Centralized Control of Space

The Use of Space Forces by a Joint Force Commander

RICKY B. KELLY, MAJOR, USAF
School of Advanced Airpower Studies

THESIS PRESENTED TO THE FACULTY OF
THE SCHOOL OF ADVANCED AIRPOWER STUDIES,
MAXWELL AIR FORCE BASE, ALABAMA, FOR COMPLETION OF
GRADUATION REQUIREMENTS, ACADEMIC YEAR 1992–93.

Air University Press
Maxwell Air Force Base, Alabama

28 June 1993

Disclaimer

Opinions, conclusions, and recommendations expressed or implied within are solely those of the author, and do not necessarily represent the views of Air University, the United States Air Force, the Department of Defense, or any other US government agency. Cleared for public release: distribution unlimited.

Contents

Chapter		Page
	DISCLAIMER	*ii*
	ABOUT THE AUTHOR	*v*
1	INTRODUCTION	1
	Notes	5
2	PLANNING FOR SUPPORT FROM SPACE FORCES	7
	Notes	15
3	LEARNING THE LESSONS AND SOLVING THE PROBLEMS	17
	Notes	25
4	CENTRALIZED CONTROL	29
	Notes	34
5	CONCLUSIONS	37
	Notes	39

Illustrations

Figure		
1	Military Satellite Communication Requirements Process	10
2	Commercial Satellite Communications Access	11
3	Missile Warning Support Coordination Process	12

Table		
1	Weather Support	9
2	Controlling Agencies for Communication Satellites	11
3	United States Central Command Access to Space Forces	13

About the Author

Maj Ricky B. Kelly (BS, University of Oklahoma; two MAs, Webster University) is a space operations officer. His assignments include commander, Detachment 3, 18th Surveillance Squadron, Maui, Hawaii; mission director, Aerospace Data Facility, Denver, Colorado; staff and executive officer, Headquarters Air Force Space Command; and operations director, Defense Meteorological Satellite Program, Loring Air Force Base, Maine. Major Kelly is a graduate of Air Command and Staff College and the Air Force School of Advanced Airpower Studies (SAAS). Upon graduation from SAAS, he was assigned to Headquarters Seventh Air Force, Osan, Korea.

Chapter 1

Introduction

Operation Desert Storm was the first conflict in which a land-based military force was directly and fully supported by space forces. For the first time in the history of warfare, space forces were an integral part of terrestrial conflict and crucial to its outcome. Air Force Chief of Staff Merrill A. McPeak called Desert Storm our first "space war" when he remarked, "Try to imagine the war without warning of Scud launches, or instant satellite communications, or weather coverage from space, or the other advantages only the United States had because of our space capability. Space assets will play a central role in any future military action."[1]

Desert Storm set a standard for space forces, and now that space forces have shown their potential, the US military must strive to improve upon their performance. Former assistant secretary of the Air Force, Martin C. Faga, insisted that Desert Storm was the initial opportunity for our forces in the field to understand that space forces are vital to success. He claimed Desert Storm would make the combat commands more demanding customers for the support of space forces in the future.[2]

Land, sea, air, and special operations forces now expect support from space forces to help them gain and maintain a combat advantage throughout the operational continuum and across the three levels of war: strategic, operational, and tactical.[3] At the strategic level of war, the military looks to space forces for enhanced surveillance, intelligence, and communications capabilities to define limits and assess risks of the use of military and other instruments of power. On the operational level, planners and commanders call upon space forces to improve upon existing terrestrial capabilities in areas such as warning, current intelligence, surveillance of areas of interest, communications, mapping, charting, geodesy, and protection from enemy space systems. While on the tactical level, space forces provide real-time and near-real-time support to the forces that execute campaigns. Support includes sequencing, positional data, surveillance and warning of enemy locations and activities, current and projected weather information, and both internal and external communications.[4]

Because all services use space assets, space forces have become joint forces. The US government recognized this long before Desert Storm when, in September 1985, President Ronald Reagan approved and established a joint command for space—the United States Space Command (USSPACECOM). This action established a single operational military organization to oversee and operate Department of Defense (DOD) space forces.[5]

As a joint asset, space forces support many different users all seeking to gain a combat edge. In time of crisis, requests for support often exceed the capability to provide support. This fact marks space forces as a limited resource that must be used efficiently. In Desert Storm demands on communications and intelligence systems outstripped the capacity of both military and civilian support systems. Constant increases in communications and intelligence capabilities also promise an increase in demands and ensure competition for assets will continue.[6]

Since the Persian Gulf War, commanders and staffs have recognized the need to incorporate the force enhancement potential of space forces into their war plans. But more importantly because of the limited space resources, they must also recognize the need to properly employ space assets. From nuclear war to low intensity conflict, from the Korean peninsula to the European theater, space has become an important medium of warfare. Orchestration of space forces in unison with other forces needs to be an essential part of any commander's operational plans. In this light two invaluable Desert Storm lessons are important to remember: (1) the role of a single theater commander, orchestrating air, land, and sea forces, and (2) the impact of having a single commander in charge of air assets.

The purpose of this paper is to determine to what extent and how the joint forces commander (JFC) should control support from space forces. Current Air Force doctrine, as delineated in Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, identifies the joint force air component commander (JFACC) as being responsible for both air and space for the theater. This statement follows the Air Force notion that air and space are an indivisible medium of warfare. On the other hand, Joint Publication (JP) 3-14, "Joint Doctrine; Tactics, Techniques, and Procedures (TTP) for Space Operations," states the Operations Directorate, J-3, on the supported commander's (the JFC's) staff functions in this role.[7] To examine this issue of in-theater control of space forces more closely, this study is divided into five chapters. Following the introduction chapter 2 looks into how space forces were planned for and employed during Desert Storm. This chapter discusses who was in charge and what planning processes were used. In chapter 3 lessons and initiatives to improve planning and employment of support from space forces are discussed. Chapter 4 explores the possible need to have one individual in-theater clearly identified as being responsible for directing space forces. Centralized control, similar to air, may have beneficial effects that allow joint commanders to take better advantage of space forces' full potential. This study concludes by offering recommendations.

Control of Forces

From the Desert Storm experience, there appear to be two important lessons regarding organization and command relationships. First, it is necessary to have someone directing overall planning and employment of

forces within a theater of operations. Second, it is necessary to have someone directing overall planning and employment of the different mediums to be employed in-theater: land, sea, and air. In Desert Storm there was a single theater commander, and he had a single commander for air.

The concept of a single theater commander was dictated in the 1986 Goldwater-Nichols Department of Defense Reorganization Act. This act enhanced the efficiency and effectiveness of military operations. In the case of Desert Storm, Goldwater-Nichols strengthened and clarified the commander in chief, US Central Command (USCINCCENT) authority and relationships with the services and the National Command Authorities (NCA). USCINCCENT was designated the supported commander in chief (CINC), to be provided with needed assistance and forces from other CINCs and defense agencies, who assumed supporting roles. These supported and supporting relationships were clarified in Goldwater-Nichols and enhanced the timely provision of assistance to USCINCCENT when and where needed.[8]

Throughout the conflict USCINCCENT was responsible for organizing and employing the forces of his command. The command relationships in effect throughout Desert Storm complied with the intent of the Goldwater-Nichols act by ensuring that the theater commander had sufficient command authority over all US forces operating in the theater. The theater commander used or held the authority to organize forces for combat, to appoint and remove component commanders, and to influence resource allocation issues.[9] Gen H. Norman Schwarzkopf, the theater commander, confirmed Goldwater-Nichols helped strengthen his operational control when he testified before Congress saying, "Goldwater-Nichols established very, very clear lines of command authority and responsibility over subordinate commanders, and that meant a much more effective fighting force in the Gulf. The lines of authority were clear, the lines of responsibility were clear, and we just did not have any problems in that area—none what so ever."[10]

The theater campaign plan called for four phases: Phase 1, a strategic air campaign; Phase 2, a short, but intense effort to establish air superiority; Phase 3, air attacks on the Republican Guard and other Iraqi army units; and Phase 4, a ground offensive. Following joint doctrine the theater commander developed a coherent plan from the beginning of operations and placed authority for air tasking in the hands of a single commander, JFACC.[11]

The air component commander (ACC) served to integrate the coalition nations' and US services' airpower capabilities, as well as to exploit their different capabilities; to plan operations to get the most from the available air assets; and to conduct an effective theater air campaign. The JFACC provided the requisite unity of effort and span of control through centralized control of theater air assets.[12] Gen Charles A. Horner, commander, US Air Force Central Command (COMUSCENTAF), described his JFACC responsibility as being "to ensure military force is applied in the most

effective and efficient manner in order to save lives, shorten the conflict period, and achieve victory."[13]

At the core of the JFACC's centralized control was the responsibility to coordinate and the authority to require consultation among the different in-theater air commanders. Lacking the authority to compel agreement, the JFACC resolved any disagreements with the theater commander.[14] Additionally, the air campaign, developed by the JFACC, employed all available theater air forces to accomplish or support the theater objectives established by the theater commander.[15] The air campaign plan formed the basis for all other planning associated with employing theater air assets. The conduct of the air campaign enabled the coalition's joint air force to seize the initiative and create conditions to fulfill the theater commander's objectives.[16]

These two lessons stress the importance of unity of effort and span of control over forces. USCINCCENT's development of a theater campaign plan fused the efforts of all the mediums of warfare at his disposal upon the objectives given to him by the NCA. The JFACC used centralized control of theater air forces to provide for the effective and efficient use of airpower in support of the JFC's overall campaign. Together these lessons emphasize the importance to harmonize overall planning and employment of force in time of conflict.

