

TECHNOLOGY AREAS: Air Platform, Information Systems, Sensors, Battlespace, Human Systems

ACQUISITION PROGRAM: Program Executive Office - Special Reconnaissance, Surveillance and Exploitation

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 5.4.c.(8) of the solicitation.

OBJECTIVE: The objective of this topic is to develop an Artificial Intelligence capability to aggregate multiple FMV sensor feeds into a single optimized and geo-rectified 3D FMV feed that can be shared by Special Operations Forces (SOF) operating in forward deployed areas of military operations. The capability will reduce distractions from multiple-FMV feeds and integrate with future 3D Virtual Reality and Augmented Reality visual augmentation systems at the tactical edge.

DESCRIPTION: USSOCOM is exploring options that provide SOF Operators with a “multi-FMV fused and optimized 3D visualization” capability that assimilates multiple UAV feeds into a single georeferenced 3D feed with continuous change detection to provide constant situational awareness of tactical areas. This aggregated single-FMV feed on handheld tactical devices will have the immediate effect of reducing warfighters cognitive burden from visualizing multiple FMV feeds. The single aggregated FMV feed will allow for transmission of the highest resolution 3D into software applications on various handheld devices such as the Android, Windows, and other SOF mobile devices employed in operational environments. The reduction of multi-feed operator distraction while enhancing FMV to 3D with continuous change detection is critical to effectively leverage tactical UAV sensors on the battlefield.

Operating system key features shall include but not limited to the following:

1. Systems architecture must be able to process georeferenced imagery from both commercial Unmanned Aerial Systems (UAS) and U.S. DoD group classified one (1) and two (2) UAS.
2. Assimilate multiple FMV feeds and stream fused and optimized single-FMV depiction in 3D in Open Geospatial Consortium (OGC) compliant formats such as CDB and GeoPackage.
3. Assess the feasibility of prototyping as FMV 3D streaming capability in combination with other emerging capabilities with lower Technology Readiness Levels.
4. Assess feasibility of combining optimized 3D FMV with the AI feature extraction (people, vehicles, weapons) with augmented GEOINT into a fully integrated 3D environment to de-clutter FMV feeds and provide optimal real-time situational awareness via a single FMV depiction for both TOC and warfighter.
5. Determine an accuracy estimate of optimized FMV data in relation to actual position/s on the ground.
6. Assess resolution of single optimized FMV relative to multiple input camera resolution. Provide potential UAS camera recommendations for greater fidelity and resolution in the optimized 3D FMV depiction.
7. As part of this feasibility study, the offeror shall address all viable overall system design options with respective specifications.

Key Military applications: Mission Rehearsal, Exercise, Tactical Operations, Mission Command

Planning/Action Mission and Command:

1. Create Common Situational Understanding, Mission Command On-The-Move, Enable Unified Action Partner Collaboration
2. Create, Communicate, and Rehearse Orders
3. Airspace Control in Unified Action Mission Command
4. Operational Adaptability and Decision-Making

PHASE I: Conduct a feasibility study to assess what is in the art of the possible that satisfies the requirements specified in the above paragraph entitled “Description.” To stimulate advances in technology and innovation, solutions including reusable code should be considered as well as re-use of open source code and integrations with fielded SOF systems utilizing existing open standards.

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The objective of this USSOCOM Phase I SBIR effort is to conduct and document the results of a thorough feasibility study to investigate what is in the art of the possible within the given trade space that will satisfy a needed technology. The feasibility study should investigate all known options that meet or exceed the minimum performance parameters specified in this write up. It should also address the risks and potential payoffs of the innovative technology options that are investigated and recommend the option that best achieves the objective of this technology pursuit. The funds obligated on the resulting Phase I SBIR contracts are to be used for the sole purpose of conducting a thorough feasibility study using scientific experiments and laboratory studies as necessary. Operational prototypes will not be developed with USSOCOM SBIR funds during Phase I feasibility studies. Operational prototypes developed with other than SBIR funds that are provided at the end of Phase I feasibility studies will not be considered in deciding what firm(s) will be selected for Phase II.

PHASE II: Develop, install, and demonstrate a prototype system determined to be the most feasible solution during the Phase I feasibility study. Incorporate user input received during quarterly hands on assessments and evaluations in operationally realistic environments.

PHASE III DUAL USE APPLICATIONS: This system could be used in a broad range of military applications where SOF and general purpose forces can de-clutter the view of multiple use organic UAS assets to collect and exploit tactical data to plan operations, conduct rehearsals, and remotely coordinate actions on the objective with organizations that are not collocated with the ground tactical commander. This capability could also be adopted by first responders, federal law enforcement (Secret Service), and for organizations that require a need to simplify their organic FMV data for a specific area prior to and during execution of a task.

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KEYWORDS: Tactical Sensor, Austere Environment, Virtualized Data, virtual and augmented reality, artificial intelligence, deep learning, neural networks, human machine interface, surveillance and reconnaissance, Georeferenced Imagery

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