

REENGINEERING THE DOCTRINAL LATTICEWORK OF MILITARY SPACE

**A MONOGRAPH
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ABSTRACT

REENGINEERING THE DOCTRINAL LATTICEWORK OF MILITARY SPACE

By Mickey L. Quintrall, USAF, 44 pages.

This study examines the ability of the US military community to integrate a world of satellite aided, precision guided weaponry and all seeing, all hearing space age systems with traditional terrestrial warfighting systems. This statement begs the question; does modern doctrine and the joint military culture adequately address the evolving military requirements involving all mediums of warfare? The answer lies partially with three issues facing the US Department of Defense: (1) contemporary military space leadership and command organization, (2) dissonant parochial feelings among the Services, and (3) a contemporary organizational structure that better meets a changing world space threat.

Certainly, space systems have become an essential component to the US's overall warfighting capability. In fact, some are saying space operations have become economic and military centers of gravity. Maybe, however, one thing is certain. The fourth medium of battlespace provides integrated capabilities that bolsters both the offense and defense of terrestrial combat components, sends resonating proof of the US's ability to sustain a global awareness, and provides global, instantaneous, secure communication to its forces.

In a recent futuristic exercise, during the initial throes of combatant exchange, the United States loses in space to a China-Russian based coalition. It took weeks before space aided American C⁴I capabilities recovered. This monograph explores the issues that must be debated in order to keep pace with the capabilities and integration of civil, military, and international space systems, their military command and control structure, and social/psychological attitudes towards contemporary change.

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PROLOGUE

Science and invention—a historical constant in the heuristic evolution of warfare; the trick—to inaugurate doctrine that remains one step ahead of technological proliferation. In the eighteenth century, Frederick the Great was able to maintain such an edge. In addition to his ordered warfighting and innovative tactics, he secretly used one of the newest technological breakthroughs. This little bit of science was key in helping him orchestrate friendly movements and providing him the opportunity to observe the entire battle as it developed. Combining technology and the high ground Frederick was able to send as receive troop messages, centralize command, and decentralize control at distances never before thought possible. His military advantage was the great-great grandfather of today's space based "eye-in-the-sky": the telescope.

Eighteenth century innovation brought the world many new methods of transportation, communication, and warmaking. For military science nothing would be more consequential, however, than a technological new "high ground." The leap into the third warfare medium—Air—began with the French Montgolfier brothers, Joseph-Michel and Jacques-Etienne, when they invented the hot-air balloon in 1783.¹ In the beginning, any trek into the sky was considered little more than an act of adventurism. It took a decade, during the Summer of 1794, before Captain Coutelle of the French Revolutionary Army ascended in a tethered military hydrogen balloon in Belgium during the Battle of Fleurus.² This first war-balloon, *Entreprenant*,² provided French commanders a picture of the battlefield never before thought possible. Though the *Entreprenant* demonstrated aerial surveillance and reconnaissance, Napoleon thought balloons a mere circus attraction and ordered the two French balloon companies disbanded in 1799. The ember-

thoughts of using anything but the land and maritime media of battle would have to wait sixty years before being rekindled.

The US Air Force lays claim to its beginning in late 1861 when Thaddeus C. Lowe, the “Father of the Air Force,” was charged to organize a balloon observation unit for the Federal Army.³ During the December 1862 Civil War crossing of the Rappahannock River, “Father Lowe’s” balloon unit signaled enemy formation and troop movement information to Major General Ambrose Burnside, Army of the Potomac Commander.⁴ Then in the Spring of 1863, during the great Civil War battle of Chancellorsville, Thaddeus Lowe’s aviation unit provided Major General J. Hooker forward area reconnaissance, troop information, local surveillance and artillery direction. Nonetheless, land and maritime warfighters remained skeptical of air support. During an 1899 downsizing and reorganizing policy, the US Army’s aviation unit was disbanded.⁵

Despite the growing civilian interest in aero-science, aviation’s military utility remained unrealized into the early twentieth century. The famous Kitty Hawk flight in 1903 only lasted 59 seconds, and traveled 852 feet.⁶ Very few imagined the unfolding significance of that flight—civilian or military. Ironically, even Orville Wright did not see the future of air and space warfare.

When my brother and I built and flew a man-carrying flying machine, we thought we were introducing into the world an invention which would make further wars practically impossible.⁷

I. BACKGROUND AND INTRODUCTION

It's a military axiom to take the high ground—and space is the ultimate high ground. In the Gulf War, US space forces were virtually unopposed. In a future that may not be the case. . . . Without question, it was fortunate there were six months to get ready. The next time, that luxury may not exist, and we must be prepared. . . . The first need is a key element—development of space doctrine to provide guidance and direction at all levels of war, across the full spectrum of conflict.⁸

—USAF LtCol Steven J. Burger

Three-dimensional warfighting has grown rapidly in the ninety-five years since the Wright brothers' initial flight. Military technology and science have escalated to heights, once thought of as only science fiction. Clearly, today's battlespace sensors are much more than a warfighter's distant-eye on the mountain tops. Frederick the Great's telescope-wizardry from atop hill provides a feeble comparison to today's dispersed & mega-lethal battlefield, worldwide command & control systems, and instantaneous information acquisition & distribution capabilities. Twentieth century satellites and high altitude military platforms are not only able to see and share three-dimensional multi-spectral imagery, but they also hear most all battlespace electronic signals, while providing pinpoint navigational accuracy to the terrestrial warrior and their robotic munitions.

As the 1991 Persian Gulf War demonstrated, access to space has become more important than ever in modern warfare. Technological proliferation, however, is a matter of historical fact, where one-sided superiority has been proven to be only temporary. The spear, long bow, gun powder, rifle, telescope, air flight, battleships, have all provided initial advantages, only to become common elements of modern warfighting. So far,

space operations provide the American warfighter that incredible advantage but for how long?

Defensively, US space and high altitude Reconnaissance, Intelligence acquisition, Surveillance, and Target acquisition (RISTA), and their space-based defense capabilities are unprecedented. History tells us, however, that proliferating abilities and the warring nature of humankind will eventually turn offensive. The following table provides a look at who has a space-launch capability, and their known satellite capabilities are.

Country/Agency	1957-94 Launches	Known (Unclassified) Satellite Capabilities
<i>CIS</i>	2464	Orbital, laser, and kinetic ASAT technology/COMSAT/Early Warning/Ballistic Missile Defense/ELINT/NAVSAT/Photo Reconnaissance
<i>USA</i>	1030	Orbital, laser, kinetic ASAT technology/COMSAT/Early Warning/Ballistic Missile Defense/ELINT/NAVSAT/Photo Reconnaissance/GEOSTAT/METSAT
<i>European Space Agency key members: Belgium, France, Germany, Holland, Italy, and the United Kingdom</i>	63	GEOSAT/NAVSAT/COMSAT/METSAT
<i>Japan</i>	47	COMSAT/NAVSAT/GEOSAT/
<i>China</i>	39	COMSAT/METSAT/Photo Reconnaissance/GEOSAT
<i>France (sovereign missions)</i>	10	<i>Helios</i> (1m, multispectral resolution Photo Reconnaissance) <i>Syracuse</i> SATCOM
<i>India</i>	6	Photo Reconnaissance/COMSAT/GEOSAT
<i>Brazil</i>	2	SATCOM
<i>Israel</i>	2	Photo Reconnaissance/COMSAT
<i>Australia</i>	2	SATCOM
<i>United Kingdom</i>	1	<i>Skynet</i> SATCOM/SIGINT

Table 1. Countries Capable of Launching Military Satellites⁹

Is the US in a doctrinal and organizational position to protect its claims to space? Current international treaties allow for no space-based weapons of mass destruction (yet). However, recent demands for space products, and the gradual worldwide proliferation of space technology highlights the importance of inaugurating contemporary doctrine that

keeps the US as the dominate leader of space aided guidance, reconaissance, intelligence, and surveillance systems.

Certainly, space exploitation has become key to the US's overall warfighting capability. American military space capabilities bolster both offensive and defensive terrestrial combat components by, (1) sustaining a global view—near-real-time, (2) providing an air defense cloak, (3) enhancing navigation and communication, and (4) establishing a deterring, ability to employ spaced-based weapons systems. A strong point for the US's air/land/sea joint military machine is their ability to organize, equip, and train their forces in a variety of scenarios. Applying these same strengths to military space will ensure American armed forces create the necessary synergy required to win future wars. It would be a tragic mistake, however, to sit on recent successes. Thankfully, contemporary military exercises are identifying some weaknesses in the employment of space systems.

Contemporary Exercise Effects

Futuristic wargames and information-intensive field experiments are adding weight to US defense leader's arguments that space control doctrine development and enabling technologies should be accelerated.¹⁰ A February 1997 "Army After Next" exercise illustrated that space will be a center of gravity in the 21st Century. During this Army War College 2020 battle-scenario, initial efforts by both sides focused on neutralizing space, culminating in an enemy nuclear spaceborne attack that destroyed virtually every satellite orbiting the earth.¹¹ One exercise official said the result was like sending the world back to about 1950 in terms of technological warfighting. The ability

of terrestrial weapons platforms to survive in a world of satellite aided, precision guided weaponry, and all seeing, all hearing space sensors is increasingly becoming more doubtful.

In addition to the 1997 Army exercise, space based exercises within the Air Force, Navy, and interestingly, the civilian space agencies continue. A National Reconnaissance Office (NRO) hosted wargame featured terrestrial military forces in a supporting, not a leading, role in theater warfighting scenario. A non-military interagency task force commander provided the leadership, who coordinated an international coalition throughout the simulated war. According NRO lessons-learned, this arrangement facilitated the employment of cross-functional disciplines, and resulted in more efficient use of space systems. Nevertheless, there are those who question the validity of such exercises. A primary factor affecting the national defense community's reaction to space aided exercises, is generated from the comments made by top military leaders. Commander-in-Chief (CINC) United States Space Command (USSPACECOM), Air Force General Howell M. Estes III, remarked "these studies aren't worth the paper they're written on, or magnetic disk space they occupy if they don't result in some concrete, tangible steps, to get on the road to the future."¹²

Unquestionably, civilian and military space systems have become key components to America's overall warfighting capability. Operating freely within the fourth battlespace medium,¹³ bolsters both the offense and defense of terrestrial combatant components, sends dramatic proof of the US's ability to sustain a global awareness, and provides worldwide—instantaneous, secure communication to its forces. Space systems innovation and extraterrestrial technological advances continue to be a

strong point for the Department of Defense (DoD). A functional air component commander, however, should not command joint space systems employment, nor coordinate of theater space. This monograph provides rationale for why there has to be pressure put on the doctrinal spin doctors to flesh out a command and control framework for not just USSPACECOM, but the entire DoD space architecture.

