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Exam Preview:

1. According to the reference material, the fourth era of space transformation, which emphasizes the space-control mission area, is under way.
    a. True
    b. False
2. The Office of Force Transformation identifies the ____ Space Commission report as the milestone for the beginning of space-superiority transformation, or, to use the joint-mission-area term, space-control transformation.
    a. 1998
    b. 2000
    c. 2001
    d. 2002
3. According to the reference material, Operation Iraqi Freedom marked the continued maturation of the C2 of joint air operations based on strong working relationships.
    a. True
    b. False
4. Using Table 7.1. Organizations operating military or military-utilized on-orbit space assets, which of the following organizations operates the FLTSATCOM?
    a. Air Force Space Command
    b. US Army Strategic Command
    c. Defense Information Services Agency
    d. Naval Network Warfare Command

5. According to the reference material, to get an accurate position from the GPS, a user needs a minimum of _____ satellites, while 24 satellites are needed to achieve global coverage.
    a. 3
    b. 4
    c. 6
    d. 8
6. According to the reference material, the focus of space operations has not changed since the launch of Sputnik in 1957.
    a. True
    b. False
7. According to the reference material, of the __ air and space power functions, many can be eliminated as potential models if they fail to meet common space-control or counterspace characteristics.
    a. 12
    b. 14
    c. 17
    d. 19
8. A final unique attribute of on-orbit assets is their persistence. Once in position on-orbit satellites have mission lives measured in years, often exceeding decades.
    a. True
    b. False
9. According to the reference material, the FOV for a particular geosynchronous-nous satellite in this constellation covers approximately _____ of the Earth's surface.
    a. 1/4
    b. 1/3
    c. 1/2
    d. 3/4
10. According to the reference material, in the period between Vietnam and Desert Storm, several actions occurred to degrade the working relationships and doctrine between the services.
    a. True
    b. False

Chapter **Contents** *Page*

About the Editor

Lt Col Kendall K. Brown, USAFR, PhD, is a technical analyst at the Airpower Research Institute, College of Aerospace Doctrine, Research and Education (CADRE), Air University (AU), Maxwell Air Force Base, Alabama. He is an Air Force Reserve individual mobilization augmentee (IMA) and conducts research to support CADRE and AU in the area of advanced space system technologies and serves to bridge the gap between technologists and the operational war fighter.

He has over 20 years' experience within the Air Force, National Aeronautics and Space Administration (NASA), private companies, and academia in the research, design, development, and testing of facilities, liquid-rocket engines, and launch-vehicle development. He served on active duty at Fairchild AFB, Washington, and as a reservist at McChord AFB, Washington; Arnold AFB, Tennessee; Eglin AFB, Florida; and currently, Maxwell AFB, Alabama.

Dr. Brown is a registered professional engineer in the state of Alabama and is employed by NASA's Marshall Space Flight Center in Huntsville, Alabama, as a liquid-rocket-engine system engineer. He holds a BS in mechanical engineering from Oklahoma State University, an MS in aeronautics and astronautics from the University of Washington, and a PhD in mechanical engineering from the University of Alabama in Huntsville. Colonel Brown's professional military education includes the Squadron Officer School and the Air Command and Staff College, both located at Maxwell AFB.

Acknowledgments

This book is the culmination of Gen Lance Lord's, former commander of Air Force Space Command, vision to initiate a vigorous discussion about how to best integrate space to support the war fighter. Part of General Lord's vision was for the Space Weapons Officer Air and Space Integration Conference to become a regular event where space weapons officers with experiences from recent operations could gather to discuss those events and propose new and perhaps radical ideas to improve the way space supports the war fighter. In the spirit of the Air Corps Tactical School, the best of these ideas could then be tested during war games and exercises. On behalf of the authors who participated in the conference and their support to this book, I extend our appreciation to General Lord for the opportunity to be part of such a unique event.

The Space Weapons Officer Air and Space Integration Conference in 2005 was a joint event between Air Force Space Command and Air Education and Training Command. The conference could not have been held without the hard work of numerous people at Space Command and Air University, including Brig Gen John Hyten, Col Dwayne Lamb, numerous members from the Space Warfare Center, the 595th Operations Support Squadron, Col Al Sexton, USAF, retired, Mr. Brent Marley, and the Maxwell AFB protocol.

Credit for this work belongs to the space weapons officers who participated in the conference and contributed their perspectives. And last, but certainly not least, the editor wants to recognize the outstanding support of the editorial staff at Air University Press, Dr. Philip Adkins, Mrs. Sherry Terrell, and Mrs. Vivian O'Neal. Their creation of an integrated book from nine distinctly separate research papers was a more complex effort than manuscripts written by a single author.

Introduction

Lt Col Kendall K. Brown, USAFR, PhD

In March 2005 the first Space Weapons Officer Air and Space Integration Conference was held at Maxwell Air Force Base, Alabama, as a joint effort between Air Force Space Command (AFSPC) and Air Education and Training Command. As then-AFSPC commander Gen Lance Lord stated in the invitation to the cadre of space weapons officers (SWO):[1] "We want to hear from the Space Weapons Officers on the best way to integrate space capabilities at the operational level of warfare. What do they think is the best way to do business? Differing views are okay. Articulate pros/cons and support with past experiences—what's worked, what hasn't." General Lord envisioned a regular event where SWOs would gather in the spirit of the Air Corps Tactical School to discuss, argue, and generate new ideas that could then be tested in war games and exercises for incorporation in doctrine, organization, strategy, tactics, and procedures.

General Lord set the stage for the conference with his introductory remarks:

> We've got to get ready for what's going to happen next in the medium of space. When Space starts in a big way, and it will, we have to have the conventional war fighters who have the capabilities, who know the rules of engagement, who are familiar with the laws of armed conflict, who know how to work in this medium and are able to shape and influence and make the right kind of decisions and direct the operational application of space capabilities.

The authors of each chapter presented their ideas directly to General Lord and over a dozen general officers from around the Air Force. The entire cadre of space-officer graduates of the Air Force Weapons School at Nellis AFB, Nevada, was invited, and more than 60 attended. The SWOs presented their ideas not only to senior leadership but also to their colleagues and peers. In the Air University tradition of nonattribution, most of the ideas presented generated lively debate. In particular, a recurring theme of "normalizing" the presentation of space forces to the theater commander was greeted with approval from most SWOs, although some of the senior officers in attendance were not quite as enthusiastic.

The chapters in *Space Power Integration* address issues across a spectrum of air- and space-integration topics at the operational level of war. Several studies argue that current space doctrine regarding organization and command relationships needs to be revised, with recommendations ranging from subtle modifications to paradigm-changing constructs. It is important to note that a major revision to Air Force Doctrine Document (AFDD) 2-2, *Space Operations*, was in process at the time of the conference and during the preparation of this book. As such, many of the fundamental arguments about organizing space forces to best support the theater joint force commander may have been addressed within doctrine. Doctrine does not and cannot provide extensive implementation guidance and direction; therefore, *Space Power Integration* provides some perspectives from space operators who have had direct responsibilities for integrating air and space power at the operational level of war.

Space Power Integration begins with a chapter providing a space-power framework and a recommendation for how the space-coordinating authority should enable unity of effort for diverse information services from space. The next chapter builds upon that background by discussing the importance of counterspace operations and how they are needed to support counterterrorism. Background information in the early chapters helps the nonspace operator put the remaining chapters in better context. The following six chapters discuss various perspectives on problems due to the current command and control (C2) of deployed space forces' organizational models. Some overlap of ideas is present, and no attempt was made to remove this overlap during the development of *Space Power Integration*. Rather, this overlap serves to identify areas of consensus. Conversely, the areas of conflicting observations and recommendations highlight the difficulty of reaching a common understanding on such a complicated subject. The final study was the last presentation of the conference, and rather than focus on the organizational charts and C2 relationships that should or should not be in the doctrine, the author takes a very personal perspective on what problems he has experienced, what he believes are the fundamental root causes, and specific recommendations to address those issues.

Discussions that occurred during the conference could not have taken place in the past because SWOs did not have the operational experience of integrating air and space at the operational level of war. SWOs have learned many lessons and are proposing we use those lessons to improve future operations. These discussions also point out how the Air Force is moving more and more towards a seamless integration of air and space capabilities versus the technically based centralization of space capabilities in the not-so-distant past.

As Gen Gregory Martin, former commander of Air Force Materiel Command, commented during his remarks:

> We do space, the United States Air Force does space, the others use it. We have the preponderance of space warriors and space equipment. It is these advances in technology and personnel that have provided the Air Force the communication, navigation, and imaging capabilities that provide the United States a critical asymmetric advantage. Operation Iraqi Freedom was the first major engagement where these capabilities were so thoroughly integrated in support of the theater commander, through the combined force air and space commander and the air and space operations center. As future adversaries increase their space capabilities, the United States must meet the challenge by improving the efficiency of integrating our space capabilities across the entire spectrum of operations.

That is the challenge for the future, providing effective and efficient integration of air and space capabilities in support of the commanders' objectives. For this level of integration in the theater to become a reality, deployed space forces will be called upon to more actively participate in the commanders' planning and operations. Hopefully, the discussions in *Space Power Integration* will help spur the discussion and debate to arrive upon the doctrine and organizational models needed to provide that support. Planning for the second Space Weapons Officer Air and Space Integration Conference, to be held in spring 2007, has begun and will provide the forum for these discussions to continue.

Note

1. Space weapons officer (SWO) is an unofficial title for career space officers who have graduated from the US Air Force Weapons School. By having a common knowledge basis with their airpower brethren, SWOs have worked in theater operations centers during multiple recent operations to more fully integrate space capabilities into operational planning.

Chapter 5

Theater Space Operations in a Warfighting Headquarters

Maj John R. Thomas, USAF

As space war fighters, these are historic times. Just as the *Mercury 7* astronauts were on the forefront of developing the first manned spaceflight TTP, today's space strategists, planners, and operators are on the forefront of developing the first TTP for the air component that will execute space operations today and in the future. The events of 9/11 have driven the United States into a new combat environment, involving enemies without uniforms, who fight outside defined borders and are sponsored by weak states or nonstate actors. This new strategic environment and the global war on terror (GWOT) have transformed geographic COCOMs into standing joint force headquarters (SJFHQ). Similarly, theater air components are transforming into warfighting headquarters (WFHQ). Military forces able to conduct rapidly executable, full-spectrum operations are the focus of the defense transformation. Theater space operators, as well as those in the United States, must develop operational procedures that keep pace with this ongoing transformation. Theater space operations in this new environment must be responsive, streamlined, and flexible. They must also support full-spectrum operations and adapt to nontraditional planning and execution methods. This chapter will identify five recommendations for addressing these imperatives and improving theater space integration at the operational level.

The New Strategic Environment

Every US government agency is transforming to meet new requirements brought about by this new strategic environment. Changes in policy and strategy have occurred at every level. The *National Security Strategy, September 2002*, outlines the new focus:

> Today, [the] task has changed dramatically. Enemies in the past needed great armies and great industrial capabilities to endanger America. Now, shadowy networks of individuals can bring great chaos and suffering to our shores for less than it costs to purchase a single tank. Terrorists are organized to penetrate open societies and to turn the power of modern technologies against us. The events of September 11, 2001, taught us that weak states . . . can pose as great a danger to our national interests as strong states. Poverty does not make poor people into terrorists and murderers. Yet poverty, weak institutions, and corruption can make weak states vulnerable to terrorist networks and drug cartels within their borders.[1]

Because weak states are vulnerable to terrorist networks, the United States, using all of its instruments of power (i.e., diplomatic, information, military, and economic), must work to support nations to enable them to defend against terrorist network infiltration. The level of military support must not only have the capability to execute major combat operations but also must have the capability to execute a full range of military operations such as noncombatant evacuation operations (NEO) and foreign humanitarian assistance (FHA). These operations move the DOD towards a transformation.

Defense Transformation

The SecDef and the chairman of the Joint Chiefs of Staff (CJCS) have discussed the importance of a transformation to the defense of the United States and its interests:

> The purpose of transformation is to extend key advantages and reduce vulnerabilities. We are now in a long term struggle against persistent, adaptive adversaries, and must transform to prevail.[2]

> Sustaining and increasing the qualitative military advantages the United States enjoys today will require transformation—a transformation achieved by combining technology, intellect, and cultural changes across the joint community. The goal is Full Spectrum Dominance—the ability to control any situation or defeat any adversary across the range of military operations.[3]

The DOD is transforming to operate in this new strategic environment. Each GCC is organizing an SJFHQ, and each major command's air component is organizing a WFHQ. These organizations support a rapid transition to a full range of military operations. Planning methods, such as deliberate planning (DP)

and crisis action planning (CAP), are giving way to adaptive planning, allowing strategists to develop "living" OPLANs that are continually updated and ready for execution on much shorter timelines. The draft JP 3-0, "Doctrine for Joint Operations," discusses the range of military operations to include contributions to homeland security (HS), stability operations, and major combat operations (MCO). HS involves worldwide defensive and offensive actions. Stability operations include arms control; enforcement of sanctions and maritime intercept operations (MIO); ensuring freedom of navigation and overflight; FHA; foreign internal defense (FID); NEO; peace operations (PO); strikes and raids; recovery operations; and support to insurgency and CT. MCOs typically involve a joint campaign with multiple phases.[4] The GCC, using the SJFHQ, has a primary role ranging from HS to major combat operations.

Standing Joint Force Headquarters

The SJFHQ model, developed by the United States Joint Forces Command (USJFCOM), is intended to carry the defense transformation into the GCC's AOR. Each SJFHQ includes expertise from various functional areas, such as operations, intel, logistics, and communications, and places them under a single director. USJFCOM's *Doctrinal Implications of the Standing Joint Force Headquarters* states, "The SJFHQ exploits new organizational and operational concepts and technology to enhance the command's peacetime planning efforts, accelerate the efficient formation of a JTFHQ, and facilitate crisis response by the joint force."[5] The SJFHQ is a full-time capability focused on war-fighting readiness. The organization of the SJFHQ staff enhances situational understanding of focus areas, as designated by the GCC, within the AOR. Maintaining a daily focus on these "hot spots" allows the SJFHQ to provide the core capability for a JTF and enables a more rapid transition to any kind of military operation. A significant part of the SJFHQ is the service and functional components. The air components have a plan to quickly adjust to this new construct.

Warfighting Headquarters

The air component within each SJFHQ is organizing into a WFHQ. The separation of these WFHQs from their traditional major command (MAJCOM) management staff serves the purpose of planning and preparing for contingencies within the AOR. Just like the SJFHQ, war-fighting readiness is a WFHQ's primary purpose. The mission of the WFHQ is to plan, command, control, and execute air, space, and information operations (IO) capabilities across the full range of military operations. As outlined in the AFFOR, *Command and Control Enabling Concept*, "WFHQs must be able to transition seamlessly from peacetime, day-to-day activities to major combat operations, and all levels of conflict in between."[6] Just as the SJFHQ must be ready to stand up a JTF, the WFHQ must be prepared to become the JTF. The decision to make the air component WFHQ the JTF will depend on the scope and duration of the operation. An air-centric operation, for example, most likely justifies the WFHQ as the JTF.

Theater Space Operations Imperatives

In order for theater space operations to transform in this new strategic environment, several imperatives must be addressed. First, theater space operations must be responsive, streamlined, and flexible in order to respond to compressed timeline stability operations. Unity of command is as vital to in-theater space operations as it is to in-theater air operations. The most responsive operations occur when the JFACC, as the single responsible commander, has direct access to forces conducting air and space operations in the AOR. Streamlined operations are possible when products used for planning and tasking space forces are standardized with those used for planning and tasking air operations. Maximum flexibility occurs when space strategists and planners within the JAOC work side-by-side with air and IO strategists and planners collocated in the JAOC. Effective integration and synchronization with other component operations also occur in the JAOC through the liaison elements. Also, like any other instrument of military power, theater space operations must support full-spectrum operations. Space ope-

rations strategists and planners within the WFHQ must have intimate knowledge of the AOR and the possible range of operations. In coordination with the SJFHQ, strategists and planners within the WFHQ must strive to continually analyze and understand the environment in which they operate. And, theater space operations must support nontraditional planning and execution. Military training in the pre-9/11 era focused around major combat operations lasting weeks, months, or years. Doctrine focused on conducting large-scale operations against an adversary of equal or almost equal capability. Today, most theaters are planning for and conducting operations on very compressed timelines against high-value, fleeting targets. USEUCOM, USCENTCOM, United States Special Operations Command, and USSTRATCOM have planning models that work on similarly compressed timelines. Positions, processes, and products must be in place today in order to conduct rapidly executable, full-spectrum theater space operations in today's new strategic environment.

Recommendations

Great strides have been made in recent years integrating space capabilities at the operational level of war. These five recommendations for the improvement of positions, processes, and products within a WFHQ address theater space operations imperatives and ensure these operations keep pace with the defense transformation. Each theater has implemented portions of these recommendations; however, they are not normalized and standardized across all theaters.

1. Identify standing DIRSPACEFOR per AOR.

Operations Enduring Freedom and Iraqi Freedom and many exercises since have identified the need to have a senior space presence on the COMAFFOR or JFACC personal staff. The position, once known as the SSO, has transformed into the DIRSPACEFOR. According to AFDD 2-2.1, *Counterspace Operations*, "The DIRSPACEFOR conducts coordination, integration, and staffing activities to tailor space support for the COMAFFOR/JFACC."[7] Either wing commanders or previous operations group

commanders from AFSPC currently hold the position of DIRSPACEFOR. Oftentimes these colonels arrive in-theater at the beginning of a contingency or exercise without adequate AOR-specific training or situation awareness. The expectation is they will get "spun up" very rapidly. The uncertainty and instability of ungoverned spaces around the globe combined with compressed planning timelines do not allow the luxury of training the DIRSPACEFOR adequately during the rapid buildup prior to mission execution. AFDD 2-2.1 outlines several responsibilities of the DIRSPACEFOR—many of which occur during adaptive planning, sometimes long before execution. These responsibilities are best suited to the permanent in-theater presence of a trained DIRSPACEFOR.

