

Solicitation Number: USSOCOM RFI TE 18-3_Technical Experimentation Event: Command, Control, Communications and Computers (C4), Intelligence Surveillance Reconnaissance (ISR), Small Unmanned Aerial Systems (SUAS), and Mobility.

Notice Type: Special Notice

TYPE: A–Research and Development

NAICS: 541715 (Research and Development in the Physical, Engineering, and Life Sciences)

Publish Date: 04 April 2018

Response Date: 03 May 2018, 12:00 Noon Eastern Daylight Time (EDT)

Synopsis:

A. INTRODUCTION: Technical Experimentation (TE)

This Request for Information (RFI) is NOT a solicitation for proposals, proposal abstracts, or quotations. The purpose of this RFI is to solicit technology experimentation candidates from Research and Development (R&D) organizations, private industry, and academia for inclusion in future experimentation events coordinated by the U. S. Special Operations Command (USSOCOM). USSOCOM invites industry, academia, individuals, and Government labs to submit technology experimentation nominations addressing innovative technologies leading to possible Government/Industry collaboration for development of USSOCOM technology capabilities. The intent is to provide participants with the opportunity to gain Special Operations Forces (SOF) insight/perspective on participant technologies. For this TE event, technology experiment nominations will be submitted via the Vulcan platform"(see Attachment 2). Respondents should pay particular attention to the instructions in paragraph C below.

Technical experimentation will explore emerging technologies, technical applications, and their potential to provide solutions for future SOF capabilities.

This RFI is for TE 18-3:

- Date: 16 through 20 July 2018
- Themes: Command, Control, Communications and Computers (C4), Intelligence Surveillance Reconnaissance (ISR), Small Unmanned Aerial Systems (SUAS), and Mobility.
- Location: Fort A.P. Hill, VA

B. OBJECTIVE:

1. Technology experimentation events provide an opportunity for technology developers to interact with operational personnel to determine how their technology development efforts and ideas may support or enhance SOF capability needs. The environment facilitates a collaborative relationship between Government, academia, and industry to promote the identification and assessment of emerging technologies.

2. The deadline for nomination package(s) is **03 May, 2018 at 12:00 Noon EDT**. After review of the TE nomination submissions, the Government may invite select

candidates to demonstrate their technologies at the USSOCOM sponsored TE event. Experiments will be conducted from 16-20 July 2018, at **Fort A.P. Hill, VA**, and will explore emerging technology solutions and revolutionary improvements in relevant technologies. Materiel solutions brought to the event should be between a Technology Readiness Level (TRL) of 3 and 6. Proposed experiments may be between a half day and two days in duration and may be conducted in unimproved expeditionary-like conditions. At the discretion of USSOCOM, respondents may be asked to complete a vendor loan agreement (RFI Notice Attachment 5). There is no intention on the part of USSOCOM to purchase or procure equipment based solely on participation in the TE.

3. Experimentation Focus: The primary intent of this event is to highlight technologies that support C4, ISR, SUAS, and mobility.

4. Technology areas to explore during the event include the following:

4.1 C4. Areas of particular interest include contested and/or congested communications systems from tactical radio to satellite systems, high throughput satellite services, next generation medium and heavy terminals, and 5G architectures and technologies.

4.1.1 Tactical communications supporting Anti-Jam (AJ), low probability of intercept (LPI), low probability of detection (LPD) to a wide variety of unknown future missions. The capability gap includes operating from tactical radios to satellite systems in heavily contested and congested Radio Frequency (RF) environments. The contested environments include jamming and or offensive threat propagation, while the congested environment includes multiple systems, commercial and military, operating in like frequency ranges at equal or higher power levels competing with each other. The SATCOM architectures should assume that all satellites in use are operating as bent pipes (i.e. minimal to no waveform signal processing on board) and only perform frequency translation. Interest includes capabilities in the following areas:

4.1.1.1 Satellite/Terminal antenna beam forming

4.1.1.2 Robust waveforms/terminals

4.1.1.3 TRANSEC (i.e. Frequency Hopping, Direct Sequence Spread Spectrum, etc.)

4.1.1.4 Low Probability of Intercept/ Low Probability of Detection (LPI/LPD)

4.1.1.5 User management, automatic resource re-utilization

4.1.1.6 Interference cancellation

4.1.2 High Throughput Satellite (HTS) services and next generation terminal systems to supplement traditional military X and Ka-bands with commercial HTS constellations & services. USSOCOM is looking for global coverage and data rate capabilities greater than 25 Mbps. Interest includes characteristics in the following areas:

