

NAVY SATELLITE PROGRAMS



PMW 146

The Navy Communications Satellite Program Office, or PMW 146, is based in San Diego, California and is responsible for managing narrowband communication satellite systems acquisition, integration, production, launch, test and providing operational support to the Department of Defense (DoD), various U.S. agencies, joint and coalition forces. This small team of 45 personnel with support from the Space and Naval Warfare Systems Command leverages the latest commercial advances in terrestrial and satellite technology to greatly expand communications opportunities and capability.

PMW 146 reports to the Navy's Program Executive Office (PEO) for Space Systems on the Navy's Mobile User Objective System (MUOS) and Ultra-High Frequency (UHF) Follow-On (UFO) programs and for managing leases on the Leased Satellite (LEASAT) commercial satellite.

NAVY IN SPACE

The U.S. Navy, with its unique needs for communications at sea, has a rich and successful heritage in space. It began with the first American satellite program, Vanguard, in 1955. In 1957 the Navy constructed the first complete satellite-launching facility at Cape Canaveral, Florida. Vanguard I, launched in 1958, is the world's longest orbiting satellite.



Although the Air Force oversees most of DoD's space systems, the Navy is responsible for all of DoD's UHF narrowband satellite communications (SATCOM) acquisition. The UHF spectrum is the military's communications workhorse for mobile warfighters, as it is the most effective military SATCOM frequency for penetrating jungle foliage, inclement weather and urban terrain.

All U.S. military forces and many of their allies rely upon Navy satellites for narrowband communications. More than 60 percent of SATCOM users are supported via the UHF band, and more than 67,000 UHF terminals are currently in military use on more than 50 terminal configurations, many of them designed to be small and portable enough to be carried deep into theaters of operation.

PEO SPACE SYSTEMS

PEO Space Systems is a Navy Echelon II acquisition organization chartered by the Secretary of the Navy as the sole executive agent for the development, procurement, engineering support and executive oversight of all DoD advanced UHF narrowband communication satellites and associated ground systems. PEO Space Systems reports directly to the Assistant Secretary of the Navy for Research, Development and Acquisition.



SATELLITE PROGRAMS AT WORK

The UFO constellation is the present narrowband (64 kilobits per second and below) military SATCOM system. UFO achieved Initial Operational Capability in November 1993 and Full Operational Capacity in February 2000. As a gapfiller between UFO and MUOS, the UFO F11 satellite was launched in December 2003. The UFO constellation consists of seven operational UFO satellites augmented by the legacy payload on MUOS-1 and MUOS-2, two FLTSAT satellites, and leased services on commercial satellites, all of which comprise the UHF SATCOM constellation.

As development and fielding of MUOS continues, the UHF constellation is on-station 24/7 supporting the warfighter. However, to satisfy the increased warfighter demand for SATCOM capability as the current UHF constellation approaches its end of life, the PMW 146 UFO team developed several innovative mitigation activities to optimize UHF SATCOM capacity in the event of a loss of an on-orbit satellite. As a result, today's UHF SATCOM constellation provides the warfighter approximately 120 more channels worldwide than the Chairman of the Joint Chief of Staff mandated requirement. These additional 120 channels are equivalent to three UFO satellites or 41 percent more than the original required number of worldwide channels.



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MOBILE USER OBJECTIVE SYSTEM



MUOS

MUOS is the next generation narrowband military SATCOM system that will support a worldwide, multi-Service population of users in the UHF band, providing increased communications capabilities to smaller terminals while still supporting interoperability with legacy terminals. MUOS is designed to support users who require greater mobility, higher data rates and improved operational availability.

MUOS-1 was placed into operational use for legacy terminal users in November 2012, MUOS-2 was launched in July 2013, and the next two MUOS launches are planned for January and August 2015. The system will undergo Multiservice Operational Test and Evaluation in December 2015 and will achieve Full Operational Capability in 2017.

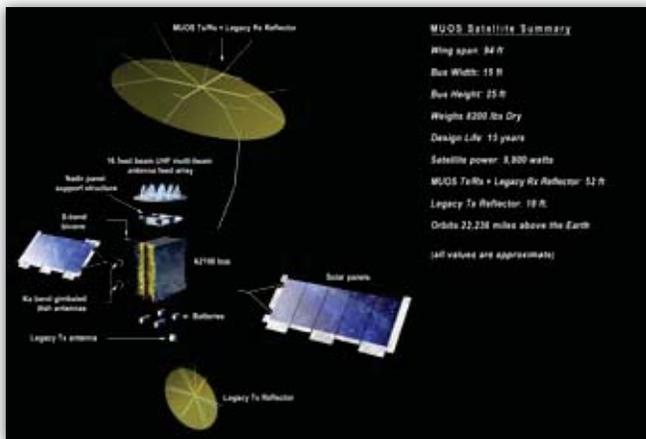


MUOS OPERATIONS

In 2012, PMW 146 was assigned as the single government lead responsible for delivering the end-to-end MUOS systems capability. The first terminal to use the new MUOS WCDMA waveform is the Army's Handheld Manpack Small Form Fit radio (PRC-155). In early 2013, Manpack radios successfully completed the first WCDMA voice and data calls with the on-orbit MUOS-1 satellite and routed through the Hawaii ground station. Other terminals are in development via both formal acquisition programs and non-developmental item endeavors that will provide the MUOS capability to all warfighting segments.

Operationally, user information will flow to the satellite via UHF WCDMA links and the satellites will relay this to one of four interconnected ground sites located in Hawaii, Virginia, Italy and Australia via a Ka-band feederlink. These facilities identify the destination of the communications and route the information to the appropriate ground site for Ka-band uplink to the satellite and UHF WCDMA downlink to the correct users. MUOS will also provide users access to select Defense Information System Network voice and data services.

The prime contractor and system integrator is Lockheed Martin Space Systems of Sunnyvale, California, with team members from Lockheed Martin Commercial Space Division in Denver, Colorado (spacecraft); General Dynamics C4I of Scottsdale, Arizona (ground and waveform); and Boeing Integrated Systems of El Segundo, California (spacecraft legacy UHF payload and channelizer). The MUOS satellites are launched aboard Atlas V Evolved Expendable Launch Vehicles from Cape Canaveral, Florida.



MUOS adapts a commercial third generation Wideband Code Division Multiple Access (WCDMA) cellular technology with geosynchronous satellites to provide a new and more capable UHF military SATCOM system. The MUOS program includes a satellite constellation of four operational satellites (plus one on-orbit spare), a ground control and network management system, and the new WCDMA waveform for user terminals. The infrastructure to both fly the satellites and control access of the users' communications is managed from the ground. MUOS will provide greater than 10 times the communications bandwidth capacity over the current UHF constellation.



Each MUOS satellite also carries a legacy payload similar to that flown on UFO F11. These payloads will continue to support legacy terminals while allowing for a gradual transition to the MUOS WCDMA waveform.



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