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STATEMENT BY

LIEUTENANT GENERAL RICHARD P. FORMICA, USA

COMMANDING GENERAL,
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
AND
ARMY FORCES STRATEGIC COMMAND

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Lieutenant General Richard P. Formica, USA
Commanding General
U.S. Army Space and Missile Defense Command
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Army Forces Strategic Command

Introduction

Mr. Chairman, Ranking Member Sessions, and distinguished Members of the Subcommittee, thank you for your ongoing support of our Soldiers, Civilians, and Families. After my initial appearance last year, I appreciate the opportunity to testify again before this subcommittee. Thank you also for your continued strong support of the Army and the key capabilities that space affords our Warfighters. Your continued support is important as we pursue our Joint efforts to provide critical space capabilities in support of our Nation, our fighting forces, and our allies.

My role has not changed since my previous subcommittee appearance. I wear three hats that entail distinct responsibilities in support of our Warfighters. First, as the commander of the U.S. Army Space and Missile Defense Command, I have Title 10 responsibilities to train, maintain, and equip space and missile defense forces for the Army. Second, I am the Army Service Component Commander (ASCC) to the U.S. Strategic Command (USSTRATCOM), or Commander, Army Forces Strategic Command. I am charged with the responsibility for planning, integrating, and coordinating Army forces and capabilities in support of USSTRATCOM missions. Third, I serve as the Commander of USSTRATCOM's Joint Functional Component Command for Integrated Missile Defense (JFCC-IMD), enabling me to leverage the capabilities and skill sets of the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT).

In my role here today as the Commander of USASMDC/ARSTRAT, I am honored to testify with these distinguished witnesses—all providers of critical space capabilities to the Warfighter and essential contributors to the Joint space planning process and our Nation's continued advances to effectively operate in space.

Within the Army, space operations and space-related activities are pursued as an enterprise and are not the exclusive domain of the USASMDC/ARSTRAT, or any other

single functional proponent. However, the Chief of Staff of the Army has assigned USASMDC/ARSTRAT as the Army's proponent for space. In this role, we coordinate closely with the other members of the Army Space enterprise, particularly the Army Intelligence, Signal, and Topographic communities. We are increasingly engaged across the broader Army community to ensure space capabilities are maximized and integrated across our entire force and that potential vulnerabilities to our systems are mitigated to the greatest extent possible. We also collaborate with USSTRATCOM and its Joint Functional Component Command for Space (JFCC Space) and other members of the Joint community to provide trained and ready space forces and space-based capabilities to the Warfighter. We also work closely with the acquisition developers in the other Services to ensure the development of systems that provide the best capabilities for ground forces.

Within USASMDC/ARSTRAT, we strive to achieve three core tasks within the space arena:

- To provide trained and ready Space Forces and capabilities to the combatant commanders—our operations function that addresses today's requirements.
- To build future Space Forces—our capability development function that is responsible for meeting tomorrow's requirements.
- To research, test, and integrate space and space related technologies—our materiel development function that aims to advance the Army's and Warfighter's use of space the day after tomorrow.

Providing Army Space Capabilities—Today, Tomorrow, and the Day-After-Tomorrow

During my appearance last year, my desire was threefold: to outline the Army as a user of space capabilities; to articulate the Army's space strategy and policy; and to inform the Committee about the Army as a provider of space capabilities. Today, within the context of my testimony from that appearance, I would like to again address the absolute necessity of space-based capabilities for our Warfighters and to expand upon the above three core space tasks that our Soldiers, Civilians, and contractors diligently execute each and every day.

Space-Based Products and Capabilities—A Force Multiplier

As I reported last year, our Army must be organized, trained, and equipped to provide responsive and sustained combat operations in order to fight as a Joint team and to respond, as directed, to crises at home and abroad. The Army is dependent on space capabilities to execute unified land operations in support of the combatant commander's objectives. Army space forces contribute to the Army's ability to be adaptive, versatile, and agile to meet tomorrow's security challenges. In other words, space is critical to our ability to shoot, move, and communicate.