4.1.2.1 Multiple regional teleports for worldwide connectivity

4.1.2.2 Commercial Internet IP Backhaul and/or direct circuit connections to customer sites.

4.1.2.3 Best practices security architecture and services

4.1.2.4 Assumed >25 Mbps throughput for service

4.1.2.5 Lowest latency possible

4.1.2.6 Spot beam service characteristics/options, i.e. movement

The next generation ground terminals should be capable of operating on existing HTS constellations and/or plans for operation on any emerging constellations: 1.0 - 1.3 meter aperture and 2.0 - 2.4 meter aperture. Interests include technologies with capabilities in the following areas:

4.1.2.7 Auto acquire/track/maintain

4.1.2.8 Team transportable

4.1.2.9 Minimal to no tools necessary to assemble/setup/teardown

4.1.2.10 Modular to operate on multiple commercial and/or military service providers

USSOCOM is interested in SATCOM on the Move (SOTM) systems capable of operating on ground vehicular and maritime platforms, using traditional military SATCOM and/or HTS services.

4.1.3 USSOCOM is interested in 5G architectures and technologies, ideas and solutions which advance communications capability in the following key interest areas:

4.1.3.1 Advanced Heterogeneous Networks (HETNET) architecture and systems (3G, 4G, 5G, WiFi combined).

4.1.3.2 802.11 ax infrastructure and end points

4.1.3.3 802.11 ad infrastructure and end points

4.1.3.4 Millimeter Wave technology

4.1.3.5 Citizen Broadband Radio Service (CBRS) architectures and systems.

4.1.3.6 Advanced antenna solutions for efficient connectivity at high wireless bandwidth (>800Mbps) with benefits in RF congested or contested environments.

4.1.3.7 Next generation end user devices planned, developed, or available with 5G connectivity.

4.1.3.8 Multi-Access Edge Computing (MEC) and application development with a 5G architecture focus, i.e. Body worn computers, swarm.

4.1.3.9 Network, baseband, radio access virtualization focused in network densification.

4.1.3.10 Network slicing architectures and systems focused on 5G bandwidths and scale.

4.1.3.11 Vehicle-to-infrastructure (V2I) architectures and systems

4.2 ISR

4.2.1 Sensors

4.2.1.1 Low Size Weight and Power (SWaP) sensor able to decode multiple signals of interest that also must be Joint Interface Control Document (JICD) 4.2 compliant.

4.2.1.2 Attended or unattended ground sensors with onboard processing capabilities. Goal is to reduce the cognitive burden on the consumer of the sensor information.

4.2.1.3 Processing capabilities that reduce false positive and false negative rates.

4.2.1.4 Trigger alerts send Cursor on Target messages.

4.2.1.5 Alert information can be stored on the sensor or a sensor network control node.

4.2.1.6 Wired and wireless interfacing without the need for user-device connectivity.

4.2.2 Direction Finding (DF) and omnidirectional antenna in a single concealable package with low SWaP. Antenna interface should be non-proprietary, consistent with industry standards and clearly documented.

4.2.3 Mobility as it applies to ISR. Technologies of interest in this area include:

4.2.3.1 Geospatial to the edge: Interoperability. Applications consuming Geospatial Intelligence (GEOINT) data on mobile devices are becoming more widely employed to provide battlespace situational awareness. SOF warfighters require detailed tactical GEOINT during mission planning and execution in Denied, Disconnected, Intermittent and Limited (DDIL) network environments. The Open Geospatial Consortium (OGC) has advanced GeoPackage, an open and extensible standard data format designed for tactical mobile users in DDIL environments. Standards-based interoperability and extending OGC GeoPackage to meet C4ISR and mobility requirements are active areas of interest to SOF. Desired characteristics of applications consuming GeoPackages include:

4.2.3.1.1 Capability to display National System for Geospatial Intelligence (NSG) standard profiles. Profiles provide strict implementation guidance to ensure interoperability of geospatial systems in highly specialized and demanding environments.

4.2.3.1.2 NSG GeoPackage 2.1, raster and vector data (OGC GeoPackage 1.1)

4.2.3.1.3 NSG Web Map Service 1.0 raster data (OGC WMS 1.3)

4.2.3.1.4 NSG Web Map Tile Service 1.1 raster data (OGC WMTS 1.0)

4.2.3.1.5 NSG Web Feature Service 1.0 raster data (OGC WFS 2.0)

4.2.3.2 Capability to display GEOINT data meeting NSG profiles above and emerging OGC GeoPackage extensions to meet SOF requirements for:

4.2.3.2.1 Visualizing elevation data

4.2.3.2.2 Styling and symbology

4.2.3.2.3 Georeferenced media attachments (photos, video, documents).

4.2.3.2.4 3D geospatial data such as building height

4.2.3.3 Next generation GeoPackage capabilities to include:

4.2.3.3.1 3D geospatial data fused with human geography data such as landmarks, buildings, businesses, roads, telecommunications infrastructure, and other urban features.

