

NAVY Transition Assistance Program

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N07-170 - Vibrant Corporation

Hybrid Bearings Non Destructive Testing (NDT)

NEED & CUSTOMER REQUIREMENT

Need: DoD wide need for advanced non-destructive testing (NDT) technologies capable of quickly and economically determining the structural integrity of a component.

Value to the Warfighter: Increase aircraft availability and reduced likelihood of in-service component failures.

Operational Gap: Current NDT technologies do not correlate well to actual structural integrity of the component, and the results tend to be subjective. Vibrant's PCRT provides objective results that relate directly to a parts structural integrity, and provide a basis for digital life evaluation and remaining life prediction.

Customer Specifications: Develop an NDT capability for hybrid bearing ceramic rolling elements that:

- rejects elements with bulk material property deficiencies
- rejects elements with subsurface density or porosity flaws
- rejects elements with surface cracks and c-spalls
- reduces inspection cost by 50% compared with current methods

Technology Description: Process Compensated Resonance Testing (PCRT) is a NDT technology based on resonant ultrasound spectroscopy in which a swept sine wave vibration is applied to the component to be tested, and the components resonant response spectra is analyzed to determine if it is structurally acceptable. The technology provides a fast, accurate, clean and objective testing capability for metal, ceramic, and some composite parts. Through application of pattern recognition techniques to the resonant spectra of parts, PCRT is capable of detecting cracks, thermal degradation, fatigue and in-service damage.

SPONSORSHIP of original SBIR/STTR Topic

SYSCOM: NAVAIR

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TECHNOLOGY DEVELOPMENT MILESTONES (SBIR/STTR)

Milestone	TRL	Risk	Measure of Success	TRL Date
Demonstration in customer facility	5	Low	production testing of ceramic bearing elements for internal defects	3/2009
Identification of surface cracks with high frequency SAW	6	Moderate	Detect induced cracks in ceramic elements by SAW examination before and after introduction of defect	11/2009
Detection of surface cracks in manufacturing environment	7	Moderate	rejection of defective components at production rates in manufacturing environment	6/2010

Open contract: N68335-09-C-0159 ending 2-28-11

TECHNOLOGY TRANSITION OPPORTUNITIES (PHASE III)

Other Potential Applications:

New manufacture and MRO inspection of turbine engine components, aircraft landing gear components, and aircraft wheels.

Business Model:

PCRT testing provided as a service at customer facilities

Objective:

To identify opportunities to apply PCRT to high value components that are currently undergo repetitive NDT inspections during their service life.

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