TEAM - Twice Encrypted and Authenticated Multicast

Twice Encrypted and Authentication Messaging (TEAM) is a device-independent software-based encryption capability supporting multi-cast that leverages approved capabilities for the protection of classified information developed by WPL, Inc. We are an engineering services and Research and Development (R&D) company founded in 1978 with extensive communications system and security engineering expertise. TEAM is targeted for the new Marine Air to Ground Task Force (MAGTF) Common Handheld (MCH) radio. TEAM’s implementation adds limited overhead on multi-cast networks thereby maximizing bandwidth efficiency. A laboratory demonstration of a proof of concept was completed in Phase 2 and we are looking at future technology demonstrations with operational users through MARCORSYSCOM. Our goal is to deploy our software capability as part of new/existing platform and provide licensing/training support for its use.

Technology Category Alignment:
Satellite Communications (SATCOM)
Robotics/Automated Material Handling Equipment
Shipyards/Shipbuilding
Supply; Storage
Satellite Communications (SATCOM)
Satellite Communications (SATCOM)
Supply; Storage
Supply; Storage
Satellite Communications (SATCOM)
Satellite Communications (SATCOM)
Shipyards/Shipbuilding
Robotics/Automated Material Handling Equipment
Robotics/Automated Material Handling Equipment
Robotics/Automated Material Handling Equipment
Robotics/Automated Material Handling Equipment
Protection, Sustainment, and Warfighter Performance
Medical Chem-Bio Defense
Military Infectious Diseases
Propulsion and Extreme Environments
Fixed Wing Vehicles (includes UAS)
Survivability
Maintainability/Sustainability
Unmanned Ground and Sea Vehicles
Corrosion
Advanced Computing/Software Development
Networks and Communications
Modular/Open/Reconfigurable Architectures
RF Components for sensing, transmission and communication
Electronics Integration
Broadband/Multispectral Components and Systems
Sensors, Electronics and Photonics
Radio Frequency (RF) (non-EW)
Survivability
Broadband/Multispectral Components and Systems
RF Components for sensing, transmission and communication
Radio Frequency (RF) (non-EW)
Networks and Communications
Guidance, Navigation & Control (GN&C) and Data Links
RF Components for sensing, transmission and communication
Networks and Communications
Cognitive/Adaptive Capabilities
Preemptive/Proactive Effects
Broadband/Multispectral Components and Systems
Advanced Computing/Software Development
Networks and Communications
Personalized Assessment, Education, and Training
System Interfaces & Cognitive Processes
Aircraft Propulsion, Power and Thermal
Modeling, Simulation & Test Infrastructure
Rotary Wing Vehicles
Fixed Wing Vehicles (includes UAS)
Fixed Wing Vehicles (includes UAS)
Acoustic, Seismic and Magnetic
Rotary Wing Vehicles
Structures and Protection
Energy storage
Unmanned Ground and Sea Vehicles
Mobility
Power and Energy
Synthesis/Analytics/Decision Tools
Information Collection/Management
Advanced Computing/Software Development
Survivability
Unmanned Ground and Sea Vehicles
Radio Frequency (RF) (non-EW)
Power Generation/Energy Conversion
Energy storage
Power and Energy
Sensors, Electronics and Photonics
Maintainability/Sustainability
Advanced Computing/Software Development
EO/IR Components for sensing, transmission and communication
Microelectronics and Nanoelectronics
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Mobility
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Structures and Protection
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Aircraft Propulsion, Power and Thermal
Power Generation/Energy Conversion
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Rotary Wing Vehicles
Broaddband/Multispectral Components and Systems
Radio Frequency Weapons (RFW)
Maintainability/Sustainability
Propulsion and Extreme Environments
Electro-Optical/Infrared (EO/IR)
Modeling, Simulation & Test Infrastructure
Radio Frequency (RF) (non-EW)
Machine Perception, Reasoning and Intelligence
Assuring Effective Missions
Modular/Open/Reconfigurable Architectures
Personalized Assessment, Education, and Training
Fixed Wing Vehicles (includes UAS)
Machine Perception, Reasoning and Intelligence
System Interfaces & Cognitive Processes
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Fixed Wing Vehicles (includes UAS)
Power Generation/Energy Conversion
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Mobility
Maintainability/Sustainability
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Fixed Wing Vehicles (includes UAS)
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Aircraft Propulsion, Power and Thermal
Propulsion and Extreme Environments
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EO/IR Components for sensing, transmission and communication
RF Components for sensing, transmission and communication
Fixed Wing Vehicles (includes UAS)
Fixed Wing Vehicles (includes UAS)
Distributed/Coordinated/Net-Enabled Systems
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Machine Perception, Reasoning and Intelligence
Scalable Teaming of Autonomous Systems
Human Computer Interfaces (HCI) for Decision Making
Synthesis/Analytics/Decision Tools
Combat Casualty Care
Military Infectious Diseases
Military Operational Medicine
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Fixed Wing Vehicles (includes UAS)
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Thermal Transport and Control
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Propulsion
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Biomedical Informatics / Health Information Systems & Technology
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High Energy Lasers (HEL)
EO/IR Components for sensing, transmission and communication
Networks and Communications
Sensors, Electronics and Photonics
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Fixed Wing Vehicles (includes UAS)
None
None
None
None
None
None
None
None
None
None
None
None
Contact:
Ryan Biondo
ryan.biondo@wpli.net
(443) 285-9874
http://wpli.net/
SYSCOM: MARCOR
Contract: M67854-18-C-6522
Motivating Scenario for Deploying TEAM

