

Topic: N171-001

FIRST RF CORPORATION

Beyond Line of Sight (BLOS) High Data Rate Communications

This 17-year old advanced technologies engineering company designs, develops, integrates, and delivers radio frequency (RF) communication, radar, AESA, and Electronic Warfare Systems for commercial and government customers. Forward deployed USMC units utilize High Frequency (HF) and Satellite Communication (SATCOM) radios for Beyond Line of Sight (BLOS) communication purposes with Navy AFLOAT networks to support operations ashore. Next generation troposcatter systems can provide high data rate communications in the ground BLOS environment but do not work well with unstable moving platforms (ship). SATCOM systems are heavy, power intensive and suffer from low availability/low data rates. New approaches and techniques, not using SATCOM, troposcatter or HF radios, are sought to provide a high availability/high data rate BLOS communications channel. FIRST RF's approach is to utilize modular (expeditionary) systems to provide multiple Line of Sight (LOS) communication links to achieve the desired BLOS capability. Expeditionary, the systems can be broken into components that weigh no more than 20 lbs. each.

Technology Category Alignment:

Command, Control, Communications, Computers, & Intelligence (C4I)

None

None

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SYSCOM: MARCOR

Contract: M67854-19-C-6501



Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=M67854-19-C-6501



Tech Talk: <https://youtu.be/BNVgSJC9iB8>

Department of the Navy SBIR/STTR Transition Program

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WHO

SYSCOM: MARCOR

Sponsoring Program: PORTFOLIO
MANAGER Command Element
Systems

Transition Target: Forward operators

TPOC:
sbir.admin@usmc.mil

Other transition opportunities:



https://www.navsea.navy.mil/Portals/103/Images/TeamShips/PEOShips/M-XU431-039.JPG?ver=n_Ze7PwHNp0VXXISiV9YA%3d%3d

WHAT

Operational Need and Improvement: Marine Corps Systems Command (MARCORSSYSCOM) needs lower Size, Weight, and Power (SWAP) communication links for Beyond Line of Sight (BLOS) applications to connect ground Marine Corps networks with Navy AFLOAT networks. These low SWAP BLOS communications approaches should use alternatives to low data rate HF or high SWAP Satellite Communications (SATCOM).

Specifications Required: BLOS communications approaches, not using troposcatter or HF radios, are needed to provide a high availability of 99.9% and high data rate of greater than 20 Mbps . A lightweight, portable and expeditionary architecture is required. The system must be able to be broken into components (expeditionary) that weigh no more than 20 lbs. each (portable) with a goal of less than 15 lbs. Each component must be able to be broken down to fit within a 2 ft cube and it is desired to minimize the size of all components for portability. The proposed system should address power concerns for the system to operate continuously on battery for 8 hours with a preference to a system than can run for 24 hours or more.

Technology Developed: FIRST RF has developed a modular antenna array to allow for BLOS communications. This new approach uses a ground relay located at a high point between the two ends of the link to provide the BLOS communication needs. This low-power approach reduces weight in both equipment and batteries. It operates at high data rates to minimize transmit time. Modular antennas allow each user to carry only the amount of equipment necessary to execute the mission.

Warfighter Value: Improving communications throughput, range and capability are key technology enablers for MARCORSSCOM. This would allow for better interconnection of the ground Marine Corps network with the Navy AFLOAT networks.

WHEN

Contract Number: M67854-19-C-6501 **Ending on:** May 21, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Phase I	N/A	Antenna gain and pattern measurements	2	2nd QTR FY18
Phase I Option	N/A	Elevation pattern measurements	2	1st QTR FY19
Phase II Baseline Program	N/A	BER measurements	4	3rd QTR FY22

HOW

Projected Business Model: FIRST RF is a product oriented company developing advanced technologies for antennas and Radio Frequency (RF) systems including communications, radar, phased arrays, Point Navigation and Timing (PNT), RF compatibility, low observable antennas, Electronic Warfare (EW), and Direction Finding (DF) systems. FIRST RF will produce the modular antenna subarrays and support equipment, including manifolds, cabling, fixtures, etc. Radio integration will be through a prime or directly with the government.

Company Objectives: FIRST RF Corporation is a developer and manufacturer of wideband, lightweight, and modular antennas. The antenna solution for this BLOS concept fits with the company's core business. FIRST RF hopes to fabricate, test, and deliver these modular antennas to primes and government customers.

Potential Commercial Applications: The wideband nature of these modular antennas provides coverage of WiFi frequency bands. These antennas could be used for the creation of hotspots during emergency operations in disaster relief or similar humanitarian aid situations.