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STATEMENT OF

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(SPACE POLICY)

BEFORE THE

SUBCOMMITTEE ON STRATEGIC FORCES

HOUSE ARMED SERVICES COMMITTEE

ON

FISCAL YEAR 2017 NATIONAL DEFENSE AUTHORIZATION BUDGET REQUEST FOR
NATIONAL SECURITY SPACE ACTIVITIES

MARCH 15, 2016

Introduction

Chairman Rogers, Ranking Member Cooper, and Members of the Subcommittee—I am pleased to come before you today along with Gen Hyten, Mr. Weatherington, Lt Gen Buck, Mr. Cardillo, and Mr. Calvelli to discuss the Department of Defense’s national security space program for 2017 and to report to you on the shared progress we have all made to extend confidence in our space forces and respond to the growing threats in that domain. My testimony today is a continuation of the dialogue that I began with this committee three years ago, and I am pleased to report that we have made substantial progress since then.

In the past, I’ve testified on the efforts that the Department has made to reorient its efforts in space to address the growing and aggressive threats we see from several nations around the globe. That effort culminated, in great measure, with the budget that the President submitted last year in which we substantially and specifically focused on initiating multiple activities throughout the space enterprise to counter those threats. FY 16 was the year in which we began to adjust the U.S. space posture to the realities of a future space environment that could be contested. In that environment, it is our intent to posture U.S. space forces to deter attacks in space and, if deterrence fails, to continually assure warfighting space services are available for our terrestrial warfighters. With your help, that budget passed and that work has begun. Our FY 17 budget continues those gains, extending similar investments throughout the rest of the enterprise as well as initiating additional efforts to better prepare us for that eventual reality.

In our discussion today I know that you will want to hear more about the “nuts and bolts” of the FY 17 submission, and I am happy to join my fellow witnesses in that discussion. But before we enter into that detailed line-by-line assessment, I’d like to spend a few moments going beyond the specifics of budgeting and focus instead on the objectives and intent of our strategy. For it is only against that strategy that we can truly judge the adequacy and efficacy of our budget.

The Importance of Space

To begin, let me assure this committee that the fundamentals of our intent have not changed. Space remains, and will remain, vital to U.S. national security. The threats that we have recognized and that Director of National Intelligence Clapper has testified to in detail, do not dissuade us from our resolve to leverage space for U.S. advantage. Space services are inextricably woven throughout the fabric of our defense and national security infrastructure, and we do not intend to yield them. Space capabilities enable continuous U.S. presence around the globe to deter conflict as well as to enable swift and sure responses to humanitarian crises, the latest terrorist threats, and conflict between states. Space enables the United States to monitor world activities in real time, and to respond where and when we are needed.

Civil and commercial space capabilities add to this national security core and are part of our civilian critical infrastructure, creating opportunities to conduct business seamlessly across the planet, to guide goods and services to their final destinations, and to examine changes in our natural environment on a continual basis. These advantages go beyond purely U.S. national security interests and remind us that while we will defend those U.S. interests, we remain fully committed to assuring the peaceful use of space by all nations.

For this reason, as Gen Hyten stated last year, the United States has no desire to see a war extend into space. We don't think that is in our interests, the interests of our allies, nor in the interests of would-be adversaries. But let me be clear about our intent—we will be ready. We are making changes in our systems, our tactics, our culture, and our people to assure that if that eventuality arises, we will be able to defend U.S. and allied interests in space. We want to make sure that it is clearly recognized that no matter the threat, no matter the expected level of effort, attacks on U.S. space services are strategically ill-advised and militarily ineffective. By assuring this is the case and by posturing ourselves in such a way that space cannot be taken away, it is our belief that we will deter attacks on space in the first place and, by extension, deter aggression overall. Today our adversaries perceive that space is a weak-link in our deterrence calculus. Our strategy is to strengthen

that link, to assure it never breaks, and to disabuse our adversaries of the idea that our space capabilities make tempting targets.

I'd like to spend a few minutes describing this space deterrence calculus, how it works and why it might be different from deterrence equations of the past. Then I will explain how we achieve it.

Space and Deterrence

During the cold war, the idea of deterrence centered on concepts of assured retaliation and imposition of overwhelming cost—so called Mutually Assured Destruction. Space forces were vital during that era to execute that deterrent posture. Space forces supported two primary objectives: first, to provide strategic indications and warning and confirmation of an attack; and second, to provide the means to command and control a U.S. response. This connection between space forces and effective nuclear reprisal meant that attacks on space were viewed as a prelude to nuclear conflict. As such, during the cold war, attacks on space systems themselves were deterred by their linkage to nuclear warfighting.

