

SERC RESEARCH REVIEW 2023 | NOVEMBER 15, 2023

System Engineering Research Center (SERC): Capstone Marketplace Overview

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Office of the Under Secretary of Defense for Research and Engineering OUSD(R&E) and U.S. Special Operations Command (SOCOM) Science and Technology

W.M. Shepherd



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**SYSTEMS
ENGINEERING
RESEARCH CENTER**

SERC Capstone Customers - FY 2024

- **US Special Operations Command, Tampa, FL**
- **Naval Safety Center, Little Creek, VA**
- **Naval Special Warfare Group EIGHT**
SEAL Delivery Team TWO
- **US Army Special Operations Command, Ft Liberty, NC**
- **Special Operations Support Activity, Lexington, KY**

SERC Capstone Universities 2023-2024

- **George Mason University**
- **Michigan Technical University**
- **San Diego State University**
- **Stevens Institute of Technology**
- **University of Dayton**
- **University of South Alabama**
- **University of Texas Austin**

2023-2024 Capstones--Army Special Ops

Research Topic	Number of Teams	Customer
Body Mounted Sensors	1	USASOC
Automatic Intubation Device	1	USASOC
Covert Communications to Working Dogs	1	USASOC
"Any Donor" Blood Transfusions	1	USASOC

2023-2024 Capstones--Army Special Ops

Research Topic	Number of Teams	Customer
Emojis in Context	1	USASOC
Drone Video to Cell Towers	1	USASOC
Friendly Forces ID	2	USASOC

2023-2024 Capstones--USN

Research Topic	Number of Teams	Customer
Electronic Operations Manual for Submersible Maritime Platform (“Everything Tablet”)	I	NSW
Computer-Based Electrical Simulator for Submersible Maritime Platform	I	NSW
Autopilot for Underwater Vehicle	I	NSW
Body Mounted Sensors-Aircrew	I	Naval Safety Center

2023-2024 Capstones--SOFSA

Research Topic	Number of Teams	Customer
Efficient Warehouse	1	SOFSA
Air-transportable Lithium Batteries	1	SOFSA
Advanced Off-Road Suspension Design	1	SOFSA/USAS OC

The Capstone Marketplace as a Model

Characteristic	Capstone Marketplace	“Innovation Capstones”
Collaborations between SERC, Universities, and Govt Customers	Yes	Yes--Part of Acquisition Innovation Research Center
Prototype developments (STEM)	Yes	Yes and No. Can be STEM or Non STEM, Business, Programmatics, Entrepreneurship
Multi-disciplinary projects	Yes	Yes
Undergrad and Graduate Students	Yes, students in Senior Design Courses	Yes
includes Business and other disciplines	Yes--but limited	Yes—Emphasis on Whole of Business and Whole of Govt solutions
For Academic Credit	Yes	Yes and No. Students can participate as extra curricular activity
Can start in Spring or Summer	Yes	Yes
Fixed Price contracts	Yes	Yes
Deliverables	Prototype Hardware and Software	May be detailed analyses or studies

2020-2023 Capstones at UT Austin

Self Intubating Airway Device—Multiyear Project

Develop a Self-intubating snake, a multidirectional device that can be loaded with an endo-tracheal (ET) tube and advanced into the mouth of a warrior in need of an airway.

This device can reduce operators' exposure to hostile fire during critical medical interventions.