Support from Space Forces

It is important to recall how these lessons relate to the use of space forces. Desert Storm demonstrated for the first time that space forces are now an indispensable tool for modern combat.[17] Lt Gen Thomas S. Moorman Jr., commander, Air Force Space Command, said in 1991, Desert Storm was "a watershed event in military applications because, for the first time, space was an integral part of terrestrial conflict and were crucial to its outcome."[18] Space forces and their capabilities made important contributions from mission planning to execution across all three levels of war: strategic, operational, and tactical.[19] Space forces now form an important portion of the force building blocks available to commanders to accomplish their assigned missions.

However, support from space forces provided to a theater commander appears somewhat fragmented because it comes from so many different sources. Most support from DOD space forces comes from the commander, United States Space Command (USCINCSPACE). Additional support may come from national systems or other DOD agencies that exploit space assets in support of operational forces. Significant support may also come from civilian and commercial space systems.[20] Congress has not assigned the role of space warfare to any single service since space crosses all aspects of combat and all services.

The JFC must coordinate and orchestrate the activities of these supporting space forces in conjunction with his own forces. The JFC has the

authority to exercise general direction of effort by designating space-force objectives, determining duration and timing of actions within his area of responsibility, and establishing instructions necessary to affect coordination with supporting space forces.[21] In essence the JFC wants space forces to be combined with his other theater forces and aimed at attaining his overall campaign objectives in the shortest period of time. Space forces should be tailored to the desired objectives in order to produce the greatest effect toward achieving theater objectives. A theater commander should plan for and employ space forces in support of his overall objectives. How the theater commander—the joint force commander—can best do this is the subject of this study. Current Air Force doctrine and joint doctrine differ on how this should be accomplished. Air Force doctrine implies that the JFACC should be in charge of planning for and employing space forces in support of the JFC's overall plan. The joint doctrine appears to leave this planning up to the in-theater functional users of space support with the director of operations (J-3) acting as a facilitator. This study examines the strengths and weaknesses of these two recommendations.

Notes

1. Gen Merrill A. McPeak, "Desert Storm Reinforces Military Space Directions," *Aviation Week & Space Technology*, 8 April 1991, 42.
2. James W. Canan, "A Watershed in Space," *Air Force Magazine* 74, no. 8 (August 1991): 32.
3. Joint Publication (JP) 3-14, "Joint Doctrine; Tactics, Techniques, and Procedures (TTP) for Space Operations," final draft, 15 April 1992, vii.
4. Ibid., III-26–27.
5. Ibid., I-6.
6. Department of Defense, *Conduct of the Persian Gulf War: An Interim Report to Congress* (Title V) (Washington, D.C.: Government Printing Office [GPO], 1991), K-47–49 (hereinafter *Interim Report*).
7. JP 3-14, V-3.
8. *Interim Report,* 26-1.
9. Ibid., 20-2.
10. Gen H. Norman Schwarzkopf's remarks regarding command and control in Desert Shield/Desert Storm found in the *Interim Report,* K-5.
11. *Interim Report,* 2-6.
12. Headquarters USAF, *JFACC Primer* (Washington, D.C.: Deputy Chief of Staff, Plans and Operations, August 1992), 2.
13. Ibid., foreword by Gen Buster C. Glosson.
14. Ibid., 6.
15. Ibid., 17.
16. Ibid., 8.
17. JP 3-14, I-2.
18. Canan, 32.
19. JP 3-14, I-6.
20. Ibid., I-16.
21. Ibid., II-15.

Chapter 2

Planning for Support from Space Forces

Planning for support from DOD and national space forces and their actual employment in time of conflict is complex because of the many space organizations involved. To understand how we currently plan for and employ space forces, we must first understand the authority and relationships of these different space organizations and the supported theater commander. Next, with authority and command relationships in mind, we should review established planning and employment procedures to further clarify our understanding of the complex way a theater commander gains support from space forces. This review must include planning for support from not only DOD systems but also national systems as well. Finally, it is important that we understand the deliberate planning process involved in managing the use of space-force assets. This entails an examination of the key space-planning document, Annex N, of the theater commander's operation plan (OPLAN).

Who's in Charge?

The commander, USSPACECOM, has combatant command over space forces assigned by the secretary of defense, meaning all military space forces are controlled by one commander.[1] He is the single authority for coordinating and controlling space forces for space operations. However, while command direction is centralized, operational control (OPCON)[2] of space forces is delegated to the separate space component commanders (Air Force, Army, and naval space commands) in support of the services, unified and specified commanders, and joint task force commanders.[3] The USCINCSPACE, unlike a theater commander who is assigned an area of responsibility, is assigned a worldwide functional responsibility not bounded by any single area of operations. He provides centralized control of assigned US space forces for more effective and efficient use of resources. However, USCINCSPACE does not have combatant command over all US space resources. He only has combatant command over those assigned by the secretary of defense. And even in the case of DOD systems, the commander's combatant command authority may be limited. For example, in the case of military satellite communications satellites, the USCINCSPACE does not have combatant command over their mission payloads. There are numerous national, civil/commercial, and other DOD agencies that also deal with space. These other organizations and agencies are not part of USSPACECOM, but they do influence the operational use of space forces by either directly or indirectly managing space systems or the products derived from these systems.[4]

Essentially, USSPACECOM represents only one part of four distinct organizations that influence our space forces. Organizational decisions made early in the development years of our space forces resulted in the establishment of separate and distinct space communities within the government. The defense community that evolved focused on space forces that supported strategic deterrence and also had a subsidiary role of supporting tactical forces. USSPACECOM is responsible for only the DOD space forces. The national intelligence community focused on providing comprehensive surveillance of areas of the world closed to other forms of observation. The primary customer was the NCA, and its product was strategic indications and warning. Two other communities, civil and commercial, developed to take advantage of emerging technological, scientific, and commercial possibilities space provided.[5]

Each of these communities developed under separate organizational structures for management, budget, and policy oversight. In turn, each community insulated itself from bureaucratic interference through what is commonly known as "stovepiping." Essentially, stovepiping is the creation of an organization or a functional capability that is isolated from any outside influence and that seeks no further use of its capabilities except for those which it was designed. While able to conduct most of their missions independently, these communities believed only minimal coordination among themselves was required or even necessary. This indifference led to overlap in some capabilities and support services. When it was left unchecked, stovepiping grew and spawned excess bureaucracy. Today, the result is a fragmented space community scattered among several different organizations that are aligned by functional capabilities.[6] What does it mean for the USCINCSPACE to have command over only DOD space forces, while other important space forces are controlled by other space bureaucracies? It means a theater commander must try to coordinate and orchestrate space support for his theater and must deal with several organizations other than USSPACECOM. Planning for and employing space forces in support of a theater commander's campaign becomes very complex.

The planning process used by the United States Central Command (USCENTCOM) in the Gulf War followed joint operational planning doctrine that is a coordinated process used by a commander to determine the best method of accomplishing a mission. The peacetime process is called deliberate planning, while in crisis situations it is called crisis action planning.[7] As the supported command in the Gulf War, USCENTCOM's staff was responsible for development of the USCENTCOM commander's space requirements.[8] This required close coordination, not only with their functionally related space force counterparts at USSPACECOM but also with their functionally related counterparts within other defense agencies and space communities. The result was a highly complex planning process that had to coordinate with separate stovepiped support organizations rather than a single point of contact for support from space forces.

Planning for DOD Space-Forces Support

Because of the global nature of satellite systems and their support to national, civil, and DOD agencies, management of space capabilities is held at the highest levels. Generally, control is based on who manages the information derived from the payload portion of the satellite system as shown by the following Gulf War examples.[9]

Desert Storm weather and environmental support to USCENTCOM was provided through weather units assigned to the component commands. Coordination of weather support was accomplished by USCENTCOM's J-3W, the command weather officer. The primary source of weather data was real-time environmental satellite data downlinked in the receive only mode to mobile tactical receivers.[10] Tactical receivers were able to copy Defense Meteorological Satellite Program (DMSP)[11] imagery, high-resolution, civil polar-orbiting satellite imagery, such as National Oceanographic and Atmospheric Administration/Television Infrared Observation Satellite (NOAA/TIROS)[12] and geostationary imagery from Geostationary Operational Environmental Satellite (GOES).[13] Use of this information provided the capability to monitor weather patterns on a timely basis. Additionally, USCENTCOM's weather officer coordinated with fixed processing facilities to provide weather and environmental data to in-theater weather units. The Navy's Fleet Numerical Oceanography Center and Air Force Global Weather Central provided services not reproducible at the local level.[14] USCENTCOM's weather support is depicted in table 1.

Table 1

Weather Support

Satellite	CINC's Contact[a]	Payload Control[b]	Satellite Control[c]	Services Support[d]	CINC's Contact[e]
DMSP	USSPACECOM	AFSPACECOM	AFSPACECOM	Air Weather Service	USAF Global Weather Central
NOAA/TIROS	USSPACECOM	Contractor	Contractor	Navy Fleet Numerical	Navy Fleet Numerical
GOES	USSPACECOM	Contractor	Contractor	Oceanography Center	Oceanography Center

[a]The CINC's contact was the organization USCENTCOM had to contact to request access.
[b]Payload Control was the organization responsible for control of satellite's weather sensors.
[c]Satellite controller maintains the vehicles' support systems (power, temperature, etc.).
[d]Services support provides regional weather analysis products and forecasts and access to full complement of real-time stored weather satellite imagery.
[e]The CINC's contact was the organization in charge of fixed facilities.

