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SENATE ARMED SERVICES COMMITTEE
STRATEGICE FORCES SUBCOMMITTEE
UNITED STATES SENATE

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE SENATE ARMED SERVICES COMMITTEE
STRATEGIC FORCES SUBCOMMITTEE
UNITED STATES SENATE

ON

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SUBJECT: Military Space Programs in Review of the Defense Authorization Request for Fiscal Year 2010 and the Future Years Defense Program.

STATEMENT OF: Mr. Gary E. Payton
Deputy Under Secretary of the Air Force for Space Programs

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INTRODUCTION

Chairman Nelson, Senator Vitter, and distinguished members of the Committee, it is an honor to appear before this Committee as the Deputy Under Secretary of the Air Force for Space Programs, and to discuss with you our military activities. I support the Secretary of the Air Force with his responsibilities as the Service Acquisition Executive for Space Programs.

I believe the overall soundness of our Air Force space program is best illustrated by our consecutive string of 61 successful national security space launches over the past 10 years and the sustainment of four distinct satellite constellations over the past three decades (navigation, weather, missile warning, and military communication). This record is the result of a world-class team of space professionals across our government and industry, all dedicated to the single purpose of providing essential capabilities to our joint warfighters and allies around the world. As a nation, we have cultivated, modernized, and integrated space capabilities for over a half century into our national instruments of power – diplomatic, information, military, and economic. The nation's reward for this commitment is a space capability which tilts the geo-political and military advantage to our leaders with the most current and accurate information around the world. With superior space systems we provide our leadership with intelligence that otherwise would be impossible to collect. Space enables us to employ military force in both irregular warfare and conventional situations – we see the battlefield more clearly and destroy targets with greater precision. While acknowledging the ever increasing advantages that these space capabilities provide, we acknowledge that many of the satellites and associated infrastructure have outlived their intended design lives.

To ensure the availability of these systems, the military space portion of the President's FY2010 budget submission is focused on the continuity of key mission areas including global

missile warning, worldwide communication, global positioning and timing, weather, and launch. Simultaneously, we are taking added measures to enhance the protection of our space capabilities through improved Space Situational Awareness (SSA), defensive counterspace, and reconstitution efforts.

Global Missile Warning through Overhead Persistent Infrared (OPIR) is our unblinking eye ensuring that we know whenever a rocket launches from anywhere on Earth. Our missile warning system is fast, persistent, and accurate in determining missile vectors. At the strategic level, it quickly aids leadership as they determine courses of action to defend America and our allies, and at the tactical level our real-time warning provides theater commanders with superior battlespace awareness.

Worldwide communication is enabled through a ubiquitous space-based system with government and commercial platforms. Our users stretch from the Oval Office to the mountains of Afghanistan. Using protected, wideband, or narrowband communications, the President can command the nation's nuclear forces, our UAV pilots can fly Predators over Iraq and Afghanistan from the United States, and Special Forces teams can call for exfiltration or tactical air support.

Global positioning and timing is a free worldwide service. It provides position accuracy down to the centimeter and time accuracy to the nanosecond over the entire planet, 24-hours a day, 7-days a week, and in any weather. The Department of Defense and the Intelligence Community depend on our Global Positioning System (GPS) to support a myriad of missions and capabilities including weapon system guidance, precise navigation, satellite positioning, and communication network timing. The civil and commercial communities are equally reliant on GPS as the underpinning for a vast infrastructure of services and products

including search and rescue, banking, map surveying, farming, and even sports and leisure activities.

Weather observation and forecasting has greatly improved over the last four decades primarily due to space-based environmental sensing. Global, high resolution measurements of atmospheric temperature, density, and humidity populate mathematic models for weather prediction. Our warfighters need accurate, time-sensitive weather data as a key enabler for maneuver planning, weapons employment, and intelligence collection.

