Department of the Navy SBIR/STTR Transition Program

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NAVAIR #2022-722

Topic # A16-090
Common Data Acquisition and Exchange Framework (CDAE) for Aircraft Health Monitoring Systems
Global Strategic Solutions LLC

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA-209 Air Combat Electronics Strategic Planning Group IPTL

Transition Target: All Fixed Wing and Rotary Aircraft with a Health Monitoring System that employs data formats and unique software to decode, process, analyze, and report health monitoring data. The Navy's P-8 is an ideal target.

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Other Transition Opportunities: The architecture can integrate into future aircraft maintenance systems to overcome the technical barrier in transitioning to an open standard of data management.

U.S Navy Photo, 220616-N-SU685-0034.jpg
https://www.navy.mil/Resources/Photo-Gallery/igphoto/2003021407/

Notes: The CDAE System provides a data structure enabling standard health monitoring system (HMS) implementation on any air platform through a common on-board data collection unit and embedded software. The collection of health state data in real time will fill a critical gap across both defense and commercial air industries.

WHAT

Operational Need and Improvement: The CDAE System aims to enable standard health monitoring system implementations on aviation platforms through a foundational onboard architecture framework. Development is needed for maintenance organizations to monitor maintenance issues actively and easily with predictive condition-based maintenance practices that would reduce aircraft down time and remove degraded components before they cause an issue. Commonality in the data collection components and management tools could achieve economy of scale and reduce duplicative investments, allowing for more effective resource management.

Specifications Required: The requirements for this technology were to develop and demonstrate an integrated, robust, flexible, and intelligent network through an onboard architecture to enable standard integrated vehicle health management implementations on aviation platforms. The solution creates commonality across platforms to integrate open standards into both legacy and new emerging weapon systems.

Technology Developed: The CDAE System developed by GSS creates an open standard data structure using an architecture that includes an onboard health monitoring system and off board health management ground support system. Together the system supports air platforms with data capture and processing within subsystems, data acquisition and storage, structure to communicate data/results from a subsystem to a health monitoring system processor, automate data transfer/download capability, and provides commonality in data management across Navy air platforms.

Warfighter Value: This system allows maintenance organizations to get ahead of aircraft performance issues by predicting potential faults based on a standardization of data recorded on the aircraft. This commonality in a health monitoring system allows all the subsystems within the organization to work in conjunction with one another to produce accurate maintenance actions before the aircraft is affected. This leads to less downtime and fewer non-mission capable aircraft across the fleet, producing a more lethal and ready organization.

WHEN

Contract Number: N68335-21-C-0272 **Ending on:** Dec 01, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Developed CDAE Architecture	N/A	Accurate Concept	2	2nd QTR FY21
Technical Specification Document	Low	Approval from Sponsor	3	4th QTR FY22
Minimal Viable Product (MVP) Developed	Medium	Proves System Functionality	4	1st QTR FY23
Demonstration in Test Flight Environment	Medium	Validates System in a Relevant Scenario	5	2nd QTR FY23
Demonstration on an Aircraft	High	System Successfully Integrates and Performs	6	4th QTR FY23

HOW

Projected Business Model: GSS is open to pursue business directly through the government or working with a prime integrator. The CDAE system can embed in government developed data capturing units, as well as working with system integrators to incorporate the software within the hardware they produce.

Company Objectives: The goal for GSS is to contribute to increasing the efficiency of condition-based maintenance practices throughout the Military. In doing so, GSS plans to become a market leader in embedded system health data capturing. The CDAE system can open a wide range of customers within and outside the Military.

Potential Commercial Applications: The same condition-based maintenance challenges faced in the Military are also present in the commercial aviation sector. This technology can integrate within any commercial air platform's data acquisition and processing system, resulting in the same maintenance operation advantages. The current target platform within the Navy is the P-8 making for an easy transition to the larger commercial aircrafts.

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