The Thesis

This monograph uses comparison and analysis to answer the thesis question: *Are US Space Forces adequately organized to support the US military joint mission of the twenty-first century?* The analysis methodology compares space operations with US Joint forces functional (air-land-maritime-special operations) component command structures' successes. Operations during the 1991 Persian Gulf War and current operations in Bosnia provide excellent arguments for recommending a Joint Forces Space Component Commander (JFSCC.) Further supporting this position, both the US Department of Defense (DoD) and Joint Chiefs-of-Staff (JCS) are rethinking USSPACECOM's role during military operations. Can USSPACECOM become a supported, combatant, geographical Unified Command? This monograph looks at theater space support for geographical CINCs and how military space systems fared during Desert Storm. Key to changing military space perceptions, however, revolves around three issues: (1) inadequate tactics, techniques, and procedures, (2) parochial and resistant attitudes, and (3) little military space doctrine.

The current state of military space doctrine and the presumptuous nature of joint civilian-military cultures have to be debated by policy makers. US national defense

communities have not come to terms with maturing military requirements revolving around the fourth medium of contemporary battlespace. To adequately address these problems there are two key issues facing the DoD: (1) establishing contemporary military space leadership and organizational doctrine, and (2) overcoming governmental parochialism, not just within civilian and DoD defense space communities, but among (and within) the individual Services as well.

Organizing, equipping, and training are principles inherent to any modern military force. Following these standards the US Armed Forces have successfully created the synergy required to decisively win its wars. As recent USSPACECOM and Service discussions indicate, however, to reach the same synergistic levels in the 21st Century the DoD has some space management and organizational issues to debate, and ultimately resolve.

Though wars are not fought in space yet, past military proliferation and human nature indicate the space medium will become an offensive battlefield. Former CINC USSPACECOM, Air Force General Joseph W. Ashy, acknowledged the political and policy sensitivities about combat in space, but predicted, ". . . it's going to happen. Some people don't want to hear this, and it sure isn't vogue . . . but—we're going to fight in space."¹⁴ In today's technological explosion, it is time to reconsider how military space is commanded and controlled, in order to maximize its joint synergistic capability and to ensure space efficiency during current and future joint warfighting and peace operations.

US Central Command's (CENTCOM's) Joint/Combined Forces example during Desert Storm and the US-UN operation in Bosnia demonstrate good and bad points about

the current structure's performance. Indeed, the Joint Forces Air Component Commander (JFACC) and the Joint Forces Land Component Commander (JFLCC) have proved to be, synergistically, a very powerful force. Nonetheless, civil and military space systems, as demonstrated during Desert Storm, continue to be organized piecemeal to support different CINCs and Services. This monograph considers DoD's inability to keep step with the evolving joint force battlespace. There are better command and control organizational schematics to conduct the joint space mission for a Joint Task Force (JTF). The tasks for DoD are to (1) quantify the differences between air and space command, (2) overcome Service parochialism, and (3) apply theater air-land-sea doctrinal successes for an architecture that revolve around a functional component commander focused on space.

Civil and military defense leaders and policy makers must look deeply, and more critically at the evolution of military air operations in order to better understand the implications of evolving space operations. We cannot wait until space becomes offensive battlespace before integrating the extraterrestrial systems into America's modern warfighting (or supporting) organization. Nor, does it seem reasonable to have anyone at the military space-helm but an experienced spacefighter. Predicting space as combatant battlespace is the natural course of military events. The trick is to stay one step ahead of the need. B.H. Liddell Hart once remarked that the practical value of history is to "throw the film of the past through the projector of the present onto the screen of the future."¹⁵ His lesson is valueless though, unless understood and applied to future requirements.

II. THE LATTICEWORK OF US MILITARY SPACE

. . . a lack of centralized authority would certainly hamper our peaceful use of space and could be disastrous in time of war. Failure to properly coordinate peaceful space activities under common direction could cause confusion . . . In war, when time is of the essence and quick reaction so necessary, centralized military authority will surely be mandatory.

—General Thomas D. White
USAF Chief of Staff, 1957

The lesson is clear: attempts to fragment the control and planning of air and space power will ultimately cost blood and treasure by diverting effort and impact.

—1997 Air Force Basic Doctrine-1

As outlined in the Unified Command Plan (UCP)¹⁶, CINC USSPACECOM is one of the nine unified combatant commands directly responsible to the Secretary of Defense for broad and continuing missions in a specified geographical or functional area.¹⁷ The USSPACECOM mission provides for either a geographical or a functional area, depending on whether its role is space as a “place,” to be controlled like one of the regional CINCs; or a medium, with a functional role similar to the one it performs now. While USSPACECOM’s geographical or functional role does not appear important today, once military weapons are stationed in space the distinction will become significant.

The Gulf War was instrumental in bringing military, as well as public, attention to USSPACECOM as a supporting partner in the execution of operational and tactical operations. Most notable were the Iraqi Scud missile warnings provided to coalition forces during the 1991 Persian Gulf War.¹⁸ In addition to the satellite assisted Scud warnings, a kaleidoscope of modernistic orbital communication, navigation, and reconnaissance systems inspired CINC USSPACECOM, General Donald J. Kutyna, to

call it the “first space applications of war.”¹⁹ The military space community had also to consider “the obligation and duties” outlined in a revised Joint Strategic Capabilities Plan (JSCP), and a post Cold War congress that emphasized allocating scarce, and declining, DoD funds towards only those military functions that truly supported the “warfighters.”²⁰

Extrapolating the successes of centralized control and decentralized execution of recent land-air-sea employment begs the question: Are we correctly integrating military space systems into a joint military theater of operations? In a regional conflict, the theater CINC exercises operational control over space products integration in his theater, but fails to have actual physical control of the satellite, its control systems, or ground control nodes. The theater CINC normally has tactical control only over ground-based military space component equipment and its application within his assigned AOR.

The current DoD space framework is not the only factor affecting efforts to maximize space support to the military. Civil, commercial, and international space systems are becoming more integrated every day. However, these space systems provide products with varying degrees of process security classifications, making space support for the warfighter difficult to piece together. Currently, DoD’s USSPACECOM, the functional Unified Combatant Command, exercises control authority over Service space command components: Air Force Space Command (14th Air Force), Army Space Command, and Navy Space Command. The bigger military space picture, however, is much more complex.

Building The Service Space Commands

In 1959, the Air Force redefined its overall mission to include the space medium and coined the word “aerospace” to describe its new mission. At the same time Air

Defense Command, the primary air defense provider for the continental United States assumed the ballistic missile warning mission. In January 1968, the name was changed to Aerospace Defense Command to reflect the earlier change of mission. Then in September 1979, the Chief of Naval Operations, Admiral Arleigh Burke suggested the JCS create a unified space command to control all DoD space assets and missions.²¹ The Army agreed, but the Air Force was unenthusiastic. Interservice disagreement continued to keep military space systems under divided command for another twenty-six years.

In 1979, during a major Air Force restructuring effort, administrative control of all space surveillance and missile warning assets were transferred from Air Defense Command to Strategic Air Command. The JCS found this arrangement unsatisfactory because it still left most other space systems scattered among many different agencies. Government research and proposals during the late 1970s identified the need for a change in space's organizational perspective. Air Force Secretary John Stetson, at the urging of, Under Secretary Hans Mark, authorized a "Space Missions Organizational Planning Study" to explore options for the future.²² When published in February 1979, the study offered five alternatives ranging from continuation of the status quo to creation of an Air Force Space Command. In August 1981, Gen. James V. Hartinger, CINC Aerospace Defense Command, met with General Robert T. Marsh, commander of Air Force Systems Command to discuss the issue of how the Air Force should organize for military space operations. As a result, Air Force Chief of Staff General Lew Allen directed Hartinger and Marsh to prepare a detailed proposal on how to command space operations.

In April 1982, General Hartinger presented a plan illustrating a new Air Force major command for managing space resources on a par with the Strategic Air Command,

Tactical Air Command, and Military Airlift Command. General Hartinger's proposal received General Allen's blessing and, subsequently, went to Air Staff's Space Operations Steering Committee for further refinement. In June 1982, the Air Force officially announced its decision to form Space Command.

During Space Command activation ceremonies on 1 September 1982, General Hartinger declared its establishment "a crucial milestone in the evolution of military space operations." He predicted the new command would "provide the operational pull to go with the technology push which has been the dominant factor in the space world since its inception."²³ The events of September 1982 culminated a long effort to create a separate military space-operations command.

Although space systems contributed measurably to US military operations as early as the Vietnam War, it was not until the 1991 Persian Gulf War that these systems had a major impact on the conduct of the war. During Desert Shield and Desert Storm 14th AF²⁴ (AFSPACE), ARSPACE, and NAVSPACE communications provided vital intra/inter-theater communications for USCENTCOM, while GPS satellites provided precise positional information directly to attacking Air Force and Navy aircraft as well as Army and Marine Corps artillery crews allowing unprecedented accuracy in munitions delivery. US ground forces used GPS satellite data to easily navigate the nearly featureless desert landscape—even at night. US Military weather satellites provided vital data on sandstorms, surface winds, and other conditions, which affected ground and air operations. Early warning satellites provided essential first warning of Iraqi Scud missile attacks on Coalition bases and Saudi and Israeli cities. This vital "heads up" assisted Army Patriot missile batteries in engaging many incoming Scuds.

Military space exploitation has grown-up as a multi-service venture. Indeed, the US Army has a rich history of space pursuing space systems integration. In fact, the US Army initiated America's space program following World War II.²⁵ Its initial success was the development of America's first working modern rocket—the Redstone Rocket. This was immediately followed by the Army's launch of Explorer I, America's first satellite. Other early efforts included the development of the Jupiter Intermediate Range Ballistic Missile, the world's first active communications satellite and some of the moon probes. These programs highlight the Army's pioneering contributions toward developing space systems for communication, navigation, mapping, and surveillance.

The US Army's contribution to the American military space program has matured and expanded. The prototype for ARSPACE sprang-up in September 1984 as a small staff field element. This space-support element acted as liaison to AFSPACE, initiating Army's Service participation in USSPACECOM.

In September 1985, the staff element was commissioned as the Army Space Planning Group and became the Army component of the newly formed USSPACECOM. In August 1986, the group was re-designated as the Army Space Agency (ASA). The ASA became USSPACECOM's Army component and a Field Operating Agency of Headquarters, Department of the Army. In April 1988, ARSPACE was activated and organized to support their field armies. It absorbed the ASA's planning and support functions and assumed operational space missions.

