Durability testing and monitoring structural performance

Solution requirements:
- Comprehensive environment to rapidly share and process secure test data among several partners across the globe.
- Generate reports automatically.
- Scalable solution to analyze and manage the massive volumes of test data.

Lockheed Martin Full Scale Testing
Since early 2006, Lockheed Martin has utilized nCode software for the monitoring, collection, analysis and management of data for F-35 Joint Strike Fighter full-scale test articles. nCode Automation software is used to analyze and manage data from two distinct full-scale test scenarios: “static” tests that apply worst case loading conditions and “durability” tests that repeat the loading of thousands of load steps to replicate several lifetimes of the aircraft in service.

Lockheed Martin selected nCode Automation as their solution for a secure system that allows engineers to:
- Manage, search for, access and examine key test data using nCode Automation for secure, web-based technology.
- Download data sets on-demand for analysis from a single web-based source and report preliminary results back.
- Upload and share data with multiple project partners while also conforming to the required ITAR regulations.
- Perform a full range of automated time, frequency, statistical and fatigue analyses using nCode GlyphWorks to indicate where behavior of the structure is changing over time, indicating a crack or other system issue.

Results:
- Set new industry standard for static and durability test schedule performance.
- Full Airframe and HT component tests for F-35A and F-35B variants completed 5 months ahead of baseline schedules.
- Schedule savings allowed incorporation of expanded capability tests without impact to flight clearance support.

“nCode products have served as a catalyst to accelerate the test program. nCode has enabled us to perform the post processing of over 4,000 channels of test data significantly faster than legacy programs. Most importantly, nCode delivers high quality results from which we are able to base key decisions.”

– Marguerite Christian
Senior Manager of F-35 SD Structures Test IPT

Comparison of Full Scale Static Test Spans

Static Testing Achieves Unprecedented Rates
The F-35 Static and Durability testing program is bigger than any program in the history of Lockheed and is being performed at faster rates than historical programs.

The results of deploying the nCode Automation systems was seen immediately with almost 200 calendar days saved over the already aggressive timeline of the first static test article and similar success has been repeated in subsequent static and durability tests.

nCode Automation has provided a common format used by all partner teams worldwide to assist with mitigation and resolution of test anomalies - reducing down time and delivering cost savings in comparison with previous legacy aircraft structural tests.”

– Marguerite Christian
Senior Manager of F-35 SD Structures Test IPT

www.hbm.com/ncode
About HBM nCode products

nCode products are provided by HBM, a world-wide technology and market leader, offering products and services across the entire measurement spectrum, from virtual to physical. For over 25 years, nCode has been the leading brand for durability and data analysis solutions. Its technologies aid customers understand product performance, accelerate product development and improve design. The company’s Product Lifecycle Performance portfolio comprises tools which enable data acquisition in the harshest environments, analysis of the most complex test data sets, and optimization of product durability. The power and ease of use of HBM technologies is a direct result of its world-class development process, expertise and in-depth experience of a broad range of industries. nCode product development is ISO9001 certified. Product support is available through nCode offices in Europe, North America and Asia. For more information, please visit www.hbm.com/ncode.

About Lockheed Martin Aeronautics

Lockheed Martin Aeronautics' core capabilities are in the design, production, and sustainment of advanced military aircraft and related technologies.

Current aircraft programs include the F-35, F-22, and F-16 combat aircraft; C-130 and C-5 airlifters; P-3 and U-2 reconnaissance/surveillance aircraft. An Advanced Development Programs (ADP) group, also known as the Skunk Works®, has principal responsibility for Research and Development, new products, and defining upgrades to existing products. Lockheed Martin Aeronautics offers its customers performance-based total life cycle capabilities. These are fully integrated with production programs that offer enhanced aircraft readiness for customers worldwide. Specifically, Lockheed Martin Aeronautics provides aircraft maintenance repair and overhaul; upgrades and modifications; supply chain management; sustainment engineering; and training and support.

Headquartered in Bethesda, MD, Lockheed Martin is a global security company that employs about 126,000 dedicated men and women worldwide; and is principally engaged in the research, design, development, manufacture, integration, and sustainment of advanced technology systems, products, and services.

The Corporation’s New York Stock Exchange symbol is LMT. Web address is www.lockheedmartin.com

Measuring thousands of strain channels on F-35 Lightning II Joint Strike Fighter test article