The Army is the biggest user of space and it is also a provider of space-based capabilities. Integrating space capabilities enables commanders, down to the lowest echelon, to conduct unified land operations through decisive action and operational adaptability. The Army's Operating Concept identifies six warfighting functions that contribute to operational adaptability: mission command, movement and maneuver, intelligence, protection, fires, and sustainment. Space-based capabilities leveraged and employed across the Army space enterprise enable each of these warfighting functions. Virtually every Army operation relies on space capabilities to enhance the effectiveness of our force—there is no going back. In the coming years, our reliance on space capabilities will continue to grow. This reliance will be even more critical in an era of tight fiscal resources, a smaller force structure, and potentially a reduced forward presence. In essence, space-based capabilities are a force multiplier. When combined with other capabilities, space systems allow joint forces to see the battlefield with clarity, navigate with accuracy, strike with precision, communicate with certainty, and operate with assurance.

Space-Based Capabilities Transcend All Combat Systems—Result is Exponential Increase in Combat Power

The Army depends on space-based capabilities and systems, such as global positioning satellites, communication satellites, weather satellites, and intelligence collection platforms. They are critical enablers to our ability to plan, communicate, navigate, and maintain battlefield situational awareness, target the enemy, provide missile warning, and protect and sustain our forces. The Army and the Joint forces

require assured access to space capabilities and, when required, have the ability to deny our adversaries the same space-based capabilities.

The Army works diligently with the Air Force and other agencies to define our requirements in order to ensure future Warfighters have access to essential capabilities and services derived from space-based assets. Most of these services are so well integrated into weapon systems and support processes that many of our Soldiers are unaware they are leveraging space capabilities in the daily conduct of their operations. This seamless integration is due in large part to the coordination and cooperation of space professionals across the National Security Space Enterprise at Air Force Space Command, the Joint Functional Component Command for Space, the Navy, the Army, and other DoD and Joint agencies.

> ***"Modern armed forces cannot conduct high tempo effective operations without reliable information and communication networks and assured access to cyberspace and space."***
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> ***--Defense Strategy, January 2012***

As previously stated, the Army has been and continues to be a provider of space capabilities. In the past, the Army's greatest investment in space capabilities has been in the ground segment—the integration of space capabilities into operational forces through command and control systems, communication terminals, and intelligence feeds. Recently, the Army has strengthened and broadened its efforts to more fully exploit national and strategic space capabilities, defend our space capabilities, leverage space to enhance missile defense systems, and train and develop the needed space professionals and space enablers.

In 2013, as in past years, the Army plans to invest significant resources, both funding and people, in pursuing space and space-related activities. The Army is evolving from a position of simply exploiting strategic space-based capabilities to one where the Army is fully engaged in the planning, development, and use of theater-focused operational and tactical space applications.

Provide Trained and Ready Space Forces and Capabilities to Today's Operations

Within our first core task of providing trained and ready space forces and capabilities to the combatant commanders (COCOMs) and the Warfighter, there are numerous recurring operations, capabilities, and training responsibilities that we provide each day. Within our 1st Space Brigade, over a thousand Soldiers and Civilians provide space capabilities via access to space-based products and services that are essential in all phases of combat operations. The Brigade, a multi-component organization comprised of Active, National Guard, and U.S. Army Reserve Soldiers, has space forces assigned world-wide that are responsible for conducting continuous global space support, space control, and space force enhancement operations. The Brigade's three battalions support combatant commanders by providing satellite communications, space operations, missile warning, and forward-deployed space support teams. These Space Operations Officers, along with members of the Army's Space Cadre, directly influence the execution of strategic operations in support of operational and tactical level ground maneuver forces. Their principal duties include planning, developing, resourcing, acquiring, integrating, and operating space forces, systems, concepts, applications, or capabilities in any element of the DoD space mission areas.

