

WHO

SYSCOM: NAVSEA

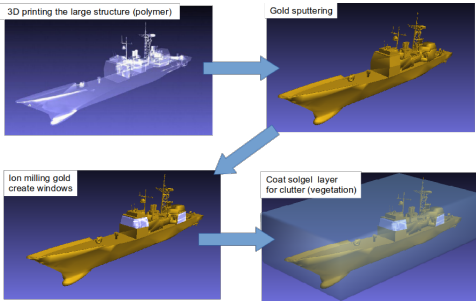
Sponsoring Program: NAVSEA

Transition Target: PMA-299 MH-60R/S, PMA-290, PMA-264 ASW, NAVSEA

TPOC: (401) 832-6887

Other Transition Opportunities: TIPD has previously developed relationships with defense system manufacturers including Lockheed Martin, Raytheon Missile Systems , Northrup Grumman, and Harris Corporation. We discussed the nanoRCS program with TIPD's defense contractor contact to understand the commercial opportunity for the nanoRCS system. TIPD used these contacts to identify key entry points for the nanoRCS system and the necessary testing required for expediting the system's transition into Navy programs and other applications. TIPD has already been in contact with Lockheed-Martin to gauge their potential interest. TIPD worked with Raytheon to further develop the nanophotonic RCS test system and that project could offer TIPD an alternate commercialization pathway.

Notes:



A multi-material model is created in a multistep process. The 3D model is printed followed by metal sputtering, ion milling to remove the metal for aperture, and solgel coating to create clutter.

WHAT

Operational Need and Improvement: The electromagnetic (EM) signatures of a platform, such as a ship or a submarine, is of particular importance for the Navy since it allows the detection and identification of the vessel. The vessel's passive EM signature, known as its radar cross section (RCS), is proportional to the reflectivity of the structure and varies with relative spatial orientation of the vessel and the radar source. Minimizing this reflection improves the stealth properties of the vessel making it more difficult for our adversaries to detect the ship using a radar system. The observed RCS can also be used to identify a target by comparing it with a database of RCS profiles.

Specifications Required: The goal of the NanoRCS effort is to design and develop a tabletop system capable of demonstrating performance comparable to the Navy current RF based simulation tools. Achieving this goal requires research in three major areas: optical system design and measurement algorithms, material development to mimic the permittivity and permeability characteristics at optical frequencies, and active component fabrication techniques to simulate radar sources.

Technology Developed: Developed the world-first benchtop NIR RCS/ISAR emulator measurement system with cross-range and time-of-flight (TOF) measurement capabilities.

Warfighter Value: TIPD's RCS system will provide the warfighter with a cheap, small, and readily available optical system with perform the same capability as the Navy's current large and expensive RF based RCS/ISAR simulators. Additionally, the development and availability of this system will increase technology and tactical readiness for the Warfighter.

WHEN

Contract Number: N68335-21-C-0114

Ending on: Dec 10, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Measure performance of test structures emulating seawater and glass	Low	Successfully Completed	4	TBD
Initial measurements of active nanoantennae	Medium	On-going	5	TBD
Provide test data and deliver the TOF RCS system to the Navy	Medium	Being Planned	5	TBD

HOW

Projected Business Model: Develop a production level lower SAWP-C RCS system. Deliver a few units for testing in several Fleet Support Team facilities. License intellectual property and designs to Prime Contractors.

Company Objectives: Field our novel efficient, low-cost, and small sized RCS/ISAR emulator measurement system into all the Naval depots, Fleet Readiness Centers, Fleet Support Team facilities, and the I-level squadron. Our main goal is to provide the Warfighter with all the tools necessary to help speed up their mission success as well as teaming up with multi-disciplinary experts, subcontract, and license our intellectual property major DoD prime contractors.

Potential Commercial Applications: As part of its marketing efforts, TIPD is working on identifying the requirements of other DoD branches for the RCS system. One potential application for the USAF and USA is to use our system for acquisition of RCS/ISAR signature of aircraft and tank. TIPD has scheduled a conference call with Lockheed Martin to identify potential next steps to discuss how the RCS system could be used in their development efforts. TIPD will also reach out to its contacts at Northrup Grumman and to the US Army's Redstone Arsenal to identify potential entry points. TIPD will also survey the industrial, scientific and medical markets to determine their requirements. While TIPD's design approach is capable of handling a wide wavelengths and powers, the RCS system may need to be customized for each of the markets. TIPD will begin to develop minimum viable products (MVP) for the other markets. TIPD will use the MVPs to gather feedback on the performance, pricing, packaging and market opportunity for the RCS system.