

SUCCESS STORY

TOPIC NUMBER:
AF05-034

SBIR INVESTMENT:
\$2,752,742

PHASE III FUNDING:
\$3,352,597



RECONFIGURABLE ELECTRONICS FOR RESPONSIVE SPACE SYSTEMS

Vulcan Wireless, Inc. developed a terminal for assured communications for cross domain networking to enable uninterrupted worldwide communication in denied environments.

Vulcan Wireless Inc.

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THE CHALLENGE

The DoD's National Cyber Strategy 2018 addressed the scope of the United State's competitor's ambitions, recommending investing in the modernization of key capabilities to include command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR). According to the report, C4ISR investments will "prioritize developing, resilient, survivable, federated networks and information ecosystems." Advanced C4ISR capabilities provide an advantage through situational awareness, knowledge of the adversary and environment, and shortened time between sensing and response. The Navy was seeking C4ISR technology to provide a more robust, protected, resilient, and reliable information infrastructure to enable uninterrupted worldwide communication.

THE TECHNOLOGY

Vulcan Wireless, Inc. developed a high-performance software defined radio payload system for small satellite systems. Developed for use on cube satellites (CubeSats), the multi-user objective system (MUOS) is designed with miniaturized size, weight and power. The payload system allows satellites to be controlled in real time, anywhere in orbit. The MUOS waveform used for communication provides a more robust communications channel in the presence of interference and provides beyond line-of-sight global coverage.

THE TRANSITION

The technology was originally developed under an SBIR Phase I award through the Air Force for reconfigurable electronics for responsive space systems. Vulcan Wireless received two SBIR Phase II awards: one through the Air Force and one through the Navy. For the Air Force, Vulcan Wireless developed a software defined radio (SDR) for a satellite-based transponder. The SDR is capable of multiple frequency bands and modulation standards.

Leveraging the Navy's Phase II award, Vulcan Wireless developed a high performance SDR payload system that can be hosted on a CubeSat vehicle. Through the Defense Innovation Marketplace Rapid Innovation Fund, Naval Information Warfare Systems (NAVWAR) awarded a SBIR Phase III contract to Vulcan Wireless for an Assured Communications for Cross Domain Networking, Miniaturized Size, Weight, and Power MUOS Functional Terminal.

THE NAVAL BENEFIT

Vulcan Wireless' MUOS functional terminal for small satellites provides a unique capability to the DoD by supplying a secure communications channel that can be accessed anywhere in orbit. The technology can be adjusted in real time, shortening the time between sensing and response. Additionally, the MUOS waveform provides a more robust communications channel in the presence of interference, allowing for uninterrupted communication and providing a reliable information infrastructure.

THE FUTURE

In addition to the Navy, Vulcan Wireless is providing software defined radio design, digital radio design, multiband microwave systems, communications waveform design and radar systems to DoD customers, including the Air Force, Army, Marine Corps, Space Force and DARPA. Vulcan is also involved in NASA's BurstCube mission, the purpose of which is to study gamma rays. BurstCube, a shoebox-sized satellite, is designed to detect, locate and study short bursts of energy light that occur after the collision of neutron stars. Vulcan Wireless's communication system enables BurstCube to transmit precise arrival time and energy data for each gamma ray detected.