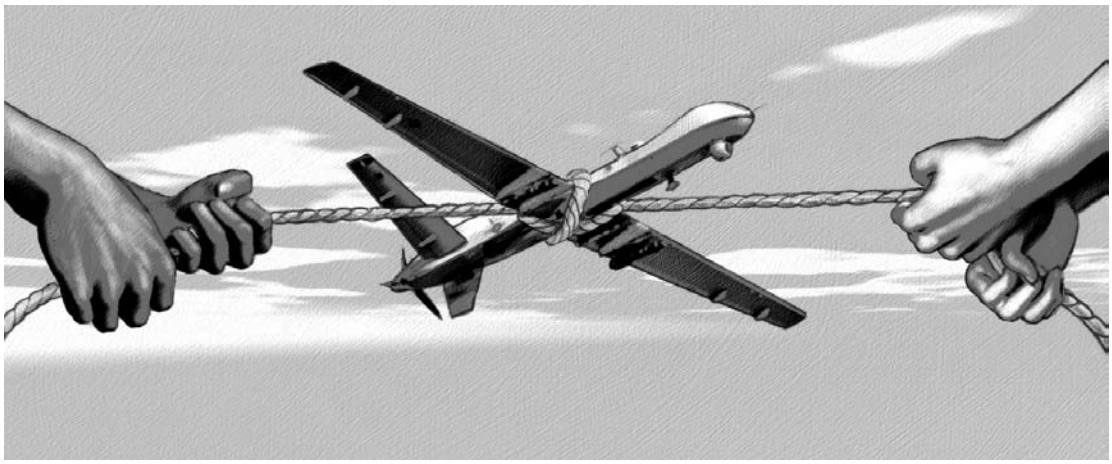
The Army's "Organic" Unmanned Aircraft Systems

An Unhealthy Choice for the Joint Operational Environment

Maj Travis A. Burdine, USAF

The rapid increase in demand for long-duration intelligence, surveillance, and reconnaissance assets, coupled with the Air Force's inability to meet that demand, has caused the Army to initiate procurement of its own extended-range, multipurpose, armed, "organic" unmanned aircraft systems (UAS) that will operate independently from the joint force air component commander's centralized control or tasking authority. The author discusses the Army's decision to parcel out these assets to division commanders and questions whether organic Army UASs provide the joint force commander the best solution for achieving US military objectives.



"Grunt 21, this is Cyclops 55, ready for check-in," says the pilot of the US Air Force Predator unmanned aircraft system (UAS) over the radio.

Grunt 21, an Army ground unit in the combat zone, replies, "Cyclops 55, this is Grunt 21. Go ahead with check-in."

The pilot, located in a ground control station in Las Vegas, Nevada, says, "Cyclops 55 is a single MQ-1B Predator, currently overhead at 12,000 feet, armed with two Hellfire missiles, 21 hours of playtime, with infrared-pointer and laser-designator capability. Sensors are on the target house, ready for situation update."

"Cyclops 55, Grunt 21 copies all. Situation update is as follows: the ground commander has been waiting two days to get Air Force UAS support over this target house. We plan to execute a raid in two hours. We are looking for a high-level insurgent commander and a weapons cache."

"Cyclops 55 copies all."

Just prior to the planned raid, the UAS crew hears a call for help from Alpha 6, an Army special forces team located 15 miles away from Grunt 21. "Alpha 6 is being engaged. Multiple friendlies killed in action. Requesting immediate CAS [close air support]!"

Knowing that troops in contact (TIC) are the joint force commander's (JFC) highest-priority objective, the UAS crew immediately conveys the TIC information to the combined air and space operations center (CAOC) and the special forces operations center. The CAOC informs Cyclops 55 that, at three minutes away, it is the closest asset.

The CAOC immediately directs the crew to support the CAS request. Cyclops 55 informs Grunt 21 that it is leaving its station to respond to a TIC and calls the airspace controller to request immediate clearance at 12,000 feet to the coordinates of Alpha 6.

"Cyclops 55, request denied. Army restricted operating zone [ROZ] Charlie is active directly in your flight path, surface to 25,000 feet."

"Cyclops 55 is unable to stand by. We are responding to a TIC with US casualties. Need immediate clearance at any altitude!"

"Unable to clear you for that airspace at this time. I do not own that airspace. It was chopped to the Army earlier this morning, and the status is unknown. We are trying to contact the Army on a separate channel. Meanwhile, I will arrange a longer alternate route."

While working the airspace problems, Cyclops checks in with Alpha 6 for a situation update. With gunfire in the background, Alpha 6 reports, "We hit a roadside bomb and were ambushed by an unknown number of insurgents. We are taking fire and need immediate CAS!"

After 13 minutes of working airspace issues, Cyclops 55 finally declares "on station" and receives the target information from Alpha 6.

