Boeing Breakthroughs in Computer-Aided Measurement Systems Reduce Joint Strike Fighter Costs

Highly sophisticated electronic measurement tools that helped Boeing reduce tooling costs for its JSF X-32 concept demonstrators by 72 percent over the F-22 will be used to achieve even greater cost reductions in the next phase of the JSF program.

Using conventional measurement tools, shop personnel measure parts electronically with special readers after the parts are built and assembled. The data gathered by these systems are then translated and cross-checked against engineering specifications.

The new way involves integrating 3D solid modeling and design software with this measurement software, allowing shop personnel to verify part quality and fit much earlier in the assembly process, substantially reducing factory flow time over comparable aircraft programs.

"Advanced measurement tools are just one example of the many proven technologies and advanced processes Boeing is using to dramatically reduce cycle time and costs," said Jim O'Neill, chief engineer for JSF Structures and Systems. "We are not relying on demonstrations to validate these processes. We have already used them on the X-32 and used earlier versions successfully on the F/A-18E/F and the F-22. We're expanding their use on the JSF."

Boeing expects to reap hundreds of millions of dollars in savings in JSF development and production costs by using innovative measurement systems that reduce tooling and cycle time.

"Designing, building and maintaining tooling can account for as much as 40 percent of the total start-up costs of a conventional aircraft production program," said Terrance Massie, manager of Tool Engineering and Sustaining. "Even a tooling reduction of a few percent can add up to millions of dollars in savings."

Boeing recently demonstrated the power of integrated measurement systems for its U.S./U.K. government customer when it built a full-scale JSF stealth-validation aircraft model using no tooling except for simple holding stands. By eliminating the need for skin-placement tools, the company avoided more than 600 hours of tool design and fabrication time.

Boeing also is integrating several different computer-aided measurement systems in a common user interface. This reduces training time by approximately two-thirds and helps operators gain proficiency in multiple systems.

"Our goal has always been to build quality into the process," Massie said. "These improvements are helping us reach that goal and save money."

Wireless communication will give measurement-system operators immediate access to drawings, status reports, web pages, e-mail and all other traditional desktop features upon demand at the work site. This information will be stored as part of the advanced configuration management system Boeing established for the JSF. Wide access to this common database will enable a "design, build, support anywhere" philosophy.

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