4.2.3.3.2 Site and building survey data in a single package with both building interior data and surrounding urban terrain including elevation.

4.2.3.3.3 Augmented reality data combined with complex urban 3D terrain data.

4.2.3.3.4 Intelligence data such as georeferenced attack and location information.

4.2.3.4 OGC-standards based game engine for virtual mission rehearsal with geospecific 3D data on mobile devices in a DDIL environment.

4.3 Mobility. The SOF portfolio of vehicles includes the Lightweight Tactical All-Terrain Vehicle (LTATV-currently the Polaris MRZR), Non-Standard Commercial Vehicles (NCSV – Toyota/Ford), Ground Mobility Vehicle 1.1 (GMV 1.1-General Dynamics Ordnance and Tactical Systems-Flyer 72), GMV 1.0 (modified High Mobility Multipurpose Wheeled Vehicle-HMMWV), and Mine-Resistant Ambush Protected All-Terrain Vehicle (M-ATV).

4.3.1 Signature Reduction Technology

4.3.1.1 Acoustic technology

4.3.1.1.1 Vehicle or vehicle modifications that reduce the acoustic signature of SOF mobility assets while on the move for all or a portion of a mission.

4.3.1.1.2 Vehicle or vehicle modifications that enable a stationary vehicle to power auxiliary systems in a quiet or low noise condition.

4.3.1.2 Visual Technology. Technology to reduce or manipulate the visual signature of SOF vehicle assets to reduce the likelihood of detection or identification.

4.3.1.3 Thermal Technology. Technology to reduce or manipulate the thermal signature of a SOF vehicular asset to reduce the likelihood of detection or identification.

4.3.2 Suspension Technology

4.3.2.1 Suspension upgrades/replacements to increase performance, durability and reliability.

4.3.2.2 Vehicle occupant technology that improves the isolation between the input from the terrain and the corresponding input to an occupant.

4.3.3 Brake Technology. Brake upgrades/replacement to increase performance, durability and reliability.

4.3.4 Modular purpose built chassis for Sport Utility Vehicles and trucks. Cost effective solutions allowing reduced logistics, or solutions that allow vehicles that are commercial in appearance to be reset at the end of their lifecycle instead of being disposed of.

4.3.5 Electric/Hybrid electric vehicle technology. Technology suitable for lightweight vehicles (V-22 aircraft transportable through GMV 1.1) allowing for increased range, exportable power, reduced maintenance or lower signatures.

4.3.6 Low profile antennas for Line of Sight, SATCOM, and Electronic Counter Measure Systems (NSCV). Antennas that can be hidden on/in/around the vehicle to appear almost non-existent while still effectively transmitting desired frequencies at specific power levels.

4.3.7 Low visibility transferable armor for commercial vehicles (NSCV). Armor materials/panels, etc., that can be transferred and integrated from one commercial vehicle to another with minimal manpower and in a minimal timeframe.

4.3.8 Lightweight transparent armor for NSCV and GMV. Novel lightweight and cost effective technologies that can replace current heavy transparent armor solutions on a vehicle. Retention of a Commercial off the Shelf like appearance is of key interest.

4.3.9. Battery technology for NSCV and GMV 1.1.

4.4.9.1 Mature 12 volt battery technology for cold temp start and/or reduced size without degrading Cold Cranking Amperage or AMP hours is desired.

4.4.9.2 Mature battery technologies that that can withstand cold start scenarios down to -50° F and also extend the timeline for silent watch. Reducing size but not performance is of interest as well.

4.4 Small Unmanned Aerial Systems

4.4.1 Unmanned Airborne Blood Delivery System. System must be vertical takeoff and landing capable (VTOL) or runway independent. USSOCOM will provide a blood surrogate for the event.

4.4.1.1 Systems should be capable of transporting a minimum of 10 pounds of blood.

4.4.1.2 The cold chain must be maintained and monitored throughout flight. Blood must be kept at 2-8 degrees Celsius from time of loading, transit, delivery, and unloading. Systems utilizing passive cooling are preferred.

4.4.1.3 Consideration must be taken to minimize shock to blood payload for any proposed delivery concept.

4.4.1.4 System must have an operational range of 100 or more miles. Command and control of the aircraft must be maintained at all times.

