

NATIONAL DEFENSE UNIVERSITY

NATIONAL WAR COLLEGE

USING SPACE FORCES AS MILITARY FLEXIBLE DETERENT OPTIONS

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Desert Storm was a watershed event for space systems. Satellites, and the ground systems and people trained to control them, played a crucial role in the outcome of the conflict. Space owned the battlefield. We had a robust on-orbit constellation and the inherent spacecraft flexibility to alter our operations to support specific needs of the terrestrial warfighter.¹

INTRODUCTION

The deployment and employment of space systems has had a profound affect on the current and future conduct of warfare by the armed forces of the United States. Although the origins of U.S. space forces date back to the early 1960s, exploitation of these systems has been limited to force enhancement of terrestrial combat forces. The United States does not possess an ability to apply force from space, however current and future space platforms can support National Military Strategy in ways other than force enhancement. This paper examines the use of space forces as flexible deterrent options (FDO) to coerce the behavior of a potential adversary. Space forces, due to their inherent flexibility and combat enhancing functions, could prove an effective contributing FDO in conjunction with other diplomatic, economic, informational or military options. These space force FDOs should be include in future joint warfighting doctrine and made applicable to current and future joint operations.

Military strategy is the art and science of employing the armed forces of a nation to secure the objectives of national policy by application of force or the threat of force.² As a nation, we looked to the “threat of force” as an effective deterrent to potential aggressors;

however, we also possess the military might to accomplish the stated objectives should deterrence fail. Deterrence, across all mediums of conflict, is a psychological communication to a potential adversary allowing them to conclude that aggressive action will fail and the consequences outweigh the benefits. “Military forces contribute significantly to deterrence by presenting visible evidence of their ability to defeat aggression, including the ability to act globally, rapidly, and decisively in conjunction with indigenous military forces.”³

Since most crisis and conflicts do not occur overnight, the United States can deter escalation, defuse situations or limit conflicts by employing various elements of national power (i.e. diplomatic, economic, military, and informational). Military flexible deterrent options (FDO) are actions taken by joint forces to signal U.S. resolve as a means to deter the actions of a potential adversary. As stated above, deterrence is about communications. The Joint Staff Officer’s Guide looks at flexible deterrent options as: “A planning construct intended to facilitate early decision by laying out a wide range of interrelated response paths that begin with deterrent-oriented option carefully tailored to send the right signal.”

In many cases, these FDOs involve the movements of personnel, equipment and capabilities to geographic locations in proximity to the adversary. We traditionally think of troop movements, forward deployment of naval warships and reserve force call-ups as examples of FDOs that signal U.S. commitment and resolve. These examples demonstrate the traditional reliance upon terrestrial forces as deterrent options based upon their physical presence. Because of our increasing reliance on space-based forces to provide battlefield situational awareness in preparation for synchronized action against a potential adversary, deployment of space forces are potential military FDOs.

From Operations Desert Storm to Allied Force, there is a growing body of knowledge and experience demonstrating the ability of space forces to increase situational awareness and enhance terrestrial combat firepower. The combination of space and terrestrial forces gives the United States the ability to globally “see first, hear first, and strike first.” Space-based missile warning, navigation, communications, weather and reconnaissance allow us to “see first and hear first.” These capabilities permit combat firepower to be applied decisively, lethally, and unexpectedly. If an adversary knows that space forces are deployed with exclusive focus on their Area of Operations (AO), they might reevaluate the cost of engaging the United States in armed conflict.

Military FDOs, that use terrestrial force packages, are highly visible even when unintended; however, space forces are often unseen. Placing the 82nd Airborne Division on alert or deploying F-117s from Holloman AFB to Kuwait are physical force movements that are clearly visible and almost always publicized (whether intended or not). When space forces are deployed (i.e. repositioned) to future combat AOs, they are not widely reported even though we have demonstrated in recent history that combat forces normally engage when space forces are in full support. Although most space force deployments are either done in secret or not sufficiently publicized to the general public (and the adversary), these movements in conjunction with informational FDOs could shape the decision making process of the potential aggressor. In the following paragraphs, we will look at three short cases where space forces in conjunction with other tools could have been used as FDOs.

