STATEMENT OF

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INTRODUCTION

Chairman Rogers, Representative Cooper, and members of the Subcommittee, it is an honor to appear before you as United States Strategic Command's Commander of the Joint Functional Component Command for Space (JFCC SPACE). This is my first opportunity to address the committee and I look forward to working with you to advance our nation's space capabilities.

It is my highest honor to represent the 3,300 Soldiers, Sailors, Airmen, Marines and civilians that make up JFCC SPACE. These professionals, along with our exchange officers from Australia, Canada and the United Kingdom, ensure our nation, our allies, and our joint warfighters have continued access to the space capabilities that enable the American way of life and provide a tremendous strategic advantage.

SPACE ENVIRONMENT

For decades, the United States leveraged space to our advantage, but the strategic environment has changed and that advantage is no longer guaranteed. The space domain is characterized today by ever-increasing congestion and competition for limited resources. Assured access to space is challenged by the exponential growth in operations driven by international users. Satellite communications bandwidth is a finite resource with a commensurate level of competition for access and use.

Today JFCC SPACE routinely tracks tens of thousands of objects in orbit around the Earth, but the true amount of debris may be an order of magnitude higher. Although we may never be able to detect and track the smallest objects, every piece of debris on orbit poses a potential threat to our operational satellites.

Potential adversaries possess, and continue to develop, a broad set of capabilities that could threaten U.S. access to space while increasing their relative strategic advantage. Several countries have charted a course to develop capabilities in an effort to deny us the use of space, even as they improve their own launch and on-orbit capabilities. Specifically, China improved their space-based imagery and radar and tested a rapid launch capability. Some nations have developed and demonstrated anti-satellite weapon capabilities that represent a potential threat to our space capabilities. Many of these activities could be considered dual-use civilian and military efforts, but have lacked transparency with regard to purpose and intent.

Adversary capabilities could range from brute force jamming of Global Positioning System (GPS) and satellite communications (SATCOM) signals, to highly sophisticated anti-satellite weapons intended to damage or destroy their targets. Today there are eleven space-faring nations that have an indigenous space launch capability. Additionally, at least 50 nations, dozens of companies and a multitude of educational and nonprofit institutions are operating satellites in space. As the barriers to access space are lowered, the number of actors is expected to increase, and our ability to carry out our missions will become progressively more difficult. A responsive and flexible global force must continue to exploit the advantages of space to ensure effective and efficient military operations.

To meet the demands of the dynamic space environment, JFCC SPACE is focused on three operational objectives: provide timely and accurate warning and assessment, support national users and Joint and Coalition forces, and protect and defend our space capabilities and prepare for contingency operations. All of these objectives require increased situational awareness and enhanced command and control (C2).

SPACE SITUATIONAL AWARENESS

Space Situational Awareness (SSA) is fundamental to effective operation and defense of our capabilities. SSA allows us to maintain the current and predictive knowledge of the space domain and the operational environment upon which space operations depend. We rely on SSA to provide timely and accurate warning to alert national and military leaders and our partners of impending threats and hostile actions. Fusion of sensor data coupled with enhanced command and control capabilities enables the rapid situational assessment, to include identifying potential threats, and providing indications and warning to decision makers.

Space debris continues to be a significant concern as even the smallest fragments pollute the space domain and can potentially damage or destroy space capabilities. Fielding new sensors with greater sensitivity will allow us to track more and smaller objects, but we must do more than simply improve our vision. We must continue broader efforts to reduce the by-products of space launches, improve plans to dispose of defunct satellites, decrease the probability of accidental collisions between space objects, and thwart deliberate acts of destruction.

JFCC SPACE is responding to today's congested space environment by tracking tens of thousands of objects, and by producing approximately 1,400 conjunction summary messages on a daily basis to inform satellite operators of impending close approaches. Those operators must then assess the risk posed to their assets and weigh the benefit of maneuvering a spacecraft to avoid a collision against the cost of consuming precious fuel and reducing mission life. One of our most vital missions is providing collision avoidance data to NASA in order to protect the International Space Station.

A continuing trend of multi-payload launches with an ever decreasing satellite size will add to on-orbit congestion. In 2012, 72 new satellites were placed in orbit; in one 7-day period

in 2013, 78 new satellites were placed in orbit. The trend includes deployment of cubesats -- cube-shaped satellites, 10 centimeters on a side, that are highly capable for their size. In February 2014, the International Space Station (ISS) deployed 33 CubeSats The upcoming Falcon-9 ISS cargo resupply mission is programmed to deploy 5 additional CubeSats, including a Cubesat that deploys 104 chipsats, which are smaller than a credit card. Detecting and tracking multiple objects of chipsat size over 250 miles above the earth is beyond the current capabilities of fielded systems. We anticipate further increase in the complexity of the SSA mission through the deployment of hundreds and perhaps thousands of additional small satellites in the next few years – a challenge that will require increasingly capable sensors analytic tools and highly-trained analysts.

