

# Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2017-811

Topic # N151-015

Minimized Space, Weight and Power Network Architecture Solution

Fuse Integration, Inc.

## WHO

**SYSCOM:** NAVAIR

**Sponsoring Program:** E-2/C-2  
Airborne Tactical Data System  
Program Office (PMA-231)

**Transition Target:** E-2D Advanced  
Hawkeye

**TPOC:**  
(301)757-7014

### Other transition opportunities:

There exists a significant need for networking solutions with a decreased SWaP footprint in multiple industries. Naval Aviation requirements for the solution defined by this project reach across multiple aircraft and unmanned vehicles. To ensure successful transition to the fleet, Fuse has targeted multiple program offices. Continued alignment with NAVAIR and the opportunity to transition Fuse solutions across the submarine, surface, and aviation enterprises will be a central theme for this project to ensure a strong transition path.

**Notes:** Single solution that integrates Plain Text and Cipher Text micro servers hosting virtualized network appliances (router, firewall, WAN Optimizer, and Distributed Network Monitoring), EMI hardened power conditioning, and a certified Type 1 HAIPE encryptor into a high-availability avionics box that is only 0.135 ft3.



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## WHAT

**Operational Need and Improvement:** Airborne platforms communicate and fight in the modern warfare environment using multiple complex networks. The information shared between aircraft, ships and ground units engaged over these complex networks significantly impacts tactical success. Size Weight and Power (SWaP) limitations severely impact available network solution and limit the airborne platforms warfighting capabilities. SWaP consumed by advanced networking and communications subsystems must be reduced, while preserving security and throughput.

**Specifications Required:** The Navy's Automated Digital Network System (ADNS) was developed to be the tactical Wide Area Network (WAN) for Navy Internet Protocol (IP) network operations. It is a key enabler for developing the FORCEnet capabilities of a robust, dynamic, adaptable, flexible, adjustable, survivable, secure and reconfigurable communications infrastructure. ADNS requires a server which meets the SWaP requirements of Airborne command and control (C2) platforms.

**Technology Developed:** Fuse continues to build on initial research into the Minimized SWaP Network Architecture to rapidly deliver smaller, lighter, cheaper, and more flexible networking capability for multiple NAVAIR platforms. Fuse investigated and demonstrated how CORE can not only fulfill E-2D networking requirements, but also provide the platform with the ability to expand their C2 and ISR functionality over IP networks. Because of the advanced level of development already achieved, this proposed strategy can be executed in a streamlined timeline to meet schedule requirements for E-2D, Stingray, and other platforms.

**Warfighter Value:** Modern warfare is net-centric and relies on sharing sensor and C2 data via multiple complex networks. To maintain situational awareness and relevance in the modern kill chain, aircraft, both manned and unmanned, require connectivity to the Navy's WAN infrastructure to distribute sensor and C2 data between aircraft and ship and shore nodes. The system developed provides the wide area transport mechanism for IP traffic including air vehicle and mission C2 and payload data via multiple line of sight and beyond line of sight radio systems. Platform integration and logistics has been simplified by a reduction of multiple legacy systems into a single CORE solution.

## WHEN

**Contract Number:** N68335-16-C-0391 **Ending on:** October 15, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
ADNS Lab Test	Med	Full Inc III Network Interoperability	5	March 2017
Environmental Test	Med	MIL-STD-810G Qual	5	June 2017
EMI Test	Med	MIL-STD-461G Qual	5	July 2017
TEMPEST Test	High	NSTISSAM TEMPEST/1-92	5	August 2017
Flight Test	Low	Successful Flight	6	September 2017

## 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 are on target for the environment in which they will be employed. Fuse developed prototype hardware and software solution that reduces SWaP of existing hardware network architecture for platform connectivity to ADNS. The solution will provide expanded networking capabilities including boundary defense, multiple radio frequency communications paths, and security enclaves, and contains computing and networking hardware and software that is integrated into a single hardware package that significantly reduces the physical envelope of the current solution. The Minimized SWaP Network Architecture Solution will also provide enhanced cybersecurity protection, radio aware routing, and on board network diagnostic and monitoring capabilities.

**Company Objectives:** Identify other potential DoD applications for this capability/technology. Explore networking opportunities with other agencies/commercial platforms with limited SWaP requirements.

**Potential Commercial Applications:** The market need for networking continues to grow, and the solutions outlined here will be immediately extensible beyond just aircraft, and even beyond the military into commercial spaces. Commercial users in multiple industries have a need for advanced networking connectivity. Surveillance systems for security, police and first responders, boat and vessel manufacturers, building, and vehicle manufacturers all work to integrate complex networks into their designs. IP networks, connected through cellular connections, satellite connections, and other links, reach out to so many connected through cellular connections, satellite connections, and other links, reach out to so many commercial products that this technology could prove to be useful will beyond military application.

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