Topic: N162-121

Trident Systems Incorporated

New Condition Based Maintenance and Energy Command and Control Network Architectures for the Naval Expeditionary Force

Current Condition-Based Maintenance (CBM) systems typically require a human in the loop to offload the data; Trident's Enhanced Autonomous Condition-Based Network (EACBN) is designed to automate retrieving CBM data both inside and outside the wire through a full download of parametric data and periodic health snapshots. A Semantic Syntactic Data Diode (S2D2) will securely isolate the CBM data collection, enabling cross-domain transmission to blue force tracking. The system has been fully prototyped and completed hardware-in-the-loop testing. Trident Systems Inc. employs a world-class team that delivers technology solutions that make a difference in the areas of Integrated Command, Control, Communications, Computers, and Intelligence (C4I), radio frequency (RF) Electronics, and Assured Collaboration Systems. The EACBN's goal is to integrate it directly into Program of Record platforms to streamline the collection of bulk CBM data DoD-wide.

Technology Category Alignment:

Human/Autonomous System Interaction and Collaboration
Machine Perception, Reasoning and Intelligence
Advanced Computing/Software Development
Information Collection/Management
Maintainability/Sustainability

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Department of the Navy SBIR/STTR Transition Program

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Trident Systems Incorporated

WHO

SYSCOM: ONR

Sponsoring Program: Code 34

Transition Target: SOCOM Combatant Craft Assault (CCA), Tactical Ground Vehicles

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Other transition opportunities: Semantic Syntactic Data Diode (S2D2) has transition opportunities across the DoD for a tactical hardware-based, small-form factor, Cross Domain Solution (CDS)

Notes: The image to the right depicts an Medium Tactical Vehicle Replacement (MTVR) using the Enhanced Autonomous Condition Based Network (EACBN) to transmit vehicle health information both in theater across a tactical radio network to blue force tracking software (e.g. Command, Control Personal Computer - C2PC, Tactical Service Oriented Architecture - TSOA) and in garrison with an offload of all parametric data stored on the platform.
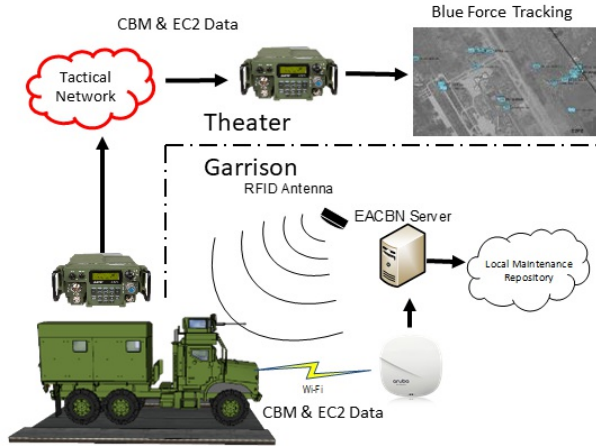
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WHAT

Operational Need and Improvement: To increase the collection frequency and decrease the time to actionable information, an autonomous communication method for condition based maintenance (CBM) and energy command and control (EC2) data is needed. To address this need, the EACBN is designed to provide autonomous data collection at the tactical edge whether on a mission or returning from one.

Specifications Required: An autonomous communication of CBM (health and usage) system that:
• Provides EC2 information,
• Provides a dashboard view of asset health to commanders and maintainers,
• Supports near real-time remote monitoring while forward-deployed,
• Integrates directly with existing vehicle/vessel CBM systems,
• Supports communications in an intermittent, low-bandwidth and sometimes disconnected environment,
• Supports communications over 802.11, satellite, and tactical radio mediums.

Technology Developed: The EACBN is an automated data communication method that is both data source collector-agnostic and data repository-agnostic. It is designed to interface directly with existing variable message format (VMF) communications paths to provide periodic health snapshots at end user-configurable intervals while forward-deployed, and to quickly and autonomously pull all stored parametric data upon return. The associated Semantic Syntactic Data Diode (S2D2) supports cross-domain data transfer and will be extensible to a number of additional data types beyond CBM data.

Warfighter Value: The EACBN reduces the manpower requirements in the war zone, increases the decision making capabilities for command leadership, integrates directly with existing infrastructure, and ensures the data security throughout the process. Compact S2D2 supports cross-domain data transfer of CBM data providing immediate elevation from the engine bus to a tactical blue force tracking application (e.g. C2PC, TSOA).

WHEN

Contract Number: N68335-18-C-0159   **Ending on:** November 26, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Hardware-in-the-Loop Demonstration	N/A	Full demonstration of essential sytem parameters in a lab environment	4	2nd QTR FY19
Field Demonstration and Testing	Low	Field Demonstration of System Prototype on Medium Tactical Vehicle Replacement	6	4th QTR FY19
Successful Contract Completion	Low	All deliverables met and 2 prototypes delivered	6	1st QTR FY20

HOW

Projected Business Model: Trident's established business model for successful commercialization of SBIR technology would both sell directly to the government and to Prime contractors. The direct to government route would be employed for retrofits of existing CBM technology. In these cases Trident would handle any test and evaluation (T&E), low rate initial production (LRIP), and full production as the Prime utilizing existing vendor relationships.
To integrate within new platforms, Trident is prepared to perform as a subcontractor under the Program of Record Prime contractor. The same capabilities are brought to bear on the contract and Trident is able to work with existing technical data packages (TDPs) and technologies to integrate the EACBN. EACBN systems would be delivered for integration on the production line.

Company Objectives: As a world-class team that delivers technology solutions that make a difference, Trident's goal for the EACBN is to integrate it directly into Program of Record platforms to streamline the collection of bulk CBM data DoD-wide and provide for increased awareness and operational uptime for these platforms. This would be achieved both as new platforms are produced and also be used to retrofit existing platforms and CBM solutions for automated offload. The goal for the S2D2 is to provide a tactical platform for cross-domain data transmission supporting the warfighter forward deployed with CBM, voice, video, chat, file transfer, and other critical communications.

Potential Commercial Applications: Current commercial fleet tracking capabilities typically rely on cellular communications. The EACBN provides capabilities for areas that are low bandwidth or disconnected at times that could benefit the commercial trucking industry. The S2D2 provides a critical control that can protect infrastructure control systems (i.e. power grid, gas delivery, factory controls, etc.). Current control systems are commonly directly connected to the infrastructure network, which presents a security concern in an environment where nation-state level actors are targeting infrastructure specifically for the crippling impact is can have when removed. The S2D2 can ensure that a compromise on one network will not impact the other.

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