The Army Space Personnel Development Office (ASPDO), part of USASMDC/ARSTRAT, develops policies, procedures, and metrics for the Army Space Cadre and executes the life-cycle management functions of FA 40 Space Operations Officers. The Army's Space Cadre, initiated in 2007 and utilizing FA40s as its foundation, is comprised of over 2,300 Soldiers and Civilians who perform space and space-related functions in support of the Army's interests in space operations, capability development, materiel development, and policy. The Cadre consists of Soldiers and Civilians from a wide variety of branches, career fields, disciplines, and functional areas.

The approximately 410 multi-component FA 40s serve in Army and Joint commands and organizations across all echelons—tactical, operational, and strategic. The Army continues to integrate space professionals into the Office of the Secretary of Defense, the Joint Staff, the North American Aerospace Defense Command, the U.S. Strategic Command, the Air Staff, the Air Force Space Command, and other space focused organizations and academic institutions. In each of these organizations,

personnel not only provide the Army perspective of space related capabilities, they articulate requirements from a ground component standpoint in the Joint environment. A summary of the critical space capabilities provided by Army's space professionals is highlighted below.

- *Army Space Support Teams*: During the current Afghanistan operations, the USASMDC/ARSTRAT's Army Space Support Teams continuously provide space-based products and services to combatant commanders and other international government agencies. The teams are on-the-ground space experts, pulling key commercial imagery, forecasting the impact of space weather, and providing responsive space support to their units. Forward deployed Army space forces support the new defense strategy by providing rotational presence and advisory capabilities in support of broader security operations. The bottom line is these teams bring tailored space products and capabilities that meet critical theater commander's needs. During the Iraq operations, Army Space Support Teams provided essential space capabilities for those commanders and Warfighters. More than 70 teams have deployed in support of Operations Enduring Freedom and Operation Iraqi Freedom in order to provide invaluable on-the-ground responsive expertise to combatant commanders and the Warfighter.
- *Satellite Communications*: USASMDC/ARSTRAT's role in satellite communications (SATCOM) has grown beyond our payload operations and transmission control responsibilities for the Defense Satellite Communication System (DSCS) and the Wideband Global SATCOM System (WGS) constellations. We also serve as the Consolidated SATCOM System Expert for the DoD narrowband and

Army Space Vision: "Assured access to resilient and relevant space-enabled capabilities to ensure Army operational and generating forces can conduct a variety of full spectrum operations around the world."

-- Army Space Strategic Plan, May 2011

wideband SATCOM constellations—the DSCS, the WGS, the Mobile User Objective System (MUOS), the Ultra High Frequency SATCOM (UHF), and the Fleet Communications Satellite. Transmission control for more than 97 percent of DoD-owned SATCOM bandwidth is provided by Army operators controlling the payloads on the DSCS and the WGS. These systems provide critical SATCOM capability for Combatant Commanders, other federal agencies, the Diplomatic Corps, the White House, and now allied nations in accordance with recent international agreements extending our cooperation in SATCOM operations. The 1st Space Brigade's 53rd Signal Battalion and Department of the Army Civilians perform this mission via the Wideband Satellite Communications Operations Centers and DoD's Regional Satellite Communications Support Centers located around the globe. A new Wideband Satellite Communications Operations Center opened in Hawaii last year, and just this month, we completed the lifecycle replacement of essential equipment and infrastructure at our Fort Detrick, Maryland satellite operations facility. Construction on the replacement for our facility at Fort Meade, Maryland is underway and the construction at our site in Landstuhl, Germany will begin soon. The operations centers required modernization and replacement of aging antennas and terminal equipment in order to be compatible with the fleet of new and expanding WGS assets being acquired and launched by the Air Force, and to ensure the continued operation of the regional management hubs for a majority of the DoD's satellite communications capabilities. As the SATCOM System Expert for MUOS, the Army is responsible for DoD's use of our next generation tactical system which will transform tactical SATCOM from radios into secure cellular networked communication tools. During this past year, our Satellite Support Centers participated in numerous worldwide operations and exercises, including Enduring Freedom, New Dawn, Odyssey Dawn/Unified Protector, Tomodachi, and other operations.

