Department of the Navy SBIR/STTR Transition Program

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Topic # N192-137
Propulsion Monitoring for Use in Missile Space Applications
Intellisense Systems, Inc.

WHO

SYSCOM: SSP

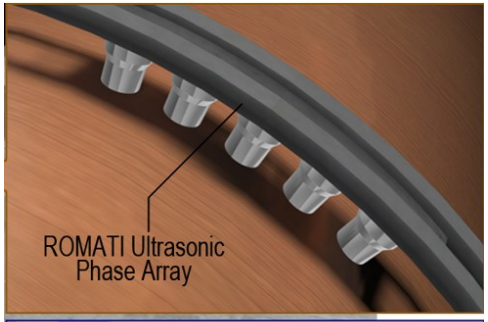
Sponsoring Program: Navy Solid Rocket Motor Programs

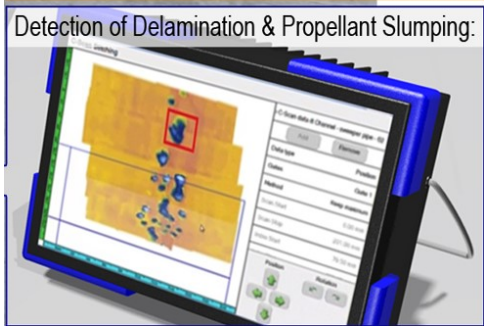
Transition Target: Solid rocket motors inspection systems

TPOC: SSP.SBIR@ssp.navy.mil

Other Transition Opportunities: Any program requiring monitoring of the propellant health in solid rocket motors.

Notes: Intellisense Systems Inc.'s Rocket Motor Acoustic Tomographic Inspection (ROMATI) addresses the Navy's need to detect propellant slumping and insulation gaps in bonds in rocket motors. The ROMATI system is based upon new nondestructive evaluation (NDE) techniques. Specifically, the innovations in the fusion of acoustic multi-modal near field and far-field phased array focusing, combined with custom signal processing algorithms, enables the system to inspect the health of propellant in rocket motors during missile production and maintenance operations and automatically detect unbonds and propellant slumping.





WHAT

Operational Need and Improvement: ROMATI addresses the Navy's need for detection of rocket motor propellant slumping and insulation gaps in bonds.

Specifications Required: ROMATI should implement a solid propulsion monitoring system that may be used to provide assessments in the field and/or during missile production operations, specifically for detection of propellant slumping, and gaps in bonds between the case-to-insulation and insulation-to-propellant interfaces.

Technology Developed: ROMATI is an ultrasonic sensor system for detection of propellant slumping and unbonds in solid rocket motors. It is developed by Intellisense Systems, which creates advanced sensing and display solutions. ROMATI improves the accuracy and efficiency of rocket motor inspections and can replace x-ray systems while providing vital information on rocket motor health. ROMATI is currently in development, and
- Can detect unbonds with a lateral resolution of 1 mm.
- Can measure reflective targets with a radial resolution of 1 mm.

Warfighter Value: ROMATI can be applied for health inspections of the solid rocket motors in military and space applications where it will improve the accuracy and efficiency of inspections and increases safety, reliability, and availability of missile systems.

WHEN

Contract Number: N68335-22-C-0121 **Ending on:** Jun 12, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Showed ROMATI feasibility in Phase I	N/A	Demonstrated key features of ROMATI system in Phase I	4	2nd QTR FY21
The ROMATI prototype will be developed and tested at the end of Phase II	N/A	First ROMATI prototype will be developed	5	3rd QTR FY24

HOW

Projected Business Model: To incorporate the ROMATI technology to operationally deployed or missile production operations for assessment of a variety of solid-rocket-fueled military missile systems, we plan to work closely with prime contractors including manufacturers and system integrators, as well as the Navy, to ensure compatibility as ROMATI is matured throughout the Phase II Option and beyond. We plan to develop ROMATI to TRL-7/8 and then transition to low-rate initial production, selling directly to the Navy/government.

Company Objectives: Intellisense intends to leverage the ROMATI technology and develop a family of ultrasonic non-destructive inspection systems for use by all branches of DoD and other government agencies as well as in aerospace commercial applications.

Potential Commercial Applications: The ROMATI system will be applicable to assessment of a variety of solid rocket fuel-based missiles, whether operationally deployed or in production. The potential cost savings are significant, as ROMATI would eliminate the cost of manpower, transportation, and use of specialized equipment required for current inspection methodologies. As a first deployment target, RMATI will be used in Navy systems. ROMATI can be readily used in the inspection, maintenance, and assembly of commercial aircraft, where low weight and stiff composites are increasingly being used. It can be used to augment a monitoring system for solid rocket systems and composite aircraft inspection systems, and in applications to detect delamination in composites and laminate materials in aerospace and other industries.

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