Unlike the comparatively simple process USCENTCOM's weather officer used in coordinating weather support, coordination of satellite communications was much more complicated. The military satellite communications planning and employment process is vital to the DOD's proper management of all aspects of satellite communications systems. The process

through which all aspects of military satellite communications (MILSATCOM) requirements are approved and documented includes a standard method of stating requirements—the Joint Chiefs of Staff (JCS) validation of approved requirements, a central repository of approval requirements, and guidance for gaining access to military satellite communications systems.[15] USCENTCOM's Command, Control, Communications Directorate, J-6, in coordination with functional service component counterparts, consolidated, validated, and prioritized all in-theater requests for use of military satellite communications systems. Once they were reviewed by the CINC, USCENTCOM's MILSATCOM requests were forwarded to the Joint Staff for final validation, allocation, or adjudication. Figure 1 shows the MILSATCOM requirements process as traced from the component commands through the supported command. Competing military satellite communications users—federal agencies and the Joint Staff—submitted requirements to their approval authorities for review and validation through the chairman of the JCS and the Joint MILSATCOM Panel. Once requirements were validated, allocated, and adjudicated, the panel tasked the appropriate satellite communications system to provide access to communications channels. USSPACECOM, in conjunction with the systems managers and the joint panel, served as a coordination focal point for assessment of system availability.

For requests validated but not allocated due to insufficient space-force resources, commercial satellite communications (SATCOM) access was

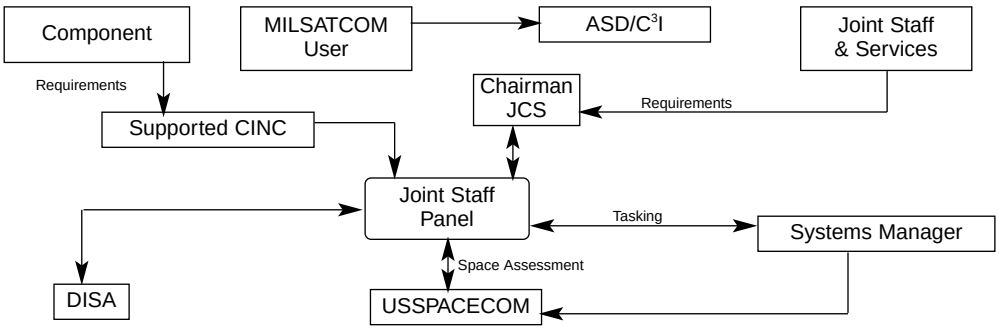

Figure 1. Military Satellite Communication Requirements Process

requested.[16] Organizations with validated requirements but no allocations (e.g., XVIII Airborne Corps),[17] submitted requests through their service chain of command to the Defense Information Systems Agency (DISA).[18] This agency then acted as the contracting agent for all of USCENTCOM's commercial access. Federal agencies' requirements are submitted to the assistant secretary of defense (ASD) command, control, communications, and intelligence (C^3I), validated, and forwarded to DISA. Figure 2 shows the commercial SATCOM request process.

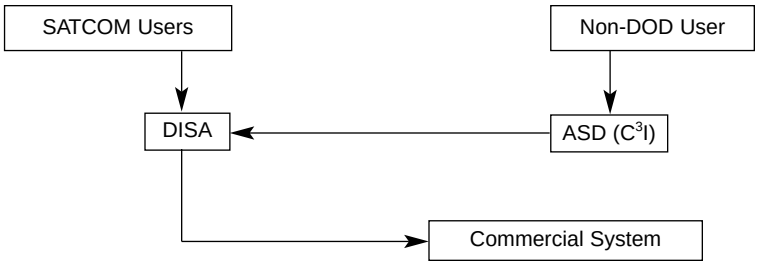

Figure 2. Commercial Satellite Communications Access

The USCINCSPACE has combatant command of DOD assigned space assets; however, this does not mean that in all cases operational direction of the bus or payload rests with him or any of the organizations in his chain of command. Communications satellites serve as an important case in point. Table 2 shows how control of communications satellites in the Gulf War was broken down. This table highlights the fact that no single point of contact existed to support USCENTCOM's communications needs. A very complex and diverse group of organizations affected the communications support of the Gulf War.

Detection and warning of Iraqi Scud missile launches allowed the USCINCCENT to take appropriate protective counterfire and antimissile

Table 2

Controlling Agencies for Communication Satellites

Satellite	CINC's Contact[a]	Network Control[a]	Satellite Control[a]
FLTSATCOM[c]	Joint Staff	USCINCCENT	AFSPACECOM
LEASAT[c]	Joint Staff	USCINCCENT	Contractor
GAPFILLER[c]	Joint Staff	USCINCCENT	Contractor
LES-9	Joint Staff	USCINCCENT	Contractor
DSCS	ARSPACE and DCA[b]	ARSPACE and DCA[b]	AFSPACECOM
NATO	NATO	NATO	AFSPACECOM
Skynet	DCA[d]	United Kingdom	AFSPACECOM
Commercial	DCA[d]	Commercial	Commercial

[a]The CINC's contact was the organization CENTCOM had to contact to request access on a communication satellite. The network controller managed what channels are active and who could communicate over the channels. The satellite controller maintained the vehicles' support systems (power, temperature, etc.) and adjusted the vehicles' orbits.

[b]ARSPACE was responsible for ground mobile forces (tactical) networks, and the Defense Communications Agency was responsible for long-haul or strategic networks.

[c]US Navy's Fleet Satellite Communications System (FLTSATCOM), US Navy's Leased Satellite (LEASAT), and GAPFILLER were shared by the Air Force and the Navy. During peacetime each service controlled their portion. During conflicts the JCS would prioritize and approve access.

[d]The Defense Communications Agency had an officer responsible for contracting commercial satellite links.

actions. Theater missile warning requests were forwarded by USCENTCOM's J-3 to USSPACECOM's J-3 so that threat assessment, communications, media requirements, false reporting tolerance, and unit output locations could be worked out. USSPACECOM's J-3 and its component command counterpart, Air Force Space Command Director for Operations (AFSPACECOM/DO), coordinated satellite sensor coverage and reporting requirements in accordance with the USCENTCOM's J-3 request.[19] Figure 3 depicts the coordination process involved.

Similar planning and employment procedures were used to gain support from space forces providing multispectral imagery and navigation.

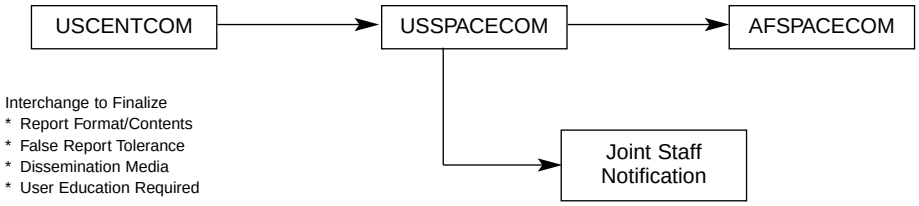

Figure 3. Missile Warning Support Coordination Process

USCENTCOM functional managers coordinated with the appropriate functional managers at USSPACECOM or the designated defense agency that validated requirements and processed requests.[20] Table 3 shows USCENTCOM's access to space-force assets.

In essence USCENTCOM had to work with four controlling organizations to get satellite communications, another to discuss satellite navigation, weather, and early warning information, and a sixth for mapping data.

Planning for National Systems Support

In addition to USSPACECOM controlled space forces, there are numerous space-based assets operated and controlled by the US intelligence agencies. They support worldwide missions, including those of USSPACECOM. Although national intelligence information is integrated with US space force's surveillance and warning data, DOD does not have operational control of national intelligence collection assets. To access these systems, DOD must compete with other national agencies for the limited resources offered by national systems.[21] In the Gulf War, this meant that USCENTCOM had to compete with other unified and specified commands for access. Once again, functional managers on USCENTCOM's staff worked closely with their service component command intelligence and operations officers to identify their in-theater requirements, prioritize them, and forward their requests through USCENTCOM's J-2, Intelligence Directorate, to the Defense Intelligence Agency (DIA). Then the DIA, acting in its role as the focal point for all operational intelligence requirements,

Table 3

United States Central Command Access to Space Forces

Satellite System	Controlling Organization
SHF COMSATs	Army Space Command[a] Defense Communications Agency
UHF COMSATs	Naval Telecommunications Command[b] Strategic Air Command
Commercial COMSATs	Defense Communications Agency
Transit NAVSATs	N/A[c]
GPS NAVSATs	USSPACECOM[c]
Intelligence	National Reconnaissance Organization
SPOT Multispectral Imagery (MSI) Satellites	Defense Mapping Agency[d]
LANDSAT MSI Satellites	Defense Mapping Agency[d]
DMSP Meteorological Satellites (METSAT)	N/A[e]
NOAA TIROS METSATs	N/A[e]
DSP Early Warning Satellites	USSPACECOM

[a]Army Space Command controlled DSCS SHF networks for Ground Mobile-Force Terminals. The Defense Communications Agency was the systems manager for all other DSCS networks.

[b]The Navy and the Air Force split control of transponders on FLTSATCOM and LEASAT Satellites.

[c]NAVSATs transmit continuously. Any unit with proper equipment can receive the navigation signal. CENTCOM had to coordinate with USSPACECOM to maintain nonencrypted navigation signal accuracy.

[d]SPOT and LANDSAT are controlled by commercial organizations. The DMA was the single point of contact to obtain imagery.

[e]METSATs transmit continuously. Any unit with proper equipment can receive weather data.

