

Technology Opportunity

Technology Transfer & Partnership Office

TOP3-00229

Structural Static Laboratory (SSL)

Technology

The Structural Static Laboratory (SSL) at NASA Glenn Research Center performs testing to verify the structural integrity of space flight and ground test hardware. The SSL also verifies modes of failure when the design is subjected to simulated service loads.

Benefits

- The lab staff provides customer support including: test plans, fixture design, instrumentation requirements, test article inspection and final test reports
- Testing can be performed to verify finite element analysis by measuring stiffness and induced stress points in a test article
- Design time and money can be saved by providing readily available testing of crucial structural design elements
- Multi-axis load testing of large structures for flight certification

Commercial Applications

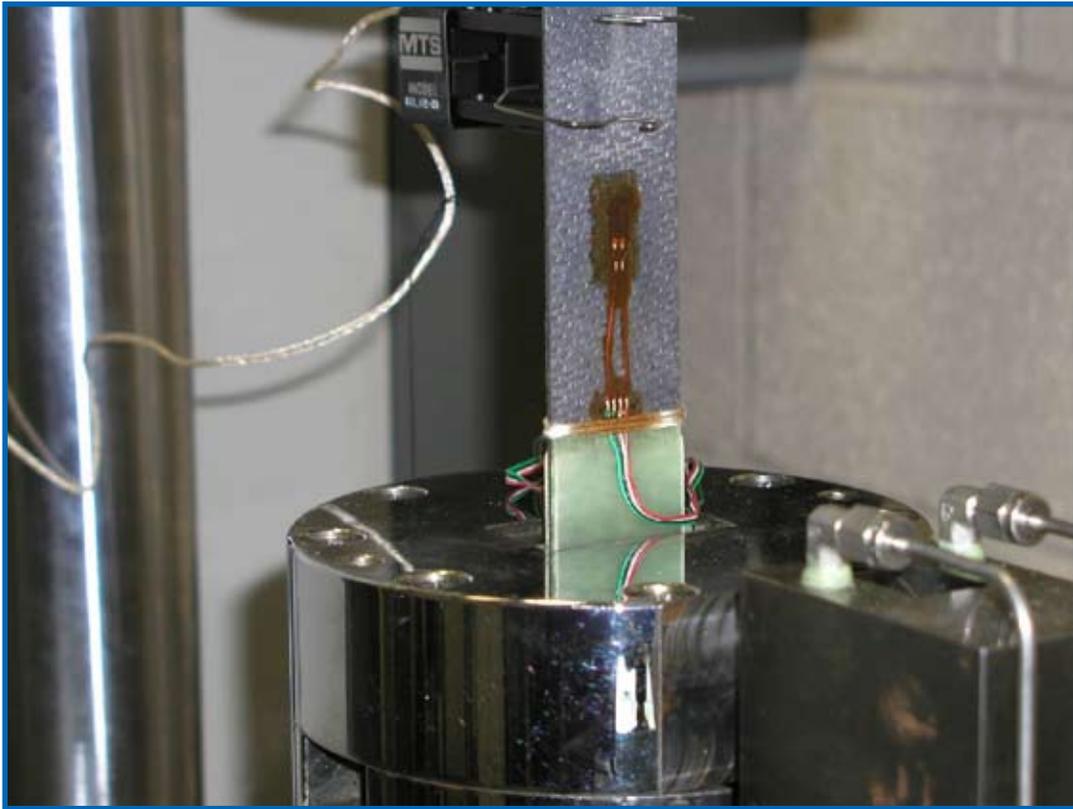
- Flight qualification of aircraft and space flight structures
- Testing to develop mechanical strength data for composite materials and adhesive joints

Technology Description

A hydraulic system capable of 3,000 psi pressure provides the SSL with the power to do structural testing of small and large test articles. A state of the art MTS TestStar IIM digital controller provides extensive testing capabilities and accurate data acquisition. Structural testing capabilities include: tensile, compression, bending, creep and creep fatigue, and high and low-cycle fatigue testing. Hydraulic cylinders are capable of developing loads of 20,000 pounds on the axes, simultaneously. The SSL is also outfitted with a tensile machine that can develop mechanical properties in metallic and composite coupons, adhesive and weld joints at up to 1,300 °F. A high temperature laser extensometer can be used to give accurate strain data during tensile testing at elevated temperatures. Complex test such as: multi-rate ramps and block loading are also possible.



A jet engine fan case being subjected to a four axis structural test in the SSL.



Carbon matrix composite material with high temperature strain gage mounted in load fram (oven not shown).



International Space Station FastMast structural testing.

Facility Testing Information

<http://facilities.grc.nasa.gov>

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Key Words

Structural static laboratory

Multi-axis loading

High temperature

Structural testing