Navy SBIR/STTR Success

Advanced Hybrid Energy System for Wet and Dry Submersibles

Lynntech's system will allow for longer UUV missions with its advanced power management system architecture.

Topic Number: N092-132

SBIR Investment:
$1,795,321

Commercial Revenue including Navy Transition:
> $20,000,000

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About the Technology:

Unmanned Underwater Vehicles (UUV) are typically powered by batteries, which limits mission endurance and capability. When the Navy wanted to develop a flexible hybrid energy system for long endurance UUVs, Lynntech got to work on a solution. While batteries keep a UUV running for several hours, Lynntech's system would enable run times of over 50% longer. The technology would be flexible, modular, and consist of a proton exchange membrane (PEM) fuel cell, a commercial off-the-shelf battery, and advanced power management system architecture.

Naval Benefit

UUVs are relied upon by the Navy for high-priority missions such as fleet protection, oceanography, communication and navigation, so it is becoming increasingly important to turn to alternative energy sources for sustained performance. The hybrid battery provides power for short-term high-power transient loads, while the fuel cell provides stable base load power and battery recharging. This would allow the UUV to operate for longer periods of time and would support a more extensive sensor capability compared with current vehicles. It is closed to the environment to maintain neutral buoyancy and avoid detection, is fully air-independent to allow operations in subsea environments, and allows for rapid refueling.

Transition

Lynntech has specialized in electro-chemical power for over two decades, with a strong focus on fuel cell technology. Although Lynntech began work on its fuel cell hybrid energy system following a Phase I award from NAVSEA, this technology was built upon years of earlier work building fuel cells for high altitude long range, long endurance operations within the Department of Defense. The challenge was now to put a fuel cell battery system into such a small piece of equipment, measuring just 12 ¾ inches in diameter. Lynntech's system garnered enough interest that the company won a Phase II.5 worth $1.25 million to continue the development of the technology, and they are eyeing lightweight-class Expeditionary UUV platforms as a target for transition. NASA currently uses Lynntech's fuel cell technologies on NASA vehicles and power systems for satellites. Potential commercial applications include undersea oil exploration, including drilling operations, oil field servicing as well as environmental monitoring, which are all areas that require power for duration and payload uses, and could benefit from fuel cell technology.