UNITED STATES AIR FORCE SPACE COMMAND

SUMMER 2004

HIGH FRONTIER

THE JOURNAL FOR SPACE & MISSILE PROFESSIONALS

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Editorial content is edited, prepared, and provided by the Public Affairs office of Air Force Space Command. All photographs are Air Force photographs unless otherwise indicated.

The High Frontier, Air Force Space Command's premier space professional journal, will be published quarterly. The journal provides a scholarly forum for professionals to exchange knowledge and ideas on space related issues throughout the space community. The journal focuses primarily on Air Force and DoD space programs, however, The High Frontier staff welcomes submissions from within the space community. Comments, inquiries and article submissions should be sent to AFSPC.PAI@peterson.af.mil. They can also be mailed to:

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COVER: Space professional development encompasses multi-service personnel including active duty, Reservists, National Guard, Department of Defense civilians and contractors. Cover design by Janet Kays, 30th Communication Squadron, Vandenberg Air Force Base.

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Space & Missile Journal Vol. I, No. 1 Summer 2004

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Introduction

Welcome to High Frontier!

General Lance W. Lord
Commander, Air Force Space Command

"Growing the intellectual properties of our space professionals will harvest more decisive, innovative and integrated effects on the battlefield."

-General Lance W. Lord

Welcome to the premier publication for our space professionals working in the Department of Defense and throughout the governmental agencies responsible for space and missiles. I am proud to introduce our first space professional journal for space professionals of all services. This quarterly journal is designed to generate intellectual debate through thought provoking articles and essays on the strategic, operational and tactical aspects of space and missile power in the twenty-first century. We have certainly completed the transition from a nation interested in space to a country with national interests in space. Therefore, it is absolutely critical for our nation's space professionals from all organizational backgrounds to focus on the intellectual properties we will need now and in the future.

At a minimum, there are three main components to any system requiring human interaction: The system hardware, the knowledgeable and skilled operator, and the critical human and technical infrastructure necessary to support both. Of course this includes talented people required in the acquisition, development and sustainment of the hardware and infrastructure. We need innovative scientific minds to advance our research and development efforts. Throughout the history of national security space we have focused a significant amount of our attention on the development of hardware: satellites, launch vehicles, missile development and space operations centers, to name a few. The dedication and devotion of our Space and Missile Pioneers provided our nation with cutting edge world-class space and missile hardware.

This year marks the 50th anniversary of the United States Air Force's involvement in the development of space and missile systems. We have a proud heritage with significant achievements in the development of innovative hardware and material solutions. Since Brigadier General "Bennie" Schriever set up the Western Development Division in Inglewood, California in 1954, I believe spacepower has matured quicker and provided more substantive contributions to the American way of fighting wars than the first 50 years of airpower.

As a nation we stand tall on the shoulders of our Space and Missile Pioneers. We have continued to lead the world in the development and manufacturing of spacecraft, launch vehicles and missile components. The hardware we use to access and operate in and on-orbit in space is quickly growing in complexity, therefore, we must ensure our space professionals develop at a faster pace than our technology. We need knowledgeable and skilled operators, scientists, engineers and program managers to ensure our growth in the next fifty years and beyond. Space Professional Development is our plan initiated at Air Force Space Command with the ultimate goal of developing our nation's cadre of space operators, engineers, program managers and scientists.

The concept of Space Professional Development goes well beyond the United States Air Force. The Space Cadre is composed of almost 10,000 engineers, space operators, program managers and scientists across all organizational ties in our government. Most of the Space Cadre is assigned to Air Force Space Command, the National Reconnaissance Office, our governmental research labs, logistics centers, the Joint and other service staffs, as well as unified commands and other government agencies. Space Professional Development is not limited to the development of our officer corps. We need to develop officers, enlisted members and civilians, reserves and national guardsmen in the operation, development, sustainment, application and integration of military space systems. Just like we have led the world in the development of space and missile hardware, we need to continue to lead in the development of our space professionals.

General Lance W. Lord (BS, Otterbein College; MS, University of North Dakota) is the Air Force Space Command commander, Peterson Air Force Base, Colo. General Lord is responsible for the development, acquisition and operation of the Air Force space and missile systems. The general overseas a global network of satellite command and control, communications, missile warning and launch facilities, and ensures the combat readiness of America's intercontinental ballistic missile force. The general has commanded two ICBM wings and a space wing as well as served as the Commandant of Squadron Officer School. Prior to his current position, General Lord was the Assistant Vice Chief of Staff for Headquarters U.S. Air Force. The general is also a graduate of Squadron Officer School, Air War College and a distinguished graduate from Air Command and Staff College.

The most senior leaders in the Department of Defense agree with our assertion. In 2001, the Commission to Assess United States National Security Space Management and Organization was established to assess space activities in support of our national security interests. The Honorable Donald H. Rumsfeld led this formal evaluation, commonly referred to as the "Space Commission". The Space Commission concluded that a new and comprehensive approach to national security space management and organization was required to protect the nation's security interests in space. The Department of Defense Directive 5101.2 designates the Air Force as the executive agent for space.

After being designated the responsible agent for developing our nation's space expertise by Dr. James Roche, Secretary of the Air Force, we have moved out aggressively to define and implement a Space Professional Development Strategy to ensure the development of our nation's expertise in national security space. The foundation for Space Professional development is a quest for continual learning. By providing educational opportunities throughout one's career, documenting occupational experiences and carefully matching future assignments and opportunities we have a plan to develop the expertise across all areas of military space. Formal educational classes, courses and certifications will help us document levels of expertise.

"Where do ideas flourish? From reading and reflecting."
-Benjamin Franklin

We must take advantage of every opportunity to stimulate our thinking on key issues in the national security of space. Documenting individual experiences is challenging for us, but we are off to a great start with over 6,000 individual records reviewed to date. You learn and grow professionally from your experiences and a life-long learner looks for ways to capture the lessons learned. This journal provides the canvas for which we can paint the intellectual pictures of tomorrow's spacepower. I ask each reader to use this opportunity to grow professionally and, hopefully, increase your experience base.

This journal is designed with our nation's space professionals in mind regardless of your organizational roots. We are not developing space professionals for any one organization, but rather for our nation. We plan to include articles from our space and missile professionals on current issues with lively reader commentary, interviews with military leaders and strategists, historical essays, and book reviews. *High Frontier* will quickly become a primary forum for communicating the thoughts of our military and civilian professionals on issues affecting today's air and space power. You will find this reading indispensable to your development as a Space Professional.

"Reading furnishes the mind only with materials for knowledge; it is thinking [that] makes what we read ours."
-John Locke

High Frontier will be a catalyst for new ideas and innovative approaches in helping us solve critical space and missile issues. Our inaugural issue of *High Frontier* is dedicated to our number one priority – Developing Space Professionals. Subsequent issues will highlight significant events throughout the 50-year history of space and missiles. We plan to discuss current and projected space and missile capabilities, the requisite need to gain and maintain space superiority, the future of strategic nuclear deterrence, the evolution of the Space Cadre, and much more. We seek to significantly expand and improve our knowledge base and understanding of space's role in conducting and supporting both theater and global military operations. Additionally, we want to continue learning about relevant air, land and sea power lessons and the integration of air and space operations to better achieve combat effects.

We should strive to become experts in space while continuing to advance our knowledge of air, land and sea power. We are more dependent upon space today than ever before in the history of our great nation. Space capabilities enable the American way of fighting and winning modern wars. Space is an equal partner with air, land and sea forces. Space capabilities help provide timely and accurate combat effects for our combatant commanders. Our recent campaign successes in Operation ENDURING FREEDOM and Operation IRAQI FREEDOM are well known throughout the world. The international community looks to the United States as the leader in space operations.

Each of us has an important role in leading our military space personnel into the next generation of spacepower. Modern warfare is dependent upon the capabilities space systems provide. This reliance upon spacepower will continue to grow. We must ensure the development of our minds and our capabilities is not outpaced by the ever-changing dynamic nature of modern war. This is an individual responsibility, but we must create opportunities for learning and intellectual growth. Defeating tomorrow's enemy starts today. We must ensure we are ready for the future both militarily and intellectually. Finally, we must advance spacepower beyond our current capabilities and contributions to the war effort. Spacepower enhances our ability to fight an enemy today; ultimately, it will provide full spectrum combat effects on the battlefields of the future. We will continue to work on integrating space capabilities and combat effects into the appropriate command and control infrastructure. We will "Command the Future" to ensure we advance the technology, knowledge and operational skills required for leading the world's greatest space and missile force into what promises to be a very exciting and rewarding future.

I'm extremely excited about this journal. I invite your feedback as we continue to make this the best possible publication we can. As we continue to build upon the intellectual framework created by this journal, all systems report "Go!" The main engines have fired. We have cleared the tower, so sit back and enjoy our first launch into the "High Frontier".

NSS Plans Strategy for Developing Space Professionals

Peter B. Teets
Under Secretary of the Air Force

In the space business it is easy to focus on hardware and technology. After all when we think of space, images of rockets launching from the pad and satellites orbiting the Earth quickly spring to mind. Because of this, at times there is a tendency to take our space professionals—the crucial element of space power—for granted. We do this at our peril. In my 40-plus years of space experience, both in the private sector and now in government, I have seen time and again that Mission Success cannot be achieved without dedicated, hard working, talented people. And it is our people, forged into a dedicated space cadre, who will be critical in preserving our nation's decisive, asymmetric advantage in space.

Developing and maintaining a team of space professionals remains one of my highest National Security Space (NSS) priorities, and we are making consistent and rapid improvement in this area. Adopting a Total Force approach, we will continue to develop well-educated, motivated, and competent people who are skilled in the demands of the space medium. Operationally, we must groom people who understand the tactical environment they support, as well as the space-unique tactics, techniques, and procedures needed. Technically, they must be schooled in the requirements, capabilities, and characteristics of vehicles that operate in space, the acquisition of space systems, and space-related research, science, and technology. They must be able to create new systems, technologies, training methods, concepts of operations and organizations that will sustain the U.S. as the world leader in space. These new systems must achieve desirable effects at all levels of conflict. Furthermore, they must ensure these systems are interoperable with and integrated into architectures that support the creation of lethal and non-lethal effects.

This is a tall order because we are not talking about creating a mere career field or sculpting a field of expertise. We are talking about forging an entirely new breed of warrior who will ultimately transform warfare in the same way airpower professionals did in the past century. This is a great responsibility of the most serious nature. As one of the first steps in fulfilling this stewardship of the cadre of space professionals, we are implementing a comprehensive DoD-level framework to guide the efforts of the military services. This framework, the Space Human Capital Resources Strategy, will ensure the space cadres of all the Services possess the necessary education, skills and experiences to meet National Security Space needs.

The strategy has four main goals. The first is to ensure the Services develop the space professionals they need to fulfill their service-unique requirements. Any strategy for developing space professionals must recognize the Services have a wide variety of needs; one size truly does not fit all. When one recognizes space professionals in the Navy will have different skills, education and training, and experiences than Air Force space professionals, it becomes apparent Services and their components must continue to grow and manage a unique cadre of space professionals to support their particular mission requirements. It is also important to recognize and accommodate the specific needs of one of the major stakeholders in the National Security Space community, the National Reconnaissance Office (NRO). The NRO is developing a comprehensive workforce management strategy consistent with the goals and objectives of the DoD strategy, and understandably it is tailored to the unique requirements of the NRO.