With events like the Chinese ASAT demonstration and the Iridium / Russian satellite collision as examples of the increasing political and physical complexity of the space environment, our on-orbit assets face greater threats that could deny, damage, or destroy our access to space capabilities. We must anticipate potential disruptions, either accidental or intentional, to our space operations or risk losing continuity of service. As such, we are expanding our ability to detect, identify, characterize, and attribute threats, as well as clearly discriminate between a hostile act and one that is naturally occurring. In parallel, we are developing the organizational, operational, and technical enablers including command and control architectures that will allow us to react swiftly and decisively when threats materialize.

Though challenges remain, Congress' support has been a vital component in improving our acquisition of space systems, maintaining continuity of service, and charting a course for the next generation of space capabilities that will enhance American security, freedom, and prosperity.

UPDATE ON SPACE

I would like to briefly discuss some of the achievements we have had over the last year and the progress we are making with regard to the mission areas I described earlier.

MISSILE WARNING

For over 35 years, our legacy Defense Support Program (DSP) satellites, in conjunction with ground based radars, have unfailingly met the nation's missile warning needs. This legacy constellation, however, continues to age, while threats such as the proliferation of theater ballistic missiles and advanced technologies continue to grow. These threats are driving the need for increased coverage and resolution provided by the Space Based Infrared System (SBIRS).

SBIRS supports four mission areas: missile warning, missile defense, technical intelligence, and battlespace awareness, and is comprised of both geosynchronous earth orbit (GEO) satellites and highly elliptical orbit (HEO) payloads. In 2008, the first HEO payload was fully certified by United States Strategic Command to perform the strategic missile warning mission. The second HEO payload is on-orbit and proceeding through operational checkout. Launch of the first SBIRS GEO satellite is scheduled for late 2010.

Our funding request continues development of the GEO satellite, HEO payloads, plus the necessary ground elements. Additionally, this budget requests advanced procurement for a fourth GEO satellite, and procurement of our fourth HEO payload. We continue to work with our industry partners to resolve challenges on the SBIRS GEO-1 spacecraft, specifically with respect to the Flight Software Subsystem. Our budget request also funds Wide Field-of-View (WFOV) technology development within the Third Generation Infrared System funding line. By partnering with the commercial space industry, we will have the opportunity to conduct early on-orbit scientific experiment of WFOV infrared data phenomenology using a Commercially

Hosted IR Payload (CHIRP) in 2010. WFOV offers considerable potential for reducing cost, schedule, and performance risks for the next generation of missile warning satellites.

COMMUNICATIONS

The United States military is a highly mobile and dispersed force that relies heavily on wideband, protected, and narrowband satellite communications (SATCOM) for command, control, and coordination of forces. SATCOM enables forces to receive real-time images and video of the battlefield, thereby accelerating decision-making from the strategic to the tactical levels. These images and video often come from Unmanned Aerial Vehicles (UAVs) controlled via SATCOM links, allowing the UAVs to fly far beyond the line of sight and to collect information without endangering U.S. forces.

On April 3, 2009 we successfully launched the second Wideband Global SATCOM (WGS) satellite as part of the Department's constellation of wideband satellites providing increased capability for effective command and control of U.S. forces around the globe. In August 2009 we are planning to launch the third WGS satellite. As we populate the WGS constellation, each individual satellite provides greater wideband capacity than the entire legacy Defense Satellite Communications System (DSCS) III constellation. Our FY2010 funding request continues on-orbit support for WGS-2 and 3, as well as, non-recurring engineering development and advanced procurement for WGS-7.

In the protected SATCOM portfolio, we are completing testing of the first Advanced Extremely High Frequency (AEHF) system with a projected launch in late 2010. This initial AEHF launch will complete the worldwide Medium Data Rate (MDR) ring, increasing the data-rate for low probability of intercept/detection and anti-jam communications from tens-of-

