

Topic: A04-127

RKF Engineering

New Advanced Integrated Line-of-Sight Equipment System (nAILES)

Serving high-profile commercial companies such as Google, Facebook, Broadcom, and SES Networks and overseeing radio and satellite communication procurement efforts for DARPA and NASA, RKF specializes in wireless systems spanning hardware, systems, and software engineering for space-based, drone, and terrestrial communications. The Hybrid Open Transceiver new Advanced Integrated Line-of-Sight Equipment System (HOT nAILES) is a modernized line-of-sight radio frequency communications distribution system for VHF/UHF communications to/from shipboard platforms with improved performance and SWAP-C. Targeting the AN/USC-61(C) Digital Modular Radio (DMR) as part of the FFG(X) development, where key system components/related parts have been analyzed for inclusion and TRL in the design. Partnership with a program of record is underway along with the large business prime for that program; company seeks inclusion in all future naval ship builds.

Technology Category Alignment:

Contact:

David Milliner, Ph.D.

dmilliner@rkf-eng.com

(202) 441-9300

<http://rkf-eng.com/>

SYSCOM: NAVWAR

Contract: N00039-18-C-0028

Room: FST at WEST 2020

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00039-18-C-0028

Department of the Navy SBIR/STTR Transition Program

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NAVWAR SR-2019-226/227/228

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WHO

SYSCOM: NAVWAR

Sponsoring Program:

Communications and GPS Navigation Program Office (PMW/A 170)

Transition Target: AN/USC-61(C) digital modular radio (DMR) systems

TPOC:

Other transition opportunities: Naval platforms employing DMR systems as well as other digital radio systems.

Notes: RKF is also the single sourced prime contractor for the Defense Information Systems Agency (DISA) Defense Spectrum Organization's Mobile Service Provider (MSP) spectrum management contract valued at \$19.7M where we analyze electromagnetic interference (EMI) and environmental (EME) effects.



https://www.navy.mil/management/photodb/webphoto/web_110827-N-JD217-016.jpg

WHAT

Operational Need and Improvement: Digital Modular Radios currently operate aboard U.S. Navy surface and subsurface vessels, fixed-sites and other Department of Defense communication platforms using frequencies ranging from 2 MHz to 2 GHz and is certified to pass secure voice and data at Multiple Independent Levels of Security (MILS) over HF, VHF, UHF, and SATCOM channels. Existing systems are subject to parts obsolescence and are limited in performance: consequently, there is a need to mitigate obsolete parts within VHF/UHF shipboard line-of-sight (LOS) RF distribution paths, improve frequency hopping capabilities, allow for easier system upgradability, and reduce SWaP-C for components/systems that interface with the DMR. This requires a custom design/build by a capable company willing to focus on this specific problem and differentiating partnerships with hardware subcontractors.

Specifications Required: Enable simultaneous multichannel communications of frequency hopping VHF/UHF waveforms with modernized equipment and reduced SWaP-C. Other benefits could include mitigation of parts obsolescence, enablement of future advanced waveforms and modernization at HF frequencies in addition to VHF/UHF systems.

Technology Developed: An RF distribution system that reduces the size, weight, power and the number of topside antennas, as well as mitigates intermodulation effects aboard Navy ships employing VHF/UHF frequency hopping radios. The system will mitigate parts obsolescence of legacy shipboard RF equipment and modernize existing RF distribution systems challenged to fully achieve performance, SWaP and upgradability goals.

Warfighter Value: Anticipated reductions to Size, Weight, and Power relative to currently deployed systems are anticipated to exceed 40%, respectively. Additionally, improved performance of RF communications due to co-site EMI mitigation and increased frequency-hopping capability aboard Navy ships are expected achievements. Ease of maintenance and system upgrades are also anticipated to be improved along with efforts to improve component reliabilities inclusive of high powered amplifiers.

WHEN

Contract Number: N00039-18-C-0028 **Ending on:** July 27, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Preliminary Design Review	Low	Government approved PDR against exit criteria	4	December 2019
Critical Design Review	Med	Government approved CDR against exit criteria and demonstrated prototype	5	December 2020
EDM Validated	Med	Completed Environmental Campaign of Form/Fit/Function EDM	6	December 2021
PRA Validated	Med	Completion of Navy Led Validation of Production Units	7	September 2022
Field Test	Low	Naval approval of field test completion	8	March 2023
Sea Trials	Low	Naval approval of sea trial completion	8	September 2023

HOW

Projected Business Model: RKF intends to make and sell the complete hardware deliverable as a system directly to Navy and support these deliverables through warranty/maintenance agreements for the full lifecycle. Partnership and relationships with large defense primes are considered for integration activities, although RKF intends to lead this effort through to completion. Key components of the system or related parts have been analyzed for inclusion and TRL in the design. Partnership with a program of record is underway along with the large business prime for that program.

Company Objectives: RKF intends to grow in size and capability to take on ever increasing responsibility as a DoD system integrator focused on communication system advancement and modernization to meet critical telecommunication needs of the coming decades. RKF desires to eventually become a large defense contractor. RKF focuses on targeted activities to meet this objective and organic growth through demonstrated value-add performance and mission success.

Potential Commercial Applications: While there are limited anticipated commercial applications at this time for this niche product, RKF serves high profile commercial and Government customers with a slight majority of its revenue from commercial efforts supporting companies such as Google, Facebook, Broadcom, and SES Networks. For the Government RKF has overseen radio and satellite communication procurement efforts for DARPA and NASA, respectively.

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