"Cyclops 55, this is Alpha 6. You are cleared hot. Danger close!"

"Weapons away! Sixteen seconds to impact."

As the missile destroys the target, the Predator liaison officer in the CAOC receives a message from the original Army unit that was supposed to have Predator coverage all day: "Cyclops 55, there is an Army colonel on the phone with the joint force air component commander [JFACC], screaming about how you botched the entire operation by leaving his unit without his permission. He cancelled his entire ground operation because you failed to support him by departing your orbit . . . again."

THIS SCENARIO HIGHLIGHTS UAS challenges in the joint operational environment. The rapid increase in demand for long-duration intelligence, surveillance, and reconnaissance (ISR) assets, coupled with the Air Force's inability to meet that total demand, has caused the Army to initiate procurement of its own extended-range, multipurpose, armed, "organic" UASs that will operate independently from the JFACC's centralized control or tasking authority.

Is the Army's decision to parcel out theater-capable UASs to division commanders the correct way to apportion the limited supply of these high-demand assets? Do organic Army UASs provide the JFC the best solution to achieve

US military objectives? The Army's decision to develop and field organic theater-capable UASs is not in the best interest of the US military; however, there are ways to integrate these Army UASs into the joint operational environment.

Background

UASs give the JFC the ability to gain situational awareness of the battlefield and simultaneously project power. According to one key document, "information is the key enabler to today's joint warfighter," and ISR is still the number-one Department of Defense (DOD) priority for combatant commanders.[1] UASs deliver real-time, full-motion video and signals intelligence directly to tactical users and strategic decision makers, while "maintaining a degree of covertness."[2] These aircraft have the unique ability to sustain long-duration missions (in excess of 21 hours) by changing crews in the middle of a sortie. They provide "unrelenting pursuit" of the enemy while reducing the time required to prosecute "actionable intelligence."[3] The JFC can wield this capability without air-refueling tankers or support from combat search and rescue. Additionally, most Air Force Predator crews conduct operations from the United States via remote split operations (RSO).

The Air Force's MQ-1 Predators and MQ-9 Reapers fly 24-hour combat air patrols (CAP), supporting the JFC in US Central Command's area of responsibility. Each CAP provides armed reconnaissance with full-motion video at a fraction of the cost of manned assets. According to the 432d Wing at Creech AFB, Nevada, Predators and Reapers in 2007 and 2008 launched 247 Hellfire missiles (95 percent direct hits), dropped 71 bombs, supported 834 TICs, and provided armed ISR during 2,509 raids on enemy compounds in both Operation Iraqi Freedom and Operation Enduring Freedom, while burning less than four gallons of fuel per hour.[4] As demonstrated in the scenario that began this article, long-duration, centrally controlled, theater-capable UASs can also be dynamically retasked to higher-priority objectives within seconds. From proactive events (raid support, target development, direct attack) to reactive events (TICs, detection of roadside bombs), the demand for UASs continues to grow.[5]

Growth

The number of requests for UASs is staggering. In a memorandum to all his commanders, Gen T. Michael Moseley, former chief of staff of the Air Force, mentioned "a continued and apparent[ly] insatiable demand for our UAS capabilities," before outlining his plan to increase the Air Force's UAS capacity.[6] Predators have flown over 500,000 total hours since 1995, currently fly over 16,000 hours per month, and support the JFC with 31 CAPs in Central Command's area of responsibility.[7] To put this in perspective, three additional CAPs are the equivalent of building an entire fighter squadron's worth of aircrews.[8] Annual requests for full-motion video have increased by 300 percent.[9] According to the Air Force UAS Task Force, it took 12 years for Predator to reach the first 250,000 flight hours and only 20 months to reach the second 250,000 hours.[10] Although the Air Force's UAS capacity is doubling every two years, it still cannot keep up with current demands from war fighters (fig. 1).[11] Effective integration of emerging capabilities and systems into the joint operational environment for UASs is vital to the future success of US joint combat operations.

MQ-1B Predator versus MQ-1C Sky Warrior

The Air Force and the Army have developed two distinctly different constructs for operating essentially the same airframe. Both systems are theater-capable, medium-altitude, armed, multirole unmanned aircraft manufactured by General Atomics Aeronautical Systems (fig. 2). Both have two lasers (one for guiding munitions and one for illuminating targets at night), infrared cameras (for night operations), and electro-optical cameras (for color daytime video); moreover, both aircraft fly either line of sight or beyond line of sight with a satellite link, and both appear almost identical. The Air Force has flown Predators since 1995, while the Sky Warrior is still in develop-

