

**STATEMENT OF**

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**BEFORE THE**

**U.S. HOUSE OF REPRESENTATIVES**

**COMMITTEE ON ARMED SERVICES**

**SUBCOMMITTEE ON STRATEGIC FORCES**

**ON**

**SUSTAINING GPS FOR NATIONAL SECURITY**

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Good morning Chairmen Turner, Ranking Member Sanchez and distinguished Subcommittee Members. Thank you for the opportunity to testify before you as the Department of Defense (DoD) Chief Information Officer (CIO) regarding the importance of the Global Positioning System, or GPS, to our national defense capabilities.

My testimony today will focus on the importance of GPS reliability to the DoD in ensuring that our warfighters and allies have the critical Positioning, Navigation and Timing, or PNT, capabilities they need.

GPS stands as the cornerstone of the DoD PNT capability. GPS is vital to national security and is relied upon by our service men and women for a wide array of capabilities. Simply put, GPS is integrated into almost every aspect of U.S. military operations. GPS is designed to deliver extremely accurate information of 3-dimensional positioning and precise timing to DoD aircraft, ships, land vehicles, and personnel on the ground. Used throughout all the Services and Combatant Commands, GPS supports training and contingency operations, ranging from the tactical through strategic levels. To provide but a few examples, GPS signals are used to ensure the accuracy of precision-guided munitions, to guide troop movements, to synchronize communications networks, to enable battle-space situational awareness, and to conduct search and rescue operations.

Sustaining the reliability of GPS signals is a particular example of the Department's overall reliance upon access to the limited natural resource of the radio-frequency spectrum. The radio-frequency spectrum is crucial to DoD not only for GPS operations, but for literally all U.S. military operations. DoD uses federally allocated and regulated spectrum assignments for command and control operations, communications, intelligence, surveillance and target acquisition, and other military activities on land, at sea, undersea, airborne and in space. Military spectrum requirements are diverse and complex given the variety of different missions that the Department must support around the world. In the continental United States, our systems utilize spectrum and are critical to military readiness, allowing our forces to properly train as they must fight to support contingency operations overseas. DoD spectrum access requirements must also be interoperable with those of our military allies. Each of these factors grows DoD spectrum requirements much the same way as commercial demand for spectrum has been increasing.

The Department fully supports the national economic and security goals of the President's 500 MHz initiative and is committed to the implementation of more

effective and efficient use of the finite radio-frequency spectrum and the development of solutions that ensure no loss of critical National Security capabilities, to include GPS.

To deliver GPS service to all DoD, civilian, and commercial users who rely upon it, DoD maintains and continuously upgrades a constant constellation of 24 satellites, comprised of a minimum of four satellites each in six planetary orbits.

Congress mandated in Fiscal Year 1994 that all major DoD platforms and weapons systems must utilize GPS after September 2000. The Department has worked hard to meet this mandate and GPS continues to be critical for DoD missions, and is planned to remain at the center of military PNT solutions. In meeting this mandate, the Department also understands that the dependence upon GPS for major systems and operations makes them susceptible to unintentional or hostile interference.

On that basis, DoD is committed to sustaining and modernizing GPS to maintain and improve our Military PNT capabilities. Several GPS modernizations are scheduled during the next 10 plus years, including three new civil signals, enhanced encrypted military signals, and a new constellation Operational Control Segment, which are scheduled to come on line by 2018 and then be implemented system wide into the GPS receiver populations by upgrades or replacements over the succeeding five or more years. These GPS modernizations fulfill requirements that have been vetted by rigorous acquisition oversight to ensure they support the widest user bases while meeting sound budgetary constraints.

As the DoD's Chief Information Officer, I have a collateral duty as the co-chair of the Executive Steering Group (ESG) of the National Executive Committee for Space-Based Positioning, Navigation and Timing, along with my counterpart from the Department of Transportation. The PNT National Executive Committee (EXCOM) is co-chaired by the Deputy Secretaries of Defense and Transportation, and includes Agency members from the Departments of State, Interior, Agriculture, Commerce, Homeland Security, the Joint Chiefs of Staff, and the National Aeronautics and Space Administration and includes representation from the Director of National Intelligence to round out our national security team. Our role in the PNT ESG and EXCOM is to advise Departments, Agencies, and the Executive Office of the President regarding strategic policies, requirements and security of all U.S. positioning, navigation, and timing infrastructures, including of course GPS.