- *Friendly Force Tracking*: USASMDC/ARSTRAT operates the DoD's Friendly Force Tracking Mission Management Center (MMC) on behalf of

USSTRATCOM. The MMC provides situational awareness of U.S. military and other government personnel, along with coalition and allied partners. Translating more than one and a half million location tracks a day, this capability is an essential enabler for our force. As the Army has the greatest number of Warfighters and systems to track on the battlefield, our friendly force tracking assets are critical in identifying friendly forces during unified land operations.

- *Ballistic Missile Early Warning*: Critical to the Joint Force Commander's theater force protection, the Army provides ballistic missile early warning and missile defense support from within the theater or region. The 1st Space Brigade's Joint Tactical Ground Stations (JTAGS) Detachments, operated by Army personnel, monitor enemy missile launch activity and other infrared events of interest and share the information with members of the air and missile defense and operational communities. Our JTAGS Detachments are forward-stationed across the globe, providing 24/7/365 dedicated, assured missile warning to USSTRATCOM for deployed forces.
- *Geospatial Intelligence (GEOINT) Support*: The Army provides geospatial intelligence production in direct support of the combatant commands, as an operational element of the National System for Geospatial Intelligence. The Army's space and intelligence experts perform exploitation of a variety of commercial, civil, and DoD imagery data derived from space and airborne sources. Additionally, they aid in the exploration of emerging spectral system technologies and in transitioning new capabilities to the Warfighter. Last fall, USASMDC/ARSTRAT activated a new GEOINT branch to support USSTRATCOM's mapping requirements. In 2011, we provided geospatial situational awareness in support of Hurricane Irene and the Japanese earthquake relief efforts as well as crisis support operations around the globe including North Atlantic Treaty Organization operations in Libya—Operation Unified Protector. We also provided almost 100,000 unclassified commercial

Space is Inextricably Linked to Warfighting

imagery products to U.S. Strategic Command, U.S. Northern Command, U.S. Central Command, the State Department, and other agencies.

- *Operations Reach-back Support and Services*: The USASMDC/ARSTRAT Operations Center, located at Peterson Air Force Base in Colorado Springs, Colorado, provides reach-back support for our space experts deployed throughout the operational force and allows us to reduce our forward-deployed footprint. This center maintains constant situational awareness of deployed elements, continuously responds to requests for information, and provides the essential reach-back system of connectivity with technical subject matter experts.
- *Tactical Exploitation of National Capabilities*: The Army Special Programs Office is the Army's focal point for the exploitation of national intelligence, surveillance, and reconnaissance assets and products through the Tactical Exploitation of National Capabilities program. The Army is fully integrated into the National Reconnaissance Office and the Intelligence Community.
- *Strategic Space Surveillance*: The Army also operates facilities and assets that are of utmost importance to protecting the Nation's use of space. The U.S. Army Kwajalein Atoll/ Reagan Test Site (RTS), located in the Marshall Islands, is a national asset that provides unique radars and sensors that contribute to USSTRATCOM's space situational awareness mission, enabling protection of the nation's manned and unmanned space assets.

Build Future Space Forces—Meeting Tomorrow's Requirements

The Army's ever increasing dependency on space-based capabilities requires active participation in defining space-related requirement needs. The identified needs serve to ensure necessary Joint force structure, systems, and concept of operations (CONOPs) are developed and acquired, thereby enabling the land force to conduct the full range of military operations now and in the future. Ensuring tactical and assured access to space is our focus—reassuring the requisite capabilities and effects are delivered to the tactical Warfighter on time, every time demands that our space capabilities and architectures become more resilient against attacks and disruption. We

must ensure that our Army does not face a day without space and space-related capabilities.

In our second core task of building future space forces, we use our capability development function to meet tomorrow's space requirements. As reported last year, the Army uses established and emerging processes to document its space-based needs and pursue Army and Joint validation of its requirements. This disciplined approach helps ensure limited resources are applied where Warfighter operational utility can be most effectively served. As a recognized Army Center for Analysis, USASMDC/ARSTRAT conducts studies, in conjunction with the Army and the other Services, to determine how best to meet Army space requirements. With this information, we continue to pursue and develop the necessary adaptability across the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) to mitigate threats and vulnerabilities while sustaining land force operations.

