STATEMENT OF

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Introduction

Mr. Chairman, distinguished members of the Subcommittee, I am honored to appear before you today to address the Navy's space activities. Space capabilities underlie the Navy's ability to operate forward and meet increasing anti-access/area denial (A2AD) demands with a shifting focus towards the Pacific. The Navy continues to be highly dependent upon space-based systems for beyond line of sight communications; missile warning, intelligence, surveillance and reconnaissance, and environmental remote sensing to provide battlespace awareness in support of joint warfighting and global maritime operations; and positioning, navigation and timing information for critical command and control, battlespace and global navigation, and information system timing. The Air-Sea Battle Concept, whereby joint air and naval forces retain freedom of action through tight coordination of operations in and across multiple domains, highlights the particular importance and criticality of the space domain. With the emergence and proliferation of anti-satellite and counter-space weapons, the U.S. can no longer assume that the space domain will remain uncontested. Our service must remain nimble and agile as we deal with these new space threats.

In the face of rapidly emerging threats in space, the Navy must continue to pursue new investment strategies and widely diverse capabilities to provide resilient access to space and space services to ensure mission success. As adversaries become more proficient in their use of space capabilities, they will continue to develop both offensive and defensive space capabilities in an attempt to remove or reduce the asymmetric advantage the U.S. enjoys in the space domain. It is critical the Navy continue to leverage space capabilities while improving the resilience of future space architectures to meet information demands in an increasingly contested electromagnetic environment. The Navy must also identify alternative sources and capabilities and work with the other Services to develop and refine the necessary tactics, techniques, procedures, and operational plans to help preserve Navy fleet information dominance in degraded or denied areas.

The Navy's Information Dominance strategy fully integrates the Navy's information functions, capabilities, and resources to optimize decision-making and maximize warfighting effects. Navy leaders increasingly rely on critical satellite communications (SATCOM) paths; positioning, navigation, and timing (PNT) signals; environmental monitoring (EM) data; missile warning (MW); and intelligence, surveillance, and reconnaissance (ISR) reporting to satisfy the three pillars of Information Dominance: assured command and control (C2), battlespace awareness, and integrated fires. Maintaining access to, and proficiency in, operations utilizing all of these space capabilities enables decisiveness, responsiveness, and agility – critical attributes for a forward-deployed force operating in an anti-access/area denial environment.

Mobile User Objective System (MUOS)

The capabilities, flexibility, and robustness of our Navy and Joint forces across the board require improved access to reliable worldwide communications to successfully execute their missions. The Navy's MUOS, with its advanced technology wideband code division multiple access (WCDMA) payload, is the key enabler that will support worldwide multi-Service users in the Ultra High Frequency (UHF) band for many years to come. MUOS will provide increased communications capabilities to smaller terminal users that require greater mobility, higher data rates, and improved operational availability. As today's legacy UHF satellite constellation continues to age, MUOS, with its legacy payload, provides the bridge to allow our forces time to transition to the newer and more capable WCDMA terminals.

The MUOS program continues to make significant strides in achieving the overall program goals. In February 2012, the first satellite was launched and within eight months its legacy payload was made operational in order to replace a failing UFO-5 satellite, providing seamless transition without any degradation in service. The second MUOS satellite launched from Cape Canaveral, FL on July 19, 2013, and its legacy payload is now available for early operational use in the event of an unexpected failure of an on-orbit legacy satellite. The remaining three satellites are under a fixed price incentive fee contract and will launch in January 2015, August 2015, and a date TBD in 2016.

Production of satellites #4 and #5 has gone very well, however there have been challenges with satellite #3. During last year's thermal vacuum testing, satellite #3's legacy payload experienced an uncommanded shutdown. The subsequent investigation using photographic inspection, contractor logs and technician interviews identified the root cause as insufficient solder volume during the production of the Output Multiplexer (OMUX). The program office has initiated corrective actions and through extensive investigation has determined that this deficiency is isolated to satellite #3 only. It does not affect any of the other satellites.