Source: Eliot A. Cohen, *Gulf War Air Power Survey (GWAPS),* "CENTCOM Access to Space Assets," draft (Washington, D.C.: Office of the Secretary of the Air Force, March 1993).

validated and prioritized all USCENTCOM requests. Once validated and prioritized, requests were forwarded to the appropriate national collection manager for processing in accordance with the priority established by the DIA.[22]

Key Document—Annex N

USCENTCOM's Desert Storm planning for support from DOD and national space forces was reflected in OPLAN 1002-90, "USCENTCOM Operations to Counter an Intra-Regional Threat to the Arabian Peninsula." Dated 13 July 1990 and in its second draft, USCENTCOM was forced to use this immature and uncoordinated plan to begin its initial deployments to Saudi Arabia on 7 August 1990.[23] OPLAN 1002-90 should have represented the commander's concept of operations and identified the forces and supplies required to execute the plan and a movement schedule of the resources into the theater.[24] For integrated planning within the theater, USCENTCOM had developed supporting annexes to the OPLAN. These annexes provided detailed guidance to USCENTCOM's component commands, subordinate commanders, and supporting commanders. In the case

of space forces, detailed guidance and a statement of operational need was included in multiple annexes. However, the primary annex for space remained Annex N: Space Operations.[25]

Annex N to OPLAN 1002-90 was supposed to describe the concept of operations and explain theaterwide space forces support required by USCENTCOM's employment plan. However, the level of detail reflected the relative immaturity of the space mission.[26] Some space force functional areas, such as communications, weather, and intelligence, contained enough detail to be of use. On the other hand, navigation, early warning, and geodesy lacked even basic information. Any good planning found in Annex N can be largely attributed to the fact that there were separate, detailed annexes in some functional areas, such as communications, intelligence, and weather.[27] Nevertheless, even in these areas preplanning was not totally acceptable. For example, SATCOM communications links had to be altered at least 75 times, and the intelligence dissemination network worked backwards.[28] The lack of planning for interoperability between service dissemination systems forced intelligence data collected by one service to be routed from the theater back to the Pentagon, then transmitted back to the theater. Consequently, throughout the Gulf War operations space support took on an ad hoc character because of inadequate planning for the use of space forces.

Summary

Planning for and employing space forces was no easy task in the Gulf War. USCENTCOM had to establish relationships between the supporting commands and agencies that provided support from space forces. Coordination and validation of requirements both in and out of theater had to be accomplished along lines of functional support. Each space functional area was independently planned for and employed in an attempt to gain the fullest potential from these limited resources. The required actions and processes to get space support were not readily available in the theater commander's operations plan and supporting annexes, notably Annex N.

USCENTCOM's planning for and employment of space forces in the Gulf War can be characterized as having no single integrator. Space support outside of the mature areas of weather, communications, and intelligence was provided ad hoc, and even the mature areas suffered from planning deficiencies. Much of the success was because of the five months available to prepare US and coalition forces following Iraq's invasion of Kuwait. No single individual or organization had the assigned responsibility to coordinate space support and bring space expertise to the theater commander. Space had no JFACC to ensure all actions taken to gain in-theater support from space forces were focused upon one thing, the joint force commander's objectives. Is a single theater space commander necessary? This question will be discussed in the

next chapter. Chapter 3 will also review the space lessons from the Gulf War and various resulting initiatives that seek to improve planning and employment of space forces.

Notes

1. Armed Forces Staff College (AFSC) Publication 1, *The Joint Staff Officers Guide 1991*, 2-21. Combatant command (COCOM) is defined as the authority of a commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the mission assigned to the command.
2. Ibid. OPCON is the authority delegated to echelons below the combat commander. The authority to perform those functions of command over subordinate forces involving the composition of subordinate forces, the assignment of tasks, the designation of objectives, and the authoritative direction necessary to accomplish the mission. While COCOM equates to owning of forces, OPCON equates to leasing forces; this allows maximum control without the burden of support.
3. JP 3-14, "Joint Doctrine; Tactics, Techniques, and Procedures (TTP) for Space Operations," final draft, 15 April 1992, V-21.
4. Ibid., V-4.
5. Vice President's Space Policy Advisory Board, *A Post Cold War Assessment of U.S. Space Policy* (Washington, D.C.: Office of Vice President, December 1992), 4.
6. Ibid., 5.
7. JP 3-14, VI-1.
8. Ibid., VI-2.
9. Ibid., VI-10.
10. Ibid., VI-25.
11. DMSP is a polar-orbiting, DOD meteorological satellite system that provides terrestrial, oceanographic, and solar-geophysical data to civilian and military users.
12. NOAA/TIROS is a government owned (Department of Commerce), civilian-operated satellite system that provides specialized meteorological information to worldwide weather forecasters.
13. GOES is another government-owned (Department of Commerce) satellite system that provides supplemental meteorological information to military weather forecasters.
14. JP 3-14, VI-26.
15. Ibid., VI-11–12.
16. Ibid., VI-15.
17. Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress (Title V)* (Washington, D.C.: GPO, 1991), K-48 (hereinafter *Final Report*). Although XVIII Airborne Corps was one of the first military units in-theater, it was not allocated MILSATCOM and had to use commercial SATCOM.
18. JP 3-14, V-23.
19. Ibid., VI-18.
20. Ibid., VI-18–22.
21. JP 3-14, V-16.
22. Ibid., V-25.
23. Eliot A. Cohen, *Gulf War Air Power Survey (GWAPS)*, "Continuing Evolution of Space Support" (Washington, D.C.: Office of the Secretary of the Air Force, March 1993), 14.
24. AFSC Publication 1, 6-1–6-80.
25. *GWAPS*, 1. While Annex N provided in-theater military decision makers with an overview of military space operations, it also referenced functional space support areas in other support annexes such as Annex B, Intelligence; Annex C, Operations; Annex H, Environmental Services; and Annex M, Mapping, Charting, and Geodesy.
26. Ibid.,
27. Ibid., 14.
28. Ibid., "Space Order of Battle," 22.

Chapter 3

Learning the Lessons and Solving the Problems

Operation Desert Storm demonstrated for the first time that space systems are now an indispensable tool for modern combat.[1] Recently, General McPeak stated that the mission of the Air Force is "to defend the United States through the control and exploitation of air and space."[2] The Gulf War was the first opportunity for the military to employ space support in theater planning and operations. By reviewing the lessons learned during Desert Storm/Desert Shield and by examining recent initiatives in response to them, we can begin to understand and to determine to what extent and how space forces should be controlled by the theater commander.

Lessons Learned

Close scrutiny of the different conclusions by the war's various participants shows three common areas of agreement with regard to space forces.[3] These are the criticality of preplanning, the need to normalize space operations with regard to space forces, and the requirement for realistic training based on peacetime planning. These lessons serve as a source for the future development of space operations doctrine. Planners will look to the Gulf War as a model to define how to better use space forces in future joint and combined theater operations. Use of space forces was stronger in some areas than in others, but it provided a glimpse of how space forces can affect future theater operations. Review of these lessons can help determine to what extent and how a theater commander should control his support from space forces.

Planning

Our war experience has demonstrated that joint operational planning must take into consideration space forces. Since joint operational planning is a coordinated process used by a theater commander to determine the best method of accomplishing the mission, space operations planners need to be actively involved in the planning process from the beginning.[4] Gen Donald J. Kutyna, USCINCSPACE, identified preplanning for support from space as his command's number one lesson from the Gulf War. USSPACECOM's postconflict assessment noted that space forces were there when required, but significant effort was needed to optimize their effectiveness. The United States is not likely to have the luxury of six month's preparation to develop ad hoc procedures or procure equipment

in a future conflict. Therefore, the benefits of space must become ingrained in our joint force planning.[5]

In the Gulf War, space systems performed remarkably well in providing land, sea, and air forces with capabilities and support.[6] First on the scene, space forces provided communications, weather, navigation and position, detection and warning, and multispectral and intelligence support at unprecedented levels. Gen James S. Cassity Jr., the J-6 of the Joint Staff, remarked that "the services put more electronics communications connectivity into the Gulf in ninety days than we put in Europe in forty years."[7] Satellite communication was the backbone of long-haul and intratheater connectivity for the Gulf War. Over 90 percent of the communications into and out of theater went over communications satellites. Almost one-quarter of all satellite communications traffic was carried by commercial systems. Over 10 different military and commercial communications satellite systems supported USCENTCOM. Ground forces that deployed initially had only minimal access to the most effective means of navigation, the Global Positioning System (GPS), and this remained so until the Army procured and distributed thousands of commercial GPS receivers. Because they lacked the necessary maps, US and coalition forces used space-derived products to supplement their needs. By using multispectral imagery (MSI) derived from US LANDSAT and French SPOT satellites, coalition forces gained unparalleled insight and exploitation of features of the earth beyond visual detection capabilities.[8] Defense Satellite Program satellites provided warning for theater forces and Patriot missile batteries. This missile detection and warning capability helped head off a potential political problem associated with Iraq's attempt to push Israel into the war. Development of procedures and connectivity were constructed from scratch and took months to set up and finely tune.[9]

Our Gulf War experiences indicate what the future holds for operations support from space. Theater planners need to understand and plan for the force enhancement capabilities that reside in our space assets to ensure they are effectively, efficiently, and coherently focused on the theater commander's objectives. Theater planning for the use of space forces marks the first step in gaining control over the space resources needed to conduct a theater commander's campaign.

