Department of the Navy SBIR/STTR Transition Program

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Topic # N132-093

Compact, Logistics Free Electrochemical Reduced Oxygen Breathing Device

Lynntech, Inc.

WHO

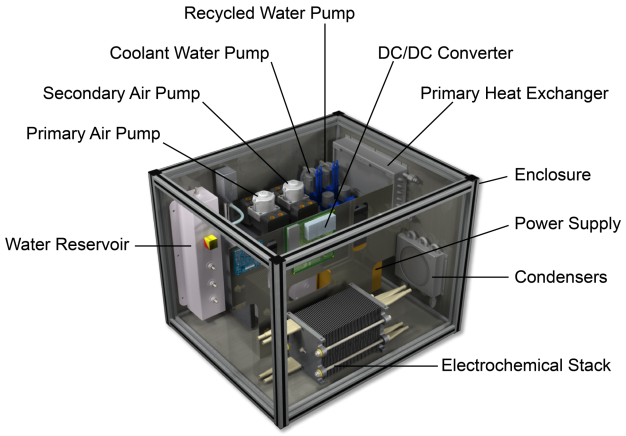
SYSCOM: NAVAIR

Sponsoring Program: Aviation Training Systems Program Office (PMA-205)

Transition Target: Navy Medicine Operational Training Center (NMOTC) Naval Survival Training Institute (NSTI)

TPOC:
(407)380-4773

Other transition opportunities: Hypoxia training for the Army, Air Force, or Marine Corps; or for the civilian aviation sector.



WHAT

Operational Need and Improvement: Hypoxia training is essential for early recognition of hypoxic conditions, which is paramount to implementing corrective action to minimize the impact on the pilot's cognitive function. Advanced mobile training devices that are not bulky, have reduced logistical burdens and prevent air starvation of the trainees via pressure-on-demand delivery are needed to improve the quality of training.

Specifications Required: Portable, low maintenance, and lightweight normobaric hypoxia training device to deliver pressure on-demand oxygen depleted air via an oxygen mask (MBU-23/P series) to pilots that undergo hypoxia training that can be powered using a regular 110 VAC–20 amp wall outlet.

Technology Developed: An electrochemical oxygen separation (EOS) device that is based on liquid water fed electrochemical cells that utilize a highly efficient oxygen evolution reaction (OER) electrocatalyst in a membrane electrode assembly (MEA). The EOS separates the oxygen from the nitrogen present in the ambient air.

Warfighter Value: Lynntech's hypoxia training device will increase overall training flexibility with the ability to conduct training at various facilities across the country. The pressure-on-demand delivery eliminates the oxygen starvation risk of the current equipment and enhances the overall safety of training due to the pure oxygen delivery feature that can aid recovery in the event of oxygen starvation. Lynntech's hypoxia training device is anticipated to significantly increase hypoxia training quality, efficiency and safety.

WHEN

Contract Number: N68335-15-C-0050 **Ending on:** May 10, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Design and demonstrate full-scale breadboard system operation and performance.	N/A	Design meets flow rate, power and training profile requirements.	5	September 2015
Package and automate full-scale breadboard system components for hypoxia training.	Med	Design and operation meet weight, form factor and noise thresholds.	6	September 2016
Human testing of packaged system to validate performance in a simulated operational environment.	Med	Reliable and safe operation without significant discomfort to the trainee.	7	December 2016

HOW

Projected Business Model: Lynntech will manufacture the hypoxia training devices in-house and supply them to the Navy. NSTI uses ~70-80 devices for hypoxia training for the entire Navy. Lynntech currently plans to manufacture and supply these devices to NTSI without needing to interface with a prime contractor.

Company Objectives: Lynntech's objective for this project is to increase hypoxia trainer efficiency and the safety of naval aviators by developing this electrochemical technology into a hypoxia training device that meets the Navy's requirements. Lynntech is a for-profit business and believes that if we properly meet the above objective, sales and profit will follow.

Potential Commercial Applications: In addition to being a training device for commercial aviation, the technology developed has many civilian applications such as training for athletes, mountain climbers and elevated personal exercise. The technology developed may also be transitioned into portable, compact oxygen concentrators for medical purposes.

Contact: Brian Hennings, V.P. Business Development
brian.hennings@lynntech.com 979-764-2234