178]

On the evening of the crash the commander of the 374th Wing grounded all C–124's pending determination of the cause of the accident, a matter which was not apparent for several days. The AMC generator team arrived in time to participate in the accident investigation, which, as seen above, determined that a faulty generator had caused the crash. After this, the generator team examined other Globemasters and found that most of them also had generator problems. Most of the stocks of generators in the Far East, moreover, checked out defective.[179] The AMC team outlined an extensive course of remedial actions which would have to be accomplished before the Globemasters could be released for flying, and on 8 July, after rigid scrutiny of inspectors, such of the C–124's as had been repaired or had passed the necessary tests were returned to flying. Because of the large quantity of defective generators found in supply stocks, however, eight C–124's remained out of commission for want of these critical items. FEAF requested expedited shipments, and as a result of AMC action a cargo of 101 generators arrived by air transport from the United States

*One of the passengers was an unmanifested captain from the 18th Fighter-Bomber Wing.

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on 20 July. Of this quantity, 22 generators were new items and these generators were sufficient to supply the eight AOCP aircraft. The remainder of the shipment comprised overhauled items, none of which checked out satisfactorily in bench tests and all of which had therefore to be rejected.[180]

Because of problems of supply and maintenance the 315th Air Division did not realize the rates of aircraft utilization which it desired to obtain from the Globemaster transports. In this same period, a variety of situational factors in the Far East at once complicated the employment of the Globemasters and denied them an opportunity fully to exploit their load-carrying capabilities. When it had first proposed to employ the C–124's in flights to Korea, the 315th Air Division had secured the Fifth Air Force's permission to use its principal airfields provided a Globemaster's landing weight did not exceed 160,000 pounds. Under this limitation, a C–124 could carry a potential payload of 36,000 pounds, provided it was able to obtain 115/145 octane avgas in Korea for a return trip to Japan. This landing weight restriction appeared at first to be detrimental to the best utilization of the Globemasters but its significance was soon diminished by another factor: the Korean airlift was based upon the principle of expeditious delivery of critical items and backlogs of cargo seldom accumulated. Under this circumstance, 18-ton cargoes were not too frequently available. Large numbers of passengers could have provided these maximum cargo loadings, but in the interest of flying safety the 315th Air Division in December 1952 reduced and standardized passenger loads at 120 per Globemaster. On one peak sortie flown from Tachikawa to Seoul (K–16) a Globemaster moved 40,406 pounds of cargo, but the general average of cargo loadings seldom equaled even the 36,000-pound potential payload. In the August through October 1952 training period the average Globemaster cargo weighed 21,439 pounds, and in the operational period of November 1952 through April 1953 the average Globemaster payload was 24,346 pounds.[181] During May 1953 the Fifth Air Force attempted to improve its utilization of allocated C–124 airlift by establishing an agreement with FEALogFor by which a daily flow of about 15 tons of available traffic "filler cargo" was delivered to the Tachikawa freight terminal and was used to occupy space on C–124 aircraft which was not filled with high priority freight. The Fifth Air Force also filled otherwise unoccupied Globemaster space on return trips to Japan with large quantities of reparable vehicles, engineer equipment, and clothing which would normally have been moved by surface means.[182]

Despite the limitations imposed upon their landing weights, the Globemasters proved to be too heavy to operate into most Korean airfields, and as time passed more and more of these tactical facilities were put off limits to C–124's. By October 1952 the Fifth Air Force had restricted C–119 landings to Seoul (K–16), Kimpo (K–14), Suwon (K–13), and Taegu (K–2).[183] In November, however, C–124's were allowed to use the new heavy-duty airfield at Osan-ni (K–53), but on 29 March 1953 failure of the runway foundation at Suwon (K–13) forced discontinuance of C–124 landings there.[184] During their year of operations into Korea the Globemasters had access to only about four airfields. Viewed in one respect, however, these landing restrictions were not altogether burdensome because it was difficult to generate justifiable Globemaster loads into Korean destinations other than K–2, K–14, and K–16.[185] To meet these situational factors, the 315th Air Division, with the cooperation of the Fifth Air Force, worked out new operational techniques. The 315th had operated a major air terminal at Seoul Airfield (K–16) since November 1951, and in the summer and autumn of 1952 Fifth Air Force aviation engineers constructed at Seoul a new runway of sufficient bearing capacity to accommodate the Globemasters.* The runway was completed in October 1952 and during the next month avgas refueling facilities were provided to meet the demands of the Globemasters. Although a substantial number of C–124 trips were flown into the airfield at Taegu (K–2), the Seoul Airfield (K–16) became the principal Globemaster terminal in Korea.[186] Free troop carrier access to the airhead at Seoul was so generally beneficial to the airlift effort that FEAF later described a standing need for at least one primary air transport base within a combat aircraft base complex.[187] Since small package loads of air freight and passengers were required daily at most K-sites, the development of K–16 and K–2 into the major Globemaster terminals posed a need for feeder airlines into those

*See Chap. V, p. 175.

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airfields. Operating out of K–16, the C–47's of the 6461st Troop Carrier Squadron and the RHAF detachment provided some feeder airlift, and C–119's and C–46's also picked up and delivered intra-Korea cargoes. These arrangements did not meet the complete satisfaction of the Fifth Air Force, and its Director of Materiel commented in May 1953 that experience with the system had demonstrated that composite loads of passengers and freight, with possibly six final destinations, when lifted to control points within Korea for transshipment usually resulted in delays in delivery of urgently required materiel, excessive handling of cargo, overburdened terminal facilities, and mishandled, missing, or stray freight.[188]

During the period of nearly a year in which they operated in the Far East, the C–124 Globemaster transports posed special requirements, but, when the final thinking about them was formalized, FEAF noted that the C–124, although plagued by certain parts shortages, "proved itself a valuable addition to the fleet of transport aircraft." [189] The FEAF Deputy for Comptroller also recommended a statement of policy in reference to the Globemaster as follows: "Although the runway and refueling facilities for the C–124 operation in the FEAF area are not the most desirable, the C–124 has, through its actual performance within this theater, fully accomplished its position as a cargo aircraft completely acceptable and vital to the accomplishment of the intra-theater airlift mission in the geographical areas of FEAF and the Far East Command." This same report, however, noted that an airlift command employing Globemasters would require a balancing capability of smaller type cargo aircraft which could move or transship small but urgently needed quantities of supplies to airfields which did not have large airlift requirements.[190] Not officially filed but nevertheless made of historical record was a dissenting opinion of the Fifth Air Force's Director of Materiel, who wrote: "The solution of the problem involving support of tactical air operations in this or any other theater would be Air Force procurement of long haul, ten-ton-payload aircraft that will not gross over 70,000 pounds landing weight [and] . . . would allow distribution of loads from depots directly to the consumer in forward areas." [191]

To the successful accomplishment of the airlift mission in the Far East, the C–119 Flying Boxcars assigned to the 483d Troop Carrier Wing at Ashiya were of unique importance. These post-World War II transports had been especially designed for dropping paratroops and supplies: with their clamshell doors removed and their monorail equipment installed, the C–119's could release a full cargo of paratroopers or palleted supplies in one pass over a drop zone. The C–119 fleet was the 315th Air Division's main capability for launching the 187th Airborne Regimental Combat Team and for dropping supplies to beleaguered troops in Korea. The Flying Boxcars also possessed potential for hauling cargo: one of these planes could be called upon to haul up to 10 tons of cargo and their roomy and rear-loading cargo compartments could accommodate bulky items with an ease of handling not found in other transports. The C–119's had been brought to the Far East by the 314th Troop Carrier Group in September 1950, supposedly to launch a single airborne operation. Once in the theater, however, the C–119's had proven so versatile in handling cargo that they had been retained and used extensively for this purpose.

When the 314th Group had been dispatched to the Far East the USAF had not been able to provide it with a sufficient number of C–119's to launch the 187th in one lift, but in order to give it as many planes as possible the group had been augmented with a fourth squadron. From the beginning, however, the 314th Group had not had the 96 aircraft which it required to handle the 187th, and as time had passed its strength in C–119 aircraft had been eroded by combat losses. Therefore in October 1951, when USAF had suggested it, the 315th Air Division had readily agreed to trade the 61st Troop Carrier Group (C–54's) for another C–119 wing. As this proposal progressed through planning and action stages, however, the 315th did obtain the 403d Wing and its three squadrons but these organizations were sent to the theater without aircraft. Arriving in April 1952, the 403d had absorbed the personnel and aircraft of the fourth squadron in the 314th Group (the squadron designation returned to USAF), and the 403d Group additionally took over an equitable share of the 314th Group's other C–119's. In this reorganization the 403d and 314th Groups were authorized 48 C–119's each as unit equipment. The reorganization had a salutary effect on the C–119 situation: the 403d Wing provided the table

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of organization supporting units needed to operate Ashiya Air Base, and the wing would also be able to supervise the transport efforts of the 314th and 403d Troop Carrier Groups.[192]

The reorganization at Ashiya did not immediately provide the 315th Air Division with more C–119 aircraft nor did it provide any immediate alleviation for the tottering serviceability of these aircraft. The serviceability rates of these aircraft in fact hit their lowest levels in June and July 1952. Of 71 active aircraft on hand in the 403d Wing during these two months, only 28 were in commission in June and only 23 in July. Even these figures were deceptive for not a single one of the C–119's in the theater in June 1952 was considered to be safe for flight. The C–119 capability was so completely bankrupt that on 19 June FEAF reluctantly informed CINCFE that the Boxcars would have to be relieved from all routine airlift employments, except for a very minimum requirement which might be made upon them for hauling bulky material. Requirements made upon these planes to drop supplies or train with the 187th RCT would have to be pared to the bone. In case of a genuine emergency and after not less than 72 hours alert, CINCFE was told that the 315th Air Division could muster 40 C–119's for an airborne operation, but such an emergency employment would be virtually a one-time affair for the C–119's would have rapidly diminishing capabilities to provide resupply drops.[193]

This virtual collapse of the 315th Air Division's C–119 capability traced its origins to a variety of causes, but it was basically attributable to the fact that the Flying Boxcars were not as ruggedly and durably designed as earlier USAF transports, and yet, because of the urgency of the tactical situation in 1950 and 1951, the C–119's had been compelled routinely to make rough field landings at forward area strips with gross loadings in excess of 71,500 pounds.[194] In mid-1951, when the ground fighting had begun to stabilize, the 315th Air Division had limited gross takeoff weights of C–119's to 64,000 pounds, but by this time the excessive stresses already endured had gravely weakened the structures of these aircraft. The type of operations required from the C–119's in Korea had also had adverse effect upon the supply and maintenance support allocated to them. Supply support of spare parts for the C–119's, programmed initially in terms of peacetime operations off improved flight surfaces, had never been adequate. Maintenance services in the theater had been so hard pressed to accomplish the major modifications and component changes required to keep the C–119's in flyable status that they had been permitted very little time in which to conduct scheduled maintenance and effect technical order compliance. By June 1952 the accumulated maintenance burden had gotten completely out of hand: even if it could secure the supply support required to permit a general overhaul of the Boxcars, FEAF noted that the burden of such maintenance would be too great for its depot structure to bear and still support the combat units in Korea.[195]

In order to rehabilitate its C–119 capability the 315th Air Division needed to exchange its war-weary aircraft for later series, low-airframe-time aircraft. As early as April 1951 the 315th had requested that a C–119 reconditioning program be established in the United States to provide for depot inspection and repair (DIR) on its aircraft of this type when they had attained 1,000 hours of airframe time. FEAF had strongly endorsed this request on to the USAF Air Materiel Command,[196] but the latter organization was unable immediately to secure the tools and equipment which it required to stock a civilian contract reconditioning plant. By February 1952 all C–119's in the 315th Air Division had over 1,100 hours of airframe time, and FEAF again urged that a ZI reconditioning program should be established for these aircraft. Preparatory to releasing planes for DIR, FEAF asked that it be loaned 20 C–119's from the United States.[197] This proposal was evidently unacceptable, and final agreements looking toward a solution of the C–119 problems awaited a conference held at USAF on 1 April 1952 and attended by representatives of the Air Materiel Command, the Tactical Air Command, and FEAF. Here the major responsibility for bringing the 403d Wing up to strength with serviceable aircraft was laid on the Tactical Air Command. To accomplish this, TAC would transfer five C–119's to FEAF in the last half of June and after 1 July it would transfer one C–119 to FEAF for each new C–119 which it received from production. These transfers would continue until the 314th and 403d Troop Carrier Groups possessed 96 authorized aircraft, and thereafter TAC would

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maintain the two groups at this strength. As soon as possible, the Air Materiel Command would open a C–119 modification center at Birmingham, Alabama. The Military Air Transport Service was assigned ferrying responsibilities for all of the aircraft involved in the movements to and from the Far East.[198] This program promised eventual alleviation of C–119 problems in the Far East, but it stopped short of what FEAF wanted, which was to replace as rapidly as possible all of its C–119's with new or low-time aircraft drawn from units in the United States.[199]

Even as it mentioned the prospect of trading off all its war-weary C–119's, FEAF recognized the impossibility of any such immediate action. It nevertheless requested TAC to send as soon as possible the 21 aircraft owed to the 403d Wing as unit equipment, and, having done all that was possible to get replacements, FEAF buckled down to the task of locally rehabilitating as many C–119's as was practicable. The first matter demanding attention was the chaotic supply support for the Boxcars. Looking backward at C–119 supply support, it was evident that logistical failures were attributable to shortcomings both in the theater and in the United States. At the AMC level spares for the C–119's had been inadequately programmed during the first part of the Korean hostilities, and when additional spares had been put on order the producer had been slow to deliver them. During the spring of 1952, for example, the Fairchild Aircraft Corporation was so delinquent in shipping spare parts that AMC finally, on 2 June, threatened to curtail aircraft acceptances pending attainment of concurrent deliveries of spares. As a result of all-out effort on the part of the contractor, spare shipments increased from approximately 250,000 pounds in May and June 1952 to 577,000 pounds in July 1952. Supply deliveries remained responsibly high after July.[200] Called upon to operate a relatively new and inadequately supplied aircraft in an all-out situation, the C–119 units in the Far East groped blindly: "Stock levels weren't zeroed in, ordering procedures weren't standardized and effective, substitute items weren't known."[201] Unit supply discipline had broken down. Maximum cannibalization for parts, although protested by the 314th Group commander, was acceptable to the 315th Air Division, and, while cannibalization made an unsatisfactory supply set-up look better than it was, such practices pyramided maintenance requirements and complicated orderly requisitions of needed supplies. On occasion, a plane was grounded for want of parts, and then the AOCP was canceled and the aircraft was released for flying.[202] More or less as a matter of practice, the C–119 units requisitioned items needed in future scheduled or nonscheduled maintenance on AOCP priorities.[203] Such chaotic supply discipline at the operating unit levels thwarted efforts to compute realistic supply requirements for the C–119 aircraft from historical experience in the theater.

On 20 June 1952, judging that some drastic action was necessary to improve logistical support for the C–119's, FEAF asked the Air Materiel Command to establish a crash procurement of 360 days of C–119 supplies for expedited delivery to the theater.[204] On 7 July a FEAF liaison team reached the Air Materiel Command and conferences with AMC and Fairchild representatives followed. It was agreed that all immediate requirements for the C–119's would be met and that an additional six months stock would be soon obtained and shipped to the Far East. In view of the AMC assurance of expedited deliveries of spare parts, FEAF canceled its demands for 360 days of C–119 spares. The AMC also furnished the FEAF representatives with certain data relative to the interchangeability of parts on the various series of C–119 aircraft, data which the 403d Wing had previously lacked and which promised to reduce supply requirements to lesser levels than had been thought.[205]

Starting off slowly in July 1952, the 315th Air Division's C–119 rehabilitation program gained speed in August and paid dividends during September 1952. During July and August the 403d Wing began to receive some replacement aircraft from TAC, and it was able to rotate some of its old planes to the now operational Birmingham modification center for overhaul.[206] By 29 August logistical support for the Boxcars was so improved that the 403d Wing commander assembled all his people and announced the beginning of "Operation Get Ready," which in the period 2 September through 2 October would be expected to put a standard 75 percent of the wing's aircraft in commission. Spurred on by this challenge and assisted by favorable logistical developments, the 403d Wing pushed its C–119 in-commission rate up to 60.2 percent during September. The

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AOCP's dropped from an average of 18 aircraft per day to 6 per day, a number which was considered to be fairly satisfactory in view of the length of the supply pipeline to the United States. This progress was readily notable in formation flights: on 6 September the wing flew a 27-aircraft formation and on 28 September to cap the climax of the logistical program it sent up a 52-aircraft formation.[207] The growing airlift capabilities of the C–119's, which soon reached 2.5 hours utilization per aircraft per day, allowed the 403d Wing on 12 September to release the 53d Troop Carrier Squadron, whose C–54's had been the main airlift capability out of Ashiya for several months, for movement to Johnson Air Base in preparation for return to the ZI with its parent 61st Group. In October, the 403d Wing was prepared to participate in "Operation Feint," the airborne phase of the CINCFE amphibious ruse conducted during that month.*

After September 1952 the Flying Boxcars continued to present logistical and operational problems, but these planes never again lost their airlift capabilities. Rotation of combat-fatigued planes went more slowly than was satisfactory, with the result that at the end of January 1953 the 483d Wing (the 403d was so redesignated on 1 January 1953) still had 46 of the original C–119's which had come to the Far East in 1950. Many of these planes were now so decrepit that they contributed little to airlift commitments. The Tactical Air Command, however, continued to transfer in serviceable C–119's with each increment being a little larger than the one which the 315th was required to return to the ZI for overhaul. Benefiting from such a favorable balance of imports and exports, the C–119 fleet became more serviceable and grew towards authorized strength: in April 1953 the 483d Wing attained its unit equipment allocation of 96 C–119's. Supply support for the Boxcars was generally improved: in the first six months of 1953 the AOCP rate for this type aircraft averaged 4.7 percent, and during five days in April the rate was reduced to zero. Able to devote their talents to generally serviceable aircraft, the maintenance technicians of the 483d Wing were able to keep well abreast of scheduled maintenance and were thus able to check many minor discrepancies before they could grow to major proportions. Profiting from better supply and maintenance and more modern aircraft, the 483d Wing kept an average of 67.2 percent of its planes in commission during the first half of 1953, and in June 1953 it had 78.8 percent of its planes in commission.[208]

Despite the adequate logistical support which they received during the first half of 1953, the Flying Boxcars continued to be temperamental aircraft, and they developed enough periodic malfunctions to cause trouble. The 315th Air Division generally limited C–119 cargo loadings on the Ashiya to Korea traffic channel to six tons per plane, because of landing gear weaknesses in the C–119. Landing gear mulfunctions still continued, however, and two planes were lost in wheels-up crash landings. Propellers, like landing gears, had also been a weak article on the C–119's, and they proved to be the "next biggest headache" during 1953. The C–119 was equipped with hollow steel Hamilton Standard propeller blades, which were peculiarly susceptible to damage from loose rocks and gravel. Such debris was prevalent on runways and warm-up aprons in Korea and frequently caused minute dents, nicks, or scratches on C–119 prop blades. Such marks were often barely visible under the best of light conditions, but they started hard-to-see hairline cracks which rapidly progressed until the propeller blade failed. The infinitesimal warnings of disaster, together with the ease with which the blades picked up damage, imposed a need for a tremendous amount of inspection and maintenance work. Moreover, when a propeller failed in flight it usually tore out an engine and forced the crew to abandon the aircraft. The problem was not new: after two major accidents in January 1952 all C–119 propeller blades had been replaced with a newer type blade which was supposed to give better service.[209] In a period of a year, however, 210 of these new blades had to be changed for cause and three in-flight failures caused the total loss of two aircraft. The second of these two losses took place on 11 March 1953, and, although the crew of four parachuted to safety, the accident precipitated a sweeping investigation of the problem. A first consideration was as to whether the C–119's could safely transport passengers, especially in over-water flights. The conclusion was that it would be best to bar the use of C–119's for carrying casual passengers who were relatively unfamiliar

*See p. 292.

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with parachutes. Paratroopers and aircrew members were expected to have a good chance for survival and could still be transported in the C–119's.[210] Effective 26 March 1953 the C–119's were consequently restricted from airlifting passengers, but they continued to haul cargo and to engage in airborne training.[211] The Air Materiel Command promised new nickel-plated prop blades but such did not arrive during the Korean hostilities. As interim measures, the 315th stressed a thorough blade inspection prior to each flight, and FEALogFor demanded that all commands vigorously police their airfields to remove stones and gravel.[212]

Although the 315th Air Division managed a substantial modernization of its transport aircraft force in the last year of the Korean war, it continued to use three types of World War II aircraft to good advantage. Lacking any better type of newer plane, the 6461st Troop Carrier Squadron continued to fly the old C–47 aircraft in front-line and feeder-line employments in Korea. For shuttle runs into rough forward-area airstrips, the C–47's proved invaluable: logistical support for them was satisfactory and they could be each programmed for four hours of utilization a day. Their major limitation was a three-ton payload, which did not allow them rapidly to deliver the large quantities of supplies which the C–124's could lay down in Korea. In planning for the conversion of the 374th Troop Carrier Wing to C–124's, the 315th Air Division had selected to keep this wing's 21st Squadron equipped with C–54 aircraft, largely because the C–54 had the range and cargo capability which well suited it for scheduled inter-island transport tasks within the Far East theater. In the last year of the war these C–54's presented few problems, and the 315th Air Division expected 6.3 hours of utilization from each of them each day.[213] The C–54's ably performed the scheduled flights which were expected of them and additionally backed up the faltering Globemaster capability on the air routes out of Tachikawa.

At first because no other aircraft were available but later because of the demonstrated abilities of these planes to surmount situational factors, the 315th Air Division kept its 315th Troop Carrier Wing equipped with obsolete C–46 aircraft. What the old C–46's lacked in the way of modern performance, they made up in dependability. In the latter half of 1952 the 315th Wing was able to keep an average of 75.8 percent of its aircraft in commission and in the first half of 1953 the rating was even better—78 percent in commission.[214] Supply support for the planes was generally excellent: in the first half of 1953 the wing's AOCP rate averaged only 0.81 percent.[215] In view of the fact that the 315th Wing was the last such organization in the USAF to remain equipped with C–46's, a somewhat limited supply of aircrews and of trained mechanics held the utilization rate of its planes down to four hours per day. The wing, benefiting from high in-commission rates and good support, demonstrated an ability to carry a heavy workload on a steady, day-to-day basis. The Commando aircraft, moreover, displayed great versatility: they regularly spelled the logistically hampered C–119's in their task of dropping supplies and paratroops. In September 1952, when the C–54's left Ashiya, the 315th Wing began to handle routine airlift of medical air evacuation patients from Korea to southern Japan.[216] In March 1953 when the C–119's were forbidden to haul personnel, the 315th Wing's C–46's undertook the movement of all passengers to and from Korea and southern Japan.[217]

Although classed as obsolete, the C–46 aircraft provided a cushion of capability which permitted the 315th Air Division to maintain an adequate quantity of airlift even in those months when the more spectacular Globemasters and Flying Boxcars were in logistical doldrums. Despite the fact that the C–119 was "under normal circumstances . . . a more desirable aircraft" than the C–46, General McCarty in December 1952 announced that he feared the results of a USAF program which slated the 315th Wing for conversion to C–119's beginning in July 1953. McCarty explained his reluctance to convert the 315th Wing in the following manner: Brady Air Base was an old and slightly improved Japanese airfield and without a new runway it could not safely serve C–119 aircraft; conversion training in any new-type aircraft would for a time reduce the 315th Wing's contribution to the theater airlift; and the lower utilization rate of the C–119, combined with a long history of inadequate spare parts support, promised a lowered theater airlift capability even after the 315th Wing was converted.[218] Even as General McCarty was informing FEAF of these facts, an amendment to USAF programming post-

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poned the planned conversion of the 315th Wing from July 1953 to January 1954.[219] Even this latter date looked to be too soon, and FEAF in March 1953, adding an account of the C–119's propeller failures, poor ditching characteristics, and unsuitability for medical air evacuation purposes to General McCarty's arguments, requested USAF still further to delay the conversion of the 315th Wing. In fact, if USAF could continue to support the C–46's, FEAF wanted to keep them in service until the end of the Korean war.[220] USAF responded that the second-line C–46's would have to be replaced as scheduled with first-line C–119's. TAC, it explained, was hard pressed to supply replacement crews for the obsolete C–46's; moreover, if the 315th Wing did not convert as scheduled the C–119's earmarked to go to it would have to be placed in storage. For these reasons USAF intended to proceed with the programmed conversion of the 315th Wing on 1 January 1954.[221] As events transpired, the January 1954 date was sufficiently far in the future as to permit FEAF to continue to use the old C–46's through to the end of the fighting in Korea.