To mitigate these challenges we are taking a multi-pronged approach to enhancing SSA. We are fielding new, more-capable SSA sensors, implementing a new SSA Sharing Strategy, and entering into two-way sharing partnerships.

Service provided capabilities such as, the Geosynchronous SSA Program (GSSAP), the Space Fence, and the Space Surveillance Telescope will fill a critical shortfall in the SSA mission with increased tracking and characterization of objects in space.

Working closely with United States Strategic Command (USSTRATCOM), we are in the process of implementing a new tiered SSA Sharing Strategy. The tenets of this strategy are to share more information in a timelier manner with the broadest range of partners. We aim to promote an interactive, exchange-based relationship with satellite owners and operators where all parties gain. This open exchange of information also supports U.S. and allied efforts to detect, identify, and attribute actions in space that are contrary to responsible use and the long-term sustainability of the space environment..

We have entered into SSA sharing agreements with 41 commercial firms and five nations. Over last year, , USSTRATCOM, with interagency coordination, finalized eight commercial and five international agreements. Seven additional commercial/intergovernmental and five more national agreements are in work. The desired end state is the development of routine operational partnerships, creating a true data sharing environment that extends to the robust inclusion of international data. SSA Sharing Agreements are laying the foundation for increased international cooperation, and are aided by efforts to integrate partner nation sensors into the Space Surveillance Network (SSN). Recently, the first such sensor was incorporated, the Canadian Sapphire satellite, and work is being done to place a US Space surveillance telescope and radar in Australia. These successes represent initial steps toward the goal of leveraging existing and planned SSA capabilities of allies and space partners..

Combined space operations are USSTRATCOM's response to US National Security Policy (NSP) and the National Security Space Strategy (NSSS) direction to establish an operational working relationship in the space domain with Allied and like-minded nations. This multinational military effort will strengthen deterrence, improve mission assurance, and enhance resilience. To best protect vital space-based capabilities, we need to operate in space as we do in other domains: with our closest partners and allies.

SUPPORT NATIONAL USERS AND JOINT AND COALITION OPERATIONS

With the knowledge provided by SSA, JFCC SPACE is able to provide necessary support to national users and joint and coalition forces. Our space systems and capabilities exist for this purpose. While it is not my intent to cross into the Services' organize, train, and equip

responsibilities; the space capabilities they develop and provide are vital to USSTRATCOM's space operations mission.

Positioning, Navigation and Timing (PNT)

Positioning, Navigation and Timing provided by the Global Positioning System (GPS) is widely recognized by military, civil, and commercial users, and is highly integrated into the Joint Force. The dependence of joint warfighting on GPS services and the asymmetric advantage they provide to our way of warfare means that we must protect and defend this vital capability or face the reality of conducting our operations under very different circumstances.

The reliability of our GPS constellation continues to improve as the Air Force systematically replaces aging satellites with more capable satellites and upgrades the architecture that improves capabilities. These capabilities will reduce the vulnerability of the PNT mission by making the GPS signal more robust/resilient, boosting the power and reliability to users, and providing near real-time command and control to enable space operators to take quick action in the face of growing threats.

Missile Warning

JFCC SPACE is responsible for providing robust, reliable, global missile warning for the U.S. and our allies. While spaced-based missile launch detection is a key element of the mission, ground-based radars are the mainstay of our homeland protection capability. Most of these systems have been operating 24 hours a day, 365 days a year since the early days of the Cold War. Currently, three of our six strategically-placed phased array radars have been upgraded to provide improved detection capabilities and enable autonomous missile defense. Two of the remaining radars are expected to be upgraded by year's end.

In addition to maintaining ground based warning, the men and women of JFCC SPACE continue to maximize the use of our national Overhead Persistent Infrared (OPIR) missile warning capability, the space-based element of our missile warning architecture. In 2013 alone, 9,584 infrared events and 625 missile warning reports were generated and distributed to national leaders and the combatant commands, twice the number recorded in 2012. In addition to protecting the homeland, our OPIR assets provide near-real time support to joint forces in Iraq, Afghanistan, and more recently, Syria. We have only begun to fully understand and exploit the ground-breaking capabilities provided by these new systems and must continue explore innovative ways to use them.