SPACE FORCES AS FLEXIBLE DETERRENT OPTIONS (FDO)

“Space force deployment” is the action of altering or moving space forces in order to focus maximum capabilities on an Area of Operations (AO). Although not defined in official joint warfighting doctrine, space force deployments are integral to exploiting space for joint operations. The Joint Staff Officer’s Guide defines deployment as “the reallocation of forces and material to desired areas of operations.”⁴ We will see in the three cases below, space forces deployed from different hemispheres or focused on desired areas of operations to fit within the spirit of the joint doctrine definition. To demonstrate how these space deployments can be used as FDOs in future conflicts, we will examine these cases captured during Operations Desert Shield and Storm. Even though the Gulf War’s use is historical, the concept of deploying space forces to enhance the combat killing capability in the AO can apply to all types of space forces and across all spectrums of conflict both current and future.

Optimize Space-based Missile Warning on the Area of Operations (AO)

The ability to “see first” on the battlefield not only includes space-based missile warning but intelligence, surveillance, and reconnaissance (ISR). “Seeing first” attacks the enemy’s element of surprise, which may eliminate their only advantage against U.S. forces. Although this section will only discuss missile warning, the premise is applicable to other space-borne ISR forces. The ability to “see first” and the enemies’ knowledge of this fact eliminates the element of surprise from the enemy’s cost/risk calculation.

A key component of the U.S. military defensive architecture is the capability to provide Integrated Tactical Warning and Attack Assessment (ITW/AA) to U.S. forces worldwide. A principal feature of this system is space-based early warning provided by the Defense Support

Program (DSP). First launched in the 1970s, the DSP constellation has provided uninterrupted early warning to the United States of ballistic missile attacks against North America; however, the Gulf War changed the focus of this mission from CONUS-centric to theater-centric. The system's capability was demonstrated during the Gulf War when satellites detected Iraqi SCUD launches and provided warning to civilian populations and coalition forces in Israel and Saudi Arabia.⁵

The most critical element in an adversary's tool bag against the United States is the element of surprise. The ability to mass forces undetected or launch missiles at U.S. forces is critical to the adversary's ability to seize the initiative. If the enemy loses the element of surprise, it might make them more reluctant to expose their forces to attack. The essence of space-based warning and other reconnaissance/surveillance-type space forces is their ability to deny the enemy the element of surprise. They can become even more effective when deployed to blanket the enemy with continuous coverage thus reducing the adversary's ability to move or launch undetected.

Deployment of the DSP satellites to Southwest Asia (SWA) increased the accuracy of missile launch detections while reducing warning times to theater forces. The 50th Space Wing (under USCINCSpace) reoriented DSP satellites into optimal locations in order to focus maximum capability on the AO, thus enhancing our ability to detect SCUD launches. This also aided in the ability of coalition strike forces to rapidly retaliate against identified launch locations. Air Force planners sought to increase early detection of Scud launches by deploying the DSP satellite stationed over the Indian Ocean to a westward location.⁶ Moving a DSP satellite to a new location to enhance coverage required the expenditure of precious, non-renewable fuel, which makes this decision very critical, and a clear demonstration of U.S. commitment to a

certain course of action. Deploying an additional DSP satellite to the SWA Theater was limited by the time required to drift the satellite to an optimal location; however, the location of the Indian Ocean DSP satellite at 70 degrees east longitude minimized this factor. This inherent flexibility characterized by aerospace forces “will allow us to find, fix, track, target, engage, and assess any target, any opponent, globally, 24-hours a day, in all-weather.”⁷ If a potential adversary is aware of this space force deployment and views it as a strategic and tactical precursor to strike operations, they may deviate from or delay the implementation of their undesired course of action.