With those GPS and PNT contexts explained for the Subcommittee, I now move on to address the recent matters pertaining to LightSquared.

In response to the January 2011 Federal Communications Commission (FCC) Order that conditionally allowed LightSquared Subsidiary LLC to unbundle their Ancillary, or auxiliary Terrestrial Component, restriction in the Mobile Satellite Services band adjacent to GPS, the PNT EXCOM in February tasked the National Space-Based PNT Engineering Forum, or NPEF, to perform testing to ascertain the potential interference to GPS. DoD tasked the Air Force and Space and Naval Warfare Systems Center to conduct testing of the affects of LightSquared's proposed network deployment upon a cross section of DoD, civil aviation, public safety and commercial GPS receivers. That testing was performed at White Sands Missile Range and Holloman Air Force Base in New Mexico, in cooperation with the PNT's other Federal Agency members and its civil and commercial industry advisory members.

The NPEF test report was completed on June 15, 2011 and subsequently submitted to the spectrum regulator for Federal Agencies, the National Telecommunications and Information Administration (NTIA), for their review and transmittal to the FCC. The test data indicated that the proposed LightSquared terrestrial operations would cause harmful interference to GPS operations. For example, GPS receivers of various types and manufacture operated by DoD, National Geospatial-Intelligence Agency, U.S. Coast Guard, Federal Aviation Administration, the State of New Mexico public safety, commercial aviation, and precision farming systems showed varying degrees of degradation of GPS accuracy, interruptions of GPS signal acquisition, or total loss of GPS tracking and position, depending upon the GPS receivers' proximity to the tested LightSquared signal transmitter.

None of the parties cognizant of the NPEF testing, including LightSquared, whose personnel observed the NPEF testing on-site, or FCC staff, dispute that the LightSquared terrestrial network plan that was tested by NPEF caused unacceptable levels of harmful interference to GPS. The testing also showed a source of interference that was due to the combined effect of the LightSquared dual-channel signal. The LightSquared dual-channel, its so-called 'Lower 5 or 10 MHz' combined together with the 'Upper 5 or 10 MHz', caused an inter-modulation product, or IMP, that was generated on top of the GPS L1 signal in its GPS band, interfering with GPS receivers. This IMP was caused by the LightSquared dual-channel choice and its design, and not by the designs or filtering limitations of GPS receivers.

Subsequent to the NPEF test report completion, LightSquared and the GPS Industry filed their Technical Working Group, or TWG, report. That report does not contest the NPEF results, nor does it offer a mitigation solution of the IMP interference caused by LightSquared dual-channel signal. Instead, LightSquared proposed to FCC their recommendation of an alternative terrestrial network that was not in the test plans of either the NPEF or TWG tests and was not tested to any extent comparable to the dual-channel tests.

LightSquared's modified proposal recommends launching commercial services initially using only the lower 10 MHz. DoD at this time has not received a sufficiently clear and complete description of a LightSquared Lower 10 MHz deployment plan to professionally analyze its new aggregate interference environment.

In addition, DoD is evaluating the effects of LightSquared terrestrial transmissions to the military's use of the Inmarsat satellite systems for its data and voice needs. Inmarsat satellite terminals are used by the military units, commanders, and other senior government officials for global communications. The LightSquared terrestrial system will likely interfere with DoD usage of Inmarsat if appropriate actions are not taken to mitigate interference.

As a result, DoD is diligently working with Inmarsat to identify mitigating techniques for reducing the potential interference for the military land, maritime, and aeronautical missions and communication requirements.

However, interference to the land-based Inmarsat usage remains a challenge and cannot be handled in the same manner as the maritime and aeronautical usages. The military land-mobile users are in closer proximity to LightSquared's terrestrial operations and as a result will likely be affected more severely.

The Department will continue to work with its interagency partners and NTIA, as well as with Congress to address long-term solutions regarding a balance between Federal spectrum requirements and the expanding demand for mobile broadband services. DoD has a wealth of institutional and personnel expertise in radio-frequency engineering and looks forward to working with the FCC, NTIA, and LightSquared to ensure that all further proposed mitigations or alternatives for the LightSquared terrestrial network are thoroughly tested to ensure no harmful interference to GPS receivers, or other military spectrum requirements. The ability of GPS to operate without harmful interference remains of paramount importance to the Department.

I want to thank you for your interest in the Department's efforts in this area and I would be pleased to answer any questions you may have.