Normalization

The Gulf War was the first opportunity for our forces to employ space support comprehensively. This support was more effective in some areas than others, but it provided enough data to provide a vision of how space forces can affect future operations. The data from the Gulf War makes a case for space support to be normalized into today's operations.[10]

Often characterized as high tech, space forces have dramatically increased the effectiveness of our military forces. However, space is not yet part of everyday operations. Normalizing space simply means to ensure that the people who ultimately use space systems to maximize combat

capabilities—airmen, soldiers, and sailors—know what space capabilities are available to them, how to get the data, and how to best exploit it.[11] The Gulf War was the first war to exploit the technological possibilities of what has been called a "military technological revolution." The war tested an entire generation of weapons at the forefront of this revolution and, in particular, represented a coming of age in the use of space forces.[12] Space power, like airpower 50 years ago, reached full fruition during Desert Storm.[13] However, too few officers in-theater really understood how and to what extent space supported the theater commander's campaign objectives. Now, armed with extensive operational experience, it is important that we more fully and effectively integrate space's enormous potential into our military plans and operations.

Communications. USCENTCOM forces were well prepared to exploit some aspects of space areas but had to innovate in others.[14] The nature of coalition combat imposed difficult tasks on the leadership as it sought to integrate the forces of the different services and of the different nations that formed the coalition against Iraq.[15] The coalition was fortunate to have almost six months in which to deploy an overwhelming force, to collect specific intelligence, and to put together the complex command and control arrangements and communications systems that were needed. USCENTCOM J-6 was given the difficult task of planning, deploying, installing, and controlling a communications structure capable of servicing command and control, intelligence collection and dissemination, and data-processing needs for the four US services along with British, French, Egyptian, Syrian, Saudi, Kuwaiti, and other Arab/Islamic allies.[16] Even though 13 of 15 military communications satellites that supported USCENTCOM's operations were already in position on 2 August 1990, the lack of a communications plan at the start of the Gulf War forced the inefficient use of these limited assets.[17] Concerned over these limited space resources, J-6 aggressively rationed communications links to assure that units first deploying into the region would not consume all available SATCOM capabilities.[18] A sophisticated network of multimedia communications capability had to be built from the ground up to tie the coalition forces together so that timely command and control could become a reality. Because of the high demand for limited airlift resources, initial forces arrived with minimum essential communications capabilities—usually single channel, ultrahigh frequency (UHF) satellite communication and sporadic access to the local commercial telephone system using secure telephone units. This level of communications support would have been insufficient to conduct operations had hostilities begun immediately.[19] Interoperability between the different coalition members' equipment, in addition to differences among US forces, had to be taken into account. The hybrid system that emerged combined several generations of equipment and many different command and staff elements. Satellites were the single most important factor that enabled USCENTCOM to build the command, control, and communications network of Desert Storm.[20] The Gulf

War, as in past wars, once again proved that communications was a linchpin in the conduct of theater operations. Limited communications assets, lack of control over on-orbit forces, and complex coordination procedures led to inefficient use of this critical resource. Our continued normalization of communications operations, from space systems deployment to ground terminal interoperability to allocation of communications links, is necessary to gain the full advantage of support from space.

Navigation. While commercial satellites were essential for command and control, GPS also proved invaluable. GPS was essential in updating maps, providing accurate targeting information, artillery placement, rendezvous in the featureless desert, maneuvering units in open country, deconfliction of forces, rescue operations, guiding fighters and bombers to targets, clearing mines, and providing launch coordinates to Tomahawk cruise missiles.[21] Although not scheduled to enter full operational service until 1993, the GPS system's potential had been demonstrated for years throughout the services. The Gulf War created an operational demand on GPS that got equipment into the theater.[22] All those who used this extraordinary space asset claimed it was one of the heroes of the conflict, and yet we have only begun to tap the potential it offers. The commander of the 101st Air Assault Division, Maj Gen Binford Peay, wrote that his GPS receivers were "the most popular new piece of equipment in the desert." The extensive use of GPS as a military asset demonstrates the importance of this capability offered by space forces. As GPS is incorporated into the services, new navigation methods and precision applications require doctrinal revision and thorough planning. Applying the lessons of Desert Storm will further increase our ability to exploit this valuable hardware.[23]

Weather. Similarly, weather satellites played a leading role in Desert Storm operations and were, in fact, used in novel ways not originally envisioned when these systems were procured.[24] Weather satellites assisted in USCENTCOM target planning, selection of munitions, redirection of strikes and reconnaissance sorties, planning ground movements, optimization of night vision equipment and night-capable target systems.[25] These capabilities became invaluable when the worst weather in 14 years ravaged the region. USCENTCOM took steps to procure more receiver terminals to enable the use of weather data at all levels of command. New lightweight, prototype desktop receivers were distributed to ensure the Army had access to real-time weather data from a variety of weather satellites.[26] However, field units still did not have total access to all the data available. Rapidly changing weather patterns in Southwest Asia resulted in units not always having timely and accurate information on target-area weather conditions.[27] As a result of insufficent weather information, aircraft missions were canceled because they were assigned obscured targets. This reinforces the need to continue to make space forces more responsive to the tactical user. The use of space-based assets by operational and tactical commanders needs to be improved, institutionalized in military training, and routinely incorporated into operational plans.[28]

Missile Warning. Desert Storm significantly improved the responsiveness of missile warning space systems to the tactical user and sensitized our leadership to the value of space-based missile warning.[29] The Gulf War was not the first war in which ballistic missiles were used, and there is no reason to think that it will be the last. The ballistic missile was an important political weapon that Saddam Hussein was able to use in his attempts to cause dissension within the Arab-Western coalition. In Desert Storm, an overriding concern was the potential disintegration of the coalition if Israel were provoked into attacking Iraq and thus creating the appearance of an "Arab-Israeli" war.[30] Defense Support Program and Patriot surface-to-air missile systems modified during Desert Shield provided tactical defenses; however, extensive ad hoc communications hookups were necessary to provide early detection and warning from both national and theater intelligence systems.[31] The Gulf War provided the first operational example of the critical nature and the difficulty in providing theater missile defense. Normalization is the key to the continued exploitation of missile warning capabilities for theater missile defense. This promises to be a challenge in the face of future requirements to detect more missiles aimed at smaller targets.

Desert Storm provided evidence of how space forces can enable discriminate and decisive combat power. Information on potential targets and enemy forces was gathered and delivered via space-based systems to theater and unit-level users. Terrain data collected by space systems was vital to develop guidance information for cruise-missile targeting and then delivered by satellites halfway around the world to the Persian Gulf. Map and terrain information was used by mission planning systems at the unit level to plan and practice air missions against high-value, heavily defended targets. Extremely precise space-based navigation permitted more concentrated artillery attacks, confident ground maneuver, and accurate bombing strikes. These operations were conducted at an unprecedented tempo. The force multiplying effect of space systems will prove even more valuable in the future. With numerically smaller forces, the Air Force needs to achieve the highest degree of precision, speed, and lethality possible. As the United States reduces forward deployed forces, space will increasingly provide the in-theater combat information infrastructure that will enable the swift and decisive application of firepower.[32] Normalization becomes increasingly important as we continue to integrate space forces to better exploit the capabilities of the air, land, and naval forces. The theater commander's thorough understanding of space forces and their capabilities will add to his ability to control their use in support of his overall theater campaign.

Training

Peacetime preparedness is essential for any military organization's potential for success in war. The Gulf War demonstrated that the US military was not prepared to use space assets efficiently. A lack of prepared-

ness resulted in many ad hoc relationships created to gain access to force enhancement capabilities from space. One lesson is that peacetime training must simulate, as close as possible, wartime conditions to include the deployment and employment of space forces and of equipment required to take advantage of space. Realistic training is the cornerstone of planning for the use of and the continued normalization of space systems into the force structure. Probably the most important lesson is that well-trained and well-led people win wars. Weapons are important, but they alone are not decisive.[33]

Terrestrial forces must know what space assets are available, how to gain access to information derived from space, and how best to exploit the information once it is provided.[34] This means operational commands must become familiar and comfortable with space. Our Desert Storm experiences with space-based missile warning, precision navigation, communications, and reconnaissance serve to highlight the importance of training to use space forces.

As noted earlier, the Gulf War provided a first look at the importance of having an effective theater ballistic-missile defense. While Iraq used inaccurate Scuds as terror weapons, the proliferation of ballistic missile technology and mass destruction technology around the world implies the next enemy may have more accurate and more lethal missiles to employ against the United States and its allies.[35] Combined with mobility and short flight times, these missiles pose a major threat to our forces projected into a regional conflict. The synergy gained through the ad hoc measures taken in Desert Storm, which linked the Defense Support Program satellite system with ground-based and airborne platforms,[36] requires constant exercise to gain a full understanding and appreciation of the intricacies and difficulties associated with an effective theater ballistic missile defense system.

GPS provided allied armor forces with the extraordinary navigational detail needed to move and resupply with precision.[37] GPS offered three-dimensional position, velocity, and timing coverage over a featureless terrain.[38] This was only one of the many examples of space support that was "taught as we fought" since few GPS receivers were available for peacetime training or even during the initial deployments to Saudi Arabia. Desert Storm only scratched the surface of the application of navigation technology. In the future, with continued training, GPS data coordinates transmitted directly into the aircraft cockpits may enable pilots to turn off their avionics, fly through clouds and smoke, and end up with their weapons on target as they break through cloud decks.[39]

Finally, satellite imagery from MSI satellites proved invaluable in tactical air and ground operations. This first extensive use of MSI enabled planners to detect camouflage and concealment, create new maps, and exploit terrestrial surface features.[40] Although a commercial asset, multispectral imagery proved a valuable planning tool whose utility was unquestioned. Continued training with MSI products remains essential.

Training not only ensures user familiarity with products but also clarifies the actions necessary to acquire them as well.