Recognizing this fact, U.S. space forces were developed to operate in that environment. We designed them to be nuclear hardened, to have electromagnetic pulse-hardened and survivable back-up ground infrastructure, and to be operated in such a manner that they could function before, during, and after a nuclear conflict. We retain that capability today because, while it may be true that newer and less violent threats are our most current focus, we can never abandon the need to assure space's role in our nuclear posture.

Space's role in modern conventional deterrence is far more nuanced than it is for nuclear deterrence. Conventional deterrence relies on an adversary's perception of the ability and likelihood of a U.S. or coalition response to provocation. Today, there is a perception that by denying our access to space services, an aggressor can blunt a U.S. response—to cause it to be less certain, less timely, and less overwhelming. This perception leads to a destabilizing reality—by attacking, or threatening, U.S. conventional space capabilities adversaries believe they may deter U.S. entry into a conflict. In this new conventional

reality, space forces are seen as the chink in the conventional armor of the United States—the place to gain an asymmetric advantage and reduce the likelihood of a U.S. response.

Potential adversaries also recognize that because we use space capabilities to project power globally, to multiply the speed, effectiveness, and impact of a conventional response, early attacks on space have a doubly beneficial impact—even if they do not deter a response, they make it less effective.

This condition leads to a seemingly paradoxical situation for space forces in which attacks on space capabilities are driven by their linkage to conventional war; the opposite of where we found ourselves strategically for nuclear war. In this topsy-turvy state, attacks on space forces may even become the opening gambit of an anti-access/area-denial strategy in a regional conflict wherein an adversary seeks to forestall or preclude a U.S. military response. Chinese military strategists began writing about the targeting of space assets as a “tempting and most irresistible choice” in the late 1990s, and the People’s Liberation Army has been pursuing the necessary capabilities ever since.

Therefore, we must remove the likelihood that attacks in space will succeed. Strangely enough, there are those who believe that we cannot do this. That we cannot assure space systems in the face of conventional attack in the same way we assured them in the face of nuclear attack. That somehow the threat from co-orbital microsatellites or direct ascent conventional missiles is harder to defend against than the threat of a directly launched nuclear weapon. That conclusion would be untrue. Certainly defense against these newer kinds of attacks will require different techniques; but be assured, as a nation, we can and will assure our space systems against those threats.

Space Mission Assurance

During our strategic portfolio review of 2014 we developed the concept of Assured Space Operations—the notion that space forces needed to be as dependable as the forces that depend on them, regardless of threat. For nuclear and strategically-linked space forces, this meant as high a level of assurance as we maintained during the cold war. For more

tactically-linked space services, this meant that space forces needed to be assured through every phase of conventional conflict.

In 2015 we developed the mechanism to execute those assurance requirements, creating the DoD Space Mission Assurance Framework. It included three assurance pathways: reconstitution, defensive operations, and resilience. We are in the process of promulgating DoD policy that makes it mandatory to include some or all of these types of mission assurance pathways in all new space systems. While the specific combinations we will choose are mission and architecture dependent, one or all must be included in any operational architecture in order to meet the precepts of Assured Space Operations.

We're hard at work across the DoD space enterprise to determine how we best execute these concepts, both operationally and architecturally. On the operational side, U.S. Strategic Command, Air Force Space Command, and the National Reconnaissance Office are actively working to understand the doctrinal and command and control aspects of this new posture through initiatives such as the Joint Interagency and Combined Space Operation Center (JICSpOC) experiments and the Joint Space Doctrine and Tactics Forum (JSDTF)

On the architectural side, we are reexamining completed analyses of alternatives, and beginning new ones, with this new mission assurance mindset at the front and center. As we engage in that process, we recognize that assurance efforts will not create the deterrence posture we seek unless they can be communicated to potential adversaries. In order to deter space attack, would-be attackers need to understand or at least suspect that their attacks will likely be unsuccessful. Recognizing that all assurance efforts will not be openly broadcast, we are working to strike the balance between those assurance efforts that are understandable and measurable by the adversary, and those that must remain more ambiguous. As we've worked through that calculus we arrive at the conclusion that of the three pathways we've outlined—reconstitution, defensive operations, and resilience—resilience is the best path for both understandable assurance and robust assurance. It's also the area where we can best offset the advantages that adversaries seek to exploit with their offensive space control ambitions.