In order to minimize impact on the launch schedule, the third satellite will be repaired and launched in a later launch slot, and the fourth production satellite is on track to take its place on the launch schedule in January 2015. That is a six month slip from the original schedule. Because of an effective contract structure, the government will not expend any additional funds to bring the third satellite up to standards. Additionally, thanks to flexible program management and the ability to launch satellite number four earlier than planned, the warfighters who depend on satellite communications will see no change in service.

In addition to the spacecraft, the MUOS program continues to meet objectives for the ground sites in Geraldton, Australia; Wahiawa, HI; and Northwest, VA. These sites have completed hardware installation and final acceptance testing, and have been officially handed over to Fleet Cyber Command. The fourth site at Niscemi, Sicily, has had several setbacks over the past year as Italian protesters have caused significant delays; however, the program recently cleared a major hurdle with the installation of the three large antenna dishes at the Niscemi site. The U.S. and the central Italian governments have worked together closely and Navy officials have increased cooperation with the local Sicilian authorities to maintain unfettered access to the site. Italian government studies were released in 2013, reassuring the local population that all RF levels at the site are within safe and normal operating levels. Two previous studies were conducted by the U.S. Navy with acceptable results by both American and Italian health standards. The Navy resumed work late last summer at the site, and the current projection is to finish work by the end of this year.

The final segment needed to achieve full MUOS capability is the fielding of the MUOS-capable terminals. The MUOS waveform software was completed in 2012, placed in the Joint Tactical Network Center (JTNC) Information Repository, and made available to industry in December 2012. The first terminal that will be fielded and has been used to complete the initial phase of the MUOS End-to-End (E2E) testing is the

AN/PRC-155 Manpack Radio. The U.S. Army PEO C3T Tactical Radio Program has developed this terminal by adding the MUOS capability to this new radio. Army fielding of MUOS capable Manpack radios is scheduled to begin in FY15 and continues through FY27.

Additionally, the Navy is currently adding the MUOS capability to its Digital Modular Radio (DMR) to support shipboard operations. Upgrade kits will be fielded in FY16 to existing UHF SATCOM DMRs and older systems will begin full DMR installations in FY17 with 196 radios fielded by 2020. The Navy has been contacted by several MUOS terminal vendors to gain access to the MUOS testing labs. Three vendors have been scheduled to utilize the Navy testing labs beginning in March and others will be scheduled in the near future as their terminals are ready for testing. These additional terminals are expected to greatly increase the numbers of MUOS terminals over the next several of years.

Since the beginning of the MUOS program, development of the full MUOS capability has been managed through multiple program offices, including PMW 146 (Navy), Tactical Radio Program Office (Army), Joint Tactical Networking Center (Army) and the Defense Information Systems Agency. Significant progress has been made since the Navy was assigned overall responsibility by USD (AT&L) in May of 2012 to deliver the MUOS End-to-End capability. The first phase of events designed to reduce risk associated with seams between each of the program offices has been completed. WCDMA voice and data calls were successfully transmitted by a Manpack Radio through the MUOS-1 satellite, routed through the MUOS ground system using a single ground site, and received by a second Manpack Radio. The second phase of risk reduction events is in progress and involves two MUOS satellites, two ground stations, and at least fifteen Manpack Radios. The next major event for the MUOS program is the completion of the Multiservice Operational Test and Evaluation (MOT&E) which will occur later this year. The MOT&E is the final test that will certify the system operational, testing the full E2E capability of the terminals, ground stations and satellites utilizing multiple operational scenarios. Once the system is certified the program will achieve Initial Operational Capability (IOC) followed by Full Operational Capability (FOC) after all five satellites have been launched and tested.