The Army's Space Policy, published in 2009, focuses on the operational and tactical needs of land forces and assigns space related Army organizational responsibilities. It follows implemented DoD space policies and procedures, reestablishes objectives for Army space, and continues the Army Space Council. The Army's Space Policy outlines four broad space related objectives:

- Maximize the effectiveness of current space capabilities in support of operational and tactical land warfighting needs.
- Influence the design, development, acquisition, and concepts of operation of future space systems that enable and enhance current and future land forces.
- Advance the development and effective use of responsive, timely, and assured Joint interoperable space capabilities.
- Seamlessly integrate relevant space capabilities into the operating force.

In May 2011, the Chief of Staff of the Army approved the Army's Space Strategic Plan. This document, which was shaped by national level guidance such as the National Space Policy and the National Security Space Strategy, outlines the Army's space enterprise path for strategic planning, programming, and resourcing.

The essence of our space strategy and the guiding vision of the Army space enterprise are to assure access to resilient and relevant space-enabled capabilities to ensure Army forces can conduct unified land operations. To achieve this, our space strategy rests on three tenets that link Army strategic planning and programming for space to the guidance in national and DoD space policy and strategy. The three essential tenets are:

- To enable the Army's enduring mission by providing requisite space-enabled capabilities to support current operations, as well as future transformation efforts.
- To leverage existing DoD, national, commercial, and international space-based capabilities.
- To pursue cross-domain solutions to create a resilient architecture to mitigate threats, vulnerabilities, and assure access to critical capabilities needed to sustain land force operations.

To properly train space professionals, the Army developed the Space Operations Officer Qualification Course and the Army Space Cadre Basic Course. These two courses provide the necessary foundation for the Space Cadre. The Army has come a long way since the first Space Operations Officer Qualification class in 2001. Today, through USASMDC/ARSTRAT's Directorate of Training and Doctrine, we conduct space training via resident, mobile training teams, and distributed learning venues to support initial skills and qualification training, leader development, lifelong learning and professional development in support of life cycle management.

Preparing Today's Warfighter for the Challenges of Tomorrow

The Army also leverages the high-quality space training developed and administrated by the Air Force. Finally, numerous space officers complete additional post-graduate studies at the Naval Postgraduate School, accredited civilian institutions, and training with industry. The Army is committed to growing, training, developing, tutoring, and advancing space professionals. In 2011, the Army Space Council assigned USASMDC/ARSTRAT the task to execute an Army-level initiative and incorporate space knowledge and leader development training into all Army Schools.

We are leading this effort with support from the US Army Training and Doctrine Command (TRADOC) and are researching and identifying gaps in space knowledge training at the Centers of Excellence and associated schools. Once completed, the analytical results will help us define the what and how of Soldier space knowledge training and facilitate the integration of that space knowledge training into existing lessons and school curricula.

Our Battle Lab continues to find new ways to exploit space capabilities, to bring more space-based products to the tactical Warfighter and integrate them with Army network capabilities. Via a Joint effort between Air Force Space Command and USASMDC/ARSTRAT, we have developed a way to provide situational awareness of Space capabilities to the tactical user, via a handheld tablet device, similar to an iPad. Prototype iSpace tablets are currently in the hands of deployed Army space professionals while specialized variants are being used by deployed Army Special Operations Soldiers.

Research, Test, and Integrate Space and Space Related Technologies

Our final core task entails our materiel development function in which we seek to provide the Warfighter with space and space related technologies that provide dominant advantages on the battlefield—essential enhancements for the day-after-tomorrow. We realize that fiscal challenges will stress all modernization efforts. As such, we have focused our science and technology research, development, and demonstrations on capabilities that return maximal advances in our combat effectiveness. Recognition of the inextricable dependence of our weapon systems and battle command capabilities on orbiting spacecraft specifically highlights our determined effort to develop affordable spacecraft and launch systems which, in turn, will enable assured access to global reach from space. Our focus on affordability ensures a feasible means to field sufficient numbers of space systems to completely and effectively complement our active combat brigades.

