# Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2025-074

Topic # N211-062
Nondestructive Detection of Flaws through Thick Polymers using Electromagnetic Imaging Technologies
Texas Research Institute Austin, Inc.

## WHO

**SYSCOM:** NAVSEA

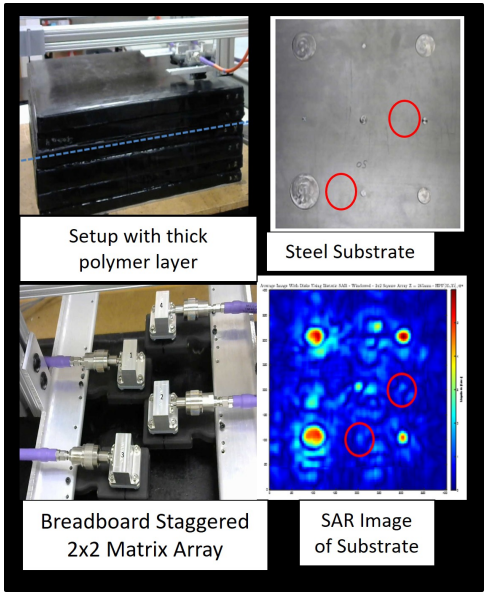
**Sponsoring Program:** Submarines, and other Subsea applications

**Transition Target:**

**TPOC:** (401) 832-4462

**Other Transition Opportunities:**

**Notes:** Prime: TRI Austin, Inc. (PI - Doyle Motes, P.E. – dmotes@tri-austin.com)
Subcontractors: Iowa State University Center for Nondestructive Inspection (PIs – Dr. M. Tayeb Al Qaseer, PhD), AVID R&D (Dr. Trevor Watt, PhD)




Images courtesy TRI

## WHAT

**Operational Need and Improvement:** USN is anticipating advanced sustainment needs for marine vessels that are covered in thick polymer coatings. Specifically, these vessels can experience seepage between the polymer coatings that allow water ingress to the steel substrate below. This can cause corrosion, metal loss, and degradation of the bondline between the polymer and the steel below, in the worst case resulting in the loss of the polymer coating in totality. Inspection of the substrate health is made more complicated by conductors embedded within the coating itself.

**Specifications Required:** Developing a bi-static electromagnetic (EM) imager (frequency range ~ 8-18 GHz) will permit inspection of the substrate around conductive obstructions. The imaging system has been shown to identify corrosion defects at sizes of interest.

**Technology Developed:** TRI Austin is developing a real-time, high resolution, microwave frequency imaging system for the inspection of the surface of a metallic substrate under thick polymer coatings. The imaging system will use synthetic aperture radar (SAR) imaging algorithms to generate high resolution images from raw microwave inspection data (in the range from 10-18 GHz). The system will accurately provide data on the substrate's state, service capabilities, and bond life at various times in their life cycles. Currently, there is no method for testing thick polymers besides destructively removing sections which is costly, labor intensive, and time consuming. The NDT capability will greatly enhance performance and readiness across a number of Navy platforms.

**Warfighter Value:** There is currently no method for nondestructive testing (NDT) of metal substrate health underneath the bondline of thick polymers. TRI Austin's electromagnetic inspection technology provides high resolution, microwave frequency imaging system for the inspection of the surface of a metallic substrate under thick polymer coatings.

## WHEN

**Contract Number:** N68335-23-C-0410 **Ending on:** Aug 26, 2026

| Milestone | Risk Level | Measure of Success | Ending TRL | Date |
|---|---|---|---|---|
| Breadboard Imager lab model | N/A | Completed | 5 | 4th QTR FY24 |
| Breadboard Imager Prototype | N/A | Completed | 5 | 4th QTR FY25 |
| Final Production Model | Medium | 3rd QTR 26 | 6 | 4th QTR FY26 |

## HOW

**Projected Business Model:** Sell to customers either via licensing or direct application of product.

**Company Objectives:** Sell an end product commercially.

**Potential Commercial Applications:** Subsea infrastructure

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