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THE SENATE ARMED SERVICES COMMITTEE

STATEMENT OF

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Committee on Armed Services

Introduction

Chairman Udall, Ranking Member Sessions, and Members of the Subcommittee, I am pleased to join General Shelton, Lieutenant General Mann, Dr. Zangardi, and Ms. Chaplain to testify on Department of Defense (DoD) space programs and policies. I first testified in front of Congress on these topics one year ago, and I welcome the opportunity to continue that discussion today.

As I stated last year, space remains vital to our national security. It underpins DoD capabilities worldwide at every level of engagement, from humanitarian assistance to the highest levels of combat. It enables U.S. operations to be executed with precision on a global basis with reduced resources, fewer deployed troops, lower casualties, and decreased collateral damage. Space empowers both our forces, and those of our allies, to win faster and to bring more of our warfighters home safely. It is a key to U.S. power projection, providing a strong deterrent to our potential adversaries and a source of confidence to our friends.

But the evolving strategic environment increasingly challenges U.S. space advantages. Space is no longer the sole province of world powers – it is a frontier that is now open to all. In the last several decades, space has become more competitive, congested, and contested. I am confident that with the right policies, the United States is well-positioned to remain ahead in the competitive environment. I am equally confident that we are on course to deal with congestion. But what worries me the most is the contested environment we now face. Over the last 15 years, our adversaries have watched us closely and have recognized that if they are to challenge the United States, they must challenge us in space.

The United States has successfully addressed such challenges before in air, sea, and land domains, and now we must likewise respond in space. We do so against the backdrop of a decreasing budget that challenges both the ability and speed with which we can act, but that in no way diminishes the importance of successfully sustaining our crucial advantages in space.

Our strategic approach remains consistent with what we outlined in the 2011 National Security Space Strategy and reaffirmed in DoD Directive 3100.10, the DoD Space Policy, released in late 2012. In my testimony today, I will outline the five key elements of this strategic approach and describe specific steps we are taking to implement our approach.

Promoting the Responsible, Peaceful, and Safe Use of Space

As still the world's leading space power, the United States is uniquely positioned to define and promote the responsible, peaceful, and safe use of space. We need to do this to ensure that we can continue to reap the military benefits that space provides and, more importantly, the civil, scientific, and economic opportunities it presents. Space is woven into the fabric of modern economies and the United States, beyond all others, has led the way in using that to our national advantage. We are taking steps to make sure that access to and use of space is not threatened by irresponsible actions. The Department of Defense is working closely with the Department of State to establish an International Code of Conduct and other "rules of the road" for the safe and sustainable use of space. Those rules include common sense standards for debris limitation, launch notification, on-orbit monitoring, and collision avoidance. The United States already follows these practices and, by encouraging their adoption by others, could help ensure that space remains sustainable for the future

I know there are some who question the wisdom of these multilateral activities. They are worried that in establishing international norms of behavior we would limit our response options. Let me assure you, we do not intend to allow that to happen. We have worked side-by-side with the Joint Staff, Combatant Commands, Military Services, Defense Agencies, and Intelligence Community to make sure that any agreement we develop enhances security and does not threaten current or future U.S. capabilities.

I am not so naïve as to believe that a simple set of rules will solve all of the major issues we face – they will not; nor would I expect that they will inhibit those who would try to threaten our use of space. But common sense rules that can be embraced by a majority of space-faring nations will help stem the rise of uncontrollable debris, add demonstratively to spaceflight safety, and clearly differentiate those who use space responsibly from those who do not.

Our efforts here go beyond mere words – they are backed by actions. As I have discussed before, a key aspect of improving spaceflight safety, and assuring we can monitor the space environment more closely, is our space situational awareness (SSA) capabilities. We have been working on this for some time, and I am happy to report that we have made some real progress over the last year. That progress comes in two forms – new sensors and information sharing agreements.

On the sensor front, we have remained on a constant path for the last several years to reposition sensors where they can do the most good and to invest in new sensors where needed. Last year we reported that we had entered into an agreement with Australia to relocate and repurpose a launch tracking radar, the C-Band radar, from Antigua to western Australia to aid in our ability to monitor activities at low altitude in the southern hemisphere. That work is now underway. We complemented that effort with a second agreement signed with Australia this past

November to relocate the DARPA-developed Space Surveillance Telescope to western Australia to give us an unmatched ability to track deep space objects in that critical region of the world. Additionally, after years of focused effort, and a sequestration-imposed six-month delay, we will soon award the contract for the first Space Fence site. The Space Fence will provide an unprecedented ability to track an order-of-magnitude greater number of objects in low earth orbit, supporting long-term spaceflight safety.