**WHO**

**SYSCOM:** MARCOR  
**Sponsoring Program:**  
**Transition Target:** MAGTF Common Handheld (MCH)  
**TPOC:** sbir.admin@usmc.mil  
**Other transition opportunities:**  
- Information Assurance Specialists (IAS)  
- Aruba Federal  
- Silvus Technologies

Nearly any RF radio platform capability, including US Army radios and other tactical applications.

**Notes:** The scenario for deploying TEAM is an ad hoc, scalable network supporting many additional nodes, as required. By leveraging multicast protocols, we can provide secure transmissions with minimum bandwidth impacts due to encryption overhead.

**WHAT**

**Operational Need and Improvement:**  
Develop Encryption Algorithms for Hand-held devices and Man-pack Radios. The encryption algorithm is to provide Commercial Solutions for Classified (CSIC) protection and integrity and confidentiality of transmitted information. The transmitted information will include Command and Control (C2) messages and Precision Location Information (PLI) for dismounted radios and tactical hand-held devices while providing the ability to be certified at the classified level, agnostic to the network used.

**Specifications Required:**  
Solution must:  
- provide the impact on the availability and throughput (rate of transmission) of messages  
- provide integrity and confidentiality for all messages and protect classified information  
- algorithms must meet the CSIC requirements for protection of classified information  
- employ open architecture designs principles to protect an Internet Protocol (IP) message  
- have an overhead < 6% when used in current Marine Corps systems for a 1 kilobyte message

**Technology Developed:**  
A platform/device-independent software encryption capability supporting Multicast RF/terrestrial network communication security. Allows additional scaling of new/additional radios without adding significant overhead that would otherwise be introduced in a scaled unicast network architecture.

**Warfighter Value:**  
- TEAM (Twice Encrypted & Authenticated Multicast) provides secure communications leveraging Suite B encryption; potential for CNSA Suite encryption support  
- TEAM software encryption supports multicast network architectures  
- TEAM maximizes user data throughput (6% bandwidth for encryption overhead)  
- TEAM can be deployed on nearly any RF/terrestrial network  
- TEAM is platform-independent (to include Android, Apple, or Linux)

**WHEN**

**Contract Number:** M67854-18-C-6522  
**Ending on:** October 15, 2019

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Risk Level</th>
<th>Measure of Success</th>
<th>Ending TRL</th>
<th>Date</th>
</tr>
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<tr>
<td>Live demo of proof-of-concept prototype in emulated environment</td>
<td>Med</td>
<td>TEAM meets USMC overhead requirements</td>
<td>3</td>
<td>3rd QTR FY17</td>
</tr>
<tr>
<td>Beta release of scaled prototype software</td>
<td>Low</td>
<td>TEAM meets Government security requirements</td>
<td>4</td>
<td>3rd QTR FY19</td>
</tr>
<tr>
<td>Live demo of scaled prototype in Raspberry Pi network</td>
<td>Med</td>
<td>TEAM supports streaming multicast video in COTS devices</td>
<td>5</td>
<td>4th QTR FY19</td>
</tr>
<tr>
<td>Integration and demonstration in GOTS network</td>
<td>Med</td>
<td>TEAM can be integrated with MCH</td>
<td>6</td>
<td>3rd QTR FY20</td>
</tr>
</tbody>
</table>

**HOW**

**Projected Business Model:**  
Software licensing or engineering training services support. We would like to license this capability to prime radio platform developers for integration and provide integration support, as required.

**Company Objectives:**  
Ultimately, we are looking to deploy this capability to support MULTIPLE warfighter capability gaps when it comes to provided simplified encryption and handling on ad-hoc and multi-cast network architectures.

**Potential Commercial Applications:**  
This technology could provide Communications Security (COMSEC) for radio frequency (RF) and terrestrial networks without relying on the handling and logistics of NSA Type-1 secure capabilities. This includes commercial or coalition users for which these capabilities are otherwise not available.

**Contact:** Ryan Biondo, Principal Engineer  
ryan.biondo@wpli.net  
(443) 285-8874