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INTRODUCTION

It is my distinct honor to appear before the Committee today to discuss our National Security Space activities as Under Secretary of the Air Force and Department of Defense (DoD) Executive Agent for Space. As the DoD Executive Agent for Space, my role is to "develop, coordinate, and integrate plans and programs for space systems and the acquisition of DoD space Major Defense Acquisition Programs to provide operational space force capabilities to ensure the United States has the space power to achieve its national security objectives."

The President's Budget, released on February 6, 2006, "focuses taxpayer resources on National priorities like the War on Terrorism, health care, energy research and strengthening our global competitiveness," and includes defense spending to "maintain a high level of military readiness, develop and procure new weapon systems to ensure U.S. battlefield superiority, and support our service members and their families." This budget "reflects the Department's continued shift in emphasis away from the static posture and forces of the last century toward the highly mobile and expeditionary forces, and accompanying warfighting capabilities, needed in the century ahead."

As discussed in the Secretary of the Air Force's and Chief of Staff of the Air Force's testimony in the 2006 Air Force Posture Statement, "The U.S. depends upon the Air Force to supply critical space capabilities to meet the needs of Joint operations worldwide, and also the needs of national missions across the instruments of diplomatic, informational, military and economic power." These space capabilities enable the U.S. to assure allies, dissuade military competition, deter threats and decisively defeat adversaries. The National Security Space community must address the 21st Century defense challenges by "modernizing critical capabilities across the spectrum of

global strike, navigation, weather, communication, missile warning, launch, surveillance, counterspace and ground-based space systems."

Today, I want to outline the importance of space to our warfighters and then focus on three key areas for national security space. The first is to improve the integration of space capabilities across the national security space community, as well as with air, land, and sea-based capabilities. The second area is to get "back-to-basics" in space acquisition. The third is to ensure the viability and proficiency of our space professionals and science and technology (S&T) workforce.

Before I discuss each of these areas, it is important to reiterate the importance of space capabilities to our nation. Space pervades many aspects of everyday life in America. Space services enter homes, businesses, schools, hospitals, and government offices to affect transportation, health, telecommunications, weather forecasting, education, commerce, agriculture, and energy. Space services are transforming major aspects of commercial and social activity and will continue to do so as emerging technologies increase the satellite capabilities. Our nation's ability to respond to events around the world is heavily enabled by space-based capabilities whether defending our borders, facilitating disaster assistance at home or aiding disaster victims in the Far East.

From a military standpoint, leveraging our space capabilities provides the U.S. with an asymmetric advantage over our adversaries in our fight to win the "Long War," the Global War on Terror. Today's fast-paced military environment requires global connectivity between many fast-moving elements. Satellite communications (SATCOM) is the backbone that connects

forces to allow an intercontinental flow of information whether in remote deserts or crowded urban terrain.

Space-based warning systems help to defend our forces abroad as well as the American homeland from ballistic missile attack. Successful cueing of defensive systems allows timely responses to attacks. This past December, the Under Secretary of Defense, Acquisitions, Technology and Logistics certified and restructured the Space Based Infrared System (SBIRS) High program. As part of the certification, it was determined that this program is essential to national security, there are no other lower cost alternatives, the program cost estimate is reasonable, and the management structure is adequate. The first Geosynchronous Earth Orbit satellite (GEO-1) is now planned to launch in Fall 2008. Given the continued importance of the missions, the Department will work with Congress to initiate a new, competitor capability in parallel with the SBIRS program to ensure that the nation's missile warning capability is sustained and that support to theater and strategic missile defense, technical intelligence, and battlespace characterization is also achieved. This proposed program should exploit new technologies to provide the Department with additional options for making decisions related to these mission areas. The Department will also conduct enhanced oversight of the SBIRS program to ensure that cost, schedule, and performance are closely monitored.

Battle-space awareness, coupled with precision weapons such as those guided by Global Positioning System (GPS), allows our forces to successfully engage enemy targets with a minimal number of weapons and limited collateral damage. In fact, precision strike is no longer just a goal; it is an expectation.

