HOUSE COMMITTEE ON ARMED SERVICES

SUBCOMMITTEE ON STRATEGIC FORCES

STATEMENT OF

LIEUTENANT GENERAL DAVID J BUCK

COMMANDER

JOINT FUNCTIONAL COMPONENT COMMAND FOR SPACE

BEFORE THE HOUSE ARMED SERVICES SUBCOMMITTEE ON STRATEGIC FORCES ON FISCAL YEAR 2017 NATIONAL DEFENSE AUTHORIZATION BUDGET REQUEST FOR SPACE PROGRAMS

15 MARCH 2016

HOUSE COMMITTEE ON ARMED SERVICES

SUBCOMMITTEE ON STRATEGIC FORCES

Introduction

Chairman Rogers, Representative Cooper, members of the Subcommittee, thank you for your time this afternoon. More importantly, thank you for your steadfast support for our men and women in uniform and this Nation. I'm honored to appear before you, side-by-side with my esteemed colleagues, as the Commander of United States Strategic Command's Joint Functional Component Command for Space, or simply JFCC Space.

As Commander JFCC Space, I'm privileged to lead a world-class team of space professionals from across the Services and with strong participation from our commercial and Allied partners. The command is laser-focused on delivering combat effects for the current fight while simultaneously preparing for tomorrow's. A key tenet is domain superiority and the ability to provide unfettered access in, through and from space for the international community and ensuring that access exists for all nations.

And like every other domain . . . be it air, land, sea or cyberspace . . . freedom of action is foundational. That said freedom of action in the space domain cuts a pretty wide swath. In order to maintain our operational advantage we must continue to normalize the space domain in areas like information dominance, mission resilience and the ability to protect and defend through robust battle management command and control (BMC2). Building strong connective tissue across the Department of Defense (DOD), with the Intelligence Community (IC), the Interagency (IA) and with our commercial and Allied partners is foundational to these efforts.

As this Committee is well aware, space underpins our Nation's way of life in peacetime and provides critical warfighting capabilities during conflict. It's no surprise that potential adversaries have taken notice and are working to counter our operational advantages in space.

Since testimony at this Committee last year, potential threats to our freedom of action in space continue to evolve. Our ability to deliver space effects is challenged by the unprecedented

development of counter-space programs . . . resources invested and systems designed to deny or degrade our freedom of action. The implication, of course, is that we can no longer take for granted the strategic, operational and tactical advantages we've come to depend on from space. From a warfighting perspective, the consequences are far reaching since an adversary can impose multi-domain impacts by denying or degrading space effects. Clearly, we don't ever want to fight a fight that extends to space, but we must be prepared. We must be prepared to defend ourselves and, if necessary, fight through a degraded space environment.

I've been in the space business awhile now and these are easily the most dynamic, complex and exciting times I've experienced. That said, I'm optimistic about the future. Through United States Strategic Command and with the help of this Committee, our Sister Services, the IC, IA, and commercial and Allied partners, there is a renewed emphasis on space. We will leverage innovation, experimentation, partnership and technology to meet current and emerging challenges to set the global standard for peaceful use of space.

I again thank you for the opportunity to offer my perspective. I look forward to continuing to work with you and your staffs to advance and protect our Nation's space capabilities.

Space Domain

Space is not a boutique domain or the exclusive purview of a few space-faring nations; rather, space is a common operating environment for approximately 60 nations, plus various governmental, commercial and academic organizations . . . and home to some 1,300 active satellites. In fact, a new satellite is launched almost every week. Unfortunately, not all space-faring nations view space as a peaceful domain – we have witnessed intent and ability to conduct hostile operations in this arena. Space has evolved like every other operating domain and is contested, degraded and operationally-limited (CDO) and it's imperative that we adapt our Tactics/Techniques/Procedures (TTPs), systems and cultures to enable us to fight through a

degraded space environment.

Our potential adversaries have a vote. They pay attention to our advancements in modern warfare and how adept we are at multi-domain integration . . . and also how dependent we have become on space-based effects. In response, they are developing, testing and fielding space capabilities designed to deny, disrupt and degrade the United States' and our Allies' advantages in, through and from space. Simply stated, there isn't a single aspect of our space architecture, to include the ground architecture, that isn't at risk. Today, more than ever, assured access to space is vital for our national security and investments to sustain our advantage are critical. I will specifically address challenges posed by Russia and China as they have deliberate focus and possess specific counter-space programs.