In August 1992, ARSPACE became a branch of the US Army Space and Strategic Defense Command, changed its name in 1996 to Army Space and Missile Defense

Command, and moved the headquarters to Arlington, VA. ARSPACE-forward now represents Army warfighters in both contingency operations and major exercises, serves as the Army component to USSPACECOM, and provides long-haul satellite communications access to the joint warfighter through the Defense Satellite Communications System (DSCS).²⁶

The US Navy also owns an important niche in space. Admiral James B. Watkins, then Chief of Naval Operations, called the October 1, 1983 establishment of NAVSPACE, an evolutionary event. Speaking at the Naval Surface Warfare Center at Dahlgren, VA, Admiral Watkins emphasized the Navy's growing dependence on space technology:

The Navy's critical abilit[ies] . . . are being sharpened by the movement of sensors from the masthead to the edge of space. With the advent of space-based satellite systems, we can no longer base sea power on shipboard capabilities alone. Today, and increasingly tomorrow, a seafaring nation must also be a spacefaring nation.²⁷

NAVSPACE, he observed, would consolidate the Navy's disparate space efforts into a cohesive program supporting US maritime strategy and sea power/projection missions.

Specific Navy commands and activities placed under the operational control of NAVSPACE at that time included the Naval Space Surveillance Center, based at Dahlgren, the Naval Astronautics Group headquartered at Point Mugu, CA, and elements supporting the Fleet Satellite Communications System for the Naval Telecommunications Command.

The US Navy constructed a new headquarters building for NAVSPACE at Dahlgren and dedicated it in October 1987. Chief of Naval Operations Admiral Carlisle A.H. Trost, guest speaker for the dedication ceremony, remarked;

Space is indispensable to the successful execution of our national maritime strategy and thus of our national military strategy. Finally, after 25 years of relying more and more on space systems, we in the Navy have a facility that can handle all of our requirements at one time—in one place.²⁸

NAVSPACE headquarters merged with the Naval Space Surveillance Center into a single organization in June 1993. The result was a more robust and functional NAVSPACE.

Space Support Teams

In 1993, USSPACECOM officials instituted a plan that dramatically changed the way the military space communities did business. USSPACECOM organized Forward Space Support Teams to provide space assistance and expertise to theater CINCs. This organizational evolution changed internally and, more importantly, externally the space role as a functional supporting command to the geographical warfighting CINCs. This general reorganization resulted from a combination of unique circumstances that occurred during and after the 1991 Persian Gulf War.

In the early 1990s USSPACECOM increasingly focused on operational support to the warfighter, and tried to apply Persian Gulf War lessons learned, while developing new concepts and methods for applying its diverse space assets to battlefield situations. USSPACECOM introduced Service Space Support Teams (SSTs) who deployed into the operational theaters, worked directly with warfighters, and worked to integrate space into real-world operations such as the Bosnian peacekeeping operation.

In addition to the support acquired from within USSPACECOM, the individual Services derive a great deal of technical, educational, and personnel support from within their own space components. In 1994, CINC USSPACECOM, Air Force General Joseph Ashy, directed a more direct relationship be established between USSPACECOM and its

components, such as exists within other Unified Commands. Thus, Service components established their Air Force Space Support Teams (AFSST), the Naval Space Support Teams (NSST), and the Army Space Support Teams (ARSST). Analogous to Service air components, SSTs are made up of personnel from their respective Services, and are responsible for team manning, training, and funding. As parochial ventures, each Service SST deploys to provide direct support to its parent Service's mission. Nevertheless, CINC USSPACECOM retains combatant command and operational control of all space personnel and equipment unless otherwise directed by higher authority. The JFC (or the theater CINC) retains his own SST for the joint mission, and tasks it to coordinate all DoD, civilian, and international theater space activity through a multi-service Joint Space Support Team (JSST.)

USSPACECOM deploys task-organized JSSTs to facilitate tasking and distribution of space acquired information, and to ensure space support to the theater commander. USSPACECOM assigns these liaison elements to coordinate civilian and military space derived RISTA, space communications, missile warning, and GPS navigation information. They also work with the theater CINC's staff in writing the joint operations order Annex N (Space Operations) and other annexes requiring space expertise. In an attempt to equitably allocate the duties and responsibilities of space support, four JSSTs were formed by dividing-up the geographical warfighting CINCs.

JSST-1: USACOM, USSTRATCOM, USSOUTHCOM, and NORAD.

JSST-2: USSPACECOM.

JSST-3: USCENTCOM and USSOCOM.

JSST-4: USEUCOM and USTRANSCOM.²⁹

Civil Space Support for the Warfighter

According to current US National Policy, defense and intelligence space policies are overseen jointly by the Secretary of Defense (acting on behalf of the military) and the Director of Central Intelligence (acting on behalf of non-military, National systems). Often the military community forgets, like the airways and sealanes, civil and private interests share space as well. Without listing geo-satellite and meteorological users, a partial listing of governmental space subscribers include:

1. National Security Agency (NSA)
2. National Reconnaissance Office (NRO)
3. Defense Intelligence Agency (DIA)
4. Central Intelligence Agency (CIA)
5. National Imagery and Mapping Agency (NIMA)
6. Bureau of Intelligence and Research (BIR)
7. National Aeronautics and Space Administration (NASA)

The web of military space resource acquisition is often times tangled as each Service works independently to acquire limited National Defense satellite intelligence and imagery products through their Tactical Exploitation of National Capabilities Program (TENCAP). TENCAP products and non-US derived RISTA information during Desert Storm, however, were distributed slowly, and military space-based information capabilities as a whole were grossly misunderstood, or unknown altogether, by the majority of military users. According to Desert Storm lessons learned, weak national space support for the warfighter during Desert Storm was due to a confused governmental space command structure, and inadequate space doctrine.³⁰ Service and USSPACECOM RISTA acquisition and space liaison continue to evolve, but the technological successes should not stifle efforts to better fit space into American military strategy.

US National Military Strategy affirms, "Space [civilian and military] forces play an increasingly important role in processing modern warfare . . . Space assets facilitate effective command and control and enhance the joint utilization of our land, sea, and air forces."³¹ Correspondingly, Deputy Under Secretary of Defense for Space (DUSD (S)), Robert V. Davis published an FY1998-2003 National Security Space Master Plan (NSSMP). His 4-part vision for the next 10 years are: (1) Focus [space] on the warfighter, (2) Centralized [space] planning and decentralized execution, (3) Coordinate and integrate DoD and NRO activities, and (4) Capitalize on growth in US, civil, commercial and international space activities. In addition to having management oversight authority over most of the programs on which USSPACECOM relies, DoD acts as the catalyst to help the joint operational command bridge any space based mission gaps. A close look at the NSSMP Senior Steering Group membership reveals very diverse interests in national space activities.

Co-Chairs: Assistant DUSD(S), Director of NRO Plans and Analyses
Adjunct Members: US Depts of Energy, Commerce, Transportation, and Interior
Flag Level Representatives: Each Service, Joint Staff, USSPACECOM, NIMA, DIA, CIA, NASA, NSA, CMS, and the DoD Space Architect.³²

Clearly, maturing attitudes between the DoD and the civilian space communities help information sharing and governmental cooperation tremendously. The National Intelligence Support Team (NIST), for example, is a conglomerate of the DIA, CIA, NSA, NRO, and other intelligence agencies that organize to best support the theater reconnaissance efforts. The NIST is currently organized to operate through the theater J-2 section, and only occasionally deploys with the JSST. The below organizational chart represents how confusing the current military space community looks to the theater warfighter.

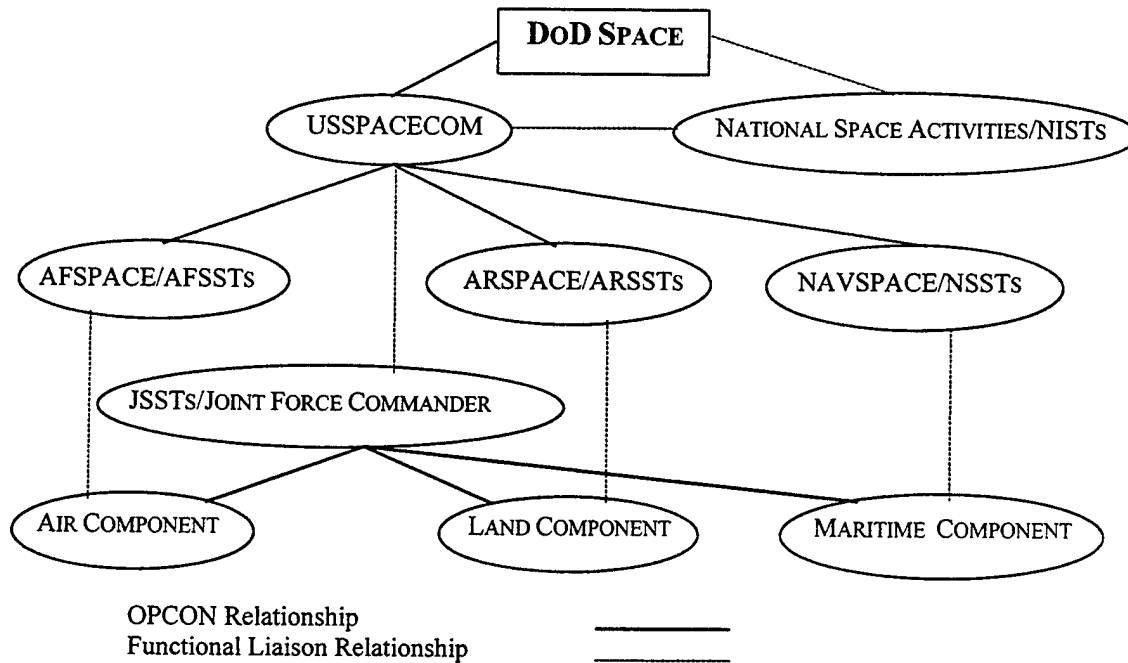


Figure 1. Current Space Structure For the Theater Warfighter³³

Decentralized, But Unorganized Space

Space systems have rapidly become an incredible force multiplier. Satellite orbital selection and space systems integration flexibility has made it possible to employ space power against selected regional areas and the multiple AORs almost simultaneously. USSPACECOM refers to this operational concept as Full Force Integration and Global Engagement. Space forces have become a battle-winning factor of the first importance. However, if the JFC expects to deliver a decisive blow using space systems, centralized operational space control must continue to reside with USSPACECOM, and the issue of decentralized space execution, has to revolve around a theater space, not an air community.

The issue of space organization becomes more enigmatic by trying to understand DoD's relationship with civil and commercial space agencies. In short, the evolution of

the US military space structure has resulted in a gross violation of the basic principle “unity of command” and sets the stage for disjointed and dysfunctional space support for the 21st Century Joint Forces Commander (JFC).

