

Non-Destructive Inspection for Electron-Beam Additive Manufacturing of Titanium

Problem

Concurrent Technologies Corporation (CTC), through a joint Navy ManTech and DMS&T project, is assessing the capability of several traditional and advanced non-destructive inspection (NDI) processes to detect internal defects in Electron Beam Direct Manufacturing (EBDM) parts to be used on the F-35 Joint Strike Fighter (JSF). An NDI procedure for EBDM parts must be developed and approved before those parts can be implemented on the JSF to improve affordability.

Solution

A project team, led by the CTC-operated Navy Metalworking Center, is investigating the viability of NDI methods, such as traditional radiography, standard and phased array ultrasonic inspection, and computed tomography, to comprehensively inspect EBDM-produced parts. The results of those efforts will form the basis for acceptance standards that will lead to the approval to use EBDM technology to fabricate F-35 airframe components.

Benefits

This project will identify an accepted NDI process for EBDM parts on the JSF, which will save program costs by enabling the use of EBDM for this application. Studies have shown that EBDM technology has the potential to reduce per-part manufacturing costs by 35 percent to 60 percent, when compared to the cost to manufacture complex-shaped parts with traditional manufacturing approaches.

Implementation

Upon approval, the recommended NDI practices will be implemented by Sciaky, Inc. (the EBDM vendor), and Lockheed Martin Aeronautics – Advanced Development Program on designated F-35 EBDM components beginning with LRIP 9; tentatively targeted for 2017.



Development of effective NDI methods is critical to ensure implementation of EBDM components on the F-35. (Sciaky photo)