Space-based ISR systems, by providing global presence and increasing persistence, provide data that make it possible for military commanders and national decision makers to lift the fog of war over the battlespace. Detailed information from space systems helps us utilize limited national resources more effectively. Only with space systems can we consistently observe remote or denied areas to help us better prepare for and respond to threats. In addition to military applications, space-related capabilities also help national leaders make foreign policy decisions by supplying key data for diplomatic decision-making, helping verify treaty compliance, and monitoring diplomatic crises.

Future ISR systems, such as Space Radar, will give users more persistent, worldwide, day, night, and all-weather knowledge of enemy movement. When integrated with other space-based systems and terrestrial systems, this additional source of information will provide more robust battle space awareness.

Space capabilities also play an important role in disaster response and homeland security. For example, our weather satellites observed Hurricanes Katrina and Rita and provided data for forecasting their strengths and impacts. After these storms disrupted many normal means of navigation and communication, response teams relied on GPS for precise navigation and used SATCOM to coordinate their efforts. Space-derived data aided the disaster response in many ways to help alleviate the severity of these disasters.

Aside from commercial industries that use space services directly, space has a pervasive economic and social impact. Many banking and financial firms employ GPS timing to synchronize their encrypted computer networks. With the rise of computer-based stock trading

and e-commerce, precise timing of transactions is becoming more important, and GPS is a key mechanism for distributing these necessary timing signals.

Maintaining the asymmetric advantages we enjoy today in space will continue to be vital to U.S. national security in the future. Operations in Afghanistan and Iraq clearly demonstrate that space-enabled warfare is the way we will fight current and future battles. Plans for future military capabilities across the entire DoD reflect this new reality. For example, the Army's Future Combat System will operate in more complex battle environments requiring a mix of manned and unmanned systems connected by a network. To provide global connectivity, that network will rely on space-based communication systems. The Transformational Satellite (TSAT) Communications Program is being developed to support the extension of the Global Information Grid to deployed and mobile users, allowing the warfighter and other users increased agility and effectiveness in dispersed, decentralized and constantly changing environments.

In order to provide continuous, reliable space services, we must ensure access to space. This past year I had the opportunity to witness the final Titan IV launch. Culminating a nearly 50 year history of the Titan program, this launch out of our West Coast facility at Vandenberg Air Force Base, extended a record 44 consecutive successful national security launches. We are maintaining this assured access to space by using the Evolved Expendable Launch Vehicles (EELV) as we simultaneously investigate new Operationally Responsive Space (ORS) launch options.

The Air Force is continuing its pursuit of ORS small satellite capabilities with the potential to rapidly deploy and employ communication, ISR, and other space capabilities. The range of

opportunities for small satellites includes not only rapid response capabilities such as TACSATs, but also development of small satellites as standard elements or backups for global constellation operations, and as enablers for more aggressive S&T and technology/system development programs.

Since space capabilities are so vital to our defense as well as our everyday life, they must be protected. As we become more operationally tied to space systems, future adversaries will try to deny us the asymmetric advantages that space provides us. The Space Commission pointed out in 2001 that the U.S. is an attractive candidate for a "Space Pearl Harbor." We saw the beginnings of this with GPS jamming in Operation IRAQI FREEDOM. While the United States supports the peaceful use of space by all, it has been our nation's policy since 1996 to ensure hostile forces cannot prevent our own use of space, and to counter, if necessary, space systems and services used for hostile purposes, preferably using temporary or reversible manners.

The first step in protecting our space capabilities is improving our Space Situation Awareness (SSA). SSA forms the foundation for all of space control and includes traditional space surveillance, collection and processing of space intelligence data, analysis of the space environment, and the fusion of these elements to contribute to a better understanding of the space domain.

Space control activities also emphasize the protection of our national security interests against potential vulnerabilities and rapidly evolving threats. We are increasing our focus on ensuring our assets will meet operational requirements in a growing and changing threat environment.

Our DoD Space areas of emphasis—integration, acquisition basic back to basics, and workforce development—are aimed at continued access and successful exploitation of space in support of our warfighters.