According to current Air Force doctrine interpretation, the JFACC oversees theater space support, with technical help from the JSST. This doctrinal issue offers confusing views of future military space operations, and runs counter to other Services’ views on how space should be controlled. Analogous to ongoing joint air power issues, each Service space component is hesitant to give operational or tactical control to a different Service commander. DoD and the Services must develop joint doctrine to guide emerging space warfare technologies and provide the best possible command and control structure. Only by orchestrating doctrine with evolving technologies, and adjusting command and control structures in concert can the DoD and the Services hope to match military space systems capabilities with strategic requirements the coming century will bring.

III. MILITARY SPACE DOGMA

Senator Sam Nunn, Chairman of The Senate Arms Services Committee: “*General Horner, are you in charge of space?*”

General Charles “Chuck” Horner, CINC USSPACECOM: “*That depends, sir.*”³⁴

— 1994 Air Force Association Special Report

Current US joint and service doctrine is based on centralized command and control and decentralized execution. At echelons below USSPACECOM, however, theater CINCs receive little more than piecemeal space support from Service SSTs, and a JSST located on within the JFACC staff. CINC USSPACECOM understands the dilemma this presents. In his thought-provoking document, *Long Range Plan: Implementing USSPACECOM Vision for 2020*, he comments that USSPACECOM will “reevaluate the merit of keeping liaison officers and [space] support teams at the regional CINC [level.]”³⁵ The current reality though is a host of Service and joint debates on what to do with a growing space role within contemporary military battlespace, and how to develop command relationships.

USSPACECOM is currently a “supporting” versus a “supported” Unified Command, and command relationships are unclear when space is assigned a functional role within a theater. Its qualification as a geographical combatant command, however, is at the heart of the debates. Space's geographical nature is obvious; land-sea-air and space media are all geographically bounded. Secretary of Defense William S. Cohen made the question academic in his 1997 statement to the President and Congress regarding space forces. In it, he remarked, “Space is a medium—like the land, sea, and air—within which military operations take place by DoD space forces.”³⁶ Typical of military attitudes towards space, however, all Services except the Air Force continue to oppose recognizing

space as a sixth military regional AOR. Reacting to this strong inter-service opinion, Secretary of Defense Cohen moderated his support for military space during a 1997 National Defense Panel. Instead of supporting a regional Space AOR, he urged the Joint Chiefs of Staff to add the issue to the 1998 biennial review of the Unified Command Plan (UCP.)³⁷ The dogmatic attitudes toward military space operations, lack of doctrine, and operational command relationships are real issues that must be overcome. Attitudes toward military change, however, have always been difficult to overcome.

Dissonant Military Parochialism

A “wise man learns from his experience; a wiser man learns from the experience of others.”³⁸ Therefore, if we accept that US land and naval forces, after almost a century, have come to understand “air-mindedness”, why do the Services have such a hard coming to terms with “space-mindedness?” Indeed, the 1991 Persian Gulf War, ongoing Bosnian operations, and recent large scale Service and Joint exercises illustrate military space operations’ inadequate structure and underdeveloped joint space doctrine.

The validation of functional component planning and joint employment of theater air and ground forces was demonstrated in the 1991 Persian Gulf War. Since then, joint doctrine, service/joint training and joint exercises continue to develop the roles of all joint forces functional component commanders. Lagging, however, is comparable organizational and employment doctrine for the functional role of joint and national space assets. The military community outside USSPACECOM remains unaware of space power, its employment, and its ability to function synergistically with other players on the civilian-joint military team.

The US military has frequently had difficulty accepting a different warfighting ethos; horse-cavalry versus tank forces, ground forces versus air forces, bomber pilots versus fighter pilots, and now terrestrial forces versus space forces. Dr. Leon Festinger's psychosocial theory of "cognitive dissonance" helps make sense of this behavior.³⁹ His theory rationalizes why human nature holds firm to parochial decisions and pursues inappropriate choices. Cognitive dissonance occurs when a person rationalizes their actions through group consonance, holds steadfast to traditions, and bases decisions on memories of success and failure, with little regard to the benefit or quality of another alternative. Dr. Festinger contends that this phenomenon must be overcome in order to accept change.⁴⁰ Military cognitive dissonance, or *dissonant military parochialism*, provides some idea why US land and naval warfare proponents took so long to pervasively think air, and now, why they have a difficult time thinking space.

Dissonant military parochialism has resulted in Service and careerfield territorialism, illogical budget battles, and outmoded parochial positions on joint issues. This type of cognitive dissonance occurs as one careerfield only reluctantly accepts another careerfield's technological development or employment in a particular theater or media. The often used 20th Century US Air Force example is the Army's apparent need for an explanation, defining the moment when the airplane truly transformed the terms of war, and specific proof of airpower's lethality claims. It is not that clear-cut. Dissonant military parochialism delays acceptance of combatant transformation. Sadly, old paradigms and dogma often have no chance for debate without a catastrophic event.

Lieutenant Kermit A. Tyler, an Army Air Defense Officer provides an extreme, but classic, 20th Century example. Lieutenant Tyler was warned by personnel manning

the newest early warning technology of incoming aircraft, he responded with the memorable phrase, "Well, don't worry about it." No alarm was sounded, and on December 7, 1941 an American fleet was decimated. It took a "Pearl Harbor" to shake the military into a different "early warning" paradigm. Prior to World War II the military sentry did not watch for flying weapons. Instead, the guard was for political signals and events that were considered natural precursors to war. After the events at Pearl Harbor the US military and national defense communities disengaged themselves from the weight it gave political warnings, intuition, and experience and wedded early warning and national defense to technology.

Certainly, the problems caused by US dissonant military parochialism are not new. The Services have had fundamental differences over close air support for sixty years. Similarly, the Air Force, Navy and Army have bickered over theater missile defense issues for more than thirty years. The mixes of combatant roles by the four Services offer other numerous examples. Understanding the different Services' sociology may shed light on why theater space support organizes (some say artificially) under an air component rather than developing doctrine that supports a joint forces space component.

US joint air power is the strongest military air force in the world. Behind today's air power success is an abundance of joint forces doctrine and guidance. However, toward the end of World War I, and through World War II, the US Army viewed aviation as merely an extension of fire support and target acquisition for land based maneuver elements. The very thought of an independent Air Force with offensive striking power threatened traditional core competencies, sparking parochial attitudes at the extreme.

Thankfully, there were men like the controversial—1920s—Billy Mitchell and the—1940s—Army Air Corps Generals Henry “Hap” Arnold and Carl A. Spaatz. They refused to be restricted by terrestrial warfare dogma, and pushed air doctrine forward. As with so many issues though, history has a way of being ignored.

Today, few would dispute the prominent air-combatant model in the Air Force and Navy should continue to be fighter and bomber pilots. An unfortunate side effect of perpetuating air power proponents, however, is airmen believing they should organize and employ theater space assets. World War II, conflicts in Korea, Vietnam, and most recently Desert Storm, provide a long list of warrior-leaders with air expertise, leading air-warriors. However, as the following chart illustrates, the same attitude has not held true for space.

POSITION HELD	RANK	NAME	COMBATANT BACKGROUND
CINC USSPACECOM/NORAD	General (AF)	Estes	Fighter Pilot
USSPACECOM/CV	VAdmiral (Navy)	Bien	Fighter Pilot
USSPACECOM/J-3	MGeneral (AF)	Kelly	Fighter Pilot
USSPACECOM/J-5	BGeneral (Army)	Johnson	Infantry/Artillery
NAVSPACE/CC	RAdmiral (Navy)	Moneymaker	Fighter Pilot
NAVSPACE/CV	Colonel (USMC)	Henderson	Air Traffic Control
ARSPACE/CC	LtGeneral (Army)	Anderson	Infantry
ARSPACE/CV	Colonel (Army)	Ferguson	Infantry/Artillery
AFSPACE/CC	General (AF)	Estes	Fighter Pilot
AFSPACE/CV	LtGeneral(AF)	Lord	Missile Operations
AFSPACE/J-3	BGeneral(AF)	Hinson	Fighter-Bomber Pilot
50 th SW & Space Warfighting Center/CC	BGeneral(AF)	Moorhead	Fighter Pilot

Table 2. Key USSPACECOM Personnel, as of April 16, 1998⁴¹

When one looks at top positions within the military space community it becomes apparent traditional combatants, the infantryman and fighter pilot, firmly hold space leadership influence.⁴² Considered by many as today’s conduit for bringing space issues to debate, CINC USSPACECOM, spoke at the November 1997 Air Force Association’s

National Symposium about the future of military space forces. His remarks were similar to what the Army traditionalists professed in the 1930's about US air forces. "We claim space as an Air Force domain. . . . We say we are evolving toward becoming a Space and Air Force because spacepower and airpower are inextricably linked as components of the vertical dimension of warfare."⁴³ Without realizing it, General Estes' statement reflected US Air Force cognitive dissonance in the first order.

Commercial, civil, and military space technologies have outgrown an air commander's ability to command and control them. The attributes and individual distinction of space applications require more than an airman's perspective. Certainly, atmospheric aerodynamics and air power warfighting roles are very different from orbital mechanics and the fast-evolving role of the military satellite. Similarly, the roles of USSPACECOM personnel include multi-functional warfighting techniques, tactics, and procedures, all fundamentally different from air power employment. Nevertheless, US Services still consider space merely an extension of terrestrial combat power, and only semantically add space to their doctrine. Perhaps this misperception about the unique nature of space is the reason there is little approved space doctrine for space operations. Certainly, this sentiment continues because of blind eyes given to answers outlined in joint and DoD doctrine, and dissonant military parochialism exhibited both within traditional Service combatants and the military space community as a whole.

Military Space Doctrine

US military doctrine until 1979 made only token mention of space. Since then, military space continues to develop without official doctrine and remains an extension of

the air medium. Whether this resulted from cognitive dissonance or poor judgment about emerging warfighting demands, military space doctrine is hotly debated among Space components and military leaders. The lack of Air Force space doctrine is only one example.

Air Force Manual (AFM) 1-2 (1959)—The term “aerospace power” replaced “air power” acknowledging developments in missiles and space systems.

AFM 1-1, *USAF Basic Doctrine*, (1964)—The term aerospace was redefined as “the region above the earth’s surface, composed of both atmosphere and near-space.”

AFM 1-1 (1971) —The definition of aerospace was expanded back to include: “the region of the earth’s surface, composed of both atmosphere and space” and a new division “The Role of the Air Force in Space” was added. Space forces were described as having two major roles: (1) Promote space as a place devoted to peaceful purposes, and (2) Insure no other nation gains a strategic military advantage through exploitation of space.

AFM 1-1 (1975) —The definition of aerospace was shortened to be “the region above the earth’s surface.”