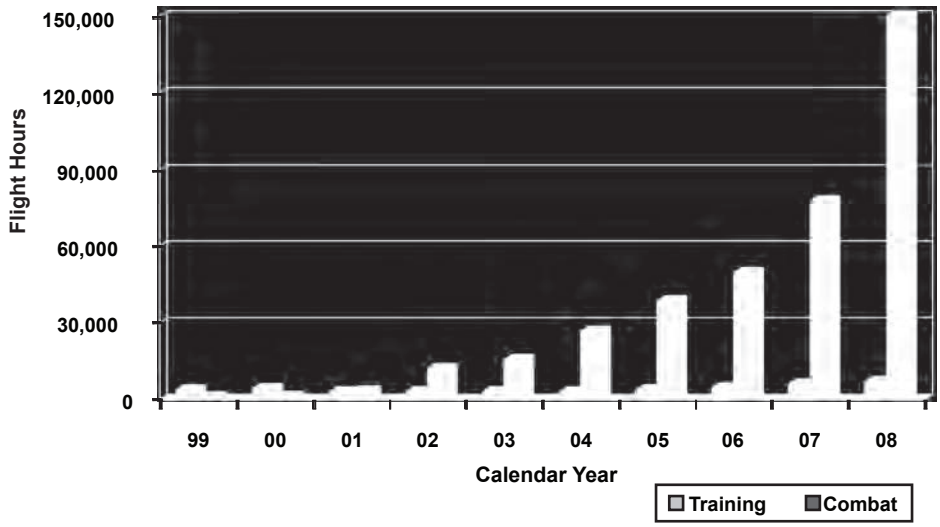


Figure 1. Growth of UASs: The MQ-1B Predator's flight hours. (From information provided by Headquarters Air Combat Command/A8U1.)

Capability	Predator (Fielded)	Sky Warrior (Preproduction)
Length	27 ft.	28 ft.
Wingspan	55 ft.	56 ft.
Weight	2,300 lb.	3,200 lb.
Endurance	40 hrs.	30+ hrs.
Max Altitude	25,000 ft.	29,000 ft.
Max Speed	120 knots	135+ knots
Max External Weight	300 lb.	500 lb.
Weapons	2 Hellfire Missiles	4 Hellfire Missiles
Payloads	- Electro-Optical/Infrared (EO/IR) Cameras - Synthetic Aperture Radar (SAR) Capable	- EO/IR Cameras - SAR - Signals Intelligence - Communications Relay
Fuel	Aviation Gasoline	JP-8 Heavy Fuel
Auto Takeoff/Landing	No	Yes
Ground Control Station (GCS)	Common between MQ-1/9	Army Universal GCS

Figure 2. Comparison of Predator and Sky Warrior. (From information available at General Atomics Aeronautical, http://www.ga-asi.com.)

ment. Sky Warrior, however, can carry two extra missiles and fly 4,000 feet higher than Predator (see fig. 2).[12]

Service Perspectives

The Air Force and Army have contrasting views of UAS employment. Department of Defense Directive 5100.1, *Functions of the Department of Defense and Its Major Components*, defines the functions of the services according to Title 10, *US Code*.[13] The functions of the two services are clearly different by design. However, the need for ISR, coupled with the advent of UASs, has blurred the boundaries between those functions.

Air Force

The Air Force has over 60 years of experience flying theater-capable medium-to-high-altitude manned aircraft, as well as over 14 years and half-a-million hours of Predator flying time. The Predator, the "Wright Flyer" of UASs, became the first production UAS in the Air Force's inventory. The Air Force and Federal Aviation Administration (FAA) use only rated pilots (or navigators with civilian commercial instrument ratings) to operate the larger theater-capable UASs because the skill set required to fly them in the joint operational environment is nearly identical to that required of pilots of manned assets.[14] Skilled pilots mitigate the risks associated with flying UASs in complex, crowded airspace and dropping precision weapons in close proximity to friendly forces.

To meet the overwhelming demand for ISR while decreasing the need for constant deployments, the Air Force developed the RSO concept to enable aircrews to perform theater operations from their home station. RSOs reduce the expeditionary footprint by enabling the pilot to control the aircraft via satellite link.

Air Force doctrine states that centralized control of limited airpower assets is essential to maximize aviation's strengths of range, speed, mass, and lethality.[15] In a memorandum to the chief of staff of the Army, the former chief of staff of the Air Force remarked that "interdependence has become the standard for joint operations and is a major priority for the Air Force."[16] Air Force doctrine calls for the theater air control system, operated through the CAOC, to manage the air war.[17] Centralized control of the entire airspace and all theater-capable assets provides massed "airborne ISR and firepower anywhere across the battlefield in minimum time."[18] The Air Force model responds to the theater commander's priorities by optimizing range, speed, and payload to deliver theaterwide effects. However, this construct often poses serious challenges for ground commanders.

