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HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

STATEMENT OF

LIEUTENANT GENERAL LARRY JAMES

COMMANDER

JOINT FUNCTIONAL COMPONENT COMMAND FOR SPACE

BEFORE THE SUBCOMMITTEE ON SPACE AND AERONAUTICS

HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

ON "*KEEPING THE SPACE ENVIRONMENT SAFE FOR CIVIL AND COMMERCIAL USERS*"

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Madam Chairwoman, Ranking Member Olson, and distinguished Members of the Space and Aeronautics Subcommittee, I am honored to be here today for my first opportunity to appear before you as United States Strategic Command's (USSTRATCOM) Commander of the Joint Functional Component Command for Space (CDR JFCC SPACE).

It's a distinct privilege to address you on the challenges faced by civil and commercial space users, and to represent the men and women of JFCC SPACE who employ space capabilities around the globe every day. These Soldiers, Sailors, Airmen, and Marines are a dedicated and innovative joint force, working hard to generate timely, accurate and thorough space situational awareness (SSA) and conduct command and control of our worldwide space forces. Their professionalism ensures, to the maximum extent possible, that the U.S. and our Allies may operate freely and safely in space.

Today I will focus my discussion on what the current space environment looks like, how we work with commercial space users through the Commercial and Foreign Entities (CFE) Pilot Program and identify some of the challenges we face as we work to meet the growing challenge of operating safely in an increasingly complex and congested space environment.

CURRENT SPACE TRAFFIC ENVIRONMENT

Space traffic growth is both a challenge and a concern. In 1980 only 10 countries were operating satellites in space. Today, 9 countries operate spaceports, more than 50 countries own or have partial ownership in satellites and citizens of 39 nations have traveled in space. In 1980 we were tracking approximately 4,700 objects in space; 280 of those objects were active payloads/spacecraft, while another 2,600 were debris. Today we are tracking approximately

19,000 objects; 1,300 active payloads and 7,500 pieces of debris. In 29 years, space traffic has quadrupled.

It's challenging to accurately predict the growth of active payload space traffic and debris. In addition to the growth of national security and commercial satellites from existing and new space-faring nations, we believe the global diffusion of space technologies, especially the availability of small spacecraft technologies and providers, will lead to a larger and more diverse population of active spacecraft.

Based on the last 10 years of launch activity, we conservatively project the number of active satellites to grow from 1,300 to 1,500 over the next 10 years. We also estimate the overall number of tracked objects could increase from 19,000 to as much as 100,000 depending largely on anticipated increases in sensitivity of future sensors such as the Space Fence. The increased sensitivity will allow us to track existing but undiscovered small debris. However, there will still be potentially lethal objects in space too small to be tracked by the Space Surveillance Network (SSN).

We have made progress in improving our SSA; however, February's unfortunate collision between an active Iridium communications satellite and inactive Russian satellite, and the January 2007 Chinese test of an anti-satellite (ASAT) continue to shape our future planning by tangibly demonstrating the vulnerability of our space assets. To date we have cataloged over 870 pieces of debris as a result of the Iridium/COSMOS collision. The ASAT test by the Chinese left over 2,400 pieces of potentially destructive orbital debris that we're still tracking 24 X 7. In both cases, there are likely thousands of smaller pieces our sensors can't track. A combined total of only 58 items have reentered so far, with the remainder expected to be in orbit for decades. This

debris will slowly decay due to natural forces and will remain a hazard to manned and unmanned spaceflight in low Earth orbit, and to satellites transiting that region, from low to higher orbits.

With an increased use of space by a growing number of state and non-state users and the increased threats to their valuable space systems, it is paramount that the Department of Defense (DoD)—in collaboration with its partners in the U.S. Government—work hand-in-hand with civil, commercial, and international operators to ensure a safe environment.