Additional developmental testing was sponsored by the prime contractor in 2013. Initial indications are that MUOS may provide some coverage for narrowband SATCOM in the Arctic. A recent test successfully communicated over MUOS to an aircraft flying at 23,000 feet at 89.5 North latitude. Further testing will be required to determine if and to what degree surface ships could employ MUOS to communicate in ice free waters in that region. Routine surface and subsurface operations in the region cannot be supported as there is insufficient coverage. The USAF EPS is required to support joint Arctic operations. MUOS is not capable of supporting joint Arctic operations, and it does not provide a protected SATCOM capability. Protected SATCOM is essential to these operations.

Navy Multiband Terminal

The increasing threat to access Space is a growing Navy concern. A2AD threatens satellite communications systems that enable critical warfighter commander assured C2 functions. The Advanced Extremely High Frequency (AEHF) Satellite communications program acquired and deployed by the USAF provides a means to protect satellite communications. The Navy Multiband Terminal (NMT) Program will allow the Navy to leverage the AEHF satellite communications program to mitigate this risk. NMT provides secure, protected, and survivable high capacity mission bandwidth access for all warfare areas in an A2AD environment. NMT variants are being installed on surface ships, submarines, and shore sites, including ground sites for the Enhanced Polar System program. Each order for a production lot of NMTs requires a 15-month lead time for the first unit of delivery. The remaining units can be delivered over a 12-month window. Once a unit is delivered to the Navy, it undergoes an additional period of Government testing of up to two months prior to being delivered to its ultimate installation platform. This timeline means that an NMT unit may be bought up to 29 months prior to installation, giving an inaccurate perception of being early to need. Further program cuts could lead to breaks in production, which will negate learning curve efficiencies and increase production costs, while delaying delivery of this much needed capability for the warfighter. Given these points, if current budget funding levels remain stable, program FOC will occur in 2022.

Positioning, Navigation, and Timing

Precise time and time interval (PTTI) is absolutely critical to the effective employment of a myriad of Department of Defense (DoD) systems. Coordinated Universal Time as referenced to the U.S. Naval Observatory (UTC-USNO) is the DoD standard and the primary PTTI reference for the Global Positioning System (GPS). The Navy remains at the forefront of timekeeping technology with the USNO Master Clock, an ensemble system of independent atomic clocks. Four Navy Rubidium Fountain (NRF) atomic clocks achieved FOC at USNO Washington, DC in August 2013. These additions to USNO's timing suite improve UTC-USNO to better than one nanosecond per day as required for GPS III. The DoD Alternate Master Clock facility in Colorado Springs, CO received its second of two planned NRF clocks in early February. IOC was delayed to September 2014 and September 2015, respectively, due to furloughs and funding cuts.

The Navy initiated a Critical Time Dissemination (CTD) program in 2013 to ensure PTTI remains available to DoD users in contested environments. This program will provide critical upgrades to timing stations to overcome dependence on GPS-only solutions and ensure correct PTTI delivery to the warfighter. These efforts are being resourced and executed in concert with DoD Chief Information Officer (CIO) priorities and the department's long term strategy for Assured PNT. CTD funding supports four lines of effort: development of a radio-frequency interface, a timing reference upgrade, timing system integration, and development of an optical interface. The $3M cut to CTD research and development in the FY14 budget due to 'excess growth' will retard program goals at least one year to FY19.

The Military-Code (M-Code) GPS signal is a new encrypted signal for military users designed for resiliency. The USAF led development of M-Code GPS User Equipment (MGUE) is critically important to the warfighter in order to capitalize on the advantage gained by precise PNT while enhancing its ability in a denied and degraded environment. Hand-held requirements are vital to the USMC, however current development has been deferred to increment 2, and delaying USMC access to M-code beyond FY22. Protecting the funding for its development is important to ensure that the ground segment keeps pace with on orbit capabilities and provide future access to space-based PNT for ground forces utilizing hand-held devices.