AFM 1-1 (1979) —Expanded the discussion of space and listed three responsibilities for military space operations: (1) Protect [US] use of space, (2) Enhance land, sea, and air forces, and (3) Protect the United States from threats in and from space. In addition, it listed three types of space operations: (1) Space support, (2) Force enhancement, and (3) Space defense.⁴⁴

In 1977, the CSAF directed the development of a doctrinal publication devoted to space operations. *Military Space Doctrine* was assigned the number AFM 1-6. Even at this stage of doctrinal development, however, General Thomas White, Air Force Chief of Staff, was quoted as stating “air and space comprise a single continuous operational field.”⁴⁵ Five years later, on 15 October 1982, it was officially approved. AFM 1-6 provided a contemporary view of Air Force responsibilities, functions, and missions and laid the foundation for developing detailed operational space doctrine.⁴⁶ Dogmatically though, this space doctrine presented space power as “a natural extension of the evolution of airpower development.”⁴⁷ It described three roles for space power: (1) Strengthen the

security of the United States, (2) Maintain US space leadership, and (3) Maintain space as a place where nations could enhance the security and welfare of mankind. AFM 1-6 listed five military objectives for space forces: (1) Maintain freedom to use space, (2) Increase effectiveness, readiness, and survivability of military forces, (3) Protect the nation's resources from threats operating in or through space, (4) Prevent space from being used as a sanctuary for aggressive systems by our adversaries, and (5) Exploit space to conduct operations to further military objectives.⁴⁸ AFM 1-6 described two contemporary missions: Force Enhancement and Space Support, and three potential missions, Space-based weapons for deterrence, Space-to-ground weapons, and Space Control & Superiority. Several "Operational Art" elements were mentioned within the document. In reality though, "Operational Art" elements were only described as desired military capabilities:

1. Survivability, endurance, and reconstitution
2. Multi-mission capability
3. Avoid or survive attack
4. Detect, identify, and neutralize threatening enemy systems
5. Deny unauthorized use
6. Reliability, security, and flexibility
7. Quick-reaction launch, short-time regeneration and turnaround for space launches
8. Survivable launch facilities⁴⁹

Considering the progress of their functional air, sea, and land counterparts, a lack of space doctrine flies in the face of DoD's efforts to keep pace with joint warfighting. AFM 1-6 was rescinded in January 1991 to make way for AFM 2-25, which was to be the operational-level doctrine for space.⁵⁰ AFM 2-25 was never published and the core ideas in AFM 1-6 were never expanded. Similarly, DRAFT Air Force Doctrine Document (AFDD) 4, *Space Operations Doctrine* was a project equivalent to the rescinded AFM 1-6. When AFDD 4 was presented to the Air Force Chief of Staff for approval, he

decided an operational-level (AFDD-2 series) space doctrine was needed instead of basic-level doctrine, leaving the document in its draft form. In April 1998, AFDD 2-2 continues to be in final draft form—unofficial doctrine. Written at a very basic—almost tutorial—level, it is unclear whether the current draft is well suited to serve as operational-level doctrine.

Basic Air Force Doctrine, AFM 1-1 (1992) put the air and space role together, and rescinded AFM 1-6. This artificially closed the gap between air forces and space forces. Aerospace was described as “an indivisible whole” with no absolute boundary between air and space.⁵¹ References to space were made throughout the AFM 1-1, but again only in parallel to air power concepts. The 1992 version of AFM 1-1 made no separate mention of space roles other than space-related missions: (1) Counterspace, (2) Spacelift, and (3) On-orbit support.

The 1997 version of Air Force Basic Doctrine, AFDD-1 defines Air and Space doctrine as “a statement of officially sanctioned beliefs and warfighting principles that describe and guide the proper use of air and space forces in military operations.”⁵² AFDD-1 does an admirable job for air forces employment. However, it does little for space forces, other than shuffle space throughout the wording and redefines the doctrinal terms of Counterspace and Spacelift. Military space technology growth has outstripped the Air Force’s ability to publish relevant space doctrine.

Surprisingly, only the US Army has approved military space doctrine. From their studies; *The Army Operational Concept for Space Operations* (1987) and *The Army Space Architecture* (1988) the US Army’s Training and Doctrine Center (TRADOC) incorporated space operations in the US Army capstone doctrine Field Manual (FM) 100-

5, *Operations* (1993), and developed and published FM 100-18, *Space Support to Army Operations* (1994).⁵³ FM 100-18 provides the soldier information on space policy, the impact of space on Army force projection operations, how and what to consider when using space systems. FM 100-18 also provides a doctrinal method of preparing and using the Space Annex to a Service or Joint OPLAN/OPORD. The Army's effort to integrate intra-service space support to the warfighter is commendable, but even they were forced to base their space operations on unofficial Joint doctrine, with little reference to national and inter-service integration.

The Goldwaters-Nichols DoD Reorganization Act of 1986 brought huge gains within the joint community to standardize and integrate Service capabilities. Indeed, the 1994 Joint Publication (JP) 3-56.1, *Command and Control for Joint Air Operations* does a superb job of outlining the JFACC's doctrinal role as the coordinator for air power.⁵⁴ Additionally, JP 3-56.1 provides guidance for the JFACC to perform the duties as the theater's Area Air Defense Commander (AADC) and Airspace Control Authority (ACA.) The JFACC's roles as coordinator for space power and his relationship with a JSST, however, are not mentioned. Are land based or maritime-based JFACCs provided optimal space doctrine? Doctrinal development indicates they are not.

The impact of joint doctrine lies in its overriding authority over Service doctrine.

The Preface in each JCS doctrine publication makes it clear:

If conflicts arise between the contents of [JP 3-14] and the contents of Service publications, [JP 3-14] will take precedence for the activities of joint forces unless the CJCS, normally in coordination with the other members of the JCS has provided more current and specific guidance.⁵⁵

Official joint space doctrine, however, has not been published, causing the Services to balk at writing their own. Incredibly, there have been seven drafts of JCS Publication

3-14, *Tactics, Techniques, and Procedures for Space*, since the JCS directed the project in 1990. The result—As of April 1998, most Service space publications and essays on military space doctrine have no official joint guidebook to turn to. USSPACECOM's Long Range Plan makes it clear that the employment of JP 3-14 is a starting point for fully integrating space forces with their land, air, and maritime counterparts.⁵⁶ So, what is the hold-up?

USSPACECOM's Vision For 2020 may provide some rationale for the attitudes that drive space operations. Current proposals by CINC USSPACECOM, and others, continue to suggest space should be a separate AOR.

Space is a region with increasing commercial, civil, international, and military interests and investments. The threat to these vital systems is also increasing. The space AOR is global and requires a combatant commander with a global perspective to conduct military operations and support regional warfighting CINCs. USSPACECOM is the only military organization with operational forces in space. Establishing space as an AOR merely states an operational reality.⁵⁷

If by their statement they mean it becomes its own separate Service, then the contemporary military joint ethos and fiscal structure will not support it. However, if a separate space AOR means recognizing space as a distinct warfighting medium, equal to land, sea, and air, then it makes sense, and supports the Secretary of Defense's comment to the President and Congress. Neither doctrine nor parochial attitude changes, however, have kept pace with rapidly growing abilities of space technology. There is a large literature on space policy, space technology, anti-satellite weapons, space based weapons for what used to be known as the Strategic Defense Initiative, and arms control for strategic "stability" in orbit.⁵⁸ There effectively is, however, no body of writing which attempts to explain what space power is and how it will work as a pervasive, albeit

technologically dynamic, influence on warfare in ways complementary to land, sea, and air power.⁵⁹

The military “Air—Space” mentality and the continuing *dissonant military parochialism* towards military space doctrine limits opportunities available through the fourth battlespace medium, and reinforces “stovepipe” Service space organizations. Thankfully, the civilian space community is changing the way they integrate with USSPACECOM and the Service space components.

Integrating the National Reconnaissance Office

It was not too long ago when NRO stood for “Not Referred to Openly.” However, since the Persian Gulf War, the NRO’s methods of coordinating and integrating with DoD have changed. The NRO continues to be at the intersection of and DoD intelligence, national defense, and space. Interestingly, the duality of reporting to both the Secretary of Defense and the Director of Central Intelligence has resulted in little managerial friction. This is probably due to its joint organization, with personnel primarily drawn from the Navy and Air Force, and CIA. Like the four Services though, the NRO also has parochial problems, budget constraints, and organizational issues. Since the beginning, the military/NRO relationship has been based solely on trust and confidence. Unfortunately, this has meant, on occasion, the military did not trust the NRO, and the NRO held little confidence in the military, but that too is changing.

In a 1996 Report to the NRO Director titled “Defining the Future of the NRO for the 21st Century,” a group of 19 distinguished military and civilian space and intelligence experts⁶⁰ addressed the issue of NRO interaction with DoD space organizations.

Findings: The NRO is . . . an intelligence organization with responsibilities to national and DoD customers. . . . There are important interrelationships between the NRO and DoD space activities in areas such as launch, technology, industrial base, communications, and the NRO need to use DoD systems such as GPS as well as the DoD need to use products from NRO systems. The interrelationships work well at the operational and technical levels, but issues remain unresolved at the policy, architecture, and oversight levels. . .

Recommendations: Refine and clarify the relationships between the NRO and DoD space organizations. For now, the construct of one architecture with two architects (NRO, DoD) should be continued, however, there must be assurance cross functional issues are worked appropriately. Clarify the relationship between [the DoD Space Community] and the NRO. . . . Develop additional interfaces with Air Force Material Command/Space and Missile Systems Center, and closer relations with USSPACECOM.⁶¹

To better coordinate limited space resources, interface programs between federal agencies and civil space programs are ongoing. Certainly, with worldwide proliferation of space technology, liaison is increasingly required with foreign space agencies. US National and DoD space programs, operations and initiatives are increasingly intertwined with commercial concerns in the world marketplace, civil agency programs and operations at home, and policies of other countries—whether ally or foe. Thus, hard choices and difficult processes lie ahead in order to continue protecting economic, sovereign and military space interests. Part of the answer lies in ensuring the US military space organization better meets the needs of future theater or joint force commanders.

Change must build on progressive doctrine and a clear command and control structure. Altering military doctrine, however, is especially difficult if the change implies the promotion of non traditional-combatants, requires new proficiencies, and exacerbates inter/intra service rivalries.

IV. A DOCTRINAL REEVALUATION

There is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For he who introduces it has all those who profit from the old system as his enemies, and he has only lukewarm allies in all those who might profit from the new system.

— Niccolo Machiavelli⁶²

Capabilities described in Joint Vision 2010 are necessarily evolutionary. . . . [Doctrinal] transformation of our forces is not a choice between people and technology, but about how to integrate the strengths of both to give the Nation the best possible military capability.