The Department has also made great strides in more transparently sharing SSA information with other space operators. Over the past year, U.S. Strategic Command (USSTRATCOM) has continued to pursue SSA sharing agreements with commercial companies and foreign governments, consistent with existing legislative authority. This year, USSTRATCOM signed five agreements with other governments – Australia, Japan, Italy, Canada, and France – and increased to forty-one our agreements with commercial satellite operators. Many more agreements are in varying stages of negotiation. We are committed to providing SSA services to enhance spaceflight safety for all.

While the purpose of these agreements is to allow us to share more advanced space flight safety products with other space-faring nations, they really serve to lay the groundwork for the next stage of effort – two-way data sharing. The space environment is too big and too complex for a single nation to bear the entire cost of monitoring it. Cost-effective SSA requires cooperation among space actors. The increasingly congested space environment means that an unparalleled level of information sharing is needed to promote safe and responsible operations in space and to reduce the likelihood of mishaps, misperceptions, and mistrust. We are currently engaged in detailed technical discussions with several nations that have space situational awareness capabilities to explore opportunities for two-way information exchange. This type of

sharing will increase SSA information available to the United States while limiting unnecessary duplication of SSA capabilities. In short, we save money and improve safety for us and our allies.

Improving DoD Space Capabilities

Improved SSA is but one facet of the next pillar of our strategy – improving our own space capabilities. This element boils down to a single refrain – make DoD space systems and architectures more resilient. Yes, we need to continue to improve how space systems operate, the services they provide, and the capabilities they create; yes, we need to make space systems less expensive; but above all others, we have to focus on making those capabilities more resilient. The most capable and cost-effective space capability in the world is of little use if it is not there when the warfighter needs it. If we are to overcome the challenges posed by others, resilience is job one.

We have been talking about resilience for some time, but often I am unsure if we have clearly defined what we mean. In fact, I am sure we have confused several audiences. Before I describe specific investments in resilient space architectures, allow me to explain the concept.

Resilience, in fact, is not an end in and of itself; rather we seek to assure the mission benefit that our capabilities provide – omnipresent positioning from the Global Positioning System (GPS), global surveillance from overhead intelligence, surveillance, and reconnaissance (ISR), and worldwide information availability from Satellite Communications (SATCOM). As we see it, that assurance can be achieved through a combination of (1) strengthened or resilient space architectures, (2) the ability to replenish lost or degraded capabilities, and (3) defensive operations to provide warning of and interruption to an adversary's attack. Making architectures more resilient is a combination of adequate protection, increased proliferation, service diversity,

appropriate distribution, well-reasoned disaggregation, and operational ambiguity – all to create a service that can stand up to an adversary's attack. These are the same force structure ideas we use in every other field of warfighting to help our systems survive in a hostile environment.

With these concepts in hand, we have begun to consider resilience in a variety of architectural and programmatic discussions. For the first time ever, for example, our protected SATCOM analysis of alternatives is focusing on resilience. The same will be true when we look at overhead persistent infrared monitoring later this year. From an investment standpoint, we have identified extremely cost-effective enhancements in automated anti-jamming for our Wideband Global SATCOM system (WGS) to increase protection in a jammed environment. We are committed to assuring that GPS can face the rigors of a hostile battlefield environment by continuing our investment in our military (or "M-code") user equipment program. And the Department continues to use Space Modernization Initiative (SMI) investments to improve affordability and capability of our current Space Based Infrared System (SBIRS) and Advanced Extremely-High Frequency (AEHF) architectures. SMI funds are also being used to invest in evolutionary follow-ons to those architectures that disaggregate strategic and tactical elements and look at ways to distribute and proliferate the resulting pieces. Every aspect of these decisions is driven by our focus on improving space system resilience.

Partnering with Like-Minded Nations, International Organizations, and Commercial Firms

Resilience, however, will not be achieved through U.S. investment alone. The reality of the budget is such that we cannot just hope to "buy our way out" of these challenges. They are too complex, and they are too long term. Instead we have taken a more expansive approach:

joining with other like-minded space-faring nations and commercial partners to create a coalition approach to space, just as we have done in other warfighting domains.