> *Over the last two and one half years, I've had the great fortune to see this community in action across the spectrum—from acquisition to operations. I am thoroughly impressed by the outstanding leadership, professionalism, dedication, and ability of our men and women in the space arena.*
>
> **Peter B. Teets**

The second goal of the strategy is to synchronize and integrate the space professional efforts of the NSS community to increase efficiency and reduce unnecessary redundancies. With the establishment of a DoD Executive Agent for Space it has become clear some level of overarching management, concerning our space professionals, is necessary to provide unity of effort and guide the space community in common endeavors. This senior level of management is the cornerstone of our synchronization and integration efforts. Specifically, senior leadership will establish and maintain sound personnel

policies. As part of this, the community must come together and establish a DoD-level education and training framework as well as ensure the Services pool the data needed to manage our DoD-wide team of space professionals. Working together we can identify best practices and apply them throughout the community.

The third goal of the strategy is to continue to improve the integration of space capabilities into joint warfighting and intelligence operations. We are not developing space professionals to work in isolation. Our space professionals must be sensitive to the needs of the many and varied end-users of space capabilities, and be able to formulate and articulate new space doctrine to fully control and exploit the medium of space in support of our nation's security objectives. The depth and breadth of our space professionals' education, training and experience must instill an understanding of joint warfare and how space capabilities are best woven into our operating concepts and war plans. Additionally, we must continue to educate our non-space professionals on what space brings to the fight. In order to do this the strategy calls for increasing space education in our service and joint professional military education, and graduate degree programs.

The last goal of the strategy is to consistently assign the best available space professionals to the most critical jobs within the National Security Space community. There are many models we are examining as we decide how best to manage people at the DoD-level. Acquisition professionals have a three-tiered certification process that we may emulate. There is also the methodology for the selection and manning of joint-critical billets that may be adapted to our purpose. Regardless, we understand putting the right person, in the right place at the right time does not happen by accident. It requires effort and forethought. My goal is to create a system that serves the space community without becoming onerous or self-defeating.

Over the last two and one half years, I've had the great fortune to see this community in action across the spectrum—from acquisition to operations. I am thoroughly impressed by the outstanding leadership, professionalism, dedication, and ability of our men and women in the space arena. We owe them a strategy, the Space Human Capital Resources Strategy, which will foster their development as space professionals. Truly, people form the backbone of our joint and interagency space capabilities, and we must keep this backbone strong to preserve the United States' decisive edge in space.

Peter B. Teets (BS, University of Colorado; MS, University of Colorado; MS, Massachusetts Institute of Technology) is the Under Secretary of the Air Force, Washington D.C., and is responsible for all actions of the Air Force on behalf of the Secretary of the Air Force and is acting secretary in the secretary's absence. Designated the Department of Defense Executive Agent for Space, Mr. Teets develops, coordinates and integrates plans and programs for space systems and the acquisition of all DOD space major defense acquisition programs. As the Director of the National Reconnaissance Office, Mr. Teets is responsible for the acquisition and operation of all U.S. space-based reconnaissance and intelligence systems.

Developing and maintaining a team of space professionals remains one of my highest National Security Space (NSS) priorities, and we are making consistent and rapid improvement in this area.

Peter B. Teets

Developing Space Professionals

General Lance W. Lord
Commander, Air Force Space Command

This year marks a milestone for the space and missile community—it's the 50th anniversary of the Air Force's Western Development Division. From the early days, General Bernard Schriever and his team of scientists, engineers, contractors, government officials and Airmen developed missile and satellite systems that led the nation into outer space, made possible arms control agreements with the Soviet Union and ultimately helped win the Cold War. Their innovation and prescient leadership evolved into the transformational military space and missile capabilities the Air Force operates today. Although it's important to reflect back on the contributions and lessons-learned from our space and missile heritage, it's even more essential that we cast our attention toward the future. In that light, we recently unveiled a new Space Professional Cadre development program, which will benefit operators, maintainers and acquirers in all ranks—Officer, Enlisted and Civilian. Without question, our most vital resource is people and that's why we are working hard to create a strong program that will professionally develop our next generation of Space Professionals. To achieve this goal, a number of critical initiatives are necessary.

Before we delve into specifics, it's helpful to understand why this new program came about. The Space Professional Strategy was derived in part from the 2001 Space Commission Report, which stated the Department of Defense in not on course to develop the space cadre the nation needs. The Commission further asserted that space operators and acquirers must "master highly complex technology…and operate some of the most complex systems ever built and deployed." Their declarations are certainly holding true. Right now the acquisition pipeline is filling up with increasingly complex space systems, such as Transformational Communication and Space Based Radar, which will provide unprecedented capabilities for our nation's military. These systems will blend space with air, land and sea components in ways never before possible. A highly skilled Air Force Space Cadre will be absolutely critical if we expect to successfully design, operate and integrate these new capabilities into the high-tech battlefields of the future.

Implementation of the Space Professional Strategy will lead to more purposeful and effective career development for the entire space community. This includes the Space Cadre (scientists, engineers, program managers and operators who design, acquire, employ and integrate our space capabilities), as well as other critical roles, such as intelligence, maintenance, communication, weather and logistics. The plan calls for identifying every individual in the Air Force's Space Cadre, tracking their unique "space experiences," developing new and improved space education and training courses, and instituting a robust certification program to monitor progress and status of each individual. Other Space Professionals, who are not members of the Cadre, will also receive specialized education in space missions and organizations to better prepare them for assignments in the national security space arena.

Mission success will undoubtedly hinge on providing the strongest foundation of education and training possible. To that end, we already have a continuum of education initiatives in progress that are designed to enhance understanding of the space medium and the importance of integrating space capabilities into joint warfighting. But we need to do more, especially with the civilian sector. My vision is for the creation of a "National Security Space Institute" centered in Colorado Springs and enabled by a collaborative effort between services, agencies, and local and distant universities. I want this National Space University to be the "go to" place for space education. Although there will be many hurdles ahead, together we can make this vision a reality.

How do we know we're on the right path? With tighter budgets and a smaller fighting force, greater attention is required to sustain the right number of people, with the correct education and training, to fill the necessary jobs, at the proper time in their careers. The Space Professional Implementation Plan gives the Air Force a solid roadmap for achieving this mandate and is flexible enough to accommodate changes along the way. While Air Force Space Command is already making big strides, a number of challenges still remain. Cultural shifts and change are sometimes met with apprehension and skepticism; however, these initiatives are needed to face the asymmetric challenges of the 21st century. The growing complexity and types of combat missions demand that space operators and acquirers get out in front of the problem intellectually. To maintain our nation's continued preeminence in space, the Air Force must produce a highly dedicated Space Cadre to execute planning, programming, requirements development, acquisition and operation of future military space systems. This new professional development program offers the right approach, it enjoys the full support of Air Force senior leadership and we pledge to commit all of the necessary resources to accomplish our goals.

Since the Space Commission first published their findings and recommendations in January 2001, we have been diligently working to identify and implement sound solutions. Space Professional Development is designed to promote career growth opportunities while thoroughly preparing our people to overcome the increasing challenges associated with securing the ultimate high ground. In addition, merging our world-class space scientists, engineers, program managers, operators and other specialists into a more unified team, will sustain the overwhelming advantage the United States has come to depend on. Finally, a National Security Space Institute in Colorado Springs will pave the way for educating this new Cadre, while keeping our extraordinary city as the "Place for Space." The mutual benefits to individuals and to the community will be enduring, as we become the recognized leader in Advanced Space Education and Training.

For additional Space Professional information visit the Space Professional Development Web Site at: http://www.peterson.af.mil/spacepro

Developing Space Professionals Crucial to Critical Wartime Roles

Col James C. Hutto
Air Force Space Command

March 2003-While engaged in a deadly firefight in Central Iraq, lead units of the 3rd Infantry Division (ID) mysteriously lost their primary communication link with the MILSTAR Satellite network. In an instant, critical targeting coordinates being transmitted to rear fire support elements were completely cut off. Fortunately, an alert crew from the 4th Satellite Operations Squadron at Schriever Air Force Base, Colorado, quickly determined that another user inadvertently moved the satellite spot beam away from the combat zone. After initiating over-ride procedures, the beam was immediately repositioned back to the fight and the urgent link was restored. The 3rd ID was able to resume its coordinated attack and went on to win this key battle.[2]

This story represents just one of many recent examples of the critical wartime roles played by military space assets and the dedicated space professionals who wield them. Make no mistake; the victorious outcome of this engagement, along with numerous other battles in Operation IRAQI FREEDOM, would not have been certain without dominant U.S. military space power. During the past 20 years, space systems and the people who develop and operate them, have repeatedly demonstrated their indispensable contribution on the battlefield. Rest assured, this decisive role for space will only continue to expand in future conflicts.

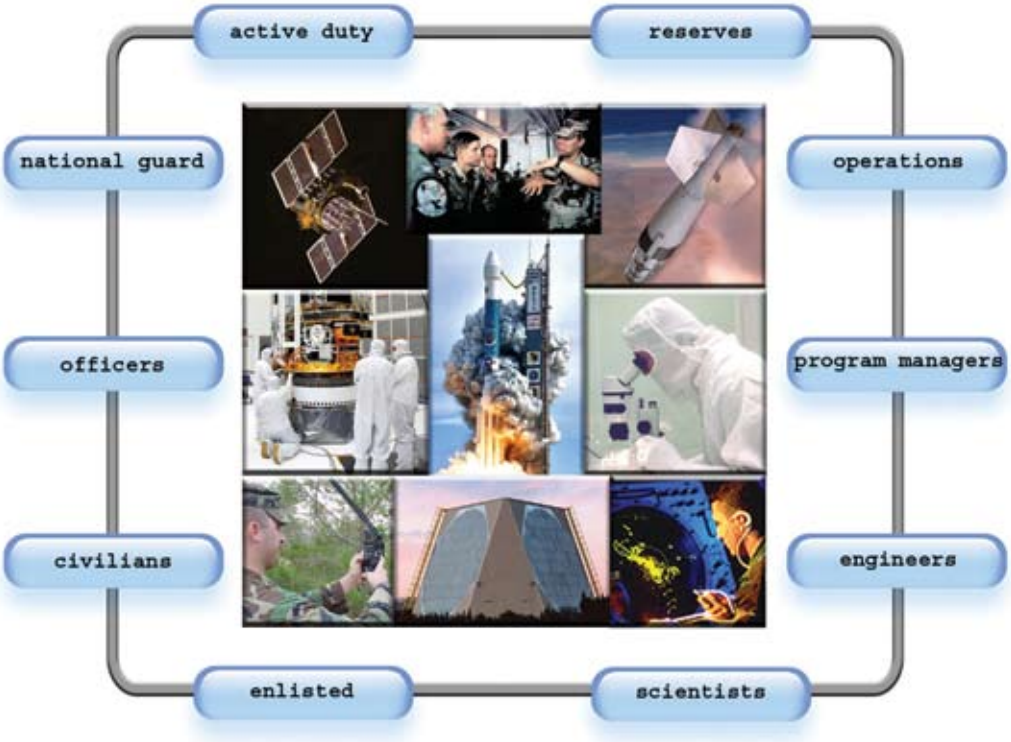
But this is no time for complacency. The acquisition pipeline is filling up with increasingly complex space systems, such as the Space Based Radar and Transformational SatCom systems that will provide unprecedented capabilities. These systems will integrate space with air, land and sea battle arenas in ways never before imagined…and people are the key to making it all work. More than ever, specialized space expertise will be critical in order to maximize the battlefield effects from these highly sophisticated systems.