In written comments, Admiral Haney highlighted that Russia is seeking to reassert its great power status. In 2015 we saw Russia continue to streamline and modernize their space industry by merging space, air, air defense and missile defense forces into a unified command. They also integrated the Russian Space Agency with the Russian United Rocket and Space Corporation in order to strengthen government control of the space industry. As Russia demonstrates its resurgent military forces in Syria, we see an increased priority on the development and fielding of advanced military equipment that leverages space to enable long-range precision strike. Furthermore, since 2014, Russia has nearly doubled the number of advanced satellites on orbit, including a new generation of missile warning satellites and geosynchronous signals intelligence collectors. Russia views US dependency on space as an exploitable vulnerability and they are taking deliberate actions to strengthen their counter-space capabilities. Additionally, Russia remains a space launch leader and is currently constructing the Vostochny Cosmodrome to support its human spaceflight activities and heavy lift capabilities to geosynchronous orbit. This indigenous facility allows

Russia to control launches from within their borders and will ultimately replace the Baikonur Cosmodrome in Kazakhstan.

As 2015 came to a close, China formally established its Strategic Support Forces as a separate military service. These forces include China's space, electronic and network warfare capabilities. The reorganization signifies the importance the People's Liberation Army place on space and also their recognition of the congruency between space and cyberspace. China is developing, and has demonstrated, a wide range of counter-space technologies to include direct-ascent kinetic-kill vehicles, co-orbital technologies that can disable or destroy a satellite, terrestrially-based communications jammers and lasers that can blind or disable satellites. Moreover, they continue to modernize their space programs to support near-real-time tracking of objects, command and control of deployed forces, and long-range precision strikes capabilities.

To support Combatant Commanders in the current fight and prepare for challenges precipitated by the CDO environment, we are focused on domain superiority through the following operational objectives: information dominance, mission resilience and the ability to protect and defend space assets. Building strong connective tissue and unity of effort across the DOD, with the IC, IA and our commercial and international partners is foundational to these efforts. The aforementioned operational objectives are enabled by accurate and actionable SSA.

Space Situational Awareness (SSA)

A cornerstone of space domain superiority is SSA and it must be accurate and actionable -- in other words, precise and timely. Accurate and actionable SSA allows us to understand where an object is, what it is, where it is going and its specific intentions.

JFCC Space, through its command and control center, the Joint Space Operations Center (JSpOC), tracks approximately 23,000 objects in orbit . . . we know the actual number of orbiting debris is significantly larger; however, most debris is too small for our current sensor network to

detect and/or maintain custody. This is important since every piece of debris is a potential threat to human spaceflight and operational satellites. The ability to maintain custody of 23,000 objects travelling up to 17,500 mph through some 73-trillion cubic miles of space is a critical and complex endeavor. The corresponding space catalog is a living product and the JSpOC routinely adds hundreds of objects to the database each year. In 2015, for example, the space catalog grew by 861 objects, of which 176 are active satellites and 685 pieces of new debris.

Through a largely automated process, every day, the JSpOC provides an average of 3,300 warnings of close approaches (termed conjunctions). During 2015, the JSpOC received over 120 million observations from the Space Surveillance Network, which resulted in 1.2 million messages to over 600 satellite owner/operators, including US government, commercial and foreign organizations informing decisions on 148 successful collision avoidance maneuvers by owner/operators. The team also provided worldwide notifications for 123 high-interest man-made objects that reentered earth's atmosphere.

As our SSA network is modernized, we will have the capability to detect and track even smaller objects -- vastly expanding the current catalog and likely increasing the number of close conjunctions notifications we send to owners and operators. A notable upgrade is the new Space Fence, which I believe is the most-significant improvement to low- and medium-earth orbit SSA capabilities in decades. By some estimates, the Space Fence will improve our catalog awareness from 23,000 to over 200,000 tracked objects. The delivery of this Kwajalein-based radar in the 2018 timeframe will provide USSTRATCOM's Space component incredible coverage for detection of near-earth objects as well as improved ability to detect unforeseen or unannounced space events such as breakups and maneuvers.

Clearly SSA is more than knowing where an object is in space; when operating in a CDO environment, confirming location is no longer good enough. We must have the capability to

actively search the domain to determine what an object is, understand intentions and characterize vulnerabilities to inform potential countermeasures within tactically-relevant timelines. In this vein, SSA and corresponding sensor tasking is an essential aspect of employing and protecting our national security space assets; therefore, the DOD will always have a primary role in this mission area.