Together, planning, continued normalization, and training promises to incorporate space into military operational plans. Space forces are just emerging from their infancy in much the same manner as air forces did some 50 years ago. It remains incumbent upon theater commanders and planners to understand and use the potential force enhancement capabilities of space assets. If employed properly, space can help ensure the efficient, effective, and coherent use of force. These three lessons stress the importance space forces play in the operations of a theater commander's campaign plans. However, the control a theater commander now exerts over space forces is quite different from the control he exerts over air, naval, and ground forces. Several initiatives are under way which assist in overcoming shortfalls in control over space forces and over the focus of these assets in-theater.

Initiatives

Several initiatives have been undertaken by USSPACECOM and AFSPACECOM in an effort to better employ support from space forces. In particular, three initiatives focus on the previously discussed lessons. The first initiative, development of space planning support (Annex N) teams, offers assistance in planning. The second, creation of forward space support in theater (FSST) teams, aims at continuing the normalization process of space at the theater level. The third, exercising with space, seeks to close the loop between planning for and normalization of space support. Taken together, these measures continue the maturation process space has undergone since the conflict with Iraq.

Space Planning Support (Annex N) Teams

To assist the supported commanders in the development of the space annex of their operational plans, Annex N, USSPACECOM has created space planning support teams. Support planning generally consists of determining all the requirements to sustain forces in combat. JP 5-03, *Joint Operational Planning and Execution System*, states support planning includes "computations of support requirements based on capabilities, service planning guidance, inter-service and allied support requirements, and the time-phasing of this support in accordance with the supported commander's overall concept of operations." The outcome of this phase of planning is the consolidation and statement of operational needs in the appropriate annex.[41] These space planning support teams provide the expertise to assist theater planning staffs in identifying current and projected space needs. The team works with the staff in formulating and writing Annex N and supporting appendices to related annexes, taking into consideration command and control architecture and equipment capabil-

ities. The space planning support-team initiative supposedly ensures the use of current space expertise in preplanning for a theater's use of limited space assets.[42]

Forward Space Support In-Theater Teams

The support a theater commander receives from space assets depends upon how well his staff and component commands understand space systems and their products. AFSPACECOM has developed FSST teams to assist the JFACC in gaining and utilizing space support. FSST teams are regionally organized and trained to help the theater JFACC understand and acquire space support for air operations, usually in a joint campaign environment. These teams are geared to help integrate available space capabilities and outputs into theater command, control, communications, computers, and intelligence (C^4I) support processes. The goal is synchronized action of space forces designed to help achieve strategic, operational, and tactical objectives. A space support team's aim is to enable conduct of air operations at a tempo that exceeds the enemy's ability to respond in a coordinated fashion.

Space support teams are designed and trained according to the specific needs and requirements of a particular regional theater air commander. The team's composition and strength will be subject to change based on the support situation and desires of the supported commander. Composed of select members from AFSPACECOM, space support teams stand ready to deploy into a theater of operations based upon the request of the theater air component commander. They may be deployed as early as Phase 1 (Situation Development) of a potential crisis or to participate in theater war games. In essence, space support teams serve to further normalize space operations in a theater by acting as facilitators in solving problems and by serving as on-site representatives between the JFACC and commander, AFSPACECOM.[43] Team members take the appropriate actions to ensure space support is combined as part of the air campaign and operations plans. They take care in identifying space-related options while ensuring that implementation of the selected option provides the most effective support for theater air operations.[44] AFSPACECOM's FSST team initiative shows a commitment to better understand space support required by each regional theater. The initiative is designed to provide individualized support only to the JFACC, not to ensure the entire theater uses space assets effectively and efficiently. Accordingly, JP 3-14 points out that each theater service component command may be supported by its sister space component command.[45]

Training

Knowing oneself and the enemy allows employment of friendly strength against the enemy's weakness and avoids exposing friendly weakness to the enemy's strength.[46] The key to this concept is simple: centralized plan-

ning and decentralized execution. The basic requirement of decentralized operations in peace or conflict is preplanned response in accordance with commonly understood beliefs about how to best accomplish a given mission.[47] The Gulf War reinforced these beliefs and the importance of having a basic awareness of the nature of space systems and the capabilities they can provide to operations. The utility of space is generally recognized; however, in-depth understanding and detailed knowledge about employing space capabilities in military operations is less widespread. As previously stated, the Gulf War employment and integration of space and air operations were conducted on an ad hoc basis. As a result, training initiatives have been initiated which reinforce the concept that the Air Force should practice integration of space operations, both in service exercises and evaluations, such as Green, Blue, and Red Flags, and major joint exercises like Reforger and Team Spirit.[48] Participation in regularly scheduled and ad hoc exercise opportunities provides a training and validation process that evaluates the planning and space support team augmentation concepts. Training brings all three initiatives full circle and helps assess our potential for success on the modern battlefield.

Preplanning, normalization, and training are the keys to the continued evolution of space support. They form a foundation from which to build an integrated force, steeped in the advantages space has to offer. Nevertheless, these initiatives alone are not enough to ensure the proper use of space forces. USSPACECOM and AFSPACECOM initiatives are limited to providing advisors to the theater staffs. USSPACECOM provides advisors to help in the development and formulation of space support planning while AFSPACECOM provides advisors to help the JFACC better use space systems during conflict. Napoléon believed that nothing was more important in war than unity in command.[49] Even now, with these initiatives taken in full measure, space remains disjointed, stovepiped, and function-area oriented, particularly its use in theater operations. Chapter 4 takes a closer look at the problem of unity of command and the need for centralized control of space forces in theater operations.

Notes

1. JP 3-14, "Joint Doctrine; Tactics, Techniques, and Procedures (TTP) for Space Operations," final draft, 15 April 1992, I-2.
2. Gen Merrill A. McPeak, chief of staff, USAF, *Air Force Mission Statement,* Washington D.C., June 1992, 1.
3. Conclusions refer to the official lessons learned published by the Joint Staff in its Joint Universal Lessons Learned database, Eliot A. Cohen, *Gulf War Air Power Survey (GWAPS)* (Washington, D.C.: Office of the Secretary of the Air Force, March 1993); and Headquarters USSPACECOM, *Operations Desert Shield and Desert Storm Assessment,* Peterson Air Force Base, Colorado Springs, August 1991 (hereinafter *Assessment*).
4. JP 3-14, VI-2.
5. *Assessment,* 2.
6. Ibid., 3.
7. Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress (Title V)* (Washington, D.C.: GPO, April 1992), K-26 (hereinafter *Final Report*).

8. *Assessment,* 40.
9. Ibid., 3 and 22.
10. Air Force Manual (AFM) 2-25, *Air Force Operational Doctrine, Space Operations,* January 1993, v–vi.
11. Lt Gen Thomas S. Moorman Jr., interviewed by J. R. Wilson, 24 January 1991, transcript, *Jane's Defence Weekly,* transcript, Headquarters AFSPACECOM, Peterson AFB, Colo.
12. JP 3-14, I-5.
13. *GWAPS,* "Continuing Evolution of Space Support," 2.
14. Ibid., 13.
15. JP 3-14, I-6.
16. *GWAPS,* "Communications," 16.
17. Ibid., 18.
18. Ibid., 25.
19. *Final Report,* K-28.
20. Gen Colin L. Powell, chairman, Joint Chiefs of Staff, *National Military Strategy of the United States,* January 1992, 6.
21. *GWAPS,* "Navigation," 3.
22. Ibid., "Continuing Evolution of Space Support," 12.
23. Gen Donald J. Kutyna, "The State of Space," *Defense Issues* 6, no. 14 (23 April 1991): 1–8.
24. *GWAPS,* "Weather," 17. Both Gen Charles A. Horner and Gen H. Norman Schwarzkopf required space-derived weather photos. Horner requested them on top of his desk each morning, while Schwarzkopf was briefed twice daily.
25. Ibid., 1.
26. Edward H. Kolcum, "Military Leaders Say GPS Success in Gulf Assures Tactical Role for Satellites," *Aviation Week & Space Technology,* 13 May 1991, 89.
27. *Final Report,* T-221.
28. Department of Defense, *Conduct of the Persian Gulf War: An Interim Report (Title V)* (Washington, D.C.: GPO, July 1991), 15-5 (hereinafter *Interim Report*).
29. Vincent Kiernan, "Gulf War Led to Appreciation of Military Space," *Space News,* 14 January 1993, 8.
30. *GWAPS,* "Scud Detection," 14.
31. *Final Report,* C-9.
32. AFM 2-25, 18.
33. Norman Friedman, *Desert Victory: The War for Kuwai*t (Annapolis: Naval Institute Press, 1991), 236.
34. Lt Gen Thomas S. Moorman Jr., USAF, commander, AFSPACECOM, *Jane's Defence Weekly,* interview, 9 February 1991, 200.
35. Steve Fetter, "Ballistic Missiles and Weapons of Mass Destruction," *International Security* 16, no. 1 (Summer 1991): 5–42.
36. Desmond Ball, *The Intelligence War in the Gulf,* Strategic and Defence Studies Centre, Research School of Pacific Studies (Canberra, Australia: Australian National University, 1991), 10–12.
37. Craig Covault, "Spacecraft Played Vital Role in Gulf Victory," *Aviation Week & Space Technology,* 22 April 1991, 91.
38. *Final Report,* T-227.
39. *GWAPS,* "Navigation," 3.
40. Patricia A. Gilmartin, "France's Spot Satellite Images Helped U.S. Air Force Rehearse Gulf War Missions," *Aviation Week & Space Technology,* 1 July 1991, 22–23.
41. JP 3-14, VI-4.
42. Ibid., VI-5.
43. Headquarters AFSPACECOM/DOX, "Concept of Operations for Forward Space Support in Theater (FSST) Team," 1 February 1993, 2.
44. Headquarters AFSPACECOM/DOX, "Forward Space Support in Theater (FSST) Team Training Course, Plan of Instruction," 1993, 1-1.
45. JP 3-14, VI-6.
46. JP 1, *Joint Warfare of the US Armed Forces,* 11 November 1991, 35.
47. Ibid., 36.