As a result, the Air Force must redouble its efforts in recruiting and training talented people to design, acquire, operate, plan, integrate and sustain a completely new generation of space weapon systems. This imperative was clearly spelled out by the Space Commission in January 2001. As noted in their final report, "The DoD is not yet on course to develop the space cadre the nation needs." They further asserted that space operators and acquirers must "master highly complex technology…and operate some of the most complex systems ever built and deployed." This conclusion led the Commission to call for initiatives to "create and sustain a cadre of Space Professionals…within which the space leaders for the future can be developed."[3]

The Secretary of Defense agreed with the Commission's findings and tasked the Secretary of the Air Force (SECAF) to prepare a comprehensive space career management plan.[4] As a first step, Air Force Space Command built an *Air Force Space Professional Strategy* that lays out a sound approach for developing and sustaining space professionals. Approved by the SECAF in July 2003, the strategy identifies the specialties and disciplines required to take space systems from *concept to employment*. Additionally, the SECAF designated the Commander of Air Force Space Command as the Space Professional Functional Authority, responsible for "managing the space career field."

Implementing the Space Professional Strategy

Beginning with our initial response to the Space Commission Report, the Air Force focused on a Total Force space population. We expanded the concept of the "AF officer career field for space" to include not only officers, but also enlisted members, civilians, reserves and national guardsmen who are all highly skilled, competent and knowledgeable in the development, application, operation, integration and sustainment of military space systems. All space professionals will be afforded specialized education, training and tracking of their space experience whenever they serve in space positions. A more stringent set of initiatives will apply to a subset of space professionals, known as the Space Cadre. The Space Cadre



is composed of nearly 10,000 scientists, engineers, program managers and space operators. At present most of these individuals are assigned to Air Force Space Command and the National Reconnaissance Office, but many also work at research labs, Air Logistics Centers, Air and Joint Staffs, as well as other major commands, unified commands and government agencies. Once identified, this group will comprise the AF's core career field for space. As such, they will be fully vested in the new professional development initiatives spelled out in the remaining sections of this paper.

Identifying the Space Cadre

In concert with the Air Force's new Force Development program, the primary focus of our implementation efforts is on enhanced education, training and experience initiatives to ensure we have the right person, with the right education and training, in the right job, at the right time in their career. To that end, we are implementing six major initiatives that will address each of the deficiencies identified by the Space Commission and, more importantly, provide each individual with better professional tools, more purposeful development and many pathways to career success.

Identify who's in the Space Cadre and determine distinguishing skills of Space Professionals

The first step in this process is to carefully identify every individual who belongs in the Space Cadre. By reviewing Air Force Specialty Codes and individual duty histories, we can further distinguish each member and identify the unique experiences they acquire while serving in their various space assignments. In his role as the Space Professional Functional Authority, General Lance W. Lord, Air Force Space Command commander, identified nine categories of *space experience* that are critical to develop and monitor now and in the future. It's important to note these experiences apply to acquirers as well as operators, but a different set of criteria will eventually be needed to track other functional specialists. The nine categories consist of: satellite systems, nuclear systems, spacelift systems, warning systems, space control, intelligence-surveillance-reconnaissance, kinetic effects, space warfare command and control and a general category for all other types of space experience. The method chosen to record and track each of these experiences is a new identifier known as "Space Experience Codes" (SPECs). These codes are further broken down to distinguish between acquisition, operations and staff type of assignments, as well as much more detailed information concerning the specific mission systems involved. In practice, one SPEC will be awarded for each space assignment completed. We have already completed a data call on active duty members of the Air Force Space Cadre and recorded their tentative SPECs. By the fall of 2004, we anticipate completion of a similar process for government civilians, as well as the Reserves and National Guard.

Institute stronger, technically oriented space education and training programs

The foundation for space professional development is a continuum of educational courses spread throughout one's

career. These courses will be offered to all officers, enlisted and civilian cadre members. The courses are designed to bring space professionals together several times during their careers in order to stay current on evolving missions, technologies and capabilities and to prepare the individual for the next level of responsibility. Space 100 will be taught to accessions, both operators and acquirers assigned to space-related areas, giving them a foundation in space fundamentals and indoctrinating them into our unique space culture. Space 200 will be taught to Space Cadre members at the 8-10 year point and focuses on the operational environment, the design and acquisition of space systems and the integration of space capabilities into joint warfighting. Finally, Space 300 will be taught to senior Space Cadre members starting at the 12-year point and will focus on space policy, doctrine and the strategic use of space capabilities. We are also developing a space fundamentals course for other specialists when they serve in their first space assignment. Each of these courses is designed to accommodate joint service, total force and agency participation.

For a broader understanding of the range of space capabilities, a small group of space cadre members are selected each year to attend the U.S. Air Force Weapons School. Upon graduation, these individuals are typically assigned to key positions in non-space organizations including major command planning functions and theater Aerospace Operations Centers. The goal is to better integrate space capabilities into all levels of conflict and planning activities as well as bring that operational experience back into the space profession. Additionally, Advanced Space Training (AST) courses, focused on specific space systems, are under development to provide space cadre members with an in-depth level of expertise in the design, vulnerability, operation and employment of an individual weapon system. These experts return to their organizations to employ their new skills and enhance unit training programs. The inaugural AST course dealt with all aspects of navigation and recently graduated its first class.

We are also working closely on developmental education and advanced degree programs as part of the new U.S. Air Force Force Development initiative. Specifically, we assisted Air University on development of a Space Specialized Studies course as part of their Air Command and Staff College curriculum. We are also participating in review of graduate education programs at the Air Force Institute of Technology and the Naval Post Graduate School, as well as various civilian universities. An even more ambitious proposal was recently approved to create a National Security Space Institute in Colorado Springs that will serve as a Space Education Center of Excellence.

Design a 3-level certification program to set standards and monitor the Cadre

The glue that holds the Space Professional construct together is a certification program. It serves two primary purposes: it measures the overall health and status of the space cadre and it sets attainable standards for education, training and experience at key points in their career. As a measurement tool, certification keeps track of the cadre as a whole, detailing the number of individuals at each level. Additionally, it establishes fair and consistent standards that comply with U.S. Air Force Force Development goals, responds to Space Commission recommendations and facilitates the assignment process. The certification program also creates a "forcing function" that encourages individuals to meet standards in order to stay on track and competitive with their peers. There are three levels of certification appropriately tailored for officers, enlisted and civilian cadre members. Individuals will progress from a foundation of technical depth and competency (Level 1) in their early years, through a demonstrated ability to apply and integrate space capabilities (Level 2) at approximately the 8-10 year point and progress to extensive knowledge in space doctrine and policy (Level 3) by the 15-year point of their careers. As implied above, certification criteria includes number of years of service, types and years of space experience acquired and appropriate levels of education and training. We have established a "grandfathering" process for assigning certification levels to each qualified individual in the existing space cadre. A regulated waiver process will also be established to accommodate any unforeseen circumstances in the future.

Identify each Space Cadre position and its education, experience and certification requirements

Once all the cadre members are identified and appropriately specified and certified, the next step is to re-evaluate the unique requirements for every space job. This will involve a complete review of the requisitions associated with each position to identify education, training, experience and certification standards. This process will be carefully coordinated and validated with the owning units and the AF Personnel Center to establish a permanent Space Coded Billet tracking system.

Ultimately, this information will be compiled into a career planning guide and catalog of space positions. In addition to providing information on every space job, the catalog will be essential for mentoring space professionals on the proper education, training and experiences they must pursue in order to achieve their long-term career goals.

Issue Career Development Guidance

AFSPC/CC, designated the Space Professional Functional Authority (SPFA) in July 2003 by the SECAF, will coordinate policy guidance to aid force development teams in managing the space cadre. Additionally, the SPFA will provide input to the AF Force Development Council and periodically balance the number of Space Cadre authorizations versus the inventory to meet the needs of the National Security Space community.

Establish a permanent Space Professional Management Office

To oversee the implementation process, a Space Professional Task Force was established in October 2002. They were responsible for writing the Air Force Space Professional Strategy and associated Implementation Plan, as well as directing development of the new education programs and establishing relationships with other space professional development organizations. While the task force was only intended as an interim entity, the initiatives are not self-sustaining and will require permanent management and oversight. As a result, a new Space Professional Management Office (AFSPC/MSPAX) has replaced the Task Force and continues to manage the program on behalf of the SPFA, including administration of the certification process, coordination of the new Space 100, 200, 300, AST and Space Fundamentals courses, evolution of the National Security Space Institute, and implementation of reporting and tracking procedures for all space cadre members.

Conclusion

With tighter budgets and a smaller fighting force, we must constantly strive to sustain the right number of people, with the right education and training, to fill the right jobs, at the proper time in their careers. The Space Professional Implementation Plan gives us a solid roadmap for achieving this mandate and is flexible enough to accommodate changes along the way. While we're already making big strides, a number of challenges still remain. Cultural shifts and change are sometimes met with apprehension and skepticism. However these initiatives are needed and have the full support of Air Force senior leadership. Working individually with the thousands of Space Cadre members throughout the Air Force is a monumental task, but it's imperative that everyone understands how the new program works and how it interacts with force development. We're confident we can accomplish all of our goals and we're working hard to implement the program as smoothly as possible. For additional information, please visit the Space Professional Web Site at: https://halfway.peterson.af.mil/spacepro for those with .mil accounts or http://www.peterson.af.mil/spacepro for those with commercial only access.

Notes:

1. Statement to the Senate Armed Services Committee's Strategic Forces Subcommittee by USECAF, 12 March 2003, 1, 8

2. The story of moving the MILSTAR Satellite spot beam in support of the 3rd Infantry Division during Operation IRAQI FREEDOM as recounted by Capt Ryan Stalnaker, 4th Satellite Operations Squadron, Schriever AFB CO

3. Report of the Commission to Assess United States National Security Space Management and Organization, Chaired by the Hon. Donald Rumsfeld, 11 January 2001, viii, xiii, xviii, 27, 42

4. Hon. Donald H. Rumsfeld, National Security Space Management and Organization, Secretary of Defense Memorandum for Secretaries of the Military Departments, 18 October 2001

Col James C. Hutto, Jr. (BA, The Citadel; MS, Lesley College) is the Chief, Force Development and Readiness, Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. He is responsible for development, implementation and funding of the Air Force Space Professional Strategy to include education, training and certification development. He is the space professional liaison with the other Services and the National Reconnaissance Office. In previous assignments, Col Hutto gained experience in satellite command and control for the Defense Support Program, Defense Meteorological Satellite Program and Global Positioning System satellites. While assigned to the Air Staff in the Pentagon, he assisted in the development of the Air Force's Strategic Master Plan and Vision. Col Hutto also commanded the 6th Space Warning Squadron at Cape Cod Air Force Station where he was responsible for detecting sea-launched ballistic missiles and tracking earth-orbiting satellites. Col Hutto is a graduate of Squadron Officer School, Air Command and Staff College, Royal Australian Air Force Command and Staff College and Air War College.

Space Professional Development Frequently Asked Questions

Q. What is a Space Professional?

A. A member of a team skilled and knowledgeable in the development, application and integration of space concepts, doctrine and capabilities to achieve national security objectives.

Q. Who is included in the Space Professional population?

A. Total Force population of officers, enlisted, and government civilians required to take space systems from concept to employment. Composed of two groups:

"Space Cadre" composed of scientists, engineers, program managers and operators

"Space Support" composed of personnel vital to space mission success and includes specialists such as intelligence, communication, maintenance, logistics, weather and others

Q. What is included in the Space Professional Development Program?

A. The program hinges on three areas: depth of experience, breadth of experience, and education and training. Each area contributes to enhancing the expertise of the space professional, and each is vital to improving the proficiency of the individual and the cadre as a whole.