Space is no longer limited to just a few nations. It is a major force structure component for each of our allies, and that is force structure we can all share. Whether we are talking about the dozens of radar and electro-optical imaging satellites that the United States and our allies already have on orbit, the rapidly multiplying navigation constellations whose satellites will soon number over 100, or the ever-growing array of weather and SATCOM capabilities at the world's disposal, we have begun to recognize that the United States neither can, nor does it need to, go it alone in space. This is a fundamental shift in how we approach this problem. Just as in other fields of combat where we combine with allied land, sea, and air forces, so too can we combine our space forces with equally effective results and for very little increased investment.

For example, by 2020 we anticipate that at least six nations or regional intergovernmental organizations will have fielded independent space navigation systems – our GPS network, the European Union's Galileo, Japan's Quasi Zenith Satellite System (QZSS), the Indian Regional Navigation Space System (IRNSS), China's Compass system, and Russia's GLONASS. Those constellations will include nearly 140 satellites, with a dizzying number of new signals and services. While it may be possible for an adversary to deny GPS signals through jamming, physical antisatellite attacks, or a cyber-attack on a ground control network, it is much more difficult to eliminate multiple services at the same time. Assuring U.S. warfighters have access to the bulk of these systems is a very powerful way to make sure no warfighter will ever have to face battle without the incredible benefit of space-enabled positioning, navigation, and timing (PNT). To that end, we have begun negotiations with like-minded PNT owner/operators to

ensure the United States has that access. We must likewise ensure our equipment is capable of receiving these different signals – just as is already happening in commercial applications.

The same is true for other space services and is already bearing fruit in our plan for future space weather capabilities. We closely examined what we could get from others – international partners, U.S. civil agencies, the commercial sector, and even non-space services – and we defined a new, minimal, DoD owned- and operated-system that is an order-of-magnitude less expensive than the previously planned system it replaces. Together this "system of systems" meets U.S. warfighting needs in a way that stymies an adversary's ability to threaten the resulting whole. A combination of diversity, distribution, disaggregation, and proliferation can increase resilience while reducing needed investment.

This approach is particularly well-suited to areas in which the commercial world plays a major role, such as remote sensing. In this area, we are aligning several of our policy elements to take advantage of and hasten the diversity- and proliferation-driven resilience I have been discussing. Building on over a decade of experience with traditional commercial providers, we are reexamining commercial remote sensing licensing policy, while leveraging new authorities to relax export controls for systems that are widely available commercially. Our aim is to posture U.S. industry – both traditional commercial providers and entrepreneurial start-ups – to compete successfully in a burgeoning global marketplace.

Deterring Aggression

The fourth strategic element is to prevent and deter aggression against our space systems. In fact, all of the policy elements I have covered thus far – promoting responsible use, improving our own capabilities, and partnering with allies and commercial space providers – are also aimed

squarely at this fourth strategy element. Those efforts are complemented by a focus on SSA to provide timely and accurate indications and warning prior to an attack and attribution during and after an attack, with a focus on command and control systems that support our ability to respond appropriately.

Let me discuss two efforts aimed at those objectives. First is our Joint Space Operations Center (JSpOC) Mission Systems (JMS). That program delivered its first operational increment early last year, and we are on track to complete increment two in fiscal year 2017. That will be followed by additional increments that support characterizing attacks and coordinating operational responses.

The second is the Geosynchronous Space Situational Awareness Program (GSSAP) recently announced by Gen Shelton. This previously classified program will deliver two satellites later this year for launch into near geosynchronous orbit (GEO). From that unique vantage point they will survey objects in the GEO belt and allow us both to track known objects and debris and to monitor potential threats that may be aimed at this critically important region. In short, threats can no longer hide in deep space. Our decision to declassify this program was simple. We need to monitor what happens 22,000 miles above the Earth, and we want to make sure that everyone knows we can do so. We believe that such efforts add immeasurably to both the safety of space flight and the stability that derives from the ability to attribute actions – to the benefit of all space-faring nations and all who rely on space-based services.