Environmental Monitoring

Environmental monitoring is a vital capability that the Navy relies on for its short and long term forecasts, as well as climate monitoring programs. Satellite data is the primary method for collecting these large volume data sources that are used to feed the Navy's, as well as other Federal and International numerical models. As the DoD budget has decreased over the past several years, the Navy has relied on other Federal agencies and International governments to provide the necessary data. The DoD is not the only organization feeling the budget crisis. Smaller budgets are a reality for space organizations around the world and thus there is the potential of being left without the necessary resources to ensure operations can be conducted safely and efficiently. In order to develop mitigation plans, the Navy has been participating with the Air Force in a study to review the operational requirements for Space-based Environmental Monitoring. This study has shown that space-based solutions are required; especially to support Ocean Surface Vector Wind and Tropical Cyclone Intensity. The study is due to report out by the end of April but the Navy is hopeful that the documented requirements will be met with the necessary resources to support this vital service need.

Intelligence, Surveillance, and Reconnaissance (ISR)

The nation's recent focus on the western Pacific and the Arctic has increased the need for better access to space-based ISR systems. The WESTPAC and Arctic key maritime operating areas of interest are located in remote regions of the earth, cover very large expanses of water, and offer limited access from land-based and airborne sensors. Space-based sensors are not restricted in these areas. In fact they are well suited to support the wide variety of missions the U.S. Navy is called upon to support, from both a strategic and defensive perspective, for the nation as well as our International Partners.

Significant progress has been made since last year's testimony in defining maritime collection needs for future national and commercial ISR systems. Over the last year the Director of National Intelligence has completed work on a series of capability documents for our next generation national systems. These documents outline required sensor collection capabilities as well as system architecture design specifications. The U.S. Navy has been actively engaged in ensuring the nation's maritime collection needs are properly defined so the sensors, when fielded, will be able to provide the required collections to support these missions well into the 2030 timeframe and beyond. The Navy is also working with the National Geo-Spatial Intelligence Agency to determine what role commercial satellite systems can play in meeting our collection needs. Commercial sensors offer unique collection capabilities for the maritime domain that in some cases exceed national systems capabilities, cost less than their national counterparts, and provide information at the unclassified level which ease data flow within DoD as well as with our allies and coalition forces. Although national security concerns do preclude use of commercial sensors for some collection operations, they can play a significant role in filling collection gaps.

Nano Satellites

With the increasingly contested nature of space and the promulgation of International counterspace capabilities, the pressure has been turned up for more resilient, cost-effective access to space and capability on orbit. In response, the Navy is participating in nano satellite initiatives designed to provide low cost and quick response capability for emerging space requirements. One such effort is the Vector Joint Capability Technology Demonstration (JCTD), which launched two, foot-long "CubeSats" in November 2013 to demonstrate advanced communications capabilities. Both satellites were part of the Operationally Responsive Space (ORS)-3 mission which launched from Wallops Island, VA on a MINOTAUR IV space vehicle. The satellites will be demonstrated and their military utility assessed by our mission partners through the spring of 2014. The multi-mission satellite is designed with an open payload interface that allows third party capabilities to be integrated quickly. Three companies are now developing prototype Naval payloads for the multi-mission satellite using our Small Business Innovative Research (SBIR) program. While not as capable as larger satellites, nano satellites can be launched in relatively short timelines in order to address a quickly evolving operational need.

Conclusion

The Navy continues to be reliant upon space for SATCOM, PNT, EM, MW and ISR information in order to enable decision-making in increasingly contested and denied environments. Growing global uncertainty and emerging and expanding adversary capabilities will continue to require the Navy to become more resilient and efficient in the use of available assets in order to maintain the level of effectiveness that the nation expects. This will require a re-validation of fleet information requirements and promotion of resilient measures to ensure that threats to space access and services are continuously evaluated and that mitigations are in place to ensure forward-deployed commanders have the tools necessary to ensure mission success.

Mr. Chairman - thank you for the opportunity to share our efforts with you today. We look forward to answering any questions you and the Subcommittee may have.