— 1997 US National Military Strategy

In keeping with the strategic theme of centralized control and decentralized execution, nowhere does US National Space Policy direct or allude to how civilian or commercial space assets should be commanded or controlled. It does require, however, the National Security Space community “develop, operate, and maintain space systems and develop plans and architecture to meet requirements of operational land, sea, and air forces through all levels of war commensurate with their intended use.”⁶³

In line with US National Policy, it is plain CINC USSPACECOM, DUSD(S), and the NRO Director believe wholeheartedly in centralized control and decentralized execution. Proof is demonstrated in the content of USSPACECOM’s *Long Range Plan*. This document outlines six anticipated strategic environments affecting space in the year 2020: (1) politics, (2) economics, (3) technologies, (4) militaries, (5) space, and (6) foreign threat. The derived implications of USSPACECOM’s *Long Range Plan* rightly point to space emerging as an economic and military center of gravity (some say is already is). National policy makers and DoD officials have little problem excepting military space as equal to land, air, and sea. Levels of dissonant parochialism among top

civilian and DoD space leaders are very low. Rather, there is governmental agreement on National Security Space responsibilities. DoD's Space Policy predates the September 1997 National Space Policy, but echoes National Space Policy. Based on US National Security, strategic military space;

1. Provides support for the US's inherent right of self defense and for our defense commitments to allies and friends;
2. Deters, warns and if necessary defends against enemy attack;
3. Assures hostile forces cannot prevent our own use of space;
4. Counters, if necessary, space systems and services used for hostile purposes;
5. Enhances operations of US and allied forces;
6. Ensures US's ability to conduct military and intelligence space related activities;
7. Satisfies military and intelligence requirements during peace and crisis as well as through all levels of conflict; and
8. Supports the activities of national policy makers, the intelligence community, the National Command Authorities, combatant commanders and the military Services, other federal officials, and continuity of government operations.⁶⁴

Clearly, DoD provides purpose, direction and motivation to the US armed forces, which helps link strategic to operational goals. National vital interests, guided by the National Command Authority and National Policies provide the military's "purpose and motivation." Specific direction for military space, however, has come from Secretary of Defense Cohen. He directed a military space force structure that comprises systems and capabilities that support four mission areas:

1. Space Support. Operations to deploy and sustain military systems in space;
2. Force Enhancement. Space combat support operations to improve the effectiveness of US armed forces in all four operational media—land, sea, air, and space—as well as operations which support other national security, civil, and commercial users
3. Space Control. Operations to insure the ability of US and friendly forces to exploit space, while limiting or denying an adversary's ability to exploit space for hostile purposes, and;
Force Application. Operations to influence the course and outcome of conflicts.⁶⁵

Strategically, military, civil, and commercial space policy makers understand the implications of a sound space program, and share in many common goals. Unlike the civilian and commercial communities though, the military has not developed space

systems personnel to a level where they trust them to command and control theater space systems.

Rationale For Theater Space Organization

Doctrinally, the Joint Publication System (JPS) provides the justification for establishing a theater command and control structure. Certainly, combat effectiveness of US forces is enhanced, and normalized through joint doctrine provided by the JPS as overriding doctrine,

The JPS system furnishes principles, guidelines, and the conceptual framework to initiate, validate, develop, coordinate, evaluate, approve, and maintain joint doctrine and joint tactics, techniques, and procedures (JTTP) for joint activities of the US Armed Forces.⁶⁶

In essence, the JPS provides CINCs and their component commanders everything they need to know in order to coordinate a multi-Service, multi-function conflict. From the JPS, the justification for a theater space component can easily be determined.

JP 0-2, *Unified Action Armed Forces* (UNAAF), is considered the “Capstone Joint Warfare Doctrine that links joint doctrine to National Strategy.”⁶⁷ UNAAF is an overreaching document that plainly instructs the joint force commanders how to organize their forces in a manner, which allows control and coordination of the various theater forces spread across the Service and functional components. In the chapter, “Doctrine and Policy For Joint Commands,” it states that,

A JFC is authorized to organize the staff and assign responsibilities. . . . to ensure unity of effort. . . . JFCs may elect to centralize selected functions within the joint force, but should strive to avoid reducing the versatility, responsiveness, and initiative of subordinate forces.⁶⁸

There is nothing preventing a JFC from organizing a joint forces space component. Moreover, given the fact there are problematic Service views of military space, sustained

by dissonant military parochialism, it becomes even more important to consider a theater space architecture manned by personnel trained to support the next warfighting JFC. Although today limits to the strategic value of space power cannot be estimated with confidence, space plainly has the greatest near—and medium—term growth potential for military utility among all geographically distinctive elements of US military might.

CENTCOM's Example of a JFACC in Charge of Space

Desert Storm's JFACC, and later CINC USSPACECOM, General Charles "Chuck" Horner synthesized the most critical problems discussed in the Desert Storm lessons learned *USSPACECOM After Action Report*, *USCENTCOM After Action Report*, *Gulf War Air Power Survey*, and *Conduct of the Persian Gulf War: Final Report to Congress*.⁶⁹ The first problem General Horner noted was inadequate experience US forces demonstrated using space assets, especially intelligence acquisition and distribution. In his opinion, US forces simply were not ready to use satellite systems like the Defense Support Program (DSP) and Global Positioning System (GPS). The second significant problem Horner critiqued was over classification of space information. General Horner commented "the way to resolve these problems is to tear down the walls of classification the space intelligence community has built around themselves."⁷⁰ The latter of the two issues seems to have been resolved, but the first problem is a sore spot, and continues to fester with inadequate doctrine.

In a 1992 *Strategic Review* article, M. Thomas Owens reviewed a number of Gulf War studies and distilled all of the "lessons learned" down to four principle areas: people, organization, technology, and ideas [doctrine].⁷¹ Certainly, experience, technology and

doctrine are key to modern operational and tactical warfighting. The complex structure of CENTCOM's space component similarly called for a functional component commander with the same expertise.

Though General Horner helped validate the JFACC concept during the 1991 Gulf War, space system success was due more to individual Service space components' abilities to gather, coordinate, and distribute RISTA information, and organizational workarounds. Over time, Service TENCAP units answered theater cries for space acquired battle damage assessment and intelligence information. However, very little of their space systems success can be attributed to Desert Storm's JFACC.

General Horner's position entailed overseeing the coalition's 3,000+ daily sorties with a published and distributed coalition air tasking order, coordinating a very complex theater airspace structure with international Army, Navy and Air Forces, and guaranteeing an enigmatic theater air defense architecture. Moreover, as the JFACC, Horner was expected to orchestrate a complex latticework of military, civil, and international space elements. As the following table illustrates, operational control of space systems were never in theater, nor was General Horner provided the know-how to adequately employ the various orbital systems.

Orbital System	Organization with Operational Control	Remarks
SHF Communication Satellites	ARSPACE Defense Communications Agency	ARSPCE controlled DSCS SHF networks for Ground Mobile Force Terminals. The Defense Communications Agency was the systems manager for all other DSCS networks
UHF Communication Satellites	Naval Telecommunications Command & STRATCOM	The Navy and Air Force split control of the transponders on FLTSATCOM & LEASAT satellites
Commercial Communications Satellites	Defense Communications Agency	
Global Positioning Navigational Satellites	N/A	NAVSATs transmit continuously. Any unit with proper equipment can receive the navigational signal. Although, CENTCOM had to coordinate with USSPACECOM to maintain non-encrypted navigation signal accuracy.
Intelligence	NRO	Highly classified, and acquired through each Service's TENCAP component
French owned System Probatoire d' Observation de la Terre (SPOT) & US LANDSAT MSI satellites	Defense Mapping Agency	SPOT and LANDSAT were controlled by commercial organizations, and coordinated through the DMA as the single point of contact to obtain geographic imagery.
Defense Meteorological Satellite Program (DMSP) & NOAA TIROS Meteorological Satellites (MESATs)	N/A	METSATs transmit continuously. The Services have different equipment which helps retrieve METSAT weather data.
Defense Support Program (DSP) infrared based Early Warning Satellites	USSPACECOM	

Table 2. CENTCOM's Gulf War Access to Space Forces⁷²

Clearly, we were not prepared to use space. Without unit and personal innovation, success using space systems would have been minimal. During Desert Storm, commercially acquired Global Positioning System units and satellite cell phones by tactical units are legendary. However, higher level workarounds are what indicate there was a poor space organization. Air Force Brigadier General Buster C. Glosson, the Horner's offensive coordinator, used personal contacts and his reputation in acquiring civilian space products in near real time. This mooted the lengthy delays acquiring closely held TENCAP information and civil space products out of Washington, DC. According to the *Gulf War Air Power Survey*, early in the conflict General Glosson met

with Defense Intelligence Agency's Rear Admiral J.M. McDonnell in Washington, DC and struck an off-line deal. Admiral McConnell routinely used secure facsimile to send one or two page analytical reports on recommended targets with accompanying [satellite] imagery. It did not take long for theater commanders to realize they could obtain more current information through Washington, rather than waiting for in-theater intelligence sources.⁷³

The Way Forward

While over 90 percent of the DoD space budget and 80 percent of the experienced space personnel reside in the Air Force, the Army and Navy TENCAP programs have spent several times more than the Air Force in fielding numerous systems utilizing national space assets. In the opinion of the Services, JFACC has little credibility as the joint-Service space provider. This issue makes a JFSCC more practical as a doctrinal theater space broker. The last Air Force space system was almost 16 years ago. This issue further takes from an Air Force JFACC's credibility to act as an honest broker for scarce space resources and perpetuates various forms of dissonant parochialism.

Under the 1998 UCP, CINC USSPACECOM is "the single point of contact for military space operational matters." However, just as Army, Navy and Marine air forces policy and doctrine are parochially directed, so too are Service component space forces. Military space policy is made more complex with civil and commercial integration, and the recent USSPACECOM partnership with the NRO. The following figure offers one functional example where the space component is equal with the other components.

