



PROPULSION TEST PROJECTS

Shuttle Orbiter Program

Space Shuttle Rocket Engine and Component Repair and Acceptance Tests - White Sands Test Facility (WSTF) repairs and refurbishes space shuttle hypergolic system rocket engines and components. Some original equipment manufacturers no longer exist or do not support the space shuttle program. WSTF has become key to assuring that the shuttle continues to fly.

The site is currently performing complete refurbishment of Primary and Vernier Reaction Control Subsystem (RCS) thrusters, Orbital Maneuvering Engines (OME), and other complex components. This effort includes disassembly and repair of valves and replacement of major electrical components and chambers.

Acceptance test firing are performed to verify that engines are acceptable for manned space flight after the WSTF Component Test Facility repairs or refurbishes them.

Space Shuttle Orbital Maneuvering Subsystem/RCS Fleet Leader Test Project - This program periodically subjects three test articles—the Forward and Aft Reaction Control Subsystems (FRCS and ARCS) and the Orbital Maneuvering Subsystem (OMS)—to operating cycles, propellant exposure, and maintenance operations that closely simulate mission and turnaround activity while accumulating life in excess of the space shuttle flight vehicles. The program is designed to detect shuttle OMS and RCS life-dependent failures and anomalies before they impact the shuttle fleet. Data from the program extend component life and expand operational limits. The test articles are also used to investigate on-orbit anomalies and evaluate procedural and hardware design changes. The program was expanded in 2003 to include an Improved Auxiliary Power Unit (IAPU) Fleet Leader test article.

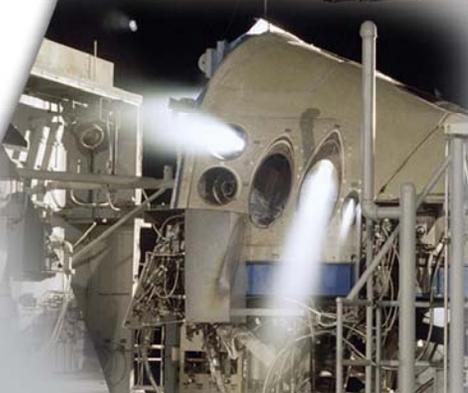
IAPU Qualification - A series of runs at various hydraulic loads under ambient and simulated altitudes are performed to qualify improvements of the IAPU. Sufficient tests to qualify the IAPU for 75 hours between rebuilds have been completed, and continuation of the program to achieve 100 hours between rebuilds resumed in 2003.

Oxidizer Molecular Sieve Project - A new molecular sieve material to remove water and iron oxide from nitrogen tetroxide was evaluated, thus minimizing corrosion problems. Data from a small unit test indicated excellent results. A larger unit was fabricated and installed at the Kennedy Space Center to support shuttle launches.

DEPARTMENT OF DEFENSE PROGRAMS

Liquid Propellant Program - Provides propellant-handling support and hands-on training in hypergolic propellant handling to customer project personnel in preparation for transportation operations.

McDonnell Douglas Delta II Upper-Stage Engine Qualification - A 9700-lbf thrust bipropellant engine was tested to qualify an upgraded ablative combustion chamber and nozzle for the Delta II. This test was performed at simulated altitude and emulated a flight firing profile.



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Minuteman Aging and Surveillance Tests – Simulated mission duty firings are conducted on the Minuteman Post-Boost Propulsion System to ensure the system has not degraded during years of storage.

NASA DEVELOPMENT PROGRAMS

Pad Abort Demonstrator (PAD) – Integration of the PAD vehicles, including the technologies being demonstrated for ultimate use in the Orbital Space Plane, will be conducted at WSTF. In addition, WSTF will be supplying most of the ground support equipment and part of the launch and landing team for flights to be conducted by the Army at White Sands Missile Range.

Non-Toxic Reaction Control Thruster and OME Testing - A program to develop OMS and RCS propulsion systems for the Next Generation Launch Vehicle has been in work for years at WSTF. Single engine testing that demonstrated ignition characteristics and the ability to provide two thrust levels (roughly equivalent to the shuttle vernier and primary thrusters) from a single engine has been demonstrated. The propellants are liquid oxygen (LOX) and ethyl alcohol. The test article to demonstrate multiple RCS thruster firing locations was tested in 2004. Thermal control and quality of the LOX is a prime concern of this program due to the potentially long feed lines in the next vehicle.

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