

WHO

SYSCOM: ONR
Sponsoring Program: ONR

Transition Target: Energy and Power Communities of Interest (COI), UUV

TPOC: Mike Wardlaw
mike.wardlaw@navy.mil

Other Transition Opportunities: PMS 408 (MK18); PMS 406 (LDUUV); PMS 485 & PMW 120 (LBS-AUV); PMW 770 (UC); Oil & Gas Industry. The EESD has the potential to be used across many energy and power consuming platforms (Communities of Interest) throughout the DoD and industry.

Notes: Images shown (left to right) stack of EESD cells to be packaged (number of cells per package determines energy density, etc.), (top right) individual EESD cell, (bottom right) control electronics for packaged cells.



Image courtesy of Carver Scientific, Inc. (2022)

WHAT

Operational Need and Improvement: Navy systems often require energy storage that provides both high peak power and high energy density in support of naval operations.

Specifications Required: Develop an innovative non-electrochemical rechargeable energy storage cell capable of achieving 2x or greater the energy density with same or greater power output as current state-of-the-art battery cells. Must be inherently safe, stored at no voltage for extended periods, environmentally neutral, and able to operate across a broad spectrum of environmental conditions at both sub-atmospheric and high-pressure environments or as defined under MIL-STD-810G. Cell-level technology should be electronically scalable and integration-capable.

Technology Developed: Advanced Non-Electrochemical Energy Storage (Entropic Energy Storage Device - EESD)

Warfighter Value: Developing the EESD as a scalable, integration-capable energy storage device that is safe, lightweight, capable of the same or greater power output as current state-of-the-art batteries and is domestically produced will meet many SWaP-C goals, including reduced logistical costs and eliminate unsafe disposal practices.

WHEN

Contract Number: N68335-21-C-0166 **Ending on:** May 16, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Proof of Concept	Low	Component system verified	3	2nd QTR FY20
Prototype, lab-validation	Medium	Met increasing levels of performance across a range of parameters	4	3rd QTR FY20
Prototypes Delivered and Operated in UUV	Medium	Deliver 5 working prototypes for testing and evaluation	6	4th QTR FY22
If follow-on II.5 is awarded company expects to integrate technology in multiple platforms and begin transition efforts	High	Prototype testing is passed and follow-on contract is awarded	7	2nd QTR FY24

HOW

Projected Business Model: Company and sub-contractors can meet low-rate initial production capability and capacity via its own manufacturing processes and equipment, but will need a manufacturing partner for full-rate production. The primary goal is to license technology to prime defense contractors, large commercial entities such as energy companies, electric generation manufacturers, etc. Licensees will design and manufacture energy storage products to be integrated with their own energy-consuming devices by market segments (such as transportation, industrial cement and steel, commercial, residential, agriculture, space, other segments, government, DoD).

Company Objectives: The short-term company objective is to identify and partner with a prime or a system integrator - initially to meet Navy and multiple DoD needs identified in the energy and power communities of interest (COI). There is significant overlap with other COIs due to need to power products and platforms across many COIs. Company will seek out such partners that may fall outside the energy and power COI.

Potential Commercial Applications: The EESD is a scalable design that can be manufactured in many form factors, is integration-capable across many energy consuming devices, ranging from hand-held or wearable devices to large energy consuming platforms.