kilobytes per second to approximately a megabyte per second. Last September, the Secretary of the Air Force declared a critical breach of the average procurement unit cost (APUC) against the AEHF Acquisition Program Baseline. The cost growth was dominated by the four-year production break between the SV-3 being placed on contract in January 2006 and SV-4 contract award projected for early 2010. Subsequently, the Under Secretary of Defense for Acquisition, Technology, and Logistics ~~USD(~~USD (AT&L) led a team of Department of Defense (DoD) organizations that reviewed the AEHF program to determine if: (1) the program was essential to national security, (2) there were any alternatives that could provide equal capability at less cost, (3) the new estimates of the unit cost were reasonable, and (4) the management structure was adequate to control costs. On 29 December 2008, ~~USD(~~USD (AT&L) certified the AEHF program as a four satellite constellation with the launch dates of: SV-1 in September 2010, SV-2 in September 2011, SV-3 in September 2012, and SV-4 in September 2016. Also as part of the recertification, AEHF costs were rebaselined per DoD Cost Analysis Improvement Group (CAIG) estimates. Our funding request supports the assembly, integration, and test of AEHF SV-1 through SV-3 as well as the launch and start of on-orbit check out of SV-1, continued development, integration, and test of the AEHF Mission Control Segment, and the production contract award for SV-4.

On 6 April 2009, the Secretary of Defense announced key decisions and recommendations for the FY2010 President's Budget submission. Among them was the cancellation of the Transformational Satellite Communications (TSAT) program in favor of two more AEHF satellites (SV-5 and -6). This recommendation was the result of careful consideration to balance valid warfighter requirements against fiscal constraints. The Air Force plans to work closely with the other Services, the Office of the Secretary of Defense, Joint Staff,

and the Combatant Commands to meet the Department of Defense's protected and wideband communication needs. To this end, the Air Force will evolve the MILSATCOM architecture to provide connectivity across the spectrum of missions, to include land, air and naval warfare; special operations; strategic nuclear operations; strategic defense; homeland security; theater operations; and space operations and intelligence.

POSITIONING, NAVIGATION AND TIMING

The United States Global Positioning System (GPS) continues to be the world standard for positioning, navigation, and timing (PNT). As a result, GPS has been incorporated into military, commercial, and civilian applications, to include navigation, agriculture, banking, cartography, telecommunications, and transportation. Last year the GPS Program Office seamlessly implemented the Architecture Evolution Plan (AEP) upgrade to the existing GPS Operational Control System (OCS). This upgrade increased sustainability and provided the ability to control the new GPS IIF satellites. Perhaps most notably, these upgrades were implemented with no impact to day-to-day operations and did not require any modifications to existing user equipment.

This year we are going to launch the final GPS IIR satellite, a program which was initiated over twenty years ago and represents one of our most successful, enduring space acquisition programs. This year, we will also begin launching the next generation GPS IIF satellites which will sustain the constellation over the next ten years. GPS IIF will also populate the GPS constellation with additional M-code capability and introduce a new "L5" civil signal.

Moving beyond GPS IIF, GPS III will offer significant improvements in navigation capabilities by improving interoperability and jam resistance. The procurement of the GPS III

system will occur in multiple blocks, with the initial GPS IIIA contract award in May 2008. GPS IIIA includes all of the GPS IIF capability plus up to a ten-fold increase in signal power, a new civil signal compatible with the European Union's Galileo system, and a new spacecraft bus that will support a graceful growth path to future blocks.

WEATHER

The Defense Meteorological Satellite Program (DSMP) continues to be the nation's workhorse for terrestrial forecasting and space environmental sensing. We have three DMSP satellites remaining with DMSP Flight 18 scheduled for launch this October. Flight 19 and 20 are currently undergoing a Service Life Extension Program (SLEP) to repair, replace, and test components that have exceeded their shelf life. Flight 19 will launch in October 2012 and Flight 20 will launch in May 2014 or October 2016, depending on operational requirements.

In the future the nation will transition to the next workhorse for terrestrial weather – NPOESS (National Polar-Orbiting Operational Environmental Satellite System) – a tri-agency effort with NASA and Department of Commerce. Similar to the previous generation of satellites, NPOESS will provide visible and infrared cloud imagery and other atmospheric, oceanographic, and terrestrial information. It will become the nation's primary source of global weather and environmental data for operational military and civil use.

