

Lockheed Martin JSF Shows Robustness Of Stealth Materials And Design; Long-Term Savings Could Top \$50 Billion

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The Lockheed Martin Joint Strike Fighter (JSF) team recently completed radar cross-section (RCS) tests of a full-scale highly detailed JSF model, validating its stealthy shape, the resilience of its low-observable (LO) materials and previewing its cost-savings potential.

"This design will cost less to produce and maintain than any previously fielded LO platform," said Frank J. Cappuccio, vice president and program manager for the Lockheed Martin JSF. "We project the Lockheed Martin JSF fleet will cost at least \$50 billion less to maintain than a same-sized fleet with F-117-like stealth designs."

The highly successful tests, using the full-scale Signature Measurement Aircraft (SigMA) model at Lockheed Martin's remote Helendale Measurement Facility in California, showed the robustness of LM Aero's low-observable design, the durability of its LO materials and the ease of their repair. Previous LO programs have used full-scale models in the early development phase, but none has included models like SigMA, which incorporates all the details important to the vehicle's radar cross-section.

After obtaining baseline RCS measurements, the Supportable LO team intentionally inflicted extensive damage to many areas of the SigMA model. The inflicted damage -- more than three dozen significant defects -- represented in type and frequency the cumulative effect of more than 600 flight hours of military aircraft operations.

Stealth engineers from Lockheed Martin and Northrop Grumman characterized the test results as "spectacular." When team members overlaid the RCS curves of the undamaged, damaged and repaired configurations, they found it difficult to determine which curve represented which configuration.

"The cumulative amount of damage introduced to the model represented an extreme combat turnaround condition," said John Schueler, Supportable LO manager for the Lockheed Martin JSF. "In both the damaged and the repaired conditions, the results exceeded our most optimistic expectations."

Repairs proved fast and easy. Shop personnel fixed all the damage in a single eight-hour shift. Similar repairs to a legacy B-2 would have required more than 72 hours.

A critical objective of JSF is to produce a stealthy airplane that stays stealthy in severe combat conditions -- a goal best achieved by building an aircraft that is hard to damage and making sure that anything other than very severe damage does not significantly degrade the RCS. The design must also ensure that any required repairs are rapid and can be performed in a combat environment. In its SigMA testing, Lockheed Martin demonstrated that its JSF incorporates all three characteristics.

"Unlike traditional RCS models that were rigorously protected from damage, no special care or handling rules have been imposed on the SigMA model," Cappuccio said. "Visitors and technicians routinely walk on the model wearing street shoes and work boots. No discernable RCS degradation has been detected as a result of months of such handling."

Lockheed Martin and teammate Northrop Grumman have built upon their collective experience with the F-117, B-2, F-22 and other low-observable aircraft to develop this affordable and supportable stealth design. The companies' innovative thinking has revolutionized the dependability and affordability of stealth characteristics.

Lockheed Martin produces the world's most advanced and successful fighter aircraft, including the F-22, F-117 and F-16. The company, in partnership with Northrop Grumman and BAE SYSTEMS, is in

competition to build the JSF for the United States and Great Britain. A government panel will choose the winner in 2001.

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