

Advanced Metalworking Technologies Create Cost Avoidance/Weight Reduction for N-UCAS

Status: Pending Transition

PROBLEM / OBJECTIVE

The objective of this Navy Metalworking Center (NMC) project was to use advanced metalworking technologies to reduce the weight and cost of airframe components on the Navy-Unmanned Combat Air System (N-UCAS). The ultimate goal was to demonstrate the viability of selected technologies on a full scale test article. The project was coordinated with the Composites Manufacturing Technology Center (CMTC) project in a System Design and Manufacturing Demonstration (SDMD) program.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

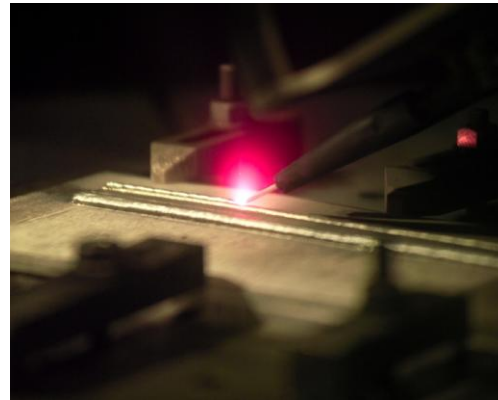
Two advanced metalworking technologies—advanced High Speed Machining (HSM) and Electron Beam Free Form Fabrication (EBFFF), a direct metal deposition process—and several advanced assembly techniques were selected for further development and demonstration during a previous concept exploration project. Advanced HSM was selected to manufacture ultra-thin aluminum spars and ribs. EBFFF was selected to produce lower-cost titanium components. The follow-on SDMD project was conducted in two phases; Phase I focused on design and development while Phase II focused on fabrication, assembly and testing.

Implementation and Technology Transfer:

The full-scale significant structural test article that was designed, built and tested under this NMC project met or exceeded all requirements established by NAVAIR. The next opportunity to transition these advanced metalworking technologies into the N-UCAS Production Vehicle will be the System Design and Development program in 2012. By inserting ManTech solutions early in the design process, this project will reduce life-cycle costs, preserve development schedules and promote timely transition to the N-UCAS Platform.

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Electron Beam Free Form Fabrication direct metal deposition process

Expected Benefits:

The project demonstrated significant acquisition cost avoidance and a 16% to 35% weight reduction of affected parts. In addition to reduced fuel costs, the weight savings could lead to performance enhancements such as increased payload and endurance. The estimated cost benefits of using EBFFF, advanced HSM and advanced assembly techniques to produce a fleet of 150 N-UCAS aircraft are:

- \$25.0M manufacturing cost avoidance in titanium components
- \$3.8M manufacturing cost avoidance in aluminum spars and ribs
- \$12.1M assembly cost avoidance
- \$36.3M weight affected life-cycle cost avoidance

TIME LINE / MILESTONE

Start Date:	July 2005
End Date:	April 2008

FUNDING

- Navy ManTech Investment - \$3M
- Boeing Company Industrial Contribution - \$1M

Total ManTech Investment:	\$3M
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PARTICIPANTS

N-UCAS Program Office (PMA268)
Naval Air Systems Command (NAVAIR)
Navy Metalworking Center (NMC)
Boeing Phantom Works
Sciaky Inc.
National Institute for Aviation Research