Optimize GPS Space-based Navigation in the Area of Operations (AO)

During Operation Desert Shield and Storm, the Global Position System (GPS) provided U.S. forces with highly reliable and accurate navigation in the featureless terrain of the Saudi Arabian desert. Providing all weather, day/night, precision navigation for deployed forces in the AO significantly increased the lethality of U.S. combat forces. Deployment of GPS satellites to their operational locations with focus on Southwest Asia enabled U.S. forces to unleash extensive and sustained combat firepower when deterrence failed.

First launched in 1978, the GPS constellation was not declared operational until 1995. With only 16 of the necessary 24 satellites in the system during Desert Storm, the Air Force was able to provide highly accurate navigation to the Area of Operations (AO). The 50th Space Wing (under USCINCSpace supporting the CENTCOM Joint Forces Commander) optimized the 16-satellite constellation by rephasing the satellite orbits and vehicle orientations to provide maximum capability over the AO. Deploying the GPS satellites from their test locations to

operational locations allowed the constellation to provide U.S. combat forces two-dimensional (latitude and longitude) navigation 24 hours per day and three-dimensional (latitude, longitude, and altitude) navigation for 20 hours per day. Additionally, planners altered the orbit of GPS Block II #9 to optimize its coverage over Baghdad, especially at night.⁸ These orbital adjustments (or space force deployments) reduced navigational accuracies in other theaters as planners concentrated assets on Southwest Asia (SWA). With the completion of the 24-satellite constellation in 1995, global coverage is no longer sacrificed to concentrate a limited number of satellites on a particular AO however; space force deployments can still be used to ensure the most accurate signal reaches deployed forces in the event of satellite failures or counterspace operations by a potential adversary. Rephasing GPS during Desert Shield and Desert Storm demonstrated a capability to focus space-based navigation on an area of interest and thus heighten situational awareness and force enhancement for combat forces in the region.

The second piece of using GPS as a space force FDO is the use of selective availability (SA). Use of Selective Availability as a counterspace or space denial FDO demonstrates U.S. commitment to maintain exclusive use of the most precise navigation signal and defeat an enemy's use of the same medium. This action could influence an adversary's calculus between facing the precision-guided firepower of the United States and his non-GPS supported forces.

Selective Availability is a military warfighting feature on GPS that introduces errors into the broadcasted signal in order to reduce the accuracy of the system. This prevents non-military users or adversaries from acquiring the most accurate signal and using it to their advantage. U.S. and Allied military users with special GPS receivers can filter out the SA effects and receive positional accuracies to within thirty feet.⁹ Because of a shortage of military-specific receiver units equipped to operate with SA enabled, selective availability was turned off to accommodate

those force deploying to Desert Storm with commercial receivers. Eleven years since the Gulf War, U.S. and Allied forces have integrated GPS receivers into combat platforms that can now work in a SA enabled environment. Activating SA prior to conflict could be used as a clear signal to a potential adversary of U.S. commitment and resolve to deter aggression. An adversary could postulate the activation of SA as a precursor to U.S. and Allied combat operations. Should deterrence fail, the adversary would be clearly aware of the tactical disadvantage his forces face in terms of precision navigation by U.S. and Allied combat forces. Activation of SA would be unpopular with the U.S. civil community and other nations that rely upon the unadulterated GPS signal; however, our decision to enable SA in the face of international criticism would demonstrate a clear resolve and maybe force an adversary to rethink a dangerous course of action.

Optimize Military Space Communication Satellites in the Area of Operations (AO)

“Seeing first” on the battlefield is critical to decision-makers formulating policy and direction; however, guidance and orders cannot be effectively executed without “hearing first.” During the Gulf War, military satellite communications was the linchpin for successful joint operations in an immature communications environment. By using military satellite communications, as well as civil, commercial, and international systems, commanders disseminate plans and orders over long distances.¹⁰ The ability to “hear first” provides U.S. combat forces the advantage to strike over great distances with synchronization. This global command and control potential enhances the joint warfighting element of “unity of command” before “striking first.” It is likely that U.S. forces will find themselves increasingly involved in areas where terrestrial communications are sparse or denied. Space force deployment of

satellites to Southwest Asia during the Gulf War was critical to the movement of the U.S. Army's Third Corp from Germany to the AO. As a flexible deterrent option, massing of satellite communications in the AO signals our intent to provide our armed forces "broadly connected joint system of systems that provide total battlespace information."¹¹