Seemingly a straightforward idea to integrate DMSP and POES (Polar Operational Environmental Satellite) in the early 1990s, the NPOESS program has encountered unforeseen engineering challenges. Integration of requirements across the spectrum of space and terrestrial weather into several 'first-of' sensors partially caused the 2006 Nunn-McCurdy breach whereby two sensor suites were de-manifested from the program. Currently, the VIIRS (Visible Infrared

Imaging Radiometer Suite) sensor has bedeviled the program, but it is planned to deliver later this year. As a result, NASA's NPP (NPOESS Preparatory Project) satellite will become a de-facto operational spacecraft when it is launched in 2011. Like the DSP / SBIRS missile warning architecture, NPOESS C-1 and C-2, scheduled to launch in 2013 and 2016, respectively, will initiate the phase out of four decades of DMSP service to the country.

OPERATIONAL RESPONSIVE SPACE (ORS)

As a complement to the nation's assured access to space, the ORS program builds on the "back to basics" approach we have cultivated over the past several years by providing enhanced mission capability through incremental blocks of small satellites and integration of other responsive space capabilities. Key tenants of the ORS program are to keep costs low, react rapidly to urgent warfighter needs, and reconstitute capability in contested environments. A clear example of these tenants is exemplified in the first ORS operational satellite (ORS-1). It is being built for United States Central Command (USCENTCOM) to monitor denied areas and will be taskable like other USCENTCOM organic airborne ISR assets.

Leveraging on the ORS-1 experiences, the Air Force will apply this model to other mission areas like communications and space situation awareness. In the FY2010 budget request we will begin the steps of on-demand space support with Rapid Response Space Capability, whereby plug-and-play satellite busses will be assembled, integrated, and tested with Modular Open System Architecture (MOSA) payloads.

LAUNCH AND RANGES

National Space policy requires assured access to space. Currently this requirement is satisfied by the Evolved Expendable Launch Vehicle (EELV) program from the United Launch Alliance (ULA) consisting of the Delta IV (developed by Boeing) and Atlas V (developed by Lockheed Martin) launch vehicles. The first 23 EELV launches have all been successful, and are part of our consecutive string of 61 successful national security space launches. ULA achieves efficiencies through combined engineering, production, and launch operations while maintaining the separate Delta IV and Atlas V families of launch vehicles. The FY2010 budget request funds EELV launch capability (ELC), or infrastructure activities for two EELV launch systems and on going support for over twelve launch services ordered by the Air Force that are working toward launch. In addition, DoD requests funding for five EELV launch services which will take place in 2012.

SPACE PROTECTION

The need for increased space protection of our space assets is paramount and requires enhanced Space Situational Awareness (SSA) capabilities – improved accuracy, responsiveness, timeliness, and data integration to support the warfighter. To do this we must combine various inputs into a single picture for decision makers. Currently, operators and warfighters must assemble an understanding of the global space picture from many disparate sources, including e-mails, telephone calls, classified chat rooms, intelligence web sites, and imagery feeds. We have acknowledged this shortcoming, and in our FY2010 budget request we are consolidating the Integrated Space Situational Awareness (ISSA), Rapid Attack Identification Detection Reporting System **(**RAIDRS) Block 20, and Space Command and Control (C2) programs into a new program element – the Joint Space Operation Center (JSpOC) Mission System (JMS). The JMS

program will continue risk reduction engineering and focus on incremental deliveries to deploy a services-oriented architecture (SOA) environment and tools to progressively advance operational capabilities toward an integrated JMS. JMS produces and delivers services in four major categories: *Infrastructure* provides a SOA net-centric collaborative information environment at the Top Secret/Sensitive Compartmented Information, Secret, and Unclassified levels; *Mission Applications* enhance and modernize accuracy, sustainability, and responsiveness of space surveillance capabilities from the legacy functionality; *Command & Control (C2)* provides design, development, and integration functions that create, visualize, and share decision-relevant views of space operational environment at all echelons; and, *Data Integration* migrates non-traditional sensors and data sources into a net-centric based enterprise enabling distribution of data obtained across traditional sensors within the space surveillance network critical to the JSpOC mission.

