

Department of the Navy SBIR/STTR Transition Program

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

NAVAIR 2020-862

Topic # N181-007

Robust Communications Relay with Distributed Airborne Reliable Wide-Area Interoperable Network (DARWIN) for Manned-Unmanned Teaming in a Spectrum Denied Environment

WHO

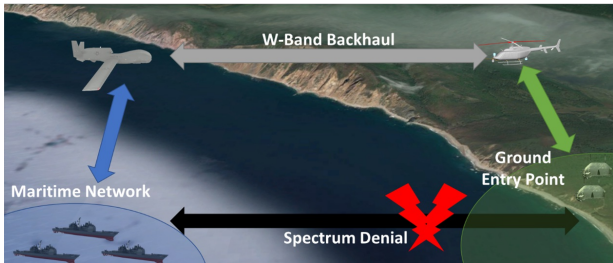
**SYSCOM:** NAVAIR

**Sponsoring Program:** MUDLAN JCTD

**Transition Target:** MUDLAN will transition the technologies to a U.S. Air Force Air Combat Command program of record.

**TPOC:**  
(619)553-8713

**Other transition opportunities:** Navy Sea Hunter Demonstration, mmW high data rate communications between ships. Future JALN opportunities with Air Force and Navy communications programs. Marine Corps communications relay pods and payloads for Predator UAV.



MaXentric produced graphic

WHAT

**Operational Need and Improvement:** Ku/Ext. Ku-Band BE-CDL Directional Mesh Networking supports the National Defense Strategy's focus on command, control, communications, computers, intelligence, surveillance and reconnaissance (ISR) and fully networked command, control and communications modernization. In FY2019, under an Air Force RIF MaXentric demonstrated an all digital 16 element X-Band array which can support resilient networking for high data rate communications across multiple airborne and surface platforms operating in contested environments. The W-Band high data rate long range back haul link will further enhance the relay capability between aircraft.

**Specifications Required:** The MaXentric RF-SoC based software defined modem/transceivers support up to 4x1GB/s links and support interfaces with network management devices. The Ku-Band digital beamforming system can support up to 8 simultaneous Rx/Tx beams and can be scaled up to 32 beams if required. The W-Band scanning antenna and MaXentric transceivers have a 4-channel monopulse receiver, is low SWAP, fast scanning and can achieve 1GB/s links at 300NM. The system is SWAP compatible with the MQ-8C pod.

**Technology Developed:** All Digital 4 Beam Tx/Rx 16-RF Port Ku & Extended Ku-Band AESA with integrated switching to software defined BE-CDL radio system. A mmW data link system for long range back haul communications between aircraft.

**Warfighter Value:** MaXentric will develop a highly directive multi-beam digital array based BE-CDL radio system capable of determining location of user terminals utilizing real-time digital beamforming (DBF), Angle of Arrival (AoA), jammer suppression and inference cancellation techniques.

WHEN

Contract Number: N68335-20-C-0121

Milestone	Risk Level	Measure of Success	Ending TRL	Date
RIF-8 RF Port DBF Tx/Rx Prototype	N/A	Demonstrated 8-channel DBF Array	TRL-5	December 2020
2-CH Ku & Extended Ku-Band Transceiver	Low	CDL/BE-CDL Waveform Demonstrated	TRL-5	August 2021
SIL Interface Tests	Low	SIL Testing demonstrated CDL radio-radio communications	TRL-6	September 2021
W-Band SDR Prototype	Low	Demonstrate W-Band SDR Waverform 1GB/s	TRL-5	December 2020
W-Band Antenna Amplifier Integration	Med	Integrated SDR Antenna Testing at 1GB/s	TRL-5	August 2021
SIL Interface Tests	Med	SIL Testing demonstrated W-Band 1GB/s data rates	TRL-6	September 2021

HOW

**Projected Business Model:** MaXentric is a high technology and product oriented company developing advanced RF technologies for antennas and radio frequency (RF) systems including communications, radar, digital phased arrays, RF interference mitigation systems, FPGA and GPP modems, transceivers, and digital beamforming systems. MaXentric will produce the DBF AESA radio system and integrate them onto a variety of aircraft types and sizes.

**Company Objectives:** MaXentric intends to quickly productize the Digital Array and Modem system for commercial and Military applications. Digital AESA sales at MaXentric have continued to grow and represent approximately 20% of our overall sales.

**Potential Commercial Applications:** Commercial applications of this technology have been identified and include high bandwidth air-to-ground communications and internet for commercial aviation aircraft as well as AESAs for aircraft to satellite communication (SATCOM) systems.

**Contact:** David Massey, Vice President Business Development  
dmassey@Maxentric.com 202 807 9122