4.4.2 Nano VTOL UAS

4.4.2.1 Extremely small, lightweight Nano VTOL UAS with a takeoff weight of 75 grams or below are desired with the following characteristics.

4.4.2.2 Day and night imaging capability

4.4.2.3 Autonomous flight modes

4.4.2.4 Indoor flight capability with augmented collision avoidance, operator in the loop control.

4.4.3 Micro VTOL UAS

4.4.3.1 Small, lightweight micro VTOL UAS with a takeoff weight of 750 grams or below are desired with the following characteristics.

4.4.3.2 Day and night imaging capability

4.4.3.3 All-weather capability

4.4.3.4 Autonomous flight modes

4.4.3.5 Autonomous indoor flight capability with collision avoidance

4.4.4 Small Fixed Wing UAS

4.4.4.1 Hand launchable or VTOL fixed wing UAS with no launch or recovery equipment (bungee, net, etc.) is desired with the following characteristics.

4.4.4.2 VTOL configurations not to exceed 3.5 kg takeoff weight

4.4.4.3 All-weather capability

4.4.4.4 Day and night imaging capability

4.4.4.5 Autonomous flight modes with Global Positioning System denied capability

4.4.4.6 Minimum of 90 minutes endurance at sea level

5. Security/Classification Requirements: Technology developers shall not submit classified information in the technology experimentation nominations.

6. Safety Requirements: All respondents shall review TE Safety Guide (RFI Notice Attachment 3). Those respondents who are invited to demonstrate their technologies must complete a Deliberate Risk Assessment Worksheet (Department of Defense Form 2977) (RFI Notice Attachment 4) in accordance with MIL-STD-882E and the Department of the Army Techniques Publication No. 5-19 (ATP 5-19). Risk assessments shall be emailed directly to the **tech_exp@socom.mil** by **22 June 2018**. Respondents should include instructions that describe the safe operation of the device nominated for the experiment. Respondents wishing to conduct experiments of a

kinetic or energetic nature are responsible for ammunition and/or explosives shipments to include an Interim Hazard Classification (IHC) or Final Hazard Classification (FHC) and coordination for receipt and storage at Fort A.P. Hill, VA. A point of contact for coordination will be provided with the invitation to participate in the technical experimentation event.

7. Frequency Requirements: If your experiment will be radiating on a given frequency or frequency band, you must have prior approval to transmit on that frequency. Prior approval may include compliance with Federal Communications Commission (FCC) Title 47, Part 15, a **Special Temporary Authority (STA)**, or Part 5 **experimental license from the FCC**. You must have National Telecommunications and Information Administration (NTIA) frequency approval if your experiment includes Government-owned equipment and you will be operating within a Federal Band. **Respondents are advised to not wait for confirmation of selection/invitation to the event before requesting a STA or experimental license from the FCC.** Your authority to radiate must be emailed directly to **tech_exp@socom.mil** by **1 June 2018**. All frequency questions shall be directed to the USSOCOM Technical Experimentation team at the email above. **Respondents shall not contact the Virginia Frequency Manager directly.**

8. Human Subjects. It is not anticipated that activities being conducted in this TE event will require the use of research or experimentation involving human subjects. Technology experiment submissions will be reviewed for potential research or experimentation involving human subjects. Any submission that is determined to potentially include research or experimentation involving human subjects will be required to adhere to DoD Instruction 3216.02 "Protection of Human Subjects and Adherence to Ethical Standards in DoD Supported Research" and ensure appropriate Institutional Review Board and DoD Human Research Protections Office approvals prior to conducting those activities.

9. Other Special Requirements: DO NOT SUBMIT PROPOSALS OR MARKETING DEMONSTRATIONS. SUBMIT TECHNOLOGY EXPERIMENTATION NOMINATIONS ONLY. EXPERIMENTATION NOMINATION SUBMITTALS FOR THIS RFI WILL ONLY BE ACCEPTED UNTIL THE CLOSING DATE OF 03 May 2018, 12:00 Noon EDT, for the requirements stated above. No contracts will be awarded based solely on this announcement or any subsequent supplemental RFI announcements.

C. SUBMISSION INSTRUCTIONS:

Technology experimentation nominations shall be submitted electronically via the Vulcan platform. Instructions for the submitting via the Vulcan platform are in Attachment 2. Associated technology experiments with distinctly different uses or applications should have a separate nomination submitted by each respondent. USSOCOM personnel will review submissions to determine whether an experiment submission will be accepted for invitation to attend the TE event.