INTEGRATION OF NATIONAL SECURITY SPACE CAPABILITIES

Efficient operation of on-orbit and ground assets requires integrating space capabilities with other operational military systems and between the military and intelligence communities. While our space systems function well individually, we need them to work together for maximum effect on the battlefield. We have learned from our experience integrating air and space operations into Combined Air Operations Centers (CAOC) that our systems should complement one another rather than compete against each other. The best overall effect should be realized by a mix of integrated systems; combining orbiting platforms with manned and unmanned aircraft, ground-based assets, and other systems, linked together so they share data, and cue one another.

Space capabilities serve the interests of a wide array of stakeholders: the Department of Defense, including the Combatant Commanders and fielded forces; the Department of State; the Department of Commerce; and the Director of National Intelligence and the Intelligence Community. As the DoD Executive Agent for Space, I have had the opportunity to visit five of the Combatant Commands -- PACOM, NORTHCOM, STRATCOM, CENTCOM and SOCOM--to discuss first-hand their needs and requirements. I also work with the Joint Staff and the Army, Navy, and Air Force space components to gain similar insights. Through on-going interaction with the Defense space acquisition community, government laboratories, DARPA, Federally Funded Research and Development Centers (FFRDCs), industry, academia, and the

Director of the National Reconnaissance Office (DNRO), we are enhancing links between the warfighters and the acquisition community. In particular, the activities of the DoD Executive Agent for Space and the DNRO, Dr. Don Kerr, must be coordinated. I assure you that Don Kerr and I work closely together to provide continuity and focus to the overall National Security Space portfolio. This is especially important as we consider the need to improve planning, development, acquisition, and management of our space capabilities.

The government relies on a robust space industrial base to provide the systems, technologies, and services necessary to maintain our space capabilities. A good example is the commercial SATCOM industry. The DoD depends on a vast network of commercial ground and space-based systems to meet its telecommunications needs. In particular, commercial SATCOM is a large part of the space communication system that supports the warfighter. Current estimates are that commercial SATCOM provided about 60% of the wideband SATCOM during Operation ENDURING FREEDOM and up to 80% of the SATCOM during Operation IRAQI FREEDOM.

The strategic relevance of space as a force multiplier underscores the necessity for government to ensure we have a strong industrial base that will satisfy our requirements now and in the future. The Space Industrial Base Council (SIBC), co-chaired by Dr. Kerr and myself, is a forum to address space industry issues and bring together stakeholders from across government to provide coordinated attention and action on space industrial base issues. We have also taken steps to include industry and academia to help inform and implement our initiatives.

BACK TO BASICS IN SPACE ACQUISITION

My second area of emphasis is to get "back to basics" in space acquisitions to maximize the probability for success in our space acquisition programs. Acquisition links technology with operations—turning ideas into real, tangible items and delivering those items to the field. It is a continuous process with four distinct but interrelated stages. The first stage is Science and Technology (S&T), where we conduct basic research and explore the possibilities of new technologies. In the second, Technology Development, we evaluate the utility of discoveries made in the S&T stage. The third stage is Systems Development. Here, we take the most promising technologies and mature them to higher readiness levels so they can be integrated into operational platforms in the fourth stage, System Production.

In this acquisition construct, technology is matured through the four stages to move from the lab bench to the test range to operations. We are emphasizing early technology development to ensure mature technology is available for our production systems.

Basic research in science and technology generates knowledge and helps develop our scientists and engineers in our laboratories, universities, and research centers. This kind of cutting-edge work is inherently high risk--discoveries take hard work and insight but are not predictable--but we want to take risk in the earlier stages. For instance, the Air Force Research Laboratory is exploring everything from material properties of beryllium-aluminum alloys, ceramic-matrix composites, and "aerogel"-based thermal insulation, to the operating characteristics of components and systems such as spinning disk lasers, and on-orbit vibration isolation systems. The DoD investment in space-related S&T has doubled over the last four years.