With military satellite communications already saturated before October 1990, joint planners were troubled by the lack of terrestrial infrastructure to support intra-theater communications as well as the ability to "reach back" to CONUS. After extensive discussions with the Joint Staff and Defense Communications Agency (DCA), USCINCSpace directed the 50th Space Wing to deploy an aging Defense Satellite Communications System (DSCS) spacecraft from its position high above the Pacific Ocean to the Southwest Asia Theater. The addition of this satellite would satisfy the communications requirements of the U.S. Army's Third Corp as it arrived in the theater before December 1990. Additionally, civil and commercial resources were purchased or leased from various agencies to increase the capacity and bandwidth of intra- and inter theater communications. The deployment actions not only included the movement of the DSCS satellite but the movement of satellite antennas (or beams) in order to focus all available resources on the AO.

With limited on-orbit resources, these deployments reduce capabilities in other theaters and reduced the life expectancy of space-based assets through the expenditure of non-renewable fuel. Because of the risk to satellite mission life and reduced capabilities in other theaters, deployment of space forces can be a clear sign of U.S. commitment to certain actions over the risk inherent in removing assets from another theater. The arrival of the DSCS satellite and other C4I assets ensured the U.S. would be "first to hear" in the SWA.

If an adversary believes the United States will not fight without “seeing and hearing first,” the commitment of space forces is a clear indication of U.S. resolve in the face of conflict. With assets in position providing command/control links with combat forces while ISR platforms survey and target the enemy, U.S. forces are poised to unleash overwhelming firepower if deterrence fails. With the global strike ability of U.S. forces from CONUS, space force deployments may be the only indications of an imminent attack. If an adversary understands the long-range nature of U.S. firepower, the deployment of space forces may be enough impetus for him to withdraw or change his course of action

INFORMATION OPS AND SPACE FORCE FDOs

The three cases above are only a few space deployment options available to CINCSPACE to increase situational awareness and force enhancement. Despite these various techniques, the key to using them as FDOs rest with the ability of the U.S. government to communicate these actions to a potential adversary. Since the adversary may lack the ability to see these actions taking place, information operations/warfare and public diplomacy may be used to communicate the relevance of these deployments.

Open source information carried by news media would provide this type of information to the adversary. Daily press briefings from the supported CINC headquarters concerning the deployment of certain space assets to the region or the activation of selective availability would ensure that open source information is available to the adversary’s leadership. Since we have no guarantees that open source, uncensored media will reach the adversary, diplomatic notification of these types of actions may also be required.

If the leader or his advisors cannot receive the information via open source media or the message is unclear, the diplomatic channels for send information to national leaders could be used to communicate space force deployments to the adversary. Diplomatic personnel can provide briefings or photos to communicate capabilities brought to bear on the situation and the potential actions that could follow. The key to making space force deployments an important element in the mind of the adversary is publicizing deployments through open source media or diplomatic communications.

THE RISK OF USING SPACE FORCE FDOs

Space forces and Flexible Deterrent Options are situational dependent and carry certain levels of risk in their implementation. Like all FDOs, they may not apply in every case; however, they are options available if conditions warrant. This section highlights the risk of using space forces as FDOs.

First, adversaries with demonstrated anti-satellite, counterspace or advanced denial and deception programs may use these deployments as opportunities to deny, disable or disrupt our space forces. Space forces may become a principal target of the enemy in order to eliminate the “see first and hear first” abilities of the United States. In these types of situations, openly publicizing space force deployment may not be appropriate. This can be true in many cases in which the adversary has an ability to disrupt the capability put forth.

Second, deploying space forces may require the use of non-renewable fuel, thus reducing the mission life of the space-based asset. Premature expenditure of fuel could reduce the long-term use of the satellite and increase the cost of satellite replenishment. Until satellites are developed with on-orbit refueling capabilities or unconstrained propulsion system, fuel capacities will always be a limiting factor for executing space force deployments.