To take full advantage of permanent-party DIRSPACEFORs, general roles and responsibilities as well as AOR-specific training must be provided during initial training. AFSPC has done a great deal of work establishing a baseline DIRSPACEFOR initial qualification training program. The natural extension of this initial training is for AFSPC to develop continuation training and for each theater to provide theater-specific mission qualification training (MQT) as well as continuation training. Theater MQT and continuation training will include frequent situational awareness about activities within the AOR. Once trained and in-theater, the DIRSPACEFOR will be equipped to provide input from adaptive planning to execution to redeployment. A DIRSPACEFOR "living and breathing" within the theater WFHQ is the most effective use of this valuable resource.

2. Integrate space operations expertise into WFHQ operational planning teams.

As mentioned above, a WFHQ must be able to seamlessly, and sometimes rapidly, plan and execute a full range of military operations. This seamless transition from planning to execution requires close coordination across all mission areas between the AFFOR staff (A-staff) and the JAOC. Traditionally, responsibility for DP and CAP rested with the A-staff, which required little input from the JAOC Strategy Division. This type of relationship required the JAOC to spin-up rapidly and, in some cases, duplicate planning efforts to effectively meet the JFC's objectives.

Further, multiple examples identify the disconnect between A-staff (A3/5) collateral-level CAP and A-staff (A39) special technical operations-level CAP. Many times the two planning efforts occurred simultaneously without any interaction between the two planning groups. It is very difficult to develop a single-air-component strategy when the A-staff and the JAOC do not effectively coordinate across all functions. The WFHQ construct allows the A-staff and JAOC Strategy Division to work closely on DP and CAP. The C2 Enabling Concept mentions the establishment of an operations planning group or a long-range planning group, but does not include options for implementation. USAFE is developing a model that establishes operational planning teams (OPT) that mirror the USEUCOM SJFHQ OPTs. These OPTs are focused on the different ranges of military operations such as CT, NEO, and FHA. Functional area experts from the A-staff and the JAOC are assigned to each OPT. Just like the SJFHQ is tasked to analyze hot spots specified by the GCC, the WFHQ OPTs, as the air component representatives to the SJFHQ, focus their efforts on analyzing the same regions. In order to effectively plan and execute theater space operations, it is imperative that these OPTs include space operations personnel from the A-staff as well as the JAOC. This type of coordination and organization provides a seamless transition from DP and CAP within the A-staff to execution within the JAOC.

3. Normalize a space coordinating plan.

When designated as the area air defense commander, the JFACC outlines air defense operations in an area air defense plan (AADP); likewise, when tasked as the airspace control authority, the JFACC outlines airspace operations in an airspace control plan (ACP). When designated as the SCA, the JFACC should outline space operations coordination within a space coordinating plan (SCP). AFDD 2-2.1 states, "The commander with SCA is the single authority to coordinate joint theater space operations and integrate space capabilities. The SCA facilitates unity of effort within theater by coordinating joint theater space operations to support integration of space capabilities and having primary responsibility for in-theater joint space operations planning."[8] Although the JFACC's joint air and space OPLAN

outlines the overall conduct of air, space, and information operations, it does not go to the level of detail that is contained within an AADP or ACP. The AADP and ACP outline the method by which operations will be conducted, the units conducting operations with associated C2 details, the interaction between each unit, the communications equipment used for operations, and the battle rhythm that each unit will follow. These plans offer a "one-stop shop" for the producer of effects and the user of effects. The SCP should offer producers and users of space-derived effects a common reference to understand how effects are produced and the method by which they are requested. CENTAF has developed a model SCP, but it has not yet been normalized across the theaters.

4. Normalize an Integrated Tasking Order (ITO).

JFACCs use the ATO as the mechanism by which to task air assets under their tactical control; likewise, the mechanism used to task space assets under their tactical control is the theater STO. (Note: There are two types of STOs, one which directs global space operations and is published by the JSpOC and the other developed for theater-specific space operations). In order to effectively synchronize air and space operations—kinetic and nonkinetic effects—these assets should be tasked via an ITO. Currently, production and distribution of the ATO and STO occur independently from each other. As the JAOC becomes a weapon system, much time and money are being invested to automate the ATO process from strategy development through ATO production. Similar tools do not exist on the space operations side, relegating much of the STO process to manual procedures. Combining the ATO and STO into a single ITO, theater air and space planners could take advantage of existing, already developed tools. The ITO would then be sent to air and space MPCs, which would produce the detailed mission plans the tactical units would execute. The ITO includes information such as platform, target, timing, and effect and provides insight to mission commanders and package commanders on the assets supporting the overall mission. The ITO would be produced from a single-integrated MAAP. The MAAP briefing would contain kinetic and nonkinetic effects and present the JFACC with an

overall picture of that day's air and space operations. Pacific Air Forces (PACAF) currently uses an ITO, but it has not been normalized across the theaters.

5. Normalize a Reconnaissance, Surveillance, and Target-Acquisition Annex.

The Reconnaissance, Surveillance, and Target-Acquisition (RSTA) Annex is an attachment to the daily ATO that provides detailed tasking for ISR sensors and processing, exploitation, and dissemination nodes supporting the JFACC. According to Air Force Operational Tactics, Techniques, and Procedures (AFOTTP) 2-3.2, *Air and Space Operations Center*, "This product outlines the entire JFACC ISR plan for a given ATO, possibly at multiple classification levels."[9] No standardized and normalized RSTA Annex for ISR supporting theater space operations presently exists. As mentioned above, just as theater space operations should be tasked via the ITO, ISR sensors supporting them should be tasked via the RSTA Annex as well. Personnel within the ISR Division of the JAOC produce the overall RSTA Annex. Currently, space or IO personnel develop the collection plan for theater space operations. However, ISR Division personnel should be responsible for production of the entire RSTA Annex. This will require "space-smart" intelligence personnel permanently assigned to the ISR Division. PACAF and USSTRATCOM have developed an RSTA Annex in support of exercises, but it has not been normalized across theaters.

Conclusion

The strategic environment has fundamentally changed. Consequently, the US government (specifically the DOD) is in the midst of a transformation. The DOD is transforming the geographic COCOMs and major commands to maintain day-to-day wartime readiness by continual situational awareness of activities within their AOR. This continual situational awareness and wartime readiness allows for a more rapid transition to full-spectrum operations. Theater space operations imperatives must be addressed within a WFHQ to ensure these operations effectively integrate with other operations. For theater

space operations to react rapidly and provide a critical contribution to full-spectrum operations, positions such as an identified DIRSPACEFOR per AOR, processes such as space operations personnel on WFHQ OPTs, and products such as a normalized SCP, ITO, and RSTA Annex are essential.

Notes

1. Pres. George W. Bush, *National Security Strategy of the United States, September 2002* (Washington, DC: White House, 17 September 2002), 3–4.
2. Donald H. Rumsfeld, SecDef, *National Defense Strategy of the United States, March 2005* (Washington, DC: US Department of Defense, 1 March 2005), 10.
3. Gen Richard B. Myers, CJCS, *National Military Strategy of the United States, 2004* (Washington, DC: Pentagon, 2004), viii.
4. JP 3-0, "Doctrine for Joint Operations," draft, 15 September 2004.
5. USJFCOM Pamphlet 3, *Doctrinal Implications of the Standing Joint Force Headquarters* (*SJFHQ*), 16 June 2003, 4.
6. AFFOR, *Command and Control Enabling Concept* (change 1), 7 March 2005, 11.
7. AFDD 2-2.1, *Counterspace Operations*, 2 August 2004, 24.
8. Ibid., 9, 23.
9. AFOTTP 2-3.2, *Air and Space Operations Center*, 13 December 2004, 6-117, par. 6.6.8.3.8.

Chapter 6

The Next Evolution for Theater Space Organizations

Specializing for Space Control

Maj Keith W. Balts, USAF

Our ongoing activities in support of the global war on terrorism highlight the fact that our space capabilities have become increasingly integrated in our national intelligence and warfighting operations.

—Peter B. Teets
Acting Secretary of the Air Force

Since Desert Storm, space power personnel and organizations at the theater operational level have been primarily focused on integrating space platform capabilities into military operations. Their contributions include educating the military on available space capabilities, transforming strategically-focused legacy systems to support theater operations, and developing space requirements geared toward the operational and tactical levels of warfare. These space power experts have significantly improved and continue to enhance space support to combat operations. In fact, this era of improved space-force enhancement has been so successful that space capabilities are now an indispensable part of any campaign plan for the United States, our allies, and even potential adversaries.

Along the way, each type of theater space organization has been an important step in the evolution of space power. Liaison officers (LNO), joint and service space support teams (SST), embedded SWOs, augmentees, Space and Information Operations Elements (SIOE), the SCA, and the newly ordained DIRSPACEFOR have had the integration of space platform capabilities at the core of their missions. They have also led theater efforts to protect these capabilities and negate the enemy's use of space platforms.

While these efforts are commendable, this question now arises: What is the next step in the evolution of the theater space-power organization? The answer depends on two differing approaches to the question. One approach focuses on continuing improvements in space-force enhancement; the other focuses on protecting these force multipliers while negating space-force enhancement strides made by future enemies. To use Air Force doctrinal terms, the first approach focuses on how various *space* platforms and forces, old and new, support multiple operational functions like strategic attack, counterair, counterland, counterspace, CSAR, weather, and others. In other words, what is the next step in the evolution of theater space-power organization *for space-force enhancement*? The second approach focuses on how multiple platforms and forces, regardless of the medium, carry out the *singular* counterspace operational function. More specifically, what is the next step in the evolution of theater space-power organization *for space control*?

This study takes the second approach by putting space control at the center of the discussion and proposing a theater space-organizational structure that is less dependent on the platforms and more focused on the specific operational function. At the theater operational level of war, operational functions, not platforms, should be the focus.[1] The author will first describe the evolution of space operations, nuances in space doctrine applicable to the discussion, and current theater space organizations. Once this groundwork has been laid, this chapter will outline a new theater space organization focused on space control and based, to some extent, on the theater personnel recovery (PR) organizational structure. Once the proposed organizational structure is defined, specific recommendations will be made to resolve doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) implications.

While this proposal concentrates on space control, it does not negate the need for theater space organizations focused on space-force enhancement. However, the US military has arrived at a point in the evolution of space power where a single theater space organizational entity cannot simultaneously support the two critical functions of space control and space-force enhancement. Continuing to put all theater operations related to space

under one organizational umbrella dilutes the GCC's and JFC's ability to accomplish either of them effectively.

It is important to take a look at the evolution of space operations and to consider space transformations in the context of history. Understanding how space operations have transformed, with respect to theater operations, will provide the required justification for transformations related to theater space organizations.

Space Operations Evolution

The focus of space operations has changed since the launch of Sputnik in 1957. Subsequent decades concentrated on providing "global" space capabilities for national decision makers, but this emphasis shifted in the 1990s to distributing these capabilities to the operational and tactical levels of war.[2] Although, the Tactical Exploitation of National Capabilities (TENCAP) program has been in existence since the 1970s to drive these changes.[3] The Office of Force Transformation within the Office of the SecDef sets the milestone between these two transformational periods as Operation Desert Storm.[4] The catalyst for this change in focus can be traced to Gen Charles Horner, who took over as CINC of USSPACECOM and commander of AFSPC after serving as the CFACC in Desert Storm.[5] Using the joint doctrinal terms for space mission areas, these two transformations can be characterized as space-force enhancement at the strategic level and space-force enhancement at the lower levels of war. That is, operational and tactical as shown in figure 6.1.

The success of this emphasis shift in space-force enhancement from the strategic level to the operational and tactical levels has certainly left its mark on Air Force doctrine. Space

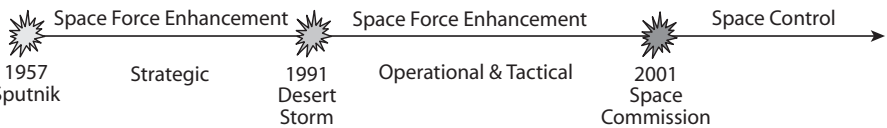

Figure 6.1. Space operations transformations. (*Adapted from* Col Jay Raymond, USAF, DOD Office of Force Transformation [address, Air War College, Maxwell Air Force Base, AL, February 2005], slide 6.)

capabilities are now a must for any combat operation. "Space assets are force multipliers across the spectrum of conflict and must be integrated into deliberate and crisis action planning, as well as operations planning, combat operations, and time-sensitive targeting to ensure timeliness of effects."[6]

However, increased reliance on space capabilities has turned our asymmetric advantage into an asymmetric vulnerability and a likely target for potential adversaries.[7] This leads to a third transformational period in the evolution of space operations, namely one focused on space superiority to protect our force-enhancement capabilities and negate any advances in space-force enhancement made by our adversaries. The Office of Force Transformation identifies the 2001 Space Commission report as the milestone for the beginning of space-superiority transformation, or, to use the joint-mission-area term, *space-control transformation*. The attempted jamming of the GPS by Iraqi forces during the initial stages of OIF provides a real-world example of military operations in this current era of space-superiority transformation.[8]

Theater Space–Control Concepts in Doctrine

All transformations should include changes to capabilities, concepts, people, and organization.[9] This chapter focuses on how theater organizations have changed or need to change to keep pace with the current space-control transformation. The discussion is also scoped to theater operations, but a similar study could be conducted for organizational changes at the national and strategic levels.

Air Force and joint doctrine have made some significant steps toward documenting specific concepts in space control. In addition to basic space doctrine, the Air Force has developed specific space-control doctrine.[10] The joint community also has plans to develop a classified appendix to JP 3-14.[11] The long-term plan for Air Force space-control doctrine is to roll the information up into the basic space volume, but this may dilute the significance space superiority plays in current and future conflicts.[12] For joint doctrine, the appendix keeps space control as a distinct doctrine, but unfortunately keeps it away from

mainstream reading as a classified document. When sister-service doctrine mentions space operations, they focus almost exclusively on the space-force enhancement mission area and mention *space control* primarily to define the term. Sister-service doctrine is void of any details on how to accomplish space control for organizations assigned space-control responsibilities.[13]

Despite specific Air Force and joint doctrine focused on space control, there are some significant disconnects in doctrine related to this mission area. First, a disconnect in terminology exists on the precise term for protecting friendly and negating enemy space capabilities. Joint doctrine uses *space control* in describing the specific space mission area, while Air Force doctrine defines it as an operational function called *counterspace*, akin to *counterair*.[14] While not a showstopper for space-superiority discussions, this may cause confusion when Air Force personnel try to articulate concepts and organizational structures in a joint community and vice versa. This chapter will primarily use space-control terminology to be more relevant in the joint community, but counterspace will be used when discussing Air Force–specific concepts.

One benefit of using the Air Force term is that counterspace also includes concise descriptions of protecting friendly capabilities and negating enemy capabilities, DCS and OCS, respectively.[15] This is something that is not as easily articulated within space control. The counterspace concept also includes SSA, a necessary component of protection and negation actions, especially with respect to complex intelligence requirements.[16]

A second doctrinal disconnect exists in describing the space-control-related duties and responsibilities for theater commanders. JP 3-14 does not explicitly list space-control duties or responsibilities for theater commanders except for force protection of space forces and coordination with USSPACECOM on campaign plans.[17] When discussing C2 of space forces, JP 3-14 states that the JFC can retain or designate the authority to coordinate and integrate space operations, but nothing specific to the space-control mission area.[18] In fact, joint doctrine primarily focuses on coordination and integration of space capabilities for space-force enhancement and has not yet transformed to meet the new era of space-control emphasis. Hopefully, JP

3-14.1 will address specific details on theater commanders' space-control responsibilities.

While not a joint document, AFDD 2-2.1 does specifically address space control, or in this case counterspace, responsibilities and authorities for theater commanders. Unfortunately, it is unclear how best to delegate these authorities within the theater chain of command. According to AFDD 2-2.1, the GCC is responsible for all space requirements and establishing command relationships necessary to meet those requirements.[19] The document does state that the JFC is responsible for space superiority in the specified AOR/JOA and recommends assigning this responsibility to the JFACC.[20] Unfortunately, the document is a bit confusing, as AFDD 2-2.1 also recommends that the JFC assign a supported commander for space operations (which presumably includes counterspace operations), a supported commander for theater counterspace operations, and the SCA.[21] SCA is mentioned here because it includes specific space-control responsibilities: facilitate space target nominations, maintain SSA, and assist JFC with theater counterspace operations.[22]

These overlapping responsibilities, titles, and authorities beg the question, What is the best way for a JFC to delegate space-control responsibilities to ensure unity of effort and unity of command by all players involved? The recommended solution is to delete generic references to space operations or space responsibilities and authorities and concentrate on specific joint mission areas. Ideally, space-control tasks should be mutually exclusive of space-force-enhancement tasks for clarity in assigning them to subordinate commanders. That is not to say the JFC could not assign both responsibilities to one commander, like the JFACC. To provide clarity in expressing space-control responsibilities, doctrine should state that the JFC may assign a supported commander for space control. A supported commander is a support-command relationship and is a much stronger designation than a coordinating authority for accomplishing space-control tasks.[23] Space control is used vice counterspace to be recognizable in the joint community. Of course, the JFC does not have to delegate any authorities, but if delegation is desired, the JFACC/COMAFFOR should be designated as the supported commander for space control. While not the

focus of this study, space-force-enhancement responsibilities should be grouped under a separate SCA or equivalent and include specific wording for space-force enhancement or "information services" in the title.[24]

Despite these two disconnects in terminology and description of responsibilities, doctrine is showing significant signs of transformation to specifically address this new emphasis on space control. While the space-control concept is gaining momentum in transforming doctrine, the next section examines how theater space organizations are not necessarily meeting this level of transformation with respect to space control.

Evolution of Theater Space Organizations

Looking back on the previous transformation related to space-force enhancement, the Desert Storm milestone also triggered a transformation in theater space organizations (fig. 6.2).