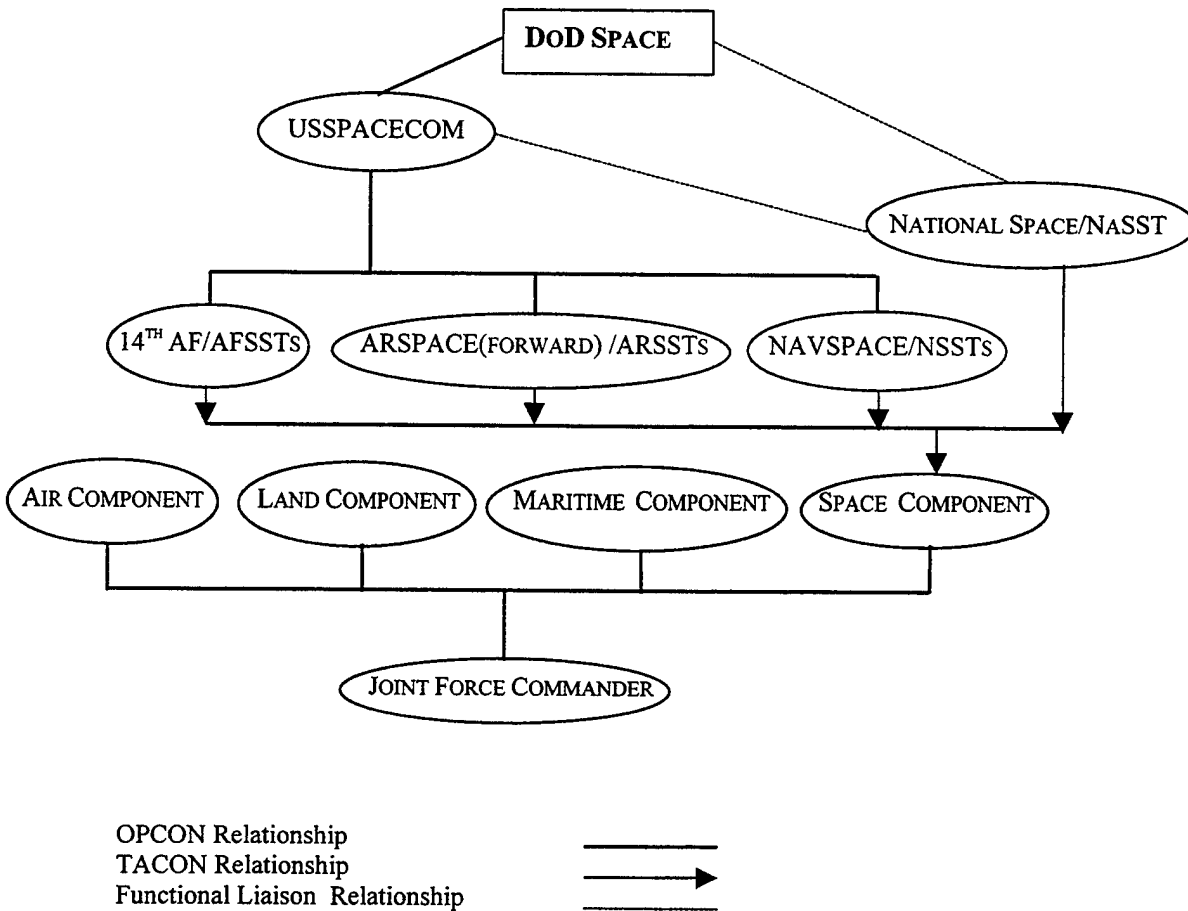


Figure 2. JFSCC Space Structure For the Warfighter

There are other contemporary DoD-Civil space structure examples for the joint warfighter. USSPACECOM's *Long Range Plan* offers three examples, (one similar to Figure 2) of future space support for the theater CINC.⁷⁴ The notion of change is a start, but re-engineering the military space framework will require three key issues being resolved; (1) Space warrior-leaders commanding space warriors, (2) Developing Joint and Service space doctrine, and (3) Breaking down the barriers of dissonant military parochialism.

V. CONCLUSION

A successful military is one that constantly overthrows old weapons and doctrine and integrates new ideas and personnel without social upheaval. All successful military forces have been able to do this for a while. None has been able to do this permanently.

—Friedman, *The Future of War*

The ability to integrate space operations in the 21st Century will be a center of gravity in diplomatic, information, economic and military operations. The 1991 Persian Gulf War and ongoing operations in Bosnia demonstrate military, civil, and commercial space integration is becoming more important than ever in joint and coalition warfare. Today, our 3-dimensional battlefield, worldwide command and control systems, and instantaneous information acquisition and distribution capabilities are accomplished by integrated air-land-sea-space systems.

Civil defense communities and US military have not come to terms with maturing military requirements revolving around our fourth medium of contemporary battlespace. Thus, there are two essential issues the DoD must continue to debate: (1) How to change military space leadership and organizational doctrine, and (2) What to do about governmental parochialism, both within civil and DoD defense space communities.

Are US Space Forces adequately organized to support the US military joint mission of the 21st century? No! Joint doctrine and USSPACECOM's *Long Range Plan* acknowledge better organizational schematics for theater space operations. However, to produce the changes, the DoD will have to (1) quantify the differences between air and space command and control requirements, (2) suppress dissonant military parochialism, and (3) apply recent air-land-sea doctrinal successes to a new theater architecture that

revolves around individual functional component commanders that are focused on air-land-sea-space.

American land-air-sea forces have matured into a doctrinally sound joint team. Infantry soldiers lead, train and motivate infantry soldiers. Airmen and seamen do likewise for their battlespace warriors. It is a mistake for National and DoD policy makers to allow theater space warriors to remain parceled out piecemeal to the Services. If we fail to apply the lessons learned from the “Joint Forces Functional Component” concept, we set ourselves up for another procedural “Pearl Harbor”. Various forms of group cognitive dissonance, motivational needs, and the will to be their best influence Warfighters. Consequently, new ideas, concepts, philosophies, and changing doctrine will always have measures of resistance. As Colonel Ed C. Mann, author of *Thunder and Lightning* aptly put it, “Boring or not, when Popes (chiefs of staff), Cardinals (4-star generals), and Archbishops (3-star generals) disdain [or ignore] doctrine, the faithful will follow suit.”⁷⁵

ENDNOTES

¹M. Taylor and D. Mondey, *Milestones in Flight*, Jane's Publishing London, England, 1983, 9.

²Taylor and Mondey, 13.

³Charles D. Bright and Robin Higam (editors), *Historical Dictionary of the US Air Force*, Greenwood Press: New York, NY, 1992, 347.

⁴Gene Gurney, LtCol, USAF, *A Chronology of World Aviation*, Franklin Watts, Inc.: New York, NY, 1965, 3.

⁵Bright and Higam, 347.

⁶Taylor and Mondey, 21.

⁷As quoted by Taylor Munson, *Warplanes of Yesteryear*, Arco Publishing Company: New York, NY, 1966.

⁸As quoted in Frank Gallegos' essay "After the Gulf War: Balancing Spacepower's Development," 1995.

⁹*Jane's Space Directory*, Edited by Andrew Wilson, International Group Limited, Alexandria, VA, 1995.

¹⁰William B. Scott, *Aviation Week & Space Technology*, "Wargames Underscore Value of Space Assets for Military Operations," April 28, 1997.

¹¹*Defense Trends*, "War Game Illustrates Vulnerabilities," March 10-16 1997.

¹²*Ibid.*

¹³The mediums of battlespace are commonly designated as the 1st Medium=*land*, the 2nd Medium=*sea*, the 3rd Medium=*air*, the 4th Medium=*space*, and now the 5th Medium=*information*.

¹⁴William B. Scott, *Aviation Week & Space Technology*, "Pentagon Considers Space As New Area of Responsibility," March 24, 1997.

¹⁵US Army *FM 22-100--Military Leadership* (US Government Printing Office, Washington, DC: July 1990), 9.

¹⁶This document is approved by the President, and establishes guidance to all unified combatant commanders; establishes their missions, responsibilities, and force structure; delineates the general geographical areas of responsibility; and specifies functional responsibilities.

¹⁷As outlined in the 1998 Joint Unified Command Plan.

¹⁸John T. Correll, *Air Force Magazine*, "The Command of Space," October 1996, 3.

¹⁹Dwayne A. Day, *Space Times*, "The Air Force: Past, Present and Future," March-April 1996, Vol. 35, No. 2, 15-21.

²⁰The JSCP is a "living document" that contains guidance to the CINCs, Joint Chiefs, and Service Chiefs for accomplishing military tasks. The JSCP provides strategic planning guidance and direction based on national security objectives.

²¹This information was drawn from the Air Force Space Command's homepage and consolidated for the purpose of this monograph.

²²*Ibid.*

²³*Ibid.*

²⁴AFSPACE at one time meant Air Force Space Command. Now AFSPACE refers to 14th Air Force, USSPACECOM's Air Force component.

²⁵This information was drawn from the US Army's Space and Missile Defense Command Public Affairs office, the ARSPACE homepage, and was synthesized for the purpose of this monograph.

²⁶This information was derived from their one page informational handout, and *US Army Space and Missile Command Vision 2010* September 1997.

²⁷Quotes and information in this portion of the monograph was drawn from the NAVSPACE homepage.

²⁸Ibid.

²⁹UMD 38-2, *Space Support Teams Procedures*, United States Space Command Instruction, Peterson AFB, CO, January 2, 1996, 3-4.

³⁰CENTCOM and USSPACECOM lessons learned from Desert Storm.

³¹As quoted in the 1997 *Department of Defense Space Program: An Executive Overview*, <www.asq.osd.mil/space/programs/execsum/s-support>.

³²Ibid.

³³Extrapolated from the August 1996 Draft Joint Publication 3-14, *Joint Space Operations*, and the USSPACECOM home page.

³⁴As quoted in the *Air Force Association Special Report*, "Facing Up To The Space Problem," November 1994.

³⁵The *Long Range Plan: Implementing USSPACECOM Vision for 2020* is a 150-page document, handout during the Space Symposium in Colorado Springs, CO in April 1998. This thought provoking publication was well received during the symposium from civil, commercial, and military communities alike. The theater space organization issues are addressed in the chapter "Full Force Integration."

³⁶US Secretary of Defense William S. Cohen, *Annual Report to The President and the Congress*, US Government Printing Office, April 1997, 199.

³⁷*Military Space*, "Cohen Endorses NDP on Space," Vol. 15, No. 1, January 1998, 2.

³⁸*FM 22-100*, 11.

³⁹"Cognitive Dissonance" was a term coined by Leon Festinger in his 1957 studies on basic psychology. This essay takes from Henry Gleitman's 1983 interpretation in his book, *Basic Psychology*. According to the 1998 *Encyclopedia Britannica*, cognitive dissonance is the mental conflict that occurs when beliefs or assumptions are contradicted by new information. The unease or tension that the conflict arouses in a person is relieved by one of several defensive maneuvers: the person rejects, explains away, or avoids the new information, persuades himself that no conflict really exists, reconciles the differences, or resorts to any other defensive means of preserving stability or order in his conception of the world and of himself.

⁴⁰Leon Festinger, *Scientific American* 207, "Cognitive Dissonance," October 1962, 93-102.

⁴¹Source: Command Biographies extracted from <<http://usspacecom.af.mil>> 01 March 1998.

⁴²Key USSPACECOM personnel, as of April 6, 1998 according to the USSPACECOM, AFSPACE, ARSPACE, and NAVSPACE homepages.