An Offset Strategy for Space

As potential adversaries attempt to deny U.S. warfighters the advantages that space confers, the United States must find ways to offset the relatively cheap and technologically obtainable methods that adversaries have begun to employ. An advanced U.S. satellite might cost upwards of \$1 billion; missiles that could destroy such a satellite cost a few percent of that sum; co-orbital microsattellites cost even less; and lasers that might blind or damage satellites have an unlimited magazine with almost zero cost per shot. The same can be said for a cyber attack. While many advocates have called for the United States to move to small, reconstitute-able satellites as a reaction to these threats, it's far from clear that this strategy could ever serve to offset the cost advantage that these methods employ, nor is it clear that a single, monolithic strategy can ever defeat an advancing and evolving threat. Plus, such a reaction limits the immense advantages the United States garners during lower intensity conflicts from our exquisite space capabilities.

Rather, a space offset strategy must employ a diverse set of resilience measures that complicate the technical, political, and force structure calculus of our adversaries, by arraying a complex set of responses, with few overlapping vulnerabilities and a combination of known and ambiguous elements. To do this within our expected budget limitation, the U.S. response is clear—we must leverage our two natural and sustained space advantages: the U.S. commercial/entrepreneurial space sector, and our ability to form coalitions with our space-faring allies.

Space Security and Commercial/Entrepreneurial Space

The technologies and opportunities of greatest significance for national security space today are being paced by advances in the commercial space sector. The situation is profoundly different from the one confronted by the Defense Department in the early cold war era. In that era, the U.S. Defense Department led the way in national security space, with little interest or need to access commercial space services. Today, the DoD is already significantly dependent upon commercial satellite communication (SatCom) capabilities to meet its worldwide communication needs; the same is true for remote sensing.

On the communication front, the future holds even greater promise of new and ubiquitous high throughput systems from IntelSat to ViaSat, among others, as well as multiple entrepreneurial startups, such as from One Web and Space Explorations Technologies (SpaceX). Thanks to the \$26 million supported in the FY 2016 National Defense Authorization Act, the Air Force is planning to fund new business arrangements, so called Commercial SatCom pathfinders, to determine ways to better access these new commercial capabilities. In the President's 2017 budget we have included an additional \$121 million over the five year defense plan to continue that work. These funds will not only create new business arrangements that will save money; they are intended to provide new kinds of access to commercial SatCom capabilities to increase resiliency and to complicate any adversary attack. It's one thing to have to eliminate the communication capabilities of a few centrally controlled Wideband Global SatCom (WGS) satellites; it's quite another to have to deny communications from dozens of commercial satellites all built by different companies and all operated independently. And if the newer entrepreneurial firms are successful, these numbers rise to hundreds or even thousands of satellites in completely different orbits. The key question for DoD is how best to leverage these advances as part of our resilience efforts.

A similar dynamic is playing out in the commercial remote sensing field. Many operators, from SkyBox, to Planet Labs, to Urthecast, to BlackSky Global, are adding to the already substantial capabilities of DigitalGlobe, flying dozens of satellites with plans to add hundreds more. Our job is not to figure out how to buy similar systems, but rather how best to access those launched by industry; how to work with them to assure they can serve us during peace and during conflict, and most importantly, how to make sure they remain onshore as U.S firms. It is for that reason, among others, that the administration two years ago relaxed commercial remote sensing restrictions. By lowering the regulatory barriers to entry, we can encourage greater entrepreneurial investment here at home, and add to the already large and growing stable of resilient space applications now budding across the nation.

While SatCom and remote sensing are the most notable areas of commercial leverage, they are far from alone. The United States is experiencing rapid growth in almost all space services that were previously the provenance of only government, from ground entry points, satellite telemetry and control, space situational awareness, weather, and of course space launch. Commercial satellite servicing is also on the way. The robust and burgeoning commercial space sector provides unmatched opportunity for the United States to augment and supplement traditional government-owned capabilities with U.S. commercial capabilities, with significant increases in resilience and mission capability, all while lowering overall cost.

Our job in the DoD is to figure out how best to access these capabilities and to work with the Congress and other sectors of the executive branch to develop the right regulatory structure that encourages greater risk taking, without creating greater risks. We believe the time is right to examine the role of a civil agency, such as the Federal Aviation Administration, to begin to explore how to monitor and regulate this exponentially expanding population of commercial space systems to best position the United States to maintain leadership in this field.

Space Security and International Engagement

While the United States may be the world's preeminent space power, we are not in this alone—many of our allies are in space with us. Our 2014 Portfolio Review highlighted that the strategic pursuit of partnerships with allied nations can simultaneously reduce the need for direct U.S. government investment, increase the complexity of the target set our adversaries must engage, diversify the means for us to support space missions, and create political hurdles for any adversary who might want to try to isolate the United States. Just as we need to leverage commercial space capabilities, so too do we need to capitalize on our allies' investments in space services.