Q. Is Space Professional Development consistent with the AF's proposed Force Development Program?

A. Yes! "Each development program will be designed to ensure that your experience emphasizes a breadth of exposure to the Air Force mission while focusing on the depth of experience you need to be good at your job. . . . The programs will be prioritized in a manner that respects your valuable time and eliminates 'square filling' training and education. . . . In all cases there will not be one "set solution" for success. We will examine each individual based on credibility, depth of experience, breadth of exposure, and potential to serve the AF in higher positions of responsibility." (From General John Jumper, CSAF, Chief's Sight Picture, 6 November 2002)

Q. Will there be a certification process, and, if so, how will it work?

A. Yes. The details of the certification plan are still being finalized. The evolving concept is similar to the recognized Acquisition Professional Development Program, established to develop AF acquisition officers. We envision three certification levels with the individual's level of certification tied directly to the pillars of Space Professional development—depth of experience, breadth of experience, and education. The certification process will be a measurement tool to help ensure the entire Space Professional Development Program is achieving its goals. More importantly, it will serve as a mentoring tool for supervisors and individuals to use in ascertaining professional development paths. As noted elsewhere, the certification process will have definite "check points" but will not be a checklist for career advancement. That will continue to reside with the individual.

Q. Will certification levels affect my career?

A. They could. A Space Professional certification process will establish guidelines for individual career progression, and will vary by career path. It will; however, not be a checklist for guaranteed promotion or job assignments. These will continue to depend more on an individual's sustained performance, rather than their chronology of job titles. The purpose of Space Professional Development is to create a purposeful and repeatable method for improving the overall growth of the Space Professional cadre.

Q. If I am already serving as a Space Professional how, will my certification level be determined?

A. There will be a grandfathering process for current Space Professionals based on the guidelines in the Air Force Space Professional Development strategy, but modified to reflect the experience and education of each current Space Professional. The AFSPC Space Professional Task Force, or designated authority, will devise the grandfathering procedures. We expect most grandfathering will be relatively straight forward, but there will always be those gray areas that need to be resolved. The exact grandfathering process is still being developed. Check back often for updates.

Q. When will this process begin?

A. The Space Cadre will have Space Professional Experience Codes (SPECs) and Certification levels assigned by June 2004 and Billets will be identified with SPECs and Certification levels by the end of the Summer 04.

Q. How do I stay abreast of the latest information regarding Space Professional Development?

A. The Commander, Air Force Space Command, will periodically provide updates via established public affairs methods. In addition, Air Force Space Command has established this web site as a vital part of getting the word out to the Space Professional. Check it often.

Q. Will Space Professionals be allowed to serve in non-space assignments?

A. Yes. As Air Force resources, Space Professionals will still have the opportunities (and are expected) to serve in a variety of AF requirements. Selective career broadening will be allowed as well as serving as ROTC, USAFA, and PME instructors, recruiting and other key positions.

Q. What tools will be available to track my progress and mentor others within this program?

A. A Space Professional Database is being developed to track all experience, education and training throughout a Space Professional's career and will be accessible to the individual to review their progress. Supervisors and commanders can also use this database to help guide personnel throughout their careers. Access will be protected to ensure the privacy of the individual. We envision the Space Professional Database, Space Professional Website and certification program to be three key tools that supervisors will use in mentoring Space Professionals. Check this web site for more information on the database. Expected availability for the Database is fall of 2003.

Q. Do other services have Space Professional programs?

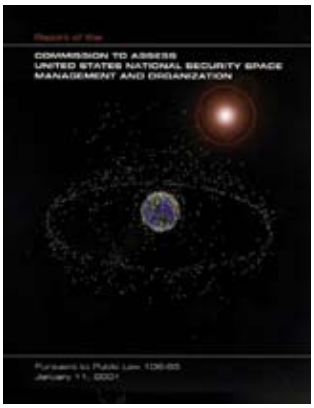
A. Yes. The intent of the Space Commission was to develop and enhance space competence on a national scale. Each Service is developing their own program and we are in constant contact with them. We expect the programs will be similar, but not identical, to meet the specific needs of each Service.

"Our first priority is developing our people to lead us into the future, and educating them through ***Space Professional Development*** *- this is significant, as we've formulated a plan that ensures the success of our operators, developers and maintainers as one warfighting space cadre."*

General Lance W. Lord
Air Force Space Command Commander
March 2004

Developing Enlisted Space Professionals

Chief Master Sergeant Ronald G. Kriete
Command Chief, Air Force Space Command



Cover of the 2001 Space Commission report.

This inaugural issue is dedicated to space professional development. Other articles will detail the Space Commission findings and the programs to improve our management of space professionals.[1] However, I want to focus on the importance of our enlisted space cadre to our nation. Only in the U.S. Air Force can an Airman control a multi-billion dollar satellite constellation relaying time critical information for tens of thousands of warfighters on the front line in various theaters around the world. How can we do this? Our Airman are successful because we provide them the best possible education and training, while they are asked to perform these highly specialized duties covering all aspects Of space operations. This time tested approach brought us to where we are today. We remain the best Air and Space Force in the world. But we cannot rest on our laurels. With the increasing complexity of new space systems on the horizon, we need to improve our education, training and management of today's space professionals so we will maintain our superiority in operations as we integrate these new systems into our war fighting capability. That is why we have space professional development.

General Lord in his role as the Space Professional Functional Authority outlined his direction for development and utilization of space professionals in the Space Professional Strategy.[2] It provides overarching guidance for how the USAF will develop and manage our space cadre of approximately 10,000 officer, enlisted, civilian, guard and reserve personnel. Air Force Space Command's Space Professional Management Office, formerly the Space Professional Task Force (AFSPC/CVX) is charged with developing new programs, polices and procedures to implement the Space Professional Strategy. The office is implementing new education and training courses to improve our knowledge base while enhancing our space culture. They have developed new ways to track our Space Cadre personnel during their careers. There are new experience tracking mechanisms and a Space Professional Certification process that will challenge our cadre to push past the status quo and sharpen their skills in the space arena. Personnel will be deliberately developed to ensure they acquire the necessary education, training and depth of experience in space mission areas to meet present and evolving national security space requirements. Future assignments will be driven by the need to fill these requirements by putting the right person with the right experience in the right job at the right time. That is space professional development in a nutshell.

Let's jump forward to the year 2015 and Airman Doe is controlling a satellite in the Space Based Radar constellation in support of Joint Forces Air Component Commander, in the PACAF Area Of Responsibility. This particular satellite is currently tracking a high priority target and is being used to cue a strike package and then the satellite experiences an anomaly. Will Airman Doe be ready for the challenge and keep our capability-based effect on target? If we implement space professional development correctly, they will be ready. Space is the battlefield of tomorrow and the space professional development programs being instituted today will ensure our enlisted space cadre is ready for it and will guarantee our position as the best air and space force in the world.

CMSgt Ronald G. Kriete (CCAF) is the Command Chief Master Sergeant to the commander, Air Force Space Commander, Peterson Air Force Base, Colorado. Chief Kriete is responsible for advising the commander and senior staff on matters influencing the health, welfare, morale, effective utilization, quality of life, and progress of the command's enlisted members in the United States and overseas, encompassing 13 time zones. The chief completed Phase 1 NCO PME, Phase II NCO PME, Tactical Air Command NCO Leadership School, Air National Guard NCO Academy and USAF Senior Noncommissioned Officer Academy.

Notes:

1. Report of the Commission to Assess United States National Security Space Management and Organization. (2001). Washington, DC: U.S. Government Printing Office

2. Lord, L. W. (2003). Space Professional Strategy. <http://www.peterson.af.mil/spacepro/Documents/Strategy%20Lower.pdf> (2004, Mar 04)

Army Cadre Ensure Security of Vertical Battlefield

Lieutenant General Larry J. Dodgen
Commanding General, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command

It is certainly a pleasure to contribute to the inaugural edition of the United States Air Force Space Command's Space Journal. The United States Army Space and Missile Defense Command (SMDC) wholeheartedly shares in the Journal's theme of fostering awareness and debate among the entire space professional community and we look forward to participating in this joint effort.

Our Nation is at war. Security of our homeland, the Global War on Terrorism (GWOT) and sustained engagement around the world define today's complex and uncertain operating environment. Operations ENDURING FREEDOM and IRAQI FREEDOM (OEF/OIF) are demonstrating as never before the importance of space to the Army and the Joint Warfighter. Although Operation DESERT STORM is often called the first space war because it was the first time space-based capabilities were used to support an army during a conflict, the space-based resources currently being employed in OIF and OEF are demonstrably more capable, more abundant, and more integrated into all phases of combat operations. The immense combat capability of the U.S. Army, fighting as part of the joint and coalition effort, has been facilitated and enhanced at every step by space professionals leveraging space products and services for joint warfighters.

Leading that effort are the Army's cadre of space professionals, who provide the Army, the joint warfighter, and Department of Defense organizations with the expertise, access, and tools to make maximum use of space assets in all phases of operations. The Army space cadre professional ensures readily available access to the services and products of national, service and commercial space systems. Through each phase of operations, the Army space professional provides the warfighter a focal point to synchronize space operations and maximize the value of space to the fight.

To offer some background - in 2000, the Commission to Assess United States National Security Space Management and Organization was established to assess the organization and management of space activities in support of U.S. national security interests. The Commission unanimously concluded that the security and well being of the United States, its allies and friends depended on the nation's ability to operate in space. Referred to as the "Space Commission," it strongly advocated the military departments create and sustain a trained cadre of space professionals. The Honorable Donald H. Rumsfeld, who chaired the commission until his nomination by President Bush to be the Secretary of Defense, agreed with the commission's conclusion that a new and comprehensive approach to national security space management and organization was needed to promote and protect the nation's interests in space. On 18 October 2001, Secretary of Defense Rumsfeld tasked the military departments to develop and maintain a cadre of space-qualified professionals.

The Army, however, had already recognized the need for a cadre of space professionals specifically trained in and knowledgeable about space capabilities to complement the actions of the signal, intelligence, information operations, and engineering staff officers. Lessons learned from DESERT STORM and subsequent exercises, emerging technologies, the proliferation of ballistic and cruise missile technology, and the increased use of space by the government and commercial sector created the need for an Army cadre of space-qualified professionals. To satisfy this need, the Army, in 1998, established a space operations functional area designated FA 40 "Space Operations." SMDC is the Army proponent for space and the personnel proponent for all FA 40 officers. In 2000, eight officers graduated from an interim space course but the first graduates of the Space Operations Officer Qualification Course (SOOQC) received their certificates 3 August 2001, and were immediately assigned across the Army, the Office of the Secretary of Defense, various defense agencies and among the joint combatant commands. The impact of these space operations pioneers was immediate as they contributed to the development of space doctrine and space tactics, techniques, and procedures. They turned the latest space technology into unrivaled capabilities for the joint warfighter and forces in the field.

To date, 82 officers, including one Marine Corps officer and one Army non-commissioned officer, have successfully completed the rigorous eight-week SOOQC conducted in Colorado Springs, Colorado. These graduates have been exposed to a variety of focused areas of training designed to provide them the skills required to plan and conduct space operations to support a commander's concept of operations. These areas of training include: planning space control operations, analyzing friendly force space control capabilities and limitations, recommending space applications to support the military decision-making process, determining the impact of space and terrestrial weather on space and terrestrial operations, producing the space staff estimate, and apprising the command and staff on space-related missions, functions and capabilities, to name a few. The course ends with a four-day capstone command post

exercise where students must successfully apply skills from all previous instruction during a tactical scenario.