Army

The primary purpose of Army aviation is to support ground-maneuver commanders and their objectives.[19] The Army has struggled to fulfill ever-growing demands for ISR following the terrorist attacks of 11 September 2001. In September 2007, Gen David H. Petraeus told Congress that "unmanned aircraft have proven invaluable in Iraq."[20] As the Army transformed into a lighter, more technologically reliant force, the capabilities that UASs bring to the ground fight became vital.

Simultaneously, the Air Force historically has failed to meet the Army's growing UAS and ISR needs, due to both a lack of assets and the necessity of fulfilling higher-priority requests such as special operations and TICs. Army colonel James G. Rose, commander of the Army Intelligence Center, observed that "current and envisioned non-Army UAV [unmanned aerial vehicle] systems are limited in their ability to provide responsive support to various requesting ground-maneuver units based on limited assets." Furthermore, he noted that "when units were successful in requesting UAV support, communications problems, delays in data receipt, and retasking procedures/authority decreased the effectiveness and responsiveness of the UAV system."[21]

In 2004 the Army decided to solicit bids for an extended-range/multipurpose UAS to replace the aging Hunter UAS and fulfill division commanders' requirements for dedicated, reliable, and organically controlled ISR. It did so partly because limited UAS support "is mul-

tiplied by the supporting units' lack of direct control and direct tasking authority over the UAV asset."[22] The Army contends that only UASs controlled by the division commander will be immune from last-minute, higher-priority taskings. It also strongly believes, based on success with smaller tactical UASs, that enlisted "operators" should fly these systems. Therefore, the only way to ensure that it has them is to own and control them.

Issue Analysis

To find solutions to the contrasting Air Force and Army UAS perspectives, one must review the following five contentious issues from both points of view. Additionally, it is important to acknowledge the change in environment over the past five years, particularly the growth in the Air Force's UAS capacity and the increased experience of both services.

Command and Control

According to Air Force doctrine, centralized control and decentralized execution are critical to the employment of airpower because they have "been proven over decades of experience as the most effective and efficient means of employing air and space power."[23] The CAOC weapons system, as part of the theater air control system, "provides operational-level C2 [command and control] of air and space forces" capable of coordinating thousands of sorties per day.[24] Historically, there has never been enough airpower—including UASs. To gain maximum capability from limited air assets, a single Airman—the JFACC—should be responsible to the JFC for all such assets capable of operating throughout the joint operations area.

The Army intends to give operational control of Sky Warrior to the joint force land component commander, who will delegate tactical control to division- and brigade-level commanders. Operational and tactical control of Predator, on the other hand, resides with the JFACC for centralized tasking. The Army's current plan calls for each Army division commander to receive 12 Sky Warrior aircraft.[25] This level of control explicitly prohibits the JFACC from using these assets for integrated JFC objectives, effectively mitigating the positive attributes of mass and maneuver for dynamic situations.

After reviewing the current UAS situation, retired Army general Barry R. McCaffrey wrote, "We are confusing the joint battle space doctrine. Air Component Commanders should coordinate all UAVs based on Combatant Commander situational war-fighting directives."[26] Air Combat Command (ACC) and the Army Training and Doctrine Command recently developed a "Predator and Sky Warrior UAS Enabling Concept" outlining how the JFC will employ these two similar aircraft. It allows the JFACC to manage most assets for air-centric campaigns, giving the organic Army assets back to the joint force land component commander for predominantly ground-centric operations.[27] This concept is a positive sign that the Army and Air Force can employ a joint, interdependent solution that best meets the needs of the JFC.

Military leaders since World War I have tried various constructs to manage limited airpower assets—each with varying degrees of success. In the North African battle at Kasserine Pass during World War II, the Germans decimated American ground forces. Army doctrine at the time tied airpower, as an auxiliary force, to the corps commanders. Airmen commonly used the phrase "penny packets" when referring to "the improper subdivision and parceling out of airpower to ground forces," a procedure that failed miserably.[28] While German planes attacked Gen George Patton's troops, "some fighters and bombers were not even tasked" to help out. The few Allied aircraft that did fly were unable to coordinate their efforts. British air marshal Arthur Coningham declared that "the strength of airpower lies in its flexibility and capacity for rapid concentration."[29] Airpower did not arrive when ground commanders needed more air help than they could organically provide themselves. The ground commander's inability to coordinate and mass airpower over the enemy caused the death of many US soldiers. Air Marshal Coningham added, "It follows that control must

be centralized in an air commander and command exercised through Air Force channels; and air forces must be concentrated in use and not dispersed in penny packets." Within three weeks of returning from Africa, the War Department published Field Manual 100-20, which declared that "the inherent flexibility of airpower is its greatest asset. . . . Control of available airpower must be centralized and command must be exercised through the air force commander if this inherent flexibility and ability to deliver a decisive blow are to be exploited."[30] The success of the major combat phases of Operations Desert Storm and Iraqi Freedom demonstrated the lethality of joint airpower managed by a single Airman. The Army has a penchant for lessons learned, so it would be a travesty if it had to relearn past lessons by penny packeting the Sky Warrior to division commanders.

