USSOCOM

SCIENCE AND TECHNOLOGY - PREPARING FOR THE FUTURE 2020-2030

MISSION ASSURED COMMUNICATIONS (MAC)

After more than 16 years of sustained combat operations, USSOCOM has reassessed its capability requirements in light of rapid changes occurring in the strategic operating environment.

Technology is rapidly accelerating and changing the geopolitical dynamics between state and non-state actors-that include violent extremist organizations.[1] Advances in artificial intelligence (AI), materials, manufacturing, robotics/autonomous systems, long-range precision strike weapons, bio-technologies and energy will have a significant impact on future warfare and military instruments of power.

The world is becoming more complex, crowded and connected. Think about the impact to USSOCOM Special Operations Forces (SOF) identity security in a future where AI, facial recognition, and biometric tools at ports of entry and even crowd-source screening in public venues identifies and tracks individuals. In a networked world using AI tools, an individual's movements could be tracked over time, databased, and accessed from anywhere. To mitigate these effects and gain access to challenged regions/domains, SOF must have the ability to avoid drawing attention by better obscuring and concealing their physical and virtual presence to blend in and appear innocuous.

State and non-state actors threaten disruptive and destructive non-attributable engagements against non-military and military infrastructure, information systems, and equipment. Flexible, secure, and resilient communications systems must be developed that provide mission assured communications for SOF operating in any threat or disadvantaged combat environment. The future SOF operator's kit will have to include the means and skills to navigate at the intersection of the physical and virtual world.

Beyond the employment of improved technologies, adversaries will continue to rapidly evolve and adapt by employing novel tactics/techniques, capabilities, and resources to challenge U.S. interests. The challenge for SOF is pacing with the commercial sectors on AI, data and machine learning as our competitors and adversaries rapidly acquire and leverage these technologies, anticipating emerging challenges and, when necessary, maintaining the ability to rapidly respond to erupting crises through non-traditional means or the employment of overwhelming force.

[1] ***State Actors*** are entities that have sovereignty over an area of territory and the people within it and act on behalf of a governmental body. ***Non-State Actors*** are non-sovereign entities that exercise significant economic, political, or social power and influence at a national, and in some cases international level.

USSOCOM Acquisition, Technology, and Logistics Center's Science and Technology Directorate (SOF AT&L-ST) future concept of "Mission Assured Communications" will be part of USSOCOM's solution to the challenges posed by the accelerating velocity of human and technological change.

Providing Solutions - USSOCOM's S&T Innovation Ecosystem

For the purpose of SOF AT&L-ST acquisition, Mission Assured Communications (MAC) is defined as those real-time information exchange systems and capabilities deemed critical by the warfighter to the success of special operations activities and their associated missions at the command and control level to the battlefield level. SOF has several "No-Fail" missions. These include: the ability to successfully execute Hostage Rescue and Recovery (HRR), Countering Weapons of Mass Destruction (CWMD), and Countering Terrorism (CT) missions globally, at any time, under all conditions, unilaterally and with partners, to eliminate threats to the Nation. In most cases, SOF require the support of enabling capabilities from conventional forces such as transportation, intelligence support, or logistical support. SOF refer to these as enablers. Thus, SOF communication equipment must be interoperable with that of conventional forces. Maintaining unmatched advantage will require the discovery, development, and rapid injection of the most effective technology opportunities into SOF small units to meet future 2020-2030 challenges, opportunities, and threats.

SOF AT&L-ST's intent is to continue building an "S&T Innovation Ecosystem" by reaching out to external government and non-government organizations, industry, academia, and other non-traditional partners for solutions that can provide an asymmetric advantage for future SOF. Specifically, USSOCOM is seeking your unique expertise to provide solutions.

Communication is an enabler to freedom of maneuver – the ability to proactively or reactively position forces, equipment, tactics, and methods in response to adversary actions. This requires systems to be reliable, beyond line of sight (BLOS) capable, non-ambiguous (clearly understood), and capable of real-time or near real-time data exchange rates.

Capability Requirements

The table below provides examples of typical SOF mission activities or anticipated threats to SOF activities along with the capabilities required to achieve the mission or overcome the threat. Some capabilities are required across several activities or threats.

Activity or Threat	**Capability Required**
SOF must execute a special mission and exchange data locally and over the horizon (OTH)/BLOS	- Expeditionary communications that function in remote locations, highly contested or denied environments (which means intentional or unintentional limitations in the areas of communications, navigation information, and timing signals) with equipment that is "plug and play" (i.e. device agnostic)

SOF must have assured communications with its enablers	– Mobile ad-hoc networks/long-range smartphone/LTE networking – Multi-path communications for various vehicles (manned and autonomous) – Unattributable networks – Low Probability of Interception (LPI), Low Probability of Detection (LPD)
RF transmissions are intercepted and degraded/denied by adversary (includes OTH/BLOS transmissions)	– Expeditionary communications that function in remote locations, highly contested or denied environments with equipment that is "plug and play" – Systems that can switch among several transmission types – Frequency-hopping, azimuth-filtering network – Multi-transmission capable surveillance systems (video, audio, motion detection, etc.) – Secure (encrypted) communications and data exchange – LPI/LPD
Local Global Positioning System (GPS) coverage is intercepted and degraded/denied by adversary	– Non-GPS navigation – Non-GPS tagging/personnel recovery systems
Long range, high data throughput communications	– LPI/LPD – Resistant to jamming – Capability to communicate in a satellite-denied environment – Must support transmission and reception of secure digital communications – Must be operable with Internet Protocol networks

Contacts/Collaborative Next Steps

- ***USSOCOM Public Website*** – http://www.socom.mil
- ***USSOCOM Technology and Industry Liaison Office (TILO)*** – https://www.socom.mil/SOF-ATL/Pages/submit-your-idea.aspx ; TILO@socom.mil
- ***USSOCOM Technical Experimentation (TE)*** – https://www.socom.mil/SOF-ATL/Pages/technical-experimentation.aspx
- ***SOFWERX*** – https://www.sofwerx.org
- ***USSOCOM Small Business Innovation Research (SBIR)/Small Business Technology Transfer Programs*** – https://www.socom.mil/SOF-ATL/Pages/sbir.aspx
- ***Vulcan*** – https://www.vulcan-sof.com/home/request