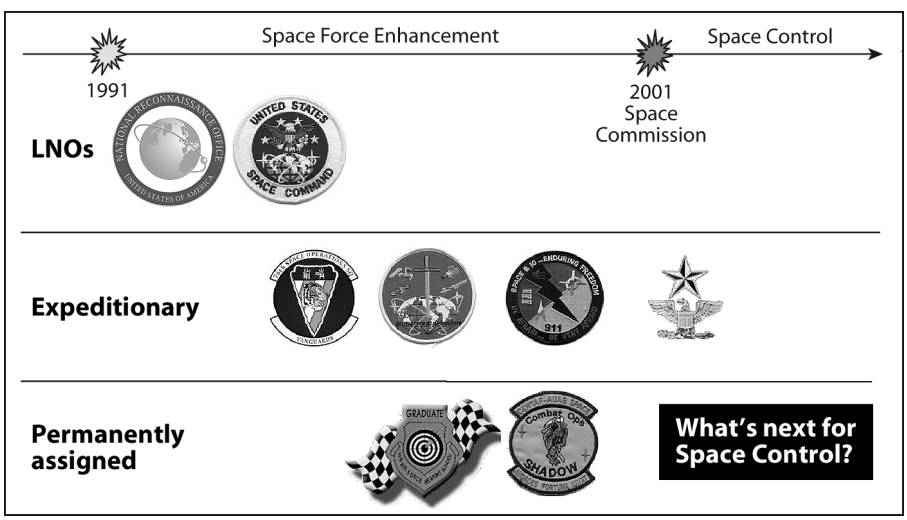

Figure 6.2. Evolution of theater space organizations. (*Adapted from* Col Jay Raymond, USAF, DOD Office of Force Transformation [address, Air War College, Maxwell Air Force Base, AL, February 2005], slides 6 and 8.)

LNOs, expeditionary organizations, and eventually permanently assigned individuals emerged to better coordinate, plan, and execute space operations in each AOR. Because of the era in which they were born, these organizations were formed with space-force enhancement as their core mission area. LNOs to the GCC from the National Reconnaissance Office (NRO), United States Space Command (USSPACECOM [now USSTRATCOM]), and other agencies provide a daily pipeline between space capability providers and theater commanders and their staffs. When the focus shifted post–Desert Storm to supporting the theaters, more personnel were required above and beyond these LNOs to meet the high demands of integration during major combat operations.

Expeditionary space organizations filled this gap and continue to provide space operations expertise to GCCs and their component commanders. USSPACECOM and its service components formed joint and service SSTs to assist theater commanders and staffs in coordinating, planning, and executing space operations in-theater. USSPACECOM went even further during OEF by sending an SIOE to USCENTCOM to further augment their deployed joint SST and LNO. USSTRATCOM now deploys a consolidated USSTRATCOM-support team to fulfill JSST and SIOE roles.[25] These expeditionary organizations proved extremely effective in jump-starting space-capability integration during major combat operations. However, since they were not permanently assigned to the theater staffs, their contributions were less effective during relative peacetime for working detailed coordination and planning efforts.

To overcome this shortfall, the Air Force deactivated the Air Force SSTs in the late 1990s after the United States Air Force Weapons School (USAFWS) began graduating SWOs for permanent assignment to air component staffs throughout the DOD. SWOs populated permanent positions with CCDR staffs as well. These were not the first space officers on theater staffs, but they represented a major transformation in how theater space officers would be trained and employed for assignment to theater headquarters. Despite this move, the Air Force did not completely eliminate the expeditionary concept. During exercises and times of major military operations, additional space officers deploy to augment the limited number of SWOs permanently

assigned to theater. The Air Force also developed a senior-level expeditionary position in the years leading to OIF. The position was initially called an SSO during early development and the assistant CAOC, director for Space and Information Warfare, during the initial phases of OEF. This senior-level advisor is now documented in AFDD 2-2.1 as the DIRSPACEFOR.[26] The DIRSPACEFOR serves as the senior space advisor to the COMAFFOR but is not permanently assigned to the CCDR's air component staff.[27]

Theater Space Organizations in Doctrine

The 2001 Space Commission's increased emphasis on space control may have transformed space-control concepts in doctrine; however, there has been no comparable transformation in theater space organizations like those triggered after Desert Storm for space-force enhancement. Instead, increased space-control responsibilities are merely added to theater space organizations' existing space-force-enhancement responsibilities. A transformation this large demands a comparable change in organization to handle the increased emphasis. To transform theater space organizations, it is important to understand the organizational shortfalls in doctrine.

Unfortunately, current organizational doctrine lacks reality and concentrates much more on liaisons and expeditionary organizations, like space support teams, instead of permanently assigned space organizations on the GCC, JFC, and component commander staffs. When discussed in doctrine, the responsibilities of the LNOs and expeditionary organizations are weighted heavily toward operational- and tactical-level space-force enhancement. This is not surprising since they were developed during the second space transformation, where emphasis was on space support to the war fighter. Space control is not totally disregarded by these organizations, but they must fulfill these responsibilities in conjunction with their space-force-enhancement responsibilities. This was not an issue in the 1990s when space-control responsibilities were not as demanding as they are during this current transformation.

A similar look at doctrine regarding permanently assigned personnel within GCC, JFC, and component commander staffs does not yield much detail. Sister-service doctrine does not address permanently assigned space expertise in-theater.[28] JP 3-14 mentions "joint space planners" in-theater and a "network of space operators" working for the GCC, but provides no significant details on how they are organized or what their responsibilities include.[29] Air Force doctrine mentions "embedded space experts" in the AOC.[30] However, only Air Force Instruction (AFI) 13-1AOC, volume 3, *Operational Procedures—Aerospace Operations Center*, lists specifics on how they are organized and their responsibilities.[31] In all cases, specific or not, organizational responsibilities are primarily focused on space-force enhancement and do not reflect the new emphasis on space control.

An increased emphasis on space control puts the current organizational structure at risk since they are expected to simultaneously meet growing space-force-enhancement and space-control responsibilities. Unfortunately, stagnant manning levels plus added breadth versus depth in training dilute theater expertise and make it less effective in both mission areas. Personnel who populate space organizations are slowly becoming "jacks-of-all-trades, masters of none" with respect to space mission areas. While there is some overlap, each mission area also interfaces with its own set of organizations. Adding more breadth instead of depth to existing theater space organizations also dilutes their ability to form effective relationships and develop combined TTP with other organizations. This includes other organizations within theater as well as those outside the theater that support or are supported by space-control operations.

The recommended solution is to increase manning, where appropriate, but also to specialize the organizing, training, and equipping of theater space personnel. This specialization ensures depth in expertise and depth in forming effective relationships for meeting the challenges associated with this space-control transformation. This transformation should not take away from space-force-enhancement responsibilities but should lead to specialized theater space organizations focused separately on each of the two main mission areas. Creating specialized theater space-control organizations will have an impact on how space-

force enhancement is accomplished in-theater, but a detailed discussion of those impacts is beyond the scope of this study.

Summary

The third era of space transformation, which emphasizes the space-control mission area, is under way. This emphasis is beginning to change theater space-control concepts in doctrine but has not led to significant transformations in theater space organizations. First, GCCs and JFCs should designate their air component commander as the supported commander for space control to meet space-superiority responsibilities across the spectrum of conflict. Supported commanders need specialized space-control personnel permanently assigned to their staffs to meet increasing demands on coordinating, planning, and executing space-control operations. To do this effectively, they must be properly organized, trained, and equipped for space-control missions without the burden of theater space-force-enhancement responsibilities.

Proposed Theater Space–Control Organization

As stated earlier, a theater space-organizational structure focused on space control does not negate the need for other organizational elements concentrated on space-force enhancement. It merely elevates space control to a visible position on GCC, JFC, and subordinate commanders' staffs so space-control-specific training, exercising, coordination, planning, and execution can occur without the diversions associated with space-force-enhancement responsibilities.

By way of comparison, theater air operations could be considered one organization grouped together under the AOC construct. However, each air-related operational function has its own subordinate organizational structure to accomplish tasks in a specific mission area. Even beyond the four AOC divisions dedicated to strategy, planning, operations, mobility, and ISR, specific cells exist for weather, CSAR, counterair, TMD, and other Air Force operational functions.[32] Likewise, space power has evolved to the point where some individual functions demand

separate space-force-enhancement and space-control structures beyond generic space experts in each plan's cell or under the Combat Operations Division (COD) space cell responsible for all space operations.[33] The same argument can be made for a separate theater space organization for space-force application and space support, if and when those capabilities are ready for theater employment.

Since the JFACC should be designated the supported commander for space control, any theater space-control organization should fit within the AOC structure. Unfortunately, space operations in the AOC are platform-centric in that they focus on how space platforms, capabilities, and forces support other functions in the AOC. This stems straight from the "space support to the war fighter" mind-set developed under the second space-operations transformation. Even when the function of counterspace is discussed in doctrine, it primarily looks to space forces; that is, singular medium platforms, to accomplish those tasks. That said, JFACCs will always need space-platform experts to provide support to AOC functional cells, much like fighter, bomber, tanker, predator, and other unit LNOs work platform issues in the AOC for other airpower functions. However, the operational level of warfare is still centered on accomplishing functional tasks regardless of any specific tactical platform (see fig. 6.3).

Instead of developing a theater space-control organization from scratch, a similar function-centric organization could be used as a model and starting point. Once again, the AOC provides many function-centric organization models to choose from. Therefore, the right criteria must be selected to ensure applicability to space control. Of the 17 air and space power functions, many can be eliminated as potential models if they fail to meet common space-control or counterspace characteristics.[34]

First, the model should involve joint capabilities that are not dependent on a single medium. That is, they should not just meet functional responsibilities by employing Air Force or air capabilities. Most functions meet these two criteria with the exception of airlift, air refueling, and spacelift. Second, since this is an evolutionary step, the model should be based on a relatively small theater organization. This excludes expansive orga-

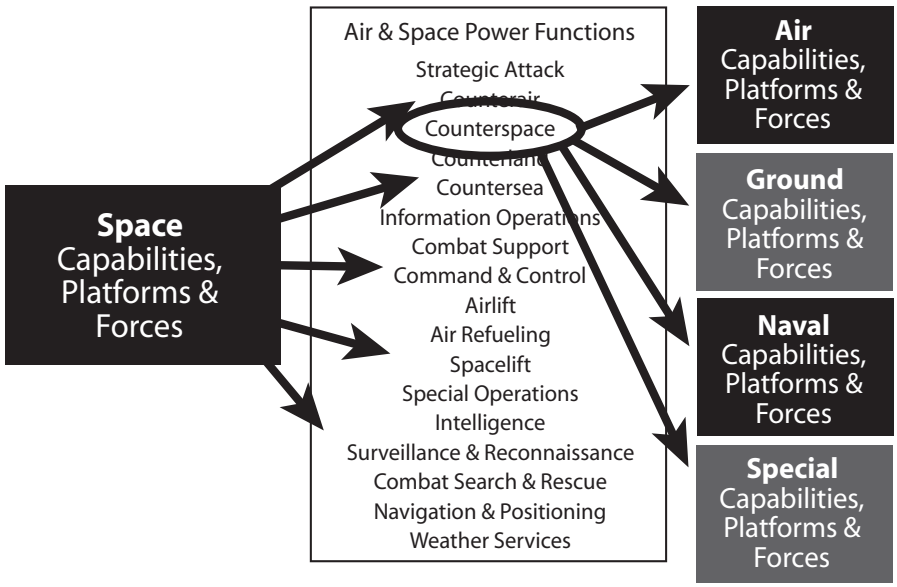

Figure 6.3. Platform-centric versus function-centric focus. (*Adapted from* AFDD 1, *Air Force Basic Doctrine*, 17 November 2003, 39.)

nizations like ISR with its full-up AOC division and special operations with its complete theater functional component.

Next, the functional model should be applicable to the full spectrum of conflict since SSA, DCS, and to some extent, OCS operations are not confined to major combat operations. This excludes many traditional airpower functions like strategic attack, counterland, and countersea. Also, the model should not be based on pure support functions. While counterspace operations may not be the main effort in an operation, they could be, and therefore its organizational structure should not look like a support structure. This excludes combat support, C2, PNT, and weather services. This leaves counterair, information operations, and CSAR as potential candidates.

Counterspace is often compared to counterair and to information operations, making them obvious candidates. However, IO is excluded because space control should be based on a mature and experienced organizational model. While elements of information operations have been around for almost as long as war itself, the IO concept is a fairly new one, especially with re-

spect to specialized theater organizations. Counterspace doctrine shows many comparisons to counterair, but the final criteria were the author's personal experience and knowledge of the functional organization. Having depth in the functional area helps make for educated comparisons based on experience, not merely based on current doctrine. While the need for a specialized theater space-control organization is the key thesis of this chapter, using an IO, counterair, or some other joint operational model as a basis is definitely worth additional research. However, for the purposes of this discussion, CSAR, or the more appropriate joint term, *PR*, will serve as the functional model for developing a specialized theater space-control organization.

Using Personnel Recovery as a Model

In searching for a model, theater PR organizations provide a template for a theater space-control organization. The PR function has many characteristics in common with space control, and its structure serves as an excellent point of departure for making comparisons. More importantly, PR meets all the criteria mentioned above for selecting a comparable function.

First, PR is a joint concept supported by platforms in all mediums. PR-specific platforms do exist—the HH-60 to name one—but theater PR personnel must integrate all available platforms for effective PR operations. These include fighters, tankers, C2 and ISR platforms, and even naval, ground, and special forces, if applicable to the situation.[35]

Second, the theater PR organizational structure is relatively small compared with many other operational functions. There are no PR functional component commanders or large PR divisions at operational-level command centers. PR incidents also occur across the spectrum of conflict and are not confined to major combat operations. Theater commanders have a standing PR organizational structure to deal with these various types of incidents, from supporting a civil rescue to recovering a downed pilot in combat.[36] The same is required for space control, especially in this era of terrorism. A DCS mission may be required at any time to deal with an adversary's attempt to negate friendly space capabilities. Although this particular incident was re-

solved diplomatically, the jamming of Iranian Voice of America from Cuba in 2004 is a good example of a DCS event occurring in peacetime that may have required use of the military instrument of power.[37] GCCs need a standing space-control organizational structure to resolve these situations, if only to provide specialized support to their existing 24-hour joint operations center when an event occurs. Functional agencies related to space, such as USSTRATCOM and NRO, also need a 24-hour space-control point of contact in each theater to resolve incidents. If a space capability owned by USSTRATCOM, NRO, or a commercial entity with US national interests is attacked, the GCC needs a trained organization to coordinate the resolution.

Finally, PR meets the last three criteria outlined above. PR is not a support function but a necessary operational function inherent throughout the spectrum of conflict. While it is rarely the main effort, PR can be the primary mission, with other functions acting in a supporting role. Also, even though current PR organizational doctrine is under review, theater PR organizations are mature and have existed since at least World War II.[38] Finally, the author has spent seven years working with or in the joint PR community, which meets the last criteria, personal experience.

Relevant Personnel Recovery Doctrine for Space Control

Since PR was the chosen model, PR doctrine should be the starting point for developing a theater space-control organization. JP 3-50, "Joint Doctrine for Personnel Recovery," is the cornerstone of military PR doctrine. Unlike JP 3-14 and AFDD 2-2.1, JP 3-50 goes into great detail on the theater organizational structure GCCs, JFCs, and component commander's leverage to accomplish PR tasks. This PR doctrine not only lays out the detailed roles and responsibilities of the various PR-specific organizations within each theater, it also describes coordination channels these organizations have with other theater entities and external agencies.

The actual theater PR organization is outlined in JP 3-50. Key PR personnel in-theater exist on the GCC and JFC staffs,

in Joint Personnel Recovery Centers (JPRC), and in personnel recovery coordination centers (PRCC) at each component. JP 3-50 provides detailed functions and responsibilities, summarized here, for each of these organizational entities. According to JP 3-50, a PR office of primary responsibility (OPR) should be identified on the GCC staff to ensure proper horizontal and vertical coordination on joint PR issues. Among its many responsibilities, this full-time individual or staff ensures a coordinated PR program exists for the AOR; maintains liaisons with PR assets, components, and host nations; develops joint-force PR SOPs, intelligence requirements, ROEs, and CONOPS; and coordinates and deconflicts PR plans, exercises, and reporting within the theater.[39]

Whether the JFC exercises command authority for PR or designates the JFACC or other component commander as the supported commander for PR, the JFC normally establishes a JPRC to plan, coordinate, monitor and/or execute, and integrate PR missions within the assigned OA. The JPRC also serves as the JFC's primary coordinator for assisting host nations or civil authorities, as authorized by the president or SecDef. Not every operation will require a fully staffed JPRC; however, one should be established when operations dictate a requirement for PR support. Doctrine even describes key personnel, materiel, and training recommendations for effective JPRC execution. The JPRC should consist of specifically trained personnel, to include a director, controllers, and intelligence personnel plus unit, multinational, and joint representation, as appropriate. In addition to personnel, the JPRC also needs a proper C2 structure and extensive exercise training. As the focal point for all PR operations within a theater, JP 3-50 lists 35 specific functions and responsibilities for the JSRC.[40] This detailed doctrine makes the JPRC an effective group of specialized, standardized, integrated, and identifiable action officers for all theater commanders and their staffs.

