Topic: N08-225

Scalable Network Technologies, Inc.

Application Traffic Injection into Live Virtual Constructive Link-16 Models
SCALABLE provides network design and analysis tools that enable customers to develop, plan, test and deploy wired, wireless, acoustic and optical networks in a high fidelity, physics-based simulation environment from undersea-to-space. SCALABLE is working with the Multifunctional Information Distribution System (MIDS) Program office to deliver a live/virtual/constructive Link-16 network environment that combines a Joint Range Extension Applications Protocol Version C (JREAP-C) application layer model, standards-compliant external interfaces to live radio hardware, J-series message generation and consumption capability, and functional interfaces to external simulation systems such as the Network Enabled Weapons Control Interface Module (NEWCIM). This will provide a robust, scalable Link-16 network system-in-the-loop capability as part of the Joint Network Emulator (JNE) library of military waveforms to enable predictable communications in all physical and cyber warfighting domains.

Technology Category Alignment:
RF Components for sensing, transmission and communication
Synthesis/Analytics/Decision Tools
Cyber
Collaborative Analysis and Decision-making
Modeling and Simulation Technology

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SYSCOM: NAVWAR
Contract: N68335-18-C-0224

Department of the Navy SBIR/STTR Transition Program

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SPAWAR SR-2018-261

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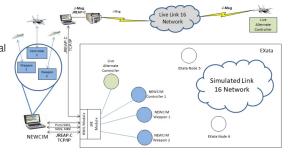Scalable Network Technologies, Inc.

WHO

SYSCOM: SPAWAR

Sponsoring Program: Multifunctional Information Distribution System (MIDS)

Transition Target: Multifunctional Information Distribution System (MIDS)

TPOC:
(619)524-1582

Other transition opportunities: NAVAIR, PMA-298, US Air Force, MDA

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WHAT

Operational Need and Improvement: Scalable Network Technologies is working with the Multifunctional Information Distribution System (MIDS) Program office to provide a robust, scalable Link-16 network system-in-the-loop capability as part of the Joint Network Emulator (JNE) library of military waveforms to enable predictable communications in all physical and cyber warfighting domains. This effort addresses an operational need for a scalable application level simulator that can accurately model Link-16 application traffic over existing protocol standards such as the Joint Range Extension Application Protocol Version C (JREAP-C).

Specifications Required: This project will result in a Link-16 application layer model that conforms to the JREAP-C standard with respect to the subset of data transfer functionality needed to transmit J-messages over live/virtual/constructive simulation networks. It will also ensure that the Link-16 emulation provided is compatible and interoperable with the Network Enabled Weapon Controller Interface Module (NEWCIM). Additionally, this effort will enhance the JNE external interface module to enable capture and injection of live Link-16 application traffic that conforms to JREAP-C and NEWCIM standards into a constructive Link-16 simulation environment.

Technology Developed: Scalable Network Technologies provides network design and analysis tools that enable customers to develop, plan, test and deploy wired, wireless, acoustic and optical networks in a high fidelity, physics-based simulation environment from undersea-to-space. This project will deliver a live/virtual/constructive Link-16 network environment that combines a JREAP-C application layer model, standards-compliant external interfaces to live radio hardware, J-series message generation and consumption capability, and functional interfaces to external simulation systems such as NEWCIM.

Warfighter Value: The robust, scalable Link-16 network system-in-the-loop capability delivered by this project will enable predictable communications in all physical and cyber warfighting domains, enhancing future integrated fires and cooperative engagement capabilities for all Link-16 network capable platforms including tactical aircraft, ships and submarines. At the conclusion of this project, warfighters will directly benefit through significantly improved command, control and communications enabled by greatly enhanced Link-16 network training, planning, analysis and operations.

WHEN

Contract Number: N68335-18-C-0224

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Hardware-in-the-Loop (HITL) Interface	Low	Integration Testing/Demonstration	TRL 5	March 2018
Joint Range Extension (JRE) Module	Med	Integration Testing/Demonstration	TRL 5	May 2018
J-Series Message Application Model	Med	Integration Testing/Demonstration	TRL 5	July 2018
NEWCIM Integration	Med	Integration Testing/Demonstration	TRL 5	September 2018
Graphical User Interface Support	Low	Integration Testing/Demonstration	TRL 5	November 2018

HOW

Projected Business Model: Analysis of Link-16 networks under realistic operational conditions and identifying and resolving potential performance issues which may adversely affect mission assurance will provide significant value to mission and network planners. The Link-16 network system-in-the-loop capability developed by this project will allow current and future customers to plan and deploy reliable Link-16 networks with minimal expenditure in terms of time and resources.

Company Objectives: Scalable Network Technologies will use the results of this project to develop a Link-16 Network Planner (LNP) capability that can be used to plan and debug Link-16 network deployments, in the laboratory, prior to deployment. A capability such as the LNP will help to significantly reduce cost of deploying an effective Link-16 network that makes efficient use of available Link-16 resources.

Potential Commercial Applications: Scalable Network Technologies has a well-established technology transition path via incorporation of the enhanced capability to simulate/emulate Link-16 networks and applications into the Joint Network Emulator (JNE), which is already being used by a broad swath of DoD customers. Current JNE users include SPAWAR, PEO C3T, CERDEC, AMRDEC, CDID, Ft. Gordon and the Army Operational Test Commmand. Additionally, many other DoD customers, such as Naval Air System Command (NAVAIR) China Lake, use Scalable's communications and neworking modeling and simulation software. Many of these DoD customers require a high fidelity capability to analyze the end-to-end performance of applications running on Link-16 networks.

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