

SOCOM224-D004: Human Machine Teaming for Reduction of Operator Cognitive Load

ADDITIONAL INFORMATION

N/A

TECHNOLOGY AREAS:

Information Systems

MODERNIZATION PRIORITIES:

Artificial Intelligence/ Machine Learning | Autonomy | Control and Communications | General Warfighting Requirements (GWR) | Network Command

KEYWORDS:

Special Operations Forces, Artificial Intelligence, Decision Support System, Cognitive Load, Human Machine Teaming, Machine Learning, Mission Command Systems, Common Operating Picture

OBJECTIVE:

Develop Artificial Intelligence Decision Support System (AI-DSS) to achieve a Human Machine Teaming (HMT) construct for specific Special Operations Forces (SOF) mission thread(s) that will be provided by the Government.

ITAR:

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), 22 CFR Parts 120-130, which controls the export and import of defense-related material and services, including export of sensitive technical data, or the Export Administration Regulation (EAR), 15 CFR Parts 730-774, which controls dual use items. Offerors must disclose any proposed use of foreign nationals (FNs), their country(ies) of origin, the type of visa or work permit possessed, and the statement of work (SOW) tasks intended for accomplishment by the FN(s) in accordance with section 3.5 of the Announcement. Offerors are advised foreign nationals proposed to perform on this topic may be restricted due to the technical data under US Export Control Laws.

DESCRIPTION:

SOF operators have a high cognitive load to accomplish all their simultaneous tasks on various mission threads. To relieve a portion of this cognitive load, program offices are working with operators to identify specific cognitive loads that the human would like to offload to the machine. The machine would act as an AI-DSS, providing answers, recommendations, and the like back to the operator. This enables the human to focus on tasks only humans can currently accomplish based on complexity, policy, and/or trust. The goal of this effort is to enable a machine to understand real world objects, their interactions, mission goals, legal/policy/doctrinal/physical constraints, the environment, etc. to establish a knowledge representation where the machine can provide decision support. This will reduce SOF operator's cognitive load, reduce the human decision space, and potentially accelerate Observe, Orient, Decide, and Act (OODA) loop and mission accomplishment, while potentially reducing uncertainty.

PHASE I:

Conduct a feasibility study to assess what is in the art of the possible that satisfies the requirements specified in the above paragraphs entitled "Objective" and "Description."

The objective of this USSOCOM Phase I SBIR effort is to conduct and document the results of a thorough feasibility study ("Technology Readiness Level 3") 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 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.

NOTE: This topic is accepting Direct to Phase II (DP2) proposals only. Proposers interested in submitting a DP2

proposal must provide documentation to substantiate that the scientific and technical merit and feasibility described above has been met.

PHASE II:

Develop, install, and demonstrate a prototype system determined to be the most feasible solution during the Phase I feasibility study for an AI-DSS prototype.

PHASE III DUAL USE APPLICATIONS:

This system could be used in a broad range of military applications where cognitive load overwhelms the user and machine decision support could allow for execution of operations in increasingly complex mission sets in peer/near peer environments. This technology could be easily carried over to commercial applications where complex problems create a cognitive burden on users of a system or technology.

REFERENCES:

1. Artificial Intelligence for Decision Support in Command:
https://www.foi.se/download/18.41db20b3168815026e010/1548412090368/Artificial-intelligence-decision_FOI-S--5904--SE.pdf
2. Human-AI Cooperation to Benefit Military Decision Making:
<https://www.sto.nato.int/publications/STO%20Meeting%20Proceedings/STO-MP-IST-160/MP-IST-160-S3-1.pdf>
3. The military wants AI to replace human decision-making in battle:
<https://www.washingtonpost.com/technology/2022/03/29/darpa-artificial-intelligence-battlefield-medical-decisions/>

TOPIC POINT OF CONTACT (TPOC):

TPOC-1: SOCOM SBIR
PHONE: N/A
EMAIL: sbir@socom.mil