Military Satellite Communications

JFCC SPACE also provides the Joint Force with protected, wideband, and narrowband satellite communications. Information technologies have revolutionized our capability to operate globally. Terrestrial wired, wireless, and cellular networks are connecting the world, but they do not meet the need for a flexible, responsive network to communicate globally, securely, and reliably in all locations and under all conditions. From combat operations to humanitarian assistance, we use military satellite communications every day when no other form of communications is capable or available. Our protected communication capability is the reliable, survivable command and control mechanism for decision makers regardless of the circumstance, even if it is a contested and potentially nuclear environment. Emerging mission sets and advanced technologies have additional communications requirements that present unique challenges, requiring high bandwidth and theater-centric communications capabilities. Highly mobile satellite communications capability provides ground, sea, air, and Special Forces additional flexibility in a dynamic operational environment. The Joint Force requires a

complementary suite of satellite communications capabilities, and the enhanced capabilities of Advanced Extremely High Frequency (AEHF), Wideband Global SATCOM (WGS), and the Mobile User Objective System (MUOS) narrowband satellites, along with commercial satellite communications provide forces a vital C2 mechanism for not only wartime operations, but humanitarian assistance missions as well.

PROTECT AND DEFEND AND PREPARE FOR CONTINGENCY OPERATIONS

The importance of JFCC SPACE-provided capabilities highlights our need to protect and defend the Space domain. Space Control requires knowledge derived from SSA to warn and assess threats that pose a risk to US and coalition space operations. Space Control may also include threat avoidance, safeguarding of our on-orbit assets, and the ability to mitigate electromagnetic interference. Our current space systems and set of tactics, techniques, and procedures (TTPs) were not developed with the need to operate in today's contested and congested environment. Nevertheless, these systems will be operating for years to come. In order to effectively operate using the current capabilities, JFCC SPACE will lead the effort in the development of options and TTPs that provide the highest possible level of protection against evolving threats. Further, we will develop or modify existing practices that accept and normalize the reality of contested operations and address risks to space assets by accepting risk of action at appropriate levels and in a practical time-frame to counter threats, ensure mission success, and meet national security requirements.

There is no silver bullet to address the space protection challenges. Better intelligence, improved C2 systems, increased capacity, balanced policies, robust coalition sharing agreements, and improved SSA sensors are critical needs that will allow the US to face challenges of space

threats. All of these areas need to be addressed to ensure responsible use of space and our national security. JFCC SPACE, with USSTRATCOM and other Combatant Commands, Allies, and partners will plan and prepare for contingencies that allow the U.S. to maintain the strategic advantage.

ENHANCE OUR ABILITY TO COMMAND AND CONTROL

The JSpOC Mission System (JMS) is currently in the process of replacing our legacy command and control systems designed in the 1980s and fielded in the 1990s. JMS is designed as a decision aid supporting the full range of JFCC SPACE operations. It is not intended to, nor can it, replace our highly trained space operators who remain the primary element of effective decision-making. JMS will provide an architecture that aggregates and rapidly processes data into actionable information for our operators and planners, giving them the understanding and ability to develop courses of action (COA) and provide support to senior leader decision-makers. JMS advanced data processing is critical to the effectiveness of our Joint space forces who must adapt to keep pace with and anticipate the demands of operating in an increasingly congested and contested space domain. Each deployed increment of JMS will significantly enhance our ability to understand the space situation with an improved, integrated operating picture and increased ability to respond to a dynamic space environment. We will continue to build upon this initial capability to ensure our commanders and operators have the situational awareness, tools, and the infrastructure needed to accomplish the mission. Rather than simply processing events, JMS will enable the operator to investigate events and test hypotheses, including most-likely and most-dangerous scenarios, in order to fully develop response options for commanders.

CONCLUSION

We find ourselves in a strategic space environment that requires active stewardship to preserve the capabilities on which our Nation relies. JFCC SPACE is responding to these challenges and will continue to be the world's premier provider of space capabilities - even as it faces a constantly evolving operational and threat environment. This is in large part due to a spirit of dedicated innovation and devotion to duty that drives our Soldiers, Sailors, Airmen, Marines, and Civil Servants to aggressively meet and overcome any and all operational challenges with the resources we are allocated. We will continue to develop new TTPs, and employ new technologies and methodologies to maintain and extend our advantage in space. We will continue to strengthen relationships with allies and industry partners to ensure capabilities derived from and provided by space operations are available for all who peaceably require them. While we continue to face new challenges in space, I am extremely confident that the men and women of JFCC SPACE are prepared to meet these challenges and will continue to provide the warfighter assured access to the world's premier space capabilities. I thank the Committee for your continued support as we strive to preserve and enhance the space capabilities which are vital to our nation.