Upon graduation, space professionals have demonstrated the ability to provide the joint warfighter a specialized capability for planning, developing, training and integrating space capabilities to support tactical, operational, and strategic military operations. They have the access, tools, and expertise to make maximum use of space assets in all phases of operations. Army space professionals are also trained to provide the joint warfighter the expertise and guidance on conducting the space component of information operations. In addition, these officers may attend further training via Advanced Civil Schooling, Training with Industry, Air Education and Training Command or Space Warfare Center courses.

A noncommissioned officer with the Army Space Support Team 5 during the deployment with the 1st Marine Expeditionary Force in Iraq.

The Army Space Operations Officer also brings at least 10 years of "basic branch" Army doctrine and tactical experience to the joint warfighter. This experience in the Army's combat arms, combat service, or combat service support branches enables the space operations officer the unique opportunity to adapt space operations to the tactical, operational and strategic mission of the component commander. In the field, the space operations officer strongly advocates SMDC's goal of "normalizing" space throughout all Army and joint operations and activities, i.e., make the use of space "business as usual."

Making the use of space "business as usual" means being in the fight wherever our Nation's forces are engaged. The Army's space cadre, whether providing "reach-back" capability from the theater of operations to a home-station location, to augmenting our deployed forces in direct contact with the enemy, are at the "tip of the spear" supporting GWOT and OIF.

Army Space Support Teams (ARSSTs), supporting the Coalition Force Land Component Commander (CFLCC), V Corps, 1st Marine Expeditionary Force (I MEF) and the Coalition Provisional Authority, provided space products, services, and expertise directly to the joint warfighter. Additional space-trained Soldiers and liaison officers supported the Special Operations Command and other deployed units. Of particular significance was the ARSST imagery capability, coordinated with SMDC's Spectral Operations Resource Center (SORC), used in fast-moving tactical scenarios. When the 4th Infantry Division occupied the Tikrit presidential palace it came under fire from mortars, rocket-propelled grenades and small arms. The ARSST 14 team on site provided the commander with imagery of the palace complex and the surrounding area. Using this current imagery, the enemy positions were identified and successfully counterattacked.

Col. Patrick G. Forrester, USA, taking a space walk while working on the International Space Station.

SMDC's SORC, crewed by Army and Air Force personnel, delivered unclassified commercial imagery for Central Command (CENTCOM) press briefings. This imagery down-linked by the Air Force Eagle Vision 1 system was passed to the SORC for processing and was briefed by Brig. Gen. Vincent Brooks, CENTCOM, within 24 hours of imaging. Other imagery products used showed the oil well fires created by the crumbling Iraq regime. The SORC, working with ARSSTs, utilized multispectral imagery analysis to identify the locations of enemy mine fields, determine suitable sites for airborne assault operations, assist units with the mobile missile-hunting missions, help planners reposition logistics staging areas to fit their needs better and avoid potential flood areas and in the identification of potential mass gravesites in the Baghdad area.

Our space Soldiers with the Army Space-based Blue Force Tracking Mission Management Center (SB-BFT MMC) also worked closely with the CFLCC by providing Near-Real-Time Blue Force Tracking data to the V Corps commander for the portion of the Corps Apache Helicopter force equipped with the Grenadier BRAT (beyond line-of-sight reporting and tracking) system. The SB-BFT MMC provided support for 400 Grenadier BRAT and 2,500 miniature transmitters. Space cadre Soldiers of the Regional Satellite Communications Support Centers (RSSC) and the Defense Satellite Communications System Operations Centers (DSCSOC) provided reliable and responsive satellite wide-band communications support. Space professionals in the SMDC Operations Center, working 24/7, maintained situational awareness of deployed elements, responded to hundreds of requests for information and provided the essential reach-back system of connectivity with technical and operational professionals.

The Army's space cadre also includes members of the Army Astronaut Detachment assigned to the Johnson Space Center, Houston, Texas, supporting the National Aeronautics and Space Administration (NASA). The Army has been involved in space since the 1950s. During that decade, the Army began work on a heavy booster rocket called Saturn 1, which later

evolved, under NASA, into the massive Saturn V that sent Americans to the moon. When Alan Shepard's Mercury 3 capsule made its historical flight in 1961, the launcher was a modified Army Redstone rocket, created by Dr. Wernher Von Braun and his rocket team at the Army's Redstone Arsenal. Army Astronauts have worked on the International Space Station, conducted "space walks," worked on advanced robotics systems and supported crews training for scheduled missions. There are currently six Army Astronauts and two space support officers supporting NASA. The Army's participation in the Astronaut program confirms that space is the Army's "ultimate high ground," as Peter B. Teets, Under Secretary of the Air Force, proclaimed.

Although the Army is growing a professional core of space operations officers, the Army's space professional cadre is additionally made up of Soldiers and civilians from a variety of branches and functional areas of our service who bring a unique capability to the collective space-support system. Officers, warrant officers, Soldiers and civilians from the Military Intelligence and Signal Corps along with others, constitute a large population of space-smart professionals who work space-related issues and requirements fully integrated into the collective process. Other space professionals include scientists, engineers and acquisition experts skilled and knowledgeable in research, space system development, acquisition and application of emerging technologies to support the Army's needs and joint full spectrum operations. They are competent and skilled in all aspects of developing, procuring, employing and advising the warfighter on maximizing the use of space systems to support full spectrum operations.

Ongoing success in the GWOT and OIF is not only because of superior technology and the products mentioned previously. Success is being achieved because of motivated, educated, trained and competent professional space cadre consisting of Soldiers and civilians who are fully committed to meeting the national security space needs of the 21st century.

The future of the Army space cadre of professionals is an exciting one as it continues to evolve and grow while developing space professionals who are trained, educated and experienced on the value of space to the joint warfighter. Lessons from GWOT and OIF are being gathered and studied. These lessons will help us refine the curriculum of the SOOQC and will be subsequently applied in the field. The Army Staff with the Deputy Chief of Staff, G-3, having the lead with SMDC in support, are currently working hard to address a number of issues vital to the long-term development of the Army's space cadre. These issues include developing consensus on space cadre membership and responsibilities; establishing an Army space cadre office for management and oversight; developing a comprehensive Army space cadre strategy; establishing a tracking system to identify and support the Army's space cadre development, education, training, retention and assignments; and obtaining proper funding for cadre training, education, administration and management. The Army is also considering an Air Force proposal to establish a joint space university called the "National Space University." The concept is being deeply analyzed while resourcing issues are addressed by both services. Currently, Army space cadre professionals attend the Air Force Institute of Technology and the Naval Post Graduate School. Space professionals of the other services attend the Army's SOOQC as well. The Army is also conducting a Space Enlisted Force Study designed to provide a workable recommendation to incorporate the best mixture of enlisted force specialties as members of the Army space cadre. As the Army identifies requirements and develops capabilities for its future force, Army space professionals will be increasingly integrated into all phases of current and future operations, planning, research, development and acquisition efforts within the Army and Department of Defense.

The Army is an interdependent member of the joint space community that relies on space products and services provided by national, military and commercial space systems and platforms. We are committed to the robust development of our professional space cadre to provide the joint warfighter with the capability to assure complete decision dominance and decisive victory on today's and tomorrow's battlefields. We are working with the DoD in its phased strategy implementation efforts to synchronize and integrate the space cadre activities of the military departments and intelligence community to the maximum extent possible. As space is a vertical extension of the battlefield, the Army's space cadre professional will lead the effort, in collaboration with the other services, to ensure the "ultimate high ground" is secured.

LTG Larry J. Dodgen (BS, Louisiana State University; MBA, University of Missouri; MS, USNA) is the Commanding General for the U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command. LTG Dodgen's military career began in Fort Hood, Texas, and spanned to various countries to include Korea and Saudi Arabia. He served in Germany as the Chief of the CINC's Initiatives Group, Office of the Commander in Chief, U.S. Army Europe. He also served as the sixth Deputy Assistant Secretary of Defense for Policy and Missions and the Director, Joint Theater Air and Missile Defense Organization. LTG Dodgen is a graduate of the Air Defense Officer Basic and Advanced Courses, the U.S. Army Command and General Staff College and the U.S. Naval War College.

Navy Develops Own Space Cadre

CAPT Cheryl Spohnholtz
Navy Space Cadre Advisor

Early in its history, the United States Navy began to exploit the "ocean" of space in direct support of ships deployed to the far reaches of the globe. The U.S. Naval Observatory was established in 1844 and has since played a leading role in astronomy, precise measurements and timekeeping. The Observatory has been a major contributor to the modern space era through its accurate measurements of the Earth's motion, global coordinates and the maintenance of precise time standards. The Navy's research and development community has been on the forefront of space science and responsible for the introduction of major space-based systems in navigation, surveillance and communications. And operationally, the Navy has employed satellite systems to enable the Fleet to perform vital command, communications, control and surveillance functions.

Navy and Marine Corps forces are consistently the largest users of space systems and space-derived information. At the threshold of the 21st century, the Navy's use of space is critical to the execution of every phase and component of its mission.

In spite of its longstanding and accomplished history in the exploitation of space, the Navy has not institutionalized a specialized career path in space for its members, in the same way it has developed surface, aviation and submarine warfare communities. Initially, the service elected, instead, to capitalize on the space education and experience of its officer community. Beginning in the mid-1980s, concurrent with the development of space operations and space engineering curricula at the Naval Postgraduate School, the Navy began "coding" officers as space subspecialists. As space subspecialty codes were then assigned to particular officers' billets on numbered Fleet staffs and at commands ashore, the service began assigning Navy members with matching codes to those positions.

More recently, the Navy has begun efforts to build a cadre of "space smart" officers, enlisted personnel and civilian employees. The Naval Space Cadre Working Group was formed in 2001 in response to Secretary of Defense Donald Rumsfeld's findings on the report issued that year by the Commission to Assess United States National Security Space Management and Organization. In October 2001, Secretary Rumsfeld directed the armed services to "maintain a cadre of space-qualified officers" as a means of ensuring that space will be incorporated into all military operations.

The Naval Space Cadre is composed of active-duty and reserve Navy and Marine Corps officers and enlisted personnel, along with Navy civilian employees from a wide range of career fields who meet mandatory education, training and experience standards established for a particular certification level. The Navy Space Cadre is a distinct body of expertise horizontally and vertically integrated within Navy and Marine Corps active duty, reserves and civilian employee communities organized to operationalize space. Still without a separate career field in space, the Navy capitalizes on the space education and experience of its officers, enlisted and civilian workforce to create the cadre.

Initial identification of the cadre began in mid-2001 with the standup of the Naval Space Cadre Working Group and culminated in a naval message (NAVADMIN 201/03 DTG 211435Z JUL 03) announcing the first 700 officer members of the cadre. These officers were identified by the subspecialty codes of 6206, Space Systems Operations, and 5500, Space Systems Engineering or by the additional qualification designator of VS1, VS2, VS3 or VS4. Identification of enlisted and civilian cadre members is more challenging, as these groups do not have specific space identifiers like the officers do.

Approximately 265 billets are currently identified as space billets. These jobs are in Navy, joint and National Security Space organizations. Space cadre members are currently assigned throughout the National Security Space arena, including the National Reconnaissance Office, National Security Space Architect, National Security Space Integration, MILSATCOM Joint Program Office, as well as in all Navy organizations that deal with space.

Formal management of Navy space expertise officially began in September 2002 with the assignment of the first space cadre advisor. This position is responsible for the establishment, identification and tracking of the Navy's Space Cadre, including both the people and the billets.

