

SOCOM222-003: CO2 Scrubber Material

ADDITIONAL INFORMATION

N/A

TECHNOLOGY AREAS:

Materials

MODERNIZATION PRIORITIES:

General Warfighting Requirements (GWR)

KEYWORDS:

oxygen rebreather; scrubber; scrubber canister; carbon dioxide; breathing loop; life support system; CO2 scrubber; CO2 scrubbing

OBJECTIVE:

The objective of this topic is to develop applied research toward an innovative capability to enhance CO2 scrubber material composition, duration, and technology. The proposed solution has the benefit of being regenerative and having a significantly greater surface area which will allow for a much higher volume of CO2 to be captured per unit area. The introduction of this solution potentially enables a range of innovative new diving product designs offering equivalent performance in a smaller and lighter package, with reduced user maintenance. Moreover, it has the potential to significantly reduce the risk of CO2 breakthrough due to improper filling of scrubber material into a canister.

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:

The diving industry's standard solution for the removal of exhaled carbon dioxide (CO2) from the breathing loop is a cartridge containing soda lime; a unit commonly known as a CO2 scrubber. Soda lime is a solid off-white mixture of calcium and sodium hydroxides used in rebreathers and other closed-circuit breathing environments to prevent the build-up of CO2 gas. The diver's exhaled breath passes through the soda lime where the CO2 chemically reacts with the soda lime where it is absorbed. This irreversible chemical reaction restricts subsea operations based on size and duration of the system. This current CO2 absorbent technology cannot be recharged and therefore must be replenished / replaced after each use.

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 (not to exceed "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.

PHASE II:

Develop, install, and demonstrate a prototype system determined to be the most feasible solution during the Phase I feasibility study on a CO2 scrubber material.

PHASE III DUAL USE APPLICATIONS:

This system could be used in a broad range of military applications where removing carbon dioxide within life support systems is required.

REFERENCES:

1. <https://www.earth.com/news/co2-scrubbing-technology-scuba-gear/>

TOPIC POINT OF CONTACT (TPOC):

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