Rated Pilots versus Operators

The most apparent divergence between the Army's and Air Force's UAS models is the Army's plan to fly the Sky Warrior with enlisted "operators." The Air Force contends that only officer rated aviators should fly Predators. General Atomics has committed to incorporating new technology into Sky Warrior that will reduce the Army's need for traditional pilots. These advances include an automatic takeoff-and-landing system, an automatic sense-and-avoid capability to help prevent midair collisions, and an improved, user-friendly ground control station. Simultaneously, to get more capacity out of its existing platforms, the Air Force is pushing increasingly complex upgrades, such as advanced weapons and the operation of multiple aircraft by one pilot. The Air Force uses the skill and experience of fully qualified pilots to safely fly UASs within 1,000 feet of manned aircraft, a feat regularly required by the current operational environment.[31] As the joint community continues to demand greater coverage and increased capabilities from UASs, we must have well-trained "pilots" flying them. The Air Force stood up the first UAS Weapons School at Nellis AFB, Nevada, in September 2008 in order to continue to push the upper limits of UAS capabilities so vital to the service's core mission requirements.[32]

Although we can accept risks in combat airspace, major legal issues exist for nonpilot operators flying UASs in both US and international airspace. According to the FAA, "a person may not act as pilot in command or in any other capacity as a required pilot flight crew member of a civil aircraft of the U.S. registry, unless that person has a valid pilot certificate." Furthermore, "because the FAA has determined that UAS are civil aircraft . . . [they] must be operated by a pilot."[33] The rules are the same in foreign airspace. Annex 13 of the International Civil Aviation Organization Convention states that "UASs are aircraft," thereby subject to the same rules and regulations as manned aircraft.[34] For example, to fly above 18,000 feet in the United States (the altitude varies by country), pilots must have an instrument rating. All Air Force pilots maintain an instrument qualification, allowing them to fly above 18,000 feet. The former chief of staff of the Air Force cited the requirement for all of the Air Force's UAS pilots to be "credentialed" to fly anywhere in the world as one of his reasons for cancelling the first Predator nonpilot test program.[35] Both the FAA and International Civil Aviation Organization have declared that the rules applying to manned aircraft are the same for UASs. The DOD and JFC should comply with these regulations. A midair collision between a large UAS and a civilian airliner would have strategic repercussions for the joint fight, especially if nonpilot operators were involved.

Airspace Control and Deconfliction

UASs make airspace control and aircraft deconfliction significantly more difficult in the joint air domain. High-flying, long-loitering, and organically controlled Army UASs vastly complicate the JFACC's limited and crowded airspace dilemma.

The airspace control plan for the Army's organic UASs degrades the combat effectiveness of the joint force. The Air Force's theater air control system and the Army's airspace C2

systems meet at a horizontal plane in the joint air domain called the "coordinating altitude" (fig. 3). Recent combat operations have placed that altitude at approximately 3,000 feet above the ground.[36] All aircraft above the coordinating altitude must fly in a more centralized, positive-control manner, falling under the procedures and special instructions set by the JFACC.[37] The newer, more capable Army UASs (like Sky Warrior) operate at much higher altitudes than that service's traditional aviation assets. The Army's desire to fly its noncentrally managed aircraft in the JFACC's centrally managed airspace (above the coordinating altitude) is one of the major contentious issues degrading the effectiveness of joint combat.

The Army solution to this airspace-coordination issue calls for creating a restricted operating zone around the UAS. As depicted in figure 3, the ROZ is typically a large cylinder of airspace, from the surface to an altitude safely above the UAS, that excludes other airspace users. This allows the Army to fly without using centralized positive-control procedures. The disadvantage of this model is that it uses airspace inefficiently, preventing airspace controllers from maintaining situational awareness within the ROZ and making it difficult for other air assets to navigate through the joint airspace. According to joint doctrine, "efforts should be made to integrate UAVs with manned flight operations to enable a more flexible and adaptable airspace structure."[38] Using the ROZ as a UAS airspace-control measure represents a step backwards towards independent and deconflicted operations, which lack the synergy that properly integrated airpower should bring to the joint fight.