Taken together, all of these elements combine to enhance stability and deterrence – seeking to reduce the likelihood of attack, to provide the necessary indications and warning to take evasive actions prior to an attack, to deny benefits to the adversary if such attacks are

undertaken, to attribute the source of the attack, and to make it impractical for an adversary to isolate the United States from the community of space-faring nations that will be affected.

Defeating Attacks and Preparing to Operate in a Degraded Environment

Even with all these efforts in place, however, attacks may occur. Our last strategic element is to assure we can defeat attacks and prepare to withstand them should they occur. Much of our effort in this area is coordinated through our Space Security Defense Program (SSDP). SSDP was established last year as an outgrowth of the Space Protection Program initiated in 2008 by Air Force Space Command and the National Reconnaissance Office. SSDP is developing methods to protect and defend our space systems by finding ways to counter the ever growing list of threats they will face.

Several of the initiatives I have already mentioned today, such as the WGS automatic anti-jamming capability, are derived from work of SSDP. We have requested increased funding for SSDP this year to allow them to examine non-material solutions, such as changes to tactics and procedures, that can be implemented today. While our long-term intent is to move to more resilient and more defendable space architectures, we have over a decade before those systems will even begin to deploy, and we need to protect ourselves and our on-orbit systems now.

Other Matters

Let me conclude by moving from our overall strategy to address specific matters in which I know there is continuing interest. First, last year your colleagues in the House Armed Services Committee challenged me to explain why the United States was leasing communication links from a Chinese provider to support U.S. Africa Command (USAFRICOM). I agreed that while

the initial lease was driven by operational need, it was not an appropriate long-term solution. I pledged that we would address the issue as quickly as possible. I am happy to report that we have. Working with us, USAFRICOM has made significant progress over the last year in moving DoD SATCOM leases from the Chinese Apstar system to other commercial satellite providers in the region. We have already transitioned over 75% of the Apstar bandwidth to other satellites, and our intent is to be completely transitioned by May of this year.

Second, we are developing a better strategy for making long-term commitments to commercial SATCOM providers to reduce cost, increase capability, and add resilience. Later this year, Air Force Space Command will purchase a commercial transponder, one that is already in space, for use by USAFRICOM. This is not a lease – instead it is government ownership of an on-orbit asset that will be managed and operated by the commercial provider at a small fraction of the cost that it would take to lease this capability on an annual basis. Not only will this transponder help to accelerate the move off of Apstar, it will provide needed experience with this new method of acquiring commercial SATCOM, potentially ushering in a revolutionary way to do so worldwide.

Third, we recently welcomed the President's new National Space Transportation Policy, released November 21, 2013. This policy will help ensure the United States stays on the cutting edge by maintaining space transportation capabilities that are innovative, reliable, efficient, competitive, and perhaps most importantly, affordable. This policy supports DoD's ongoing efforts to provide stability to the industrial base that currently provides launch vehicles to the national security community by mandating that all programmatic decisions are made in a manner that considers the health of the U.S. space transportation industrial base. The policy also calls for a level playing field for competition that can spur innovation, improve capabilities, and

reduce costs, without increasing risk. The President's budget request already bears evidence that this strategy is working: the EELV request has been reduced significantly. Those benefits will become even greater in the future as we fully qualify new entrant launch providers, an effort that is already well underway.

Fourth, we continue to make progress in building coalition space operations. Led by USSTRATCOM, the Department is working with close allies on cooperation, not only in the systems we fly, but in the operations we perform. This initiative paves the way for far closer operational collaboration with allies than we have ever had, with the aim of eventually broadening participation to include additional space-faring countries.

Finally**,** just as the United States develops its space capabilities and leverages them to support military operations, so too do other countries. We are increasingly seeing rival nations begin to integrate space into their own operations in the same way as the United States and our allies have done for years. This is not unexpected. But it does mean that the benefits we ourselves derive from space will begin to be available to those that we may someday have to face in combat. We recognize that this is the reality of the future and we are beginning to prepare to face a more capable adversary. We appreciate the increased interest from the Congress in this area and look forward to working with you over the coming years to assure our strategies and plans in this area are thoroughly deliberated.

Conclusion

Mr. Chairman, thank you for the opportunity to provide these updates on the Department's space policies and programs. My colleagues and I look forward to working

closely with Congress, our interagency partners, our allies, and U.S. industry to continue implementing this new approach to space.