Once we find a promising technology, we investigate its utility in the Technology Development stage. For example, back in September, the STP-R1 experimental satellite -- the "Streak"--launched from Vandenberg Air Force Base on a Minotaur rocket. It has a payload that will study the low Earth orbit environment, but also has an objective to demonstrate an approach of rapid response, short duration missions. It is one of many projects sponsored by the Defense Advanced Research Projects Agency and run by the Air Force Space Test Program office at Kirtland.

Thus, in the two supporting stages of Science and Technology and Technology Development, the approach is to take more risk and push the frontier harder. We will allow those that are creating new ideas and exploring new technologies greater opportunity to push their ideas forward.

After we prove a concept or demonstrate the technology, we mature it until we are confident it will work reliably in space. We build that confidence and performance during the Systems Development stage, where we get new technologies ready to incorporate into operational systems.

The XSS-11, built at Kirtland Air Force Base and launched from Vandenberg Air Force Base last April, is an excellent example of a space Systems Development effort. The XSS-11 did more than prove a concept and check out technology and techniques for future space missions; it also helped improve the quality, experience and knowledge of our workforce. The program managers and engineers operated on a tight schedule and budget, and even after several technical problems and three different launch platforms they had the vehicle ready to launch within 3 months of the original 36-month development timeline and within a few million dollars of the original budget estimate.

Finally, once we have mature technology, we move into the fourth stage, System Production. As an example, we launched the first modified Global Positioning System (GPS) IIR (GPS IIR-M) satellite in September 2005. It will provide the same GPS signals as earlier GPS IIRs, plus two new military signals and another civilian signal. Since the early GPS I series, the program has evolved through a block approach where each increment has provided additional capabilities. GPS satellites are operational assets used by troops in the field. We must minimize the risk involved as we produce these systems and in the System Production stage, we want to integrate mature technologies while employing a disciplined systems engineering process. We must also design in testability and modularity so that we have a path to spiral newly matured technologies into operational systems. We are reducing the risk in that final stage of System Production by starting with more matured technologies, more stable requirements, and more discipline in the systems design.

This idea of managing the risk, or apportioning risk in a more controlled manner is important. You can view it as a redistribution of risk where the higher risk is in those beginning stages while we lower the risk in System Production, incorporating only proven technologies and focusing on taking smaller, more manageable steps. By doing so, we allow a constant, on-going rhythm of design, build, launch, and operate. I believe that developing this rhythm of activity will reduce the acquisition cycle time, insert stability into our production lines and workforce, and enable us to field better systems over time, all while increasing confidence in our production schedule and cost. Ultimately, the warfighter should receive a rhythm of needed, timely, affordable capability.

The restructured TSAT program reflects this new approach to meeting warfighter requirements through major discrete increments or blocks. The Quadrennial Defense Review endorsed this TSAT approach as the way to begin accelerating some needed network capability for the warfighter. Consistent with Congressional inputs, we have focused on technology maturity to define the first block for TSAT. The new program will reduce the risk for the first two satellites by providing basic laser communications capabilities and processor/routers in a Block 1 configuration. Higher risk technologies such as a more capable laser communication capability and more capable Internet Protocol Packet-based processing can be incorporated into later blocks of satellites. Block 1 directly corresponds to those technologies that the TSAT Program Office and Government Accounting Office agreed are mature consistent with this phase of the program. We also have increased the budgetary confidence levels of TSAT from 50% to 80%.

In addition, we recently announced an award of the TSAT Mission Operations System (TMOS) contract--the ground segment for TSAT. Going forward with TMOS allows for better development and horizontal integration with other Global Information Grid (GIG) systems. The networking capabilities provided by TMOS are the cornerstone to the future MILSATCOM architecture (AEHF and TSAT) and its interface with the GIG. Since the space segment interface requirements will be consistent with the TMOS design, our approach simplifies design trades for the space segment contractors. The TMOS contract source selection criteria also reflected a decision process which weighted proposal risk and contractor past performance over system mission capability and cost.

This overall approach reduces technology and integration risk and increases our confidence in timely delivery of capabilities to the warfighter--an approach consistent with the 2003 Young Panel recommendations. We are exploring this same approach for Space Radar and GPS III.