This year, we added New Zealand to our previously announced Combined Space Operations (CSpO) initiative, creating a true five-eye coalition approach to space operations. CSpO provides the venue to coordinate our space activities, share insights and

knowledge of the space environment, and to plan and exercise our space forces together. This effort is the start of creating a true coalition approach to space operations. By increasing awareness of shared threats and our plans to deal with them, our common understanding has highlighted the importance of space to senior leaders across the globe. While CSpO is still a nascent effort, the Department is committed to achieving the desired end state with our partners. Moving forward, we recognize the importance of bringing other like-minded allies and partners into this initiative.

The CSpO forum is only but one of an extensive array of bilateral arrangements and initiatives. The DoD has, as of today, signed a total of 63 space situational awareness sharing agreements with commercial partners, multi-lateral organizations, and other countries. Not only have we been working very closely with our four CSpO partners, but with many other allies and partners, including Japan, France, Germany, the European Union (EU), and others to find areas where we can cooperate in both space operations and space service provisions. Each of these nations maintains multiple space capabilities of their own, and by planning and operating them together, we garner significant additional mission capability and immeasurable resilience capacity.

For example, in the remote sensing realm, each of these nations fly their own indigenous electro-optical and radar imaging capabilities, each fundamentally different in capability, each with different vulnerability characteristics, and each presenting a different political dynamic to would-be adversaries. The National Geospatial Intelligence Agency (NGA), under the leadership of Director Cardillo, is working to integrate all these capabilities so that U.S. warfighters can rely on not just U.S. Government owned, or U.S commercial imagers, but on the entire range of imaging capabilities from our allies. Today, that includes nearly 200 satellites and likely 20 ground infrastructures. By 2020, it will likely rise to over 600 satellites. Using this lever to increase assurance of U.S. imaging capacity presents an extremely complex problem to our adversaries, with little increase in our own costs. This is resilience upon which we can all agree.

On the position, navigation, and timing (PNT) front we are working similar initiatives. With the State Department, the administration is working with the European Union to gain

access to their own encrypted PNT service known as the Publically Regulated Service (PRS) from the Galileo satellite system. We're working with Japan to investigate how best to leverage their home-grown regional PNT system called the Quasi-Zenith Satellite System (QZSS); and we're examining the efficacy of providing our warfighters with enhanced military-code user equipment that can access signals from all these systems. Such a strategy would deny any warfighting benefit from an attack on the Global Positioning System (GPS), because a U.S. warfighter and our allies would still be able to navigate with certainty.

We're also working with allies to extend the benefits of the Mobile User Objective System (MUOS) to meet their needs, and with NATO to assure our European allies the access to protected communications such as the Advanced Extremely High Frequency (AEHF) system, to operate through the intensifying jamming threat in Europe.

From remote sensing to PNT, to space situational awareness, to satellite communications, and other services beyond, our allies will play an ever increasing role in how the United States assures space for ourselves and for them. Of course this is no different from the same dynamic we see on land, at sea, and in the air, from combined naval exercises in the Pacific, to combined land exercises in Europe. Alliances have always been critical to the U.S. deterrence posture, and space is no different—we're just not used to it.

Finally, an additional benefit of expanded international and commercial cooperation is the potential for U.S. space exports to allies and partners. To enable this possibility, DoD will work with the Department of State and Department of Commerce to support approval of appropriate export control legislation and space-related technology sharing, and encourage the appropriate U.S. space exports to our allies and partners to enhance their capabilities. This in turn expands U.S. trade with allies and enhances U.S.-allied combined warfighting capabilities—and strengthens the deterrent posture we desire.

Closing

Chairman Rogers, Ranking Member Cooper, and Members of the Subcommittee—I've spoken primarily today not about budget but of strategy; of how we intend to address the

threats we see arrayed before us in the coming years and how we intend to do so within the means we can afford. Clearly there are other efforts in the budget that also enhance U.S. space security and deterrence with direct government investment—from designing the next block of GPS satellites, to the follow-on to the Space Based Infrared Satellite (SBIRS) and AEHF systems. I know that we will review these over the course of this hearing.

But just as important as these direct investments is the articulation and realization of an offset strategy for space that deters conflict on earth and in space. Our adversaries are determined to take space away from us to deter U.S. action. We are determined to assure that this will not be the case. We believe that with the combination of direct DoD investment and incorporation of robust and growing commercial and coalition capabilities, we can meet this challenge. More than dollars, that will require new thinking. It will require outreach, new ways of viewing the problem, and a change to our long held view that we can go it alone in space. We can't and we don't want to. Our challenge therefore is to determine not just what to invest in, but how to change policies and strategies to incorporate these new ways of solving the space assurance problem.

I 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 on implementing this new approach to space and I stand ready to answer your questions.