Many of the Army's organic UASs fail to integrate into the JFACC's airspace plan, making air defense difficult. Historically the JFACC (or CAOC) has little situational awareness of air operations below the coordinating altitude or inside the ROZs. The Army's organic aviation assets such as helicopters and UASs take off, land, and fly at the discretion of the ground-maneuver commander. This disconnect with the JFACC fails to provide a common operational picture, making air defense virtually impossible—historically not a problem due to US air supremacy. In Iraq, improvised explosive devices (IED) have killed more ground soldiers than any other threat—over 60 percent of the total—and the enemy, no doubt, will convert inexpensive UASs into airborne IEDs.[39] To support the joint fight, the

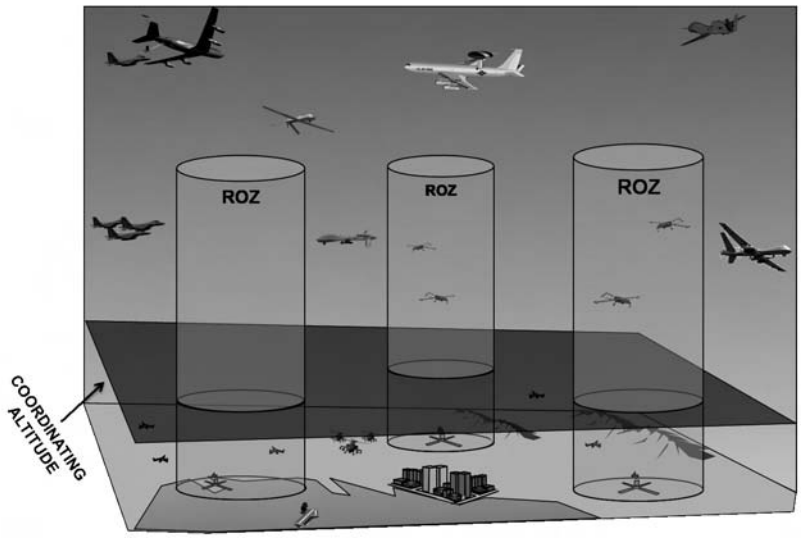


Figure 3. The restricted operating zone and coordinating altitude

JFACC, as the designated area air defense commander, must be able to integrate all airborne assets into one system.

Service Interdependence

Joint interdependence offers the best solution to allow the United States to win future wars in an environment of significantly constrained resources. Lt Gen David Deptula highlights the progress thus far: "Goldwater-Nichols helped move the American military from the independent, barely deconflicted operations of the early 1980s to the sustained interoperability that has proved so effective [today]."[40] But it is time to make the next step to interdependence.

The JFC cannot afford to have two independent and barely deconflicted airspace control systems or two redundant, separately developed weapons systems. Joint doctrine states that "joint interdependence is the purposeful reliance by one Service on another Service's capabilities to maximize complementary and reinforcing effects."[41] According to Army Field Manual 1, "joint interdependence allows each Service to divest itself of redundant functions . . . [and] reduces unnecessary duplication of capabilities among the Services . . . [to achieve] greater efficiencies in their respective domains."[42] The current diverging plans for Predator and Sky Warrior do not follow joint interdependent principles.

The Air Force's repeated failure to meet the needs of the Army has reduced trust between the two services. Consequently, the Army is scheduled to spend $1.02 billion to research, develop, test, train, and field the Sky Warrior UAS—a capability that already exists in the Air Force.[43] Meanwhile, the Air Force simultaneously develops, trains, and fields a temporary force of Airmen to augment the Army by performing traditional Army functions, such as guarding prisoners, driving convoys, and conducting civil affairs, having deployed over 22,000 Airmen since 2004 to perform such Army functions.[44] Congress has already initiated a comprehensive review of service roles and missions to determine if it is in the best interest of the country to have the Army build an air force while the Air Force builds a small land force. Only a proactively designed interdependent system will allow American service members to deliver the efficient combat performance that American technology promises to deliver.

Deployment Footprint

An integral part of service interdependence lies in achieving greater efficiency by optimizing the expertise of each service.[45] Flying theater-capable UASs from the United States offers the best example of how the Air Force's lessons learned from a fielded system promote efficiency through centralized control. According to ACC, remote split operations represent a force multiplier that provides a 200 percent increase in armed ISR capability to the JFC with almost no extra manning or aircraft. For example, without RSOs, it takes 240 total aircrew members (pilots and sensor operators) to sustain four CAPs in-theater—80 deployed, 80 in garrison, and 80 in preparation for deployment. With RSOs, ACC maintains four CAPs indefinitely with only 86 total aircrew members—80 flying combat missions (while in garrison) and six deployed.[46] RSOs allow over 85 percent of trained crews to support the JFC indefinitely.[47]

The Army system dedicates a combat aviation brigade, including a Sky Warrior company, to each division in the traditional deployed manner—with only one-third of the force deployed at a time.[48] According to the Air Force's UAS Task Force, the JFC would receive an almost 100 percent increase in CAPs by applying the Air Force's RSO model to the planned Army Sky Warrior program. The current Sky Warrior plan would provide 21 CAPs to Central Command. By applying the RSO model, that number increases to 40 long-term, sustainable CAPs.[49]