Two programs critical to providing SSA data to the JMS are the Space Fence and SBSS (Space-Based Space Surveillance). The Space Fence is a three station, worldwide, radar system to detect and track smaller sized space objects, while the SBSS satellite is an optical system to search, detect, and track objects in earth orbit, particularly those in geosynchronous orbit. The Space Fence replaces the Air Force Space Surveillance System (AFSSS) and SBSS builds upon our success with the Space Based Visible (SBV) technology demonstration. In the FY2010 budget, the Space Fence program will complete a System Design Review and the SBSS program will support on-orbit operations of SBSS Block 10 which is expected to launch this summer.

SPACE INDUSTRIAL BASE

A stable industrial base is vital to successful space systems. Numerous studies and reports have documented that the U.S. market share of the global space business is steadily decreasing (CSIS Study, January 2008). Maintaining a stable space industrial base is not solely an Air Force or even DoD concern, and must be addressed with our civil and commercial partners as one team.

We are working with our agency and service partners to strengthen inter-agency awareness and support processes to better synchronize efforts across the civil, commercial and national security space domains. The Space Industrial Base Council and its subsequent working groups consistently address industrial base and critical technologies risks and opportunities. Their efforts lead to better management practices, identification of cross-cutting technology risk areas and subsequent mitigations, and improve communication with industry. Specifically, the DoD is working to support U.S. industrial capacity in several areas key to space including batteries, radiation hardened read out integrated circuits (ROICs), energy efficient solar cells, and traveling wave tube amplifiers (TWTAs).

Continued and enduring attention to the space industrial base, particularly the sub-tier industry, is vital to maintaining a robust and viable capability to respond to national security space interests.

SPACE CADRE

DoD has over 15,000 military and civilian space professionals. They are essential to our full spectrum of operations from keeping the peace to fighting the overseas contingency operations, or engaging a peer competitor. Consequently, we are committed to providing the best possible education, training, and career development to these professionals who operate,

acquire, and enable our systems. Institutions like the Naval Postgraduate School, the Air Force Institute of Technology~~, Defense~~, Defense Acquisition University, and the National Security Space Institute are at the forefront of our efforts to educate and train these warriors. These organizations provide education and training throughout a space professionals' career.

We recognize that we must be able to measure how we are doing with respect to Space Professional Development. We have a set of metrics that help us gauge the numbers of cadre needed, our current supply, and the health of our cohort in terms of accessions and separations. All of these measures will help make us more efficient and better at developing our cadre, and ensuring we have the right professionals to fill billets across DOD.

CONCLUSION

Our space systems are the envy of the world. Our infrared surveillance satellites are able to detect missile launches anywhere in the world; no other nation can do that. Our strategic communications systems allow the President precise and assured control over nuclear forces in any stage of conflict, and our wideband SATCOM systems rapidly transmit critical information between the continental U.S. to our front line forces; no one else has global, secure, anti-jam communications. Our weather satellites allow us to accurately predict future conditions half a world away as well as in space. Our GPS constellation enables position knowledge down to centimeters and timing down to nanoseconds; no one else has deployed such a capability. These sophisticated systems make each deployed Soldier, Sailor, Marine, and Airman safer, and more capable.

In the FY2010 budget, continuity of service across our space portfolio and improved space protection is paramount. Our ‘back to basics’ strategy over the recent years is

demonstrating results, as we continue toward securing the world's best space capabilities today and ensuring the same for our nation's future.

The space constellations and the space professionals that deliver these capabilities are our critical asymmetric advantage. We must ensure the recapitalization and health of these constellations and continue the professional development of our future space leaders. Delivering space capabilities is complex, challenging, costly, yet rewarding. Although we have faced significant challenges, we are also making significant progress. I am honored to represent a dedicated cadre of space professionals who are delivering space capabilities that support our deployed warfighters, our allies, and our nation.

I look forward to continuing to work with this Committee and thank you for your continued support of military space programs.