The last major element of theater PR organization is the establishment of a PRCC at each component. Each component commander normally establishes a PRCC to coordinate all component PR activities. If a PRCC is not established, PR activities are normally assigned to another component staff organization, like the operations section. PRCC functions and responsibilities

are similar to those of the JPRC but deal specifically with the component level.[41]

JP 3-50 also includes specific details on intelligence support to PR. Like most operational functions, intelligence is a critical element for success, so "intelligence support at every level must have PR-knowledgeable personnel integrated within their staffs." Also, dedicated intelligence personnel must be assigned to the JPRC and PRCCs to ensure intelligence requirements are satisfied in a timely manner.[42]

Some key differences exist between PR and space control. An exact replica of the theater PR organization with "space-control" titles would not be appropriate for accomplishing the space-control function. First, PR is generally reactive in nature, triggered by the incident causing personnel to be isolated. While significant deliberate, crisis-action, and daily planning is required to ensure theater commanders are ready to accomplish their PR responsibilities, there are no proactive PR operations. This function is more closely related to counterland, counterair, countersea, and the combat-support function of force protection than resident in the PR community. Space control, on the other hand, has a significant OCS element which requires extensive strategy and planning. This difference is manifested in the current PR organization, where PR personnel are centered in the AOC operations division and only support strategy and planning activities as needed.

The second major difference between PR and space control is the level of support provided by functional components besides the JFACC. All functional component commanders have the responsibility to recover their own isolated personnel to the best of their abilities, but this level of effort has not been demonstrated for space control. That is not to say other components could not or should not have space-control responsibilities. Indeed they should, but the space-control transformation has not risen to that level in other components. This is evident by the lack of space-control sister-service doctrine and organizational details mentioned above. Other functional components are not excluded from space control, but their *current* level of activity with respect to space control is limited. This could and should change as the transformation filters to all the services over time.

Proposed Theater Organization for Space Control

Despite these differences, the author's proposed theater space-control organization still has many similarities to the PR model. The GCC and JFC should designate a space-control OPR, a supported commander for space control with a joint space-control center (JSCC), and space-control OPRs at all the components. The space-control OPRs on the GCC and JFC staffs will ensure proper horizontal and vertical coordination on joint PR issues for their respective commander and liaison with USSTRATCOM, NRO, and other satellite providers, as required. While every situation is different, the JFC should normally designate the JFACC as the supported commander for space control and direct this commander to establish a JSCC. Like the JPRC description above, the JSCC would be the specialized, standardized, integrated, and identifiable group of action officers meeting the theater-functional space-control responsibilities. Figure 6.4 shows the proposed organization.

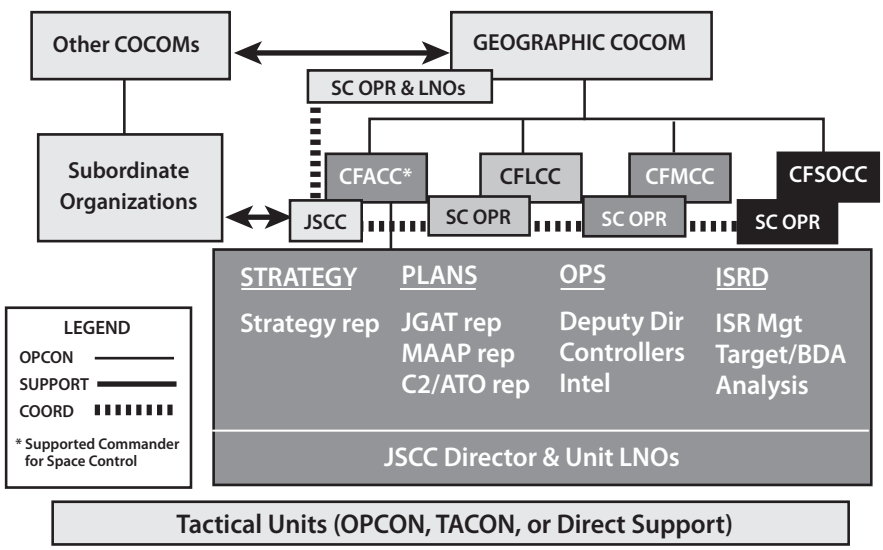

Figure 6.4. Proposed theater space-control organization

The differences between PR and space control mentioned above translate to differences between the established PR organization construct and the proposed space-control version. For instance, the current difference in how component commanders contribute to each function affects the kind of organization required at their level. Full-up PRCC equivalents, or space-control coordination centers (SCCC), are not yet needed at the component level. However, component commanders should designate a space-control OPR at the very minimum to coordinate component space-control activities. If and when the space-control transformation expands deeper across the joint community or the threat dictates their increased involvement, component commanders may need to convert the OPR into a fully staffed SCCC.

Also, the extensive planning activities required for space control mean JSCC representatives must be embedded within strategy, planning, and ISR cells. This leads to better unity of effort within the operations center hosting the JSCC, normally the CAOC, but causes problems for unity of command for the individual personnel. Do they work for their respective cell chief or the JSCC director? Who does the JSCC work for, the chief of Combat Operations, the chief of Combat Plans, the chief of the Strategy Division, or the DIRSPACEFOR?[43] The answer depends on the situation and, more importantly, on the decision of the supported commander for space control. One recommendation for doctrine is to state, "When the JFACC is designated the supported commander for space control, the JSCC should normally be assigned to the Combat Operations Division with representatives embedded in the other divisions. The JSCC director would serve as a specialty team chief within the AOC and act as the lead action officer on space-control issues for the CFACC."[44] The permanently assigned space-control OPRs and the JSCC director would also represent space-control issues in the IO cell at their respective levels within the theater.

Summary

Since the proposed theater space-control organization primarily exists at the operational level of war, the proposed struc-

ture is based on a function-centric model, not formed around the specific platforms employed for space control. This differs from current theater space-operations organizations, which grew out of the previous space transformation tied to operational- and tactical-level space-force enhancement. They are focused on how space platforms, capabilities, and forces support the war fighter.

With some accommodations for the differences between PR and space control, the proposed structure is based on the theater PR organization as outlined in the current draft of JP 3-50. Using PR as a model meets all the criteria for selecting a comparable function to space control. In short, the proposed theater-space-control organization includes OPRs on GCC, JFC, and functional component commander staffs. The JFC should designate the JFACC as the supported commander for space control and direct him or her to establish a joint space control center for accomplishing the day-to-day responsibilities for space control in-theater.

DOTMLPF Recommendations

While this proposed theater space-control construct has its focus on organizational changes, it also has implications for DOTMLPF. Fortunately, space control itself is not new to theater operations; so much of the groundwork has already been laid with respect to these categories. The impact of this proposed organization leads to recommendations in all seven DOTMLPF categories.

Organization, Personnel, and Leadership

The most obvious implication is on the personnel, leadership, and organization in-theater. These three areas are critical to ensuring unity of effort and unity of command with regard to theater space control.

Luckily some space, IO, intelligence, and other personnel already spend a considerable part of their time working space-control issues in-theater. With the space-control transformation under way, one or a small group of these individuals at the GCC and JFC levels should be identified and assigned as the

space-control OPR for that commander. The most obvious choice would be an SWO already embedded on the J-3 staff and possibly already working some space-control issues. The threat level and situation in the theater would determine whether this OPR should be dedicated full-time to space control or act as the OPR in addition to other responsibilities. Component commanders should also identify their space-control OPR. Ideally, this would be a permanently assigned individual with space operations expertise or general IO expertise at a bare minimum.

Each GCC and JFC should designate a component commander as the supported commander for space control, normally the air component commander. The GCC and JFC could also retain the authority if that is more appropriate. This designation should be a separate authority other than the coordinating authority for space mentioned above. Both authorities could be delegated to the same commander, that is, JFACC, but the responsibilities should be mutually exclusive.

The supported commander for space control should then assign a JSCC director and provide the resources necessary to meet space-control responsibilities. Depending on the threat level and the situation, personnel resources should include the appropriate number of controllers, planners, intelligence representatives, and unit-level liaisons necessary to accomplish their responsibilities.

Once these individuals are identified they should begin the coordination process with other theater space organizations to deconflict responsibilities and processes already present. At a minimum, this coordination should include the individuals working space-force-enhancement issues and the DIRSPACEFOR. While beyond the scope of this study, a comparable, specialized theater space-force-enhancement organization should be pursued to handle the ever-increasing workload associated with that transformation. Joint war-fighting space may very well be the avenue to solving this open item.[45] The JSCC and OPRs also need to deconflict with the DIRSPACEFOR, if one is present in-theater, to resolve process differences. This deconfliction may happen naturally as a product of rank, presence, and scope. DIRSPACEFOR is a senior-level advisor, whereas the JSCC director and associated personnel work at the action-

officer level. As a permanent organization, the JSCC is present throughout the spectrum of conflict to handle space-control responsibilities as they present themselves, whereas the DIRSPACEFOR may only be available during major combat operations or whenever senior-level presence is required. Finally, the scope of the DIRSPACEFOR extends beyond just space control, leaving the JSCC and OPRs to work at a more specialized level for that mission area.

The last area to consider under organization, personnel, and leadership is the effect this proposal has on organizations external to theater. Once a standardized theater space-control organization is adopted, theater OPRs and JSCCs need to work aggressively to coordinate TTPs with organizations representing space capabilities that need protecting, organizations that can provide OCS capabilities for negating adversary use of space, and agencies that provide ISR and other support capabilities for SSA. They also need to coordinate with other JSCCs for theater space-control operations that extend beyond the borders of a single AOR.

Doctrine

Specific doctrine recommendations have already been discussed but are included here as a consolidated list of recommendations for how organizational concepts should be documented. First, joint and Air Force doctrine needs to resolve discrepancies in terminology for space control. Time and experience will determine whether *space control* and *counterspace* will continue to exist in the military lexicon. Until one term goes away or a new term replaces both, discussions between Air Force and the joint community will be hampered by cumbersome translations.

Doctrine must also do more than simply document the proposed theater space-control structure outlined in this study. It must also include detailed functions and responsibilities, to include intelligence-related activities, for each element of the organization. As a model, PR doctrine does an excellent job detailing responsibilities and interaction among the various theater PR elements. In listing these responsibilities, space-control responsibilities should be removed from the coordinating au-

thority for space, or SCA, description in joint and Air Force doctrine. GCCs and JFCs should designate a supported commander for space control to delegate specific authorities associated with this mission area.

Training

Merely changing doctrine and organization does not guarantee success for theater space-control operations. Theater space-control personnel must be trained in this new construct. Likewise, other theater personnel and external agencies and organizations that interface with theater space-control personnel also need training on the construct. This construct includes the theater space-control organization itself, its functions and responsibilities, and TTPs specific to their sphere of influence.

To accomplish this task, JSCC-specific curriculum should be added to service and joint schools. For personnel assigned to the AOC, this training should be added to the existing AOC initial qualification training (IQT) curriculum at the Air Force Command and Control Training and Innovation Group (AFC^{2}TIG). To address the joint community, JSCC-specific curriculum should also be added to the Counterspace Planning and Integration Course and other courses at the National Security Space Institute (NSSI).[46] By comparison, the PR community has comparable courses for JSRC personnel in the AFC^{2}TIG AOC IQT Course[47] and at the Personnel Recovery Education and Training Center (PRETC), the PR equivalent to NSSI.[48] To meet complete transformational demands, space-control intelligence concepts must also be added to intelligence school curricula. A specific course for intelligence support to space control should be developed at the NSSI similar to the PRETC's PR220, Intelligence Support to PR Course.[49] To ensure this JSCC academic training is institutionalized, theaters should conduct frequent realistic space-control exercises and include external organizations as much as possible.

Materiel and Facility

Finally, this new organizational construct needs a place to live. Fortunately it is a relatively small organization and, to some degree, is already being accomplished in theater operational-

command centers. Therefore, existing C4 systems and operations centers are adequate for near-term JSCC operations. Having said that, there may be some additional space required for any significant increases in personnel associated with a fully staffed JSCC.

Once this specialized organization is formed in-theater, one of their first tasks would be to identify any additional space-control capability and ISR requirements needed to fulfill their responsibilities. This could lead to the need for fielding specialized systems or making space-control–specific modifications to existing systems.

Conclusion

The current space operations transformation emphasizing space control has significant implications for theater space organizations. First, this transformation has led to new theater space-control concepts in doctrine, but some disconnects still exist. These doctrinal disconnects include different joint and Air Force terminologies for protecting friendly and negating enemy space capabilities, *space control* and *counterspace,* respectively. The other disconnect deals with how the authority for space control is delegated within a theater. Many conflicting options are offered in doctrine, but the recommended solution is to separate force-enhancement authority from space-control authority and assign a supported commander for space control. Furthermore, GCC and JFC should assign this authority to the air component commander and JFACC/COMAFFOR, respectively.

Second, theater space organizations must transform to adapt to the emerging space-control emphasis. The current organizations grew out of the efforts from the previous space transformation. Therefore, they are platform-centric, focused on space-force enhancement, instead of function-centric, focused on space control. Theater space organizations focusing on space-force enhancement must continue, but specialized organizations focused on the space-control function are required to overcome challenges associated with diluting expertise and relationships. Several theater functional organizations could be

used as a model, but PR offers a model that meets several mutual criteria between the two functions.

Modifying the PR model slightly to overcome differences between the two functions yields a specialized, standardized, scalable, integrated, and identifiable theater space-control organizational structure. GCC and JFC staffs would include a space-control OPR for horizontal and vertical coordination to support senior-level decision making. Space-control OPRs should also be identified at the functional component to assist in this coordination and support. The supported commander for space control, normally the JFACC/COMAFFOR, should establish a JSCC within the operations center and ensure representatives are integrated across the following functional areas: strategy, plans, operations, and intelligence. The JSCC should also include access to unit liaisons involved in space-control operations. This organization has implications across DOTMLPF elements. Besides the obvious organizational recommendations outlined above, changes must also be made to doctrine, personnel, leadership, training, materiel, and facilities to institutionalize this proposal and ensure it effectively meets the challenges of the space-control transformation.

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15. AFDD 1, *Air Force Basic Doctrine*, 43.

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Chapter 7

Applying Air Mobility Lessons Learned to Space C2

Maj Stuart Pettis, USAF

For countries that can never win a war with the United States by using the method of tanks and planes, attacking the U.S. space system may be an irresistible and most tempting choice . . . the Pentagon is greatly dependent on space for its military action.

—Wang Hucheng
Beijing Xinhua Hong Kong Service

Purposeful interference with U.S. space systems will be viewed as an infringement on our sovereign rights . . . the US may take all appropriate self-defense measures, including the use of force.

—Bill Cohen
Secretary of Defense

The two statements above were chosen with care. The first indicates that at least one potential adversary has identified US reliance on space assets as a potential COG during conflict. In addition, while the threat from adversarial nation-states is troubling, nonstate actors, such as China's *Falun Gong*, have conducted actual jamming activities.[1] The second statement, taken from the DOD policy governing space, states that the US military must be prepared to defend against and overcome any attack on our space assets. However, what does this mean and how should we be organized to meet this potential threat?

While some would argue space is an extension of the air medium and that principles which apply to other terrestrial forms of military power also apply to space, there are unique attributes to space assets that must be addressed. First, depending on the orbit, satellites may have a field of view (FOV) which

covers approximately one-third of the Earth's surface. The second attribute, ownership and control of space systems, is extremely fragmented between DOD, non-DOD US government, and civilian owners. Thirdly, space systems tend to function as "system-of-systems." The final unique attribute of on-orbit assets is their persistence.

These unique attributes might lead some to advocate a global command structure. However, any attempt to lump all space systems into a "global asset" bucket is inadvisable. Some space assets should fall under a more traditional C2 structure. For practical purposes, neither C2 system is wholly correct for all space systems. Rather, we must utilize positive aspects from each model to be most effective. In this regard, space C2 is analogous to the C2 structures used for air mobility forces. This study makes a comparison of this analogy. A suggested structure based on the Air Mobility Command (AMC) tanker airlift control center (TACC) and the theater airlift system for space C2 will be presented.

Sometimes Space Is Different

During a joint exercise, I had a conversation with an Army infantry officer and a Navy F-14 pilot. As we debated and discussed each of our services' idiosyncrasies, it became apparent that each of us had a different perspective on the battlespace. The infantry officer's perspective was shaped by how far he could move in a day, measured in tens of miles. What concerned him most were those enemy assets, normally artillery pieces and usually just tens of miles away, that could put his troops at risk. The regions the carrier battle group could operate within shaped the Tomcat pilot's perspective. He was also concerned with the time it took the battle group to steam there and the range of his aircraft. While substantially more than that of the infantry officer's, his perspective was still limited.

When it was my turn to speak, I gave a two-part answer on my perspective of the battlespace. First, I explained that Airmen have a global perspective, that the Air Force could employ aircraft from inside or outside a CCDR's AOR to achieve combat effects throughout the battlespace. Airmen can also employ

assets from outside an AOR, to include the CONUS, to achieve those same effects within it. However, I then explained that space operators could create combat effects in multiple regions around the world simultaneously. In other words, Airmen have a limited global perspective, but space operators have a truly global perspective.

As figure 7.1 shows, the FOV for a particular geosynchronous satellite in this constellation covers approximately one-third of the Earth's surface. Anyone within this FOV can utilize the communications services provided by that satellite. Also, multiple theater commanders and their forces could simultaneously use the same particular satellite.

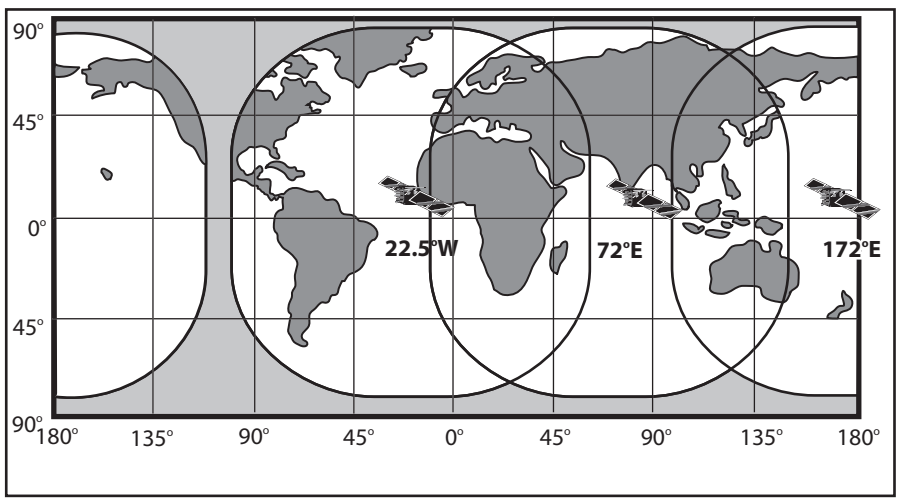

Figure 7.1. Fields of view for the Navy's UFO satellites. (*Adapted from* figure 2-5, FLTSATCOM coverage areas, Integrated Publishing, Information Technician, http://www.tpub.com/inch/17.htm.)