Air Terminal Operations: The function of receiving, loading, and unloading supplies delivered by air was an air force responsibility, but through expediency army troops had performed this function both in the Berlin Airlift and in exercise "Swarmer."[222] Following these precedents at the beginning of the Korean war, the Japan Logistical Command assumed responsibility for air terminal operations in Japan. After the Inchon invasion, however, the FEAF Combat Cargo Command had as a matter of necessity organized two Combat Cargo Support Units to manage air terminal activities in Korea, but on 30 September 1950 CINCFE had directed the Eighth Army and X Corps to take over the aerial ports in Korea. Under such an arrangement as this General Tunner, whose plan of operations required that a steady stream of transports ply between Japan and Korea, had no control over the loading or the unloading of his planes. Since a major factor in aircraft utilization is ground handling time, General Tunner was forced to inform FEAF that he could not guarantee any certain airlift capability unless he could himself control transport aircraft both while on the ground and in the air. General Tunner therefore recommended that the Air Force organize so as to handle all air terminal activities both in the Far East and worldwide wherever transports operated. After a discussion of the problem, USAF directed FEAF to seek local solutions within the Far East Command, and in a theater action announced on 14 January 1951 the CINCFE directed FEAF to assume the responsibility for the operation of aerial ports in Japan and Korea. This responsibility for airlifted cargo included manifesting, loading and lashing, unloading, and delivery to consignee. Control of air traffic was to begin and end at the air freight or passenger terminals. Moreover, the packaging, loading, and ejecting of airdropped supplies remained a responsibility of the Army, as did the establishment and operation of holding stations for medical evacuees at bases served by the airlift.[223]

Effective on 7 February 1951 the 315th Air Division organized the 6127th Air Terminal Group, and by 31 March all air terminals which had been under the control of the Army in the Far East were manned and operated by Air Force personnel. The principal mission assigned to the new air terminal group was to increase the effective utilization of FEAF airlift through prompt and proper onloading and offloading of transport aircraft. The group was also charged to organize and operate air movement teams which would indoctrinate and assist units which were required to move by air within the theater. Organized from table of distribution allotments, the 6127th comprised a group headquarters and supporting section at Ashiya and air terminal detachments at the principal airlift airfields. The commander of the 6127th was directly responsible to the commander of the 315th Air Division, and air terminal detachment commanders were responsible to the 6127th Group commander, not to local air base commanders.[224]

At its establishment the 6127th Air Terminal Group was authorized a total strength of 107 officers and 762 airmen, and the original tables of distribution allocated this strength on the basis of 10 air terminal detachments. Actually these strength figures presented a false impression because it was expected that the major portion of all physical labor would be done by Japanese and Korean civilians, and thus the detachments soon employed approximately 2,000 indigenous laborers who were provided by local air base commanders.[225] This initial concept of organization

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proved almost immediately unsatisfactory on two counts: 10 detachments were not enough especially if they were fixed to given air bases and could not be moved where they were needed; and there was not enough administrative and supervisory support for so many scattered detachments. The 6127th Group therefore proposed that it be authorized additional personnel with which to man more detachments and to create three squadrons, one each to manage air terminal detachments in Japan, Korea, and at island stations. Neither FEAF nor the 315th Air Division was willing to allot any more troop spaces to the 6127th Group, but both were willing to authorize the group to treat its alloted strength as a pool and to permit the group to move existing detachments, open additional detachments, and vary the strength of detachments in proportion to the need for terminal services at airlift stations.[226] Under a similar arrangement never-plentiful cargo-handling equipment was controlled by the group and moved about between detachments where it was most needed. The 6127th was initially penalized by problems of personnel and equipment. Many of the persons assigned to it came from a FEAF levy; all of these new men were untrained and not a few unit commanders had taken advantage of the levy to transfer maladjusted airmen to the 6127th.[227] Cargo-handling equipment was initially in short supply and for several months the group borrowed lifts and trucks from the Army. Under the press of combat requirements in Korea, however, people and equipment were soon whipped into shape, and the routines needed to facilitate the movement of air traffic were perfected. The growing proficiency of the air terminal detachments was revealed by improving aircraft turnaround times, which decreased from an average of 1 hour and 33 minutes at all stations in March 1951 to 55 minutes in June 1951. In this latter month, moreover, the 6127th handled its biggest month of operations: its 13 detachments loaded 10,938 transport sorties with 25,480 tons of traffic, including 60,475 passengers, 17,146 tons of cargo, 899 tons of mail, and 10,520 air evacuation patients. Most of this cargo was also unloaded by air terminal detachments.[228]

The results achieved by the 6127th Air Terminal Group in its first year of operations were thoroughly satisfactory to the 315th Air Division, and General Henebry stated that the activation of the group had been "one of the most important developments of the Korean operation." To Henebry the Korean experience had "shown it to be essential that the air transport commander . . . command the air terminal units which control the ground time of his aircraft and . . . be able to deploy these units and portions thereof between his operating points in coordination with his aircraft." Henebry also announced the rule that air terminal tasks "cannot be properly performed . . . by each air base commander [but] . . . must be accomplished by a separate unit, trained and equipped for the task, and not under the operational control or command of a base commander." [229]

The rule that the air terminal detachments were responsible to the 315th Air Division, administratively through the 6127th Group and operationally through Transport Movement Control, worked well enough until the autumn of 1952 when the giant C–124 Globemasters became operational in the Far East. Globemaster characteristics were such as to require weight and balance computations in flight as well as on the ground, and as the 374th Wing set about converting two squadrons to these planes it perceived that it would require trained loadmasters as aircrew members. Such men were recruited and trained for loadmaster duty, and during the period of transitional training a loadmaster section in the 374th Group supervised the loading of all C–124 aircraft. On 9 September 1952, however, all loadmasters were released to the two C–124 squadrons, and the responsibility for loading these planes was given to the 6127th's air terminal detachment at Tachikawa. Since the air terminal detachment continued to need the higher experience of the squadron loadmasters the delineation of exact responsibilities for loading the Globemasters was confused and uncertain. The 374th Wing believed that its squadrons would be best able to perform the loading functions.[230] Simultaneously with these special developments at Tachikawa, General McCarty noted throughout the 315th Air Division "an unwarranted increase and an apparent disregard of published departure times on scheduled and projected flights." On 22 October 1952 he also cautioned the commander of the 6127th Air Terminal Group concerning a reported lack of coordination between air terminal detachment personnel and personnel in the operational wings.[231]

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As a matter of general policy, moreover, General McCarty favored consolidation of functions where possible and the strengthening of the troop carrier wings. Study of the causes of delayed aircraft departure times revealed the split responsibilities for preparing aircraft for takeoff; the wing commanders were responsible for planes meeting their scheduled block times yet they did not control the air terminal detachments which loaded their aircraft. A concomitant investigation also exposed the difficult command situation under which the 6127th Air Terminal Group labored: from a small headquarters at Ashiya, the 6127th group commander was expected to control 13 scattered air terminal detachments in Japan and Korea and liaison sections on Formosa, at Clark AFB in the Philippines, and at Kadena AFB on Okinawa. Such a span of control was simply too great for efficient supervision.[232]

When all of these facts relative to air terminal operations were put together, General McCarty effective 5 February 1953 relieved the 6127th Air Terminal Group of the responsibilities for operating the air terminal detachments at Tachikawa, Ashiya, and Brady. Complete control of these detachments passed to the commanders of the 374th, 483d, and 315th Wings on 15 February, and these officers were officially charged to conduct their own air terminal functions. At locations other than those occupied by troop carrier wings, the 6127th Air Terminal Group remained responsible for establishing, administering, deploying, and operating the necessary air terminal detachments. Loss of these three major terminals cost the 6127th approximately 35 percent of its personnel, and its table of distribution was reduced to 45 officers and 339 airmen. In February the 6127th's headquarters establishment was reorganized to provide individual deputy commanders and directors of traffic for Korea and Japan, thus providing closer control over the detachments in these areas. The results of this reorganization were generally wholesome: the 6127th was able to exercise closer supervision over the air terminal detachments which it retained. At Tachikawa at least, transfer of the control of the air terminal detachment to the 374th Group paid off in the form of increased punctuality in meeting C–124 flight schedules.[233]

In February 1951, when it was organizing the 6127th Air Terminal Group, the 315th Air Division had felt that it was unwise to disturb the status of the 2348th Quartermaster Airborne Air Supply Packaging Company which was located at Ashiya Air Base and packed, loaded, and ejected all supplies dropped by troop carrier aircraft. At that time a great amount of supplies was being dropped to Eighth Army units in Korea; the Air Force, moreover, had no trained personnel to take over the function.[234] The 2348th Company therefore continued under Army control and in the spring of 1951 it was reorganized as the 8081st Army Unit, having, as such, an expanded capability to pack, load, and eject 215 tons of supplies a day. By all accounts this Army unit did an excellent job, but its status limited the authority of the 315th Air Division in the exercise of its responsibility for supply dropping. The 8081st Army Unit's capacity of 215 tons per day represented some potential restriction to the 315th Air Division, which had a drop capability of 450 tons per day. Existence of an air terminal detachment and the Army unit at Ashiya was also a wasteful duplication of manpower: when airlift was used for supply dropping the air terminal detachment marked time, when supplies were air landed the Army unit had little to do. On 29 June 1951 General Henebry therefore requested FEAF to secure authority and responsibility for the packaging, loading, and discharging of all airdropped supplies. FEAF indicated that the matter was under study at USAF, but the 315th Air Division on 17 August 1951 dispatched forward another recommendation that the 6127th should assume the responsibilities exercised by the 8081st Army Unit. Once again FEAF replied that the problem would have to be resolved not in the theater but at inter-departmental levels.[235] General Henebry continued to feel quite strongly about the matter: as long as he continued in command he insisted that the 6147th Group would maintain plans and training looking toward its assumption of the terminal functions of packaging, loading, and ejecting airdropped cargo. The 6147th proved quite able to load and eject para-supplies, but it lacked the equipment and parachutes needed to pack such supplies.[236] In a publication issued in November 1951, the 315th Air Division repeated its conviction that "the scope of Air Force responsibility [must] include the parachute preparation, and packaging of supplies, as well as the loading and 'kicking' operations for air resupply drops."[237]

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At the same time that the 315th Air Division was effecting its air terminal organization in the Far East, USAF planners were attacking the worldwide application of the air terminal problem. On 29 June 1951 the Air Force Council approved the proposition that the Air Force should man and operate air terminals, and at this same time USAF directed its Tactical Air Command to work out plans for cellular aerial port units which could be assigned to air bases to support airlift operations.[238] Armed with this authority, TAC's Eighteenth Air Force organized an Air Cargo Resupply Squadron (Provisional) on 20 July 1951 and after a short period of training tested the organization in Exercise "Southern Pine." This provisional unit was redesignated as the Aerial Port Operations Squadron (Provisional) on 21 November 1951, and finally on 11 January 1952 the provisional yielded to regular status and the 1st Aerial Port Operations Squadron was activated and attached to the 443d Troop Carrier Group. During January and February 1952 the 1st Squadron was further tested in Exercise "Snowfall."[239] Meanwhile the USAF had been seeking a clear statement as to service responsibilities for air terminal activities, and such a decision was provided by the U. S. Joint Chiefs of Staff on 5 December 1951. Under this decision, Military Air Transport terminals were judged to be the responsibility of the Air Force. Such other air terminals as might be required were to be the responsibility of the service which furnished the airlift for the cargo and personnel moved through them. The service which shipped cargo, however, was to be permitted to establish facilities at the aerial port to perform functions pertaining to its cargo and personnel in accordance with detailed interservice agreements which would have to be worked out.[240]

Learning of the JCS decision, General Henebry drew up and sent to FEAF on 20 February 1952 a proposed Air Force regulation which he saw as a statement of policy. This draft regulation generally incorporated all of the concepts of air terminal operations which had been put into effect in the 315th Air Division. The responsibility for establishing and operating air terminal detachments was vested in the airlift commander who would exercise control through an air terminal group. Organized air terminal facilities would be provided at airfields where the volume of traffic justified them; at other lesser-used airfields local air base commanders would provide the facilities. In unit movements or in joint airborne operations, air terminal personnel would supervise, but the organizations being transported would load and unload the aircraft. In other transport operations, the Air Force would take charge of cargo or personnel at delivery to the air terminal and retain responsibility until the cargo or people were delivered at their destination. The Air Force would have the responsibility for documentation, manifesting, loading of aircraft, unloading of personnel and cargo, and the releasing of air-dropped supply.[241] What disposition FEAF made of General Henebry's recommendations is not evident, but the USAF had already made plans for further testing the details of air terminal organization.

Without committing either service to the establishment of precedents, the Tactical Air Command and Army Field Forces agreed on 11 March 1952 to test new concepts of airborne and air landing assault activities in Exercise "Longhorn." The new concept granted that the Air Force was responsible for all loading, lashing, unloading or ejection activities conducted in its aircraft and gave it a free hand to manage airlift activities at forward landing grounds. Since the 1st Aerial Port Operations Squadron would not be able to handle all the terminal work involved, Quartermaster units would package para-supplies and would assist with loading and ejection, but Air Force personnel would supervise and bear the responsibilities for these activities.[242] The broadened concept of Air Force responsibility for terminal operations was tested in the maneuvers of Exercise "Longhorn" in March and April 1952, and the results of this testing were formalized in an Army-Air Force memorandum of understanding relating to the operation of Air Force air terminals, jointly approved by the chiefs of staff of the Army and Air Force on 23 December 1952. This agreement vested responsibility for operating the air terminals in the Air Force, but it permitted the Army to establish facilities and station personnel at these air terminals as were needed to perform such airlift functions as were charged to it. The Army and Air Force would jointly prepare instructions for packaging and crating airlift cargo, and, if the cargo was to be airdropped, such packaging would include the necessary parachutes or other aerial delivery equipment. The Air Force had the

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right to refuse to accept improperly packed supplies if they were presented to its air terminal. Receiving cargo at its terminal, the Air Force would manifest, load, tie down, provide enroute service and supervision, unload, notify, and deliver traffic to consignees at the destination air terminals. Although the Army would remain responsible for parapacking such supplies as were to be dropped to its forces, Air Force terminal personnel would load such cargo and eject it from aircraft over the drop areas. When Army units were required to make air movements, Air Force personnel would supervise and provide technical assistance and loading plans, but the Army units would load, tie down, and unload their cargoes. This agreement did not apply to MATS air terminals, nor to the subject of aeromedical evacuation.[243]

Following the accomplishment of the joint agreement with the Army, the USAF initiated plans to activate a number of aerial port operations squadrons on the model of TAC's 1st Squadron. These squadrons were to have an authorization of personnel and equipment which would enable each of them to meet the terminal needs of a troop carrier wing. Over a period of three years following July 1953, three of these new squadrons were programmed for deployment to FEAF,[244] but the Korean hostilities would have been long finished before the first of these units was activated in the Far East theater.* In view of its earlier agitation which had developed the need for aerial port squadrons, the 315th Air Division might have logically been expected to have moved rapidly to effect the Army-Air Force agreement. Such, however, was not the case. In the last year of the Korean war there were no airborne troop employments and very few aerial supply drops in Korea. Moreover, General McCarty recognized that the existing terminal system was working very well: the 8081st Army Unit was satisfactorily performing the aerial drop functions planned for an aerial port squadron and the 6127th Group was tailor-made to meet the theater's air terminal functions. General McCarty therefore saw no reason to hasten a reorganization of aerial port functions in the Far East.[245]

Aeromedical Evacuation: During World War II the air evacuation of sick and wounded military personnel had been utilized within every theater of operations. The AAF Air Transport Command had made substantial achievements in transoceanic and inter-theater aeromedical evacuation. In the theaters, however, aeromedical evacuation of casualties had been considered to be an emergency method of moving men who could not be practically transported by more normal motor ambulances or hospital trains. Air Transport Command transoceanic medical air evacuation had supplemented naval hospital ships but had never challenged the supremacy of the surface means of transport.† The end of World War II had cut short the development of air evacuation techniques within active combat theaters, but the Military Air Transport Service had continued to provide worldwide aeromedical evacuation, which by September 1949 had demonstrated such efficiency that the U. S. Joint Chiefs of Staff had made air the primary means for handling all transoceanic movements of military patients.[246]

Despite the fact that the value of aeromedical evacuation within active theaters of operations had been established during World War II, neither the Army nor the Air Force had studied the subject with a view toward the establishment of the most efficient system for such evacuation and toward the fixing of definite service responsibilities within the system. When the Korean war began, CINCFE had no regulation governing intratheater aeromedical evacuation, and he did not issue such a theater directive until 18 December 1951.[247] Coming at this late date, the theater directive merely confirmed policies and practices which had been worked out and informally effected within the theater. These policies and practices did not necessarily represent the most efficient methods of aerial evacuation: most of them were nothing more than Air Force efforts to meet Army desires. There had been no examination as to whether time-honored Army transportation and hospitalization procedures, based as they were upon the speeds of foot-moving litter bearers and earth-bound motor ambulances, might have

*On 8 February 1955 the 6127th Air Terminal Group was replaced by the 7th Aerial Port Squadron. Since the 7th Squadron had a table of organization strength of only 7 officers and 209 airmen it was augmented with an additional 42 officers and 219 airmen, which brought it to the strength of the former 6127th Group. *See* Hist. 315th Air Div. (Combat Cargo), Jan.–June 1952, I, 83–91.

†*See* Mae M. Link and Hubert A. Coleman, *Medical Support of the Army Air Forces in World War II* (Washington: Office of the USAF Surgeon General, 1955), pp. 352–412.

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deserved change in context with the demonstrated rapidity and efficiency of aerial evacuation.

When American troops went to Korea in July 1950, the Eighth Army implemented traditional ground systems for handling military troop casualties. Fundamentally, this system was predicated on a concept of keeping a casualty as far forward as possible in order to return him to combat as soon as he was physically fit. The Army medical service established and used in Korea thus provided the typical medical installations of increasing size from the forward to the rear areas which would permit a patient to be sorted, treated, and disposed of in a manner depending on the nature of his medical condition. The echelons of this medical system and the normal surface means of transportation were as follows: a wounded soldier was transported from the battlefield to a battalion aid station by litter-bearers or litter-jeep. From this battalion aid station he was evacuated by motor ambulance to a regimental collecting station and thence on to a division clearing station, at which point he could be either dispatched immediately to an evacuation hospital or routed by motor ambulance to a mobile army surgical hospital (MASH) which could provide emergency surgery and short periods of hospitalization. Either directly from the division clearing station, or through the MASH, the more seriously wounded patient, or one requiring special treatment, moved by motor ambulance or hospital train to an evacuation hospital, where he was hospitalized pending recovery or removal to a general or convalescent hospital in the communications zone. In terms of the movement of casualties to medical facilities, the steps in this evacuation system were: battlefield pickup and movement to the mobile army surgical hospitals; mobile army surgical hospital to evacuation hospital; evacuation hospital to general or convalescent hospital.[248] The systems of aeromedical evacuation which were improvised in the Far East implemented this conventional Army medical system. Even within this conventional framework, there was general agreement that aeromedical evacuation made magnificent achievements: along with other scientific advances, aeromedical evacuation could claim a large part of the credit for the reduction of the death rate from combat casualties in Korea to one-half the rate of World War II and to one fourth the rate of World War I.[249] But when tried against conceptual standards of potential economy and efficiency, Korean aeromedical evacuation left much to be desired.

When a frontline soldier is wounded in combat, the speed with which he receives medical attention and adequate hospitalization is frequently the controlling factor in whether he lives or dies. In Korea, the poor state of the roads and the railroads and the heavy logistical traffic which had to move over them would make air evacuation a virtual necessity for seriously wounded personnel. FEAF recognized this fact at the beginning of the hostilities, and as quickly as possible it moved its small 801st Medical Air Evacuation Squadron from Clark Air Force Base in the Philippines to Tachikawa, there attached the squadron to the 374th Troop Carrier Wing,[250] and on 4 July 1950 FEAF advised CINCFE that it was prepared to accomplish air evacuation of casualties from Korea.[251] During July and August 1950, however, the Eighth Army made token use of aeromedical evacuation: in these two months the 374th Wing evacuated only 1,631 patients whereas approximately 6,500 were moved from the front line to hospitals in Japan by combinations of rail and water transportation.[252] The reasons why the Eighth Army preferred to utilize conventional surface transportation for moving its casualties during this period were explained to the FEAF surgeon and a FEAF Combat Cargo Command representative. Taegu (K–2) airfield, the most advanced air facility available during the Pusan perimeter fighting, was eight miles from the mobile hospital in Taegu City, and the Eighth Army selected, because of the poor road and a shortage of ambulances, to move its casualties by train to the evacuation hospital at Pusan. Most of the patients at Pusan who required extended treatment waited for hospital-ship transportation to Japan; a few were taken to Pusan East Airfield (K–9) for air transportation to Japan but there were no holding facilities there and, since each packet of patients required especial arrangements for air transport, they often had to wait for excessive lengths of time before a transport aircraft picked them up. In this early period, the Air Force had not offered any sound program of air evacuation to the Eighth Army, and it was not unnatural that this force, which had to evacuate its casualties on an orderly and programmed basis, could scarcely affort to count

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on a "catch as catch can" system of air evacuation.[253] Early in September 1950, the FEAF Combat Cargo Command devised and put into operation a system of aeromedical evacuation which was calculated to meet the needs of the Eighth Army, but even as it took this step other developments were afoot which would eventually divide what should have been one unified system of aeromedical evacuation into two systems: one system for the areas forward of the mobile army surgical hospitals and the other for the areas rearward of these most advanced medical facilities.

If in the early months of the Korean war the Eighth Army was lukewarm toward the aeromedical evacuation of its casualties by C–47 and C–54 transports, it knew a grave need for some form of frontline air pickup which would spare seriously wounded men the hazards of slow trips over tortuous roads to surgical hospitals. When the war began FEAF air rescue squadrons had possessed eight H–5 helicopters. These utility aircraft had not been designed for combat, but they had a capability of lifting a pilot and a medical technician and two patients, the latter being carried in external litter capsules. Early in August 1950 the Fifth Air Force had the 3d Air Rescue Squadron move three H–5's to Korea, where they were used to evacuate seriously wounded soldiers directly from the front lines to surgical hospitals. On 14 August, FEAF informed USAF that within the week it was going to move three more H–5's from Japan to Korea, but these six helicopters would be too few to meet emergency evacuation requirements. FEAF therefore asked that an evacuation and utility squadron be organized and equipped for it in the United States, with 25 H–5 aircraft, the necessary crews and mechanics, a flight surgeon, and medical technicians.[254] Later on, the Air Force would perceive that such a function as this was a logical and desirable forward extension of the troop carrier effort, but in August 1950 USAF Operations thought in terms of how many helicopters it had and the precedent involved in this proposed action. The Overseas Division, Directorate of Operations, handled the FEAF request at the USAF level. This division noted that USAF had only 103 helicopters, most of which were in the hands of overseas air rescue squadrons. By withdrawing helicopters from continental units of MATS, from the Caribbean Air Command, and from the Special Weapons Command, USAF could get together 14 H–5's for delivery to FEAF. The USAF action agency, however, observed that USAF planning for the air evacuation of wounded "has not included U. S. Army function of evacuation from front line battle stations," and it hesitated to set a precedent. The USAF Surgeon General nevertheless believed that the FEAF request should be met, and the USAF Directorate of Operations therefore proposed to send the 14 H–5's to the Far East. It cautioned that the aircraft would not be used to form a new evacuation squadron but would instead be assigned to the 3d Air Rescue Squadron. On 21 August 1950 these recommendations were approved at USAF, and FEAF was informed that the 3d Squadron would soon be augmented with 14 H–5's.[255]

From the beginning of their employment in Korea, the H–5 helicopters of the 3d Air Rescue Squadron gave badly needed service. Through 29 August 1950 they had moved 83 men from the frontlines to Pusan hospitals, men whom the Eighth Army surgeon said would have died had they made the 10- to 14-hour trip by motor ambulance.[256] On 24 September 1950 the helicopter flights in Korea were organized into Detachment F, 3d Air Rescue Squadron, and this detachment followed the ground war northward. How these helicopters could best operate was shown by trial and error: the best means for employing them appeared to be to base several of them at a mobile army surgical hospital and to authorize the surgeon-in-charge to dispatch them in response to valid requests from the front lines. Because of the short numbers of H–5's available, only those patients were carried who were wounded so badly that surface evacuation would have jeopardized their chances for recovery. By 20 February 1951 Detachment F had evacuated 750 critically wounded soldiers from the front lines.[257] During the spring ground campaigns of 1951, Detachment F with 15 H–5 helicopters continued to provide brilliant but essentially scarce support to UNC ground troops. When, on 15 and 16 February, elements of the U. S. 2d Division were surrounded in the central Korean town of Chipyong, the H–5's flew in blankets, plasma, and medical supplies and carried out 52 wounded men. On 24 and 25 March the H–5's, now assisted by a single H–19 which had been sent to Korea for service tests, evacuated 148 wounded and injured paratroopers who had

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jumped with the 187th Airborne RCT at Munsanni. By 5 April 1951 the 3d Air Rescue Squadron helicopters had evacuated 1,423 wounded or cut-off UNC soldiers from the battle lines. The USAF Surgeon General described these achievements as "one of the brightest chapters in the history of our Air Force." [258]

While the USAF helicopter pilots were thus distinguishing themselves in around-the-clock operations with aircraft which were never meant to fly at night or in bad weather, FEAF had been unsuccessfully attempting both to get more helicopters and to secure recognition for the forward area medical air evacuation function. On 16 January 1951, when General Vandenberg was in the theater, FEAF handed him a request for more capability: at this time FEAF had 14 H–5's and it wanted 31, most of which would be used to organize a provisional evacuation squadron. In answer to this request, USAF assigned MATS a responsibility for bringing the 3d Squadron up to a strength of 23 H–5's, but, other than this, it professed an inability to meet FEAF's helicopter requirements. It was unwilling to take away the few H–5's which its worldwide rescue squadrons still held, and the new and larger H–19 and H–21 helicopters were not going to be available from production in any appreciable quantities until early 1952.[259] Determined not to let the matter rest, the FEAF commander on 11 March 1951 requested General Vandenberg to provide to the Fifth Air Force a liaison squadron with 12 H–5's and 12 L–5's, which would give it an air evacuation and liaison capability separate and distinct from the 3d Air Rescue Squadron, which ought to be concerning itself with the emergency rescue of aircrews. The old L–5's and H–5's were not the most desirable aircraft but FEAF was willing to accept them. It nevertheless requested that it be given the highest priority for the new H–19's.[260] Once again USAF reminded FEAF that its policy was to give first priority for helicopters to the Air Rescue Service, but on 14 April it recognized that the Fifth Air Force needed a liaison squadron, which would be equipped with 12 L–5 aircraft. Beginning in the autumn of 1951 the squadron could be gradually provided with L–20 liaison aircraft, the new DeHavilland Beavers, which could accommodate three litter patients. Armed with this authority, the Fifth Air Force on 25 July 1951 activated the 10th Liaison Squadron and, among other duties, charged it to perform air evacuation as required.[261]

But in mid-1951 FEAF still lacked the helicopter capability which it needed. On 24 July FEAF accordingly bespoke its thanks for the liaison squadron authorized to the Fifth Air Force and asked for another to be assigned to the Japan Air Defense Force, but it informed USAF that it additionally required one squadron of H–19 helicopters to perform frontline medical air evacuation functions. The function, FEAF explained, was being performed by Detachment F, 3d Air Rescue Squadron, but since this unit lacked the wherewithal adequately to provide forward area air evacuation services the Eighth Army had been compelled to make extensive use of its liaison aircraft for such purposes. "If FEAF is to carry out its responsibility of adequately providing this service for the Army," noted the FEAF letter to USAF, "one squadron of H–19-type helicopters is required for assignment to the 315th Air Division." On 23 August 1951, USAF replied that the Air Rescue Service would have first priority claims on critically short H–19 aircraft. Under the current composition of the USAF no other liaison or helicopter squadrons were available for deployment to FEAF.[262]

During the first year of the Korean hostilities, USAF and FEAF obviously disagreed as to whether the aeromedical evacuation of casualties from forward areas was correctly an Army or an Air Force task, and, oddly enough, both of them were correct. The vagueness in this service responsibility went back to World War II, when the Army had been permitted to assign organic liaison aviation to its units but the Army Air Forces had continued to provide the ground forces with supporting liaison squadrons. Following the establishment of the USAF, various Army-Air Force basic agreements had indicated the intent to maintain this same system. Thus the JAAF paper of 21 August 1948 charged the USAF to provide air transport for the Army "except as otherwise stated." A series of adjustment regulations had effected the details of the separation of the Air Force from the Army, and one of them, issued on 20 May 1949, had amounted to a basic agreement on the subject of Army organic aviation. As defined therein there were two types of Army aircraft: fixed-wing, not exceeding 2,500 pounds in weight, and rotary-wing, weighing no more than 4,000

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pounds. Organic aircraft were to be used by the Army to expedite ground combat in battlefield areas, and one specified duty was to accomplish emergency aerial evacuation. The agreement also specified that USAF would continue to support the Army with liaison squadrons, which would perform courier and messenger service, aerial evacuation, aerial photography, aerial supply, and aerial wire-laying.[263]

