Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2021-81

Topic # N181-007

Robust Communications Relay with Distributed Airborne Reliable Wide-Area Interoperable Network (DARWIN) for Manned-Unmanned Teaming in a Spectrum Denied Environment

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA 266

Transition Target: PEO U&W

TPOC:
(301)342-6020

Other transition opportunities: F10 provides a network architecture targeted for transition into multiple joint program offices including aircraft, pods, platforms, and applications. Transition targets include: NAVAIR PEO T; NAVAIR PEO U&W; NAVWAR PEO C4I; NAVSEA M/LUSV; USAF ACC; Army SOAR.

Notes: Fuse has unique design processes that incorporate end user input at all stages of development. Fuse design thinking applies the best practices of commercial design with a focus on the warfighter,
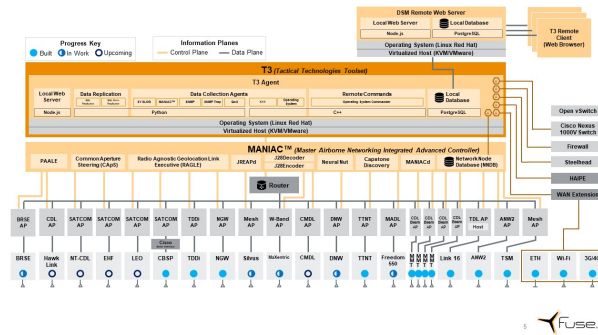

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WHAT

Operational Need and Improvement: Being able to reach back to large data-warehouses or push data or ensure communications at the forward edge. Sensor data from various platforms across a wide geographic region will require the use a spectrally diverse network that is resilient and can speak multiple machine languages. To execute advanced Integrated Fire Capabilities (IFC) capabilities joint platforms will require access to the network regardless of threat orientation or disposition. The need to be able to bring together disparate message sets, waveforms, and spectrum highlight the crux of the problems that any future objective network will face.

Specifications Required: Design and develop a networked Line of Sight (LOS) communications capability to share high-data rate Intelligence, Surveillance, and Reconnaissance (ISR) data and tactical information between ships and DoD aircraft in local area of operations for distributed operations; to provide communication relay targeting updates for network-enabled weapons; and to move high data rate ISR data back and forth to ground entry points (GEPs) in support of ISR and long-range strike missions.

Technology Developed: Fuse Tactical Edge Network Architecture (F10) consists of Tactical Technologies Toolset (T3), a web-based user interface, and Master Autonomous Network Integrated Advanced Controller with Access Points (MANIAC/AP), and a unified heterogeneous radio controller. The F10 architecture centralizes management of the platform devices and works in a distributed fashion utilizing a Data Plane Optimization Message (DPOM) set derived from CDL (Common Data Link) capstone. This CDL capstone can discover other CDL nodes and establish a network connection without broadcasting high power Ku-band radio frequency. This approach to discovery enhances the ability of the platforms to operate undetected. Through continued development Fuse is working to ensure that F10 complies with Open Mission Systems architecture. Fuse has developed an OMS adapter that provides OMS-compliance with little or no changes to legacy hardware subsystems or software services.

Warfighter Value: F10 improves network performance across platforms which support a multitude of radio links. F10 software manages platforms-of-opportunity to serve as communications nodes managing omni-directional and directional line-of-sight (LOS), and beyond-line-of-sight (BLOS) capabilities. F10 architecture allows for an agility across the radio frequency spectrum with simultaneous use of multiple radios, and a TDL gateway able to push tracks and TDL data back to distributed command center.

WHEN

Contract Number: N68335-19-C-0585   **Ending on:** January 28, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
W Band Architecture	N/A	Defined interfaces between network/modem/antenna	2	TBD
Live, Virtual, & Constructive (LVC) Demonstration	Med	Simulated connectivity between network/modem/antenna	4	TBD
MUDLAN Technical Demonstration 2	Low	Availability of high throughput network	5	TBD
Northern Edge	Med	Joint multi-platform connectivity	6	TBD
W Band Airborne Flight Test	Med	Connectivity between W band airborne nodes	6	TBD

HOW

Projected Business Model: Fuse's balance of experience in operations and systems engineering, blended through our Fuse Process, helps to ensure that the solutions we develop meet the user needs for the environments in which they will be employed. Fuse has developed a software based solution, that is optimized to run on the Fuse CORE® multi-function network controller, but can be licensed to other commercial organizations to run on any system.

Company Objectives: Identify other potential DoD applications for this architecture. Explore opportunities with other agencies/commercial partners that have similar remote/local network management needs.

Potential Commercial Applications: F10 provides an open enterprise architecture that can interconnect a wide variety of links, networks, processors, and sensors with an ubiquitous monitoring and management layer giving warfighters an intuitive capability for control and decision making.

Contact: Rebecca Unetic, Director of Strategy
rebecca.unetic@fuseintegration.com   952.994.3323