DOD AND COMMERCIAL SPACE USER COORDINATION

The DoD has a sound relationship with commercial space operators, particularly those commercial communication and remote imaging organizations that support U.S. and national security activities. The relationship includes formal contractual arrangements for the provision of service to the DoD, routine strategic-level meetings between the commercial satellite CEOs and DoD senior civilians and officers, and numerous working-level meetings.

As part of the CFE Pilot Program, commercial users can access the Air Force Space Command (AFSPC) Space-track.org website to obtain unclassified element set data on current catalogued objects. If a user would like more information, they must sign an agreement for CFE support via the website and submit a request for specific support. The request is first reviewed at AFSPC to ensure it meets policy and security requirements. Once cleared through AFSPC it is sent to the 614th Air and Space Operations Center (614th AOC) via 14th Air Force for operational review and processing. The 614th AOC works directly with users to process requests.

The recent Iridium/COSMOS collision provides an excellent example of the relationship we have with commercial users and what we are doing to ensure safe space operations. The

Joint Space Operations Center (JSpOC) began increased conjunction assessment screening of Iridium assets 4 hours and 50 minutes following the conjunction, and now screens over 330 objects daily to ensure safe spaceflight operations for both DoD and commercial space users supporting DoD missions.

Despite our efforts and the milestones reached, we continue to face challenges. Specific challenges we are working hard to resolve include sharing of SSA data, improving timeliness and accuracy of data, and protecting sensitive information. The DoD has engaged with most of the major commercial satellite operators who provide support to the U.S. government to discuss their needs for SSA as well as their ability to provide inputs to our awareness. AFSPC has initiated a working group which includes commercial operators to identify specific technical solutions that will allow the sharing of additional spacecraft positional and status information to enhance collective spaceflight safety. Additionally, AFSPC recently conducted an industry day at the 25th Annual National Space Symposium in Colorado Springs and hosted a round table discussion with owner/operators, sharing short- and long-term goals of the CFE Pilot Program.

COMMERCIAL AND FOREIGN ENTITY PILOT PROGRAM

The CFE Pilot Program has been successful in transitioning the routine provision of satellite positional information from NASA to AFSPC for developing an initial set of legal agreements. These agreements allow for the provision of additional services such as conjunction assessments and launch support, and help identify the long-term desires of commercial and foreign entities for space situational information.

The AFSPC Space-track.org website has been providing unclassified satellite catalog data to approved account holders since 2004. To date, we have hosted over 37,000 users

spanning over 110 countries with 75% of the users coming from the US, Canada, France, Germany, United Kingdom, and Australia.

The next phase in the CFE Pilot Program evolution provides advanced services to commercial and foreign entities which establish or have a pre-existing agreement with the DoD. These services include conjunction assessment and launch support delivered through web services. The long-term solution includes integrating commercial and foreign entity advanced services in the JSpOC Mission System with the ability to ingest data directly from these entities on a voluntary basis.

There have been a number of important lessons learned from the pilot program. These include a greater understanding of: 1. the specific commercial and foreign desires and rationale for space situational information; 2. the operational agility and limitations of commercial and foreign operators; 3. the necessary resources required to satisfy commercial and foreign desires for information; and 4. the potential value of the information commercial and foreign operators might share among themselves and with the DoD. The DoD intends to operationalize the support to commercial and foreign entities in the Fall of 2009. The goal is to seamlessly transition the program from an AFSPC pilot program to a USSTRATCOM operational activity. The JSpOC will be the central node for the sharing of information. We will continue to work closely with the commercial and foreign space communities to understand their evolving needs and desires for SSA information, and continue to grow our cooperative relationships to share information in ways that will improve spaceflight safety.

Although we have made large strides in SSA, it is imperative that we address the shortcomings in current SSA information, predictive capabilities, and supporting infrastructures, and develop an SSA vision for the future.