In the several years prior to the Korean war, the Army had built up a modest inventory of organic liaison aircraft, and on 30 June 1950 it possessed a total of 725 such aircraft, including 57 utility helicopters.[264] The initial ground fighting in the rough terrain of Korea placed a premium on rotary-wing characteristics, and, after observing the work of 3d Air Rescue Squadron H–5's, the Eighth Army commander in mid-August 1950 requested CINCFE to provide Army units in Korea with organic helicopters. His specific requirements were for passenger helicopters like the H–5's which would be allocated 4 per division, 2 per corps headquarters, and 3 per army headquarters, and for cargo helicopters which would be capable of carrying 1,600 pounds and which would be allocated 3 per division, 2 per corps headquarters, and 2 per army headquarters. On 20 August 1950 CINCFE forwarded the Eighth Army's request to the Department of Army with the recommendation that it be implemented, either in whole or on whatever scale was feasible.[265] This request was favorably received by the Department of Army, and between 1 July and 31 December 1950 the Air Force, which procured aircraft for the Army, put on order about 1,230 helicopters and liaison aircraft, including such models as the H–13, H–19, H–23, and H–25.[266] New organic aircraft allotments were drawn up which authorized each infantry division 10 helicopters and made other authorizations of these aircraft to other Army units. Helicopter ambulance units were established, each being authorized 5 aircraft.[267] The effects of these authorizations and procurement actions were not immediately felt in Korea. Except within the 1st Marine Division where organic helicopters were possessed, all frontline aeromedical evacuations continued to be performed by USAF helicopters until January 1951. After this time, the Eighth Army began to receive some of its authorized aircraft and to undertake a part of the evacuation task, but as of 30 March 1951 some 85 percent of frontline pickups was being accomplished by USAF aircraft.[268] As Army and Marine helicopters became available in greater quantities, air evacuation of wounded from the front lines was assumed, for the most part, by them, and medical evacuation of casualties became a secondary mission for USAF air rescue units. This task of backing up Army and Marine helicopters, however, remained a considerable responsibility, and all told, during the Korean hostilities, USAF helicopters evacuated more than 8,500 wounded UNC personnel from frontline positions either to hospitals or directly to airstrips for further air evacuation.[269]

The subject of Army organic aviation was to receive additional attention at Army and Air Force departmental levels. During 1951 the Army was increasingly dissatisfied with the weight limitations which it had agreed to observe in ordering aircraft for its field units. On 2 October 1951 the Secretaries of the Air Force and the Army signed a special Memorandum of Understanding relative to Army aviation, which eliminated the maximum weight provisions on Army organic aircraft in favor of a definition in terms of functions to be performed. As stipulated, organic aircraft would be used by the Army "as an integral part of its components for the purpose of expediting and improving ground combat and logistical procedures within the combat zone," a strip of territory which would extend backwards from the front line normally to a depth of 60 to 75 miles. Chiefly because of disputes concerning Army helicopter transport companies which the Army desired to equip and employ in Korea,* the 1951 agreement was superseded by a Second Memorandum of Understanding on Army aviation which was concluded on 4 November 1952. This agreement renewed the weight restrictions on Army fixed-wing aircraft, whose maximum weight was now established at 5,000 pounds, but imposed no weight restrictions upon helicopters, whose employment by the Army continued to be defined in terms of functions. Among other details covered, this agreement charged the Army with limited aeromedical evacuation including "battlefield pickup of casualties, their air transport to initial point of treatment and any subsequent move to hospital facilities within the combat zone." In the case of

**See* pp. 294–96.

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airborne operations, however, the Air Force was responsible for the evacuation of casualties from the objective area until such time as a ground linkup was attained.[270]

With the exception that it did not control forward area air evacuation, the FEAF Combat Cargo Command and its successor 315th Air Division established and demonstrated a system of aeromedical evacuation which was economical of scarce air effort, flexible enough to meet the changing needs of combat, and dependable enough to meet the Eighth Army's requirements. Having obtained in September 1950 the specific criticisms which the Army had in mind about the way in which aeromedical evacuation had been conducted up until then, the FEAF Combat Cargo Command promptly reorganized the effort. The control techniques which made air evacuation wherever possible a return-trip task of cargo aircraft which had delivered cargo to airfields in Korea have been noted,* but the principal element of success in the system of aeromedical evacuation developed in Korea was close coordination through good liaison and reliable communications. Staff and liaison officers needed for the system were provided by the 801st Medical Air Evacuation Squadron. The squadron commander of the 801st served as the surgeon of the 315th Air Division, while the squadron executive, an experienced medical service corps officer, was in charge of the Division's air evacuation operations section. The squadron also kept two liaison officers in the field, one at Pusan with the Eighth Army Evacuation Officer and another at Taegu with the several hospitals there. These two officers forwarded requests for the movement of patients intra-Korea and from Korea to Japan. For intra-Japan patient movements the Hospital Regulating Officer of the Japan Logistical Command made known his requests for air transport space to the air evacuation operations section directly. These same arrangements continued after the reorganization of the FEC: MAE liaison officers were accredited to the Medical Section of the Eighth Army and to the Medical Section of the Korean Communications Zone, while in Japan the AFFE Medical Regulating Officer requested intra-Japan aeromedical evacuations. All means of communication—radio, telephone, and AACS facilities—were employed in the requesting and coordination of aeromedical evacuation.[271]

Given the assurance that aeromedical evacuees would be ready for movement at a specified time and place, the 315th's Transport Movement Control was able to add flight nurses, aeromedical technicians, and the necessary litters and other equipment to the cargo planes which carried supplies into the field from which the patients were to be lifted. If no cargo-carrying plane was scheduled for the airfield, an empty plane was scheduled for the sole purpose of air evacuation. In times of crisis, all types of transport aircraft were used for air evacuation: thus on 5 December 1950 a total of 131 flights of all types of planes lifted 3,925 patients for the largest single day of aeromedical evacuation in the Korean hostilities.[272] Normally, however, the 315th Air Division preferred to use C–47's and C–54's for aeromedical evacuation. The C–47's usually picked up patients at forward area strips and took them to hospitals in Korea, and the C–54's handled the Korea to Japan patient lift. In recognition of the limited space in the C–47's and their tendency to crowd forward fields, the 315th Air Division customarily used C–54's even for intra-Korea lift at any time that they could safely get into a forward airfield. Thus in October 1950, when the Eighth Army was driving northward, C–54's lifted patients from Sinmak (K–20) and carried them back to Kimpo where they were turned over to the 8055th Mobile Army Surgical Hospital. Except in emergency periods, the usual air evacuation day saw the airlift of about 300 patients, a total which could be handled fairly easily by the C–47's, which could handle 26 ambulatory and litter patients, and by the C–54's, which could accommodate 36 ambulatory and litter patients. Since the C–119 was virtually disqualified for evacuation tasks because of its cabin noise, deficiency in single-engine flight characteristics, and poor ditching possibilities, and the C–46 aircraft on hand lacked aeromedical accommodations such as litter straps and toilets, the 315th Air Division stated on 27 July 1951 that C–47's and C–54's would be primarily used for air evacuation purposes over all routes and into all areas, with the C–54's to be favored in all cases where airfield conditions permitted their use. The command further stated that C–46 and C–119 aircraft would be used for air evacuation only in cases of emergency.[273]

*See p. 262.

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In the autumn of 1952 the departure from the theater of two squadrons of C–54's and the conversion of two other squadrons of C–54's to C–124 Globemasters had an impact upon the medical air evacuation capabilities of the 315th Air Division. Theater operational tests of a C–124A in September and October 1951 had already shown that this plane was well suited for the air evacuation mission. As a practicable maximum, the C–124 could accommodate 127 litter patients or 200 ambulatory wounded, and the loading of such numbers of evacuees on a single C–124 took less time than the loading of equivalent numbers on several planes. Proportionate to the patient load, moreover, the C–124 required fewer flight nurses and aeromedical technicians. The patients carried in the large aircraft gained confidence from its size and power. The possibility that it might have to be ditched at sea was the C–124's worst feature: because of its size and type of escape exits, ditching would prove difficult even for the crew and for ambulatory patients.[274] When the Globemasters were put into full operational use they demonstrated that they were well qualified for aeromedical evacuation: during the LITTLE SWITCH and BIG SWITCH evacuations of UNC prisoners who were retrieved from the Communists the C–124's were able to handle large movements of patients with great ease. Their full potential for patient lift, however, could seldom be completely utilized in the Far East. They could not get into forward area airfields and thus had little utility for intra-Korea evacuation; they could not operate into Pusan East Airfield (K–9) and thus were unable to pick up patients from this point for return to Japan.[275] Having recognized that the C–124's would have some trouble utilizing their aeromedical capabilities, the 315th Air Division had already made plans and preparations to employ its C–46's for medical air evacuation. Now equipped with the necessary accommodations, the C–46's in September 1952 began to carry maximum loads of 26 litter and ambulatory patients and these aircraft proved equally versatile in the intra-Korea, Korea to Japan, and intra-Japan patient lifts. The 22d Squadron's C–54 aircraft also provided some aeromedical lift from Korea to central Japan.[276]

At any time during the Korean hostilities, the 315th Air Division possessed far more aeromedical airlift capability in terms of sorties by aircraft suited for the task than could be utilized by the Eighth Army. The only limitation on the 315th's aeromedical evacuation capability was a scarcity of USAF medical service personnel. The 801st Medical Air Evacuation Squadron, present in the theater when the war began, was a small organization which was tailored to meet the needs of a MATS-type air evacuation operation running between regularly established terminals. It was authorized 29 officers (including 24 flight nurses) and 48 enlisted men (including some 18 areomedical technicians), a strength which was adequate to maintain a squadron headquarters and three flights. Neither this strength nor the organization was suited to the problems of all-out aeromedical evacuation, and as soon as it was moved northward to Tachikawa the 801st discontinued its flights and transferred all personnel to the direct control of the squadron headquarters. Having gained this flexibility, the 801st established its people where they were needed. At each airfield which served as an embarkation or debarkation point for evacuees, a medical service corps officer or a senior NCO was placed in charge of an "operating location" and thus served liaison purposes with using medical units and supervised the loading and unloading of patients. Although the USAF medical service, within the means available to it, provided flight nurses and enlisted technicians in excess of the squadron's authorized strength, most of these nurses and technicians during 1950 and 1951 often flew as many as three round trips per day to Korea and literally worked themselves to exhaustion. As time passed, however, the 801st was authorized additional flight personnel: on 6 June 1951 it was reorganized to include 45 officers (including 37 flight nurses) and 72 airmen (including 36 flight technicians).[277]

The expansion of the 801st Medical Air Evacuation Squadron proved to be slower than was desirable because the USAF medical service, caught short in the sudden outbreak of the Korean war, was initially unprepared to meet the requirements posed by large-scale aeromedical evacuation. Another most serious shortcoming was the Air Force's inability to provide the medical personnel needed to man and operate the casualty staging and holding facilities at various evacuation airfields in Japan and Korea. More or less informally and in recognition of a need that the Air Force could not fulfill, the Army established the first casualty staging unit at an airfield in

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Korea in November 1950, and, subsequent to this time, it assumed similar duties at the several evacuation fields in Japan and Korea.[278] The results of this informal assumption of what should have been a definitely established responsibility were not entirely satisfactory. On 22 February 1951 General Henebry observed that: "Such things as inadequate holding facilities, shortage of ambulances and litters, insufficient clothing, blankets, and lack of food for patients over long periods of time are a common occurrence within this theater. Although it is the understanding of this Division that these are responsibilities of the Army in this theater, when such deficiencies exist the air carrier is open to criticism."[279] In the spring of 1951, moreover, there were a good many instances wherein the Eighth Army holding units did not have patients ready to be airlifted as requested, or else requests were canceled at the last minute, after flights had been dispatched. In either event, the scarce services of flight nurses and technicians who were sent to care for the unavailable evacuees were wasted.[280]

The 315th Air Division attributed these irregularities in the preparation of patients for airlift to the lack of a theater directive defining service obligations in the aeromedical evacuation system, and finally in December 1951, after almost a year and one half of war and after repeated efforts of the parties concerned to reach agreements, a theater policy letter was drawn up and issued by CINCFE defining zones of responsibility and jurisdiction and confirming previous verbal agreements. Among its other provisions, this letter directed the commanders of medical facilities authorized to use air transportation and the commanders of holding companies or detachments to designate air evacuation coordination officers who would coordinate evacuation activities between the medical facility and the air evacuation agency. These air evacuation coordination officers were made responsible for such matters as loading and unloading patients, transporting patients to and from holding facilities and aircraft, providing in-flight meals as necessary, preparing records, furnishing special medications or diets, and replacing or exchanging supplies and equipment with the air evacuation agency as practicable.[281]

Although the Army had assumed the task of manning and operating aeromedical staging and holding facilities in Japan and Korea, USAF had not intended to abdicate the function which, being physically located at airfields and concerned with loading and unloading aircraft, could obviously be most efficiently performed by USAF medical personnel. Based upon maneuver experience in the United States, the USAF Surgeon General on 26 May 1952 completed a table of organization for an aeromedical group which, among other features, possessed cellular casualty staging flights of a nature fitting them to serve, where needed, as staging and holding activities.[282] The USAF Surgeon General recognized at this time that medical services austerity programming was so pressing that personnel for overseas aeromedical evacuation groups would not be soon available. In the spring of 1953, USAF was at last able to direct FEAF, effective on 18 June, to replace the 801st Medical Air Evacuation Squadron with the 6481st Medical Air Evacuation Group. In deference to the unusual aspects of the aeromedical function in the Far East, the 6481st was activated as an especially designed table of distribution unit which absorbed the functions, personnel, and equipment of the 801st Squadron, but its authorized strength of 50 officers and 222 airmen gave it the ability to take over the processing, temporary care, and staging of military casualties for air movement.[283] The Army, however, was reluctant to release control of the aeromedical staging facilities and presented arguments in favor of maintaining the status quo. These arguments, which actually involved nothing more than an administrative control of patient movements by air, soon branched out into a maze of statements and counterstatements concerning manpower, vehicles, and the like. Although the Air Force continued to assert that it could man and operate the staging facilities far more economically than the Army, no agreement could be reached in the theater and the problem was finally passed to the Department of Defense for a decision. The question as to which service should man and operate aeromedical patient staging detachments was not resolved before the end of the Korean war.[284]*

During the three years of the Korean hostilities, the 315th Air Division and its predecessor airlift commands provided air evacuation for more than

*The argument was finally resolved in favor of the Air Force on 8 December 1953 by a joint agreement which confirmed the fact that the Air Force was responsible for providing an aeromedical evacuation system for the Army and for the Air Force. *See* AFR 160-5 (AR 40-95), 8 Dec. 1953.

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320,000 patients, a total which in some part included multiple movements of the same patients intra-Korea, Korea to Japan, and intra-Japan.[285] As the total experience of the 315th Air Division with aeromedical evacuation is viewed, certain facts stand out in sharp relief. Aeromedical evacuation was dependable, so dependable that the hospital ships in the Far East were used after September 1950 as floating hospitals rather than as transports. Air evacuation was safe: in the course of the whole patient movement only six patients were lost in one fatal accident, this in 1951 when an RHAF C-47, taking off at night from a forward airfield, collided with a jet fighter-bomber.[286] Air evacuation was humanitarian. Knowing that air would carry him speedily and comfortably to a hospital, a patient quickly assumed a "worst is over" attitude which lifted his spirits at the very time such was needed. The same speed brought a patient to a medical center where specialists were available with the best possible equipment. Air travel caused far less trauma than surface travel over rough roads or railways. Air evacuation was economical. It was not only statistically demonstrable that transoceanic air evacuation cost far less per patient than did water transportation,[287] but as it was managed in the Far East aeromedical evacuees generally occupied space which would have been otherwise unused on transports outbound from the battle area. The 315th's surgeon aptly pointed out that in Korea one medical air evacuation squadron, working with a single air transport command which maintained a 24-hour watch and integrated air evacuation with other transport operations, accomplished more than was customary for several MAE squadrons under divergent command in World War II. "For what is probably the first time in the history of warfare," wrote another physician, "the surgeon has had an abundance of air evacuation transport offered him without having to plead for it." [288]

Viewed either in terms of its achievements or in comparison with similar endeavors in World War II, the Korean medical air evacuation effort was clearly a major accomplishment in American military history. A candid reporter of the Korean aeromedical evacuation story may nevertheless inquire whether the systems employed there were as efficient as they might have been, and whether the achievements of the effort were, in fact, as great as they might have been, had other circumstances prevailed. What, for example, was the cost in efficiency from the fact that aeromedical evacuation in Korea was engrafted upon the Army's existing medical system. The Korean experience and contemporary maneuver-experience in the United States* clearly reveals that the Army's traditional system of evacuating casualties through many medical echelons did not permit aeromedical evacuation to attain its maximum utility. A chain of evacuation designed for walking litter bearers, horse-drawn vehicles, and, at best, earth-bound motor transportation could not achieve the maximum benefits attainable from an integrated aeromedical evacuation system. In Exercise "Southern Pine" in August 1951 the USAF Tactical Air Command, employing an integrated system of aeromedical evacuation and using two helicopters for frontline pickup and a transport aircraft for evacuation to simulated rear area hospitals, achieved such success that on the ninth day of the maneuvers the 43d Infantry Division surgeon suspended all but the most forward echelon of ground evacuation activity, idling an estimated 600 persons and 100 vehicles of the Army medical service.[289] The integrated aeromedical evacuation system employed in "Southern Pine" operated on the principle that sick, wounded, and injured men should be screened sufficiently in advanced areas to prevent excessive losses to the ground combat command as a result of "over evacuation" but that all legitimate casualties should be immediately and rapidly moved, with as few stops as practicable, to rear area or communications zone hospitals. Such a procedure lessened medical manpower and logistical loads in the forward areas, speedily removed the patient from the harassment and stress of the battle area and got him to adequate medical attention, and freed the ground forces of details which complicated the conduct of the ground battle.[290] No such integrated aeromedical evacuation system, operated through the depth of the theater by a single responsible agency, was ever utilized in the Far East, and as a result aeromedical evacuation never made its maximum potential contributions to the UNC war effort in Korea.

The Last Year of the Korean Airlift: In the last year of the Korean hostilities, the 315th Air Division continued to employ its combat cargo capa-

*See AHS-129, Air Force Participation in Joint Army-Air Force Training Exercises, 1951-1954, pp. 46-48, 95-98.

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bilities as directed by CINCFE through the FEC Joint Air Priorities Board and as requested by JALCO. Following a first year of all-out combat cargo activity in support of the blazing air-ground war in Korea, the Korean airlift requirements had been cut back at the beginning of the truce talks in July 1951, and airlift requirements remained relatively modest in the third year of the war.[291] The airlift command nevertheless continued its preparations to cope with sudden increases at any time. Transport achievements of the 315th Air Division in the period 1 July 1952 through 31 July 1953 are shown in figure 21.[292]

During the last year of the war the bulk of cargo carried by the 315th Air Division's transports was airlanded cargo and passengers. Unlike the early days in Korea, when vast quantities of ammunition, rations, gasoline, and other basic supplies had constituted the major items of airlift, priorities for air movement in the last year were awarded to those articles which could not be delivered in time for their effective use by any other means of transport. Under this rule, the bulk of airlanded cargo included replacement engines and aircraft parts for the Fifth Air Force and fresh vegetables from hydroponic farms in Japan for Army and Air Force troops in Korea. To conserve airlift space, most of these vegetables were shipped by refrigerator cars to Kyushu and flown from there to Korea.[293] In May 1953 an extra C–124 trip was added to the "vegetable lift" and it carried vegetables as filler cargo directly from Tachikawa to Taegu (K–2) and Seoul (K–16).[294]

Transporting passengers, including whole military units, to and from Korea, was the largest category of 315th Air Division operations in the period after June 1952. Except for October 1952, the number of medical air evacuees lifted in transport aircraft remained moderate until June and July 1953, when renewed ground fighting in central Korea caused increased numbers of evacuees. With the beginning of the truce talks the number of sick and wounded had sharply declined, but at this same time the Eighth Army and Fifth Air Force had increased the numbers of persons permitted to return to Japan for five-day rest and recreation (R & R) leaves.[295] Of 541,935 passengers transported by air in the last half of 1952, 282,101 were R & R personnel—216,249 from the Army and 65,852 from Fifth Air Force. By the end of June 1953, the 315th Air Division had lifted

315th AIR DIVISION ACHIEVEMENTS

1 July 1952—31 July 1953

Month	Effective sorties	Total tons	Passengers	Airdrop tons	Air evacuees
1952					
Jul	5, 028	16, 552. 6	87, 961	89. 1	4, 633
Aug	5, 196	16, 935. 5	88, 103	84. 7	5, 005
Sep	4, 880	15, 778. 1	86, 143	77. 6	5, 756
Oct	5, 266	17, 306. 3	97, 104	57. 8	8, 287
Nov	4, 975	17, 556. 5	96, 221	63. 5	6, 250
Dec	4, 646	16, 669. 5	86, 403	63. 5	5, 453
1953					
Jan	5, 086	17, 565. 1	97, 050	63. 8	4, 951
Feb	4, 376	16, 617. 0	95, 220	46. 8	5, 153
Mar	6, 806	17, 851. 8	101, 873	65. 4	5, 515
Apr	6, 730	18, 325. 8	100, 147	66. 6	6, 020
May	6, 630	19, 640. 5	105, 475	74. 2	4, 917
Jun	5, 580	14, 843. 6	70, 087	59. 7	8, 956
Jul	6, 212	15, 215. 4	47, 014	29. 7	11, 951

Figure 21.

800,000 R & R passengers between Korea and Japan, a sufficient number of people to populate a city the size of Boston, Massachusetts. During the early summer of 1953, however, several factors caused the discontinuance of the R & R program. The backbone of the R & R lift was broken when all C–124's were grounded after the fatal crash on 18 June, for these large planes were carrying the majority of R & R troops. The formidable Communist push into the UNC lines in June also prevented withdrawal of personnel from operating units: with this offensive all available airlift was needed to move troops, supply, and equipment into Korea to check the southward surge of the Red forces.[296]

In its mission assignment the 315th Air Division was required to conduct air transportability training and to assist air and ground units in making air movements within the Far East. Teams from the 6127th Air Terminal Group accordingly served to indoctrinate and to assist units in air movements, and a 315th booklet entitled "Here Today—Gone Tomorrow" taught principles and precepts of air movement. Although many air movements of units had been managed in the early phases of the Korean war, the largest single airlift of an Air Force unit extended over a two-and-a-half-week period beginning 8 July 1952, when

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the 474th Fighter-Bomber Wing was moved by air from Misawa in northern Japan to Kunsan (K–8) in western Korea. In December 1952 and January 1953 the 315th Air Division lifted a large proportion of the personnel and equipment of the 18th Fighter-Bomber Wing from Chinhae (K–10) and Hoengsong (K–46) to the newly opened base at Osan-ni (K–55).[297] During the last days of June 1953, two Marine air squadrons were moved by air out of Kunsan, one going to Pyongtaek (K–6) and the other to Pohang (K–3). These movements of air units were of some magnitude, but they caused the 315th Air Division little difficulty. On 21 June 1953, however, reinforcing ground troops were needed to stem the momentum of the last-minute Communist ground assaults in Korea, and CINCFE assigned highest priorities to the movement of the 187th Airborne RCT from southern Japan to central Korea, where it was to go into battle positions. This airborne unit was well accustomed to air movements, but flooded roads in southern Japan caused it some difficulty in getting its paraphernalia moved into airlift airfields. In view of these problems, which greatly complicated an orderly loading of aircraft serials, the 315th Air Division lifted the RCT from Itazuke and Ashiya in 53 C–46 and 249 C–119 sorties, between 21 and 23 June. On the night of 23 June shortly after a takeoff in foul weather, one C–119 crashed in the sea a few miles out of Ashiya: all aboard this plane perished but these were to be the only losses during the June troop-lifts. Getting the RCT landed in Korea was also a problem: the 187th was slated to go into the battle line near Chunchon (K–47) and daytime flights headed into this airfield. But Chunchon had no GCA and it was located in a hard-to-approach cup-like mountain basin, and night and bad weather flights accordingly had to go into Seoul (K–16). Here, on the second night of the airlift the Reds sent several "Bedcheck Charlie" light-aircraft harassing sorties, and tension ran high as the transports landed at the airfield, which, in a calculated risk, was kept lighted all the time that the Red planes were in the area. Although the transport traffic pattern and the fully lighted airfield offered the Reds some prime targets, the Red hecklers for some reason did not attack. This successfully completed movement of the 187th RCT, finished just before dawn on 23 June, lifted 2,094 soldiers and 1,562 tons of equipment from southern Japan to Korea.[298]

Further to bolster the ground forces in Korea, CINCFE ordered the 19th and 34th Regimental Combat Teams of the 24th Infantry Division moved to Korea by airlift; both were to be landed in the Pusan area but the former had to be picked up from Misawa and the latter from Tachikawa. For two years the 315th Air Division had been working on air transportability maneuvers with the XVI Army Corps, and when these two RCT's had to be moved the training paid off in a fairly smooth accomplishment of a somewhat difficult transportation mission. The 315th wanted to land these troops at the all-weather base at Pusan East (K–9), but the B–26's based at this field had to stay operational, and instead of landing there the transports used Pusan West (K–1) for visibility landings and Taegu (K–2) for night and all-weather debarkations. For this operation C–46's, C–54's, and C–119's were available, and beginning at 0600 hours on 28 June, amidst extremely bad weather, the airlift got underway. In deference to fueling requirements, the aircraft flew this lift mission in a giant circle: they picked up passengers and equipment at Tachikawa and Misawa, flew them directly to Korea, returned to Ashiya for refueling and crew rotation, and then flew back to Tachikawa and Misawa to begin again. Although low ceilings delayed the lift from Misawa, the movements of the two regiments were completed on 2 July. In the movement of the 19th RCT from Misawa, 11 C–46, 4 C–54, and 55 C–119 sorties lifted 284.2 tons, including 898 troops. In the movement of the 34th RCT from Tachikawa, 63 C–46 and 123 C–119 sorties lifted 943.27 tons, including 3,039 troops.[299] Although he did not question the CINCFE order that the two regiments of the 24th Division were to be moved by air to Korea, General McCarty privately doubted that such a movement should have been made: for one thing, it used the entire 315th Air Division transport capability. The two regiments, moreover, were being moved into reserve positions and could have just as effectively, and at less cost to scarce air transport capabilities, been moved from Japan to Korea by water transport. As soon as these two regiments had been flown to Korea, CINCFE decided to airlift all of the remaining units of the 24th Division to the same

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reserve locations in southern Korea, chiefly for the training benefits to be gained from the maneuver. FEAF, however, secured an abatement of this order because it was patently unwise to continue to use up airlift capabilities when legitimate emergencies already required airlift. On 3 July, CINCFE saw reason in this viewpoint and ordered the remainder of the 24th Division moved to Korea by water transportation.[300]

During the entire course of the Korean hostilities, perhaps 5 percent of all troop carrier operations were concerned with air assault operations, but the maintenance of aircrew and paratrooper capabilities for airborne missions required that a large number of the 315th Air Division's flying hours be used for such training. Beginning in May 1952, when the 315th Air Division airlanded it in Korea, the 187th RCT was engaged for several months in quelling Red POW riots at Koje-do, and from this assignment the paratroop regiment moved to a stint of frontline infantry duty with the 7th Infantry Division. In the summer of 1952 airborne training was slack, and the 403d Troop Carrier Wing took advantage of the respite to get its C–119 aircraft restored to proper serviceability.* But to maintain proficiency in the packaging and delivery of paradropped supplies, which had been a major air transport task in 1950 and 1951, a few C–46's, C–47's, and C–119's dropped water, rations, gasoline, and other heavy resupply items to isolated radar stations and shoran beacon units of the 502d Tactical Control Group.[301]

At the end of September 1952 the 187th Airborne RCT, now slightly out of practice in airborne work, had been withdrawn from the front lines and was encamped at Taegu. From this same airfield the paratroopers had been lifted to the Munsan-ni drop zones in the spring of 1951, and, as was the case prior to this combat jump, they were told early in October that they would participate in the period 10 through 13 October in a short period of intensive practice maneuvers with 315th Wing C–46's and 403d Wing C–119's. Officially unknown to paratroopers and aircrews alike, the 315th Air Division on 8 October cut an operations plan comprehending a combat drop of the 187th RCT near Simpo-Ri in eastern Korea, which was to be coordinated with an amphibious landing in the same area.[302] On the four days of 10 through 13 October, C–46's and C–119's staged into Taegu (K–2) and conducted battalion-sized paratroop and heavy equipment drops in the nearby Naktong River valley. Following these four days of intensive maneuvers the men of the 187th were confined to their camp, and to all at the operating level it looked as if a combat jump was in the near offing. At 0300 hours on the morning of 14 October, the crews of the 403d Wing were called to a briefing, only to be informed that weather had forced the cancellation of the day's mission. After dark on the evening of 14 October it appeared that the airborne operation had been scratched because C–46's and C–119's and two Globemasters began airlifting the 187th back to Japan. This troop lift was well underway when, at 0300 hours on 15 October, 32 C–119 crews were assembled at Ashiya and instructed to implement the airborne phase of "Operation Feint," the UNC amphibious demonstration off eastern Korea. Despite the fact that airborne timing had been thrown off from the preceding day's schedule, CINCFE had determined that the airborne feint would be conducted a day late. Before dawn on 15 October the C–119's, with no paratroopers aboard, crossed the Japan Sea in tight formation. Shortly after daybreak they overflew Taegu and continued northward to the battle line, where in the vicinity of Chorwon they let down to a normal paratrooper-dropping altitude of 800 feet. Just before the C–119 formation crossed into enemy territory, it turned abruptly east and then wheeled southward and landed at Taegu, where it picked up more paratroopers and airlifted them back to Japan. Whether or not this delayed airborne phase of the Koje amphibious hoax* had fooled the Communists was never determined, but it had occasioned serious training on the part of aircrews and airborne troops who had believed that an air assault operation had been impending.[303]

Counting the October airborne training in Korea and other joint exercises conducted in Japan following the return of the 187th Airborne RCT to its home stations, the 315th Air Division flew 664 airborne training sorties and dropped 17,727 paratroopers in the last half of 1952. In the first half of 1953 the division flew 445 such training sorties and dropped a total of 10,683

*See pp. 274–75.