48. Lt Gen Thomas S. Moorman Jr., vice commander, AFSPACECOM, "Blue Ribbon Review of the Air Force in Space in the 21st Century," draft, 5 February 1993, 22.

49. Lt Col Charles M. Westenhoff, USAF, *Military Air Power: CADRE Digest of Airpower Opinions and Thoughts* (Maxwell AFB, Ala.: Air University Press, 1990), 107.

Chapter 4

Centralized Control

Operational planning to support land, sea, and air operations must be focused on meeting the objectives identified by the JFC. It should stress flexibility and the creation of opportunities to fight on terms favorable with a joint force's strength. Through orchestrated joint operations and aggressive exploitation of tactical gains, the JFC should be able to successfully accomplish the overall campaign objectives. Space forces must be organized and prepared to support commanders who see opportunities and initiate bold combat actions to achieve the JFC's operational intent.[1] Accordingly, the ongoing space "advisor" initiatives are designed to assist ground, naval, and air component commanders better plan for and use space capabilities.

Historically, space planning has tended to focus on individual missions, keeping the space community stovepiped and bureaucratically organized. For this very reason, space forces have yet to be well integrated into planning, training, or exercises. The ongoing initiatives will help but are not enough. Given the limited nature of space assets and the lack of any centralized control over them, the likelihood of a ground, naval, or air commander finding finely tuned, well-orchestrated space operations working in harmony with the strategic and theater campaign objective appears remote. No single theater organization has the responsibility to preplan for the use of space. No individual is responsible for normalizing space operations into synchronized joint operations. No single organization has the responsibility to ensure peacetime training with space assets prepares joint forces to use these assets in time of war. In the Gulf War, communications links had to be modified numerous times; GPS receivers were not available or their use planned for; multispectral imagery served as a replacement for required maps; theater missile warning was lashed together at the last minute; and commercial systems from communications satellites to weather data terminals had to fulfill unseen and unplanned for requirements. The use of space in-theater was a mirror image of the space community itself—stovepiped, bureaucratic, and identified by distinct communities such as communications, intelligence, weather, missile warning, surveillance, and reconnaissance. However, since the Gulf War was the first time the United States had gone to war with a significant amount of space assets supporting a theater, inefficient operations must be expected. But now is the time to refine how the United States will go to war in the future with space forces. There is little reason to believe the functional application of space forces in the future, even given increased awareness and hands-on exercise with equipment, will be

noticeably more effective unless someone is given the overall responsibility to plan, normalize, and train with space forces.

It is hard to predict where conflicts may occur. Furthermore, with a reduced forward presence around the world, the United States may have less knowledge of the region in conflict. This challenges the United States to have the capability to quickly observe evolving crises, gather information to support planning, and prepare for conflict in a minimum period of time. Space forces will be key assets that provide rapid and precise understanding of the evolving threats and opportunities offered in a theater of operations. Currently, functional managers act as the planners and employers of space assets. However, Air Force doctrine suggests the theater ACC should serve as the better planner and employer of space. Who can best serve as the planner for and employer of space forces? Before an answer can be suggested, we must first review why a single concept of operations for space forces is necessary.

Single Concept of Operations

The most important aspect of a single concept of operations is that it offers a way to conceptualize, plan, and execute the use of space forces in support of the theater commander's overall campaign objectives and to deny the enemy the use of space. Another name for this single concept of operations is a theater space campaign. The goal of a theater space campaign would be to use space forces to support the theater commander's campaign operations, while preventing an enemy from using space capabilities or forces. Two key elements of a space campaign would be the application of force-enhancement capabilities across the spectrum of theater forces and the conduct of coordinated counterspace operations.

Force-enhancement operations would weigh the support requirements of air, space, ground, and naval commanders; balance their requirements; and leverage the available resources. Numerous force-enhancement capabilities were identified and applied in Desert Storm. Force enhancement, through a single concept of operations, will continue to develop the enormous potential that space forces offer.

Counterspace operations would be conducted to prevent an enemy's space capabilities from adversely affecting a theater commander's possible courses of action. Counterspace operations strive to employ combatant assets to delay, disrupt, deny, or destroy threatening space systems and their capabilities. The type of targets might include uplinks and downlinks; launch sites; missile storage facilities; tracking, telemetry, and control nodes; or satellites themselves. Operations against these targets will be coordinated with all elements of the theater commander's joint campaign plans to ensure space superiority. In many cases, counterspace operations will precede air, land, and naval operations since it makes an adversary "deaf and blind" to other ground operations. No precedents have yet been set concerning attacking an adversary's space capability,

but other nations are likely to learn from Desert Storm that space is an important force multiplier. Therefore, theater counterspace operations will become essential for denying an enemy his space capabilities, while offering exploitation opportunities to theater and component commanders.[2]

Because it offers centralized control of space assets and a single concept of operations, the space campaign will weigh support requirements of air, space, ground, and naval commanders; balance requirements against the theater commander's campaign objectives; and leverage all available space resources against prioritized requirements designed to meet the challenge and opportunities that arise in conflict. The space campaign also recognizes the growing importance of space in modern warfare and that future conflicts require a theater commander to plan for and employ assets to deny, disrupt, or destroy an enemy's space capabilities. Just as in the past, when our capability to control the air permitted our freedom of movement on land and sea, so in the future will the capability to control space permit our freedom of movement on the surface and in the atmosphere. Securing control of space sets up conditions for victory. The space campaign offers a more structured and institutionalized way to preplan for the use of space forces, understand space capabilities, and train with space at the theater level.

Someone Responsible

Creating a single concept of space operations demands someone is given the responsibility and authority for its development and oversight. At present there are two alternatives for this theater single point of contact for space. AFM 1-1 recommends the ACC be responsible for employing all air and space assets in-theater.[3] This recommendation is based upon the Air Force's belief that air and space are an indivisible medium and that an airman, based on his knowledge and experience, should propose space courses of action to the JFC. On the other hand, JP 3-14 suggests the supported CINC's Operation Directorate, J-3, should act as a point of contact using a staff element with space experience as the vehicle for gaining space support. In actual practice, theater commanders would identify their space-support requirements through functionally related staff elements using the J-3 only as a facilitator. J-3 would rely heavily upon staff support provided by USSPACECOM liaison teams, deployed upon request, to coordinate and plan space resources and requirements.[4] These two alternatives, the J-3 and the JFACC, represent the current alternatives for the theater commander's single point of contact for space operations.

Staff J-3

Designating the theater CINC's J-3 as the focal point for space support has its foundation in the makeup and function of a joint staff. In all the-

aters, the CINC has a staff that is not in the operational chain of command. The primary purpose of the staff is to ensure the theater commander understands the tactics, techniques, capabilities, needs, and limitations of his forces. Additionally, the staff assists the CINC in developing and coordinating an overall campaign plan for his theater of operations. The Operations Division, J-3, assists the CINC in coordinating and controlling the operations of the service component commands, beginning with initial planning and extending through the integration and coordination of joint operations.[5]

Current joint doctrine recognizes the J-3 as the staff point of contact for space support. The J-3, staffed with adequate experienced space personnel, could plan and coordinate the use of space in an operational theater. Using the operations plan and its Annex N with associated appendices, the J-3 offers the theater commander a more focused use of space assets.[6] Initiatives such as USSPACECOM's space planning support teams that assist theater functional managers and AFSPACECOM's forward-space support in-theater teams that assist the air commander will help the J-3 provide better use of limited assets. However, there are some disadvantages to having the J-3 perform in this role.

Clearly, the J-3 is a theater operational planner, not an executor of missions. His goal is to reduce the theater commander's uncertainty by linking him directly to his forces through planning and enlightened control of operations. The J-3's recommendations are intended to enable the theater commander to shape the battlefield to his advantage. Since the J-3 is neither in the direct chain of command nor likely to be a space expert, he must rely on the functional area managers of space. Using inputs from the functional managers on the staff, the J-3 can put together recommendations to the theater commander on how space assets should be used to support his theater air, land, and sea campaigns. Desert Storm experience indicates that functional managers can function well in this advisory role. However, functional managers did not show a strong talent in planning and executing missions that cut across functional space areas. For example, theater warning in the Gulf War required integration between several different space- and ground-based systems. Because no one had planned theater warning, maintaining warning operations took on an ad hoc characteristic due to a lack of complete understanding and familiarity with all the systems involved. As discussed previously, a major portion of the theater space campaign will also be a space-control campaign. The space-control mission, like the theater-warning mission, would involve the integration of space forces with terrestrial forces.

The overall space campaign—force enhancement and space control—would require the J-3 to function much the same way as a component commander. In addition to the J-3's normal theater-level responsibilities, the directorate would be required to develop operational component-level plans for the space campaign. Since the J-3 is not a commander's position, conduct of the space campaign would have to reside with the theater

commander himself. This in effect makes the theater commander his own space commander. It may be unwise to levy this level of activity upon the theater commander and his operations' staff when their attention should remain focused on the overall theater campaign and operations.

