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SBIR INVESTMENT: \$4,335,304

PHASE III FUNDING: \$1,858,434

DEPARTMENT OF THE NAVY

NAVY SBIR/STTR SUCCESS STORY



ON-DEMAND HYPOXIA TRAINER

The small footprint and tankless solution for effective hypoxia awareness training

Lynntech Inc.

POC: John Stocker

979.764.2200

College Station, TX 77845

www.lynnotech.com

THE CHALLENGE

Hypoxia is a physiological condition where body tissues and organs are deprived of necessary oxygen, which can cause confusion, blurred vision, and ultimately lead to unconsciousness. As a means to mitigate the risks associated with hypoxia, current Navy instruction outlines annual hypoxia awareness training as well as a biennial dynamic hypoxia training requirement. Current mask-on hypoxia training devices lack a representative fidelity due to the lack of positive air pressure provided by existing capabilities.

THE TECHNOLOGY

The On-Demand Hypoxia Trainer is a small footprint Electrochemical Oxygen Separation (EOS) based hypoxia training device that provides a true pressure-on-demand flow rate. The on-demand airflow increases training fidelity by replicating the air delivery method of aircraft systems, which also alleviates training artificialities such as air hunger. Specifically, Lynntech's training system does not require compressed gases, thereby removing the need for gas bottle delivery, and also relieving the flight surgeon from signature duty, which is often required. The reduced footprint of the device, due to the elimination of compressed gases, will ease implementation of the system in higher fidelity training systems where space may be limited.

THE TRANSITION

As part of an ongoing SBIR Phase II.5 and Phase III project, a fully packaged and autonomous hypoxia training device has been designed. The company will manufacture the On-Demand Hypoxia Trainer units in-house and supply them to the Navy and other customers. Naval Survival Training Institute (NSTI) currently uses about 40 devices for hypoxia training for all mask wearing platforms; additional units are likely to be procured as the Navy Fleet uses squadron devices to support unit level training.

THE NAVAL BENEFIT

The On-Demand Hypoxia Trainer significantly increases the quality, efficiency and safety of aircrew hypoxia training. The device will also increase overall training flexibility with the ability to conduct training at various facilities across the country without worry of availability of compressed gas bottles at training sites. Due to the novel design of the system, the logistics associated with the current system will be reduced.

THE FUTURE

Additional human testing with a larger sample size is anticipated to be completed as part of the ongoing Phase III effort. Additional fleet testing is planned with specific platforms as a prototype unit has been delivered to Naval Air Station Pensacola's Aviation Survival Training Center. At end of current phase, the device is expected to be acquisition ready and the U.S. Navy plans procurement starting FY20. The Hypoxia Training Research and Development Team was selected to receive the prestigious 2018 Naval Air Warfare Center Aircraft Division (NAWCAD) Innovation Award in the technical category, as well as the 2018 Naval Air Warfare Center Training Systems Division Admiral Luis de Florez Training and Simulation Award.

"UNDERSTANDING AND COMBATING THE THREAT OF HYPOXIA IS CRITICAL FOR NAVAL AVIATORS. EQUALLY IMPORTANT IS HAVING A HIGH-FIDELITY CAPABILITY THAT REPLICATES AIRCRAFT SYSTEMS IN A SAFE AND RELIABLE TRAINING DEVICE. THE ODHT'S SMALL FOOTPRINT, MINIMAL LOGISTICS REQUIREMENT, APPROACH TO SUPPORTABILITY, AND MAINTAINABILITY COULD HAVE A POSITIVE IMPACT ON THE NAVAL SURVIVAL TRAINING INSTITUTE, EIGHT AVIATION SURVIVAL TRAINING CENTERS, AND ANYWHERE ELSE HYPOXIA TRAINING IS DELIVERED."

LCDR Lee Sciarini
Director, Training Technology
Naval Survival Training Institute