*See Chap. IV, pp. 105–06.

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paratroopers. Much of this training was conducted in small increments, but in the course of Exercise "Paraphib" held in Japan in early March 1953 battalion-sized drops were made, and three battalion-sized drops were conducted between 23 May and 6 June in an exercise called "Triple Threat." Aerial resupply missions were continued, more for their training value than for tactical need. In addition to the resupply drops to mountain-top and island-based radar and shoran stations, a number of parasupply familiarization drops were made to infantry units in Korea during April and May 1953.[304] After the Globemasters were grounded in mid-June 1953, the FEC air transportation board recognized that all C–46's and C–119's were needed for airlift commitments: further airborne training was halted as long as hostilities continued in Korea.

Divisive Factors Affecting Theater Airlift: When the Korean war was over, FEAF reported that it had learned three major lessons relative to the command and employment of that scarce category of military aviation which comprised airlift:[305]

1. Airlift missions and priorities should be established by the theater commander.
2. Airlift cannot be allocated exclusively for the use of any service except for special one-time requirements.
3. All theater airlift should be concentrated to the maximum degree in one command for flexibility and best utilization.

These lessons were in accord with Air Force doctrine and they were again proven to be true in Korea, but there was evidence that they were not accepted by the Army, or by the Navy, nor were they wholeheartedly accepted within the Air Force.

Despite the fact that the FEAF Combat Cargo Command was established to control and provide FEC theater airlift, neither this organization nor its successor 315th Air Division was able to control Navy and Marine airlift in the theater. The Navy operated an air transport squadron into and within the Far East theater for fleet logistical support throughout the Korean hostilities. For a short time in 1950, however, a Marine R5D (C–54) transport squadron was attached to Combat Cargo Command: this came about on 12 October when the FEAF commander insisted that the Marine transport squadron had to be considered to be theater airlift and not, as ComNavFE suggested, Marine logistical support. This squadron continued under the operational control of the Combat Cargo Command until its departure from the theater on 25 December 1950.[306] After this, Marine transport units which subsequently came to the Far East were exempt from the control of the theater airlift commander. Later on in the war, moreover, the Marines operated a transport air terminal at Seoul (K–16) which was literally next door to and patently duplicated the 315th Air Division's terminal.[307] In the initial stages of the Korean war, the Navy and Marines accepted approximately 10 percent of the Combat Cargo Command's airlift capability, but later, when they had their own airlines in operation, they required something generally less than 1 percent of the 315th Air Division's capability.[308]

In the Joint Action Armed Forces (JAAF) agreements of 1948 the Air Force was assigned a primary responsibility for providing air transport and airlift support of the Army. These functions could not, however, spell out the mechanisms necessary to this arrangement, and, in August 1950 in the Far East, when the theater airlift command was being established, the prevailing Army opinion appears to have been that cargo aircraft ought to have been allocated to various organizations requiring air transport in blocks of aircraft or in units.[309] In November 1950 when his force was operating independently in eastern Korea, the commander of the U. S. X Corps requested that he be assigned operational control over six C–47's, a proposal which the FEAF commander refused on the grounds that it would undesirably piecemeal already scarce air transport effort.[310] As has been noted,* the Eighth Army in August 1950 sent to the Department of Army a requirement for helicopters, which were to be assigned as organic aviation to division, corps, and army headquarters. "Helicopters," said the Eighth Army commander, "are urgently needed for communication, liaison, and supply of troops in Korea, with particular emphasis on mountain operation."[311] In response to this requirement the Department of Army ordered substantial numbers of utility helicopters, most of which would be assigned to ground units as organic aviation. But the Army went a step further and developed a table of organization and equipment for several transport helicopter companies, each of which

*See p. 285.

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would be able to transport in one lift an infantry rifle company. To equip these companies the Army ordered through USAF procurement channels a total of 72 Sikorsky H–19C helicopters, aircraft which were counted to be "light cargo" helicopters and whose airframe weight fell just short of the stipulated limits for organic Army aircraft.[312] After undertaking these actions in the autumn of 1950, Army interest in helicopter transport aviation evidently waned: in August 1951 an Army helicopter enthusiast wrote that the Army had displayed "considerable reluctance to embark . . . on a large scale program of helicopter procurement because of a general lack of knowledge of the machine or appreciation of its reliability and a great deal of concern over its high unit cost." [313]

Early in 1951 the Army displayed dissatisfaction regarding the weight limitations imposed by earlier Army-Air Force agreements relative to organic Army aircraft, and on 2 October 1951 these complaints were allayed by an agreement signed by Secretary of the Army Frank Pace and Secretary of the Air Force Thomas K. Finletter. This Pace-Finletter agreement deleted references to the weights of organic aircraft and stated that the Army would possess organic aircraft needed "as an integral part of its components for the purpose of expediting and improving ground combat and logistical procedures within the combat zone." The "combat zone" was understood to be an area from 60 to 75 miles to the rearward of the battle line. This agreement stipulated that the Air Force had a primary function of supplying airlift to the Army, but Army aircraft would also transport supplies, equipment, and small units within the combat zone.[314]

Unlike the Army, which had not maintained a sustained interest in cargo helicopters, the Air Force, almost from the beginning of the Korean war, had displayed a keen and continuing interest in rotary-wing cargo carriers. On 10 August 1950, Maj. Gen. Glenn O. Barcus, then commanding the USAF Tactical Air Command, had informed his superiors that the "helicopter is no longer a novelty aircraft but can be readily utilized as a personnel and cargo carrier." At this time, General Barcus had recommended that an experimental helicopter assault transport squadron be organized at the earliest practicable time and that it be initially equipped with Sikorsky H–19 helicopters and eventually equipped with Piasecki H–21 twin-rotored helicopters, the latter being especially designed for carrying 3,000-pound cargoes. On 23 September 1950 TAC submitted draft tables of organization and equipment for an assault transport wing, which would have one group of conventional assault transports and one group of rotary-wing aircraft.[315] USAF approved the concept of the assault transport wing in November. It had already established a program to procure H–19's and H–21's for the Air Rescue Service, but during the first year of the Korean war (fiscal year 1951) it increased the helicopter order to a total of 50 H–19A's, 73 H–19B's, 32 H–21A's, and 27 B–21H's.[316]

Although USAF had ordered the aircraft which it needed to implement the beginning of a substantial assault helicopter program, getting them delivered was more difficult. For the Army, the Air Force was able to procure lightweight utility helicopters in good quantity, but the larger cargo-carrying helicopters posed more complex design and production problems. The USAF did not accept its first H–19A until November 1951 and the delivery of all 50 of these aircraft was not completed until June 1952. All of the H–19A's went to the Air Rescue Service. The Piasecki H–21 program was delayed by engineering and production difficulties and by labor strikes, with the result that the first three H–21's were not accepted until 30 December 1952 and even then these three aircraft had to be immediately returned to the contractor for further test programs.[317] Eager to get on with the development of an assault helicopter squadron, the Tactical Air Command organized a provisional squadron at Sewart AFB, but this unit was penalized by a lack of aircraft: in order to participate in Exercise "Southern Pine" it borrowed a test model YH–12 from the Air Proving Ground Comand. By the latter part of 1951 TAC possessed cadres of helicopter pilots and maintenance technicians, but it had no cargo-type helicopters.[318]

In the autumn of 1951 events transpired in Korea which profoundly stimulated the Army's desire to possess rotary-wing cargo aircraft. On 30 August, Marine Helicopter Transport Squadron 161 landed at Pusan with 15 Sikorsky HRS–1 helicopters, and, in accordance with Navy wishes, CINCFE attached the squadron to the 1st Marine Division, which was in the battle line near Sohwa-

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ri. This helicopter squadron lent great mobility to the mountain-fighting Marines.[319] By November 1951 Army commanders in Korea were so impressed by the performance of the Marine squadron that they requested similar units, and CINCFE asked the Department of Army to make available to him four Army helicopter transport battalions equipped with 20 H–23 Hiller utility helicopters and 260 H–21 Piasecki cargo models. In the future, CINCFE said that 10 battalions, each consisting of three helicopter transportation companies, should be allotted to a typical field army. He recommended that procurement of Army cargo helicopters in apropriate quantities should be immediately instituted on such a scale as to enable the helicopter manufacturers to expand their production to a point permitting a steady flow of aircraft and maintenance spare parts from a production line. Korea, he said, had conclusively demonstrated that the Army vitally needed helicopters for modern ground warfare.[320]

Instead of making this tremendous order for transport helicopters known to USAF through the Joint Chiefs of Staff, CINCFE took the matter directly to the Department of Army; his obvious intention was to create an Army air transport force which would operate within the 60- to 75-mile-deep combat zone laid out in the Pace-Finletter agreement. Although on a lesser scale than CINCFE proposed, the Department of Army was favorable to the idea that a field army would have its own helicopter transport units: it accordingly approved an allotment order by which four helicopter transport battalions, each of three companies, would be assigned to a field army.[321] The USAF, however, contended that the added rotary-wing requirements posed by CINCFE were largely identified with Air Force functions, and it exhibited a decided reluctance to process Army cargo helicopter procurement orders. The USAF also demonstrated its readiness to perform an assault helicopter function as soon as cargo helicopters could be obtained from production. As the discussions progressed, influential Army spokesmen emphasized their reluctance to admit of the performance of rotary-wing tasks within the combat zone by any but Army aircraft. General John E. Hull, Army deputy chief of staff, stated that: "under current Army plans, a requirement has not been established for support within the combat zone by Air Force rotary wing aircraft against which the Air Force should program units."[322] This jurisdictional controversy remained deadlocked until 4 November 1952 when a second memorandum of understanding on Army aviation was jointly approved by the Army and Air Force. This second memorandum renewed a weight restriction upon Army fixed-wing aircraft, which now could not exceed 5,000 pounds weight, but the Army's authorization for rotary-wing aircraft was defined in terms of functions to be performed within the Army combat zone, an area defined as extending 50 to 100 miles behind the front lines. Within this combat zone the Army was responsible for the performance of the typical tasks of its old organic aviation, and, in addition, Army aviation was specifically charged with the function of transporting Army supplies, equipment, personnel, and small units within the combat zone. Primary functions of Air Force aircraft in support of Army ground forces were restricted to airlift of Army supplies, equipment, personnel, and units from the outside to points within the combat zone; airlift for the air movement of troops, supplies, and equipment in the assault and subsequent phases of airborne operations; airlift for the evacuation of personnel and materiel from the combat zone; and aeromedical evacuation of casualties from initial points of treatment or subsequent hospitalization to points outside, and, in the area of airborne operations, the evacuation of casualties from the objective area until such time as a ground link-up was attained.[323]

The establishment of an Army category of troop carrier aviation had little significance to the Korean war because these hostilities were in their last stages before either the Army or the Air Force obtained cargo-type helicopters. Starting in June 1952 and completing in December 1952, Sikorsky delivered to the Army the 72 H–19C's which it had ordered from fiscal year 1951 funds.[324] Desiring to test these new aircraft in combat, the Army sent its 6th Transportation Company (Helicopter) to Korea. In May 1953, the 6th Company employed 12 H–19's to supply logistical support to three frontline infantry regiments for three days in a test exercise called "Skyhook." Late in June, the 6th and 13th Transportation Companies (Helicopter) formed an air bridge to an RCT which was cut off from highway support, enabling it to maintain a commanding position against Red

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ground attacks. On the basis of these limited combat tests, General Taylor stated: "The cargo helicopter, employed in mass, can extend the tactical mobility of the Army far beyond its normal capability. I hope that the United States Army will make ample provisions for the full exploitation of the helicopter in the future." [325] Unlike the Army, which ordered cargo-type helicopters only in fiscal year 1951, the USAF ordered 110 H–19B's and 45 H–21B's in fiscal year 1952 and 61 H–19B's and 81 H–21B's in fiscal year 1953, but, of the quantity for which procurement orders were issued, USAF received prior to the end of the Korean war only 50 H–19A's, 71 H–19B's, and 11 H–21B's, all of which were deliveries from fiscal year 1951 procurement orders. The H–19A's went to the Air Rescue Service, and the H–19B's and H–21B's were accepted in the spring of 1953, too late to be of service in Korea.[326] According to USAF programming documents, the 315th Air Division was slated to receive a troop carrier assault wing in the first quarter of fiscal year 1955,[327] but these plans were canceled after the end of the Korean war.

During the Korean war the Navy and Marines maintained their own private airlift. The Army got an authority to operate its own airlift within its combat zone. And had they been permitted to do so, either the Fifth Air Force or the FEAMCom/FEALogFor would have liked to have operated an air logistical airlift which would have been separate from the theater airlift command. The argument in favor of a separate air logistical airlift went somewhat as follows: tactical air units in Korea maintained slim levels of spare parts and other supplies, and, in order to keep operating, they depended upon airlifted resupply from Japan.* Since some 95 percent of aircraft support items consigned to air units in Korea were shipped by air, the Fifth Air Force's combat capability depended directly upon the airlift support which it received from the theater airlift command. This theater airlift command, however, served Army, Navy, and Air Force forces, and the theater air transportation board could direct the airlift command to devote its entire capability to the support of any one of these services. Shortly after the FEAF Combat Cargo Command had been established, the Fifth Air Force noted that "in altogether too many instances supplies for combat units of the Air Force were backlogged . . . due to assignment of a higher priority to Army personnel, supplies and equipment." Having reported this observation, a USAF board drew from it the lesson "that the Air Force, through its depots, must operate its own airlift." [328] Under normal circumstances the Fifth Air Force received a fair allocation of the 315th Air Division's airlift capability, but on those occasions when the theater airlift was committed to airborne operations, or when a part of the combat cargo aircraft were grounded, the Fifth Air Force ran short of supplies. One such occasion was in April and May 1951 when the C–119's had to be grounded for modifications during a bitterly fought Communist ground offensive: at this time the Eighth Army got the first priority on remaining airlift capabilities and Fifth Air Force logistical resupply was cut sharply at the very time that it needed more support for all-out air operations.[329] Early in 1952, Maj. Gen. George W. Mundy, Air Materiel Command director of supply, services, and maintenance engineering, after an inspection trip to the Far East occasioned by a threatened collapse of support for Fifth Air Force jet fighters, recommended that "organic air transport should be provided to FEAMCom in sufficient quantity to satisfy their normal and continuing requirements." This logistics airlift would not be subject to withdrawal at any time for other purposes: such a dependable logistics airlift, he pointed out, would not only expedite the flow of air supplies from depots to users but it would also enable the Air Force to reduce pipeline stocks and thus to produce monetary savings.[330]

In the late spring and summer of 1952 when the C–119 transports were being rehabilitated, the Fifth Air Force's airlift allocations had to be reduced. Especially serious was the reduction in intra-Korea airlift for the C–119's commonly and efficiently handled aircraft engine movements to and from the air depots, the REMCO detachments, and the Korean airfields. This reduction in intra-Korea lift caused delays in the movement of aircraft engines and AOCP parts within Korea.[331] In the autumn of 1952, when the C–119's returned to the airlift Fifth Air Force supply returned to a more even keel.[332] But once again, in June and July 1953, crisis in the 315th Air Division severely dislocated the Fifth Air

*See Chap. V, pp. 168–69.

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Force's closely scheduled logistical support. On 18 June all C–124's were grounded, and on 21 June the 315th Air Division got the peremptory CINCFE order to move the 187th RCT to Korea. On this latter date FEAF had to notify the Fifth Air Force that for an expected period of five days its airlift support was reduced to the small amount which could be handled by normally scheduled courier flights.[333] Instead of five days, Fifth Air Force airlift allocations continued at such minimum levels for nearly two weeks, and during this same time bracket Fifth Air Force tactical wings had to step up their operations against the Communist ground attacks in Korea. The result was a serious dislocation of Fifth Air Force logistical support,* and to its director of materiel this near disastrous episode indicated that: "In order that Air Force tactical operations be sustained under existing methods of resupply from rear echelon maintenance and supply activities, the Air Force must have its own fleet of logistics-support-type aircraft."[334]

The arguments offered and episodes cited by FEAF and Fifth Air Force logistics officers to support their contention that a separate air logistical airlift was a must were impressive, but arguments and episodes alike reflected exceptional circumstances. Each serious reduction of the logistical airlift which supported air units was caused by the grounding of some part of the 315th Air Division's transport aircraft. Had these same transports been assigned to FEALogFor or to the Fifth Air Force they would have been just as prone to mechanical defects. Twice during the time that General McCarty commanded the 315th Air Division, the FEALogFor made strong efforts to attain its own organic airlift, but in each case General Weyland, recognizing the validity and advantages of a single theater airlift command, disapproved the request. Both officers recognized that with the growing importance of mobility, airlift would always be a scarce item. The tasks to be performed by airlift would be varied, and, from time to time, first one and then another of these tasks would take precedence and require a concentration of all or most of the airlift capability within a given theater or geographical area for its accomplishment. The responsibility for determining these priorities of tasks had to be vested in the theater commander who alone could dispassionately assess the relative importance of airlift uses. The concentration of airlift resources for the performance of priority tasks could be best accomplished when all airlift resources were controlled by a single airlift commander. The piecemealing of airlift resources was just as dangerous as the piecemealing of any other scarce Air Force resource.[335]

SEARCH AND RESCUE

At the beginning of the Korean war, for the performance of search and rescue functions, FEAF possessed the 2d and 3d Air Rescue Squadrons. Administratively these units were a part of the worldwide MATS Air Rescue Service (ARS), but their operations were controlled by FEAF and its subordinate air commands. In June 1952, Headquarters, 2d Air Rescue Squadron, and Flight A and Flight B were at Clark AFB, where they were subject to the operational control of the Thirteenth Air Force. Flight C and Flight D of the 2d Squadron were based at Kadena AFB on Okinawa and were under the operational control of the Twentieth Air Force. Serving the Japan-Korea area was the 3d Air Rescue Squadron, whose headquarters and Flight A were at Johnson Air Base, Flight B was at Komaki Air Base, Flight C was at Misawa Air Base, and Flight D was at Ashiya Air Base. The 3d Squadron and its lettered flights were under the operational control of the Japan Air Defense Force. Detachment 1, 3d Air Rescue Squadron was based at Seoul Airfield (K–16) and was under the operational control of the Fifth Air Force. Effective on a worldwide scale on 14 November 1952, all ARS units were reorganized on a group-squadron basis. At this time, the 2d Air Rescue Group replaced the similarly numbered squadron and the flights were redesignated as the 31st, 32d, 33d, and 34th Air Rescue Squadrons. The 3d Air Rescue Group replaced the 3d Air Rescue Squadron, and the flights were designated as the 36th, 37th, 38th, and 39th Air Rescue Squadrons.[336] Effective 1 March 1953, Detachment 1, 3d Air Rescue Group, was redesignated as the 2157th Air Rescue Squadron without change of duties or responsibilities.[337] Opera-

*See Chap. V, p. 169.

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tional control of the new ARS groups and squadrons in the Far East remained with the same commands which previously had controlled the former squadrons and flights.

Since its area of responsibility was remote from the Korean war zone, the 2d Air Rescue Squadron devoted only a part of its capabilities to the support of combat flying. On occasion, however, the crews and aircraft were rotated to Japan and Korea to back up the 3d Squadron. Flights C and D, moreover, afforded rescue services to the 19th Bombardment Group and the 307th Bombardment Wing, which flew missions from Kadena to Korea. Equipped initially with obsolete H–5's, SA–10's, and SB–17's, the Okinawa-based air rescue flights were effectively confined to short-range rescue services under the direction of the Kadena Rescue Control Center (RCC), but new model H–19's, SA–16's, and SB–29's received in 1951 and 1952 permitted the Okinawa flights to broaden their activity. In March 1952, Flight D received its fourth SB–29, which brought it up to strength and permitted it to offer a new service to the B–29 combat crews. Long cognizant that the dispatch of search planes after a B–29 was overdue or reported in trouble was not always productive of the best results, Flight D in March proposed to provide route coverage for Okinawa-based medium bombers as they plied to and from Korea. The bomber crews liked the idea, and on 6 May 1952 FEAF approved Flight D's plans. After 8 May an SB–29 flew "precautionary escort and orbit" support for every B–29 combat stream which went from Kadena to Korea.[338] The tactics employed by these "Airdale" (the name was so spelled) SB–29's were devised by Flight D and were continued by its successor, 34th Air Rescue Squadron: an SB–29 took off prior to the first B–29 of a bomber stream and escorted each bomber from takeoff until it was safely aloft. After the bombers were all airborne, the SB–29 took a position upwind from the bomber stream and accompanied it to the Korean coast-in point, where it remained on orbit until the last bomber returned from the target. When all crews had reported their separate conditions, the SB–29 shepherded the bomber stream home. Under this procedure the Airdale was generally the first plane to leave Kadena and the last plane to return.[339] These "guardian angels" were always in the neighborhood of a crippled B–29. They could alert other rescue facilities as necessary, and if a B–29 had to ditch the Airdale could promptly drop its 30-foot A–3 lifeboat and light the ditching area with flares.

Operating rescue control centers at Misawa, Johnson, Komaki, and Ashiya Air Bases, the 3d Air Rescue Squadron afforded search and rescue services over the land areas of Japan and its adjacent sea frontiers. Each of these rescue control centers maintained a 24-hour watch, and each was joined to the other by a rescue radio net. At Johnson, the 3d Squadron rescue center additionally maintained a flight-following service which had at its command every channel of theater communications. By close cooperation with Air Traffic Control (MATCon), the rescue flight-following service monitored ETA's and overdue position reports and so discovered untoward incidents involving aircraft at the earliest possible moment. If a civil or military aircraft became distressed in flight, its pilot so signaled and the rescue coordination officer dispatched a search and rescue (SAR) aircraft to intercept and escort the distressed plane. For the performance of their mission, each of the Japan-based flights possessed an SC–47 transport, one or two Sikorsky H–5 helicopters, and all of the flights except Flight B had a principal complement of 6 Grumman SA–16 amphibian aircraft. Flight B operated a complement of four SB–29 aircraft.[340]

In support of the Korean war, the Japan-based flights of the 3d Air Rescue Squadron provided several rotational SA–16's for service at a forward airfield in Korea. They also handled air-sea search and rescue in the waters between Japan and Korea. From Komaki, Flight B's long-range SB–29's offered rescue escort services to FEAF Bomber Command organizations based in Japan. These SAR escort responsibilities built up as the Korean war continued. From their first employment in the Far East, the RB–45's of the 91st Strategic Reconnaissance Squadron were considered to be so unsafe for ditching as to demand that an air rescue aircraft be on a station-orbit each time that these jet reconnaissance aircraft made a water crossing between Japan and Korea.[341] On specific occasions, when they were scheduled to enter sensitive areas on classified electronics reconnaissance missions, the RB–50's of the 91st Squadron were similarly provided with SB–29 escort.[342] During most of the war the B–29 medium bombers based in Japan did not receive

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SB–29 route escort and orbit support, but by November 1952 hostile night fighters had begun to wreak damage upon the medium bombers to an alarming degree and the FEAF Bomber Command asked that an Airdale SB–29 be provided to support 98th Wing missions from Japan to Korea. At a meeting on 24 November it was mutually agreed that the 37th Air Rescue Squadron (formerly Flight B) would provide a single SB–29 to cover the 98th Wing bomber stream from Japan to its coast-in point in Korea, to orbit over a designated area, and to return with the bombers as far as a coast-in point in Japan.[343] Begun late in November 1952, the SB–29 escort for Japan-based medium bombers soon utilized standardized procedures: the 37th Squadron received the flight plan of the 98th Wing's mission and, on the night of a bombing mission, sent up an SB–29 from Komaki at a takeoff time which permitted it to parallel the last of the bombers as the stream passed over Nagoya. Keeping continuous watch on "D" channel, the SB–29 escorted the B–29's to their coast-in point in Korea and then orbited at a point at which it could render assistance to distressed bombers when they coasted out of Korea. When the bombers attacked targets in eastern Korea, the SB–29 routinely orbited over Yo-do, a friendly held small island in Wonsan Harbor; when targets in western Korea were attacked, the SB–29 orbited over Cho-do. If a bomber crew had to ditch or parachute the waiting SB–29 was prepared to launch its boat and to aid the crew in boarding it by providing flare illumination. When a crippled bomber could still be flown, the SB–29 gave it close escort back to an emergency landing either in South Korea or in southern Japan.[344]

During World War II the rescue of downed aircrew personnel from land areas behind enemy lines had been so unusual as always to be spectacular, but in Korea in the autumn of 1951 the Fifth Air Force rounded out a comprehensive rescue system designed to exploit the capabilities of helicopters and amphibians for snatching downed airmen from enemy territory. The rescue organization which would distinguish itself as Detachment 1, 3d Air Rescue Squadron, and which, in the closing months of the war would become the 2157th Air Rescue Squadron had originated in August 1950, when, to perform frontline medical air evacuation, the 3d Air Rescue Squadron had sent a few H–5 helicopters to Korea.* At first these helicopters and a few rotational SA–16's had operated quite informally: they stood strip alerts and answered distress calls which came to their operating location. As the number of calls increased and better communications was available, some centralization of the SAR effort in Korea became at once necessary and practicable. The original helicopter Detachment F, 3d Air Rescue Squadron was accordingly reorganized as Detachment 1 on 22 June, and at this time the detachment was augmented with the experienced ARS personnel needed to man and operate an SAR Coordination Center. Because he was primarily responsible for SAR in Korea, the Fifth Air Force commander located the Coordination Center, composed of a rescue control officer, air operations officer (JOC), and a tactical air controller, in the Fifth Air Force TACC. At this central location within the tactical air force, the Fifth Air Force RCC received requests for rescue action through the facilities of the tactical control system and used the same system to direct the necessary actions to effect the rescue.[345] In addition to the communications facilities of the tactical control system, the RCC employed a SAR radio net to connect the several rescue elements in Korea.

