Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2018-782

Topic # N06-020

Enhanced Eddy Current Nondestructive Inspection Capability for Corrosion and Crack Detection of Aerospace Structures

JENTEK Sensors, Inc.

WHO

SYSCOM: NAVAIR

Sponsoring Program: Fleet Readiness Center Southeast

Transition Target: E-6B Mercury is the initial focus for 2nd layer corrosion imaging

TPOC:
(904)790-6406

Other transition opportunities: Potential applications for 1st and 2nd layer corrosion and crack detection, using adaptable general capability procedures, include Navy maritime patrol aircraft, fighter aircraft, and rotorcraft. Potential Air Force platforms include transport aircraft, fighter aircraft, and rotorcraft.

New JENTEK jET handheld adapted for 2nd layer corrosion and crack detection. Image Courtesy of JENTEK Sensors, Inc. Copyright 2018

Notes: Crack detection near fasteners with rapid scanning is also needed for commercial platforms.

WHAT

Operational Need and Improvement: More reliable and adaptable capability for the detection of corrosion and cracks in relatively thin multiple layered aircraft structures using a handheld nondestructive testing (NDT) tool in order to increase safety and aircraft availability while reducing sustainment costs. The initial need is for depot solutions, but sufficient ease of use by available personnel would promote broader field transitions and more cost and readiness impact.

Specifications Required: The specific application focus is on relatively thin structures with damage occurring within 0.15 inches from the accessible surface or with total thickness of the first and second layers being less than 0.25 inches. This includes detection and imaging of corrosion and detection of cracks at fasteners. One goal is to deliver tools to enable NDT Level IIIs and engineers to adapt the system for use on other platforms for both corrosion imaging and crack detection.

Technology Developed: To deliver more reliable and more convenient inspection of aircraft structures for corrosion and cracks, JENTEK has created a unique approach to “intelligence” in a compact handheld package. Intelligence is created first using model based multivariate inverse methods (MIMs) to enable correction for variations in skin and spar properties (conductivity) and thicknesses and then using spatial filtering to recognize defects and suppress inconsequential variations. Finally, adding more common artificial intelligence tools is planned to enable more convenient adaptation and transition for new platforms.

Warfighter Value: JENTEK’S innovative jET handheld coupled with the proven JENTEK MWM (Meandering Winding Magnetometer)-Array technology provides an extremely convenient, light weight, compact and reliable inspection capability for 2nd layer corrosion and crack detection that reduces false indications– increasing aircraft availability and improving safety. More rapid setup, calibration and inspection without removal of paint reduces the burden on depot and field personnel.

WHEN

Contract Number: N68335-18-C-0200 **Ending on:** April 10, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Upgrade jET for MWM-Array and MR-MWM-Array methods specifically for corrosion and crack detection	Low	Customer feedback on reliability and ease of use	8	July 2019
Raise the TRL and MRL for select second layer corrosion detection applications	Low	Reliable performance on a targeted set of standards for E-6 application	8	July 2019
Develop generic solutions for corrosion imaging	Med	Performance on generic set of simple samples and on aircraft	7	November 2019
Develop generic solutions for cracks	Med	Performance on generic set of simple samples and on aircraft	7	February 2020

HOW

Projected Business Model: JENTEK is a manufacturer that is proud to have a reputation for delivering solutions that are reliable and durable. With the introduction of the new jET handheld, JENTEK is now well positioned to penetrate the broader NDT market for handheld instruments. JENTEK’s goal is to deliver competitively priced eddy current array solutions that substantially outperform conventional eddy current testing (ET) methods (in speed, convenience and detection performance/reliability), while also supporting conventional ET to enable customers to avoid duplicative costs. Performance and acceptance are the key, so JENTEK is working directly with industry leading experts and launch customers to demonstrate performance and build awareness.

Company Objectives: JENTEK’s goal is to become the vendor of choice for performance leading eddy current array solutions with a reputation for delivering measurable return on customer investment, improving platform safety and availability and building durable and mutually beneficial relationships with our customers.

Potential Commercial Applications: Second layer corrosion/material loss and crack detection needs are not challenges unique to the Navy or the DOD; this solution could transition to commercial aircraft inspection (e.g., for lap joint inspection) as well. Airlines and Maintenance, Repair and Overhaul (MRO) facilities for commercial aircraft, as well as Foreign Military Services are potential customers. JENTEK supports three primary markets: Aerospace & Defense, Industrial, and Oil & Gas. The capability to reliably and rapidly detect subsurface damage is needed by a broad range of customers in each of these expansive markets.

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