

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2021-0434

Topic # N192-119

Collective Protection System Variable Speed Drive Expansion

Figure, Inc. d/b/a Figure Engineering

WHO

SYSCOM: NAVSEA

Sponsoring Program: PMS 443 / PMS 317

Transition Target: LPD17 San Antonio Class

TPOC:
(540)684-7884

Other transition opportunities: DDG Flight IIA/Flight III, DDG 1000, LSD, LHD, LHA, Fixed Sites, Coast Guard, and military ground vehicles are all excellent candidates for a modernized Collective Protection System (CPS) implementation. Focus will be on Navy ships initially with rollout to other formats to follow.

Notes: LPD 17 class ships are a primary target due to high maintenance demands of CPS on this class ship, and would benefit most from the operational advantages of a modernized CPS.



Image courtesy of U.S. Navy

WHAT

Operational Need and Improvement: The U.S. Navy needs to modernize shipboard systems to improve usability, prolong their lifecycles, and understand maintenance intervals. In particular, Collective Protection Systems (CPS) which are critical to preventing chemical, biological, and radiological (CBR) threats employ legacy ventilation control methods. Legacy systems require significant energy consumption and travel throughout the vessel to different machinery or filter rooms to monitor the health of CPS and ensure proper functionality. In an effort to prolong system life and reduce the workload on Damage Control (DC) personnel, a modernized ventilation system with programmable control and data collection will facilitate effective monitoring and control of the system from Central Command Station (CCS).

Specifications Required: For a modernized CPS to meet the Navy's needs it must reduce installation cost, improve operational efficiency, maintain or improve warfighter safety, and reduce lifecycle/maintenance costs. Any shipboard system must meet shock, vibration, and electromagnetic interference (EMI) requirements as well as minimize size and weight to meet critical to ship functionality. While autonomous systems are ideal to improve operational efficiency, this initial system design will be semi-autonomous to provide centralized control and monitoring. However, with a modern programmable logic controller (PLC) based system, autonomy can be implemented in the future with simple software updates. The hardware will be future-proofed to meet the Navy's needs for decades to come.

Technology Developed: Figure Engineering is developing an advanced ventilation control system and health monitoring capability to promote a simplified user-interface, improve operational efficiency, prolong system life, and reduce both up front and operating costs.

Warfighter Value: Primarily, a modernized CPS will ensure protection of the warfighter from CBR threats throughout operation. Additionally, the improved control and health monitoring features will ensure the system remains functional at all times and will notify the crew if issues arise. With a more self-sufficient monitoring system, the crew is freed from many of the tasks required by operating the legacy CPS technology to ensure availability for more complex tasks. Lastly, by improving the maintainability of CPS and prolonging the lifecycle, the Navy will save money to spend elsewhere that promotes other capabilities and resources for the warfighter.

WHEN

Contract Number: N68335-21-C-0212 **Ending on:** February 28, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Develop in-house single-zone prototype	Low	Test data	5	November 2021
Develop in-house two-zone prototype	Low	Test data	5	February 2022
Integrate and evaluate sensors and control at Navy Laboratory	Low	Feedback from Navy stakeholders	6	November 2022
Validate long-term operation and develop specifications package	Med	Feedback from Navy stakeholders	6	August 2023

HOW

Projected Business Model: Figure Engineering develops technologies to be licensed and implemented at scale by large engineering firms or prime contractors. Figure will maintain involvement in implementation particularly when installations require modifications to the system functionality or physical infrastructure.

Company Objectives: Figure Engineering's mission is to provide the United States Department of Defense with advanced manufacturing and maintenance technologies that reduce risk, save money, optimize efficiency, and improve the worker and warfighter's experience.

Potential Commercial Applications: Advanced CPS technology, particularly when it becomes autonomous with detection systems, will be very useful in travel environments like airports and public transit stations. Particularly with the prioritization of disease spread prevention, a modernized CPS can be integrated with a variety of detection systems that expand versatility and capability.

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