In recognition of the fact that H–5 helicopters had a radius of action of only 85 miles, Detachment 1, 3d Air Rescue Squadron, had always divided its personnel and aircraft into elements which were deployed to operating locations where they were apt to be most needed. In the autumn of 1951 these helicopter elements were variously located. One element was located at the 8055th Mobile Army Surgical Hospital, where it handled frontline medical air evacuations. Another element was situated at a point near the middle of the UNC battleline, in the vicinity of the 45th Infantry Division command post: this operating location handled pilot pickups. An element at Munsan-ni served the UNC truce negotiators but was also available for rescue when needed. Still another helicopter element was held on strip alert at Seoul Airfield (K–16), which was the main base for Detachment 1. The people and helicopters at these several elements were rotated into K–16 every 10 days for the necessary rest, inspections, maintenance, and repairs. In addition to

*See pp. 283–84.

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Detachment 1, the 3d Squadron had maintained several SA–16 amphibian aircraft at some base in Korea, and in the autumn of 1951 these planes were at Seoul (K–16). These Grumman amphibians drew only six feet of water and were well suited for sea rescues, but they had some serious operational limitations: they could not normally chance landings when waves were over five feet high, in freezing temperatures they could accumulate so much ice on open-sea landings as to be incapable of again becoming airborne, and floating ice in the water posed hazards to the hull of the aircraft, either on a landing or a takeoff.[346]

So long as the ground war waged in Korea and large numbers of air strikes attacked hostile targets along the front lines a deployment of SAR elements laterally behind the front was correct, but after July 1951 the Fifth Air Force began to send most of its strikes deep into enemy territory, first against communications targets and then against air pressure targets. The most lucrative of these communications and air pressure targets were to be found in northwestern Korea. Since its tactical aircraft were penetrating deeper into northwestern Korea, the Fifth Air Force required an augmented long-range air rescue capability. In November 1951 it accordingly laid a requirement on the 3d Squadron for three SA–16's which were to be kept in commission at Seoul (K–16) at all times: the 3d Squadron promptly required its Flights A, C, and D each to furnish one rotating SA–16. With winter coming on the SA–16's could be expected to have difficulties with water landings, and yet, in the frigid waters off northwestern Korea, a downed pilot, even when protected by an exposure suit, could not be expected long to survive. On 15 November the Fifth Air Force accordingly directed Detachment 1 to move a helicopter element from K–16 to Cho-do, at which island, within the radius of action of the H–5, it would be able to handle rescues which were too dangerous for SA–16's. Such coordinated amphibian-helicopter rescues would demand the closest cooperation of both type aircraft: effective on 17 November the 3d Rescue Squadron therefore abandoned its old arrangement whereby the SA–16 aircraft had been controlled as a separate detachment and placed these planes and crews under the control of Detachment 1.[347] At this time, however, Cho-do was not secure enough from the danger of enemy raids, and, instead of basing H–5's at that island, Detachment 1 stationed two of these planes on Paengnyong-do. Each day that weather permitted, these two helicopters moved forward to Cho-do, and there stood by for possible pilot rescues. In January 1952 two additional H–5's were stationed at Paengnyong-do.[348]

The ARS command arrangements and deployments effected by the Fifth Air Force in November and December 1951 gave that necessary degree of control which was required smoothly to coordinate SA–16 and H–5 activities. For greater effectiveness, however, the Fifth Air Force needed the larger and newer H–19 helicopters.* Two of these new aircraft were flown directly from the factory to Japan in MATS C–124 transports early in February 1953. They were assembled, test-hopped, and delivered to Korea on 28 February. During March, Detachment 1 gained four additional H–19A's, and these six new aircraft permitted the detachment to effect a new rescue plan. Several of the H–19's were equipped with floats, and Cho-do was now judged secure enough for a regular helicopter element. In March, Detachment 1 therefore stationed an H–5G and an H–19A at Cho-do, the idea being that the H–5 would make land pickups and that the H–19 would be used for water pickups. That same month, another float-equipped H–19A was added to the helicopter element at Paengnyong-do.[349] This deployment was based at least in part on an idea that the new helicopters were going to land either on ground or water to pick up downed airmen; actually, however, most H–19 pickups, whether on land or from the water, would use that aircraft's hydraulic hoist. In the latter part of 1952 an appreciation of this fact brought changes in the island rescue elements. Two H–19's were finally stationed at Cho-do, and one H–19A handled the rescue work from Paengnyong-do.

Many of the search and rescue operating procedures had been standard for some time, but during the spring and summer of 1952 the Fifth Air Force built up over northwestern Korea a comprehensive SAR system. When the fighter-bombers struck targets in northwestern Korea, an SA–16 from Seoul orbited north of Cho-do, and when a pilot ran into trouble he was expected to call out the fact and, if possible, head toward the orbit-

*In 1951 Detachment 1 had received and service-tested two YH–19 helicopters, but a lack of proper support and operational accidents had put these two aircraft out of commission.

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rescue point. If he had to parachute or crash land, the pilot's own flight gave him rescue combat air patrol (ResCAP) until such time as a regularly designated ResCAP flight of four aircraft, which orbited in the vicinity of Cho-do while fighter-bomber strikes were in progress, arrived to assume the duty. Since many water pickups and all land pickups were made by helicopters from Cho-do or Paengnyong-do, the closer a pilot got to these two points before he abandoned ship, the better were his chances of rescue. The radius of action of the H–5 was 85 nautical miles whereas that of the H–19 was 120 miles. To land and take off these aircraft required an unobstructed area 100 feet square, but, provided there were not too many obstacles to flight in the area, they could hover and drop a hoist or a rope ladder to a downed man. Both helicopters were slow of speed (about 70 knots), vulnerable to enemy ground fire, and, because of a lack of training on the part of H–19 crews and of instrumentation in the H–5's, were generally incapable of night or all-weather operations. The limitations and vulnerabilities of the rescue helicopters circumscribed the area in which inland pickups were practicable. The best area for inland rescue within enemy territory was that reach of coastal area in northwestern Korea lying westward of the active MSR's. There were less than a normal number of enemy troops in the area, and it was close to helicopters based at Cho-do. The area south and west of the Pyongyang-Sariwon-Kaesong MSR was similarly favorable either for evasion or for helicopter rescue. Because of the concentrations of enemy weapons, the H–5's and H–19's were generally forbidden to cross the main west coast supply routes.[350]

In view of the fact that the majority of Fifth Air Force targets lay in northwestern Korea, the northwestward deployment of ARS capabilities was sensible, but it nevertheless left other sections of Korea less well prepared for emergency rescue than was desirable. When Fifth Air Force planes attacked targets in east-central Korea, an SA–16 and a ResCAP flight customarily orbited over Yo-do just outside in Wonsan Harbor, and several short-range Navy helicopters were usually available to cover the area from the bombline to Wonsan. To cover the central front along the main line of resistance, the Fifth Air Force announced an ultimate intention in February 1952 to establish helicopter standby points in the U. S. IX and X Corps sectors, similar to the one which it operated near the 45th Division command post in the U. S. I Corps area. Such points, however, would never be established. South of the bombline, especially at or near its coastal airfields, the Fifth Air Force required standby emergency rescue helicopters, which would be able to save airmen who crashed or bailed out in friendly territory. Although most of these Korean bases were served by amphibian DUKW vehicles and crash boats, these surface vessels often could not get to pilots who went down in the tidal swamps and offshore mud flats. In July 1952 the Fifth Air Force was sufficiently impressed by a 3d Bombardment Wing reporting of the hazardous rescue situation at Kunsan Airfield (K–8) as to order Detachment 1 to station an H–5 there, but there were no more helicopters which could be spared for a behind-the-lines employment. Mustering a strength of only 1 SC–47, 3 SA–16's, 6 H–19's, and 11 H–5's in August 1952, Detachment 1 did not have a capability permitting it to perform all of the missions which would have been desirable.[351]

During the last year of the Korean war the Fifth Air Force achieved a small augmentation of its rescue capabilities. The problem of deficient rescue facilities within South Korea was explained to the commander of the Air Rescue Service when he visited Korea on 30 October, and this officer undertook some remedial action. At his order, the 2d Air Rescue Squadron provided two SA–16's, two H–19 helicopters, a paramedic team, and the necessary aircrews, and in December 1952, after an indoctrination stint at Ashiya, these men and equipment were organized as Detachment 2, 3d Air Rescue Group and stationed with the 1st Marine Air Wing at Pohang Airfield (K–3).[352] In December 1952 the Fifth Air Force sent forward a requirement looking toward the assignment of at least one helicopter to each of its operational air bases and expressing an immediate desire to station an H–19 and an H–5 at Kunsan (K–8) and at Kangnung (K–18), the latter airfield being situated just behind the battleline on the east coast of Korea.[353] When nothing came of this request, the Fifth Air Force in March 1953 moved one H–19 from Pohang to Kangnung, designing thereby to give additional SAR coverage to the east coast of Korea.[354] The helicopter authorization of Detachment 1 and the 2157th Air Rescue Squadron was not increased but as the H–5's were used up

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they were replaced with H–19's: in July 1953 this squadron possessed 10 H–5's and 10 H–19's and was at its authorized strength. The Fifth Air Force also got a small windfall of helicopters on detached duty from the Philippines-based 581st Air Resupply and Communications Wing. To give this newly arrived wing's crews training in combat, FEAF ordered the wing to send its flying units to Korea: under this arrangement four H–19's of the 581st Air Resupply Squadron reached Seoul (K–16) in December 1952. These aircraft and crews were supposed to fly clandestine night missions into enemy territory, but pending the development of exhaust flame arrestors they were used in frontline MAE work. In March 1953 two SA–16's from the same squadron were sent to Seoul (K–16) to fly covert missions and to support the 2157th Air Rescue Squadron.[355]

Although rescue aircraft resources continued to be spread thin, these aircraft and the men who flew them added a third year of distinguished service to their already outstanding Korean record. During the summer river floods of July 1952 the helicopters were frequently required to evacuate stranded UNC troops: in this month 710 flood victims were lifted to safety when swirling river waters cut off their positions. Enemy opposition and aircraft mechanical defects sent pilots to the Cho-do bailout zone, where air-alert SA–16's and ground-alert H–19's picked them up. Using standardized rescue procedures, Detachment 1 pilots worked fast and efficiently. In probably the fastest air-sea rescue on record, an H–19 from Cho-do hoisted a reconnaissance pilot from the water in just 15 seconds: the helicopter hovered directly over the parachuting pilot as he floated down and had a rescue line dangling within his reach with he hit the water. In September, an H–19 crew rescued both a downed airman and two men from a naval helicopter which had crashed as it attempted a rescue. In August a helicopter went inland, landed, and rescued a cool-headed Marine colonel whose F4U had been knocked down by flak. This cooperative survivor let the ResCAP and helicopter know his survival plans by means of his URC–4 radio, lighted a fire which served both to focus the attention of nearby enemy troops on a false position and to orient the rescue aircraft, and then moved on to a nearby ridge where the helicopter was able to land, make the pickup, and then take off out of range of the startled Red troops. This rescue demonstrated ingenuity, cool planning, and survivor cooperation of the highest caliber.[356]

The SA–16's commonly flew escort for the H–19's on pilot pickups, and when the range to the bailout point was too great for the helicopters the amphibians made the rescue. One of them in September 1952 made a water landing to lift Major Frederick C. Blesse, then the currently leading Korean Sabre ace, who ran out of fuel over the Yellow Sea after combat in Mig Alley.[357] On 13 January 1953 another SA–16 crew chanced rough and icy waters when a fighter pilot elected to ditch his jet in the Yellow Sea near Sok-to: the fighter pilot was evidently killed in the landing, and the SA–16 took on so much ice that it had to be abandoned, but the Fifth Air Force nevertheless praised the amphibian crew (which was rescued by a naval vessel) for its heroic efforts to save one of the fighter pilots. In the spring of 1953 other outstanding rescues continued. On 12 April, an H–19 rescued Capt. Joseph C. McConnell, Jr., who had had to parachute from his battle-damaged Sabre over the Yellow Sea; McConnell was already an ace and thanks to the helicopter rescue he would return to combat and become the leading jet ace of the Korean war.[358] As achievements in 1953, the 2157th Squadron cited five aircrew pickups and six lives saved on the three days, 16–18 May. The H–19's made all of these rescues, the first four of which lifted fighter pilots from the Yellow Sea. In the last of these episodes, on 18 May, an H–19 from K–16 penetrated far into enemy territory to save two survivors from a B–26 crew that had crashed north of Haeju.[359]

Benefiting from friendly air superiority over their operating area, USAF air rescue crews in three years of the Korean war ably accomplished their mission. The primary ARS mission was to rescue downed airmen. During the Korean air war, 1,690 USAF aircrew members went down into enemy territory, and ARS units picked up 170, or 10 percent, of these men who landed behind enemy lines. The ARS also retrieved 84 other airmen of the other UNC air services from areas held by the enemy. Counting both aircrew and nonaircrew personnel, the ARS saved a total of 996 men who, in one way or another, found themselves in enemy territory. Within friendly territory, the ARS crews rescued and evacuated

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AIR RESCUE ACHIEVEMENTS IN KOREA

June 1950—July 1953

Number of Persons Retrieved from Behind Enemy Lines

	Aircrew personnel					Non-aircrew personnel					Total
	USAF	USN	USMC	USAR	OTHER	USAF	USN	USMC	USAR	OTHER	
SA-16	66	2	4	------	9	1	5	------	2	33	122
SC-47	------	------	------	------	------	------	------	------	------	11	11
H-5	59	1	12	5	14	4	------	1	529	105	730
H-19	43	8	19	------	10	------	------	------	34	2	116
L-5	2	------	------	------	------	------	------	------	------	15	17
SB-29	Negative										------
SB-17	Negative										------
Total	170	11	35	5	33	5	5	1	565	166	996

Number of Persons Evacuated from Areas other than from Behind Enemy Lines

	Aircrew personnel					Non-aircrew personnel					Total
	USAF	USN	USMC	USAR	OTHER	USAF	USN	USMC	USAR	OTHER	
SA-16	9	------	------	------	2	48	8	4	74	55	200
SC-47	------	------	------	------	------	4	1	------	34	------	39
H-5	42	------	5	5	9	33	14	150	4,364	1,853	6,475
H-19	5	------	1	------	5	25	17	37	1,258	550	1,898
L-5	1	------	------	------	1	------	------	------	52	6	60
SB-29	Negative										------
SB-17	1	------	------	------	------	------	------	------	------	11	12
Total	58	------	6	5	17	110	40	191	5,782	2,475	8,684

SOURCE: DCS/Comptroller, Air Rescue Service, Air Rescue Service Combat Operations Summary Report, 25 Jun 50–27 Jul 53 (RCS: ARS-VI).

Figure 22.

a total of 86 aircrewmen. As a secondary mission, the ARS organizations in Korea performed frontline medical air evacuation and other similar emergency evacuation tasks. In fulfillment of this secondary mission ARS crews evacuated a total of 8,598 men, most of them being frontline Army casualties. A statistical capitulation of the ARS combat record in Korea is shown in figure 22.[360]

In the Korean war, Air Rescue met and overcame many problems and demonstrated for the first time that aircrews could be rescued from behind enemy lines as a normal operation. Contributing to the successful accomplishment of air rescue functions was friendly air superiority, which allowed vulnerable rescue aircraft to operate without hindrance of enemy air attack; a centralized control and coordination of rescue capabilities within the JOC/TACC; the employment of such new type aircraft as the SA-16 amphibian and the H-19 helicopter; and the use of new-type emergency survival equipment, including the URC-4 emergency radio, which was ultimately carried by all aircrews.[361] Without in any way reducing the luster of the ARS accomplishments in Korea, it is appropriate to note that rescue aircraft were required to perform many missions which were not necessarily in context with the primary ARS mission. Foremost of these diversionary tasks was that of frontline medical air evacuation: FEAF on numerous occasions called attention to the fact that the MAE function should be separate and distinct from the work of the 3d Air Rescue Squadron, which should have been solely concerned with search and rescue tasks.[362]

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From time to time, Detachment 1 helicopters were also required to land covert intelligence agents on the mud flats along the coasts of northwestern Korea, a hazardous undertaking which did not contribute to the SAR mission. Although the air rescue organizations used their equipment to develop previously unexpected capabilities, the test of combat also exposed existing limitations. One of the chief detriments to the ARS in Korea was its inability to continue operations after nightfall. The H–5 helicopters were not instrumented for night flying, and when the fully instrumented H–19's arrived the helicopter crews lacked night training and remained unable to effect rescues after dark.[363] Air rescue units engaged in the Korean war, moreover, worked under unique conditions which lent them special advantages and circumscribed their accumulation of experience. The units had little opportunity to encounter problems relating to long-range, inland rescue tasks. The Korean experience nevertheless indicated that as new SAR equipment was produced and rescue units gained the capability to penetrate deeper into enemy territory, a larger search and rescue force would be required to support a tactical air force in combat.[364]

AIR WEATHER SERVICES

As was the case with air rescue, weather services in the Far East were provided by the worldwide Air Weather Services (AWS) of the MATS. Topmost echelon of the Far East weather service was the 2143d Air Weather Wing, which maintained its headquarters in Tokyo and there operated the Tokyo Weather Central. Providing staff weather services to the JADF and to the 315th Air Division and giving local observation and forecasting services at Japanese air bases was the 20th Weather Squadron, which had its headquarters at Nagoya and manned weather detachments at each principal defense and combat cargo airfield. The 15th Weather Squadron provided similar meteorological services in the area of the Ryukyus, Philippines, Marianas, and Marshalls, while the 30th Weather Squadron maintained its headquarters at Seoul and provided weather services to the Fifth Air Force and Eighth Army. Assigned to the 2143d Air Weather Wing for the performance of synoptic-weather and typhoon-tracking observations were the Guam-based 54th and the Yokota-based 56th Strategic Reconnaissance Squadrons, Medium, Weather. Tactical weather reconnaissance over enemy-held Korea was performed by the 6166th Tactical Reconnaissance Flight, Weather, which was a part of the Fifth Air Force's 67th Tactical Reconnaissance Wing. A part of this theater-wide weather organization had existed at the beginning of the Korean war: how it had developed and how it operated has been described in earlier historical monographs.* In the last year of the Korean hostilities, the only striking developments in the Far East weather establishment occurred in Korea, where the 30th Weather Squadron sought to provide the weather services required by the Fifth Air Force and Eighth Army.

For the daily planning and execution of its air-pressure operations in Korea, the Fifth Air Force needed to know what the weather was going to be at least 24 hours in advance. Early in the morning of an operational day, it needed to know what the weather was over a wide number of specific pinpoint targets. For the safety of its force, it needed to keep currently conversant with what the weather was and what it was going to be at each of its operational air bases. Forecasting weather under any circumstances is not an easy task, and it was doubly difficult in Korea. While weather phenomena in Korea was generally characterized by cold and dry winter months (November through March), wet and hot summer months (June through August), and transitional months in the spring and autumn, the accurate prediction of weather in any season was complicated by the fact that Korea was a mountainous peninsula surrounded by several thousand square miles of warm ocean currents. The flow of weather into Korea and Japan, moreover, was predominantly from enemy held areas from which sparse reports of meteorological readings were obtainable: the USSR continued to broadcast weather during the Korea hostilities but the Red regime in China had ceased to share weather information with the rest of the world even prior to the war in Korea.[365] Largely on the basis of synoptic weather data, the 30th Weather Squadron in the first two years of

*See AHS–71, pp. 112–13 and AHS–72, pp. 250–56.

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the Korean war had been able to provide the Fifth Air Force with satisfactory general area forecasts which were sufficient for its needs at a time that its targets were chiefly those of opportunity, but beginning in July 1952 the air-pressure strategy brought demands for "pinpoint forecasts," which were not easily or completely met even though the 30th Squadron exerted its best efforts in an attempt to accomplish the requirement.[366]

The organization of the 30th Weather Squadron in June 1953 generally paralleled that of the Fifth Air Force. The commander of the 30th Squadron served as staff weather officer to the commander of the Fifth Air Force, and from his headquarters in Seoul the 30th Squadron commander controlled all-weather detachments in Korea. One of these detachments was located at each airfield in Korea. At Seoul, the Fifth Air Force Weather Station supported the Fifth Air Force and the Joint Operations Center, and in the latter activity staff weather officers briefed the planning conference and rendered the spot reports required by air and ground operations officers. In the same manner in which the Fifth Air Force Weather Station served the JOC with forecasts and briefs, a staff weather officer at each combat wing base made local forecasts and briefed the wing commander and his combat crews. Although the work of these tactical staff weather officers differed somewhat from that of the station weather detachments, these officers were assigned to and controlled by weather detachment commanders. Each echelon in the weather service prepared its own weather forecasts: the Tokyo Weather Central prepared a 24- to 36-hour weather forecast which was presented to the FEAF commander and his staff each morning; the Fifth Air Force Weather Station prepared several weather briefing forecasts daily, the most comprehensive of which was the planning forecast, issued at 1300 hours each day covering the weather expected that night and all the next day; the tactical staff weather officers began to prepare their forecasts anytime between 0230 and 0700 hours and usually gave comprehensive briefings early in the morning and thereafter during the day as necessary. As was entirely natural, the forecasters at the different echelons made differing interpretations of the same weather data and not infrequently arrived at different opinions as to what weather was to be expected. Recognizing that such displays of uncertainty were hardly likely to maintain the confidence of using agencies, the Tokyo and Seoul weather forecasters held periodic telephone conferences several times each day in which they attempted to resolve such differences as they might have in their forecasts. The 30th Weather Squadron instituted similar internal procedures: each tactical staff weather officer was under direction to discuss his proposed forecasts by telephone with the Fifth Air Force Weather Station prior to briefing at the tactical airfield.[367]

The meteorological observations from which analyses were made flowed into the Tokyo Weather Central and Fifth Air Force Weather Station from a variety of sources. Normally good Russian intercept data coverage was available east of 90 degrees east longitude.[368] Naval ships in Korean waters furnished other data, and each day the "Buzzard King" flight of the 56th Strategic Reconnaissance Squadron left Yokota at about 0600 hours, dropped southward down through the East China Sea, then turned northward up through the Yellow Sea, and finally headed home across Korea. "Buzzard King" or "Buzzard Kilo," as it was called after July 1952, was flown in a WB–29, and the flight observed the weather as it made up along the China Coast and in the Yellow Sea, weather which, a day or two later, could be expected to cross over Korea.[369] The 54th Strategic Reconnaissance Squadron, assisted as necessary by special 56th Squadron flights, provided typhoon observation and tracking services. The WB–26's of the 6166th Tactical Reconnaissance Flight, Weather, also flew prebriefed routes over the Yellow Sea. Each weather detachment in the 2143d Wing forwarded hourly weather observations, and, in addition to its station detachments, the 30th Weather Squadron maintained weather observer teams on Cheju-do and Paengnyong-do as well as with the three U. S. Army corps in Korea. In-flight reports from Mosquito planes and tactical aircraft comprised another source of meteorological observations, which were to become increasingly important before the end of the fighting in Korea.[370]

The air-weather establishment and procedures existing in Korea in June 1952 had been developed to support typical tactical operations of the Fifth Air Force, and with the beginning of the air-pressure campaign the 30th Squadron modified its organization and developed new procedures and

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techniques in order to keep pace with the new air strategy. In context with a growing centralization of forecasting responsibilities and increased weather support for the Eighth Army,* the Fifth Air Force Weather Station was renamed the JOC Weather Forecast Station in the later half of 1952, and in April 1953 it was again redesignated as the JOC Weather Forecast Center. The change in operational policy which was subtly represented in these changes in designations was more positively indicated in forecasting procedures. Under the system whereby independent weather forecasts were prepared both in Seoul and at the tactical airfields, supposedly with coordination to resolve any differences, tactical wing commanders were not infrequently presented with two and sometimes three different forecasts for the same time and area. Under such circumstances a tactical commander not only lost confidence in weather predictions, but if he wished he could "shop around" until he found a weather forecast which suited him.[371] In recognition both of the importance of the task and of the fact that tactical staff weather forecasters were prone to be unconsciously influenced by tactical wing commanders, the 30th Weather Squadron sought always to designate forecasters with the rank of major as tactical staff weather officers. In the latter half of 1952, however, the experience level of replacement forecasters sharply declined, with the result that, of 10 tactical staff weather officers assigned in December 1953, three were majors, four were captains, and three were lieutenants. Recognizing that these lesser experienced men required more supervision, the commander of the 30th Squadron in November relieved all tactical staff weather officers from the control of weather station detachments and placed them under his direct command.[372] In the spring of 1953 the experience and rank of forecaster personnel continued to decline, and, since there was nothing else which could be done, the 30th Squadron accorded the JOC Weather Forecast Center a first priority on rank and experience, with the result that the tactical staff weather officers became more and more dependent upon the Weather Forecast Center for advice.[373]

The demands of Fifth Air Force combat wings for current target- and terminal-weather reports compelled the 30th Squadron to stress every intrinsic capability to observe weather which was available or obtainable. As much as was possible the 30th Squadron pushed its weather observer net northward. In the latter part of 1952 two new island weather observer teams were put in operation, one on Cho-do, the other on Yo-do near Wonsan. These small observer teams took hourly surface readings and two to four upper wind observations each day.[374] Looking toward a more comprehensive collection of weather data over enemy territory, a joint 30th Squadron-Fifth Air Force effort studied and revised the operational procedures governing the 6166th Tactical Weather Reconnaissance Flight. This table of distribution flight was attached to the 67th Tactical Reconnaissance Wing, and the technical control of it was exercised by the Fifth Air Force. The 30th Squadron's responsibilities for the flight required it to assign a rated weather officer flight commander and nine aerial weather observers to the flight crews. The 30th Squadron also recommended the tracks and schedules which the flight was supposed to fly, but the 30th Squadron noted that the flight's weather missions usually secured inadequate coverage on assigned tracks. In early September, following a series of conferences, the Fifth Air Force accepted and published a new tactical weather reconnaissance operating procedure which had been drafted in the 30th Squadron. Thereafter, the 30th Squadron exercised technical control over the 6166th Flight through the JOC Weather Forecast Station. The 67th Wing remained responsible for supporting the flight and for its operational control in such matters as flight security, stand-downs, and diversions necessitated by the enemy situation. While much improved by the changes in control, the organization and operations of the tactical weather reconnaissance flight were still inadequate for maximum effectiveness. The table of distribution flight possessed six WB-26's, not a suitable aircraft for the mission, and only three of the planes were properly equipped with synoptic weather instruments.[375] Because of the performance capabilities of the WB-26's—insufficient speed and inability to protect themselves—the usefulness of the 6166th Flight declined as the Korean war continued, and by the spring of 1953 the synoptic mission of the flight had become secondary to "Snowflake" patrols along the bombline, patrols which provided

*See pp. 308–10.