Not as apparent is the obverse of the discussion above: just as anyone within a given satellite's FOV could use that satellite, anyone within the same FOV could attack the satellite. Continuing the system-of-systems discussion from above, for signals going around the globe, an attack anywhere in the path of the signal could disrupt it.

This is exactly what happened in July 2003 when the Broadcasting Board of Governors, the United States federal agency

which oversees nonmilitary international broadcasting, denounced the Cuban government for blocking US-based programming critical of the Iranian government. In this instance, jamming originating in a country in SOUTHCOM's AOR interfered with programming originating in the CONUS and intended for Iran within CENTCOM's AOR.[2]

The implication of the unique FOV and perspective generated by it is that on-orbit space assets provide a unique global perspective and the ability to affect multiple AORs simultaneously. The traditional way of dividing up assets by geographical means should not be used when a functional grouping of assets, such as those used for air mobility, is more appropriate.

The next unique aspect of space assets is the extremely fragmented C2 used for on-orbit space assets. A very cursory glance at the organizations operating military or military-utilized on-orbit space assets produces table 7.1.

Table 7.1. Organizations operating military or military-utilized on-orbit space assets

Organization	*Assets*
Air Force Space Command	MILSTAR GPS SBIRS DSCS Wide-band Gapfiller System DMSP
US Army Strategic Command	DSCS
Naval Network Warfare Command	FLTSATCOM Ultra-high frequency follow on
National Reconnaissance Office	Intelligence satellites
National Security Agency	Intelligence satellites
National Oceanographic and Atmospheric Administration	DMSP Geostationary Operational Environmental Satellite Polar-Orbiting Environmental Satellite
National Aeronautics and Space Administration	Solar and Heliospheric Observatory
Defense Information Services Agency	Allocates bandwidth on DOD communications satellites
Commercial and Consortia Satellite Owner/Operators	Provide satellite service to the DOD

The result of this fragmentation is that no one agency controls or has visibility into the operations of all on-orbit assets being utilized by the DOD. Given the mandate articulated in the DOD Space Policy to protect our on-orbit assets, this fragmentation makes protecting those satellites almost impossible. An adversary could attack any DOD space asset, and without a unified response, each agency would be forced to fight individual battles.

The third attribute that makes space systems unique is that they operate as system-of-systems. For example, while a single satellite could provide communications for a large region, two or more satellites and ground equipment are required to transmit a signal around the globe. To get an accurate position from the GPS, a user needs a minimum of four satellites, while 24 satellites are needed to achieve global coverage. Even nonorbital space assets, such as missile warning radars and space surveillance systems, require multiple sensors coupled with a command center to produce their desired effects. This attribute makes penny packeting individual space assets, especially on-orbit assets, extremely difficult.

A final unique attribute of on-orbit assets is their persistence. Once in position on-orbit satellites have mission lives measured in years, often exceeding decades. This means that they are on orbit prior to, during, and after most conflicts. This implies that they are best suited for a mature C2 structure, which is in place throughout a conflict vice a contingency C2 structure like a JTF.

Fighting and Winning a Defensive Counterspace Fight

As mentioned, nation and nonnation actors have either publicly stated or demonstrated an ability to target on-orbit assets. As military professionals, it is our responsibility to anticipate any threat and create a counter to that threat. Before examining the C2 structure required for that fight, we first need to discuss what actions are required at the tactical, operational, and strategic levels of war.

Our ability to win a future counterspace fight begins at the strategic level of war well before the fight takes place. Hopefully, several years in advance, our national decision makers will indicate who our potential adversaries may be. At the same time they would develop an appreciation for what their overall political and military objectives would be in a conflict with the United States. A component of this appreciation will be how they might attempt to target our space capabilities to help achieve those objectives. This appreciation will be used by commanders to field new space capabilities and tactics to overcome their anticipated actions.

At the same time, our intelligence professionals, along with our operations personnel, need to use that guidance to determine how an adversary would employ them during war and how these threats would affect our assets. Armed with this knowledge, our operators can build operational- and tactical-level countertactics.

Why do we need both operational-level and tactical-level tactics? Because a response to an enemy attack should consist of both actions taken to protect individual victim satellites at the tactical level and then actions at the operational level to protect the system-of-systems—all the potential victim satellites in the FOV of a threat. To take action at one level and not the other does not adequately answer the attack.

What actions would be encompassed in the operational-level counter tactics? At a broad level, the actions required to counter an attack by a ground-based threat would be:

- Prior to attack, have intelligence use indications and warnings to detect preparations for an attack.
- Once an attack occurs, regardless of the owner or operator, a command center provides an alert to other operators.
- Geolocate the source of the threat.
- Based on the geolocation, protective actions for other potential victim satellites within the FOV of the threat need to be directed.
- An appropriate response needs to be directed against the threat. If this is a kinetic response, a request for a COCOM with kinetic assets needs to be made.

How Did Air Mobility Tackle the Problem?

There are two functionally aligned communities within the United States Air Force: air mobility and special operations. Of the two, air mobility has the closest parallels to space, and there are lessons from air mobility that apply to space. Both communities have forces that function as system-of-systems and usually provide effects to COCOMs without changing OPCON of their forces. Air mobility assets can also operate, using either a functional or geographic chain of command, independent of where they are geographically situated.

Air mobility forces are divided by the SecDef's Forces for Unified Commands into forces assigned to USTRANSCOM, a functional command, and those owned by COCOMs, geographic commands. The basic division between the forces is that USTRANSCOM and its USAF service component, AMC, own strategic airlift assets such as C-5s, C-17s, C-141s, and most of the tanker fleet. COCOMs, such as United States Pacific Command and USEUCOM, are given small amounts of tactical airlift assets, such as C-130s and tankers, for use in their theaters. Control of strategic air mobility assets controlled by AMC is exercised by the TACC. Control of tactical air mobility assets is exercised either through an air mobility operations control center (AMOCC) or through the air mobility division (AMD) of an AOC. Figure 7.2 illustrates this C2 structure.

This structure was created not by design but as the result of a compromise when the TACC was created in 1992. Prior to the creation of the TACC, Military Airlift Command, the predecessor to AMC, utilized a three-tier command structure. Taskings would flow from the MAJCOM to one of two geographically organized numbered air forces (NAF) and then to a specific wing. Geography determined which NAF received the tasking. For example, cargo intended for Europe would be given to the East Coast NAF. The East Coast NAF would then parcel out the tasking to a wing, based on the overall operations tempo. Air mobility forces outside the CONUS used a smaller scale but similar arrangement, where taskings from the COCOM flowed through an AMOCC and then to an air mobility unit.

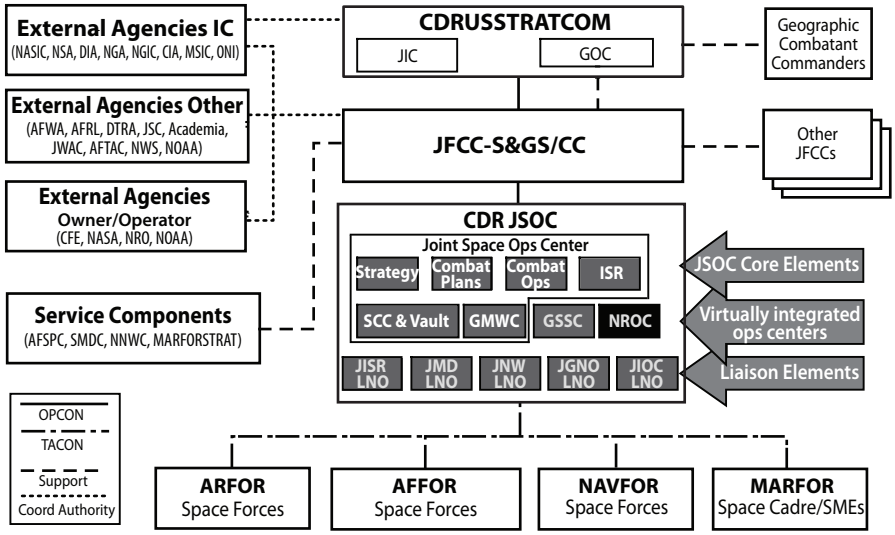

Figure 7.2. Air mobility command and control. (*Reprinted from* AFDD 2-6, *Air Mobility Operations*, Air Force Doctrine Center, 1 March 2006.)

The pitfall with this arrangement was that there was no central agency in position to optimize air mobility needs across the DOD as a whole. Instead, each wing fought its own fight. For example, there was a tasking for half a C-141 load of equipment from Fort Bragg, North Carolina, to Ramstein AB, Germany, on one day and a tasking for half a C-141 load of equipment from Fort Campbell, Kentucky, to Ramstein AB, Germany, the next day. No one was in a position to identify and optimize that cargo movement. As air mobility assets decreased and taskings increased in the post–Desert Storm era, this arrangement could not continue.[3]

As a result, in 1992 AMC created the TACC. As part of its charter, the TACC looked for efficiencies and ways to optimize cargo movements. However, the COCOMs balked at giving up total control of their air mobility assets. As a result, the SecDef brokered a compromise that allowed the COCOMs to retain control of their assets and gave them the ability to request additional airlift assets, as required. For example, during Operation Enduring Freedom, USCENTCOM was given C-17s to help with their airlift into Afghanistan.[4]

While this may seem inefficient, in practice it has worked very well. In general, TACC has championed optimizing cargo movements, while theaters are focused on ensuring responsiveness to the theater commander's needs. In addition, the forward basing of air mobility assets turned into a huge benefit. For example, the TACC commander during OEF indicated that humanitarian airdrops into Afghanistan would not have happened as quickly or when desired by CENTCOM without USAFE air mobility personnel at Rhein-Main AB and Ramstein AB, Germany, leaning forward, based on the USAFE commander's direction.[5]

Lessons for Space Command and Control

As discussed above, control of on-orbit space assets is currently fragmented. This is unfortunate because a legitimate threat exists, and to fight and win a DCS fight, we need an organization with a global perspective and the ability to direct and influence all DOD space operators. At the same time, normal geographic divisions do not apply to space assets, and space systems function as system-of-systems.

Others also share this view. USSTRATCOM issued a FRAGO that designated the AFSPC commander:

> As its Global Space Coordinating Authority (GSCA) to identify and establish a Joint Space Operations Center to provide all COCOMs with requested space support. As our GSCA, AFSPC has authority to provide direct support if necessary until the establishment of the Joint Functional Component Commander–Space & Global Strike (JFCC-S&GS), at which time, the JFCC-S&GS will issue a follow on FRAGO with further guidance. All other USSTRATCOM components will provide support to the Global Space Coordinating Authority as required.[6]

The JFCC-S&GS command center, much like the TACC, is a significant improvement because it places all of STRATCOM's space assets under a single commander with global situational awareness. The question now is What should the JSpOC consist of? What should its responsibilities be? More importantly, what are the JSpOC's operational roles and responsibilities during a DCS fight? Figure 7.3 shows a preliminary look produced by Fourteenth Air Force and its assessment of the C2 relationships. This proposed structure places all STRATCOM-assigned space

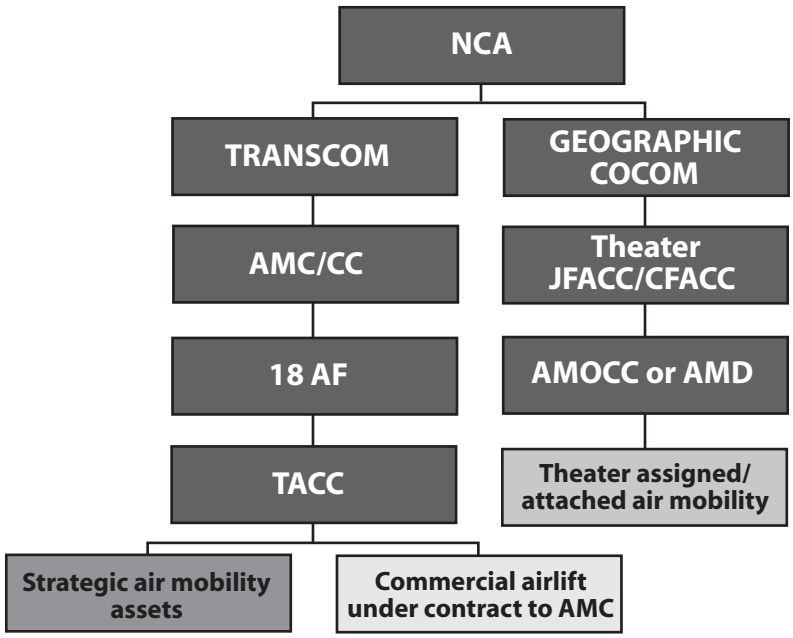

Figure 7.3. Proposed JSpOC organizational structure. (*Adapted from* Briefing, Maj Gen Michael A. Hamel, commander, Fourteenth Air Force, subject: Joint Space Operations Center, ver. 2, 1 March 2005, 8.)

forces under a single commander. It then gives the commander coordination authority with other owners and operators.

While placing all STRATCOM assets under a single commander is a positive improvement, is a coordination-only relationship with other owners/operators sufficient? In laymen's terms, a coordination relationship means that the JSpOC commander can talk directly with other owners and operators. As a part of this discussion, the JSpOC commander can advise of an actual or impending attack and discuss actions he/she is directing for the forces under STRATCOM. Other DOD owners and operators do not have to follow the advice or heed the warning of the JSpOC commander. They also are not required to notify the JSpOC commander of any attacks on their space assets.

What is missing is the ability to direct protective actions for on-orbit space assets owned and operated by others. While perhaps the best answer to this dilemma would be to place all

DOD-owned and -operated satellite systems under the JSpOC, this is probably politically impossible.

Are there any other command relationships that could satisfy the need to direct protective measures without giving STRATCOM OPCON or TACON? In the post-9/11 world, COCOMs have begun using TACON for force protection to give a single commander the ability to better posture their myriad of installations and facilities to meet the terrorist threat. This authority was authorized in a SecDef memorandum on 28 September 1998 and directs that "geographic CINCs will exercise directive authority (TACON) for the purposes of force protection, in the covered countries, over all DOD personnel."[7] Only USEUCOM enacted this as authorizing "commanders to change, modify, prescribe and enforce force protection measures for all DOD elements and personnel under the CCDR for force protection. TACON for force protection includes the authority to inspect, assess security requirements, to direct DOD activities to identify the resources required to correct deficiencies, and submit budget requests to parent organizations to fund identified corrections."[8] In practice this led to the designation of a single commander within a geographic area to hold TACON for force protection, allowing him/her to direct force protection measures over all DOD personnel and installations in that area. For example, within USEUCOM, the Third Air Force commander held TACON for force protection for the United Kingdom, allowing him/her to direct force protection for the USAF-occupied air bases in East Anglia, USN personnel in Cornwall, and USA personnel at the port of Ipswich.

Applying this concept of control to space assets would give the JSpOC commander the ability to exercise limited control over other space assets within the DOD without changing OPCON or providing complete TACON. It eliminates the pitfalls identified above by requiring other commanders to follow direction from the JSpOC commander and also to notify him/her of any attacks on JSpOC assets. In short, it would create a single space fight under a single commander rather than a collection of coordinated fights under various owners and operators.

Another key element we should take from air mobility lessons learned is the advantages in having some forces under a single functional commander while having other forces under a COCOM.

For air mobility the advantage is having one agency with a global perspective chartered to optimize cargo movements and forward-deployed forces focused on meeting the COCOM's immediate objectives.

For space forces, the advantages are similar: a global agency focused on those inherently global functions while giving theater commanders control of those assets needed to accomplish their mission. Unfortunately, in space the divisions are as clean as with air mobility assets. However, it appears that on-orbit assets should fall under the JSpOC commander. This will allow him/her to fight and win the DCS fight. As long as the combat effects delivered by those space assets continue, COCOMs should not have to worry about efforts taken by the JSpOC to ensure their delivery. At the same time, theater space personnel should be kept informed of the fight, especially if it looks like kinetic effects will be needed to counter the threat.

As for those assets which should be given to the theater, current doctrine provides a "litmus test" that uses the following criteria for CHOP of assets. The first question in the litmus test is Is the asset deployed? The second question is Does the asset produce theater-only effects? The final question is Does the theater have the ability to C2?[9]

A look at how the air mobility community CHOPs assets is useful. Because doctrine is ambiguous, the litmus test used for deciding when to CHOP an airlift asset is based on a theater's ongoing need for dedicated airlift, lack of sufficient resources, or need for additional resources. Therefore, to apply the air mobility lesson to space assets, the litmus test should be: Does the theater commander require the preponderance of the asset's capability?

Conclusion

While space assets have unique attributes, we can look toward other functionally aligned communities within the Air Force for lessons learned. The air mobility community's C2 structure holds great promise as a model for space C2. Rather than attempt to use a single C2 model, air mobility uses a global C2 structure to optimize global requirements with a comple-

mentary geographic C2 structure. This structure optimizes those assets which operate best as system-of-systems while allowing geographic commanders the ability to use organic air mobility to rapidly respond to their local needs. Applying this model to space creates the global C2 structure needed to win a DCS fight. It also allows assets to be "given" to a geographic commander when required. The final lesson learned from air mobility is the ambiguous litmus test used to CHOP assets to a theater. Rather than formally define a litmus test like space doctrine, air mobility doctrine leaves this ambiguous, providing greater flexibility.

Whatever the outcome of our debates on this C2 structure, we should never lose sight of the fact that our adversaries are looking for ways to attack us and that we must be prepared to fight and win this battle. Key to winning this fight is organizing our forces to meet and overcome any attack.

