Cutting F-35 manufacturing costs, time earns ONR top award

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The Office of Naval Research (ONR) today received one of the nation's top manufacturing awards for an innovative, cost-saving method for making advanced cockpit enclosures, or canopies, for the F-35 Lightning II Joint Strike Fighter program.

Officials from ONR's Manufacturing Technology (ManTech) program accepted the Department of Defense's Joint Defense Manufacturing Technology Achievement Award at the Defense Manufacturing Conference in San Antonio.

The Department of Defense's Joint Strike Fighter program is developing the next generation of affordable, lethal strike aircraft in variants for the Navy, Air Force and Marine Corps. The automated process will be used to make canopies—the transparent shells around the cockpits—for more than 2,000 aircraft, saving as much as $125 million over the life of the F-35 program.

ONR ManTech led a team of military and industry scientists and engineers in automating the thermoforming process used to create F-35 canopies, saving time and money and eliminating potential hazards for human work crews.

"This award confirms our commitment to developing the most efficient and cost-effective ways to manufacture some of the most critical hardware our Sailors and Marines use," said John Carney, director of ONR's ManTech program.

The automation project began in 2011 and cost just $1.3 million. Much of the work was carried out at the Composites Manufacturing Technology Center, one of seven Centers of Excellence under ONR's ManTech program.

"The potential cost savings represent a huge return on a relatively small initial investment by ONR," said Neil Graf, Program Officer for ONR ManTech.

The F-35 canopy represents the cutting edge in aircraft design. Its unique shape and specialized material the make the canopy manufacturing process more complex than that for other aircraft.

Currently, skilled technicians load an acrylic shell into a forming tool and load the assembly into an oven heated to 200 degrees where the canopy forms over a span of up to six days. During that time, workers regularly enter the oven to makes observations and manually adjust positioning clamps to control the forming process.

The new method uses a control system with cameras to see inside the oven to calculate the rate at which the canopy's shape is forming. The clamps automatically adjust to ensure the shape remains uniform throughout the process to meet the F-35's stringent requirements.

The new system gets the job done in just two or three days. It also requires fewer tools and oven time and less clean-up afterwards. Most importantly, workers no longer have to enter the hot ovens.

The automated thermoforming process underscores the Chief of Naval Operations' Navigation Plan that calls for the service to continue efforts to make investments to address near-term challenges and develop future capabilities even in the face of budget constraints.

ONR ManTech partnered with experts from the F-35 Program Office, Naval Air Systems Command, GKN Aerospace Transparency Systems and Penn State's Applied Research Laboratory to develop the automated system.

GKN Aerospace Transparency Systems, in coordination with the F-35 Program Office, plans to implement the new process in May 2015.

Provided by Office of Naval Research