Despite the current and projected resource constrained environment, the Army recognizes the continued need to prioritize, leverage, and invest in promising space research and development technologies. As such, within our materiel development

core task, we are striving to better utilize the Joint Capability Technology Demonstration (JCTD) Program. This will enable us to find, demonstrate, transition, and transfer the best operational concepts and technology solutions for transformational, Joint, and coalition warfare. Leveraging the JCTD program, I would like to briefly highlight three small satellite technology endeavors that have the potential to provide enhanced space capabilities to the ground commanders and Warfighters.

- *SMDC Nanosatellite Program-3 (SNaP-3):* Constellations of highly affordable nanosatellites deployed in mission-specific, low earth orbits can provide a cost effective, beyond-line-of-sight data communications capability for users who currently have no access to satellite communications. SNaP-3, an OSD approved JCTD, seeks to utilize three of these small satellites to provide dedicated coverage to a wide range of under-served users in remote areas. Pending final approval of the JCTD, the Army will build and launch three nanosatellites to address the current shortfall. We are hopeful this initiative will transfer to a program of record in Fiscal Year 2014.
- *Kestrel Eye Visible Imagery Nanosatellite:* New technologies are enabling the production of low-cost nanosatellites which have ever increasing military utility. Kestrel Eye, an OSD approved JCTD, is an endeavor to manufacture an electro-optical near-nanosatellite-class imagery satellite that can be tasked directly by the tactical ground component Warfighter. Weighing about 30 pounds and capable of producing 1.5 meter resolution imagery, Kestrel Eye's data will be down-linked directly to the same Warfighter via a data relay system that is also accessible by other Warfighters in theater without any continental United States relay pass-through or data filtering. At the low cost of about one million dollars per spacecraft in a production mode, the intent is to demonstrate a small, tactical space-based imagery microsatellite that could be propagated in large numbers to provide a cost effective, persistent capability to ground forces.

Space-Based Products—Providing Greater Capability to Future Warfighters

Each satellite would have an operational life of greater than two years in low earth orbit. Pending final JCTD approval, the initial Kestrel Eye launch is scheduled for next year.

- *Soldier-Warfighter Operationally Responsive Deployer for Space (SWORDS):* Concurrent with the shrinking size and cost of militarily useful satellites is a need for an appropriately sized and priced launch system. SWORDS, an OSD approved JCTD, is an initiative to develop a very low cost launch vehicle. This launch system is designed to take advantage of low cost, proven technologies, and non-exotic materials to provide launch for small weight payloads to low earth orbit for about one million dollars per launch vehicle. SWORDS is low cost because it is very simple: it is an integrated tank/booster/engine design; it has a benign bi-propellant liquid propulsion system; and it uses existing launch support and launch site hardware.

Conclusion

The Army is and will grow more dependent upon the capabilities that space brings to the battlefield. In current and all future conflicts, space capabilities will be inextricably linked to warfighting. The Army will continue to rely on and advocate for space products and services provided by the DoD, other government agencies, our allies and coalition partners, and commercial entities in order to shoot, move, and communicate. The Army's goal is to continue to provide trained and ready space forces and capabilities to the combatant commanders and the Warfighter, build future space forces, and research, develop, test, and integrate future space capabilities. Fully integrated capabilities will provide depth, persistence, and reach capabilities for commanders at the strategic, operational, and tactical levels. Assured space systems and well-trained and experienced space professionals significantly reduce the fog, friction, and uncertainty of warfare. Our use of and reliance on space is integral and absolutely critical to the Army's successful defense of this Nation. This Committee's continued support is essential in enabling us to maintain and further improve our space capabilities and

Space—The Ultimate High Ground

provide the best-trained space professionals to combatant commanders. The courageous Warfighters that serve to protect the safety and welfare of our Nation deserve nothing less.

I appreciate having the opportunity to speak on these important matters and look forward to addressing any questions you may have. Secure the High Ground and Army Strong!