Army leaders argue that organic CAPs of Sky Warriors supporting the division commander will be more effective than RSO CAPs. An Army publication notes that "dedicated UAS at brigade level will increase effectiveness of operations by providing more responsive and more detailed reconnaissance."[50] The Army contends that requesting UAS support in the

Air Force's method of centralized control is too slow and carries too much risk of having the asset diverted to other priorities. It also believes that RSOs negatively impact effectiveness due to the communication degradation caused by the 8,000 miles between crews and ground commanders. Finally, the Army argues that in order to fight as a cohesive unit, the aircrew needs to deploy with the units it supports, so as to "feel" the intensity and tempo of the day-to-day fight.[51]

These concerns are warranted; however, it is unlikely that the ground commander will be colocated with the UAS crews due to Sky Warrior's runway-length requirements. The Army will use UAS communication methods similar to those the Air Force uses today, such as radio, chat, phone, and e-mail.

Recommendations / A Solution: The UAS Capability Envelope Model

It is time for a comprehensive review of airpower management in the joint operational environment. The rapid proliferation of theater-capable UASs has brought this issue to a point that requires action. Realistically, the Army will not abandon the Sky Warrior program. Despite the negative effect on the joint operational environment, Sky Warrior and other (non–Air Force) theater-capable UASs will proliferate. The secretary of defense must convey to the joint community a clear and achievable system that addresses the five contentious issues highlighted above. Only then will the DOD maximize taxpayer dollars in a truly joint, efficient, and effective plan that meets the needs of both the Army and the JFC.

UASs will continue to provide increased combat capabilities. Both the Army and the Air Force should develop their theater-capable UASs as fast as possible, with their respective sights set at opposite ends of the UAS complexity envelope (fig. 4). The Army should develop its UAS force, focusing on the higher-demand tasks found at the lower end of the complexity spectrum (e.g., small-unit situational awareness, battlefield awareness, communications relay, and rotary-wing teaming / target acquisition). The Air Force should concentrate its efforts on the requirements aligned with its core function found at the upper end of the complexity envelope (e.g., air superiority, global precision attack, combat search and rescue, C2, and global integrated ISR). Additionally, the Air Force should continuously expand its end of the envelope with the addition of highly complex UAS tasks such as suppression of enemy air defenses, air-to-air engagement, and airborne forward air control. This interdependent model would provide maximum capability to combatant commanders while capitalizing on the strengths of the respective services. In order to build this UAS capability envelope, we must first resolve the five contentious issues, discussed previously.

Implementing the following recommendations would help resolve the contentious issues:

1. We must treat theater-capable Army UASs the same as other similarly capable fixed-wing manned aircraft (regardless of service). Systems such as Sky Warrior must operate under the same nonorganic centralized control system as the JFACC's other air assets. The Army will still operate the systems and regularly support its own ground commanders' taskings, but the JFACC would have situational awareness and retain retasking authority to capitalize on the strengths of centrally managed airpower. The division commanders can retain their smaller, less capable assets but would have to compete for the theater-capable assets with the rest of the joint community. Centralized control of all theater-capable aircraft is feasible if the Army can clearly articulate its required baseline requirements to the JFC.

2. To resolve the "pilot" versus "operator" issue, we must ensure that all personnel who control UASs are pilots in the traditional sense. At a minimum, the Army's UAS training plan must include training equivalent to that required to earn a basic civilian pilot's license. In addition, Army pilots would need an instrument