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weather reports of interest in launching close support missions.[376]

Lacking intrinsic weather reconnaissance capabilities within the tactical weather establishment for securing the target weather observations needed by the Fifth Air Force, the 30th Weather Squadron was compelled to seek assistance from the combat air wings. Although it recognized that the employment of tactical aircraft for weather reconnaissance was wasteful of combat effort, the 30th Squadron saw no better solution for the problem. The utilization of pilot reports (PiReps) as sources of weather data was not new and in the earliest days of the war weather observers had been placed aboard bombers and reconnaissance aircraft that operated over enemy territory, but in the last year in Korea tactical aircraft—chiefly RF-80's, F-86's, and F-94's—were more extensively used to reconnoiter targets and determine weather than ever before. In the period, 1 April through 30 June 1953, out of 943 weather reconnaissance sorties flown, 421 were flown by jet fighter-type aircraft, 426 by WB-26 aircraft, and 96 by other tactical-type planes. And, in the final month of the war, the 30th Squadron commander estimated that 90 percent of all weather reconnaissance north of the bombline was performed by jet aircraft.[377] The lack of weather instrumentation in combat-type aircraft limited the amount of detail which its pilot could report, but whether in an in-flight report while on a combat mission or on a special weather reconnaissance sortie the combat pilots were expected to provide information as to the extent of cloud cover, the heights of the bases and tops of clouds, visibility, and other weather phenomena hazarding flight such as icing, turbulence, rain, or freezing rain.[378] On the basis of this experience, the 30th Weather Squadron stated the rule that tactical weather reconnaissance squadrons ought to be assigned "first line, production-type jet fighter aircraft, including all-weather types, stripped to increase speed and range," as augmentations to the basic synoptic-type aircraft. These augmentation aircraft would be employed for scanning and target weather reconnaissance and for deep penetrations into enemy territory. Their pilots would have additional weather training over and above that received by the average fighter pilot. Although the 30th Squadron recommended that eight fighter-type aircraft be assigned to the 6166th Flight, nothing came of the recommendation.[379] On 18 September 1953, moreover, when the 11th Tactical Reconnaissance Squadron was activated to perform an electronics and weather reconnaissance mission, the new squadron was authorized 9 RB-26's and 9 WB-26's but no jet fighter types.*

By March 1953 the interplay of several factors brought about an increased centralization of weather responsibilities in Seoul. The experience level of both forecasting and observing personnel had fallen to a new low, the spring weather was increasingly poor and varied greatly within the hour, and the Fifth Air Force's tactical responsibilities required it to get off as many missions as terminal and target weather permitted. The JOC needed up-to-the-minute weather information, and it could not afford to depend upon periodic weather reports which were usually more than a half hour old by the time that they reached Seoul. To meet the situation, the 30th Weather Squadron increased the weather section in the JOC from two to nine people, and used this personnel to man a station in the JOC and another in the TACC. This JOC-TACC Weather Section was charged to accumulate, from every means available, the "present" weather existing throughout Korea. From the air bases in South Korea tactical staff weather officers were authorized to telephone special weather observations and PiReps directly to the junior weather duty officer in the TACC. As necessary, the TACC duty officer also requested weather PiReps from strike crews in flight, and when they were required the senior weather duty officer in the JOC requested the combat wings to fly special weather reconnaissance flights. A third functionary, the duty weather observer, maintained a current weather status board in the TACC. This JOC-TACC Weather Station kept the JOC conversant with terminal and target weather, furnished information to those officers who made longer range forecasts, and briefed tactical staff weather officers on the latest weather reports.[380] Shortly after its creation, the new function was renamed the JOC Present Weather Section, under which name the section provided invaluable weather services to the JOC, especially in June and July 1953 when the Communists timed ground attacks to coincide with bad flying

*See p. 251.

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weather. When hostile targets presented themselves during these offensives the JOC had immediate information as to which friendly airfields were open, on the target weather up forward, and as to what alternate airfields were available for recovering jet aircraft when their base weather deteriorated.[381]

At the same time that the 30th Weather Squadron was developing the organization and procedures which enabled it to support the tactical air operations of the Fifth Air Force it also built a new program designed to make weather services available to the units of the Eighth Army. Recognizing that the Air Weather Service mission required it to support both Army and Air Force, air weathermen in Korea as early as July 1950 sought to discover what kind of meteorological service the Eighth Army required. Army officials, however, were vague about their requirements, and the Eighth Army indicated that almost any type of weather forecast would be adequate. At top-level the Eighth Army continued to display little apparent regard for weather, but its subordinate organizations were greatly troubled by the frigid weather of the winter of 1950–1951 and evinced strong interest in knowing what services the 30th Weather Squadron could give them. Principally to extend its weather observer net, the weather squadron, beginning in August and October 1950, had sent several two-man observing detachments to the front lines. These located themselves at the corps headquarters, where, in addition to reporting weather observations, they disseminated some 12 specialized daily forecasts which the 30th Squadron prepared for the Army. In 1951 the 30th Squadron was well aware that the Eighth Army was not getting weather services comparable to those received by the Fifth Air Force, but the Eighth Army had no complaints. Subordinate units of the Eighth Army, however, remembered that in the winter retreats of 1950–1951 their men had suffered for want of proper clothing and cold-weather supplies. Resolved not to let its combat soldiers get caught short again, the Department of Army in October 1951 organized and sent to Korea a "Winter Environment Team," headed by Dr. Paul A. Siple, a cold-weather expert. This Siple team stayed in Korea from December 1951 through February 1952, and in May 1952 it issued a report of its findings. The report noted widespread disagreement among the echelons of the Eighth Army as to the need for weather forecasts: in general each higher headquarters believed that it needed forecasts but that its subordinate units, which were expected to execute orders as received no matter what the weather was, did not need forecasts. The Siple report, however, established the fact that the need for weather services went down to the lowest echelon commanders, to whom such factors as when valley fogs would lift, what the local snowfall would be, or how much cloud cover could be expected were matters of consequence in planning their execution of orders. The 30th Weather Squadron drew commendation for its efforts to give the Eighth Army better services than those which satisfied the latter command, but the Siple report nevertheless noted that the general area forecasts which the 30th Squadron had been providing to the Army lacked the detail which would have made them particularly useful to tactical ground commanders below the corps level. If AWS forecasts were to be of maximum value to lower-echelon ground commanders, more weather data would have to be gathered by Army observer teams in the frontline area.[382]

The 30th Weather Squadron welcomed the Siple investigation as the first real evidence of the Army's interest in establishing comprehensive requirements for weather services. Even before the Siple team filed its final report, the 30th Squadron had, on 8 April 1952, recommended that it be assigned the forecaster personnel needed to provide more extensive services to the Eighth Army. It recommended that three AWS forecasters should be assigned to the JOC Weather Forecast Station with the mission of forecasting exclusively for the Eighth Army. It suggested that AWS should organize a forecasting station at each corps headquarters, which station would keep the corps commanders constantly informed of the particular weather likely in their individual sectors. Because of a shortage of AWS forecaster personnel such a program as this could not be immediately implemented, but in April 1952 the 30th Squadron assigned one forecaster to duty as Eighth Army Liaison Officer. Negotiations between this liaison officer and the Eighth Army staff meteorologist worked out the details of an expanded frontline observer network. Since the Eighth Army believed it inadvisable to locate AWS personnel forward of corps headquarters, the recommendation was that Signal Corps personnel should be trained

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and sent to Korea to serve as weather observers in forward areas. Concerning communications, it was recommended that the Signal Corps would install facsimile circuits between the JOC Weather Forecast Station and each corps headquarters forecasting station. Between the staff weather officers at corps and the forward weather observers, organic Army communications would be utilized for passing information. These arrangements were acceptable to both USAF and the Army as the basis for a 90-day test. At Fort Monmouth, New Jersey, the Signal Corps personnel needed as forward weather observers were placed in a special six-week weather observer training course.[383]

Although planning continued, the new system awaited the arrival in the theater of the AWS forecasters and the Signal Corps observers who would man it. On 5 October 1952 the Eighth Army, for the first time, presented a formal statement of its meteorological requirements. Late in November 1952, six Signal Corps lieutenants and 44 enlisted men who had progressed out of basic training into the accelerated weather observer course at Fort Monmouth arrived in Korea, and, after a short period of orientation most of these men were divided into two-man teams and sent to predetermined forward-area sites to start the surface observation net. Five-man teams, each comprising an officer and four enlisted men, were established at each corps headquarters and at the JOC Weather Forecast Station to take observations, to collect and disseminate observations, and to supervise the operations at the observer teams under their jurisdiction. In early December 1952, the 30th Weather Squadron dispatched Corps Forecast Teams, each consisting of one weather officer forecaster, one airman weather technician, and two senior observers, to the U. S. I, IX, X, and ROK I Corps headquarters, where they became operational on 14 December. By the end of January 1953 another forecast team was installed at the headquarters of the ROK II Corps. In the JOC Weather Forecast Station two additional forecasters were assigned to meet added requirements placed on the station by the augmented Army weather program.[384]

From the start of their operations, the corps forecast teams were well received and rendered a type of service individually tailored to ground operations in the sector where they were stationed. Personal contact between forecasters and using agents permitted the preparation and dissemination of such weather data as was specifically required. Communications problems nevertheless hindered the operations of the corps forecast teams. Facsimile equipment connecting each corps team with the JOC Weather Forecast Station was initially unavailable, and the Seoul station had to send out coded map analyses to the corps teams over Eighth Army command and administrative teletype circuits. These circuits served other traffic, and the corps forecast teams not infrequently met delays of two to four hours in getting receipt of this vital weather data from Seoul. As a consequence of these delays, the corps staff weather officers frequently relied on such weather briefiings as they could get by telephone from the JOC Weather Forecast Station. Eventually, the Signal Corps installed the promised facsimile machines, but in June 1953 it was reported that "reception on these machines has, so far, been erratic and unsatisfactory." The corps teams thus continued to depend upon the administrative teletype channel and the telephone, neither of which permitted dissemination of anything more than the barest minimum of weather information.[385]

Second only to communications as a major problem of the Army weather service was the question as to whether the experimental system setup in November and December 1952 would be permanently continued. The Signal Corps weather observers had arrived in Korea on 90-day temporary duty orders, and, to the surprise of the 30th Squadron, a new Eighth Army signal officer in January 1953 voiced the opinion that this Army personnel was provided as a "supplementary service" to the AWS. The Signal Corps observers proved highly cooperative and wanted to learn but their course of instruction at Fort Monmouth had not fully prepared them for duty as weather observers, and, even before they could be properly broken in for observing, they were slated to depart from the theater.[386] Earlier, the Eighth Army had posed certain objections to the presence of USAF weathermen forward of a corps headquarters on the grounds that men who lacked combat training might encounter trouble, but somewhere along the line this objection was forgotten. On 23 March 1953, when the 30th Squadron inquired as to whether it should be prepared to man the front-line observer posts when the Army TDY person-

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nel departed, the Eighth Army replied that such, indeed, was its wish. The Eighth Army wanted the meteorological support continued by the AWS, and it requested that as soon as possible after 30 April 1953 the Signal Corps observer teams should be relieved by equivalent AWS teams.[387] Between 28 and 30 April, 30th Squadron personnel moved into the frontline observer sites, and the changeover from Signal Corps to AWS personnel went very smoothly and with no break in observations. After 1 May 1953 the Eighth Army weather program became exclusively a 30th Weather Squadron project, and, except for continued communicating problems, the program gave increasingly better weather support to Eighth Army units during the remaining three months of the Korean hostilities.[388] Back in the United States, some Signal Corps officers continued to agitate a proposition that the Army ought to develop its own organic weather services, but the manner in which the 30th Weather Squadron had supported the Eighth Army in Korea was counted to have been so satisfactory that in January 1954 the Department of Army elected not to develop its own competing weather services but instead to depend upon USAF Air Weather Service support.[389]

As was equally true anywhere in the world, the efficiency of the Air Weather Service depended to a great degree upon the effectiveness of its system of communications. Properly to support the weather mission, such a communications system has to convey accurate data rapidly from each observer station into a collection center, and then distribute these collections to the forecasting stations, which are the ultimate users of meteorological observations. In Korea, as was the case elsewhere, the AWS depended for its communications upon the Airways and Air Communications Service (AACS). The communications used by weather in the Far East were, in broad outline, as follows: in Korea there were three continuous wave (CW) weather collection nets, each with about five reporting stations, which channeled into a weather communications center at Taegu. These collection nets were "reasonably efficient" but the speed of CW transmissions was insufficient to allow these nets to handle both periodic reporting and special weather observations, and the latter were accordingly not passed on this net. At the Taegu communications center the Korean station weather reports were edited and retransmitted to all users by the Taegu blind weather broadcast. Other synoptic and raw weather data was received from a Tokyo radio-teletype blind broadcast which, for Korean users, was intercepted at Taegu, was automatically converted into teletype impulses, and was fed into landline and/or frequency modulated (FM) circuits to all weather forecast stations. The communications facilities handling the Taegu and Tokyo broadcasts of synoptic and raw weather data were woefully inadequate: frequent circuit outages and more frequent transmission garbles deprived the weather stations of accurate and comprehensive data. The 30th Weather Squadron frequently protested this situation but few positive results followed the protests since AACS organizations, technicians, and operators were not subject to AWS control. No AACS communications support was available to the forecasting and observing teams with the Eighth Army: communications for the Army weather program were supplied by the Army, and, like those furnished by the AACS, were subject to no degree of AWS control. Since the AACS communications available to the 30th Weather Squadron were not fast enough to handle special weather observations, the Fifth Air Force permitted weathermen to use its operational telephone "hotline" circuits between the JOC and station weather detachments. Special weather reports, pilot reports, and short synoptic and forecast discussions were exchanged by this facility.[390]

During the spring of 1953 an always serious weather communications problem became acute. The existing system, which had always been too slow, became increasingly unreliable and was unable to provide the weather data required by the JOC. Use of the Fifth Air Force "hotline" telephone circuits allowed the weather service to get through the crisis but represented no permanent solution to a long-enduring problem. Seeking a more permanent solution to weather communications difficulties, the 30th Squadron communications officer stated that: "Existing AACS–Weather relationship is definitely not satisfactory and has never been satisfactory. . . . There are many facets to the problem but, to put it simply, weather commanders cannot exercise authority over personnel providing weather communications." This officer proposed that in future operations, the tactical air force and not AACS should be charged with providing communications for its

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supporting weather organization. As a bare minimum, weather communications would include: (1) A high-speed blind weather broadcast of basic weather data emanating from the weather forecast center serving the JOC. This communications center would be near the forecast center: physical separation of the two functions, as was the case in Korea, was undesirable. This blind weather broadcast would be received at all forecast stations, both Air Force and Army. (2) Operational voice circuits interconnecting all tactical and army staff weather officers, base forecasting stations, the JOC–TACC weather section, and the Weather Forecast Center. (3) An exclusive air-ground channel available to the TACC weather duty officer which would permit him to request and receive weather reports from reconnaissance and combat aircraft and to transmit up-to-the-minute reports and forecasts to any tactical aircraft. The types of circuits and communications equipment to be employed in these three weather nets would depend upon the discretion and capabilities of the tactical air force which provided them, but radio-teletype and FM/telephone normally recommended themselves to weather communications.[391] A few of the features of this desirable weather communications system were improvised in Korea, but for the most part weather communications remained obsolete. The use of radio-teletype communications for weather collection and dissemination in Korea was recommended and approved as early as November 1950, but it was not until late in July 1953 that the 30th Weather Squadron finally located in Japan a sufficient quantity of AN/GRC–26 sets to meet its needs. At the request of the Fifth Air Force this equipment was committed to the 30th Weather Squadron, which planned to use it to replace CW radio and landline teletype nets, but the fighting ended in Korea before this equipment could be shipped to the 30th Squadron.[392]

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FOOTNOTES

Chapter I

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7. Msg. FEAF AX–1705–D/O, 29 June 1950.
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22. 82d Cong. 1st Sess., Military Situation in the Far East, pp. 1378–79.
23. *Ibid.*, p. 360.
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30. Msg. C–61367, CINCFE to JCS, 30 Apr. 1951 quoting "text of instructions issued this date to CG FEAF."
31. Ltr., Brig. Gen. Jacob E. Smart, Depy. for Opns. FEAF to Brig. Gen. Gilman C. Mudgett, AC/S G–3 FEC, 25 July 1952.
32. Ltr., Maj. Gen. O. P. Weyland, CG FEAF to C/S USAF, sub: Requirements for Increased Combat Effectiveness, 10 June 1951.
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43. Msg. JCS–98713 to CINCFE, 11 Aug. 1951.
44. Msg. C–68437, CINCFE to JCS, 6 Aug. 1951.
45. Msg. C–68428, CINCFE to JCS, 6 Aug. 1951.
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This Page Declassified IAW EO12958

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GLOSSARY OF TERMS

AAA	Antiaircraft artillery
AACS	Airways and Air Communications Service
AC&W	Aircraft control and warning
ADC	Air Defense Command
AF	Air Force
AFB	Air Force base
AFF	Army Field Forces
AFFE	Army Forces Far East
AFR	Air Force regulation
AG	Adjutant General
AGF	Army Ground Forces
AI	Airborne intercept
ALO	Air liaison officer
AMC	Air Materiel Command
ANFE	Aircraft not fully equipped
AOCP	Aircraft out of commission parts
APGC	Air Proving Ground Command
APR	Aerial Photo Reproduction
ARDC	Air Research and Development Command
ARS	Air Rescue Service
ATRC	Air Training Command
AW	Automatic weapons
AWS	Air Weather Service
BC	Bomber Command
BDA	Bomb damage assessment
Bde	Brigade
C/	Chief
CAS	Close air support
CAP	Combat air patrol
CAT	Civil Air Transport
CCAF	Chinese Communist Air Force
CCF	Chinese Communist Forces
CCRAK	Covert, Clandestine and Related Activities in Korea
CCTS	Combat crew training school
CEP	Circular probable error
CG	Commanding general
CIA	Central Intelligence Agency
CINCFE	Commander-in-Chief Far East
CINCUNC	Commander-in-Chief United Nations Command
ComNavFE	Commander Naval Forces Far East
CONAC	Continental Air Command
C/S	Chief of Staff
CW	Continuous wave
D/	Director
DAF	Department of Air Force
DEPTAR	Department of Army
DC/S	Deputy chief of staff
D/F	Direction finder
DIR	Depot inspection and repair
DZ	Drop zone
EA	Engineer aviation
ECM	Electronics countermeasures
ETA	Estimated time of arrival
EUSAK	Eighth U. S. Army in Korea
EW	Early warning
EWP	Emergency war plan
FAC	Forward air controller
FAF	Fifth Air Force
FAFIK	Fifth Air Force in Korea
FEAF	Far East Air Forces
FEAGOS	Far East Air-Ground Operations School
FEALogFor	Far East Air Logistics Force
FEAMCom	Far East Air Materiel Command
FEC	Far East Command
FM	Frequency modulation
FSCC	Fire support coordination center
GBR	Gun, bomb, and rocket
GCA	Ground-controlled approach
GCI	Ground-controlled interception
GHQ	General Headquarters
GLO	Ground liaison officer
GO	General order
GP	General purpose
HVAR	High velocity aircraft rocket
IFF	Identification, friend or foe
IFR	Instrument flight rules
IMC	Image motion compensation
INTSUM	Intelligence summary
IP	Initial point
JAAF	Joint action Armed Forces
JADF	Japan Air Defense Force
JALCO	Joint airlift liaison control
JATO	Jet-assisted takeoff
JCS	Joint Chiefs of Staff
JOC	Joint Operations Center
JSPOG	Joint Strategic Plans and Operations Group
KComZ	Korean Communications Zone
KVA	Kilovolt-ampere
KW	Kilowatt
LOI	Letter of instructions
LW	Lightweight
MAE	Medical air evacuation
MATCon	Military air traffic control
MATS	Military Air Transport Service
MAW	Marine air wing
MLR	Main line of resistance
MPC	Manual pip control

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M & S	Maintenance and supply
MSR	Main supply route
MTI	Moving target indicator
NAVFE	Naval Forces Far East
NKAF	North Korean Air Force
NKPA	North Korean People's Army
NMJ	Naval Member, Joint Operations Center
NNRC	Neutral Nations Repatriation Commission
ORO	Operations Research Office
OSG	Office of Surgeon General
OSRD	Office of Scientific Research and Development
PI	Photo interpreter
PIREPS	Pilot reports
POL	Petroleum, oil, and lubricants
POW	Prisoner of war
PSP	Pierced steel plank
RAAF	Royal Australian Air Force
REMCO	Rear echelon maintenance combined operation
ResCap	Rescue combat air patrol
RCC	Rescue Control Center
RCT	Regimental combat team
RHAF	Royal Hellenic Air Force
RIO	Reporting-in-and-out
ROK	Republic of Korea
R & R	Rest and recreation
SAAF	South African Air Force
SAC	Strategic Air Command
SAR	Search and rescue
SCAP	Supreme Commander Allied Powers
SCARWAF	Special category Army personnel with Air Force
SOP	Standing operating procedure
TAC	Tactical Air Command
TACC	Tactical Air Control Center
TACP	Tactical Air Control Party
TAD	Tactical air direction
TADC	Tactical Air Direction Center
TADP	Tactical Air Direction Post
TAR	Tactical air request
TC	Troop carrier
TG	Task group
TMC	Transport Movement Control
UHF	Ultra high frequency
UN	United Nations
UNC	United Nations Command
USAF	United States Air Force
UTM	Universal transverse Mercator
V/	Vice
VHF	Very high frequency
VT	Proximity fuse
WADC	Wright Air Development Center
ZI	Zone of Interior

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

SECRET

INDEX

A

Able" project, *243–44*
ces, jet, *60–62*
cheson, Dean, *1, 3*
iams, Maj. Donald E., *61*
eromedical evacuation, *262*
gan, Col. Arthur C., Jr., *172*
rborne assault operations, *105, 262–63, 292*
r Cargo Resupply Squadron (Provisional), *280*
rcrews: Communist, *45–47;* superiority of Sabre pilots, *59–62;* night intruder, *111;* medium bomber, *148–51;* tactical aircrews possessed, *160;* Fifth Air Force problems, *160–66*
Airdale," *298–99*
r Defense Command, *52*
r Divisions (numbered):
  21st, *149*
  314th, *18*
  315th, *169, 175, 304:* mission and organization, *18;* Koje amphibious demonstration, *105, 292;* provides additional flare aircraft, *228;* commanders, *260;* concept of operations, *260–63, 293–97;* deployment of units, *263–67;* problems of aircraft utilization, *267–77;* air terminal operations, *277–81;* aeromedical evacuation, *281–89;* operations, *289–93*
ir Facilities, construction and maintenance in Korea, *172–83*
ir Force Council, *280*
ir Force Photo Lab (numbered):
  No. 1, *252*
  No. 2, *252*
ir-Ground Operations Course, Fifth Air Force, *200–01*
ir Liaison Officer, *208*
ir Materiel Command, *64–66, 159, 169, 235–36, 268, 270, 273–74, 276*
ir pressure campaign: effect of FEAF's limited air striking power, *23;* planning the air strategy, *24–27;* operational policy directive, *34–35;* further refinement of air strategy, *35–37;* development of air targets, *95–96;* coordination of FEAF effort, *96–97;* operations, *97–140*
ir Proving Ground Command, *64, 66, 79, 294*
ir Rescue Service, *297–304*
ir Research and Development Command, *67, 148, 235–36, 238n, 245–46*
ir Route Traffic Control Center, 92
ir superiority: *27, 35, 38–92;* records of Red aircraft destroyed, *58*
ir Targets Division, Fifth Air Force, *95*
ir Training Command, *65–66, 162, 182*
irways and Air Communications Service, *310–11*
ir Weather Services, *304–11*
leutians, *1*
lexander, Lord Harold of Tunis, *33–34*
nak airfield, *136*
Anderson, Lt. Gen. Samuel E., *17:* on air superiority, *58, 69;* waives minimum attack altitudes, *152, 190;* evaluates F-86 fighter-bomber, *158;* calls for all-out close support, *190*
Anju, *71, 115*
Anshan, *33*
Antiaircraft artillery: Communist, *41–43;* United Nations, *84–88;* suppression of Communist frontline, *219–22*
Antung, *32, 41, 43, 45, 49, 69–70, 132, 230*
Aoji, *101*
Armistice negotiations: begin at Kaesong, *5;* adoption of agenda, *6;* debates, *7–8;* U. S. recesses, *9;* deadlock over POW repatriation, *93–94;* debates in United Nations, *104–05;* restriction of Communist convoys, *114;* resumption and conclusion, *122–26*
Army Field Forces, *8, 280*
Army Forces Far East, *9, 11, 62, 87, 225, 286*
Army Ground Forces, *84–85*
Ashiya Air Base, *18–19, 262, 265–67, 272–77, 279, 291, 298*
"Ashtray" project, *235–38*
Atlee, Clement R., *3, 33*

B

B-26: FEAF allocation and utilization, *21–22; 154–55;* attack attitudes, *70;* air defense usage, *90;* night intruders, *110–12;* USAF designates replacement for, *154;* MPQ-bombing techniques, *222–23*
B-29: FEAF allocation and utilization, *21–22, 142–43;* vulnerability, *70–81;* MPQ-bombing techniques, *222–23*
B-36, *98*
Baker, Col. Royal N., *61*
"Baker" project, *245–46*
Baldwin, Col. Robert P., *61*
Banfill, Brig. Gen. C. Y., *94, 108*
Barcus, Lt. Gen. Glenn O., *17, 33, 50, 113, 116, 120, 160, 186, 225;* announces towns to be bombed, *37, 100;* flies combat missions, *57, 131–32;* on air superiority, *58;* orders passive defense and dispersion, *87–88;* orders B-25 communications center attacks, *99–100;* orders changes in night intruder tactics, *110;* orders fighter-bomber night harassment, *112;* plans coordinated interdiction, *114–20;* fixes minimum attack altitudes, *152;* orders dive-bombing training, *153, 164–65;* views on air-ground training and experimentation, *201–02;* evaluates air-ground experiments, *205;* evaluates MPQ-bombing, *226;* establishes minimum altitudes for reconnaissance aircraft, *257;* recommends assault transport wing (1950), *294*
Battalions (numbered):
  1st Marine AAA Gun, *86*
  21st Port, *89*
  24th AAA Gun, *86*
  30th AAA AW, *87*
  50th AAA AW, *86*