⁴³General Estes' comment has been repeated a number of times. This specific quote was taken from his speech given at the Beverly Hills Hilton, Los Angeles, CA on October 8, 1996.

⁴⁴These Air Force Manual out-takes were taken from the Air Force Manual archives.

⁴⁵AFM 1-1, *Functions and Basic Doctrine of the United States Air Force*, 14 February 1997, 2-1 and 2-4.

⁴⁶AFM 1-6, *Military Space Operations*, 15 October 1982, iii.

⁴⁷Ibid., 1.

⁴⁸Ibid., 5.

⁴⁹Ibid., consolidated from information on pages 6 and 9.

⁵⁰Wolf, James R., *Air Power Journal*, "Toward Operational Level Doctrine for Space," Summer 1991, 29, 33.

⁵¹AFM 1-1, Volume I, *Basic Aerospace Doctrine of the United States Air Force*, March 1992, 5.

⁵²AFDD-1, *Basic Air Force Doctrine*, September 1997.

⁵³US Army Field Manual 100-18, *Space Support to Army Operations*, US Army training and Doctrine Command, Fort Monroe VA, July 1995, iv.

⁵⁴JCS Pub 3-56.1, *Command and Control for Joint Air Operations*.

⁵⁵This statement is made in the "Preface" of most joint publications. The basic example is in *JP 3-0, Doctrine for Joint Operations*, 1 February 1995.

⁵⁶USSPACECOM's *Long Range Plan*, 74-76.

⁵⁷*United States Space Command Vision for 2020*, "Implications for US Space Command," February 1997

⁵⁸A couple of examples are, Bhupendra Jasani, ed., *Space Weapons and International Security*, (Oxford: Oxford University Press, 1987); and Kenneth N. Luongo and W. Thomas Wander, eds., *The Search for Security in Space*, (Ithaca, NY: Cornell University Press, 1989.)

⁵⁹Notable, however, is David E. Lupton, *On Space Warfare: A Space power Doctrine*, (Maxwell AFB, AL: Air University Press, June 1988.)

⁶⁰The Jeremiah Panel members, listed in chronological order are:

Honorable Lynn Hansen — Director National Intelligence Council

VADM David Frost (USN) — Deputy CINC, USSPACECOM

LTG James Clapper (USAF, Ret) — Former DIA Director

Mr. Jeffrey Harris — Former NRO Director

Mr. Robert Fuhrman — Former President and Chief Operating Officer, Lockheed Corp.

Mr. James Woosley — Former Director of Central Intelligence

Dr. Robert Hermann — Former NRO Director

Mr. Robert Davis — DUDS(S)

Representative Larry Combest — Congress, Chairman of the HPSCI

Representative Norman Dicks — Congress, HPSCI member

Dr. Vance Coffman — VP, Lockheed-Martin Corp.

Senator J. Robert Kerrey — Congress, SSCI member

Mr. Duane Andrews — Former Assistant Secretary of Defense (C3I)

VADM Michael McConnel — (USN, Ret) Former NSA Director

Mr. Keith Hall — Acting NRO Director

RADM Robert Geiger — (USN, Ret) Former Navy Program Director

Dr. Larry Gershwin — National Intelligence Officer

Dr. John Foster — Former Defense Director for Research and Engineering

⁶¹Taken from the Jeremiah Panel's *Report to the Director National Reconnaissance Office*, "Defining the Future of the NRO for the 21st Century," 26 August 1996, Issue #6.

⁶²As quoted by Stephen P. Rosen, *Winning the Next War*, Cornell University Press: Ithaca, NY, 1991.

⁶³

⁶⁴As outlined in the DoD's *Space Program, An Executive Overview for FY 1998-2003*, March 1997.

⁶⁵These mission areas are outlined both in the *DoD Space Program, An Executive Overview* and in the DoD 1997 Annual Report to the President and the Congress.

⁶⁶AFSC Pub-1, *The Joint Officer's Staff Guide*, National Defense University, Norfolk, VA, 1997, 4-4.

⁶⁷JCS Publication 0-2, *Unified Action Armed Forces (UNAAF)*, 24 February 1995, Preface.

⁶⁸JCS Publication 0-2, Chapter IV

⁶⁹Frank Gallegos' essay, *After the Gulf War: Balancing Spacepower's Development*, has an outstanding section comparing various lessons learned from the 1991 Persian Gulf War.

⁷⁰This information was taken from an interview conducted by Frank Gallegos.

⁷¹Mackubin Thomas Owens, "Lessons of the Gulf War", *Strategic Review*, Winter 1992, 50.

⁷²The basis of this information is taken from Eliot A. Cohen, Director, Department of the Air Force, Office of the Secretary, Washington DC, *Gulf War Air Power Survey*, "CENTCOM Access to Space Assets," March 1993, Table 3.

⁷³Eliot A Cohen and Thomas A. Kearny, *Gulf War Air Power Survey Summary Report*, US Government Printing Office, Washington, DC, 1993, 131.

⁷⁴USSPACECOM Long Range Plan, 90-95.

⁷⁵Edward C. Mann III, Air Force Colonel, *Thunder and Lightning; Desert Storm and the Airpower Debates*, Air University Press, Maxwell AFB, AL, 164-165.

SELECTED BIBLIOGRAPHY

Books

- Bright, Charles D. and Higam, Robin (editors). *Historical Dictionary of the US Air Force*. Greenwood Press: New York, NY, 1992.
- Gurney, Gene, LtCol, USAF. *A Chronology of World Aviation*. Franklin Watts, Inc.: New York, NY, 1965.
- Lipton, David E. *On Space Warfare: A Space Power Doctrine*. Air University Press: Maxwell AFB, AL, June 1988.
- Mann, Edward C. III, Colonel, USAF. *Thunder and Lightning: Desert Storm and the Airpower Debates*. Air University Press, Maxwell AFB, AL, 1995.
- Munson, Taylor. *Warplanes of Yesteryear*. Arco Publishing Company: New York, NY, 1966.
- Rosen, Stephen P. *Winning the Next War*. Cornell University Press: Ithaca, NY, 1991.
- Taylor, M. and Mondey, D. *Milestones in Flight*. Jane's Publishing: London, England, 1983.
- Wilson, Andrew (editor). *Jane's Space Directory*. International Group Limited: Alexandria, VA, 1995.

Periodicals

- "Cohen Endorses NDP on Space." *Military Space*, Vol. 15, No. 1, January 1998.
- Correll, John T. "The Command of Space." *Air Force Magazine*, October 1996.
- Day, Dwayne A. "The Air Force: Past, Present and Future." *Space Times*, Vol. 35, No. 2, March-April 1996.
- Festinger, Leon. "Cognitive Dissonance." *Scientific American* 207, October 1962.
- Owens, Mackubin Thomas. "Lessons of the Gulf War." *Strategic Review*, Winter 1992.
- Scott, William B. *Aviation Week & Space Technology*. "Pentagon Considers Space As New Area of Responsibility," March 24, 1997.
- _____. "Wargames Underscore Value of Space Assets for Military Operations." *Aviation Week & Space Technology*, April 28, 1997.
- Wolf, James R. "Toward Operational Level Doctrine for Space." *Air Power Journal*, Summer 1991.
- "War Game Illustrates Vulnerabilities." *Defense Trends*, March 10-16 1997.

Government Publications

- Cohen, Eliot A, Department of the Air Force Director. *Gulf War Air Power Survey*, "CENTCOM Access to Space Assets." Office of the Secretary, Washington DC, March 1993.
- Cohen, Eliot A. and Kearny, Thomas A. *Gulf War Air Power Survey Summary Report*. Washington, DC: US Government Printing Office, 1993.
- Cohen, William S. *US Secretary of Defense Annual Report to the President and the Congress*. Washington, DC: US Government Printing Office, April 1997.
- US Space Command. UMD 38-2, *Space Support Teams Procedures*. Peterson AFB, CO: USSPACECOM, January 2, 1996.
- US Air Force. AFM 1-1, *Functions and Basic Doctrine of the United States Air Force*. Washington, DC: US Government Printing Office, 14 February 1979.
- _____. AFM 1-6, *Military Space Operations*. Washington, DC: US Government Printing Office, 15 October 1982.
- _____. AFM 1-1, Volume I, *Basic Aerospace Doctrine of the United States Air Force*. Washington, DC: US Government Printing Office, March 1992.
- _____. AFDD-1, *Basic Air Force Doctrine*. Washington, DC: US Government Printing Office, September 1997.
- US Armed Forces Staff College. AFSC Pub-1, *The Joint Officer's Staff Guide*. Norfolk, VA: National Defense University, 1997.
- US Army. *FM 22-100--Military Leadership*. Washington, DC: US Government Printing Office, July 1990.
- _____. FM 100-18, *Space Support to Army Operations*. Fort Monroe, VA: US Army Training and Doctrine Command, July 1995.
- US Department of Defense. *Space Program, An Executive Overview for FY 1998-2003*. Washington, DC: US Government Printing Office, March 1997.
- US Joint Chiefs of Staff. *Joint Unified Command Plan*. Washington, DC: US Government Printing Office, 1997 and 1998.
- _____. JP 0-2, *Unified Action Armed Forces (UNAAF)*. Washington, DC: US Government Printing Office, 24 February 1995.
- _____. JP 3-0, *Doctrine for Joint Operations*. Washington, DC: US Government Printing Office, 1 February 1995.
- _____. JP 3-14—**DRAFT**, *Joint Space Operations*. Washington, DC: US Government Printing Office, August 1996.

Internet

Encyclopedia Britannica Online -1998. <www.eb.com>.

"Facing Up To The Space Problem," *Air Force Association Special Report*, November 1994.

US Air Force Space Command's homepage. <www.afspace.af.mil>.

US Army Space Command homepage. <www.arspace.army.mil>.

US Army's Space and Missile Defense Command Public Affairs office.
<www.smdc.army.mil>.

US Department of Defense. *1997 Department of Defense Space Program: An Executive Overview*, <www.asq.osd.mil/space/programs/execsum/s-support>.

US Naval Space Command homepage. <www.navspace.navy.mil>.

US Space Command. *United States Space Command Vision for 2020*, "Implications for US Space Command." February 1997. <www.uspacecom.mil>.

US Space Command Biographies. <http://uspacecom.mil>.

Miscellaneous

Gallegos, Frank. *An Essay: After the Gulf War: Balancing Spacepower's Development*. US Air Force's Air War College, 1995.

Jeremiah Panel. *Report to The Director National Reconnaissance Office*, "Defining the Future of the NRO for the 21st Century." 26 August 1996.

US Army Space and Missile Command Vision 2010 and their one page informational handout, Department of the Army. September 1997.

US Space Command. *Long Range Plan: Implementing USSPACECOM's Vision for 2020*. Colorado Springs, CO, Peterson AFB, March 1998.