Department of the Navy SBIR/STTR Transition Program

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NAVAIR SPR-2026-0678

Topic # N232-095
Spectrum-Aware Sensor Optimized Signaling (S2OS)
A10 Systems LLC

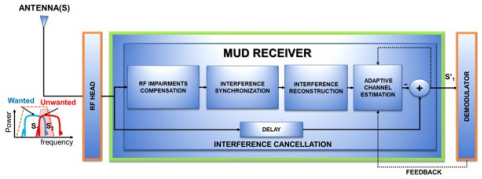
WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA-264

Transition Target: Sonobuoy RF Receiver on the Intelligence Surveillance and Reconnaissance (ISR) platform for Anti-Submarine Warfare (ASW) Applications

Other Transition Opportunities: • Maritime Patrol and Reconnaissance Aircraft (MPRA) Program Office
• Capacity Improvements in Tactical Data Links
• Interference Cancellation
• Interference Mitigation



Multi-User Detection (MUD) receiver to be implemented in FPGA

Notes: The underlying S2OS technology is broadly applicable to any military communications architecture constrained by limited spectrum availability, transmit power, or contested electromagnetic environments. The combination of partially overlapped communications channels, advanced Asynchronous Multi-User Detection (MUD), interference cancellation, and spectrum-efficient waveform design has the potential to benefit numerous Navy, Marine Corps, and Joint Service platforms that require increased data throughput without additional spectrum allocations.
The technology could also support future Navy Distributed Maritime Operations (DMO) concepts where multiple sensors, platforms, and autonomous systems share limited RF resources. In addition, S2OS techniques could improve the efficiency of tactical data links, maritime ISR systems, airborne relay platforms, and expeditionary communications systems operating in congested spectrum environments.

WHAT

Operational Need and Improvement: The Navy is transitioning to digital communication links for all of its Anti-Submarine Warfare (ASW) sonobuoy sensors for aircraft information transfer. Digital links present limitations over traditional analog communication links, offer advantages for future Navy operations such as enabling data encryption. The Navy is seeking to overcome these limitations and increase the amount of data transferred or uplinked from airborne Anti-Submarine Warfare (ASW) sensors systems, including sonobuoy sensor systems, to aircraft receivers.

Specifications Required: Spectrum-aware Sensor Optimized Signaling (S2OS) for data uplink information transfer improvements can double, triple, and quadruple the current uplink data throughput from sonobuoys with minimal increase in channel bandwidth using Asynchronous Multi-User Detection (MUD) technology at the Receiver.

Technology Developed: S2OS system provides the improved sonobuoy uplink radio communication system with flexible channel configuration options for deployment of sonobuoys with increased and mixed data rate capability using partially overlapped channels using Gaussian Minimum Shift Keying (GMSK) modulation and MUD receiver. Exemplary deployment scenarios show that with 2 Watt and 3-Watt PAs, data throughputs of 640 kbps over 320 kHz channel and 960 kbps over 750 kHz channel can be achieved with the same radio coverage area as the legacy 320 kbps GMSK system with 1 Watt PA.

Warfighter Value: The need for larger data transfer from airborne ASW sensors, including sonobuoys, is limited by the combination of limited Radio Frequency (RF) bandwidth available to use, and the need to sample and analyze large acoustic bandwidths greater than 40 kHz for transfer over the data link. The S2OS system provides significantly larger data rate options than the current maximum data rate of 320 kbps to the aircraft in the 136 MHz-170 MHz VHF band allowing the Navy to get multiple hydrophones and/or wide acoustic bandwidth data from the buoy while maintaining the same radio coverage area.

WHEN

Contract Number: N68335-25-C-0253 **Ending on:** Nov 29, 2027

Milestone	Risk Level	Measure of Success	Ending TRL	Date
System Architecture Design and Development	Medium	Number of Channels Supported, Bit Error Rate Performance	3	3rd QTR FY26
Algorithm Refinement	Medium	Number of Channels Supported, Bit Error Rate Performance	4	1st QTR FY27
FPGA Hardware Development	Medium	Number of Channels Supported, Bit Error Rate Performance	5	2nd QTR FY27
In-Lab Demonstration	Medium	Number of Channels Supported, Bit Error Rate Performance	6	3rd QTR FY27

HOW

Projected Business Model: The company's business model is centered on delivering high-value intellectual property, advanced signal processing software, spectrum-efficient waveforms, and communications optimization technologies that can be integrated into existing and future defense systems. Revenue opportunities include software licensing, engineering integration support, technology insertion contracts, sustainment upgrades, and follow-on capability enhancements. This dual-path strategy provides maximum flexibility for transition while allowing the technology to be adopted across multiple programs, platforms, and military services that face similar spectrum efficiency and communications throughput challenges.

Company Objectives: The company's objective is not only to develop innovative technologies but also to transition them into operational systems where they generate sustained mission impact and long-term revenue through software licensing, technology insertion, engineering services, system integration support, and follow-on capability enhancements. Successful deployment of S2OS would expand the company's defense market presence, establish a strong reference program within the Navy, and create a scalable pathway for applying similar spectrum-efficiency technologies across a broad range of military and commercial communications applications.

Potential Commercial Applications: S2OS holds tremendous promise for the Battlefield Internet of Things (BIoT), Critical Industrial Internet of Things (CIoT) and Industrial Internet of Things (IIoT) Markets which, together are anticipated to reach $520 Billion Globally according to Bain. This technology may be used in existing Wi-Fi systems to boost capacity in dense urban scenarios where many channels go wasted. They may even be used for Cognitive Bi-directional Spectrum Sharing between Federal and Commercial Systems to be used in bands such as Citizens Broadband Radios Service (CBRS) where channels may overlap. Another application could be the use of this technology for Spectrum Sharing where the FCC announced that signals may be offset by half the channel. Finally, a generic version of MUD receiver may be used for unintentional interference cancellation to 4G/ 5G systems which itself is a $500M market.

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