JFACC

The air commander serving in the role of the JFACC would appear suitably qualified to extend his area of responsibility to space. The primary purpose of the JFACC would be to provide unity of effort in the employment of air and space power.[7] The JFACC derives his authority from the JFC who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. Once designated, the JFACC becomes responsible for planning, coordination, allocation, and tasking based on the joint commander's decisions. Using guidance and authority, and in coordination with other service and supporting commanders, the JFACC commander can recommend to the JFC the required space tasking to support the various theater air, land, sea, and space campaigns. AFSPACECOM's forward space support in-theater team augments the JFACC's staff to ensure he has capable space people to assist him. Team members provide the air commander with the necessary experience to identify the uses and appropriate tasking of available space assets needed to accomplish his assigned objectives.

However, the real benefit derived from having the JFACC responsible for both air and space operations may lie in his ability to plan a space campaign. Similar in scope to the JFACC's air campaign, the space campaign would also need to be thoroughly planned, well thought out, and trained for under his leadership. The current initiatives—space planning teams, forward space support in-theater teams, and exercising with space—all help the JFACC provide force enhancement, just as they did for the J-3.

The JFACC's responsibility for the air campaign also dovetails nicely with a space campaign, in particular, the space-control portion. Target sets associated with the space-control portion of the space campaign will be predominately ground based. Most of these targets are likely to be embedded in an adversary's infrastructure. Accordingly, the primary means of striking these types of targets are through airpower. Therefore, it follows the JFACC's marriage to a space control mission mates well with his air responsibilities.

Additionally, Air Force doctrine supports the idea that an airman serving as the JFACC is well suited to represent space in a theater of operations. This would appear to commit the Air Force to ensuring the JFACC is knowledgeable and experienced with the characteristics and capabilities of space. In the event the JFACC were a naval aviator, the Navy is probably the service most thoroughly familiar with space's force-

enhancement capabilities.[8] Nevertheless, the JFACC acting as the focal point for space support also has its drawbacks.

The Air Force's proposed space role for the JFACC is not likely to be readily accepted by the other services. First, there exists no formal interservice agreement on responsibility for space within a theater. Joint doctrine suffers from a lack of acknowledgment of space and the significance it plays in the command and control of joint operations.[9] Second, since space has limited assets, the other services may be justifiably concerned that an inordinate amount of space support would be directed toward the air operations of a theater campaign. They may question that a JFACC would give up vital assets or lower his own space-support priority in order to support another service. Third, added to the difficulty of being a truly honest broker, the JFACC will probably not be a space expert or have an in-place staff with space experience. As in the J-3's case, augmentation will be necessary to accomplish the planning and employment of space forces in accordance with a concept of space operations. However, the AFSPACECOM's establishment of FSST teams to support theater JFACCs shows that the Air Force is bureaucratically and institutionally committed to ensuring that the JFACC has the required space-experienced personnel to support him in this role. But the FSST team's focus and expertise has been, and will probably remain, directed at supporting the JFACC's air campaign, not the land and sea campaigns. Fourth, it must be remembered that weapon systems are acquired to support theater CINC's requirements, and that he determines their use in-theater. Air Force space funding and personnel alone do not necessarily support the JFACC's claim to the space role. While over 90 percent of the DOD space budget and 80 percent of the experienced space personnel reside in the Air Force,[10] the Army's and Navy's Tactical Exploitation of National Capabilities Programs (TENCAP) have spent several times more than the Air Force in fielding numerous systems utilizing national space assets. On the other hand, the Air Force has fielded only one system in 14 years.[11] This track record undermines the JFACC's credibility as a broker for the use of space and his ability to efficiently employ it on the battlefield.

Notes

1. AFM 2-25, *Air Force Operational Doctrine, Space Operations,* January 1993, 35.
2. Ibid., 23.
3. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force,* vol. 1, March 1992, 9.
4. JP 3-14, "Joint Doctrine; Tactics, Techniques, and Procedures (TTP) for Space Operations," final draft, 15 April 1992, V-3.
5. AFSC Publication 1, *The Joint Staff Officers Guide 1991,* 2-37–39 and 2-43.
6. JP 3-14, VI-5.
7. Headquarters USAF, *JFACC Primer* (Washington, D.C.: Deputy Chief of Staff, Plans and Operations, August 1992), 11.
8. The Navy has integrated space surveillance, missile and air threat warning, space-based navigation, and satellite communications into its fleet operations independent of

other service space capabilities. The Navy operates its own Naval Space Surveillance Network designed to warning task force commanders of impending satellite overflight. It has integrated warning support from space-based missile warning systems directly into command and control functions of the fleet. The Navy operates and maintains its own communication satellites, FLTSATCOM, and its own navigation satellites, TRANSIT.

9. JP 3-56.1, "Command and Control for Joint Operations," 15 February 1993. This initial draft lacks any depth of how space is used in joint ops and mentions only that USSPACECOM is responsible for providing support in multiple areas.

10. Lt Gen Thomas S. Moorman Jr., vice commander, AFSPACECOM, "Blue Ribbon Review of the Air Force Space in the 21st Century," draft, 5 February 1993, 8.

11. Ibid. The Air Force's only TENCAP in 14 years has been Constant Source, a tactical terminal to receive intelligence and warning data. Another shortcoming in space application was to be noted on 2 August 1990 when Iraq invaded Kuwait. Less than 5 percent of the Air Force aircraft in inventory had GPS receivers installed, yet this space system was nearing its initial operational capability.

Chapter 5

Conclusions

Many analysts argue that our success in Desert Storm was achieved because the United States had the best-equipped, best-led, and best-trained military forces in the world. Taken on the whole, this appears unquestionable. Yet, review of the component parts of this coalition of forces reveals mission areas in need of improvement. Space is one such area. Space assets provided a significant amount of support in the Gulf War, and support from these assets will continue to be important in a national security strategy concerned about regional threats. Of course, future conflicts promise that space-capable opponents may have this same capability. Given this outlook, the space campaign becomes increasingly important.

Space has become so important to all air and surface combat forces that its use as an enabling agent in the projection of national power not only must be adequately planned for but also properly led. Unity of command is the only way to ensure efficiency and effectiveness in the operations of space's limited DOD and national force structure. Unity of command is defined as the principle of vesting appropriate authority and responsibility in a single commander to effect unity of effort in carrying out and accomplishing assigned objectives.[1] Since space forces are not constrained in whom they can support, these limited assets should be prudently employed. Therefore, space support to a theater of operations should be centrally controlled to achieve advantageous synergies, establish effective priorities, capitalize on unique strategic and operational flexibilities, ensure unity of purpose, and minimize the potential for conflicting objectives.

Space leadership, responsible for a single concept of space operations, must be installed at the theater level. Two alternatives have been proposed. The first alternative is the current joint doctrine approach, which assigns the theater commander's operations director, J-3, as the central point of contact for space support. This option offers an acceptable way to provide for theaterwide force enhancement but falls short in providing for an integrated space-control campaign. In addition, it places tactical employment of space on the theater commander's shoulders. This option, in effect, makes the theater commander his own space component commander, a responsibility that may unnecessarily distract him from a theater focus. The second alternative proposes the JFACC take responsibility for the space campaign and plan the employment of space assets across the theater of operations. This option appears to offer a more complete focus on both theater force enhancement and space control. Already staffed to conduct an air campaign, the JFACC could take

advantage of the forward space-support in-theater teams to plan for and conduct a space campaign. Once given the responsibility for space in theater, the JFACC could efficiently and effectively plan, normalize, and train with space forces. In a sense, this option takes a proactive approach to space versus the more reactive approach of the J-3. Whereas, the J-3 would be expected to simply trade off space requests made by the three component commanders—a JFACC might be expected to be considerably more proactive in assuring all three component commanders (himself included) better used and integrated space forces and in denying the enemy use of space forces. Doctrinally, the Air Force is already wedded to space. This makes the JFACC a natural advocate for the integration of space into theater campaign plans.

However, there is one important question associated with placing the JFACC in charge of the space campaign. Can he be an honest broker for the use of the limited assets of space? Today, the JFACC may offer the best solution, however, steps should be taken to ensure space remains focused on the joint force commander's objectives and not just on airpower objectives. Should problems occur in the Air Force's ability to meet the other services' needs, a joint force space component commander may solve this concern.

In accordance with the 1986 Goldwater-Nichols Department of Defense Reorganization Act, a theater CINC can organize his forces to match the objectives set for him by the NCA, making it possible to consider the creation of a commander solely responsible for the space campaign. Once designated, like his counterparts for land, sea, and air, a joint force space component commander could bring unity of effort through centralized control of theater space assets. As the JFC's representative, he would be responsible for planning, normalization, and training with space forces to meet the theater commander's overall campaign objectives. The theater space commander would be accountable for both force enhancement and space control when preparing his space campaign. This places the space commander in the position of being an honest broker for the use of limited space assets. As the theater planner and employer of space, the space commander would act on the theater commander's vision and intent by orienting space operations on the enemy centers of gravity. Synchronized with air, land, and sea campaigns, the space campaign would help create a cohesive and combat force.

In the future, the Air Force may have to consider the creation of numbered space forces, similar to numbered air forces, for the support of theater CINCs. Just as the Air Combat Command provides the Ninth Air Force as the air component command for USCENTCOM, AFSPACECOM would provide numbered space forces for the space component command of that theater. No matter which one of the above options is selected, the theater commander increases his ability to plan, understand, and train with space. We learned from Desert Storm that there is

a need for someone to be given the responsibility for orchestrating a theater space campaign. Space, like air, land, and sea, must be tailored to meet the theater commander's objectives. These options offer potential solutions.

Note

1. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force,* vol. 1, March 1992, 1.