Notes

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2. "U.S. Accuses Cuba of Jamming Broadcasts to Iran," *PBS.org*, 17 July, 2003, http://www.pbs.org/newshour/media/media_watch/july-dec03/jamming_07-17.html.

3. Lt Gen Mike Wooley, commander, AFSOC, interview by the author, 2 March 2005. General Wooley was the TACC commander from January 2000 to June 2002.

4. Ibid.

5. Ibid.

6. USSTRATCOM, OPORD 05-02, FRAGO 04, 3 Feb 05, https://halfway.peterson.af.mil/2Letters/cc/AFSPC%20Policy%20page/Establishment%20of%20the%20Joint%20Space%20Operations%20Center--2Mar05.pdf. Assigned GSCA to commander, AFSPC/COMAFFOR, and directed the establishment of a JSpOC. FRAGO 04 directs the commander, Fourteenth Air Force, to develop and implement an action plan to establish the JSpOC.

7. AFDCH 10-01, *Air and Space Commander's Handbook for the JFACC*, 16 January 2003.

8. Third Air Force Instruction (3AFI) 10-245, *Air Force Antiterrorism Standards*, 16 Feb 04.

9. AFDD 2-2.1, *Counterspace*, 11 August 2004.

Chapter 8

Counterspace Command and Control

Looking to History for Advice

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Former Air Force chief of staff General Jumper declared counterspace operations "critical to success in modern warfare."[1] Inasmuch, space professionals must endeavor to improve the C2 relationships and doctrine associated with counterspace systems. In particular, the complex relationship between planners in theater AOCs and those at the Fourteenth Air Force AOC provides many challenges. The complication of a functionally focused team directly supporting theater needs creates a strained working relationship between the two entities. The C2 seam that this creates is problematic for the optimal execution of counterspace effects in-theater. A brief review of the Vietnam War, Desert Storm, and Iraqi Freedom highlights similarities in the history of C2 of joint air operations and provides insight into counterspace doctrine and improvements to critical C2 relationships.

Before reviewing historical case studies, one must understand the nature of current counterspace problems. The need for significant counterspace effects in OIF exposed a problematic seam between AFSPC's designated planning and execution authority, Fourteenth Air Force, and theater counterspace planners trying to integrate counterspace effects into the CFACC air and space operations plan. Without counterspace doctrine or mutual agreement, both sides occasionally suffered from preconceived and parochial views of appropriate C2 relationships. In addition to divergent C2 views, distrust—or at least misunderstanding between the two planning groups—created a less than optimal working relationship. A strained atmosphere surrounding C2 is not unique to the counterspace arena, and counterspace planners can learn much from the development of similar relationships surrounding joint air operations.

Command and Control Disagreement in Vietnam

The Vietnam War provides a textbook case of what to avoid when cultivating a strong working relationship across the C2 seam. The US military fought this war while enduring a bitter disagreement over C2 of joint air operations. In 1966 the senior Air Force commander in South Vietnam, Lt Gen Joseph Moore, argued he should be the single manager for all aviation assets. The Air Force felt this was the most effective and efficient method of controlling operations, but other services disagreed. The Army began to use their own helicopters for missions like troop insertion, resupply, and battlefield fire support. Gen William Westmoreland, commander, United States Military Assistance Command Vietnam, captured the passions and anger surrounding this issue with a passage in his memoirs. According to General Westmoreland, Gen Curtis LeMay, chief of staff of the Air Force, chastised him for trying to infringe on Air Force turf by using helicopters and "tongue-lashed" General Moore for failing to uphold Air Force doctrine. Additionally, the Air Force's efforts to control Marine aviation caused extreme displeasure because it violated Marine combined arms doctrine.[2]

By 1968 General Westmoreland had grown tired of a situation "too ponderous, too extravagant with resources, [and] too conducive to error" and designated General Moore's replacement, Gen William Momyer, to be the single manager for air operations. Westmoreland received vociferous objections from the Army and Marine service chiefs and reported with frustration that he "was unable to accept that parochial considerations might take precedence over my command responsibilities and prudent use of assigned resources."[3] Because there was no doctrinal answer, the commander-in-chief, United States Pacific Command had to resolve the dispute by granting General Momyer "mission direction" over Marine aircraft. This ambiguous and ad hoc concept resulted in each service interpreting the term as they wanted, and the Marines never relinquished control.[4] Distrust, parochialism, and lack of clear doctrine at the service interface prevented effective C2 of joint air operations.

Beginnings of Cooperation

In the period between Vietnam and Desert Storm, several actions occurred to improve the working relationships and doctrine between the services. First, the Air Force and Army chiefs of staff, who experienced C2 frustrations firsthand in Vietnam, made a concerted effort to improve the relationship. They mandated a partnership between the Air Force's Tactical Air Command (TAC) and the Army's Training and Doctrine Command (TRADOC), which resulted in a joint office called the Directorate of Air-Land Forces Application (ALFA) and numerous improvements in air-ground operations coordination.[5] Most importantly, it established an atmosphere where both sides shared perspectives and cooperated to solve problems based on parochial interests.

Several years later, the Department of Defense Reorganization (Goldwater-Nichols) Act of 1986 expanded the mandate for interservice cooperation to all services. The act expanded the role of CINCs by giving them total responsibility for employing joint forces assigned to them. Air operations felt the impact of the Goldwater-Nichols Act directly because of the joint interface required for integrated operations.[6] These events certainly did not eliminate all problems with C2 of joint air operations, but they paved the way for improved doctrine and relationships in time for Operation Desert Storm.

Improved Command and Control in Operation Desert Storm

Operation Desert Storm proved to be a watershed event highlighting the improvements in interservice campaign planning and operations, which greatly benefited joint air operations. First, the CFACC concept, a natural doctrinal outgrowth of the Goldwater-Nichols Act, allowed a much greater degree of coordination in air operations than possible in Vietnam. The CFACC, General Horner, benefited from the centralized decision-making process his predecessors wanted, but he recognized doctrine could not substitute for cooperation and mutual confidence.[7] This recognition inevitably resulted from his experiences in

Vietnam and rising through the ranks during the TAC-TRADOC partnership era. As a result, Horner built a strong relationship with his CINC, who trusted him fully and did not get overly involved in controlling air operations.[8]

Even though he was the recognized single manager for joint air operations, General Horner had to work some of the same issues as his predecessors, but he did so in a more conducive environment. First, there were complaints from Army commanders about insufficient coverage of their targets, to which the Air Force countered that the CFACC based all his decisions on the CINC's priorities. Even though this issue was due largely to problems with a CINC that was dual-hatted as the ground component commander, all sides found a compromise in the Joint Targeting Coordination Board (JTCB).[9] Clear doctrine also helped establish a compromise with the Marines, who placed some of their aircraft under CFACC control but kept control of aircraft supporting Marine ground forces. Horner claimed mixed results with this agreement, but today's planners should note the success that was generated by the willingness of each service to see the other's perspective and find mutually acceptable solutions.[10]

Further Improvements in Operation Iraqi Freedom

Operation Iraqi Freedom marked the continued maturation of the C2 of joint air operations based on strong working relationships. The CFACC, General Moseley, and Marine leaders displayed an unprecedented willingness to find a mutually agreeable solution regarding control of Marine aviation. They agreed to place all Marine aircraft on the ATO, but allowed Marines to retain tactical control of organic Marine air assets through a direct air support center. To further improve the relationship, General Moseley requested and received a senior Marine aviator to serve on his AOC staff. This relationship helped establish an innovative kill box deconfliction system within the fire support coordination line that achieved great success in Iraq. In fact, both sides have trumpeted the success of the relationship in securing devastating ground support for Marine forces and in

allowing the CFACC to shape the deep battlespace with extra aircraft. This success would not have been possible without the "development of personal relationships, from the Generals on down. Parochial views gave way to dialogue."[11] Since Army–Air Force coordination was not as effective, the Marine successes show how much cooperation can contribute to a successful solution. Whatever the future holds for C2 interfaces, it must be remembered that success will depend on a strong working relationship based on trust and cooperation.

Counterspace Command and Control Issues

As these improvements in joint air operations were developed, the debate regarding the C2 of counterspace systems has also grappled with its own C2 seams, relationships, and doctrine. In the counterspace arena, the main seam exists between the theater AOC and the Fourteenth Air Force AOC. During initial planning for OEF, a disagreement developed between the two sides. Without guiding counterspace C2 doctrine, each developed its own strategies. Theater AOC planners, citing the JFACC as the single manager for air and space forces, requested OPCON of counterspace systems to provide the JFACC the greatest possible flexibility. Fourteenth Air Force planners preferred a direct support relationship for two reasons. The supporting relationship provided greater flexibility for AFSPC's global taskings, and it facilitated the accomplishment of nontransferable mission-planning tasks.

In addition to lack of doctrinal clarity, the lack of effective working relationships also caused problems. Theater planners did not argue the unique planning tasks, but they disagreed with the control required to perform that planning. Theater planners believed that in-theater space planners were in the best position to integrate effects into the overall campaign.[12] To help resolve these issues, AFSPC sponsored several working groups. Attendees routinely left these meetings perpetuating the C2 relationship they believed was appropriate prior to the meeting. The prewar planning devolved into acrimonious debate and diminishing trust in intentions and ability on both sides of the interface. This atmosphere created a stalemate of rigid adher-

ence to organizational preferences, with each side willing to wait until combat situations mandated a final decision.

Prior to OIF, the relationships and doctrine had not been substantially improved; thus, the same counterspace C2 issues resurfaced. Ultimately, the disagreement forced a compromise with Fourteenth Air Force, in direct support of CENTCOM, who exercised TACON. During this conflict, the creation of senior space coordinators at the CINC headquarters and on the CFACC staff further complicated the C2 debate. With split coordination and guidance efforts in-theater and disagreement over the appropriate level of control required for effective planning, counterspace planning proceeded with the idea that combat conditions would resolve the issues. When combat conditions finally occurred, routine and preplanned operations were handled well, but the need to adjust dynamically to changing threat conditions showed that the C2 seams were problematic.

The aftermath of OIF showed promise for a reengaged discussion. The Air Force published its first counterspace doctrine, AFDD 2-2.1, which codified terms, concepts, and roles. The document does not mandate a standard C2 structure. It provides situational suggestions, but leaves the solution to counterspace planners on both sides of the C2 seam.[13] With regards to C2 doctrine, historical air operations again may provide some key insights and considerations.

Director of Space Forces and Director of Mobility Forces: One in the Same?

In 2004 the Air Force's Counterspace Operations doctrine was published, outlining the function of the DIRSPACEFOR.[14] In short, the DIRSPACEFOR will work routine senior-level coordination issues between components and represent the CFACC to organizations outside the joint force. Similarly, the director of mobility forces (DIRMOBFOR) is the "designated coordination authority for air mobility with all commands and agencies both internal and external to the joint force."[15] Because the titles and duties are so similar, space planners must be clear about the appropriateness of using the air mobility model in assessing counterspace C2 relationships.

The DIRSPACEFOR and DIRMOBFOR positions have similarities and differences that must be understood to avoid making incorrect assumptions about C2 responsibilities. Similarly, senior officers with expertise and theater familiarity should fill both positions. Also, both positions are attached to the COMAFFOR and located in-theater to ensure close coordination with the overall theater air effort. Lastly, both positions are tasked with performing similar functions, including integrating, coordinating, deconflicting, prioritizing, and directing their particular areas of expertise. However, within these functions there are significant differences which change the roles of each position.

There are two key differences between the two positions that space personnel must assess in order to avoid C2 problems. First, the overarching task assigned to the DIRMOBFOR is to be "responsible for integrating the total air mobility effort for the JFACC."[16] In contrast, the DIRSPACEFOR merely conducts "coordination, integration, and staffing activities to tailor space support for the JFACC."[17] Although this may seem like only a semantic separation of responsibilities, it becomes significant as C2 responsibilities are executed. For example, in the Gulf War the JFACC, General Horner, told his senior airlifter, "I don't know anything about airlift. You take your airlift, and if you need anything from me, you let me know. I'm too busy fighting the air war."[18] For mobility operations, this type of relationship creates problems because although command responsibility of mobility forces is given to the JFACC, responsibility minus command is delegated to the DIRMOBFOR. As a result, mobility planners have concluded that the JFACC needs an expert mobility advisor but also an expert with C2 authority (OPCON/TACON) delegated directly from AMC to control theater air mobility operations.[19]

In OIF, USSTRATCOM was in a direct-support relationship with USCENTCOM to provide space capability. As a result, the JFACC did not have complete command responsibility of space capabilities. While he still needed an expert space advisor, that expert did not require C2 authority to integrate theater space effects. From this it seems that the position of director is more appropriate for space than air mobility because unlike the DIRMOBFOR, the DIRSPACEFOR must focus on coordinating, integrating, and staffing space support rather than on controlling

space capabilities in-theater. This difference leads to the second key distinction between the two positions.

The second major difference between the two directors is that the DIRMOBFOR conducts his/her responsibilities by directing the AOC's AMD, while the DIRSPACEFOR has no such division in the AOC.[20] The AMD plans, coordinates, tasks, and executes the air mobility mission but because space integration duties are spread throughout the AOC, the DIRSPACEFOR must facilitate and coordinate space activities across multiple AOC divisions.[21] The presence of an AOC division dedicated to mobility operations is indicative of the fact that unlike space capabilities in-theater, mobility operations require C2 well beyond the effects they achieve in-theater. Space effects in-theater cut across multiple mission areas in a way that demands an integrator and coordinator rather than a commander. Furthermore, the DIRMOBFOR is in a position to control *intratheater* airlift with little regard to impacts outside the AOR. However, all space effects must be considered for their impacts outside the theater and therefore require an in-theater director focused on the extensive coordination with agencies outside the AOR. In summary, it must be recognized that the position of DIRSPACEFOR is different from that of DIRMOBFOR, and understanding his/her role as an integrator and advisor rather than a controller of space capabilities will improve doctrinal understanding of counterspace C2.

A Way Ahead

Before the still smoldering relationship ignites again, personnel on both sides of the interface should look to joint air operations history for advice. The Vietnam and Iraq case studies show the key to improved control for joint air operations was developing a relationship based on trust, cooperation, and a willingness to put aside parochial positions. James Winnefeld and Dana Johnson offer two appropriate suggestions. First, both sides "should be mindful of service and joint doctrine [and organizational preferences], but not be bound by [them] when [they do] not support the mission at hand." Next, the theater and space AOC planners should "establish a close personal rapport

. . . [and] create an atmosphere [where] each sees cooperation and coordination as a necessary preliminary step in defeating the enemy." [22]

To help create this atmosphere, this study proposes several suggestions. As demonstrated by the TAC-TRADOC partnership and the two conflicts in Iraq, successful change occurs when commanders above the "iron majors" understand the needs of others and place priority on cooperation. Air Force AOC directors, including the Fourteenth Air Force AOC, should initiate discussions to exchange perspectives and formalize a partnership for improving the counterspace C2 interface, much like ALFA accomplished for the joint air operations interface in the 1970s. This step would place a priority on cooperation and innovative solutions and would discourage parochial rigidity.

A second lesson is the importance of understanding the perspective and concerns of the other side of the C2 seam. A great place to start increasing perspective is the training ground for many future counterspace planners—the 328th Weapons Squadron (WPS) at the USAF Weapons School. The squadron is currently sending students to the Fourteenth Air Force AOC for an orientation.[23] The 328th WPS should ensure this trip exposes the students to the complexity of counterspace C2 by having AOC personnel share their procedures, perspectives, and recent counterspace experiences with theater AOCs. Additionally, the 328th WPS should schedule a seminar session where students discuss relevant issues, including counterspace C2, with an experienced DIRSPACEFOR. These discussions would open a cooperative dialogue between Fourteenth Air Force and future theater space personnel, as well as provide the perspective of a DIRSPACEFOR, who coordinates with both sides of the interface. Finally, this group must fully understand and promote the Air Force's counterspace doctrine. By exercising the doctrine, learning its strengths and weaknesses, and improving it, counterspace C2 will be far better in future wars.

Another group that can contribute to sharing perspectives across both sides of the counterspace seam is the AFSPC Weapons and Tactics Branch. In managing AEF assignments for space forces, they should provide augmentees exposure to multiple perspectives by scheduling them to participate in exercises from each side of the C2 interface. This would provide the

added benefit of allowing the augmentee to work with the DIRSPACEFOR from both sides of the seam. Furthermore, in managing the billet structure for SWOs, the weapons and tactics branch should research the feasibility of switching AOC planning positions to a tier-two, second-assignment billet. The benefit would be a more experienced weapons officer with a seasoned perspective of the issues on both sides of the C2 seam.

While many challenges could threaten successful counterspace operations in the future, a crucial enabler is improving the relationship between theater AOC personnel and Fourteenth Air Force AOC personnel. Additionally, exercising and improving the Air Force's counterspace doctrine and avoiding ad hoc C2 relationships will help overcome feelings of distrust. The long history of joint air operations highlights the importance of working with solid doctrine and establishing a working relationship based on trust, cooperation, and shared perspectives. Space personnel on both sides of the C2 interface must heed the lessons of history to build an improved counterspace relationship and appropriate doctrine as a springboard to future success by employing these critical elements of modern warfare.

Notes

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3. Gen William D. Westmoreland, *A Soldier Reports* (Garden City, NJ: Doubleday, 1976), 342–44.
4. Winnefeld and Johnson, J*oint Air Operations*, 73–74.
5. Dr. Harold R. Winton, "An Ambivalent Partnership: US Army and Air Force Perspectives on Air-Ground Operations, 1973–1990," in *The Paths of Heaven: The Evolution of Airpower Theory*, ed. Col Phillip S. Meilinger (Maxwell AFB, AL: Air University Press, 1997), 411.
6. Winnefeld and Johnson, *Joint Air Operations*, 100–101.
7. Ibid., 133.
8. John Andreas Olsen, *Strategic Air Power in Desert Storm* (Portland, OR: Frank Cass Publishers, 2003), 132.
9. Winnefeld and Johnson, J*oint Air Operations*, 125.
10. Rebecca Grant, "Marine Air in the Mainstream," *Air Force Magazine* 87, no. 6 (June 2004): 60–64.
11. Ibid., 62.