Our foundational SSA architecture -- some legacy, some evolving -- affords a good mix of sensors . . . a combination of both terrestrial and space-based. The important next step is to fuse this sensor data with intelligence information, to include indications and warnings, and to provide a clear operating picture of the domain. Intelligence informs operations and we have more work to do in normalizing space to include providing more intelligence billets and developing more intelligence analysts specifically dedicated to this mission area. Ultimately, through unity of effort with the IC, we can get ahead of potential adversarial action to give our operators and senior decision makers actionable information on tactical timelines.

SSA Partnerships

SSA data sharing hit an all-time high in 2015. You heard from Admiral Haney that we have negotiated sharing agreements with 51 commercial entities, two intergovernmental organizations, and ten nations, plus we are in the process of negotiating additional agreements. This permits information sharing and collaboration with other nations and commercial firms and facilitates responsible space operations by reducing the potential for on-orbit collisions and spectral interference.

Last year, United States Strategic Command also expanded the Combined Space Operations (CSpO) concept to include New Zealand. During the October 2015 Principals meeting in New Zealand, the FVEY partners agreed to a CSpO Vision 2025 that reinforces our efforts to assure the strategic advantage of space through enduring partnership. Together, we are working an aggressive

timeline to meet initial priority objectives for continued collaboration in multiple space mission areas including SSA, Satellite Communications Electro-Magnetic Interference, Global Positioning System/Precision Navigation and Timing and Overhead Persistent Infrared. Longer term goals include working towards integrating and leveraging combined capabilities. The end state to achieve this vision requires interoperable systems that enable space battle management command and control supporting global synchronized operations.

Commercial Integration Cell (CIC)

JFCC Space directed a 6-month pathfinder to explore the technical and legal aspects of a partnership between DOD and Industry, leveraging mutual capabilities and information to enhance awareness in the space domain. The CIC allows for rapid identification, diagnosis and resolution of on-orbit events, especially as space becomes more congested and contested. Partnerships with like-minded commercial space operators establish positive norms of behavior in the space domain while also increasing the overall resilience of USG satellite operations.

The CIC is a method of pursuing greater cooperation and synergy in the space environment by integrating liaison personnel from the commercial sector within the JSpOC. Through an innovative Cooperative Research and Development Agreement (CRADA) structure, we've established a framework that allows and encourages two-way technology and information transfer to support space flight safety. The first few months of the pathfinder explored concepts to improve collision assessment processes, interference resolution, and crisis response actions. By leveraging industry subject matter experts, JFCC Space is improving processes to benefit all space-faring nations. For example, a representative industry operations center has offered to provide their position information and maneuver schedules to better inform our collision assessment process. Through our partnership, we've established better automation and data transfer standards which will ultimately lead to fewer military personnel required in this space safety role.

Our 6-month pathfinder was evaluated for its value by both industry and JFCC Space. The initial results exceeded initial expectations and all agreed to continue the CIC. Industry has gained valuable insight into JFCC Space processes and are better informed and included when detailed planning is necessary to deal with the dynamic space environment. USSTRATCOM's Space component now has access to industry operators and technology to smartly inform process improvements. The CRADAs are a three-year framework and we will continue to increase levels of cooperation and partnerships. Our goal is to institutionalize partnerships, retain a permanent industry presence in our operations center, and continue to adapt and automate our processes, especially as the number of active satellites, the size of the catalog, and the number of new entrants in space continues to grow.

Intelligence Fusion

Today, victory in battle is determined by those who can best integrate, synchronize, and leverage effects in multiple domains. Timely, accurate, and actionable intelligence is critical to characterize space capabilities, events, and operations. The Space Event Joint Exploitation and Fusion Cell (SE-JEFC) had its first full year of operations in 2015, and they proved critical in bringing together experts from the JFCC Space Intelligence Enterprise, National Air and Space Intelligence Center, National Security Agency, Central Intelligence Agency, Project West Wing, and the National Geospatial-Intelligence Agency. This core group of highly-experienced, matrixed personnel from outside agencies has access to the most sensitive information and is focused on foreign space and counter-space capabilities. Additionally, our Space Intelligence Preparation of the Battlespace team gleans information generated throughout the IC and organizes it online to efficiently support space-related campaign planning and operational decision making across all of the Combatant Commands. We are also exploring concepts to make more of this information available to our close coalition and allied partners.