Figure 1. Overview of Proposed Solution

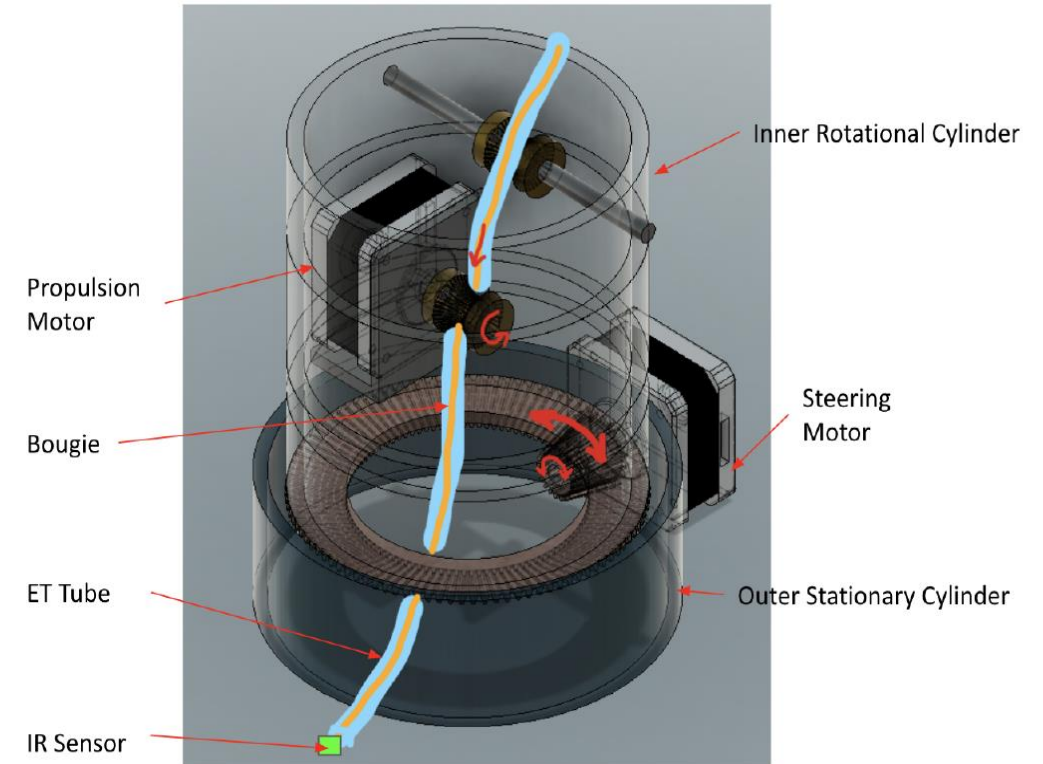


Figure 1. This figure demonstrates how the subsystems will work together. Note the inner and outer cylinders. The outer cylinder will be stationary and will hold the motor that controls steering. The inner cylinder will rotate as a unit, including the propulsion motor, the roller, and the ET tube and bougie.

2020-2021 Capstone University of Alabama Huntsville

Interior Storage for a Submersible

Objective: Design and build a prototype of an internal storage system to accommodate necessary items within a submersible vehicle.

Lack of a specific storage system makes access to essential equipment cumbersome and space is not maximized

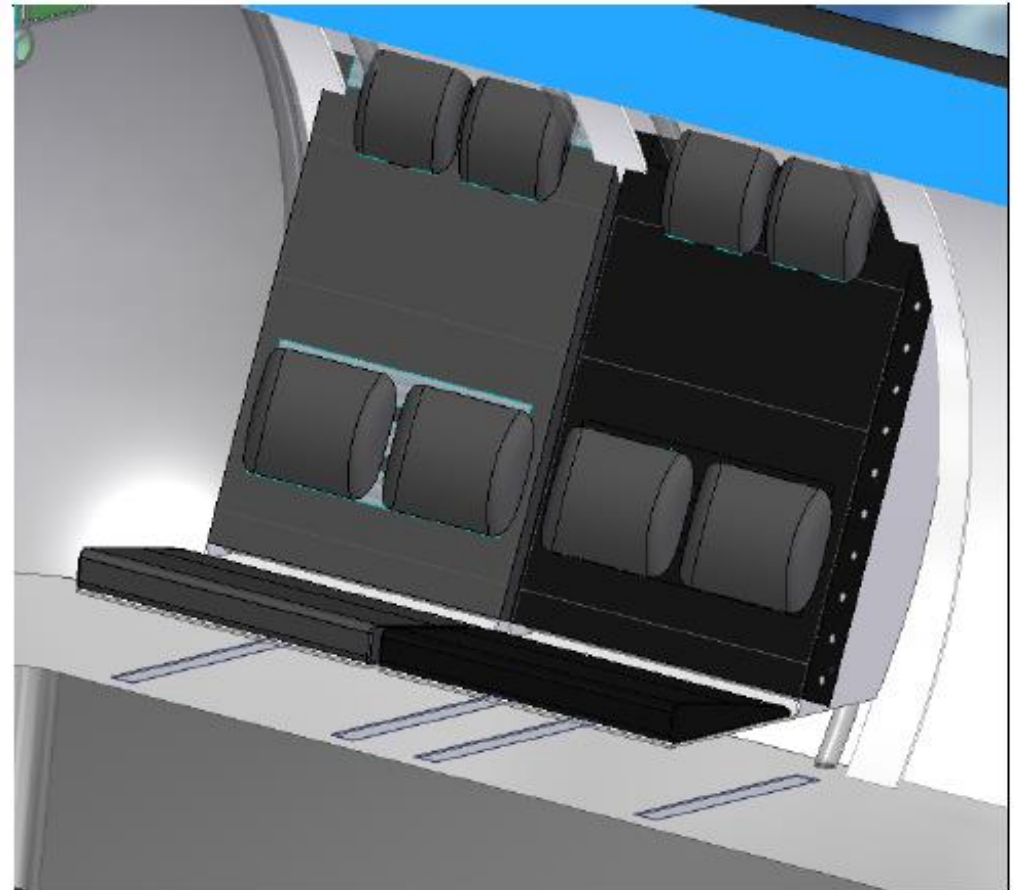


Figure 7.1.2.5: Curvature Storage in Operational Environment. The gray slits are velcro strips attached to the ballast tank (Credit: T. Ruffalo)

Capstone Marketplace Website: www.capstonemarketplace.org

Thank you

Stay connected with SERC Online:



Email the presenter: W. M. Shepherd

✉ wshephe1@stevens.edu

Email the research team:

✉ capstonemarketplace@stevens.edu
mdelorme@stevens.edu