A focused effort to develop a naval space cadre web presence on Navy Knowledge Online (NKO) has been spearheaded by Lt. Cmdr. Zigmond Leszczynski, space requirements officer, Naval Network Warfare Command. He has maintained and updated a naval space cadre site on NKO to incorporate recommendations and content from a wide range of military space-related organizations. Contributors include the Naval Postgraduate School's Space Systems Academic Group for space cadre education; Naval Network and Space Operations Command's (NNSOC) Distance Space Support Teams for reachback on NKO-S; Joint Space University (JSU) for instructor collaboration; the Air University Center for Space Studies to promote the Navy space cadre to the Air Force; and the IP community for intercommunity thread sharing.

Information and news on Navy space initiatives and programs is provided in a reference library that includes publications such as the *Naval Space Forum* by Space and Naval Warfare Systems Command's Space Field Activity and *Domain* magazine by NNSOC.

The Air Force Space Operations School introduced their instructors to the space cadre section on NKO, which immediately resulted in online collaboration for Navy inputs to Space 200. Naval Networks and Space Operations Command provided JSU with study guides and briefs for their Navy Satellite Communications Course and Naval Space Systems Application Course. Both contain a wealth of information to facilitate Space 200 development.

The Naval Space Cadre supports our warfighters by representing naval interests as a partner with the Air Force–the executive agent for space–by continually innovating and developing new products and processes to support naval needs and by ensuring those products and processes are integrated into naval warfighting. They support the naval space strategy of making space tactically relevant to naval operations, as well as providing that operational flavor to the National Security Space community.

CAPT Cheryl Spohnholtz (BS, USNA; MS, Naval Postgraduate School) currently serves as the Navy Space Cadre Advisor, a newly established position to help the Navy better manage its people with space expertise. Capt. Spohnholtz's career has focused on information technology, specializing in satellite operations. Her assignments in the space arena have included serving as the Worldwide Military Command and Control System ADP Operations Officer, Assistant to the Technical Advisor for Operations and Launch Officer, Armed Forces Communications and Electronics Association Senior Navy Fellow, Joint Staff Action Officer managing UHF satellite communication policy issues, Commander, Naval Computer and Telecommunications Station and a requirements officer for the National Security Space Architect. *(Photo unavailable)*

The USS Iwo Jima sits off the coast of Souda Bay, Crete waiting for the order to deploy 26th MEU forces to northern Iraq.

Marines Increase Effectiveness with Space-based Capabilities & Forces

Capt Ronaldo Racinez
Headquarters, U.S. Marine Corps

From its inception, the Marine Corps has modeled itself as an expeditionary force, and our history is firmly rooted in operations conducted abroad. Marines have maintained this expeditionary ethos by focusing on our ability to embark equipment and personnel, acquiring equipment that can function in an expeditionary environment, and maintaining a high "tooth to tail" ratio. Generally, if we can't embark it on a ship or a plane, we feel we don't need it.

The Marine Corps organizes to fight as a Marine Air-Ground Task Force (MAGTF). The MAGTF is a combined arms force that brings together aviation, ground forces, combat service support and a command element to execute missions.

The Marine Expeditionary Unit (MEU) is the crown jewel of Marine Corps expeditionary forces. Built around a Battalion Landing Team, MEUs are MAGTFs that are constantly deployed around the world in support of theater combatant commanders. The MEU, with its organic aircraft, artillery, armor, and infantry, as well as its ability to sustain itself, have made it the force of choice for crisis situations. Once on station, the MEU can reach 75 percent of the world's littorals in five days and can execute a mission within six hours of being tasked by the supported combatant commander. The MEU can task organize itself to suit mission requirements and can employ a tailored combined arms force very rapidly–this force can be transported by air or sea and carries sufficient combat power to immediately influence most crisis situations as well as enable the introduction of more robust combat forces.

Increasing the combat effectiveness and combat power of our MAGTFs requires us to continually evaluate our capabilities. In doing so, we need to ask ourselves "what is the next step?" and focus our effort on the enablers that will ensure the Marine Corps is able to maintain it's expeditionary edge and ethos. One of these next steps is the continued integration of space-based capabilities into Marine Corps systems and operations.

Space Operations

Space operations and space-based capabilities have become more important to 21st century warfare. While the Air Force and the National Reconnaissance Office operate the majority of space-based systems which joint and coalition forces rely, it is the individual service's responsibility to ensure it can leverage space-based capabilities as well as contribute to the development of future space-based capabilities. In fact, the Commandant of the Marine Corps is directed in DoD Directive 5100.1, to organize, train and equip Marine forces such that they can conduct land, air and space operations essential to a naval campaign.

One of the recent changes in the Unified Command Plan directed the mission to oversee DoD space operations to the Commander, U.S. Strategic Command. This along with other key mission areas designated for USSTRATCOM prompted the Commandant of the Marine Corps to direct the establishment of a USMC Service component to support the combatant commander. MARFORSTRAT represents USMC capabilities and interests and advises the USTRATCOM commander on the proper employment and support of USMC forces. In support of USSTRATCOM's space operations mission, MARFORSTRAT coordinates with USSTRATCOM and the other components on the development of space operational plans, space support to global and theater operations, space requirements and space operating concepts.

With a cloud of dust created by a CH53E Super Stallion behind him, a communicator with Fox Co., 2nd Battalion, 6th Marines, the ground combat element of the 22nd MEU (SOC), talks with higher headquarters via a satellite radio during a long-range helicopter raid. The 22nd MEU returned in late August from a six-month deployment to the Mediterranean, Horn of Africa, Persian Gulf and South Asia regions.

Marine Corps Cadre of Space Professionals

The Marine Corps' ability to fully leverage space-based capabilities and to integrate space operations in support of our core missions will also require the creation of a Marine Corps cadre of space professionals, capable of supporting MAGTF operations and contributing to National Security Space efforts. The Marine Corps is not creating a space occupational field or space career field, but has established the following goals and strategic objectives for creating a cadre of space professionals.

Marines from the Joint Task Force Enabler, 24th Marine Expeditionary Unit, conduct an operations check on a satellite set up during a communications exercise at Camp Lejeune, N.C.

The Marine Corps' goal is to produce and maintain a cadre of Marines, active duty and reserve and civilians with a diverse set of primary Military Occupational Specialties (including ground, aviation, combat support and command and control) who are:

1. Trained in joint space operations planning;
2. Educated in National Security Space (NSS) activities;
3. Experienced in space requirements generation, concept development, planning, programming, acquisition and/or operations.

The Marine Corps' strategic objectives in creating a Space cadre are:

- To support the vision and goals of Marine Corps Strategy 21 by creating a cadre of Marines who understand both the capabilities of a Marine Air-Ground Task Force and the unique advantages to be gained by fully exploiting current and future space-based systems
- To increase the integration of current and future space-based capabilities into Marine Corps systems to support the Corps' Expeditionary Maneuver Warfare capstone concept and to enable FORCEnet and the transformational naval operational concepts of Sea Strike, Sea Basing and Sea Shield
- To shape the development of future space systems to meet Marine Corps war fighting needs through increased collaboration with all NSS partners
- To increase the effectiveness of our operating forces through effective planning, integration and coordination of space-based capabilities and assigned space forces
- To increase the distribution of Marines with space training and experience throughout not only the NSS and joint community, but more importantly throughout the operating forces to inject space-knowledge at the individual unit level

Capt Ronaldo Racinez (BS, Northwestern University; MS, Naval Postgraduate School) is currently serving as the National Security Space Plans Officer in the Information Operations and Space Integration Branch; Strategy and Plans Division; Plans, Policies and Operations Department; Headquarters, U.S. Marine Corps. One of his primary responsibilities has been the development of the Marine Corps' cadre of space professionals. Capt Racinez completed the Marine Aviation Supply Officers Course.

Way Ahead

The Marine Corps has already taken the initial steps to create a space cadre by creating a space operations staff officer skill designator, Military Occupational Specialty (MOS) 9933, for Marines trained in joint space operations and have experience in a space-related billet. The Marine Corps space cadre also includes space operations officers, who have completed the Space Systems Operations curriculum at the Naval Postgraduate School. As we move forward, we will continue to integrate our enlisted and civilian Marines with space training and space experience into the space cadre.

There are a number of billets that already require either the 9933 or the 9666 MOS throughout the Marine Corps' supporting establishment and in joint commands. The Marine Corps is continuing to evaluate its structure to identify additional billets needed to support our strategic space cadre objectives. This year, the Marine Corps expects to request additional space billets to support the Marine Corps' operating forces and the DoD Executive Agent for Space.

We have also started to revise and update the space operations lessons in our Professional Military Education programs so that every Marine will learn how space contributes to the joint fight. We are also working closely with the U. S. Army Space and Missile Defense Command and Air Force Space Command to develop training courses that will support the development of a Marine Corps space cadre. In the past, many Marines have completed space operations training courses and over the past year, Marines have attended the FA-40 Space Operations Officer Qualification Course and the prototype Space 200 course at the Space Operations School, Colorado Springs, Colo. The Marine Corps will continue to send personnel to space training courses, not only to provide them with the space training they need but more importantly to interact with personnel from the other services. This interaction in the classroom will help foster the understanding necessary between the services that will lead to a more capable joint force.

The Deputy Commandant for Manpower and Reserve Affairs is coordinating the Headquarters, Marine Corps effort to develop a cadre of space professionals and is working closely with the other departments to ensure the Marine Corps can quickly meet our strategic space cadre objectives.

SOPSC Educates Space Warriors

Lt Col Joseph E. Brouillard
Space Operations School

The U.S. Air Force Space Operations School (SOPSC), Colorado Springs, Colorado, founded on 28 June 2001, strives to be the Air Corps Tactical School of Space. The SOPSC mission is to be the Air Force lead in the development and instruction of space tactics, techniques and procedures (TTP), concepts and systems knowledge required for warfighter preparation to accomplish military operations. Through its education and training programs, the SOPSC assists in bringing the full force of space to the battlefield.

School Background

The SOPSC has experienced a similar development path as early airpower development. Airpower came of age at the close of World War I. The battles of St. Mihiel and Meuse-Argonne provided proof that air forces could affect ground operations and battlefield decisions. As a result, during the post-war era nearly every major power established an air arm and integrated it with its armed forces.

The initial airpower cadre was poorly trained in air tactics and techniques. To remedy this, the Army established the Air Service School to train and educate officers to command air units. Later, in 1926, the institution became known as the Air Corps Tactical School (ACTS). The ACTS educated and returned system experts to their squadrons.

Throughout its existence, the ACTS was the intellectual center of the pre-World War II Army air arm. Although its primary mission was to educate air officers to properly employ airpower, the school became inextricably involved in the development of air doctrine and the push for new airpower technologies. Indeed, for the more than 20 years between WWI and WWII, air doctrine and tactics proved to be the cornerstone of the Tactical School.

Operations DESERT STORM and IRAQI FREEDOM gave us a glimpse of what space can bring to the fight. Today, space power is in its infancy much as airpower was in the 1920s. The SOPSC sees space TTP development, education, training, strategy and doctrine evolution as our primary DoD contribution. The outcome of SOPSC's mission today will impact our nation's ability to wage and win future wars.

Mission Today

The Space Warfare Center, Schriever Air Force Base, Colorado, is the Air Force's center of excellence for space tactics and theory development and the SOPSC serves as the medium for educating space warriors. It helps further space power development by bringing together people from many career fields including pilots, space and missile operators, scientists, engineers and program managers.

Since its inception in 2001, the SOPSC instructed more than 3,500 DoD officers, enlisted, cadets and contractors on tactical aspects of space power. In addition, the SOPSC provided computer-based training programs serving a much larger audience.