OPIR Battlespace Awareness Center (OBAC)

The men and women of JFCC Space continue to maximize partnerships and leverage capabilities of our national Overhead Persistent Infrared (OPIR) missile warning capability to provide critical missile warning reports to national leaders and Combatant Commands. In 2015, over 10,694 infrared events were detected . . . twenty four percent more than the previous year. The OBAC is a new innovative capability analyzing the existing strategic OPIR data to provide additional localized tactical information for combatant commanders. Two months ago, the OBAC began 24/7 operations to provide near-real-time OPIR data exploitation products for situational awareness to joint forces in Iraq, Afghanistan, and most recently in Syria.

Protect and Defend

My charge from Admiral Haney, to protect and defend the space Joint Operational Area, is described in Operations Directive OLYMPIC DEFENDER. As Russia and China actively develop counter-space technologies, it is paramount we maintain the edge -- we help enable this through experimentation, TTP development and active defense of our military systems.

Joint Interagency Combined Space Operations Center (JICSpOC)

To facilitate information sharing and unity of effort across the national security space enterprise, the Director of National Intelligence, USSTRATCOM, the National Reconnaissance Office (NRO) and Air Force Space Command (AFSPC) established a JICSpOC located at Schriever Air Force Base, Colorado. Not only is it staffed by space professionals, but there are also experts from across the IC to make sure we get this right. During the current phase, through increasingly complex vignettes, the team is focused on providing the DoD and IC a robust test and experimentation environment to facilitate TTP development focused on space defense. As new TTPs are developed at the JICSpOC they will be incorporated into JSpOC processes.

Automated Navigation and Guidance Experiment for Local Space (ANGELS)

Air Force Research Laboratory's (AFRL) ANGELS program epitomizes the spirit and value of experimentation. Last year, the JSpOC worked with AFRL and other agencies to conduct 6 ANGELS experiments that provided valuable insight into the TTPs, systems and processes required to operate in a CDO environment. These experiments challenged our understanding of I&W for potential threats, informed us on requirements for actionable timelines and exposed visualization and analysis techniques required for operations in a CDO environment. Control of the ANGELS spacecraft will soon transition to AFSPC and we anticipate conducting additional experiments to develop and refine our TTPs.

Geosynchronous Space Situational Awareness Program (GSSAP)

Since the GSSAP Initial Operational Capability was declared in October 2015, the command has been operating this space-based system to augment ground-based sensors for cutting-edge SSA. The GSSAP represents a significant improvement in situational awareness in geosynchronous orbit approximately 22,000 miles away. Currently consisting of two satellites, the GSSAP helps protect our assets in geosynchronous orbit; they provide us a "neighborhood watch" capability and also enable satellite anomaly resolution. The GSSAP permits Rendezvous and Proximity Operations (RPO) allowing operators to maneuver the satellites to optimal vantage points for collecting images when required.

JFCC Space, 14AF, and JSpOC Consolidation

A significant milestone to achieve true BMC2 of space involves the consolidation of JFCC Space, 14AF and JSpOC personnel into a single, modern facility. Currently our 230 Joint and Service staff and the 400 JSpOC personnel (137 Officers, 216 Enlisted, and 47 Civilians) work in separate buildings that are approximately two-miles apart. My current headquarters also shares spaces with the host wing -- the 30th Space Wing -- which, is also separated from its units. Additionally, the current JSpOC resides in a refurbished Titan booster processing hangar and,

while it has served us well these past 9 years, this repurposed hangar cannot meet future power and communications requirements. Last year we secured a $61M contract to build out and refurbish an existing building for the JSpOC. We anticipate construction will be complete in 2018, followed by communication equipment installation and final JSpOC move in 2019.

JSpOC Mission System (JMS)

The completion of JMS Increment 2 will allow the JSpOC to transition from an unsustainable and non-upgradable legacy space catalog system to a modern system that will be able to exploit data from future sensors like the Space Fence and other sensors to improve SSA in a CDO environment. Additionally, the legacy mission system does not provide BMC2 functionality. The objective that separates JMS from legacy systems is that we are fielding JMS from inception with a focus on a CDO environment to provide a sophisticated, open architecture system. I look forward to the implementation of JMS Increment 2 and then the delivery of the follow-on system, with modern software architecture to enable advanced BMC2 capabilities.

Conclusion

I remain focused on preserving the peaceful use of space, while absolutely maintaining freedom of action in the space domain and on providing unfettered support to the Combatant Commanders – wherever and whenever our Forces need space effects. At the same time, I am preparing for the future to ensure we maintain our operational advantages in the domain. We will continue to develop new TTPs, employ new technologies, foster collaboration and, most importantly, unleash the power of innovation. I thank the Committee for your continued support and partnership to ensure freedom of action in space and the corresponding ability to provide critical capabilities to the Joint Force and our Nation.