Third, the current space force structure is not robust in terms of massing forces in one theater without sacrificing capability in another. If space forces are deployed to one theater, an adversary may use the opportunity to catch the United States unaware in another. A robust on-orbit constellation or rapid spacelift replenishment would reduce the risk of degrading capabilities in other AOs.

Fourth, the time to deploy forces to the AO is governed by orbital mechanics and not aerodynamics. When space forces are deployed, they require the ground controllers to fire on-board jets to begin the satellite drifting at approximately one to three degrees per day. In Desert Shield, it took approximately 40 days to drift the DSCS satellite from the Pacific to the Middle East. Additionally, certain space forces are unavailable to ground forces during maneuver operations. A more robust on-orbit system could reduce the distance traveled by space forces by locating them closer to potential combat zones; however, this strategy must be executable in the face of dwindling defense resources.

RECOMMENDATIONS

Space force deployments are not new to joint warfighting in terms of tactics, techniques and procedures, however, they have reached a point where they are credible deterrent options. The following recommendations are submitted:

1. Expand the definition of “deployment” found in Joint Publication 1-02 “DoD Dictionary of Military and Associated Terms” to include a clear understanding of space force deployments. The definition should briefly discuss the movement of space-based platforms and or personnel to deploy space-based capabilities to the battlefield.

2. Expand space force missions as defined in Joint Publications 3-14, “Joint Doctrine for Space Forces. The document should make clear that space forces are more than force enhancers but under certain circumstances, provide an effective deterrent to potential aggression and other undesirable actions.
3. Direct planners at all levels and commands to consider space force FDOs with other options when building joint operations plans.

CONCLUSION

“Space gives the United States more opportunities to demonstrate resolve without using force.”¹²

Because of our increasing reliance on space-based forces to provide battlefield situational awareness and force enhancement, movement of these space forces and personnel are potential FDOs that could also signal U.S. commitment and resolve to a potential adversary. There is a cost for moving space forces from their intended mission locations but if the resolve and commitment is great, the expenditure of fuel is worth the cost. Unlike some FDOs in which anti-access strategies may slow terrestrial force deployments, current space superiority allows space force deployments to occur unheeded. Even though time to deploy space forces is limited by orbital mechanics, some situations do not require rapid repositioning of space forces to be effective. Under the right circumstances, space force FDOs should be highly publicized to provide the psychological communication to the potential adversary of our intent to remove surprise from his calculus while increase the precision and lethality of U.S. forces.

¹ Presentation, Lieutenant General Thomas S. Moorman, Jr., to General E.P. Rawlings Chapter, Air Force Association, Minneapolis, Minnesota, “Space...The Future is Now,” 17 October 1991.

² The Joint Staff Officers Guide 2000, Joint Force Staff College Publication 1, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., p. G-55.

³ Joint Publication 1, "Joint Warfare of the Armed Forces of the United States." November 14, 2000, Chapter IV, page IV-4.

⁴ Ibid, p. G-31.

⁵ Defense Support Program available at www.au.af.mil/au/database/projects/ay1996/acsc/96-004/hardware/docs/dsp.htm

⁶ Spires, p. 254.

⁷ Otto Kreisher, "The Move into Space." *Air Force Magazine*, April 1999, Volume 82, Number 4. Available at www.afa.org/magazine/0499space.html

⁸ David N. Spires, "Beyond Horizons: A Half Century of Air Force Space Leadership." Air Force Space Command in association with Air University, 1998, p. 249.

⁹ Ibid, p. 249.

¹⁰ Air Force Doctrine (Draft) 2-2." Space operations." Dated March 2000; United States Air Force.

¹¹ MILSATCOM Handbook Volume I, "Satellite Communication for the Warfighter." Available at www.milsatcom2000.50megs.com/milsatcom_warfighter/index.html.

¹² Thomas E. Ricks, "Space is Playing Field for Newer War Game." *Washington Post*, January 29, 2001. Comments made by Major General Lance Smith, Commander of Blue Task Force during recent space war game exercise at the Space Warfare Center.