The SOPSC trains AFSPC's Air Expeditionary Force deployers and senior leaders to effectively employ space assets in Air Operations Centers (AOC). In doing so, the SOPSC is able to provide space warfighters system-specific training to include the use of AOC checklists. From the AOC space desk to the theater Director of Space Forces, today's AFSPC deployers are better prepared to effectively and efficiently integrate space across the spectrum of deployed operations.

SOPSC trains staff members and senior leaders from the Pentagon, U.S. Stragtegic Command and NASA on DoD space system capabilities, applications and limitations. This service is essential to those who do not have a space background and a good review for those whose careers have brought them back to space. In addition, the SOPSC has a robust liaison program with the joint community, U.S. Air Force Academy, NATO and Air University. Through this program, we provide mutual training support and leverage other communities to improve and update our courses.

Space Professional Education and Training

In early 2003, the SOPSC began exploring and refining space professional education and training. Eventually, the SOPSC was given the mantle for AF and joint-level space professional education. Based on a recommendation from the 2001 Space Commission Report, the DoD determined that the development and sustainment of a "cadre of space professionals" was a top priority. DODD 5101.2 designates the Air Force as the executive agent for space. In support of this initiative, the SOPSC, working with Air Force Space Command and sister DoD organizations, successfully developed, delivered and executed its first space professional course, Space 200.

Space 200 is a four-week course geared toward mid-career officers, NCOs and civilians at the eight to ten year career point. Portions of Space 200 were taken from existing SOPSC courses and augmented with additional material in the fields of acquisition, engineering and nuclear operations. Space 200 places a stronger emphasis on warfighter integration of space power in the joint fight.

Space 100 is the entry level space professional education and training course. This course is owned and executed by Air Education and Training Command, Vandenberg Air Force Base, Calif. The first class is scheduled for early FY 05.

Space 300 will target the 12-15 year group of the space cadre. The course, currently under development, will be a four-week course building upon the concepts learned in Space 200. Space 300 will explore OPLAN conception, development and the strategic thought and doctrine behind the employment and integration of space assets. The first class is set for delivery in September 2005.

The SOPSC developed and executed the Space Support Course (SSC) to educate new space personnel. The SSC, a one-week course, provides the educational and training bridge for new space support personnel no matter where they are in their careers. Space support personnel are those officer, enlisted and civilian personnel from all services expected to serve one space tour and return to their parent organization.

Space 100, 200, 300 and the SSC are generalized courses geared towards the introduction, tactical application and strategic planning of space assets. Due to the number of systems, vast applications and complexity of space assets, these courses are, by necessity, overviews. To gain operational depth in space systems, the SOPSC created advanced space training courses.

Advanced Space Training

During the early years of airpower development, the ACTS educated and trained experts in airpower employment (i.e. pursuit, bombardment, air-to-air engagement) and tactics and they also pushed for new technologies. These airpower experts returned to their squadrons as instructors and tacticians and obtained measurable results when called upon in combat. This visionary concept was revolutionary for its day.

Today, with the foresight of General Lance W. Lord, Air Force Space Command commander, Advanced Space Training (AST) will transform generalists into the system-specific warfighters and tacticians of tomorrow. Today's complex space systems cannot be taken for granted. From design to employment, our space systems must bridge tremendous gulfs in time, technology and applications. AST courses are intense 12-week Weapons School-level, in-depth, system-specific training that afford eight to ten chosen individuals the opportunity to be the newest DoD space experts.

AST courses will develop experts in missile warning, space control, satellite communication and others and return these space-system experts to their squadrons and wings, coding them for future assignment and deployment needs. ASTs will cover system-specific applications, capabilities, limitations, tactics, command and control structure, contingency operations, design, acquisition and overall operational integration. The SOPSC feels that the AST courses will make the most contributions toward space power in the future.

Conclusion

The SOPSC is a very dynamic and responsive organization. Our training and education has immediate impact in the AOC and in the future through better understanding of space acquisition, engineering, employment and strategy. We fill a unique and important training and education void enabling space-savvy warfighters to actively and effectively take part in the fight. From USAFA cadets to unified commanders, the warriors we train today will make the difference in our present and future conflicts.

Lt Col Joseph E. Brouillard (BA, The College of Charleston; MAS, Embry Riddle Aeronautical University) is the Director, Faculty Development, Space Operations School, Space Warfare Center, Schriever Air Force Base, Colorado. Currently, he manages the school's Space Professional Education and Training, development to include Space 200 and Advanced Space Training courses. During OSW and OEF, Lt Col Brouillard served as the Deputy Air Mobility Director and Chief, Tanker Combat Operations in the Combined Air Operations Center located at Prince Sultan Air Base, Saudi Arabia. Lt Col Brouillard is a Master Navigator with 2,200 flight hours and is a graduate of Squadron Officer School, Air Command and Staff College and Air War College.

SISP Provides Big Space Picture

Col Mike McPherson, Commander, 607th Air and Space Communications Group

Maj Rhonda Leslie
14th Air Force/A6

The Single Integrated Space Picture (SISP) initiative is on track gaining momentum and capability, delivery and implementation at Air Force Space Command, Peterson Air Force Base, Colorado. The SISP is a leading edge initial operational prototype that stands to radically overhaul and enhance space and information awareness for U.S. and allied warfighting and peacekeeping capabilities, to help transform military forces and ensure national security.

SISP's primary purpose is to provide global and theater commanders the data, intelligence and means to proactively monitor, assess, plan and execute, thus the command and control space forces to optimize and achieve necessary effects. The concept was conceived and development chartered in response to the need for and synergy gained from a single, coherent view of all space forces capabilities, threats and effects.

When fully operational, a future full-spectrum SISP will enable space situational awareness, space planning and automated machine-to-machine collaboration with Space and Theater Air Operation Centers (AOCs). It will also display health and status of mission systems and provide decision support, near real-time status of forces, and visibility of military, national agency, civil and commercial space assets. SISP will demonstrate the ability to filter and display non-DoD space system data as well. As the SISP matures, it will eventually become a critical member of the Global Information Grid (GIG). The GIG is the globally interconnected, end-to-end set of information capabilities, associated processes and personnel for collecting, processing, storing, disseminating and managing information on demand to warfighters, policy makers and support personnel.

SISP will powerfully facilitate the integration of space assets into military operations, provide reliable information in near real-time and enable commonality and interoperability between services and forces. This weapon system will provide reliability and flexibility as it employs satellite communications, various mediums and forces throughout air, surface, ground, space, undersea and cyberspace. SISP will provide a vast foundation for network-centric warfare and technologically enhance U.S. Homeland Defense efforts. The tailored common operating picture directly supports the DoD's Family of Interoperable Operating Picture and is envisioned to be employed by global and theater users at all echelons of command–Joint Task Force, C2 Nodes as well as others.

The graphical user interface (GUI) available via a Space Common Desktop will provide users with a Global Mission Summary view, theater-specific health and status lookup and status alert via the Mission Critical Reporting System web interface, and also enable the launching of various other applications. The software is a combination of government and commercially developed web-based applications. The SISP GUI interfaces with various modeling and simulation tools (used for course of action development) and is GCCS compliant.

SISP architects utilize a dual-track development approach via rapid prototype fielding and formal acquisition

Col Michael R. McPherson (BS, USAFA; MS, Western New England College; MS, Air Force Institute of Technology; MS, Naval War College) is Commander of the 607th Air and Space Communications Group, Osan Air Base, Korea. Working directly for the 7th Air Force commander, the group provides communications support for he Korea Air Component Command with emphasis on command and control connectivity. Prior to his current assignment, Col McPherson was the Chief, Architecture and Integration Division at Headquarters Air Force Space Command and was responsible for policy, architectures, integration, interoperability and security of communications and information systems. He was also responsible for building Air Force Space Command a single integrated space picture, necessary for providing battlespace awareness to command and control its space forces. His other assignments have included the Air Force Operational Test and Evaluation Center, Pentagon, U.S. Strategic Command and to countries in Europe and the Middle East. Col McPherson is a graduate of Squadron Officer School, Air Command and Staff College and Joint Staff Officers Course.

processes. This ensures that the underlying technology remains leading edge and is supportable. SISP "Jumpstart" was the first spiral, with capability demonstrated on 22 Dec 2003. Since then, Spiral 1 initial operational prototype capability was delivered to the Space AOC at 14th Air Force, Vandenberg AFB, CA on 21 Jan 2004. Its features allow the Space AOC to augment its baseline capabilities and address real-world situations. Upon receiving the Spiral 1 capability, Maj. Gen. Michael A. Hamel, 14th AF commander remarked, "this is an extraordinary effort. It is an excellent example of the power of information technology to rapidly add value. The capabilities even in this initial delivery are operationally significant and provide combat capability. 14th AF wants to get its hands on as much spiraled capability as possible as quickly as possible and will continue to be a demanding customer because it loves what the command is doing with SISP."

SISP continues to evolve as it is continually upgraded and demonstrated to joint-service leadership and organizations. The next step is to implement the sustainment plan to ensure Spiral 1 is fully supportable. The Spiral 2 design is baselined and final, having passed its engineering design review. The Space AOC and HQ AFSPC Command Center are currently the prime customers and prototype execution proving ground locations. The Spiral 2 design will be demonstrated during the Joint Expeditionary Forces Experiment (JEFX) and upon completion, Spiral 1 and 2 capabilities will be transitioned into a formal acquisition program (the next version of the Space Battle Management Core System). Finally, work has already been started on requirements for Spiral 3 capabilities due for delivery by January 2005.

This weapon system will provide reliability and flexibility as it employs satellite communications, various mediums and forces throughout air, surface, ground, space, undersea and cyberspace.

Col Michael R. McPherson

The role of space in the global information grid

AF Space Infostructure Meets the GIG

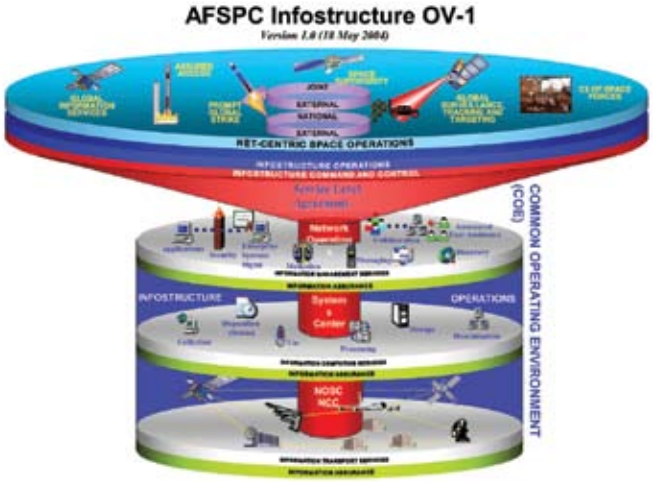
Col Mike McPherson, Commander, 607th Air and Space Communications Group

Maj Rhonda Leslie
14th Air Force/A6

As the 21st Century United States Air Force is reborn and transforms its organization, operations and technological warfighting and peacekeeping capabilities, Headquarters Air Force Space Command (AFSPC) is framing a multi-faceted, multi-lane, multi-vehicle, open thoroughfare virtual network that provides military command and control to air, space, land and water. This visionary space infostructure development paves the way for radical change, space superiority, operational efficiency, future growth and enhanced capabilities for the AFSPC cadre of space professionals, the "Guardians of the High Frontier."[1]

AFSPC's mission is to defend the United States through the control and exploitation of space. This mission is achieved though the employment of six functional concepts: assured access to space; C2 of space forces; global information services; global surveillance, tracking, and targeting; prompt global strike; and space superiority. These concepts support U.S. Objectives for Space to: "promote the peaceful use of space, use the nation's potential in space to support U.S. domestic, economic, diplomatic and national security objectives and develop and deploy the means to deter and defend against hostile acts directed at U.S. space assets and against the uses of space hostile to U.S. interests."[2]

AFSPC Directorate of Logistics and Communications



infostructure architects are developing the framework that will consolidate AFSPC's patchwork infostructure under a single mission system construct. It supports the Air Force infostructure requirements of situational connection to battlespace entities, dynamic reconfiguration, assured and prioritized information delivery and network-centric enterprise services by advocating a common baseline of the information lifecycle. The goal for the space info-structure is to be fully operational and seamless across the entire Global Information Grid (GIG).-

The space infostructure provides seamless connectivity support across all operations, command and control and mission support functions.