SECRET

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Battalions (numbered)—Continued
64th Engineer Base Topographical, *96*
68th AAA Gun, *86*
76th AAA AW, *86*
78th AAA Gun, *86*
366th Engineer Aviation, *172, 175–76*
398th AAA AW, *87*
773d AAA Gun, *87*
802d Engineer Aviation, *172–73*
808th Engineer Aviation, *172, 176, 181n*
809th Engineer Aviation, *172, 175, 177*
811th Engineer Aviation, *172, 175*
822d Engineer Aviation, *172, 178, 180*
839th Engineer Aviation, *172, 176*
840th Engineer Aviation, *172, 176–77*
841st Engineer Aviation, *172, 176*
865th AAA AW, *86*
933d AAA AW, *86–87*
1903d Engineer Aviation, *172, 175–76*
Becker, Capt. Richard S., *61*
Bedcheck Charlie, *89–92, 291*
Berlin Airlift, *277*
Bettinger, Maj. Stephen L., *61*
Bevan, Aneurin, *33*
Big Nori hill, *188*
BIG SWITCH, *287*
"Bird Dog" project, *250*
BLAST, *36, 99*
Blesse, Maj. Frederick C., *61, 302*
Bolt, Maj. John F., *61*
Bon Homme Richard, *32, 105*
Bonin-Volcano islands, *1, 17*
Bordelon, Lt. Guy, *91, 91n*
Boxer, *32*
"Buster," *248–49*
Bradley, General Omar N., *9*
Brady Air Base, *18, 262, 265, 276, 279*
Brigades (numbered):
417th Engineer Aviation, *172–81*
Briscoe, Vice Adm. Robert P., *32*
BUCKSHOT, *8, 185*
Burchett, Wilfred, *121–22*
Buttelmann, Lt. Henry, *61*
"Buzzard King (Kilo)," *305*

C

C–46, *276–77, 286–87*
C–47, *276, 286*
C–54, *276, 286*
C–119, *272–76, 286*
C–124, *265, 267–72, 287*
Canadair, *21*
Carey, Col. George B., *85*
Carmichael, Brig. Gen. Richard H., *18, 245*
Caribbean Air Command, *283*
Central Intelligence Agency, *10*
Changjin River, *29*
Changyon, *100*
"Charlie" project, *244–45*
Chasan irrigation dam, *129–31, 134*
Cheju-do, *81, 305*
Cherokee attacks, *15, 188–91*
Chigyong, *103*
Childre, Col. Cecil H., *260*
China, Communist: *97;* refuses to accept Indian peace proposal, *104–05;* eager to end hostilities, *122–23*
Chinese Communist Air Force, *20, 32, 39–49, 81–82*
Chinese People's Volunteers, *2, 7, 93, 121*
Chinhae Airfield (K–10), *17, 19, 22, 156, 291*
Chinnampo, *53, 100*
Chinwi-chon (river), *176*
Chipyong, *283*
Chitose Air Base, *19*
Choak-tong, *71, 107, 121*
Cho-do: *53, 56, 71, 88, 187, 208, 249, 306;* establishment of TADC, *54, 82;* limits on GCI, *75;* antiaircraft artillery defenses, *86–87;* air attacks against, *89–92;* air rescue base, *299–302*
CHOKE, 113
Chongchon estuary, *114–20, 134–35*
Chongjin, *101*
Chongjin airfield, *136–37*
Chongju, *71, 115, 130*
Chongnyong-ni, *115*
Chorwon, *105, 134, 292*
Chosen hydroelectric complex, *27–34, 100–01, 132, 236*
Chou En-lai, Premier, *97, 123*
Chunchon Airfield (K–47), *17, 87, 90, 175, 209, 267, 291*
Chunggangjin airfield, *136, 139*
Churchill, Prime Minister Winston S., *33–34, 93*
CINCFE. *See* MacArthur, Ridgway, or Clark.
CINCUNC. *See* MacArthur, Ridgway, or Clark.
Civil Air Transport, *265*
Clark, General Mark W.: assumes command of UNC/FEC and diagnoses situation, *8;* approves FEAF plans, *8;* military victory requirements, *9;* reorganizes UNC/FEC headquarters, *11–12;* on unification of air effort, *13;* approves hydroelectric facilities attacks, *31;* names British deputy, *33–34;* states importance of hydroelectric facilities, *34;* limits air attack to military targets, *37;* reports conscientious observance of air combat restrictions, *49;* on operation MOOLAH, *62–63;* views on air pressure, *93;* objects to Soviet good offices, *97;* forwards CCRAK report to JCS, *103;* Kojo amphibious demonstration, *105;* restricts Communist convoys, *114;* requests intensive reconnaissance, *116;* resumption of armistice negotiations, *123;* approves air attack against sensitive targets, *124, 132;* alert to Communist ground attack, *125, 134;* irrigation dam attacks, *127–31;* comprehensive air attacks against North Korean airfields, *138–39;* statements on air support for ground forces, *184;* orders air-ground training and experiments, *197–205;* unwilling to divert B–29's for MPQ-bombing, *225;* orders airlift of ground troops to Korea, *291–92*
Clark AFB, *19, 282, 297*
Collins, General J. Lawton, *36, 85, 195*
Columbus General Depot, *181*
Commands (numbered):
XIX Tactical Air, *15*
Communist air capabilities: order of battle, *39–40;* airfields, *40;* antiaircraft artillery, *41–43;* warning and control, *43–44, 69–70;* aircraft and aircrews, *45–46;* strategic concepts, *46–49;* Bedcheck Charlie attacks, *89–92*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Companies (numbered):
6th Transportation (Helicopter), *295–96*
13th Transportation (Helicopter), *295–96*
82d Engineer Petroleum, *178*
98th Engineer Aerial Photo Reproduction, *252, 256*
622d Engineer Aviation Maintenance, *172, 180*
733d Engineer Aviation Supply Point, *173*
919th Engineer Aviation Maintenance, *172, 180*
2348th QM Airborne Air Supply Packaging, *279*
Congress, *34*
Continental Air Command, *172*
Corps (numbered):
I ROK, *15, 89, 309*
I US, *125, 134, 185–86, 203, 222, 301, 309*
II ROK, *125, 134–35, 190–91, 193, 226–27*
IX US, *8, 105–6, 125, 134, 185, 188, 191, 203, 220, 222, 226, 301, 309*
X US, *9, 12, 15, 185, 195, 197, 203, 222, 227, 293, 301, 309*
XVI US, *105, 200, 291*
Covert, Clandestine and Related Activities in Korea, *10–12, 99, 103, 131, 186–87*
CRASH, *181*
Creighton, Lt. Col. Richard D., *61*
Crew Training Air Force, *149*
Curtin, Capt. Clyde A., *61*
Czechoslovakia, *7, 123*

D

Dairen, *30, 33, 41*
Davis, Maj. George A., Jr., *61*
Dean, Maj. Gen. William F., *122*
Defense Department, *34*
Dentist Charlie TADC, *54*
Department of the Army: responsibilities for antiaircraft artillery, *84–87;* provides engineer aviation troops, *172;* agreement on photo reproduction, *251–52;* agreement on air terminals, *280–81;* procures Army helicopters, *285, 293–96;* agreements on organic aviation, *284–86, 295–96;* organizes helicopter transportation companies, *293–96;* accepts USAF weather services, *310*
Department of State: on UN objectives in Korea (1950), *2;* attitude toward North Korean hydroelectric facilities, *29–30;* deplores pre-strike civilian warnings, *37;* proposes to seek Russian good offices, *97;* tentatively favors Mexican armistice proposals, *104*
Detachments:
Royal Hellenic Air Force, *18, 265, 272*
Royal Thai Air Force, *18, 265*
Divisions (numbered):
1st ROK, *188*
1st US Marine, *213, 285, 294*
1st US Cavalry, *105*
2d ROK, *8, 188*
2d US, *185, 188, 203, 283*
3d US, *203*
7th US, *8, 188, 203–05, 292*
24th US, *291–92*
25th US, *203*
37th Soviet, *107*
40th US, *203*
43d US, *289*
45th US, *203, 299, 301*
Doorstop, *87–88*
Douglas Aircraft Corporation, *269*
Doyle, Brig. Gen. John P., *19*

E

Edwards Air Force Base, *68*
Eighteenth Air Force, *280*
Eighth Army: *5, 8–9, 11, 15, 27, 31, 125, 175, 206;* mission, *4;* control of AAA, *85–87;* operation SHOWDOWN, *105;* air-ground operations in last year of war, *184–93;* views on tactical air doctrine, *193–97;* air-ground operational training, *200–01;* air-ground experiments, *203–05;* air-ground operations system, *209–11;* views on TACP's, *213–14;* air observers, *215;* tests artillery flak suppression, *219–22;* MPQ-bombing, *224–28;* requirements for aerial reconnaissance, *253–60;* airlift support for, *261–62;* use of aeromedical evacuation, *282–89;* undertakes frontline aeromedical evacuation, *285;* R&R airlift, *290;* secures transport helicopters, *293–96;* provision of weather services for, *308–11*
Eighth Army-Fifth Air Force Indoctrination Team, *201*
8055th Mobile Army Surgical Hospital, *286, 299*
Electronics countermeasures, *71, 73–74, 77–79, 248–51*
Everest, Lt. Gen. Frank F.: *17, 155;* discusses tactical air doctrine, *195–96*

F

F3D: escort for medium bombers, *75–76;* air defense, *90–92*
F4U, *91*
F7F, *75*
F-51: FEAF allocation and utilization, *21–22;* replaced with F-86's, *156–57*
F-80: FEAF allocation and utilization, *21–22;* replaced with F-86's, *156–57*
F-84: FEAF allocation and utilization, *21–22, 155–56;* effort to provide night escort, *74–75*
F-86: requirements for, *20;* increased allocation and utilization, *21–22;* planning factor, *50;* performance comparison with MIG-15, *50–53, 68–69;* destruction of MIG-15's, *57–58;* modifications, *63–69;* as a fighter-bomber, *66, 156–60*
F-94: fire control system, *74;* escort for medium bombers, *75–76;* air defense, *90–92*
Fairchild Aircraft Corporation, *236n, 274*
Far East Air Forces: air component of FEC, *1;* mission, *4–5;* change in mission and operations policy, *8;* relations with NAVFE, *12–15;* status in mid-1952, *15–19;* aircraft problems, *19–22;* combat capabilities, *22–23;* needs new doctrines, *25;* states new operations policy, *25, 34–35;* coordination of hydroelectric facilities attacks, *31–32;* study on Sabre pilots, *60;* evaluation of MOOLAH, *63;* requests solid-leading-edge F-86 wings, *68;* restricts medium bomber operations, *72;* policy on HAIL, *73;* evaluated searchlight suppression, *74;* authorizes tests of night fighter escort, *74;* evaluates bomber stream compression, *77;* evaluates ECM, *79;* evaluates air defense, *92;* pioneers beyond existing air doctrines, *94;* targeting for air pressure, *95–96;* orders attacks against North Korean mines, *102;* intensifies air operations during Koje amphibious demonstrations, *105–06;* night intruder organization, *112;* fears Com-

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

munist ground offensive, *116;* irrigation dam attacks, *126–31;* orders attack against Pyongyang Radio, *131;* neutralization of Red airfields, *135–40;* requirement for target vulnerability study, *140;* on deviations from combat replacement crew schedules, *162;* evaluates REMCO, *169;* plans runway arresting barrier, *177;* states air facilities lessons, *183;* statistics of air support sorties, *184, 192;* evaluates artillery flak suppression, *221–22;* on reconnaissance requirements, *231, 260;* on fighter escort for reconnaissance planes, *134;* plans RF–86 modifications, *236–38;* policy on ECM, *248;* ideas on electronics reconnaissance unit, *251;* tests C–124 transports, *268–72;* states need for a primary air transport airfield in a combat airfield complex, *271;* seeks solution to C–119 problems, *273–74;* prepares for aeromedical evacuation, *282;* requests additional helicopters, *283–84;* evaluates air rescue, *304*

Far East Air-Ground Operations Course, *200–201*

Far East Air Logistics Force, *19, 65–66, 79, 143, 156, 168–69, 177, 235–38, 240, 245, 250, 269, 271, 276, 296–97*

Far East Air Materiel Command, *19, 237, 249, 252, 269, 296*

Far East Command: mission and theater area (1950), 1; additionally designated United Nations Command, *2n, 9;* organization, *9–12;* area responsibilities reduced, *17;* orders on control of AAA units, *85–86;* states AAA requirements, *86;* estimates Communist supplies, *117;* notes Red troop movements, 126; directive on aeromedical evacuation, *281–82, 288*

Fast Shuffle, *88*

FEAF Bomber Command (Provisional): *17, 29;* organizational and mission, *18;* aircraft strength, *20–21;* target systems for attack, *27;* responsibilities in air pressure campaign, *35;* solves problem of Communist night air defenses, *70–81;* difficulties with targets for shoran bombing, *95–96, 102–03;* standard ordnance, *107;* participation in coordinated interdiction, *112–20;* continues to attack communications centers, *120–21;* irrigation dam attacks, *127–31;* attacks sensitive targets, *132–33;* coordinated attack against Chongchon estuary bridges, *135;* participation in airfield attack, *135–39;* weapons selection for airfield neutralization, *139–40;* increased combat effectiveness, *141–51;* lends bombardiers to Fifth Air Force, *161;* support for ground operations, *185–91;* MPQ-bombing, *224–28;* reconnaissance capabilities, *232, 242–47;* search and rescue support of, *298–99*

FEAF Bomber Command, Detachment No. 1, *142*

FEAF Combat Cargo Command, *260–61, 277, 282–83, 286, 293*

FEAF Formal Target Committee, *13, 15, 25, 34–36, 96–97, 106, 108–10, 123, 127, 134–35*

FEC Joint Air Priorities Board, *260–61, 290*

Feng-cheng, *41*

Ferguson, Brig. Gen. James, *7, 30*

Fernandez, Capt. Manuel J., Jr., *6*

Field Manual *31–35, Air-Ground Operations, 194*

Fifth Air Force: mission, *12, 17;* coordination with Seventh Fleet, *15;* organization and composition, *16;* relations with JADF, *18–19;* aircraft possessed, *20;* aircraft utilization, *22–23;* hydroelectric attacks, *32;* responsibilities in air pressure campaign, *35;* planning factor for Sabres, *50;* report on F–86F fighter-bomber, *66, 157–60;* restrictions on B–26 attack altitudes, *70;* seeks to suppress enemy searchlights, *73–74;* evaluates searchlight suppression, *74,* conference on support for night-flying bombers, *75–76;* responsible for air defense in Korea, *81, 88;* control of AAA units, *85–86;* states AAA requirements, *86;* establishes AAA priorities, *86–87;* air defense procedures, *90–91;* air targets division, *95;* attacks Communist troop concentrations, *102;* intensified operations during Koje amphibious demonstration, *106;* devises night intruder tactics, *110–12;* implements SPRING THAW, *117–20;* irrigation dam attacks, *127–31;* emphasizes armed reconnaissance, *133–35;* coordinated attacks against Chongchon estuary bridges, *134–35;* participation in airfield attack, *135–39;* study of weapons selection, *140;* adherence to planning factors, *151–53;* receives new aircraft, *153–57;* aircrew problems, *160–66;* declining fighter-bomber accuracy, *165–66;* develops REMCO, *166–69;* service tests a reinforced air wing, *169–72;* air facilities problems, *172–83;* support of Eighth Army operations, *184–93;* air-ground operational training, *200–01;* air-ground experiments, *203–05;* air-ground operations system, *208–09;* views on TACP's, *214;* tests artillery flak suppression, *219–22;* MPQ-bombing, *224–28;* employment of flare aircraft, *228–29;* reconnaissance capabilities, *232–42, 248–60;* reconnaissance conference, *251, 253–56;* makes airfields available to C–124's, *267, 271;* criticizes Globemaster transports, *272;* provides frontline aeromedical evacuation, *283–84;* R&R airlift, *290;* seeks organic airlift, *296–97;* search and rescue system and operations, *299–304;* weather forecast capabilities and operations, *305–11*

Finletter, Secretary of Air Force Thomas K., *294*

"Firefly," *116, 228–29*

Firefly fighter, *91*

Fischer, Lt. Harold E., Jr., *61*

Fisher, Brig. Gen. William P.: *18, 43, 79, 145, 150;* states vulnerability of B–29's, *71–72;* adjusts B–29 attacks to weather conditions, *73;* urges camouflage painting of B–29's, *79;* on Communist air defense, *80–81;* on Communist bridge repair, *119;* encouraged by communications center attacks, *120–22;* control of shoran beacon units, *147;* institutes remedial bombing training, *149;* value of volunteer and career crews, *149*

Fithian, Capt. Ben L., *75*

Flare support, *228–29*

Flight Commander Forward Air Controller, *208*

Flyaway kits, *143*

Forbes Air Force Base, *149*

Formosa and Pescadores Islands, *17*

Fort Monmouth, New Jersey, *309*

Forward Air Controller, *208, 214–15*

Foster, Capt. Cecil G., *61*

Funchun, *33*

Funei hydroelectric complex, *27–34*

Fusen hydroelectric complex, *27–34, 132*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

G

Gabreski, Col. Francis S., *61*
Ganey, Brig. Gen. Wiley D: *18;* deplores combat restrictions on B-29's, *72;* requests searchlight suppression, *73;* requests B-29 flash suppressors, *79;* states requirement for tail warning radar, *79;* recommends reorganization of 19th Bombardment Wing, *142;* on shoran CEP, *148*
Garrison, Lt. Col. Vermont, *61*
GHQ Target Group, *10, 13*
GHQ Target Selection Committee, *10, 13*
Gibson, Capt. Ralph D., *61*
"Glow Worm," *80*
Great Britain: attitude toward extension of Korean hostilities, *3;* controversey regarding hydroelectric attacks, *33–34*
Groups (numbered):
2d Air Rescue, *297–98*
3d Air Base, *228*
3d Air Rescue, *297–304*
4th Fighter-Interceptor, *51, 60–61, 67, 156*
5th Communications, *208*
8th Fighter-Bomber, *56*
10th AAA, *85–87*
12 Marine Aircraft, *17, 32, 176*
18th Fighter-Bomber, *22, 56, 156, 175*
19th Bombardment (Medium), *18, 69, 71, 80, 142, 144, 148, 150, 246, 298*
33 Marine Aircraft, *17, 32*
49th Fighter-Bomber, *170–71*
51st M&S, *167*
58th Fighter-Bomber, *170–71*
58th M&S, *167, 170–71*
61st Troop Carrier, *18, 263, 265, 268, 272*
98th Bombardment (Medium), *142*
307th Bombardment (Medium), *142*
314th Troop Carrier, *18, 265, 272–74*
374th Troop Carrier, *263*
403d Troop Carrier, *265*
443d Troop Carrier, *280*
474th Fighter-Bomber, *171*
502d Tactical Control, *81–84, 146, 191, 208–09, 222, 292*
930th Engineer Aviation, *172–73*
931st Engineer Aviation, *172–73*
934th Engineer Aviation, *172–73, 176, 179*
6127th Air Terminal, *18, 277–81, 290*
6147th Tactical Control, *17, 163, 175, 208–09, 211–17*
6167th Air Base, *116, 228*
6481st Medical Air Evacuation, *288*
Ground Liaison Officers, *299*
Guam, *304*
Gun-Bomb-Rocket sighting systems, *64–66*
GUN-VAL, *63–64*

H

H-5, *283–84, 299–304*
H-19, *294–96, 299–304*
H-21, *294–96*
H-23, *295*
Haeju airfield, *136*
Haeju peninsula, *37, 55, 106, 114–16, 126, 146, 249, 302*
Hagerstrom, Maj. James P., *61*
HAIL, *73*
Hale, Brig. Gen. Dudley D., *17*
Hamhung airfield, *136, 139*
"Hammer" aircraft, *234, 255*
Han River, *125, 175, 179*
Haneda Airfield, *265*
Happocham, *115*
Harrison, Lt. Gen. W. K., *9, 103*
Harvard University Russian Research Center, *62*
"Haymaker" project, *237–38*
Henebry, Brig. Gen. John P., *260, 278;* requests Globemaster transports, *267;* urges Air Force control of airdrop supply mechanism, *279–80;* reports irregularities in medical holding facilities, *288*
Higashi Fuchu, *18*
"Highlight" project, *240–41*
Hoechang Ore Processing Plant, *102*
Hoemun airfield, *136, 139*
Hoengsong Airfield (K-46), *22, 87, 156, 175, 291*
Hoeryong, *46, 102*
Hoeryong airfield, *136, 139*
Hokusen Cement Plant, *107*
HOLY LAND, *6, 114*
Hot pursuit, *49*
Huichon, *49, 112, 122, 135*
Hull, Gen. John E., *205, 215, 295*
Hungnam, *29*
"Hunter-Killer" operations, *111–13*
Hwanghae province, *126*
Hwangju airfield, *136*
Hyangbyong-san, *81–82, 146*
Hydroelectric facilities attacks: description of targets, *27–29;* indecision as to air attack, *29–31;* air strikes, *31–32;* evaluation, *32–34;* continued neutralization, *101–02, 120, 132*
Hyesanjin airfield, *136–37*

I

IL-28, *41, 45, 47, 81*
Imjin River, *125*
Inchon, *82, 86–87, 89–92*
India, *104, 123*
Interdiction operations: *23;* evaluation of rail interdiction, *25–26;* interdiction as air pressure, *108–22;* against hostile ground forces, *133–35*
Itazuke Air Base, *19, 142, 155, 166–70, 291*
Iwakuni Air Base, *19*

J

Jabara, Maj. James, *61*
Japan, *1, 18, 98*
Japan Air Defense Force, *18–20, 22, 74, 144, 167, 170, 200–201, 250, 284, 297, 304*
Japan Logistical Command, *11, 277, 286*
Jarewski, Lt. Franciszek, *63*
JAYBIRD, *65–66*
"Jenkins Limiter," *66*
JOC Present Weather Section, *307–08*
JOC Weather Forecast Center, *305–11*
Johnson, Col. James K., *61, 68*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Johnson Air Base, *19, 177, 200, 298*
Joint Action Armed Forces, *85, 284, 293*
Joint Air-Ground Operations Conference (1953), *206, 210, 214, 219, 221, 228–29*
Joint Airlift Liaison Control, *261, 290*
Joint Amphibious Task Force, *77, 105*
Joint Chiefs of Staff: *5, 132;* authorize air operations in North Korea, *2;* issue new directives to MacArthur, *2;* provide codification of directives to Ridgway, *3;* evolve politico-military restrictions on air operations, *4;* disapprove massive air attack against Pyongyang, *5, 25;* convinced ground offensives are fruitless, *8;* favor recess in armistice negotiations, *8;* direct maximum air pressure against Communists, *9, 93;* reorganize theater commands in Pacific, *17;* suspend air attacks against North Korean industry, *29;* changing attitude toward hydroelectric facilities attacks, *30–31;* emphasize that air pressure strikes be against military targets, *37;* agree to consider air strikes against Manchuria, *38;* consider "hot pursuit," *49;* approve MOOLAH, *62;* allow one-time air attack near Siberian border, *101;* favor settlement of POW status before armistice, *104;* direct exchange of sick and wounded POW's, *123;* concur in irrigation dam attacks, *130;* make MATS air terminals an Air Force responsibility, *280;* order transoceanic medical air evacuation (1949), *281*
Joint Eighth Army-Fifth Air Force Air Support Board (1951), *200, 210*
Joint Operations Center (Korea): *12–15, 17, 33, 119, 299, 303;* naval member, *15, 206–07;* functions, *205–08;* communications, *207–08;* air-ground operations section, *209;* reconnaissance branch, *253–54*
Joint Psychological Committee, *62*
Joint Strategic Plans and Operations Group, *10*
Joint Training Directive for Air-Ground Operations, 194, 205, 210, 252–53
Joint US Tactical Air Support Board (1952), *200, 213*
Jolley, Capt. Clifford D., *61*
Jones, Lt. Col. George L., *61*
Joy, Vice Adm. C. Turner, *9n*

K

Kachiapa, *41*
Kadena Air Force Base, *18–19, 142, 144, 267, 297–98*
Kadena Rescue Control Center, *298*
Kaesong, *4, 114–16, 124, 301*
Kandong airfield, *136*
Kanggye, *106, 122*
Kanghwa-do, *187*
Kangnung Airfield (K–18), *175, 208, 301*
Kasler, Lt. James H., *61*
Kaya-san, *146*
Kennan, Ambassador George F., *97–98*
Kijang-ni, *27*
Kilchu airfield, *136–37*
Kim Il Sung, *63, 123*
Kimpo Airfield (K–14), *17, 62, 71, 81–84, 86–87, 89–92, 139, 170, 173–75, 177–79, 208, 232, 252, 267, 271*
"Kimpo MIG," *52–53*
Kincheloe, Capt. Iven C., *61*
Koje amphibious demonstration, *105–06, 292*
Koje-do, *31, 292*
Kokura general depot, *265*
Komaki Air Base, *19, 268, 298*
Kompodong, *71*
Kongosan hydroelectric complex, *27–34*
Korean Air Defense Region, *81, 84, 88*
Korean Bay, *41, 49*
Korean Communications Zone, *85–87, 286*
Korean Targets Analysis Division, FEAF, *96*
Kowon, *105, 113*
Kuan-tien, *41*
Kuksa-bong, *81–82, 146, 208*
Kumgang Political School, *106*
Kumhwa, *8, 134, 190*
Kumsong River, *125*
Kunsan Airfield (K–8), *17, 22, 81, 86, 164, 170, 179, 291, 301*
Kunuri, *108, 115, 130*
Kusong, *115, 130*
Kusong irrigation dam, *130*
Kuwonga irrigation dam, *129*
Kwaksan, *71–72, 77, 79–80, 114–15*
Kwantung peninsula, *41*
Kyodong-do, *187*
Kyomipo, *120*
Kyosen hydroelectric complex, *27–34, 132*

L

Langley AFB, Virginia, *160*
Langley Combat Crew Training School, *160*
Latshaw, Capt. Robert T., Jr., *6*
LAZY DOG, *73*
Le Bailley, Col. E. B., *74*
Lilley, Capt. Leonard W., *61*
Little Nori hill, *188*
LITTLE SWITCH, *123, 133, 287*
"Longhorn" exercise, *280*
Love, Capt. Robert J., *61*
Low, Lt. James F., *60–61*
Luke AFB, Phoenix, Arizona, *162*
Lynn, Maj. Gen. Roy H., *18*
Lyons, Lt. Sam R., *75*

M

MacArthur, General Douglas: *9, 11;* commander of FEC and UNC, *2;* authorizes air operations in North Korea, *2;* critical of accordion fashion fighting, *3;* relieved from command, *3;* considers ground force decisive, *4;* attitude toward hydroelectric facilities attacks, *29–30;* on air support for ground operations, *184;* directs FEAF to operate aerial ports, *277;* requests Army helicopters, *285*
McCarty, Maj. Gen. Chester E., *18, 260, 281;* pilots first operational C–124 flight to Korea, *265;* apprehensive about C–124 supply support, *268–69;* asks investigation of C–124 generators, *270;* opposes conversion of 315th Wing, *276–77;* directs command change in air terminal detachments, *278–79;* questions practicability of airlifting Army division to Korea, *291;* defends unity of airlift, *297*
McConnell, Capt. Joseph, Jr., *61, 302*
McHale, Lt. Col. Robert V., *90*
McNitt, Col. James R., *217–18*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Maenjung-dong, *115*
Maintenance: medium bomber, *143–44*; Fifth Air Force, *153*; engineer aviation, *181*. *See also* REMCO.
Manpojin, *43, 94, 108, 115*
Mao Tze-tung, *56n*
Marianas islands, *1, 17, 304*
Marshall, General George C.: explains politico-military restrictions, 4; on North Korean hydroelectric facilities, *30*
Marshall, Lt. Col. Winton W., *61*
Marshall Islands, *304*
MATCon, *91, 298*
Mayo, Lt. Col. B. I., *25–27*
ME–109, *49*
Menon, Krishna, *107–08*
Meteor–8, *20, 50, 55*
Meyer, Col. J. C., *67–68*
MIG–15: range estimates, *45, 47*; models, *45*; armament, *45*; Chinese discontent with, *47*; Russian testing in combat, *47–49*; performance comparison with F–86, *50–53*; vulnerability, *63*
MIG Alley, *49, 53–54, 58, 61, 64*
Miho Air Base, *166–68*
Military Air Transport Service, *274, 280–81, 283, 300, 304*
Misawa Air Base, *19, 170, 291, 298*
Mitchell, Col. John W., *45, 58*
MOOLAH, *62–63*
Moore, Maj. Gen. Ernest, *11, 19*
Moore, Capt. Lonnie R., *61*
Moore, Capt. Robert H., *61*
Mosquito control, *15, 215–19*
Mukden, *30, 41, 45*
Mundy, Maj. Gen. George W., *296*
Munsan-ni, *284, 292, 299*
Musan, *29, 101*

