

NAVY Transition Assistance Program

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N08-036 - Creare Inc.

A Laser-Assisted Machining Approach for the High Performance Machining of CMCs

NEED & CUSTOMER REQUIREMENT

Need: Ceramic matrix composites (CMC) are desirable for high performance aerospace and missile components due to their excellent strength-to-weight ratio and their ability to withstand high temperatures. However, CMC components are difficult to machine with conventional single-point tooling, rendering grinding as the only available option. The inaccuracies and sub-surface damage induced render grinding operations less than optimal for manufacturing CMC radomes. As a result, current CMC machining processes are costly and time consuming. New manufacturing technologies are needed to reduce the cost and decrease the cycle time associated with fabricating finished CMC components for the Advanced Anti-Radiation Guided Missile (AARGM).

Value to the Warfighter: The high strength and low density of CMCs are ideal for numerous military applications, including missile radomes, engines, and exhaust washed aircraft structures.

Operational Gap: There is a lack of affordable CMC parts available for integration into current military platforms. Correspondingly, this diminishes the opportunities to enhance system performance.

Customer Specifications: The Navy needs to reduce the cost and enhance the performance of current military systems, such as AARGM. Our machining approach does so by enabling the effective, rapid machining of these difficult-to-fabricate materials, with a significant reduction in part rejection/rework, and decreased machine wear and maintenance costs.

Technology Description: Our innovation uses a laser to preheat the CMC material prior to removal using conventional machining operations. Our approach reduces the cutting forces, which enables the production of CMC components at reduced costs.

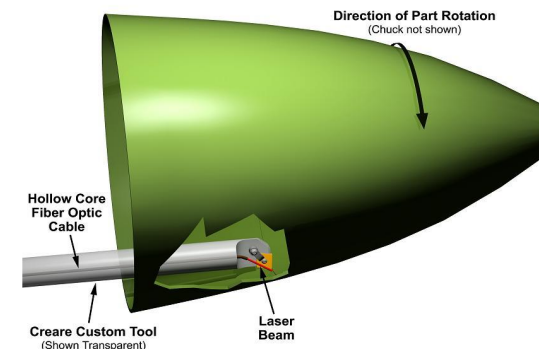
SPONSORSHIP of original SBIR/STTR Topic

SYSCOM: NAVAIR

Transition Target: PMA 242, PEO (U&W) Direct and Time Sensitive Strike Programs

Original Sponsoring Program: JSF PO-Prop

TPOC Phone Number:
301-757-7384



TECHNOLOGY DEVELOPMENT MILESTONES (SBIR/STTR)

Milestone	TRL	Risk	Measure of Success	TRL Date
Design Prototype	3	Low	Complete design of prototype	March 2010
Fabrication and Integration	4	Low	Complete prototype fabrication and functional testing	November 2010
Performance Testing	5	Low	Establish benefits for AARGM radomes	February 2011
Performance Demonstration	6	Low	Complete an demonstration at ATK, fostering technology transition	May 2011

Open contract: N68335-09-C-0209 ending 5/5/2011

TECHNOLOGY TRANSITION OPPORTUNITIES (PHASE III)

Other Potential Applications:

Machine tools incorporating our innovation will significantly reduce manufacturing costs and reduce part cycle time for hard-to-fabricate materials. This enhanced capability will allow broader, cost-effective use of CMCs. Examples of part and platform applications include missile radomes for AARGM, engine components, and exhaust washed structures on fighter aircraft. This manufacturing capability is applicable to a broad range of platforms and systems.

Business Model:

Creare is seeking partners/licensees to provide and employ this capability in the manufacture of critical components for DoD.

Objective:

Creare is seeking Program Office T&E and prime contractor support to transition our laser-assisted machining technology for the fabrication of missile components/parts. We are also seeking to provide this cost-effective, rapid manufacturing process for T&E by aircraft, missile, and other programs. In addition, we seek to provide this technology to defense contractors that will benefit from employing this capability.

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