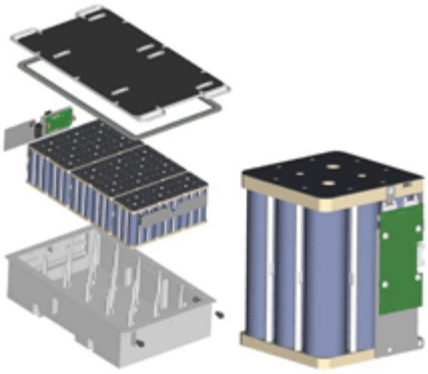
The MK8 MOD1 SDV
New Energy Storage System

Background

The MK8 MOD1 SDV New Energy Storage System project was undertaken by the U.S. Navy Seals to support various missions. The SEAL Delivery Vehicle (SDV) was initially developed to utilize silver-zinc (AgZn) batteries. These batteries had the highest energy storage capacity of rechargeable batteries at that time. With the advancement of Lithium- Ion in consumer electronics and commercial energy storage, the U.S. Navy and Special Operations Command (SOCOM) funded in partnership with the US Navy ManTech Program to pursue a replacement battery program that would result in higher energy density, less maintenance, and a lower life cycle cost system.

An Integrated Product Team [IPT] has been established that will survey, analyze, monitor and provide the US Navy Special Warfare Command [SPECWARCOM] and US Special Operations Command [US SOCOM] an energy storage system that enhances the mission capabilities and reduces the life cycle cost of the vehicle.



Team members of the IPT are from the EMPF (US Navy Center of Excellence for Electronics Manufacturing), Office of Naval Research (ONR), NSWC Crane, Panama City, PMS-Naval Special Warfare. Additional participation from the Portsmouth Naval Shipyard, Ocean Engineering Inc. and the US Navy Submarine Safety Program Office will be provided to the IPT as required.

The EMPF, in partnership the Office of Naval Research ManTech Program and US Special Operations Command has initiated a manufacturing technology program that will improve the issues encountered with Silver-Zinc [AgZn] Energy Storage System. The acquisition cost of a Li-Ion energy storage system is higher than that of the Ag-Zn system, but the benefits are substantial.

Battery Life – The new Li-Ion battery will extend the battery life 5x that of the existing battery. The batteries also have a higher battery capacity and eliminate the need to replace batteries early for mission deployment.

Recharging – The Li-Ion batteries have a charge in place feature that eliminates the need for the battery cells to be removed from the vehicle during charging. This allows for a faster turn around time for missions. There is no disassembly of the battery required for charging except after more than 100 cycles for balance charging. NAVY Seals then have additional time to concentrate on mission goals and less time focusing on system charging.

Cost – Current annual costs of the energy storage system of the SDV are mainly associated with manpower required to support and maintain the current energy storage system. Cost savings of the energy storage system based on current projections are projected to be $18 Million.

Specific tasks within the program are:

High Cost of Energy Storage - Develop manufacturing processes that reduces the cost of packaging large scale high energy storage Li-Ion batteries.

Battery Charging System - The proposed Lithium-Ion battery will require a new battery charging system that must be qualified for operation aboard submarines. It must also interface with the battery monitoring systems and be compatible with the safety designed hull penetrators. An additional goal is to design a commercial charging system that will meet requirements for operation on submarines, and be utilized for battery charging on various systems.

Benefits to the US Navy

The benefits to the US Navy are both in a life-cycle-cost reduction and in operational capabilities through the transition of manufacturing technologies, and integration of commercial technologies into undersea special warfare applications. Operational benefits will be apparent throughout the Special Warfare community.