N

Naktong bombing range, *164–65*
Nakwon Munitions plant, *101*
Nam Il, Lt. Gen., *7, 55, 93, 123–24*
Nam River, *8, 185*
Namchonjom, *100*
Namsan-ni, *69, 74, 76, 98, 102*
Namsi, *114, 136–39, 148*
National Security Council, *4*
Naval Forces Far East: *9–10*; relations with FEAF, *12–15*; Koje amphibious demonstration, *105–06*; participation in airfield attack, *135–39*; provides close support, *186–91*; operates separate airlift, *293*
Nehru, Jawaharal, *104*
Nellis AFB, Las Vegas, Nevada, *162*
Nellis Combat Crew Training School, *162–63*
Neutral National Repatriation Commission, *93, 123–25*
Niigata Air Base, *19*
Ninth Air Force, *231*
NO–GLO, *75*
North American Company, *64–68, 236*
Northern Air Defense Area (Korea), *88–89*
North Korean Air Force: *39, 63, 81, 139*
North Korean irrigation dams: *124*; destruction of, *126–31*
North Korean Military Academy, *54–55, 102*
North Korean People's Army, *1–2, 41, 93*
North Korean Tank and Infantry School, *120*
Noryong-Jim Pumping Station, *179*

O

Ocean, *91*
O'Donnell, Maj. Gen. Emmett, Jr., *24–25*
Okung Lead and Zinc Mill, *107*
"Old Baldy," *185, 190, 229*
Ongjin airfield, *136*
Onjong-ni airfield, *136*
Opari, *114*
"Operation Feint," *105, 292*
Operations analysis, *112, 116, 139, 152, 165, 228*
Oriental Light Metals Company, *72, 101*
Oryong-dong, *106*
Osan (K–55), *86–87, 156–57, 173, 176–79, 267, 271, 291*
"Outpost Vegas," *190*
Overton, Capt. Dolphin, III, *61*

P

Pace, Secretary of Army Frank, *294*
Pacific Command, *17*
Paengnyong-do, *62, 82, 86–88, 146, 187, 300–301, 305*
Pakchon, *114*
Panmunjom, *6, 97–98, 114, 123, 126*
"Paraphib" exercise, *293*
Parr, Capt. Ralph S., *58, 61*
Partridge, Lt. Gen. Earle E., *67*
"Pathfinder," *218*
Peking, *41, 103–04, 121, 131*
Philippines, *1, 17, 304*
Philippine Sea, *32, 224, 238*
Pingjang-ni, *131*
"Pin point" project, *224–25*
Plan Negat, *219*
Plan Suppress, *220*
PO–2, *89–92*
Pochon, *81*
Pohang Airfield (K–3), *17, 81, 232, 291, 301*
Poland, *7, 123*
Pomhwa-dong, *100*
Port Arthur, *33, 98*
Potong River, *127*
Pravda, *103*
PRESSURE PUMP, *98–99*
Primer, *224*
Princeton, *32, 91, 177*
Psychological warfare: early thoughts of psychological attributes of airpower, *24–25*; plans for in pressure operations, *36–37*; stirs MIG's into action, *56–57*; project MOOLAH, *62–63*; BLAST, *98*; STRIKE, *100*; evaluation of pre-strike warnings, *103–04*; attack against Pyongyang Radio, *131–32*
Pugwon, *115*
Pujon-gang River, *29*
Pukchong, *102*
Pukhan valley, *125, 190–91*
Pungha-Dong, *121*
Pusan, *86–87*
Pusan Airfield (K–1), *87–88, 175–76, 291*
Pusan East Airfield (K–9), *17, 87, 175–76, 262, 282, 287, 291*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Pyonggang airfield, *136*
Pyong-ni, *136, 139*
Pyongtaek Airfield (K-6), *17, 146, 175–76, 291*
Pyongyang: *5, 25, 36, 41, 43, 53, 57, 69–70, 79, 96, 106, 111, 113–14, 120, 122, 127, 133, 135, 234, 256, 301;* massed air attacks against targets in, *98–99;* attacks against Pyongyang Radio, *131–32*
Pyongyang airfields, *91–92, 136–40*
Pyoro-ri, *100*

R

Radar: Communist, *43–44, 69;* establishment of TADC on Cho-do, *54;* Fifth Air Force control and warning, *81–84;* IFF, *84;* infra-red detector, *110n;* MPQ-2 and MSQ-1, *185–91, 222–28;* AN/APN-60 beacons, *239, 241–42;* shoran. *See* separate entry.
Radio Corporation of America, *147*
Randolph, Col. R. L., *25–27*
Randolph AFB, *149*
RB-26: *239–42;* ferrets, *249–50*
RB-29, *232, 242–46*
RB-45, *232, 298*
RB-50, *298*
Reconnaissance, aerial: electronics, *43, 248–51;* shoran targeting, *96, 242, 245–46;* role in Korea, *230–31;* organizations, *231–33;* problems, *233–47;* weather, *250–51, 305–07;* photographic technical services, *251;* allocation of capabilities, *253–60*
REDBIRD, *110n, 114, 250*
RED COW, *187*
Regimental Combat Teams (numbered):
8th Cavalry, *105*
19th, *291*
34th, *291*
187th Airborne, *105, 263, 265, 272, 284, 291–93, 297*
REMCO, *17, 166–69, 296–97*
Republic of Korea Air Force, *155, 175, 211–12*
Res CAP, *301*
RF-51, *234–35*
RF-80, *233–35, 238*
RF-86, *235–38*
Rhee, President Syngman, *62, 89, 125*
Ridgway, General Matthew B.: *9, 11;* assumes command of UNC/FEC, *3;* assigns missions to subordinate commands, *4;* thinks air reinforcements should await outcome of truce negotiations, *5;* fears Communist reinforcements, *5;* characterizes Communist truce negotiators, *6;* plans for hostilities if armistice negotiations fail, *7–8;* informs JCS of challenge to UNC air superiority, *20;* on preparedness of Communist ground forces, *27;* disapproves hydroelectric facilities attacks, *30–31;* requests Army helicopter transportation companies, *295*
Risner, Capt. Robinson, *61*
"Road Block Buddy," *116*
Rogers, Maj. Gen. Elmer J., *11*
Ro Kum Suk, Lt., *46, 63*
Ruddell, Lt. Col. George I., *61*
Ruestow, Maj. Gen. Paul E., *19*
Ryukyus, *1, 18, 304*

S

SA-16, *300–304*
Saamcham, *136–39, 148*
Sakchu, *55*
Sanwang-dong, *112*
Sariwon, *113, 234, 249, 301*
Sariwon airfield, *136*
SB-29, *298–99*
SCARWAF troops, *172, 180–83*
Seoul, *6, 17, 36, 82, 86, 89–92, 173–75, 177, 252, 304*
Seoul Municipal Airfield (K-16), *17–18, 82, 87, 173–75, 228, 265, 267, 271, 290–91, 293, 299–300, 302*
Sessums, Brig. Gen. John W., *19*
Seventh Fleet, *12–15, 33, 96, 101–02, 206–8, 223*
Shanghai, *41*
Shantung peninsula, *82*
Shaw AFB, South Carolina, *254n*
Shengyang. (*See* Mukden.)
Shoosmith, Maj. Gen. Stephen N., *34*
Shoran: training, *22, 148–50;* vulnerabilities of aircraft employing, *70;* bombing system, *95–96, 145–51;* ground units, *145–46*
SHOWDOWN, *8, 105, 188*
SIGHTLINE, *65–66*
Signal Corps, US Army, *309–10*
Simpo-Ri, *292*
Simpungdong, *240*
Sinanju, *43, 53, 69, 108, 112, 114–20, 127, 132, 134–39*
Sinchon, *37, 100*
Sindok, *101*
Sinhung-dong, *114*
Sinmak airfield, *136, 139, 286*
Sino-Soviet Treaty of 1950, *97–98*
Sinpyong-ni, *115*
Sinuiju, *41, 43, 69–70, 72–73, 75, 91, 98, 106–08, 112, 132–33, 136–39, 150*
Siple, Dr. Paul A., *308*
"Sitting Duck," *187–88*
6166th Tactical Reconnaissance Flight, Weather, *232, 250–51, 304*
"Skyhook" exercise, *295*
Skysweeper, *87*
SMACK, *204–05*
Smart, Brig. Gen. Jacob E., *25, 34, 36, 98, 164;* defends air pressure strategy, *108*
Sniper Ridge, *8, 105, 188, 226*
"Snowfall" exercise, *280*
"Snowflake" patrols, *306–07*
Sohwa-ri, *294–95*
Soktal-li, *102*
Sok-to, *187, 302*
Sonchon, *53, 71, 75, 107, 113, 115*
Sondok airfield, *136, 139*
Songgum-ni, *82–83, 146*
Sopo, *107*
Southern Air Defense Area (Korea), *88–89*
"Southern Pine" exercise, *280, 289, 294*
South Pyongan province, *126*
Soviet Air Force, *20, 39–41, 46*
Special Weapons Command, *283*
Spivey, Maj. Gen. Delmar T., *18*
SPOTLIGHT, *114, 120, 240, 247*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

RING THAW, *116–20*
adrons (numbered):
1st Aerial Port Operations, *280–81*
VMJ–1, *232*
No. 1 Marine Composite, *249–50*
1st Marine GCI, *81*
1st Shoran Beacon, *145–46*
2d Air Rescue, *19, 297–98, 301*
2d Marine Tactical Air Control, *81*
2d South African Air Force, *17, 20, 22–23, 58, 156*
3d Air Rescue, *17, 19, 283–84, 297–304*
3d Marine GCI, *81*
4th Fighter-Interceptor, *19*
6th Troop Carrier, *268, 270*
7th Aerial Port, *281n*
7th Fighter-Bomber, *156, 171*
8th Fighter-Bomber, *156, 171*
8th Tactical Reconnaissance, *233*
9th Fighter-Bomber, *156*
10th Liaison, *17*
11th Tactical Reconnaissance, Electronics and Weather, *251, 307*
12th Fighter-Bomber, *157*
12th Tactical Reconnaissance, *114, 232, 239–42, 248–51, 254–55*
13th Bombardment (Light), *110*
14th Troop Carrier, *265*
15th Tactical Reconnaissance, *232–39*
15th Troop Carrier, *265*
15th Weather, *304*
20th Weather, *304*
21st Troop Carrier, *18, 265, 276*
22d Troop Carrier, *268–70*
26th Fighter-Interceptor, *19*
28th Bombardment (Medium), *144*
30th Weather, *304–11*
31st Air Rescue, *297*
32d Air Rescue, *297*
33d Air Rescue, *297*
34th Air Rescue, *297–98*
35th Fighter-Bomber, *157*
36th Air Rescue, *297*
36th Fighter-Bomber, *157*
37th Air Rescue, *297, 299*
37th Bombardment (Light), *110*
38th Air Rescue, *297*
39th Air Rescue, *297*
39th Fighter-Interceptor, *17, 21–22, 50*
41st Fighter-Interceptor, *19*
44th Fighter-Bomber, *19*
45th Tactical Reconnaissance, *232, 234–35*
53d Troop Carrier, *18, 265, 275*
54th Strategic Reconnaissance, Weather, Medium, *304*
56th Strategic Reconnaissance, Weather, Medium, *304*
58th Air Police, *171*
58th Food Service, *171*
58th Installations, *171*
58th Motor Vehicle, *171*
67th Fighter-Bomber, *157*
67th Maintenance, *235*
67th Reconnaissance Technical, *95, 232, 252–53*
68th Fighter-Interceptor, *19*
Squadrons (numbered)—Continued
77th Royal Australian Air Force, *17, 20, 23, 50, 58*
80th Fighter-Bomber, *157*
91st Strategic Reconnaissance, *18, 71, 96, 232, 242–46, 298*
93d Bombardment (Medium), *150*
162d Tactical Reconnaissance, *239*
196th Fighter-Bomber, *19*
319th Fighter-Interceptor, *17, 74–76, 90*
335th Fighter-Interceptor, *51–52*
339th Fighter-Interceptor, *19*
343d Bombardment (Medium), *79*
344th Troop Carrier, *267*
428th Fighter-Bomber, *171*
429th Fighter-Bomber, *171*
430th Fighter-Bomber, *171*
474th Supply *171*
VMF (N)–513, *74–76, 176*
548th Reconnaissance Technical, *96, 146, 232*
581st Air Resupply, *302*
605th Tactical Control, *81, 208*
606th AC&W, *54, 81–84, 208*
607th AC&W, *81–84, 208*
608th AC&W, *54, 81–84, 208*
801st Medical Air Evacuation, *18, 262, 282, 286–88*
815th Troop Carrier, *267*
816th Troop Carrier, *267*
817th Troop Carrier, *267*
942d Forward Air Control, *208*
2157th Air Rescue, *297, 301–02*
6004th Air Intelligence Service, *95n*
6148th Tactical Control (Air), *208, 215*
6149th Tactical Control (Air), *208, 215*
6150th Tactical Control (Ground), *208*
6155th Air Base, *175*
6156th Air Base, *170–71*
6156th Operations, *171*
6157th Air Base, *170–71*
6158th Air Base, *170–71*
6167th Operations, *228*
6461st Troop Carrier, *265, 267, 272, 276*
Marine Helicopter Transport, *161, 294–95*
Stalin, Premier Joseph, *123*
Stearley, Maj. Gen. Ralph F., *19*
STRANGLE, *5*
Strategic Air Command: *80, 161, 244;* retaliatory power, *3;* responsibilities regarding FEAF Bomber Command, *18;* furnishes rotational fighter wing in Japan, *19, 22;* support for Bomber Command, *142–43*
Stratemeyer, Lt. Gen. George E.: commander of FEAF, *2;* seeks operational control of all theater air forces, *12;* relieved as FEAF commander, *15;* recommends all-out air attack against Pyongyang, *25;* requests approval for hydroelectric facilities attacks, *29–30;* insists FEAF Combat Cargo Command control Marine transport squadron, *293*
STRIKE, *36, 100*
Suan, *27*
Sui-ho hydroelectric complex, *27–34, 43, 49, 53–54, 61, 71, 73–74, 77, 98, 101–2, 120, 124, 132, 240*
Sunan airfield, *136*
Sunchon, *135*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Sungho-ri, *101*
Supply: medium bomber, *143;* Fifth Air Force, *168, 296–97;* engineer aviation, *181–82;* C–124 aircraft, *268–69;* C–119 aircraft, *272–75*
Suwon Airfield (K–13), *17, 71, 74, 86–87, 90, 131, 157, 169, 173, 177–79, 271*
"Swarmer" exercise, *260, 277*
Sweden, *7, 123*
"Swing" project, *238*
Switzerland, *7, 123*

T

T–6: air defense usage, *90;* limitations for air controller work, *217;* visual reconnaissance capability, *234*
Tachikawa Air Base, *18–19, 263–71, 278–79, 282, 287, 290–91*
Tactical Air Command, *15, 273–75, 277, 280, 289, 294*
Tactical Air Control Center, *49, 81–84, 88–92, 208, 299, 303*
Tactical Air Control Parties, *208, 211–15*
Tactical Air Coordinator, *208, 215–19*
Tactical Air Direction Center, *54, 76, 81–84, 88–92, 112, 147, 208*
Tactical Air Direction Post, *81, 208;* controls close-support bombing, *185–93, 222–28*
Tactics: air-to-air, *49–58, 63;* night air combat, *69–81;* light bomber, *100, 110–12;* night intruder, *110–12;* fighter-bomber night harassment, *112;* F–86 fighter-bomber, *158–60;* close support experiments, *203–5;* forward air control, *212–13;* Mosquito control, *216–17;* Pathfinder, *218;* artillery flak suppression, *219–22;* ground radar directed bombing, *222–28;* flare, *228–29;* search and rescue, *298–304*
Taechon, *53, 69, 148*
Taegu, *17*
Taegu Airfield (K–2), *17, 87, 105, 170–72, 178–79, 252–53. 262, 267, 271, 282, 290, 292*
Taeryong River, *113–14*
Taeyudong, *242*
Ta-ku-shan, *41, 69*
Tanchon, *102*
Tang-dong, *27*
Tapao, *41*
Tarzon bombs, *131*
Task Force 77, *12, 32, 46, 91, 98, 102, 134–39, 152, 188–91, 206–08*
Ta-tung-kou, *32, 41, 69, 230*
Taylor, Lt. Gen. Maxwell D.: *190–91, 201, 205, 226;* evaluates Army helicopters, *296*
"T-bone" hill, *204–05*
Third Army, *213, 231*
Thirteenth Air Force, *11, 19–20, 297*
Thyng, Col. Harrison R., *61*
Tientsin, *41*
Togudong, *81*
Tokchok-to, *146*
Toksan irrigation dam, *127–31, 134*
Toksang irrigation dam, *130*
Tokyo Weather Control, *304–05, 310*
Tongchon, *103*
"Trailer Camp" project, *252–53*
Training: shoran bombing, *22, 144, 148–50;* Communist pilot, *46;* ECM, *78;* fighter-bomber conversion, *156–57;* light bomber crews, *160–61;* theater indoctrination and flying proficiency, *163–64;* continuation flying, *164–65;* engineer aviation, *180–81;* air-ground operational, *200–01;* airborne, *292–93*
Triangle Hill, *8, 105, 188*
"Triple Threat" exercise, *293*
Truman, President Harry S.: directs FEC to support the ROK, *2;* relieves MacArthur from command and states military objectives, *3;* announces changes in UNC/FEC commanders, *8;* approves recess in armistice negotiations, *8, 98;* approves attack against hydroelectric facilities, *31;* opposes forced repatriation of POW's, *93;* advises CINCUNC not to lessen military pressure, *98*
Tsingtao, *41*
Tsuiki Air Base, *166–69*
Tumen River, *29*
Tunner, Maj. Gen. William H., *260, 277*
Twentieth Air Force, *18–20, 142, 144, 297*

U

Uiju, *41, 69, 72, 106–07, 136–39*
Underhill, Brig. Gen. E. H., *17*
Unhyang-po, *133*
United Nations: objectives and policies toward Korea, *1–4, 24;* organization of UNC, *9;* debates on Korean armistice, *104–05*
United Nations Command: organization, 9; military strategy, *24;* British deputy, *34*
United States: national objectives and policies toward Korea, *1–4;* accepts Indian truce proposal, *104*
Units (numbered):
8081st Army, *262, 279, 281*
8240th Army, *186*
Unjong-ni, *71*
Unsang-Dong, *133*
Upthegrove, Brig. Gen. Fay R., *19*
USAF: states need for joint theater staff, *11;* logistic support to FEAF, *21, 153–54;* states requirement for more powerful jet engine, *51;* designs more effective weapons, *64;* fixes B–29 strength of FEAF, *142–43;* B–29 combat crew training, *149;* programs F–86 fighter-bombers, *156–57;* unable to provide requisite observers, *161;* provides fighter pilots to Fifth Air Force, *162–63;* orders wing-base reorganization (1947), *169;* establishes Engineer Aviation Force, *172;* concept of engineer aviation troop employment, *173;* decision on TACP's, *213–14;* cannot support RF–80 and RF–51 aircraft, *234;* approves modifications of F–86's to reconnaissance configuration, *235–37;* develops and procures photoflash bombs, *241;* provides C–124 transports, *268;* supplies support for C–124's, *268–69;* C–119 conference, *273;* programs 315th Troop Carrier Wing for conversion to C–119's, *276–77;* actions on air terminals, *280–81;* assigns helicopters to Air Rescue Service, *283, 294;* agreements on Army organic aviation, *284–86, 295–96;* delay in meeting aeromedical evacuation requirements, *287–88;* aeromedical holding facilities, *288;* approves creation of assault transport wings, *294–96;* procures helicopters, *294–96*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

SSR: *7, 30, 36;* Sino-Soviet aviation agreement (1950), *39;* reasons for supporting CCAF, *47–48;* vulnerable to psychological warfare, *62–63;* negotiations with China, *97–98;* refuses to accept Indian truce proposal, *104;* termination of Korean hostilities, *122–23*

V

andenberg, General Hoyt S.: *5, 85, 154, 284;* explains USAF capabilities, *4;* calls USAF a "shoe string Air Force," *21;* questions radar sighting systems, *66;* authorizes F–94 employment over North Korea, *75*
an Fleet, Lt. Gen. James A.: *105, 185–86;* views on tactical air doctrine, *193–97;* testifies on inadequate artillery, *195;* views on air-ground training and experiments, *201–02;* criticizes Mosquito control, *218;* MPQ-bombing, *225;* appreciates flare support, *240*
Vector" project, *239, 241–42*
ishinsky, Foreign Minister A. Y., *93, 104*
ladivostok, *43, 46*

W

Varburton, Brig. Gen. Ernest K., *17, 170–71*
Vatchcase, *91*
VB–26, *306–07*
VB–29, *305*
Vescott, Maj. William H., *61*
Veyland, General Otto P.: *101, 124–26, 132, 144–45, 154, 185–86, 193, 225, 248;* assumes command of FEAF, *5;* impatient with armistice negotiations, *7;* recommends destruction of hydroelectric complex, *7;* notes change in operations policy, *8;* necessity for joint theater staff, *11;* named "coordinating agent" for hydroelectric attacks, *13;* naval representation on FEAF Formal Target Committee, *15;* biographical data, *15–16;* needs additional air units, *20;* emphasizes FEAF's limited striking power, *23;* recognizes value of air pressure, *25;* records change in operations policy, *27;* commands hydroelectric facilities attacks, *29–34;* approves air pressure policy directive, *34;* questions policy of limiting air attacks to military targets, 37; opinion on Communist air strategy, *46;* compares F–86 and MIG–15, *50;* favors radar gun sights, *65;* wishes to attack Sinuiju and Uiju, *72, 106;* agrees to combat limitations on B–29's, *73;* AAA defenses, *87;* reviews FEAF Formal Target Committee recommendations, *97;* recommends massed air attacks against Pyongyang, *98–99;* on psywar warnings, *103;* suggests use of incendiaries, *107;* approves continued air pressure, *123;* irrigation dam attacks, *127–31;* evaluates irrigation dam attacks, *130–31;* accepts some loss of air effectiveness during LITTLE SWITCH, *133;* comprehensive airfield attacks, *136–39;* concerned over movements of shoran beacon stations, *146;* evaluates F–86 fighter-bomber, *157;* estimates proportion of close support to total combat effort, *184;* views on air-ground training and experiments, *201–02;* seeks solution to C–124 supply support, *269;* refuses to divide airlift, *297*
Whisner, Maj. William T., Jr., *61*
White Horse mountain, *240*
Wings (numbered):
1st Marine Air: *12, 17, 20, 23, 32, 58, 75–76, 81, 175, 195, 197, 223, 291, 301;* support for Eighth Army operations, *184–92;* coordination control, *205–6*
3d Bombardment (Light), *17, 74, 110, 116, 134–35, 152, 154, 160–61, 166–67, 170, 192, 223, 228, 247, 301*
4th Fighter-Interceptor, *17, 50–52, 56, 58–59, 61, 64, 68, 87–88, 131–32, 162–63, 167, 170*
8th Fighter-Bomber, *17, 22, 88, 112, 131–32, 156–57, 162–63, 166–69, 187, 203, 218*
17th Bombardment (Light), *17, 116, 134–35, 154, 160–61, 166, 176, 182–83, 191, 247*
18th Fighter-Bomber, *17, 19, 21–22, 88, 131, 156–57, 162–63, 167, 175, 177, 223, 270n, 291*
19th Bombardment (Medium), *142*
31st Fighter-Escort, *19, 75*
35th Fighter-Interceptor, *19*
49th Fighter-Bomber, *17, 100, 155–56, 166, 170, 178, 182, 187*
51st Fighter-Interceptor, *17, 19, 21, 45, 50–54, 56, 60–61, 68, 87–88, 110, 131–32, 162–63, 166–67, 200*
58th Fighter-Bomber, *22n, 66, 127–29, 139, 155–57, 170–72, 187, 203–05*
67th Tactical Reconnaissance: *17, 95–96, 101, 116, 133, 166–67, 170, 179, 200, 228, 245, 247, 304, 306;* accomplishments, *231;* problems and capabilities, *233–42, 248–60*
90th Strategic Reconnaissance, *149*
98th Bombardment (Medium), *18, 71, 73, 75–76, 80, 105, 113, 142, 147, 246–47, 298*
116th Fighter-Bomber, *5, 19, 22, 22n*
136th Fighter-Bomber, *17, 22n, 155, 166*
307th Bombardment (Medium), *18, 71, 74, 77, 107, 142, 246–47, 298*
315th Troop Carrier, *18, 228, 265, 276–77, 292*
374th Troop Carrier, *18, 263–64, 267–72, 278–79, 282*
403d Troop Carrier, *18, 265–67, 292–93*
452d Bombardment (Light), *154, 160, 166*
474th Fighter-Bomber, *22, 22n, 120, 129, 132, 139, 155–56, 164, 170, 176, 203, 291*
483d Troop Carrier, *267, 272–76*
581st Air Resupply and Communications, *19, 232, 302*
2143d Air Weather, *304–5*
6160th Air Base, *171*
6332d Air Base, *142*
6400th Air Depot, *143*
Wolfpack guerrillas, *187*
Wonsan, *6, 29, 53, 55, 100, 102, 106, 111, 133, 255–56, 299, 301*
Wonsan airfield, *136, 139*
Wright Air Development Center, *52, 64–68, 80, 244*
Wright, Brig. Gen. Stuart P., *17*

THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

Y

Yak-15, *47, 69, 75*
Yangsi, *132–33*
Yellow Sea, *47, 64, 302, 305*
Yo-do, *299, 301, 306*
Yokohama, *265*
Yokota Air Base, *18, 96, 142, 144, 146–47, 232*
Yonan, *37, 100*
Yongampo, *125, 133*
Yongdang-dong airfield, *136*
Yongdungpo, *89*
Yongmi-dong, *112–20, 134–35*
Yongpong-dong, *125, 133*
Yong-san, *177*
Yongyu airfield, *136*
Yonpo, *103*
Yonpo airfield, *136, 139*

Z

Zimmerman, Brig. Gen. Don Z., *94, 97*

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THIS PAGE Declassified IAW EO12958

This Page Declassified IAW EO12958

THIS PAGE Declassified IAW EO12958