A complete submission consists of:

- Completing a Vulcan Scout Card (Go to [Vulcan Scout Card](#)). Allow the page to load. Once completed, add the information in Attachment 2 to this RFI and attach a White Paper describing your technology.
 - o Devices with radio frequency emissions must state the intended frequency or frequencies used by the device(s).
- Instructions on how to safely use the technology (as needed).
- An FCC STA, FCC experimental license, or NTIA document (for developmental radio frequency emitting devices). If neither is available at the time of submission, provide status of your FCC/NTIA request.
- Experiment plan.
- If applicable, a picture of the device with a short description of the size (shows the dimensions or places the device next to a ruler, currency, or man-sized object for comparison).

Selected respondents will be invited to participate in USSOCOM experiments. USSOCOM shall provide venues, supporting infrastructure, and assessment (operational and technical, based on availability of resources and written request as discussed above) personnel at no cost to invited respondent(s). **All respondents' submission costs, travel costs, technology experiments, and experimentation associated costs will be at the respondents' expense.** The TE venue will only provide basic access to training areas or ranges (if approved and applicable) to conduct experiments, a facility to connect to the internet, basic venue infrastructure including frequency coordination/deconfliction, and shore power. Invited respondents must be prepared to be self-sufficient during the execution of their experiments and not dependent on venue resources. On a case-by-case basis and at the discretion of USSOCOM, respondents invited to the event may be asked to complete a Vendor Loan Agreement (VLA) (RFI Notice Attachment 5). Do not submit the VLA form unless instructed by USSOCOM to do so.

Time and space will be made available for technology developers to conduct real-time modifications and updates to technologies. Technology developers are advised to bring all tools and equipment necessary to present/operate their technology at the event.

D. BASIS FOR SELECTION TO PARTICIPATE:

Selection of respondents to participate shall be based on the extent to which the technology represents a potential capability increase to Special Operations Forces.

Other considerations include:

- Technical maturity
- Relevance of or adaptability to military operations/missions
- Relevance to current operational needs
- Relevance to event focus areas

E. ADDITIONAL INFORMATION: All efforts shall be made to protect proprietary information that is clearly marked in writing. Lessons learned by USSOCOM from these experiments may be broadly disseminated, but only within the Government. If selected

for participation in Technical Experimentation, developers may be requested to provide additional information that will be used in preparation for the experiments.

Technology developers invited to this event are encouraged to contact each other using the social media through USSOCOM Technical Experimentation. While USSOCOM Technical Experimentation has access to several social media, the preferred collaboration social media link is LinkedIn www.tinyurl.com/LinkedIn-SOCOMTE.

F. USE OF INFORMATION: The purpose of this notice is to gain information leading to Government/Industry collaboration for development of USSOCOM technology capabilities and to assist in accelerating the delivery of these capabilities to the SOF warrior. All proprietary information contained in the submission and technology experimentation shall be appropriately marked. The Government will not use proprietary information submitted from any one firm to establish future capability and requirements.

G. SPECIAL NOTICE:

1. Federally Funded Research and Development Centers (FFRDCs) or contractor consultant/advisors to the Government will review and provide support during evaluation of submittals. When appropriate, non-Government advisors may be used to objectively review a particular functional area and provide comments and recommendations to the Government. All advisors shall comply with procurement integrity laws and shall sign non-disclosure statements. The Government shall take into consideration requirements for avoiding conflicts of interest and ensure advisors comply with safeguarding proprietary data. Submission in response to this RFI constitutes approval to release the submittal to approved Government support contractors.

2. There will be foreign military attendees, who are interested in the capabilities being demonstrated at the TE event. Technology developers are ultimately responsible for complying with all International Trafficking in Arms (ITAR)/Export Administration Regulations (EAR) requirements associated with their equipment. USSOCOM event organizers will restrict access as necessary to assist in protecting ITAR/EAR related technology demonstrations.

H. Per Federal Acquisition Regulation (FAR) 52.215-3, Request for Information or Solicitation for Planning Purposes (Oct 1997):

1. The Government does not intend to award a contract on the basis of this RFI notice or to otherwise pay for the information.

2. Although "proposal" and "respondent" are used in this RFI, your responses will be treated as information only. It shall not be used as a proposal.

3. In accordance with FAR 15.209(c), the purpose of this RFI is to solicit technology experimentation candidates from research and development organizations, private industry, and academia for inclusion in future experimentation events coordinated by USSOCOM.

Contracting Office Address:
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MacDill AFB, Florida 33621-5323

Primary Point of Contact:
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(813) 826-4646