Topic: N131-006

Radio Frequency Simulation Systems, Inc.

Direct Digital Radio Frequency (RF) Conversion Digital Radio Frequency Memory (DRFM)
RFSS' Direct-to-Digital DRFM (D2 DRFM) technology obviates the need for RF signal translation that are typically necessary to digitize and reconstruct RF signals, by using a novel D/A scheme that mimics existing A/D technology. RFSS is a leader in the design, development, and manufacture of complex hardware-in-the-loop radar simulation equipment and Digital RF Memory (DRFM) jamming systems for defense and aerospace industries worldwide. The benefits include a sizable reduction in SWAP-C, reduced system latency; and dramatic improvements in reliability, bandwidth, and capability up to 20 GHz. These would address Defense applications like UAV's, fighter aircraft, and small jammer pods. In particular, PMA-272's ALQ-167 jamming pods would enjoy the benefits of the D2 DRFM During Phase II RFSS was able to prototype and validate the interfaces through emulation and simulations on representative hardware. We also identified a lower risk approach utilizing COTS FPGA boards with industry standard mezzanine interfaces such as a high density FMC mezzanine modules, and better components that will support the higher speeds and data rates including DDR4 memories and DDS clock and multiplier schemes. By working down these risks, we see that we are much closer to a field ready unit than previously envisioned. RFSS is looking to have this technology integrated into AEA systems that are highly sensitive to SWAP-C and reliability, like UAV's and small electronic warfare pods. RFSS would likely provide these to a prime contractor for an AEA, under a subcontract that would include some NRE.

Technology Category Alignment:
None
None
None

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SYSCOM: NAVAIR
Contract: N68936-14-C-0030

Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68936-14-C-0030

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA 272

Transition Target: ALQ-167 Jamming Pod

TPOC:
(805) 989-3572

Other transition opportunities:
Unmanned Aerial Vehicles
Software Defined Radios
Airborne Electronic Attack
SATCOM
EW Threat Generation

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WHAT

Operational Need and Improvement: Current DRFM-based Electronic Attack (EA) systems have limited capability and effectiveness due to their size/cost/complexity, and limited bandwidth.

Specifications Required: The goal of the project is to develop a DRFM architecture utilizing direct RF to digital conversion to simultaneously respond to multiple radars across a broad spectrum of RF frequencies, and to simultaneously cover more than three (3) octaves of frequency while minimizing spurious harmonics and RF through put delay. In addition, it will have 40% reduced unit cost, a tenfold increase in reliability, broad bandwidth capability of 2-18 GHz, be capable of creating multiple radar responses, reduced size that would be appropriate for UAV/subscale drone applications, and a power draw reduction of 40%. It will also allow for multiple parallel DRFM chip sets that would follow advancing threat DRFM capabilities against new US radar systems.

Technology Developed: RFSS has produced a technology demonstration of a Direct-to-Digital DRFM that meets all of the required specifications. In its final embodiment it will utilize modular, open architecture and industry standard size and interfaces.

Warfighter Value: DRFM-based Electronic Warfare will now be available to UAV's and other subscale applications, with capabilities that exceed the current state-of-the art. The ability to have enhanced jamming like never before in small, inexpensive, and unmanned platforms, at reduced cost, means more systems can be deployed, less cost if one is shot down, and ZERO loss of life.

WHEN

Contract Number: N68936-14-C-0030 **Ending on:** June 9, 2016

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Test data on new RFDAC	Med	core system that meets requirements	4	February 2016
DRFM kernel programming	Med	testable bench-level system	5	April 2016
Software programming	Med	testable bench-level system	5	April 2016
D2 DRFM integration onto 3U VPX card	Med	card that can be integrated to system	5	April 2016
Integrated D2 DRFM into chassis w CPU software	Low	ability to perform required techniques	6	May 2016

HOW

Projected Business Model: If the product requires integration into a higher system, the value proposition to the integrator would be improved SWAP-C and enhanced capabilities, which would greatly improve their value proposition to the customer. Advantages that would apply to the Program Office directly would include enhanced capability (i.e. greater bandwidth, less latency, less power/weight) at a significantly lower cost.

Company Objectives: Become the manufacturer/supplier of a DRFM module that would be integrated into a higher system (Subcontractor to a Prime), and possibly an entire pod/system (Contractor to the Navy). In addition, we would consider a business case involving a license agreement with a prime.

Potential Commercial Applications: Radar simulation, test, and evaluation

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