12. Maj Keith Balts (counterspace planner, CENTAF), interview by author, 14 December 2004.
13. AFDD 2-2.1, *Counterspace Operations*, iii, v.
14. Ibid., 14.
15. AFDD 2-6, *Air Mobility Operations*, 25 June 1999, 20.
16. Ibid.
17. AFDD 2-2.1, *Counterspace Operations*, 14.
18. Ted E. Carter, Jr., "Theater Air Mobility: Historical Analysis, Doctrine and Leadership," *Air Force Journal of Logistics* 24, no. 3 (Fall 2000): 27–35.
19. Ibid., 31.
20. AFDD 2-6, *Air Mobility Operations*, 21.
21. Ibid.
22. Winnefeld and Johnson, J*oint Air Operations*, 147.
23. Maj Robert Sheehan (328th WPS, operations director), interview by author, 14 December 2004.

Chapter 9

Bridging the Gap

Five Observations on Air and Space Integration

Lt Col J. Christopher Moss, USAF

In 1998 General Jumper, then commander of Air Combat Command, declared that the Air Force would know air and space were truly integrated "when people stop talking about it."[1] If the intensity and scope of the talk at the recent SWO conference are any indication, it appears the Air Force may have more to do in its efforts to integrate air and space.

The conference, held 17 March 2005 at Maxwell AFB, was cosponsored by AETC and AFSPC to solicit ideas on how to enhance the integration of air and space capabilities at the operational level of war. SWOs from across the Air Force delivered a wide range of presentations—from employment concepts for the SCA to methods of normalizing counterspace force presentation to the JFC—all articulating ways to further the Air Force's air- and space-integration efforts.

This section summarizes the author's conference presentation, which recounted five observations for improving air and space integration drawn from personal experiences working air and space integration in two tactical fighter wings, a MAJCOM, and multiple CAOCs in both PACAF and USAFE from 1998 to 2003. To be certain, neither the presentation nor this summary attempts to articulate *the* single testable answer on how to integrate air and space. Rather, each merely seeks to describe the recurring trends that space professionals experience while working in the air side of the Air Force.

Background

The Air Force began to focus on air and space integration in the aftermath of Desert Storm.[2] Touted as the first space war, the conflict showed the true potential of space systems to sup-

port modern combat operations. In particular, airpower would be best able to realize revolutionary advances by aggressively incorporating information provided by space systems. As a result, the Air Force initiated a broad campaign to integrate its air and space systems more effectively. Throughout the 1990s, these efforts focused largely on how to exploit space products and information to support air operations.[3] The author describes this type of air and space integration as *force-enhancement integration*.

The Air Force implemented significant changes in pursuit of force-enhancement integration. For example, in 1992, it established the Space Warfare Center to develop new space-integration capabilities. A year later, the Air Force established the Fourteenth Air Force to serve as the war-fighting component to USSPACECOM and to ensure war fighters were supported by the best space capabilities available.[4] Shortly afterward, the Fourteenth Air Force created the space operations center to serve as "one-stop shopping" for DOD units requiring space support for the Air Force. Eventually, in AFDD 2-2, *Space Operations*, the Air Force codified its views on space and space integration.

In the early 2000s, however, the Air Force was compelled to broaden its approach to air and space integration. In 2001, the Commission to Assess United States National Security Space Management and Organization highlighted the importance of space as an independent medium. The commission's report concluded:

> We know from history that every medium—air, land, and sea—has seen conflict. Reality indicates that space will be no different. Given this virtual certainty, the U.S. must develop the means both to deter and to defend against hostile acts in and from space. This will require superior space capabilities. Thus far, the broad outline of U.S. national space policy is sound, but the U.S. has not yet taken the steps necessary to develop the needed capabilities and to maintain and ensure continuing superiority.[5]

In response to the commission's findings, SecDef Donald Rumsfeld directed the Air Force to, among other things, assume responsibilities as executive agent for space and to prepare for the prompt and sustained conduct of offensive and defensive space operations.[6] In effect, Secretary Rumsfeld and

the space commission expanded the concept of air and space integration so that, in addition to exploiting space systems to enhance air operations, air and space integration would entail ensuring unity of effort among independent air and space operations in support of a task force commander's objectives. The author refers to this type of air and space integration as *space-control integration*.[7]

The Air Force responded to the new aspect of air and space integration by establishing the 76th Space Control Squadron (76th SPCS) to conduct OCS and DCS operations.[8] In 2004, it equipped the squadron with the CCS to disrupt enemy satellite communications.[9] Shortly afterward, it created the 25th Space Control Tactics Squadron (25th SCTS) to develop TTP for space-control operations.[10] The Air Force complemented those efforts by revising its space doctrine. AFDD 2-2 was updated to articulate C2 relationships for independent space operations. The Air Force also published its first doctrine on counterspace operations, AFDD 2-2.1.

The two doctrine documents represent the evolution of air and space integration. Today, the Air Force is working to advance both forms of integration: force enhancement and space control. Yet, these concepts of integration are not always compatible, and differing interpretations over how best to pursue and deconflict the two have created tension in the Air Force. In fact, if the presentations given at the SWO conference are any indication, most of the issues facing air and space integration stem from differences between the two concepts of integration.

Observations

The observations and recommendations in the author's briefings are generally applicable to both facets of air and space integration—although some are more relevant to one than the other. In all cases, however, they reflect one SWO's interpretation of air and space integration from a theater (i.e., non-AFSPC) perspective.

Observation 1. The integration of air and space requires knowledge of both air and space operations.

To successfully integrate air and space requires knowledge of both air and space operations. In force-enhancement integration, integrators must understand how space information is used by air systems. In counterspace integration, integrators must comprehend operational-level air execution to ensure synchronization and unity of effort among air and space operations.

To date, the Air Force's approach to air and space integration has focused on giving broad space education to the air side of the Air Force and giving specific air training to a relatively small group of specially selected and experienced space operators. However, the broader space segment of the Air Force has been largely excluded from similar training. This reality hinders the complete integration of air and space. As space professionals conduct their operations, they must do so with an understanding of how those operations fit into the larger operations of the Air Force. For example, AFSPC has worked hard to develop systems capable of pushing near-real-time information to the cockpit of tactical aircraft. However, less work has been put into understanding *when* and *how* that information should be pushed to the cockpit. The space operators' lack of understanding about the nature of fighter operations has led them to produce user interfaces that are less than ideal. In other words, just because we *can* push data to the cockpit, doesn't mean we always *should*. Knowing when we should requires an understanding of air operations. Similarly, it is one thing for our GPS operators to know what a PDOP (position dilution of precision) of 50 means in technical terms. It is quite another to know how that value impacts the accuracy of a JDAM (joint direct attack munitions), PLGR (precision lightweight GPS receiver), or a Have Quick radio. As a general statement, however, space operators are not taught this type of information during their space systems training. Simply put, the lack of training on how air systems use space information hinders the integration of air and space.

The effects of space operators' incomplete training are compounded by a lack of firsthand experience in how space systems support air operations. By limiting the number of space operators assigned to theater commands to conduct air and space

integration, the Air Force impedes integration. In my experience, there is no substitute for being at the place where the integration occurs. During my tour in PACAF, I often said that more space integration happens over a beer at the squadron bar than will ever happen in a classroom or on an operations floor. That's because the personal relationships that develop from common experiences facilitate in-depth exchanges on what exactly space can and cannot do for air operations; or how space operations can and cannot be used to support overall campaign objectives.

To overcome these obstacles requires three things. First, AFSPC and AETC should expand space training so that *all* courses on space have in-depth modules covering how a given space system's products or services fit into the joint fight. AFSPC has made great progress in this area with the AS200 and the Advanced System Training courses. However, AFSPC can provide that training to a broader audience and conduct more tailored training if it makes sure that all initial and unit qualification training as well as continuation training have robust modules on how space data is used in air operations. DSCS III operators in the 3d Space Operations Squadron should expect to learn how ground-mobile forces use DSCS communications, why DSCS III channel 1 is important, who uses it, with what equipment, and with what operating concepts. Such training, combined with the continued push to teach air operators about space, is an important first step to bridging the air-space gap.

However, academics are not enough. Therefore, the second step is to provide space operators firsthand exposure to air operations to complement their academics. Today, there are a significant number of space personnel in billets outside of AFSPC. For example, when the author served as the functional area manager for space personnel in USAFE, over 50 core space personnel were assigned to the command. Unfortunately, all but nine were in career-broadening assignments. In other words, they were not in positions that provided them an opportunity to see how space data and products are exploited during air operations. Maximizing the integration of air and space requires increased assignment opportunities for space personnel to billets where they can obtain firsthand experience integrating air and space. Maj John "Stitch" Thomas's excellent presentation

on space integration in a WFHQ may provide such opportunities.[11] Major Thomas advocates placing space professionals on OPTs in every theater command. As OPT members, these space professionals would be charged with preparing the plans and procedures necessary to integrate air and space components in-theater.

The last step necessary to enhance air and space integration leverages the gains made by the first two. To complete the cycle of training and assignments to improve integrating air and space, AFSPC must exploit the air experience gained by those space professionals who have been assigned to theater-integration billets. The AFSPC developmental teams could be used to ensure that space professionals who go to space-integration positions outside AFSPC return to positions within AFSPC to leverage that experience.

Consider the potential benefit of a DSCS III operator from AFSPC who receives an assignment to a combat communications squadron to work an LST-5 or initial communication package in direct support of air operations. Certainly, having seen satellite communications from a systems and user perspective, that operator would have a much deeper understanding of satellite communications *writ large*. Now consider if that same operator were assigned to be a MILSTAR flight commander after his or her tour in combat communications. Air and space integration would surely benefit from a space professional whose experience is based on multiple satellite communications systems, end-user employment, and issues associated with direct support to air operations. Perhaps that same individual could then move to the 76th SPCS to work with the CCS. Who better to develop TTP for a CCS system than an operator with this level of experience? Similar arguments could be made for missile-warning operators to progress from the 12th Space Warning Squadron to the SBIRS to an AOC TMD cell or for a GPS operator to progress from 2d Space Operations Squadron to the 422d Test Squadron or 17th Test Squadron and then to the 25th SCTS.

But today such deliberate progressions are extremely rare. More typically, the Air Force relies on a relatively small number of well-trained generalists as the primary means of conducting air and space integration. These integrators come almost exclusively from the USAFWS. Established in 1996, the space divi-

sion of the USAFWS evolved from the AFSPC STS, which was originally founded specifically to provide a select group of space professionals with sufficient space experience to conduct air and space integration. By 1996, however, it became clear that air and space integration required a deeper understanding of air operations. As a result, AFSPC and ACC agreed to establish a space division at the USAFWS. From its first class, the USAFWS Space Weapons Instructor Course curriculum differed from the STS in that it included robust training on air systems and their employment. Space operators were completely integrated with air operators during nearly all air academics to ensure a common education. That air training was followed by an exhaustive space-systems training and, more importantly, instruction in how they would support air operations and how this could be leveraged to enhance the joint fight.

To date the space division of the USAFWS, recently redesignated the 328th WPS, has graduated nearly 150 SWOs. However, less than half of those are currently working space-integration jobs. Others have completed their five-year obligation to serve in SWO billets, are attending professional military education, or have been moved to non-SWO billets (e.g., MAJCOM staffs, executive officers, members of commanders' action groups, etc.).[12] This leaves a relatively small number of space officers with sufficient training and experience to conduct air and space integration. This reality is at the heart of my second observation.

Observation 2. Current air and space integration efforts are fragile.

As the Air Force has come to rely on SWOs to perform the bulk of air and space integration—both force enhancement and space control—they have become high-demand, limited assets. In the process, the Air Force's overall air and space integration efforts have become fragile. The Air Force made a conscious decision to concentrate on the operational level of war as the focus of its integration efforts. As a result, the baseline manning for space personnel in the Falconer AOCs is fairly robust. So much so, that when filled, these positions consume nearly one-third of current SWO manning.[13]

However, bridging the gap of air and space requires integration efforts outside the AOC as well as inside. Properly trained integrators are needed at MAJCOMs to incorporate space into organize, train, and equip decisions as well as to develop policy and guidance for theater space-integration efforts. Furthermore, to integrate air and space fully requires efforts in such places as the Air Force Doctrine Center, the Air Staff at NAFs, the NRO, and the full range of organizations within AFSPC. One could argue that tactical fighter and mobility wings, joint unified commands, and schools across the Air Force also require space personnel to help realize full integration.

However, filling such positions adequately is a challenge. Typically, space integrators in these non-AOC billets are one-deep; as is the case at the 35 FW, HQ USAFE, Third Air Force, Seventh Air Force, the Air Force Doctrine Center, and many others. Such one-deep manning creates difficulties for integration. First, the success or failure of a unit's space-integration effort can rest on the training, motivation, and expertise of a single individual. This has the potential to create very uneven integration efforts across the Air Force. Further, when a single space integrator is on leave, supporting an exercise, deployed, or TDY, the unit is deprived of *all* of its manning; that is, it has *no* space-integration personnel on hand to support the unit's mission.

The continuing decrease in the numbers of graduates from the USAFWS compounds that problem by creating gaps in the manning of non-AOC units. When the number of graduates lags the number of open billets for a given year, non-AOC units go without backfills for space integrators. For example, when Weapons Instructor Course class 00B produced insufficient graduates to replace departing SWOs, some units, such as the 51 FW, were left with no space-integration manning. This left PACAF and the 51 FW with few options. Either it could let the 51 FW go without a SWO for six months until the next class graduated from the USAFWS or it could send other SWOs TDY to help cover the 51 FW until the next WIC class could produce a replacement. PACAF chose the latter option. Unfortunately, the SWOs sent to fill in at the 51 FW also came from one-deep positions in their home units. Therefore, while these SWOs were deployed to the 51 FW, their home units were left without space-integration manning.

Such problems are further exacerbated by the fact that non-AOC space programs are largely autonomous. In other words, they are not typically governed by any higher headquarters (HHQ) regulations or accountable to HHQ inspections.[14] This virtually ensures the programs are not institutionalized. As a result, space integration efforts in PACAF often bear little resemblance to those in USAFE or CENTAF. Even within the same command and unit, the lack of institutionalized programs leads to significant changes as SWOs PCS (permanent change of station) and are replaced by SWOs with different perspectives.

To overcome these problems, the Air Force must find ways to increase the robustness and redundancy of its space-integration programs. In terms of manning, the Air Force must continue to fill theater-integration billets with trained and motivated space personnel. Further, it must work to increase the presence of space personnel in-theater. Obviously, it is not possible to provide AOC-level space manning to every unit where integration occurs, but AFSPC must strive to overcome the problems of one-deep manning. Once again, Maj Thomas's essay on space integration in a WFHQ may provide the answer on how to increase robustness to provide a pool of trained space personnel for a given HQ. This action would also have the added benefit of increasing space personnel exposure to air operations as recommended in my first observation.

Next, to reverse the trend in weapons school applications, AFSPC should develop a campaign plan for increasing interest in, and applications for, the USAFWS. In addition to continued support from AFSPC's senior leadership, that plan should focus on AFSPC wings to emphasize the importance and value of the USAFWS to the Air Force, AFSPC, and the individual.

Finally, the Air Force should establish air- and space-integration standards to help institutionalize space-integration programs. Specifically, AFSPC should work with the theater commands to define minimum training, equipment, and performance standards for personnel conducting space integration. Further, the commands should make their space-integration programs accountable by developing space-integration evaluation criteria for HHQ inspections. Such efforts will make existing space-integration programs more standard and more routine throughout the Air Force.

Taken collectively, these actions will make air and space integration more reliable and more redundant. While this is an important advance in air and space integration, their benefits can be undermined by the inefficiencies associated with competition over the development and fielding of dedicated space-integration tools.

Observation 3. Air and space integration requires specialized tools.

Both force enhancement and space control integrating air and space require specialized tools such as:

- computer applications—the Space Battle Manager Core System (SBMCS);
- reference material—Air Force Tactics, Techniques, and Procedures (AFTTP) 3-1, vol. 28, *Tactical Employment, Space*, 2002; and
- unique hardware—the Air Defense System Integrator.

To date, many of the tools used to support integration have also been designed to support nonintegration space operations. In several instances, the integration and nonintegration requirements competed for funding and priority during development of the tools. That competition and the need to serve multiple customers have worked to dilute the ability of the tools to support integration efforts.

For example, AFTTP 3-1, volume 28, is structured for three distinct purposes: (1) to serve as a tactical reference manual for space operators within AFSPC, (2) to serve as a space-familiarization guide for nonspace personnel across the Air Force, and (3) to be used as a reference source for space integrators working in the theater commands. The competing demands of the volume's three audiences necessitated trade-offs and compromises during its 2002 rewrite. These, in turn, diluted the volume's value as a space-integration reference manual.[15] Similarly, during the spiral development of the SBMCS, AFSPC was continually forced to make priority trade-offs between the software modules that were meant to support AFSPC mission requirements and those that were meant to support theater space-integration requirements. Although most modu-

les were eventually fielded for SMBCS, competition between its various customers led to delays in fielding several integration modules.

To overcome these types of inefficiencies, AFSPC should work with theater commands to identify space-integration needs and to develop systems that expressly meet those needs. Until such tools are fielded, however, integrating air and space is likely to require extensive training in both air and space systems. This limits the number of personnel qualified to conduct integration and contributes to the fragility described in observation two. The bulk of integration today is conducted by SWOs, which highlights the fourth observation.

Observation 4. The USAFWS is critical to air and space integration.

