USSOCOM

SCIENCE AND TECHNOLOGY - PREPARING FOR THE FUTURE 2020-2030

SPECIAL OPERATIONS FORCES SMALL UNIT DOMINANCE (SOF SUD)

After more than 16 years of sustained combat operations, United States Special Operations Command (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 US 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 future concept of "SOF Small Unit Dominance" 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

SOF's value to the nation lies in USSOCOM's global perspective, coupled with the ability of SOF small units to act early to provide a range of options for policy makers. Operating ahead of crisis allows SOF to develop long-term and cost-effective options to prevent or mitigate conflict, providing decision space and strategic options to achieve outcomes favorable to the US. SOF will be directed to support or lead integrated military campaign operations to counter approaches employed by adversaries. SOF success in these campaigns will be enabled by operators' deep understanding of operational environments, regions and populations, and establishing and sustaining critical relationships with key powerbrokers.

The desired holistic effect is providing SOF an unmatched advantage against all adversaries – SOF Small Unit Dominance (SUD). 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. 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 for the following "SOF Small Unit Dominance" areas of interest:

- ***SOF Operator/Mobility Platforms***
  - Protection for SOF operators and platforms: protection from injury (ballistic), historically achieved through advanced armor/novel materials
  - Biomedical: Rapidly deliver medical technologies and procedures to the field in order to improve, preserve, and restore SOF operators
  - Human Performance: Improve the SOF operator's mission effectiveness, resilience, physical and cognitive performance, reduce susceptibility to injury, and assist with faster return to duty
  - Comprehensive Signature Management: allow SOF operators and mobility platforms to infiltrate and operate undetected in denied areas/increasingly transparent operating environments in small teams
  - Virtual training systems and technologies to prepare more effectively for the operational environment

- ***Command, Control, Communications, and Computers (C^4)***
  - SOF Information Enterprise (SIE)-Global Network that is interoperable, adaptive, infinitely scalable, resilient/robust/redundant, and Big Data Analytics
  - Defend the Network against cyber-attacks and in highly contested or denied environments, which means intentional or unintentional limitations in the areas of communications, navigation information, and timing signals.
  - Situational Awareness: Information Management/Data Exchange with increased capacity/efficiency, reduced cognitive workload, multiple transport methods, fusing information, and displays
  - Expeditionary Communications that function in remote locations, highly contested or denied environments, are device agnostic (plug and play), and have Low Probability of Intercept/Detection
  - Development of infrastructure to include improved computers, software, firmware, electromagnetic spectrum sensing ability, and cyber protection
- ***Lethality***
  - Improved SOF operator and mobility platforms weapons, ammunition, precision guided munitions increasing kinetic effects
  - Reduction in size and weight while maintaining the kinetic effect of current SOF operator and mobility platform weapons, ammunition, and precision guided munitions
- ***Scalable Effects Weapons/Directed Energy (SEW/DE)***

  SEW/DE weapons that can provide the broadest range of non-lethal to lethal anti-personnel and anti-material capabilities for neutralizing the enemy while minimizing the risk to non-combatants and infrastructure. Key effects include:
  - Stop vehicles/stop vessels
  - Warning devices that produce an unambiguous signal(s) that are visible, audible, and easily recognizable
  - Disorienting effects on people
  - Temporary immobilizing/paralyzing effects on people
  - Deny an area to individual(s) for an indefinite period of time
  - Move individuals from a room, facility, compartment, or building
  - Deter/stop pursuit by individual(s)
  - Clear an area without entering
- ***Cohesive Information Gathering***
  - Methods to enhance the timeliness of information collection, processing and handling/distributing.
  - Improved fusion algorithms that provide integrated situational awareness from multiple sources of information
  - Improved sensors: Position, Navigation, and Timing (PNT), optical, Radio Frequency (RF), Infrared (IR), and Lasers; Miniaturization of intelligence sensors, tracking devices, and data delivery systems
  - Small/micro autonomous systems to distribute sensors which provide near-real-time information feeds

- ***Influence***
  - Methods/Equipment that more effectively influence the perceptions, will, and behaviors of relevant actors and populations
  - Opportunities exist to exploit AI assisted Internet-based/digital technologies, remote/unmanned Internet/radio/TV broadcast capabilities, and advances in online automation to provide significant capabilities for Information forces to operate with a small footprint
  - Cyber and media awareness will be an enabler while the Dark Web and gaming are potential new operational environments
- ***Adversary Impact Considerations***
  - Advances that allow SOF to gain knowledge of adversary capabilities/threats, task/purpose, and intelligence

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