

NAVY Transition Assistance Program

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N04-013 - Third Wave Systems, Inc.

High-Speed Machining of Thin-Web, Large-Pocket Aircraft Components

NEED & CUSTOMER REQUIREMENT

Need: V-22 engineers recognize the need for technology that promotes faster, high performance machining and NC program optimization; however, with no time to halt current production it is critical that this technology integrate with current resources. The Navy's V-22 and F-35 programs require components that are lighter, contain less distortion, and can be manufactured at reduced cycle times for affordability.

Value to the Warfighter: Quicker turnaround on manufacturing aircraft components while simultaneously improving quality, reducing associated expenses, and minimizing part distortion.

Operational Gap: With access only to conventional machining resources, design engineers cannot make process improvements to titanium aircraft components without the risk of adversely affecting delivery target dates. The DoD is also not equipped to analyze aluminum machining processes at the material behavior level. By acquiring integrated technology that will improve design processes for both components using existing program resources, cycle times could be reduced, distortion minimized, and quality enhanced.

Customer Specifications: Improve cycle times by 20% for targeted aircraft components and integrate enabling technology with existing computer-aided design/manufacturing (CAD/CAM) software packages.

Technology Description: Third Wave Systems' physics-based modeling software analyzes speed and feed rates of existing toolpaths, implementing high performance machining (HPM) practices where applicable, and predicting and helping control machining induced stresses and distortion.

SPONSORSHIP of original SBIR/STTR Topic

SYSCOM: NAVAIR

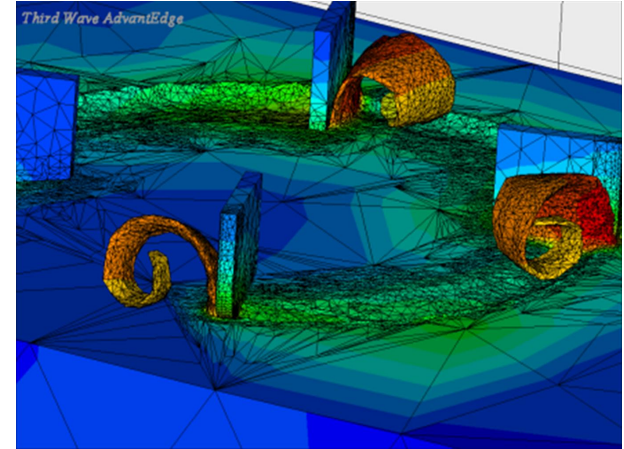
Transition Target: V-22, F-35

Original Sponsoring Program: V-22

TPOC Phone Number: (301) 757-9506

Note:

TWS' software is designed for today's top aerospace manufacturers and suppliers, interfacing with industry-standard CAD/CAM packages such as CATIA, Mastercam and Siemens NX. Consideration for material physics adds a unique and valuable facet to the software, enhancing user expertise and part quality.



TECHNOLOGY DEVELOPMENT MILESTONES (SBIR/STTR)

Milestone	TRL	Risk	Measure of Success	TRL Date
Interface and integrate modeling technology in production environment	4	Low	Modeling software in use at V-22 and F-35 machined parts suppliers	September 2009
Demonstrate HPM machining methods on titanium V-22 component	5	Moderate	V-22 gear carrier machined using physics-based modeling and HPM process	March 2010
Develop modeling capability to predict distortion in aluminum structures	5	High	Successful comparison of modeled aluminum bulkhead to previously machined distortion data	May 2010
Demonstrate HPM machining methods on titanium F-35 component	6	Moderate	F-35 forward engine mount machined using physics-based modeling and HPM process	March 2010

Open contract: N68335-08-C-0162 ending 03/11/2010

TECHNOLOGY TRANSITION OPPORTUNITIES (PHASE III)

Other Potential Applications:

A number of existing and future government aircraft consisting of machined metal parts can be identified that would benefit from the technology. Companies with the highest potential for technology impact are:

- DOD PRIME CONTRACTORS and their suppliers: The Boeing Company, Lockheed Martin, Bell Helicopter, Northrop Grumman, General Dynamics and Raytheon, among others.
- AIRFRAME MANUFACTURERS including Cessna, Airbus, Sikorsky and Bombardier.
- ENGINE MANUFACTURERS such as Rolls Royce, Pratt & Whitney, Volvo and GE Aviation.

Business Model:

Initial market penetration will be achieved through direct partnership with DoD Primes and sub-contractors during development of technology. A number of Primes are current users of our software, and would continue to license said packages and be provided with new versions every six (6) months.

Objective:

We would like the use of this technology to be a Pentagon-required step in the manufacturing of various DoD platforms, as well as pushed down from Primes to their suppliers such that we could work with them to identify areas for productivity improvement. In addition to the primary software, AdvantEdge Production Module, we will continue to market the AdvantEdge FEM and AdvantEdge Distortion Modeler technology.