

Department of the Navy SBIR/STTR Transition Program

Statement A: Approved for public release, distribution is unlimited. (19 January 2016)

Topic # N122-147

Advanced WCDMA Algorithms for Rapidly Changing Coverage Geometries
W5 Technologies, Inc.

WHO

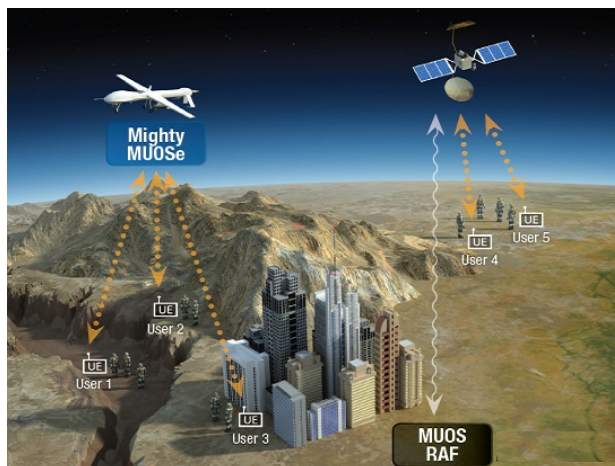
SYSCOM: SPAWAR

Sponsoring Program: Navy Communications Satellite Program Office (PMW 146)

Transition Target: Mobile User Objective System (MUOS)

TPOC:
843-218-4808

Other transition opportunities: Global Beyond Line of Sight (BLOS) Satellite Communication (SATCOM) coverage is used by all services. In addition to the increase in reliable communications links, the reduced voice delay and increased battery life will make this technology very attractive to ground soldiers such as the Army, Marines, and SOCOM.



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WHAT

Operational Need and Improvement: The Navy needs enhanced Wideband Code Division Multiple Access (WCDMA) algorithms to support use of alternate platforms hosting the MUOS MILSTD 188-187 as well as the new network topologies they create. These enhancements shall take advantage of the diverse communications paths created by the existing system and new platforms to ensure war fighters can communicate in a variety of austere scenarios, enabling links via multiple (ground, air, and/or space) communications layers.

Specifications Required: The high-level requirements for this effort are:

- Interoperate with MUOS terminals
- Support alternate platforms such as terrestrial antennas, Unmanned Aerial Vehicles (UAVs), High Altitude Platforms (HAPs), Low Earth Orbit (LEO), and Molniyas
- Increase call robustness

Technology Developed: The technology enables MUOS terminals to transition between diverse communication paths via adapted commercial WCDMA mobility algorithms. For example, a user of a MUOS terminal is communicating via a geosynchronous satellite while they have clear line of sight. With our algorithms, when the user walks into a slot canyon and the signal to the satellite starts to degrade, the MUOS terminal will look for and transition to alternate MUOS coverage at the aerial layer.

Warfighter Value: Utilizing the diverse communication links from terrestrial towers, UAVs, and satellites, the warfighter will experience 10% to 30% increase in mobile terminal battery life, increased access to higher data rate services, and fewer dropped calls. System capacity will be increased by 10% to 30% allowing for more users.

WHEN

Contract Number: N66001-14-C-5206 **Ending on:** December 21, 2016

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Demonstration of service transition from a Geo Sat Beam to a Aerial Beam in lab environment	Low	Call transitions successfully	4	December 2015
Port modified software to deployable MUOS terminal	Low	Software functions correctly in lab environment	5	September 2016
Demonstration of service transition from a Geo Sat Beam to a Aerial Beam in the field	Med	Call transitions successfully	6	December 2016
Certify MUOS waveform software modifications	Low	Terminals with updated software pass terminal certification	7	December 2017

HOW

Projected Business Model: W5 Technologies will self-fund, contingent on sales of our Mighty 'Mobile User Objective Orientation System' (MUOOS), the commercialization of the enhanced mobility algorithms into a MUOS waveform upgrade package. The upgrade package will be licensed to MUOS terminal manufacturers and programs of record. The Mighty MUOOS is an off-satellite MUOS system emulator capable of supporting MUOS terminal development, certification, regression, inter-operability testing, and application development.

Company Objectives: We are targeting the initial deployment of these algorithms on MUOS capable manpack radios. Following successful deployment, we will focus on other form factors.

Potential Commercial Applications: The MUOS program is looking at adding an additional satellite constellation to service UHF frequency block B. W5's enhanced mobility algorithms could be used to transition MUOS terminals between the frequency block A and frequency block B constellations.

Contact: Jason Ferguson, Director of Business Development
JasonFerguson@W5Tech.com (480) 422-6009