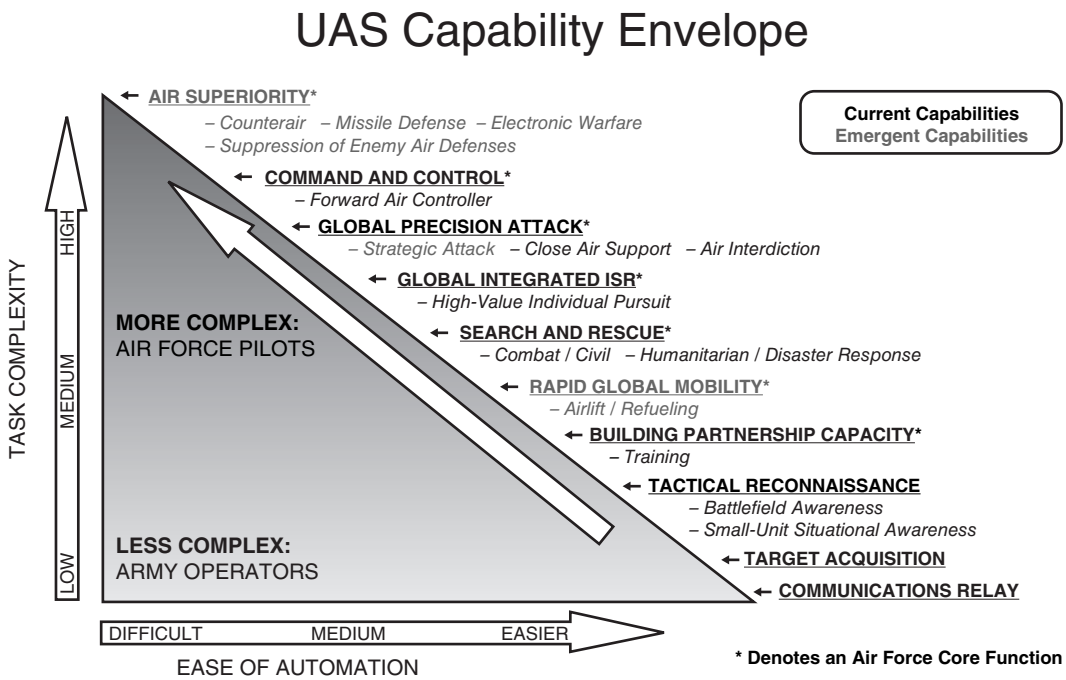


Figure 4. Air Force and Army UAS interdependence model

rating to fly at high altitude or in clouds. This policy would assure that all aircraft flying in the joint operational environment are legal and safe, as was the case prior to the advent of Army UASs.

3. Rather than protect high-flying Army UASs (like Sky Warrior) in the highly inefficient ROZs, we must see to it that airspace controllers actively manage those aircraft. ROZs dedicate an inordinate amount of airspace to each aircraft and drastically complicate the JFACC's airspace plan. The joint community must make ROZs the exception instead of the rule.

4. We must realize that the effective way to solve the Army's demands for UASs in-theater involves placing more of them in the joint fight through the RSO model. Flying UASs from the United States via the RSO system has tripled the number of the Air Force's theater-capable assets available to the JFC. The Sky Warrior system should adopt the RSO model and thus provide the greatest capability to the joint environment.

The Army's adoption of the preceding recommendations will result in service interdependence. If the two services focus their efforts on their respective ends of the UAS capability envelope, then a truly interdependent system will prevail. Only then will aviation assets in the joint operational environment be able to satisfy the JFC's aviation-related objectives.

Conclusion

Airmen and soldiers alike must put service rivalries aside, think creatively, and work together to solve today's problems. The current UAS C2 system is not capable of handling a significant number of theater-capable UASs flown by "operators" in a decentralized man-

ner in airspace that excludes other air assets. To fully utilize the potential of this new technology, the DOD must develop a single interdependent system capable of maximizing the joint operational environment. The day the enemy starts flying remotely operated flying IEDs will mark the first time in over 50 years that the Army will need to worry about enemy threats from the air. It would be tragic if the United States lost air superiority due to the services' unwillingness to agree on one seamless model for the joint air domain.

Joint doctrine tells us that "the synergy that results from the operations of joint forces maximizes the capability of the force."[52] The Army's proposed Sky Warrior model does not capitalize on jointness. We must resolve the five issues dealing with the joint operational environment, highlighted by comparing the Air Force's Predator to the Army's Sky Warrior. The joint battlespace is starting to suffer, and matters will only get worse. The Army and the Air Force can no longer "agree to disagree" on the UAS issue because risks to the joint fight are too high. The secretary of defense must make the tough decision that "going organic" with theater-capable Army UASs is unhealthy for the joint operational environment. ❑

Notes

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4. Col Christopher Chambliss, commander, 432d Wing, Creech AFB, NV (presentation to the US Air Force UAS Task Force, 9 January 2009).

5. Joint Unmanned Aircraft Systems Center of Excellence, *Joint Concept of Operations for Unmanned Aircraft Systems* (Washington, DC: Joint Unmanned Aircraft Systems Center of Excellence, 2007), II-22.

6. Gen T. Michael Moseley, memorandum for record to all MAJCOM CCs, subject: Direction to Maximize UAS Capability, 29 February 2008.

7. Maj Jonathon Songer, UAS subject-matter expert, Allied Forces Central Europe, telephone interview by the author, 10 January 2009.

8. According to Col Eric Mathewson, it takes 10 pilots and 10 sensor operators to stand up an additional CAP. During surge operations, this number can be reduced to seven. The average Air Force single-seat fighter squadron has 20–25 pilots. Two-seat fighters such as the F-15E have 20–25 of each crew member. Therefore, adding three CAPs requires 21–30 UAS pilots and 21–30 UAS sensor operators—the same number of aircrew members as an entire fighter squadron. Col Eric Mathewson, commander, 432d Operations Group, telephone interview by the author, 15 March 2008.

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