Composites Fabrication Facility

Purpose:

To fabricate composite parts for space applications through the use of advanced manufacturing techniques.

The Automated Tape Wrapping Research Cell

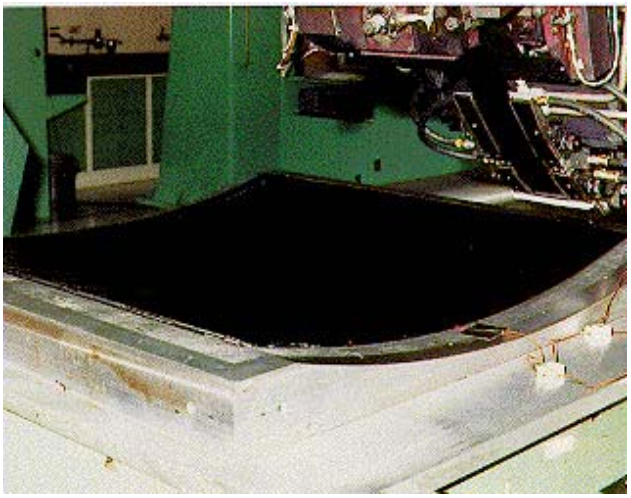
The Automated Tape Wrapping Research Cell supports the development of improved solid rocket motor nozzle manufacturing techniques. Extreme heat and pressure are applied to carbon-fiber tape and phenolic resin during the tape wrapping process to consolidate many layers into one uniform part. Nozzles and test articles are fabricated using a horizontal, computer controlled tape wrapping machine capable of producing components 2.5 m in length by 1.5 diameter. A laboratory is adjacent to the cell to determine chemical and physical properties of materials. The tape wrapping machine interfaces with a computer network that provides data collections, off-line programming and graphic simulation.

Pultrusion Equipment

The Pultrusion Equipment is controlled by a microprocessor and is capable of forming parts of any desired length and geometry. A cross section up to 30 cm square is possible. The equipment interfaces with both microcomputer and mainframe computers for data collection and analysis.

Fiber Placement Machine (FPM)

The Fiber Placement Machine provides the capability to build complex axisymmetric composites parts with concave or convex shapes. The tools used to build parts can be up to 48 feet in length and 36 inches in diameter with a maximum weight of 20,000 pounds. A method for producing part tools by mounting a cutting head on the FPM and machining the tools out of chucks of lightweight foam has been developed. Parts that have been fabricated on the FPM include: tubes, aircraft inlet-ducts, think walled tubes, human powered submarines, flat panel for testing, and Reusable Solid Rocket Motors (RSRM) nozzle overwraps.



3-D Automated Tape Layering Research Cell

The 3-D Automated Tape Layering Research Cell offers precision placement of composite tape strips to form parts, using a variety of advanced composite materials. Parts as large as 3 m wide and 10 m long can be constructed utilizing the 3.6 m gantry to lay 76 or 152 mm tape widths at speeds approaching 30 m / min. With ten axes and three sensory systems, the tape head will lay tape on a flat or contoured surfaces with far greater control and precision than manual methods. Interfaced with a mainframe computer and graphic system, tape-laying sequences can be optimized off-line before execution on the machine.

Point-of-Contact:

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