CHALLENGES AND WAY AHEAD

Space situational awareness is more than understanding the space environment, tracking objects, and conducting conjunction assessments. We need to be able to discriminate between natural and man-made threats. We need to understand the location, status and purpose of these objects, their capabilities, and their owners' intent. This comprehensive knowledge enables decision-makers to rapidly and effectively select courses of action to ensure our sustained freedom of action and safety in what is clearly a contested environment. To get there we require more automated, net-centric capabilities to command and control space forces, and networked sensors and information systems that seamlessly share information to more effectively use our current resources. This will give us the ability to rapidly react -- real-time dataflow to the JSpOC for processing and analysis, and then real-time flow of the refined product back to the user.

The overarching command and control and SSA program that will lead us towards our vision is the JSpOC Mission System. The program fuses multi-sourced space object tracking data with status and capability details, and provides automated assessment and decision-making aids.

The Enhanced Space Sensors Architecture (ESSA) project will be folded into the JSpOC Mission System and brings valuable sensor data into a net-centric architecture. The technology being developed and demonstrated by the ESSA project puts sensors' space object imaging and metric tracking information on the network for faster analysis, evaluation, and end use by operators and decision-makers at all levels. The JSpOC has participated in two demonstrations of ESSA, and is scheduled to participate in its third demonstration in May.

The U.S. space surveillance architecture currently detects and tracks thousands of objects, but critical gaps remain in an ability to fully track and characterize all on-orbit objects, analyze and predict conjunctions, and protect not just military satellites, but also commercial and civil satellites critical to national security. The SSN provides acceptable coverage in the northern hemisphere, but we have a significant coverage gap in the southern hemisphere. By filling this gap we increase the JSpOC's ability to rapidly detect, track, and characterize new payloads and maintain awareness of maneuvering spacecraft. A key program to address this gap is the Space Fence. The Space Fence will be the most accurate dedicated radar in the SSN and will provide critical coverage from the southern hemisphere. With the capability to perform 750K observations per day and track over 100,000 objects, the Space Fence will significantly reduce coverage gaps and significantly improve our low Earth and medium Earth orbit SSA.

Our sensor network is currently able to track objects as small as 10 centimeters across. We do this well for low Earth orbits; however, our ability decreases as we track objects in geosynchronous (GEO) orbit. We need to improve our capability to track and assess smaller objects in all orbits if we are to keep pace with the potential threats from the emerging small satellite technologies, and to gain better awareness of the hazards posed by small space debris. Today, many GEO objects go days without being tracked. The Space-based Space Surveillance (SBSS) satellite will provide the ability for the uninterrupted scan of the entire GEO belt every 24 hours -- vital to maintaining positional knowledge, called "track custody" of high interest objects in deep space. Additionally, this new system's revisit rate for all GEO objects will greatly reduce the "lost list" of objects that change position between observations. I look forward to the successful fielding of SBSS, and the marked improvement to situational awareness it will bring.

With respect to cooperation with friends and allies, AFSPC experts are supporting the DOD and Department of State in discussions on SSA cooperation with the European Space Agency and European Union, as well as key European allies. These discussions provide a foundation for expanded trans-Atlantic cooperation on space situational awareness in support of common civil, commercial and military requirements. They also can serve as a model for discussions on SSA cooperation with our friends and allies in other regions.

The U.S. must continue to lead the community of space-faring nations and encourage responsible behavior in the space environment. The JSpOC is the nexus of SSA and the focal point for ensuring safe, effective operation of our space forces and those of our partners. We need to gather real-time, quality data, have the ability to exploit that data rapidly and accurately, and then export decision-quality information across a range of customers from the intelligence community to deployed forces, foreign partners, and commercial users.

CONCLUSION

The nature of space operations is rapidly evolving. The United States' dependence on space across our military, civil, and commercial sectors requires improved SSA and command and control capabilities to ensure our ability to safely and effectively operate in a dynamic and contested environment. Working in collaboration with other departments and agencies in the U.S. Government, DOD must continue to build the relationships, processes, and capabilities within the global space community that allow us to operate effectively together to meet the needs of national defense. I am truly honored to lead such a talented group of men and women. Perfection is our standard and you can be proud of your Soldiers, Sailors, Airmen and Marines that expertly tackle the challenges we face every day.