DEPARTMENT OF THE NAVY
SBIR/STTR TRANSITION PROGRAM
SPOTLIGHT
STP
January 2022

Company: Lynntech Inc.
Website: https://lynntech.com
POC: Brian Hennings
Phone: (979) 764-2362
Address: 2501 Earl Rudder Freeway South, Suite 100
College Station, Texas 77845

Lynntech/ODS Team Delivers Flight Breathing Awareness Trainers to the Navy

By Jennifer Reisch

Lynntech Inc. developed a pressure-on-demand, mask-on, train-like-you-fly, hypoxia training device for aircrew, and then spun off a new company, on Demand Systems (ODS), which is manufacturing the Flight Breathing Awareness Trainer (FBAT) hardware for the Navy.

After successful human subjects testing at Embry-Riddle Aeronautical University (Embry-Riddle), as well as extensive Navy-led prototype testing at Navy sites, FBAT units have been delivered to two sites. The current contract is for 35 FBATs. "NAVAIR has eight Aviation Survival Training Centers (ASTCs) and we are delivering several of our trainers to each of those ASTCs," said Brian Hennings, business unit manager at ODS, formerly vice president of business development at Lynntech. The first two deliveries totaling nine units have been delivered, commissioned, installed, and are in use.

"The FBATs we've already delivered were being used for training the day after we delivered them," said Hennings. "We delivered and helped install them, did operator training, and maintenance training and then they started using them for training aircrew."

Hypoxia training is essential for pilots to learn to recognize unique individual symptoms as early as possible, so they can take corrective action to minimize the impact on cognitive function. To improve training options, the Navy required a normobaric hypoxia training device capable of simulating hypoxic conditions from sea level to 30,000 feet without the use of compressed gases required in alternative solutions.

Image courtesy of Lynntech Inc.

"We had been working with physiologists to develop a platform that had greater capability and was more like actual cockpit breathing. To replicate breathing systems on board military aircraft, the device was also required to have a pressure-on-demand capability to regulate airflow."

The FBAT uses an electrochemical oxygen separation (EOS) device that is based on electrochemical cells that utilize a highly efficient electrocatalyst in a membrane electrode assembly. The EOS separates the oxygen from the nitrogen present in ambient air. Lynntech's trainer delivers pressure-on-demand airflow operation, as well as integrated biometric monitoring with increased overall training flexibility. It eliminates oxygen starvation risk due to pressure-on-demand delivery, and a high concentration oxygen supply is available for emergency recovery if needed.

Lynntech ended its SBIR Phase II producing the prototypes that the Navy tested at Embry-Riddle.

DISTRIBUTION A. Approved for public release - distribution unlimited. 43-9035-22

"That testing was about user interface and things that trainers and trainees liked or didn't like. Then with a Phase II.5 we started working with an integrated product team—an IPT. They were concerned with issues such as logistics, cooling, and maintenance, not just whether it makes the trainee hypoxic but all sorts of other things. Is there room to do maintenance on it? How many parts in it are sole source? Things like that," said Hennings.

"We had worked with researchers to develop the trainer, and when it came time for the purchase order, we started working with PMA-205—the Naval Aviation Training Systems and Ranges Program Office. The Phase II.5 was manufacturing advancement rather than technology advancement; we raised up the manufacturing level—the MRL."

Image courtesy of Lynntech Inc.

Lynntech is currently developing software upgrades that allow the FBAT to train hypothetical oxygen system malfunctions that impact flow and pressure. "It's customizable. You program in the profile you want to train for and the trainee doesn't know what's coming," he said.

"We are planning for the Navy to order more units because not just shore-based ASTCs do training, but the fleet does training for aircrew as well. The Air Force is an obvious second customer and we are currently talking to them." Commercial aviators also may be interested in purchasing the trainers.

Other options for the trainer include SOCOM jumpers and Army helicopter pilots. "High altitude, low opening special force jumpers will jump out of an aircraft at high altitude and then don't open their parachutes for visibility reasons until they get to low altitude. They need hypoxia training. The Army flies helicopters in mountain ranges. If you take off from a mountain, you are already at high altitude. Even though a helicopter doesn't fly exceedingly high in the air, hypoxia is a real threat for crews lifting off at high elevations," Hennings explained.

Participating in the Department of the Navy SBIR/STTR Transition Program (Navy STP) helped Lynntech find more potential customers for the FBAT. "The Market Research Analysis Report we received was excellent because it helped flesh out the market and show this is worth doing. It gave us contacts in the Air Force, Army, and in NASA, which also conducts hypoxia training. We also had an opportunity to meet more people in the program office at the Navy FST and brief them on what we are doing. The presentation talk gave the audience a better understanding of how it's evolved over time, current TRL, current MRL. We are very satisfied with our return on investment with the Navy STP," he said.

Lynntech, a 2016 Tibbets Award winner, develops and transitions electrochemical-based technologies to the warfighter. The company's mission is to nurture and harvest scientific creativity to produce life-changing products. ODS's manufacturing proficiencies synergize with Lynntech's R&D endeavors, resulting in improved commercialization success. For more information, visit Lynntech's website at https://lynntech.com/ and ODS's website at https://on-demandusa.com/.