NASA SBIR/STTR Technologies

Hybrid High-Fidelity Auscultation Scope

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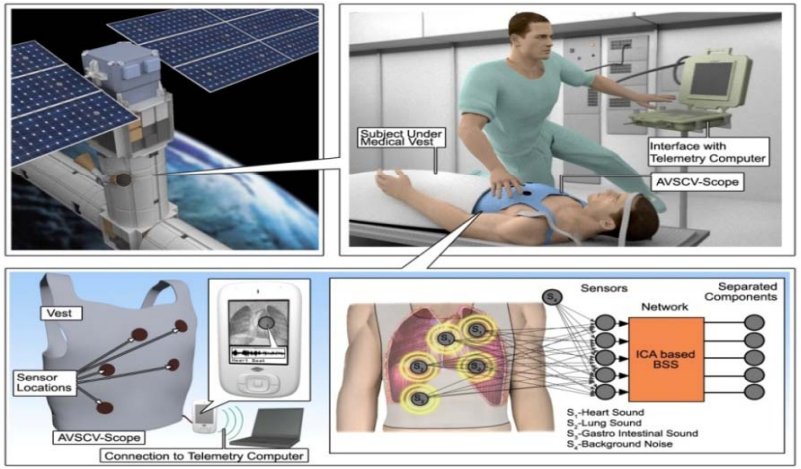
Identification and Significance of Innovation

The **Hybrid High-Fidelity Auscultation Scope (AUSCU-SCOPE)** is based on a unique combination of multiple auscultation mechanisms with a novel sensor-fusion algorithm. It incorporates a hybridized sensor configuration and novel signal processing algorithm to separate low-intensity body sounds (<25 dBA) from a noisy background (>70 dBA) experienced in spaceflights with a 20-dB signal-to-noise ratio. The safe, easy-to-use, non-invasive and space-qualified AUSCU-SCOPE directly meets the NASA requirements by providing a high-fidelity space medical auscultation capability that does not require extra training of the clinicians.

Estimated TRL (1 – 9) at beginning and end of contract: 2 to 4 in Phase I and 4-6 in Phase II



Technical Objectives and Work Plan

1. Development of a preliminary design based on sound propagation simulation and analysis to determine optimal system parameters.
2. Implementation of subsystems based on the design parameters.
3. Integration of subsystems; test and evaluate AUSCU-SCOPE.
4. Identification of preliminary commercial market for the AUSCU-SCOPE and determination of additional applications for this technology.

Work Plan

1. Define the Design Parameters and Develop a System Design
2. Research and Shortlist Sensors for the AUSCU-SCOPE System.
3. Develop the Electronic Module.
4. Develop the Signal Processing Algorithm
5. Assemble the Prototype
6. Demonstrate Feasibility of the AUSCU-SCOPE System and Test Its Capabilities
7. Explore Space Qualification and FDA Approval Strategy for the AUSCU- SCOPE
5. Explore the Commercial Potential and Product Viability
6. Prepare and Submit Reports

NASA Applications

The AUSCU-SCOPE can be used on spaceflights as well as on the International Space Station (ISS) as a handy tool in assessing and maintaining the health of the flight crew who are stationed for prolonged periods of time (>6 months).

Non- NASA Applications

It will be an indispensable tool for first responders and in emergency vehicles where noise levels are extremely high. Sensor array technologies for source localization can be used in such fields as oil exploration, voice separation, speech enhancement, and medical technologies including EEG, fMRI, fetal heart rate monitoring.

Firm Contacts

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NON-PROPRIETARY DATA