

Department of the Navy SBIR/STTR Transition Program

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Topic # N234-P02

A Quantum-Resistant Low Probability of Detection/Low Probability of Interception/Anti-Jamming Device for UxS Platforms
Forward Edge-AI, Inc.

WHO

SYSCOM: NAVAIR

Sponsoring Program: NAVAIR SBIR Phase II – Topic N234-P02: Low Probability of Detection/Interception (LPD/LPI) Quantum-Resilient Communications for Tactical Edge and UxS Systems.

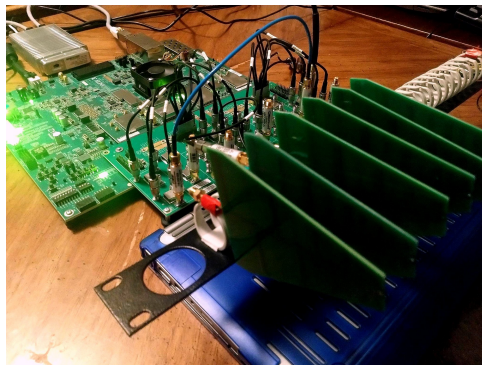
Transition Target: Navy SBIR Transition Program (STP)- Forward Edge-AI aims to transition SmartBeam QRC™ into operational use via the Navy STP pathway by aligning with Navy priorities for low observable, resilient communications for autonomous maritime systems.

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Other Transition Opportunities: -NAVWAR – Integration with shipboard and maritime UxS platforms supporting EW and RF deception
-SOCOM – Secure autonomy and low-probability-of-detection communications for denied environments
-DISA / Joint Staff J6 – TRANSEC modernization and resilient tactical C2 architectures
-Commercial Dual-Use – Quantum-resilient comms for SATCOM, ISR drones, and critical infrastructure

Notes: SmartBeam QRC™ integrates AI-enhanced adaptive beamforming, quantum-resistant encryption, and RF obfuscation to deliver resilient, low-detectability communications for UxS platforms and tactical command nodes. The system aligns with Navy priorities in JADC2 and TRANSEC modernization and is designed for rapid field deployment with plug-and-play interoperability across multi-domain systems, including maritime, airborne, and ground environments.



SmartBeam QRC™ Pototype Image – Demonstrates the integration of AI-driven adaptive beamforming, quantum-resistant encryption, and RF deception to enable secure, low-observable communications for UxS platforms operating in contested environments. Developed under NAVAIR SBIR Phase II (Contract #N68335-25-C-0170) by Forward Edge-AI, Inc.

WHAT

Operational Need and Improvement: Current tactical communication systems are vulnerable in electronically contested environments where adversaries employ jamming, sensing, and cyber exploitation to disrupt mission-critical operations. There is an urgent operational need for a quantum-resilient, low-observable communication solution that ensures continuity of command and control across uncrewed systems (UxS), even in GPS-denied or degraded conditions. SmartBeam QRC™ addresses this challenge by integrating AI-driven adaptive beam steering, RF deception, and post-quantum encryption to sustain secure, covert communications and maintain operational tempo across maritime, air, and ground domains.

Specifications Required: -Resilient performance in GPS-denied, jammed, and electronically contested environments
-Quantum-resistant encryption compliant with CNSA 2.0 standards (e.g., CRYSTALS-Kyber)
-AI-driven adaptive beam steering supporting Low Probability of Detection/Interception (LPD/LPI)
-RF signature obfuscation and spoofing resistance to counter adversarial sensing
-Sub-5W SWaP-C footprint for integration across UxS platforms (UAVs, USVs, UUVs)
-Modular, plug-and-play architecture for rapid deployment and platform interoperability
-Validated through operational test environments across maritime, aerial, and ground domains

Technology Developed: SmartBeam QRC™ is a quantum-resilient communications system that integrates AI-enhanced adaptive beamforming, RF deception, and post-quantum cryptographic algorithms. It autonomously maintains encrypted communication links while evading detection, interception, and jamming. Developed under NAVAIR SBIR Phase II funding, the system is purpose-built for tactical edge operations and seamlessly integrates across uncrewed and autonomous systems in maritime, aerial, and ground environments.

Warfighter Value: SmartBeam QRC™ enables warfighters to maintain secure communications in contested environments, ensuring continuity of C2, ISR, and targeting. Its low observability and RF deception enhance survivability and mission success across domains. The system supports TRANSEC modernization, aligns with JADC2, and improves lethality, especially in high-risk scenarios like downed pilot recovery, where maintaining covert, resilient links with isolated personnel is critical for successful extraction.

Given the long replacement cycle of military comms, next-generation solutions must integrate quantum-resistant encryption, real-time encrypted voice, video, and data, and secure connectivity to UxS, downed personnel, sensors, and mission systems, while remaining adaptable to evolving standards through 2040.

WHEN

Contract Number: N68335-25-C-0170

Ending on: Sep 25, 2027

Milestone	Risk Level	Measure of Success	Ending TRL	Date
System Integration on UxS Platform	Medium	Successful integration and field testing on UAV, USV, and UUV platforms	6	4th QTR FY26
Demonstrated LPI/LPD in Live EW Event	High	Effective communications with no detection/interception during jamming exposure	7	4th QTR FY26
Secure Transmission Validation	Low	Quantum-resistant encryption achieving throughput > 500 Gb/s	7	4th QTR FY27
Field Deployment in Simulated Mission	Medium	Successful C2 communications with Isidore integration in a simulated operation	8	4th QTR FY27

HOW

Projected Business Model: Forward Edge-AI will implement a hybrid business model that combines direct government procurement via Phase III sole-source SBIR authority, integration partnerships with defense prime contractors, and commercial sales through the Microsoft Azure Marketplace. SmartBeam QRC™ will be offered through subscription-based and licensing models, with modular options for platform-specific integration on UAVs, USVs, UUVs, mobile SCIFs, and tactical command and control nodes.

Company Objectives: To deliver the most secure and resilient communications system for contested environments by integrating artificial intelligence, quantum-resistant encryption, and RF deception technologies into scalable, low-SWaP platforms ensuring the protection of national defense assets, critical infrastructure, and mission-critical communications.

Potential Commercial Applications: -Secure communications for offshore oil and gas platforms
-Resilient drone network operations in disaster response and remote monitoring
-Private SATCOM and telemetry support for logistics and freight operations
-Quantum-resilient communications for the banking, utilities, and telecommunications sectors
-Infrastructure protection and encrypted data transmission for nuclear and energy industries

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