Topic: N17A-T007

Mentis Sciences, Inc.

Innovative Packaging to Achieve Extremely Light Weight Sensor Pod Systems
Mentis Sciences Inc. is developing a lightweight, thermally managed, universal electronics enclosure for manned and unmanned rotorcraft. The system is designed for a payload of up to 175lbs. Mentis employs a unique combination of New England ingenuity and subject matter expertise to engineer composite solutions for the Automotive, Defense, Aerospace, and Medical industries. Initial targeted platforms for the pod will include electronics packages for Naval rotorcraft. Using the modular enclosure means new sensor packages can avoid flight qualification tests. By the conclusion of Phase II, a prototype will be delivered for ground-based testing and evaluation. The goal for this technology is to reduce the time to field new electronic and sensor systems in this quickly evolving field.

Technology Category Alignment:

Electronics Integration
Fixed Wing Vehicles (includes UAS)
Readiness
Sensors, Electronics and Photonics

Contact:
Robert Lumpkins
rlumpkins@mentissciences.com
(603) 624-9197
https://www.mentissciences.com/
SYSCOM: NAVAIR
Contract: N68335-19-C-0039
Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-19-C-0039
Tech Talk: https://atsi.adobeconnect.com/p90i7khpr14t/

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2019-850

Topic # N17A-T007

Innovative Packaging to Achieve Extremely Light Weight Sensor Pod Systems

Mentis Sciences, Inc.

WHO

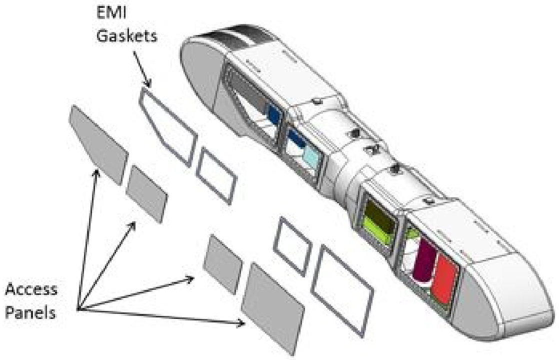
SYSCOM: NAVAIR

Sponsoring Program: PMA-264

Transition Target: Air Anti-Submarine Warfare Systems

TPOC:
(301)342-2034

Other transition opportunities:
United States Marine Corps, Coast Guard, Federal Emergency Management Administration, National Oceanic and Atmospheric Administration, United States Geological Survey, oil industry and humanitarian organizations such as Red Cross.



WHAT

Operational Need and Improvement: The Navy is continually outfitting their aircraft with new sensor packages. The current design practice is to develop a new housing for each new airborne sensor that is placed into service. This practice is time consuming and expensive. A lightweight electronics pod with integrated thermal management that is capable of housing multiple components is needed. A modular system will eliminate the need to flight qualify multiple housing systems as new sensor packages are developed. The modular pod system must be extremely lightweight and satisfy specific volumetric, center of gravity, and versatility requirements.

Specifications Required: The modular pod shall be 7 feet in length, 16 inches in width, and 16 inches in height and have a maximum weight of 125 lbs. including the mounting system for electronic components. It shall be compatible with BRU-14/A attachment points. The pod shall maintain the internal temperature at 65 F +/- 5 F for a 2 kilowatt internal head load. The complete pod shall be capable of 6000 hours of operation without maintenance.

Technology Developed: The system developed by Mentis Sciences Inc. utilizes advanced fiber reinforced composite to construct a lightweight but strong pod structure. Reinforced mounting and handling areas make the pod compatible with the BRU-14/A mounting points and current shipboard handling equipment. A vibration isolated mounting system allows the pod to be reconfigured with different electronics packages all while protecting the sensors from the effects of vibration and mechanical shock. The internal temperature is controlled with an environmental control system that self-adjusts based on external temperature and speed of the rotorcraft.

Warfighter Value: The lightweight electronics enclosure developed by Mentis Sciences Inc. represents a step forward in reducing the time and cost of fielding new airborne sensor packages. The modularity of the system means sensor packages for different applications can utilize the same common enclosure. The compatibility of the enclosure with existing mounting and handling equipment means no new equipment will be required for integration with the fleet. The pod can be used on many aircraft including manned and unmanned vehicles. The incorporation of a common electronics enclosure will eliminate the need to flight qualify a new enclosure each time a new sensor system is put into service, thereby reducing the overall time and money required to implement the new system.

WHEN

Contract Number: N68335-19-C-0039 **Ending on:** August 1, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Detailed Structural Design, Analysis, and Testing	Low	Complete structural model of the entire electronics enclosure. Data from analysis and testing demonstrates pod will satisfy requirements	4	February 2020
Tooling Design and Manufacture	Med	Mold system for fabrication of composite components designed. Manufacturing approach established	4	October 2020
Detailed Thermal System Design and Eval	Med	Computer and sub-scale testing show the ability of the thermal system to successfully maintain desired internal pod temperature.	4	August 2020
First Article Fabrication	Med	First article passes dimensional check against system drawing	5	January 2021
Full Scale Thermal Evaluation	Med	System is effective within full scale pod model	6	May 2021
Deliverable Fabrication	Med	Structurally complete model delivered to Navy	6	August 2021

HOW

Projected Business Model: Mentis Sciences Inc. will manufacture the lightweight electronics enclosure and sell direct to customers. The Navy or other DoD customers will be able to purchase units to outfit with electronics systems while sensor manufacturers and system integrators will be able to buy units to integrate their sensor packages, allowing them to provide a complete sensor solution to their customers. Production rates are unknown at this time.

Company Objectives: Mentis Sciences Inc. was founded in 1996 by John F. Dignam after 30+ years of service at Army Materials Research Lab, where he served as Army's Director Missile Materials to continue the development and advancement of Missile Materials, Systems, Structures and Analysis for DoD Systems. Principals at Mentis are experts in the design, development and manufacture of components utilizing advanced composite materials. Mentis plans to continue our growth by finding new markets for the modular enclosure and seeking out new opportunities to to design and develop composite solutions to help DoD and commercial customers

Potential Commercial Applications: A lightweight modular electronics enclosure has numerous applications within and outside the DoD. The pod has the potential for being reconfigured to carry temperature sensitive supplies for logistic and emergency applications thanks to the on board environmental control system. The low weight makes the pod a prime candidate for being carried on unmanned aircraft for rescue operations. Additionally, the enclosure can house scanning sensors to be used for geological study and ocean mapping.

Contact: Robert Lumpkins, Senior Engineer
rlumpkins@mentissciences.com 603 624 9197