We also need to get back to basics in our acquisition practices. A back-to-basics approach hinges on: first, managing risk better; strengthening collaborations between the players involved in the acquisition process; implementing more rigorous systems engineering processes; and, improving the way we recruit and train our acquisitions workforce.

I previously mentioned the various National Security Space stakeholders. As we get back to basics, we need to strengthen collaboration across the space community between technical experts, acquisition personnel, logisticians, and operators to ensure we are developing the systems we really need. There must be an early, detailed dialogue between all the players on warfighters needs balanced against a realistic assessment of what capability can be provided. We are working with the Joint Staff and Combatant Commanders to implement this approach. We should be able to provide significant new capability quicker and be more cost effective while continuing to work towards the full stated objectives in later generations. For example, deliver a first increment/block of system capability that meets 70-80% of the original stated objectives in a more timely fashion while working toward greater capability in future blocks. Key to this effort is to implement and maintain strong discipline in developing and stabilizing system requirements--another facet of sound system engineering.

A critical part of implementing the back to basics philosophy is a heavy emphasis on applying proven systems engineering practices and raising the expertise of our systems engineers. The Air Force's Space and Missile Systems Center (SMC) has instituted a rigorous training program

that includes classroom time, hands-on laboratory experience, Master's level courses, and education with industry. SMC has also captured best practices from across the community while working with the NRO, industry, FFRDCs, and technical societies to develop interface standards. One key aspect of improving the way we manage acquisition risk, and a key facet of our continuous emphasis on system engineering, is to better estimate the cost and schedule through a stronger cost estimation team and applying a more conservative approach in the System Production stage. If we have high confidence in the success of an acquisition program because we matured the technology starting with a strong S&T base, then we also have more confidence in our production cost and schedule estimates.

SPACE PROFESSIONALS / SCIENCE AND TECHNOLOGY WORKFORCE

We have a great team of space professionals in the military, civil service, and industry. We know that many of our experienced people are retiring and we need to focus on the basics of recruiting, training, and mentoring to balance out our space workforce and maintain a strong, dynamic cadre of space professionals—innovators, original thinkers, and people with solid engineering instincts.

To continue to develop, attract, and retain top talent, I urge you to continue supporting programs such as the National Defense Education Program (NDEP)--which started as a pilot program in FY05 called the Science, Mathematics and Research for Transformation (SMART). NDEP targets undergraduates and graduate students studying science, math, and engineering. The President's FY07 budget request (DoD-wide budget line) for NDEP is roughly twice that of the FY06 request.

As important as it is to recruit and train talented performers, it is also important for us to give them the opportunity to work with increasing levels of technology, consistent with the four stages in the space acquisition framework. They should have the opportunity to develop program management and systems engineering skills and gain experience on progressively more complex systems. This will teach them what risks to take, how to make tough decisions, and expand their knowledge base. Science and Technology and Technology Development efforts provide excellent opportunities for this kind of growth.

Our efforts to increase the expertise of the space force are comprehensive. We provide oversight of the space cadre through the Space Professional Oversight Board, co-chaired by the Director of the NRO and myself, which includes representatives from all military services. In addition, AFSPC's National Security Space Institute is expanding and recently completed checkout and startup of their 300 level training course, with the first offerings including students from all services, NASA and the NRO.

Finally, we recently held the first National Security Space Program Manager's Conference to discuss, analyze and exchange best practices and experiences. It was hosted by the Air Force's Space and Missile Center and attended by space acquisition officers from the Air Force, NRO, DARPA, Army, Navy, and the laboratories.

CONCLUSION

Space capabilities are essential at all levels of military planning and operations. To win the Long War, we must leverage our space contributions along with all elements of national power. As the DoD Executive Agent for Space, I am confident that the directions outlined here will help us improve the way we use existing space assets, acquire new capabilities, and

integrate with other stakeholders relying on the National Security Space community today and into the future. Thank you for the opportunity to present our approach and our emphasis on integration, back to basics in acquisition, and our space workforce.

I appreciate the continued support Congress and this Committee have given to help deliver vital space capabilities, and I look forward to working with you.