The GIG is a "globally interconnected, end-to-end set of information capabilities, associated processes and personnel for collecting, processing, storing, disseminating and managing information, on-demand, to warfighters, policy makers and support personnel. It includes all owned and leased communications, computing systems and services, software, data, security services and other associated services necessary to achieve Decision and Information Superiority. The GIG supports all Department of Defense, national security and related intelligence community missions and functions (strategic, operational, tactical, and business), in war and peace."[3] It provides capabilities from all operating locations and deployed sites and interfaces to coalition, allied and non-DoD users and systems. The GIG interfaces with various space and C4ISR (Command Control Computers Communication Intelligence Surveillance and Reconnaissance) assets to deliver seamless communications needed to provide command and control (C2) function necessary to support Air Force required capabilities.

The foundational tie for the Air Force infostructure and space infostructure is the enterprise services component of the GIG, called the GIG Enterprise Services (GES). The GES is a suite of value-added information, web and computing capabilities that will improve user access to mission-critical data."[4] GES consists of services such as collaboration, mediation, enterprise systems management and situational awareness that span across both infostructures.

Compliance of space assets to the space infostructure is mandatory and key to achieving the Air Force core competencies of Information and Space Superiority. Air Force Chief of Staff General John P. Jumper's policy letter dated 6 August 2002, emphasized the need for interoperability among joint and service-level architectures and their associated systems. Space-based capabilities are essential for future warfighting and peacekeeping efforts because the United States military must transport large volumes of data at light speed. The capabilities, satellites and equipment, communications links and nodes and ground stations for data relay, help ensure the availability of robust, reliable and secure communications for providing intelligence surveillance and reconnaissance (ISR) support, precise navigation and targeting, early missile warning and adverse weather developments.

The space infostructure architecture will facilitate interoperability among joint- and service-level architectures and their associated systems. It will aid in establishing policy,

operational procedure and guidance to transition from a program-centric vertical acquisition approach to capabilities-driven horizontal acquisition. This approach is designed for implementing, operating, maintaining and evolving the communication and information systems and services essential to achieving capabilities in the Space and C4ISR Capabilities CONOPS (Concept of Operations). The Space & C4ISR Capabilities CONOPS, is one of six capability CONOPS in the Air Force. These are transforming Air Force planning, programming, requirements and acquisition processes from their current system organized structure to a "who brings what effects to the fight" structure. The Space & C4ISR CONOPS seeks to guide the development of advanced space, C2 battle management, communication and computer systems, and ISR to provide predictive battlespace awareness, facilitate precision attack, and ultimately compress the Kill Chain.

The Space and C4ISR CONOPS advocates the capabilities that result in *globally* responsive and persistent forces that become the *centerpiece* of Joint C2 architectures. Information will be delivered to leaders and decision-makers in the priority and format they specify. From this comes our family of systems that satisfies the air, space and joint team requirements for the future with:

- targeting quality surveillance and reconnaissance from space;
- updated communications links and technology to enable the ability to seamlessly command and control forces in any theatre of operations;
- robust space situation awareness, to include characterization and reporting;
- defensive and offensive counterspace capabilities; and
- investments in non-nuclear prompt global strike along with continued modernization of our land-based deterrent.

Our investments in Air Force Space Command support this. AFSPC is truly a stakeholder in advanced C4ISR for the future. Our CONOPS overcomes the stovepiped systems mentality and outlines our future capabilities.

The Space and C4ISR operational concept graphic (OV-1) shows how the implementation for this architecture enables the capabilities outlined in the CONOPS. Specifically, the architecture shows how data is pushed, pulled, processed or stored horizontally across the surface, air and space domains by using Air Force information infrastructure and ultimately the GIG.

C4ISR is the key enabler for our military's transformation. It ensures the consistent implementation and effective employment in all operations and provides the necessary information for effective command and control of all our forces. C2 is an operational art that is supported by the communications and intelligence required for mission accomplishment. C4ISR architecture is a "representation, as of a current or future point in time, of the C4ISR domain in terms of its component parts, what those parts do, how those parts relate to each other, and the rules and constraints under which the parts function."[5]

As stated by Secretary of Defense Donald Rumsfeld, "The development and deployment of a truly modern and effective command, control, communication and intelligence system is fundamental to the transformation of the U.S. military forces..." Space, Decision and Information Superiority are essential for effective and timely battle management and predictive offensive and defensive action. Thus the need for a network-centric system of systems, the Global Information Grid, that provides among other services interoperability, bandwidth on-demand, immediate and continuous transmission of information to fixed and deployable command and control forces, collaboration, information assurance and management, shared data and diverse routing. Global Enterprise Services ensure the ability to deliver the right information, to the right place, at the right time.

Air Force Space Command is transforming the space communications and information enterprise to enable warfighter decision makers to act instantly, decisively and effectively. A knowledge-superior Air Force requires careful blending of air and space operational know-how with a robust, reliable communications and information infrastructure or "infostructure." Warfighting space and missile systems depend on network centric capabilities and services (infostructure) that have grown piecemeal over many years. It is now necessary to operate our infostructure as a single integrated mission system in its own right: the space infostructure. Space infostructure architecture represents a net-centric baseline for the information lifecycle to support the space missions of Air Force Space Command. The net-centric operations and warfare framework comes from the GIG and Air Force infostructure architectures, which provide the basis for the space infostructure architecture. This architecture is essential to achieve the capabilities identified in the Space and C4ISR CONOPS.

Notes

1. Infostructure is the shared computers, ancillary equipment, software, firmware and related procedures, services, people, and other resources used in the acquisition, storage, manipulation, protection, management, movement, control, display, switching, interchange, transmission, or reception of data or information in any format including audio, video, imagery, or data, whether supporting Information Technology or National Security systems by incorporation, protection, detection, and reaction capabilities.

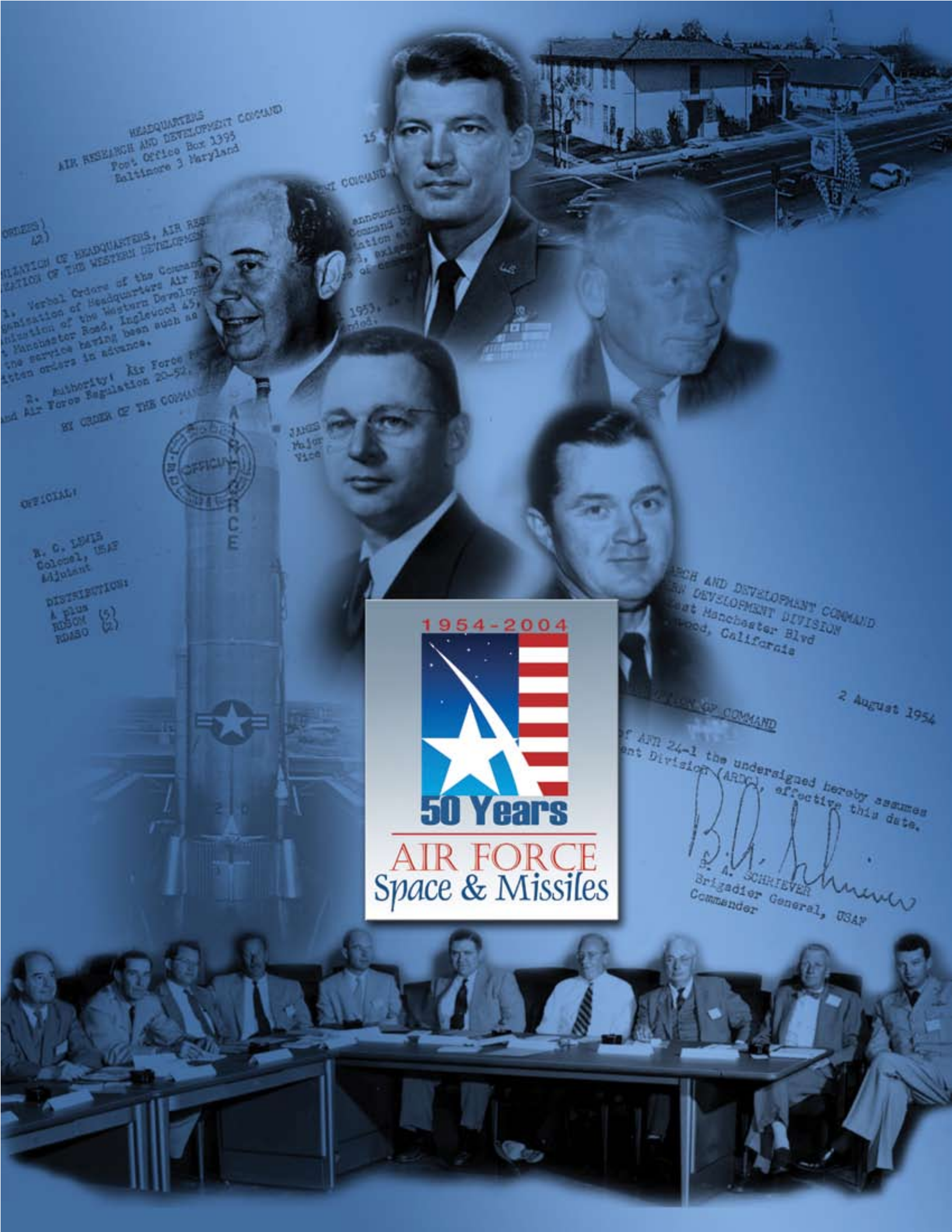
2. "U.S. Objectives for Space," DefenseLINK, available online: http://www.defenselink.mil/pubs/spacechapter3.pdf.

3. "Global Information Grid," Defense Information System Agency (DISA), available online: http://www.disa.mil/ns/gig.html.

4. "GIG Enterprise Services," Defense Information System Agency (DISA), available online: http://www.disa.mil/main/ges.html

5. C4ISR definition available on Dept. of Navy Chief Information Officer (DONCIO) website: http://www.don-imit.navy.mil/glossary/definition.asp

Maj Rhonda L. Leslie (LA, City Colleges of Chicago; BS, Amber University) is an IMA on assignment to 14th Air Force. Maj Leslie serves as the 14th AF's liaison to Headquarters Air Force Space Command Logistics and Communication Architecture Branch. She's also a member of the Single Integrated Space Picture prototype development and SATCOM subpanel. Maj Leslie's career includes serving as a Space and Missile Systems Officer, Radio Relay Communications Technician, Avionics Sensor Systems Technician and a Radio Relay Communications Technician among others. Maj Leslie is a graduate of Squadron Officer Course, Officer Space Prerequisite Training and the Academy of Military Science. *(Photo unavailable)*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