Currently, the primary source of training for personnel conducting air and space integration is the 328th WPS at the USAFWS. Although true for both types of integration, this is particularly true for space-control integration. The 328th WPS provides training on air and space systems and employment that is unique for its breadth and depth. That training is combined with an unparalleled environment for practical application during the USAFWS graduation exercise, mission employment, and Red Flag exercises. The 328th WPS produces, perhaps, the only personnel in the Air Force who can talk with equal fluency about air and space.

The future viability of the program is in jeopardy due to the decreasing numbers of applications. For example, for the fall class of 2004 there were 19 applications for 10 class slots. However, the spring 2005 class only received 11 applicants for eight slots. Of these, only eight met the minimum qualifications. For the fall 2005 class eight applicants applied for eight slots; six were selected.[16] These numbers are even more alarming when compared to numbers from the author's class in 1999, where over 100 candidates applied for 12 slots. There are several reasons why AFSPC is experiencing this trend. One reason relates to the company grade officers (CGO) in AFSPC, another involves the leadership in AFSPC, while yet another concerns the SWOs themselves.

Although space has been a part of the USAFWS for nearly 10 years, the typical CGO in AFSPC still knows very little about the school. On the flying side of the Air Force, by contrast, CGOs are fully aware of the USAFWS and the role it plays in airpower. Most flying squadrons have a dedicated weapons officer, and many of the squadron, group, and wing leadership personnel are weapons officers. This gives CGOs ample opportunity to learn about the school. On the space side of the Air Force, however, this is not the case. There are relatively few weapons officers in space wings and still fewer in senior leadership positions within AFSPC, leaving AFSPC CGOs somewhat uninformed about the USAFWS.

What AFSPC CGOs do know of the USAFWS is that it is an extremely challenging program. Unlike many other Air Force programs, students can, and do, routinely "wash out" of the USAFWS. This can be discouraging and intimidating to potential applicants—especially in a culture such as AFSPC that demands near perfection in training and evaluation. Many CGOs see the potential to wash out of the course as a strong incentive to look elsewhere for opportunities, such as serving as an executive officer or competing for the Air Force intern program. These realities combine to decrease applications to the USAFWS.

Generally speaking, there is very little push from the group and squadron leadership in AFSPC to counter that decrease. This is understandable, given the current concept for using 328th WPS graduates. In effect, group and squadron leaders are encouraging some of their best CGOs to leave their units to attend a school and then will likely assign them outside of AFSPC for three to six years. In other words, the units wind up giving up an asset, with no tangible return on their investment.

Finally, CGO applications to the USAFWS are decreasing because of SWO arrogance—both perceived and real. The perception of arrogance stems from a cultural divide between what SWOs are taught at the USAFWS and the predominant culture in AFSPC. In the USAFWS, as in much of the flying side of the Air Force, dialogue about operational issues is often blunt and critical. To those unaccustomed to it, such dialogue can appear pretentious and condescending. Yet, the USAFWS teaches that such frankness is essential to identifying, correcting, and thus preventing operational errors.

At the same time, there have been occasions when the directness of the USAFWS has been overdone and was inappropriate to the situation in which it was used. In these cases, SWO arrogance is not only perceived, but also real. That arrogance has been cited as a reason some AFSPC CGOs have decided not to apply to the USAFWS.[17] To the degree that this is true, the few instances where CGOs have the opportunity to interact with SWOs may have worked to discourage USAFWS applications.

Reversing this trend requires a change in culture in AFSPC. As part of the campaign to promote the USAFWS described earlier, AFSPC should embrace the frank and direct style of operational evaluation that is employed on the flying side of the Air Force. Second, space operators' attendance at the USAFWS must be seen as an investment in the Air Force's ability to integrate air and space. In other words, rather than viewing a space officer's attendance at USAFWS as a loss for the unit and the command, AFSPC leadership should regard it as fulfilling the command's responsibility to provide space personnel to the USAFWS as part of the Air Force's overall integration effort.

As AFSPC promotes the importance of the USAFWS, it must remember that the school is much more challenging than most other Air Force training programs. As such, it is fairly common for students to wash out of the program. Traditionally, in AFSPC, failure to complete a training program is seen as a significant black mark on an operator's record. If the command wishes to increase applicants to the school, however, it should view the USAFWS differently. Given the demanding nature of the course, applicants should be assured that students who do not complete the course will not be viewed with prejudice.

Finally, AFSPC should remember that the USAFWS is a program that serves the larger Air Force. For over 50 years, the school has been one of the genuine successes of US combat training. Today, that success is due, in large measure, to the extraordinary fidelity and comprehensiveness of the training the school provides. In other words, the school focuses its training on all the systems required to wage the modern fight. Maintaining that success requires all squadrons at the USAFWS to dedicate a significant portion of their training time to understanding other weapons systems, not just their own. That is why space students attend the same academies on air-to-air

missiles as do the Viper and Eagle students. Likewise, students from the flying squadrons attend space academies as a standard part of their curriculum. To ensure that each squadron supports the broader learning at the school, ACC serves as the executive agent for each squadron's training curriculum.

Recently, however, AFSPC has made several requests to change the curriculum at the weapons school to sacrifice blocks of air training to allow more time to focus on expanded space training. Such a change potentially undermines the value that comes from an integrated training program. To ensure that all courses remain integrated and properly balanced between air and space, ACC should remain the approval authority for the space-training curriculum at the USAFWS.

Disputes such as these, along with differences in culture and perspectives, have led to tension between those inside and outside the command over the "best" way to integrate air and space. Among those outside the command, tensions have led to the perception that AFSPC and those inside the space community tend to view space parochially.

Observation 5. The space community is perceived as parochial in space matters.

Regardless of whether these perceptions are true, perception is reality. The author experienced enough of it during his time at the wing, in AOCs, and at a MAJCOM to be convinced that it is not a matter of particular individuals nor confined to specific issues. For example, despite experience in spacelift operations, his comments submitted on the Operationally Responsive Spacelift Mission Needs Statement were rejected simply because they were submitted from his position as chief of Space Weapons and Tactics in USAFE (i.e., outside the command). Similarly, theater representatives were intentionally excluded from the recent AFOTTP 2-3.4, "Air Force Operational Tactics, Techniques, and Procedures," drafting conference. When they asked why, they were told they could provide their input when the document was released for comments. The recurring disagreement between the theater space integrators and those in AFSPC over the best C2 arrangement for deployable space assets is yet another example.

While none of these issues is beyond compromise, collectively, they represent a recurring difference of opinion between personnel inside and outside of the command on how best to integrate air and space. Moving beyond these disagreements requires AFSPC and the theater commanders to work together on integration. Specifically, AFSPC should require space personnel outside the command to help shape integration efforts. This means actively soliciting participation during the development of integration procedures and working to find common ground when resolving differences. Similarly, theater integrators must contribute meaningfully to AFSPC integration efforts. AFSPC should support the theater's indigenous space operations and valid initiatives that originate outside the command. Maj Keith "Weed" Balts and Maj Mark "Leno" Schuler presented such ideas during the conference. One would hope AFSPC and theaters will work together to evaluate their presentations to determine if they represent an improvement in air and space integration.[18] In this regard, the SWO conference represents an excellent first step.

Conclusion

To date, the Air Force has been tremendously successful at force-enhancement integration. Recently, it has made impressive strides in space-control integration. However, that does not mean there isn't room for improvement. My conference presentation was an attempt to highlight some ways the Air Force can make such improvements.

The five observations presented herein are just one SWO's opinion on some of the issues confronting air and space integration. Those opinions are the result of seven years of air- and space-integration experience *outside* AFSPC. It is quite certain that the same issues may appear in an entirely different light when viewed from *inside* the command. Given this possibility, it would appear that the more space integrators inside and outside the command can discuss the issues involved in air and space integration, the more likely we are to identify ways to improve it.

Conferences like this one are an excellent way to generate such discussion. However, more frequent discussions between AFSPC and the theater commands would be even better. Perhaps, a series of roundtables could be scheduled to rotate through the commands to continually discuss the issues facing integration. Those discussions should continue until all integrators agree that there is nothing left to discuss. Only then, as General Jumper observed, will we know that air and space are fully integrated.

Notes

1. Gen John P. Jumper, USAF, commander, Air Combat Command, Langley AFB, VA, to all staff, e-mail, February 2000.

2. Benjamin Lambeth, "The Synergy of Air and Space," *Aerospace Power Journal* 12, no. 2 (Summer 1998): 11.

3. Ibid., 14.

4. Vandenberg Air Force Base, "14th Air Force History," http://www.vandenberg.af.mil/~associates/14af/14af_history/fact.html.

5. Donald H. Rumsfeld, *Report of the Commission to Assess United States National Security Space Management and Organization* (Washington, DC: Government Printing Office, 11 January 2001), x, http://www.defenselink.mil/pubs/space20010111.html.

6. SecDef Donald H. Rumsfeld to the Honorable John Warner, chairman of the Committee on Armed Services, memorandum, 8 May 2001.

7. For an excellent yet concise description of the evolution of the two forms of integration, see Major Balts, "Organization for Worldwide Space Control Operations: Establishing Theater Space Control Coordination Centers as the Next Step in Organizing Space Power at the Operational Level" (paper presented at the SWO Conference, Maxwell AFB, AL, 17 March 2005).

8. The 21st Space Wing, 76th Space Control Squadron, "Fact sheet," http://www.peterson.af.mil/21sw/library/fact_sheets/76spcs.htm.

9. John A. Tirpak, "Securing the Space Arena," *Air Force Magazine* 87, no. 7 (July 2004): 33.

10. Lt Col Don Ridolfi (commander, 25th SCTS), interview by author, 10 May 2005.

11. Maj John R. Thomas, "Theater Space Control in a Warfighting Headquarters" (paper presented at the SWO Conference, Maxwell AFB, AL, 17 March 2005).

12. Air Force SWO functional manager (ACC/XOTW), interview by author, 14 March 2005.

13. Calculated from the list of SWOs maintained in AFSPC's Space Personnel AEF Tracking System as of 10 May 2005, https://halfway.peterson.af.mil/dotw/Documents/ww%20billet%20slide%20-%20August%2004.PPT#510,1, CurrentW13SBillets-Worldwide.

14. Headquarters PACAF has made the most progress in this area. The first generation of SWOs created space-integration CONOPs that were approved by the respective wings and NAFs. In 2001 Maj Dean "Deanis" Helmick, the Fifth Air Force SWO, conducted the Air Force's first staff assistance visit on a space-integration program when he inspected the program at the 35 FW. He conducted a similar inspection for the 18 FW and led the effort to have unit space-integration program inspections conducted by Headquarters PACAF. Unfortunately, this huge step forward has not been replicated in other commands.

15. The author participated in the 2002 Air Force Space Command Weapons and Tactics Conference, which included a session to lay the groundwork for the 2002 AFTTP 3-1, volume 28 rewrite session. During that session, the participants were required to modify inputs to the volume to ensure it would meet each of its three purposes.

16. Air Force SWO functional manager, interview by author, 14 March 2005.

17. SWO arrogance was commonly cited as a reason for not applying to the USAFWS during informal discussion between the author and AFSPC CGOs from 1999 to 2005.

18. See Balts, "Organization for Worldwide Space Control Operations"; and Maj Mark Schuler, "It Isn't Space, It's Warfare! Joint Warfighting Space and the C2 of Deployable Space Forces" (paper presented at the SWO Conference, Maxwell AFB, AL, 17 March 2005).

Abbreviations

1-4-2-1	*National Military Strategy*
9/11	11 September 2001
25th SCTS	25th Space Control Tactics Squadron
76th SPCS	76th Space Control Squadron
328th WPS	328th Weapons Squadron
AADP	area air defense plan
AAF	Army Air Forces
ACC	Air Combat Command
ACE	Advanced Composition Explorer
ACP	airspace control plan
ADCON	administrative control
AEF	air expeditionary forces
AETC	Air Education and Training Command
AETF	air and space expeditionary task force
AFC^{2}TIG	Air Force Command and Control Training and Innovation Group
AFDC	Air Force Doctrine Center
AFDD	Air Force doctrine document
AFFOR	Air Force forces
AFI	Air Force instruction
AFPC	Air Force Personnel Center
AFSOC	Air Force Special Operations Command
AFSPC	Air Force Space Command
AFTTP	Air Force tactics, techniques, and procedures
ALFA	Air-Land Forces Application
AMC	Air Mobility Command
AMD	air mobility division
AMOCC	air mobility operations control center
AO	area of operations
AOC	air and space operations centers
AOG	air operations group
AOR	area of responsibility
ARS	advanced reconnaissance system
AST	advanced system training
A-staff	AFFOR staff
ATO	air tasking order

C2	command and control
CAF	combat air forces
CAOC	combined air operations center
CAP	crisis action planning
CAS	complex adaptive systems
CCDR	combatant commander
CCS	countercommunications system
CDRUSSTRATCOM	commander, United States Strategic Command
CENTAF	Central Command Air Forces
CENTCOM	US Central Command
CFACC	combined force air component commander
CGO	company grade officer
CHOP	change of operational control
CJCS	chairman of the Joint Chiefs of Staff
COA	course of action
COCOM	combatant command
COG	center of gravity
COMAFFOR	commander, Air Force forces
COMSPACEAF	commander, Space Air Forces
CONUS	continental United States
CSAR	combat search and rescue
CT	counterterrorism
DCS	defensive counterspace
DIRMOBFOR	director of mobility forces
DIRSPACEFOR	director of space forces
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
DOTMLPF	doctrine, organization, training, materiel, leadership and education, personnel, and facilities
DP	deliberate planning
DSB	Defense Science Board
DSCS	Defense Satellite Communications System
DSCS III	Defense Satellite Communications System III
DSP	Defense Support Program
DT	developmental teams
EBO	effects-based operations

F2T2EA	find, fix, track, target, engage, and assess
FAM	functional area manager
FHA	foreign humanitarian assistance
FID	foreign internal defense
FOV	field of view
FRAGO	fragmentary order
FSST	forward space support teams
GBS	global broadcast service
GCC	geographic combatant commander
GMF	ground mobile forces
GPS	global positioning system
GSCA	global space coordinating authority
GWOT	global war on terror
HHQ	higher headquarters
HQ	headquarters
HS	homeland security
IMINT	imagery intelligence
IO	information operations
IQT	initial qualification training
ISR	intelligence, surveillance, and reconnaissance
ITO	integrated tasking order
JAOC	joint air operations center
JDSF	joint director of space forces
JFACC	joint force air component commander
JFC	joint force commander
JFCC–S&GS	joint functional component commander–space & global strike
JOA	joint operations area
JP	joint publication
JPRC	Joint Personnel Recovery Center
JSCA	joint space coordinating authority
JSCC	joint space control center
JSpOC	joint space operations center
JTCB	joint targeting coordination board
JTF	joint task force
JWS	Joint Warfighting Space
LNO	liaison officer

MAAP	master air attack plan
MAJCOM	major command
MASINT	measurement and signature intelligence
MCO	major combat operations
MILSTAR	military strategic and tactical relay system
MIO	maritime intercept operations
MPC	mission planning center
MQT	mission qualification training
NAF	numbered air force
NEO	noncombatant evacuation operations
NMS	*National Military Strategy*
NRO	National Reconnaissance Office
NSSI	National Security Space Institute
OA	operational area
OAF	Operation Allied Force
OCS	offensive counterspace
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OODA	observe, orient, decide, and act
OPCON	operational control
OPLAN	operations plan
OPR	office of primary responsibility
OPT	operational planning teams
PACAF	Pacific Air Forces
PNT	positioning, navigation, and timing
PO	peace operations
POTUS	president of the United States
PR	personnel recovery
PRCC	personnel recovery coordination cell
PRETC	Personnel Recovery Education and Training Center
PSAB	Prince Sultan Air Base
RSTA	reconnaissance, surveillance, and target acquisition
RTIC	real-time information to the cockpit
SAMS	surface-to-air missile sites
SATCOM	satellite communications
SBIRS	space-based infrared system

SBMCS	Space Battle Management Core System
SCA	space coordinating authority
SCCC	space control coordination center
SCP	space coordinating plan
SD	Strategic Command Directive
SecDef	secretary of defense
SEF	space expeditionary force
SEG	space expeditionary group
SEW	space expeditionary wing
SIGINT	signals intelligence
SIOE	Space and Information Operations Element
SISP	single integrated space picture
SJFHQ	standing joint force headquarters
SMP	strategic master plan
SOCEUR	Special Operations Component, United States European Command
SOCPAC	Special Operations Component, United States Pacific Command
SPACEAF	space air forces
SPINS	special instructions
SSA	space situation awareness
SSO	senior space officer
SST	space support teams
STO	space tasking order
STS	Space Tactics School
SWC	Space Warfare Center
SWO	space weapons officer
TAC	Tactical Air Command
TACC	tanker airlift control center
TACON	tactical control
TAF	tactical air force
TENCAP	tactical exploitation of national capabilities program
TMD	theater missile defense
TO	theater of operations
TRADOC	Training and Doctrine Command
TTP	tactics, techniques, and procedures
UCP	Unified Command Plan
UFO	ultrahigh frequency follow-on

UN	United Nations
UNAAF	Unified Action Armed Forces
USAFE	United States Air Forces in Europe
USAFWS	United States Air Force Weapons School
USCENTAF	United States Central Command Air Forces
USCENTCOM	United States Central Command
USCINCSPACE	commander-in-chief, US Space Command
USEUCOM	United States European Command
USJFCOM	United States Joint Forces Command
USSOCOM	United States Special Operations Command
USSPACECOM	United States Space Command
USSTRATCOM	United States Strategic Command
USTRANSCOM	United States Transportation Command
VOA	Voice of America
WFHQ	warfighting headquarters
WS	weapon systems

Glossary

al-Qaeda	Sunni Islamist terrorist organization
Falconer	theater AOCs
Falun Gong	banned religious group in China
InfoWorkSpace	software for secure nets
Internet Café	terrorist C2 center
kill chain	(see F2T2EA)
penny packets	splitting space forces between theaters
Ploesti	oil fields in Rumania
Reblue	getting back to basic roots
space control	(joint community)
system-of-systems	satellite group
Traveling Circus	93rd Bombardment Group

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