National Aeronautics and Space Administration

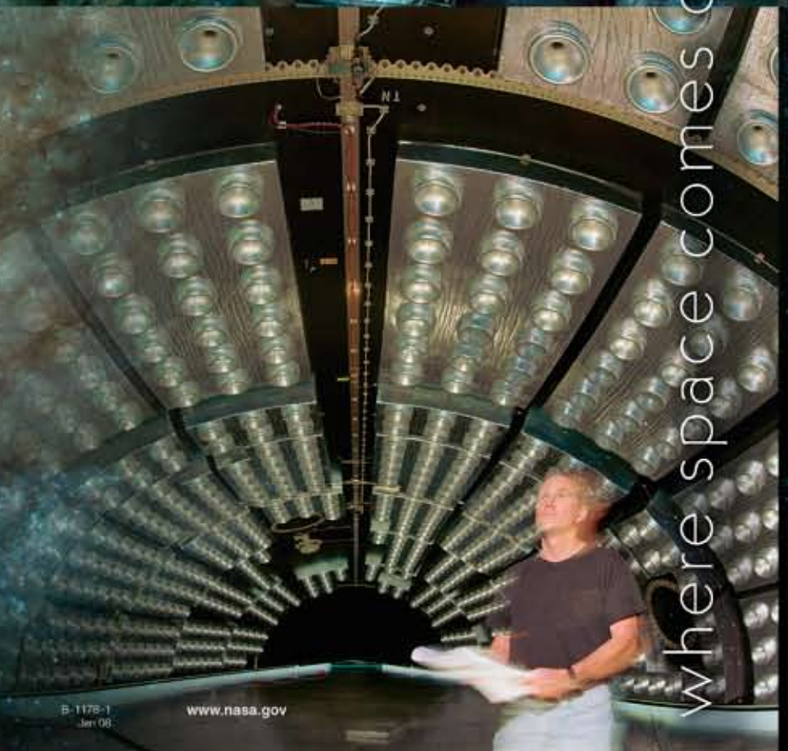
NASA

PLUM BROOK

NASA and other national and international governmental and private sector users, with the help of experienced researchers and staff, use Plum Brook facilities to safely and effectively develop, test, and prove advanced Earth and space technologies.

Plum Brook's world-class facilities are capable of emulating environmental conditions like those found on Earth, in low Earth orbit, on planetary surfaces, or in deep space.

http://plumbrook.grc.nasa.gov/



where space comes down to earth

Plum Brook Station, a field station of NASA Glenn Research Center near Sandusky, Ohio, encompasses over 6400 acres of controlled land.

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Space Power Facility

The Space Power Facility (SPF) is the world's largest space environmental simulation chamber, measuring 100 ft in diameter by 122 ft in height. This cathedral of a facility was designed to test nuclear and nonnuclear space hardware, fully simulating the low-Earth-orbit and deep-space environment except for gravity. The facility can simulate the conditions in space and on other planets such as low vacuum, low temperatures, and solar radiation. The facility can also simulate the conditions of launch and flight ascent to orbit with its new mechanical vibration test stand, acoustic chamber, and EMI/EMC (electromagnetic interface/electromagnetic compatibility) capability. The SPF's wide-ranging capabilities have been extensively used to test rocket payload fairings, orbital hardware including International Space Station systems, and planetary landing and surface systems such as the Mars Exploration Rover landing systems.

Spacecraft Propulsion Research Facility

The Spacecraft Propulsion Research Facility (B–2) is the world's only facility capable of hot firing full-scale, upper-stage launch vehicles and rocket engines under simulated high-altitude or space conditions. The 38- by 62-ft chamber and extensive supporting systems have also performed tests on equipment such as small research engines, high-altitude balloon payloads, and Mars rover airbag balloon landing systems. A test article can be exposed for indefinite periods to environmental conditions ranging from ground conditions on Earth to the low ambient pressures, low background temperatures, and dynamic solar heating that hardware will encounter during launch, orbital, or interplanetary travel.

Plum Brook's wide range of capabilities, supported by expertise and facilities at Glenn Research Center, provide complete support for ground testing of technology, from proof of concept to final verification:

- The appropriate physical environment, that is, large facilities and grounds for full-scale testing (control buildings outside the exclusion areas for the B–2, CTC, and HTF allow for safe testing of dangerous articles)
- Availability of ample quantities of liquid hydrogen, oxygen, and nitrogen, as well as gaseous nitrogen, helium, and other storable fuels and gases
- Exceptional energy and power resources

Plum Brook's experienced onsite technical staff provides design, fabrication, installation, and operations support. Test facilities are highly reconfigurable to meet a broad range of test requirements and parameters, giving the customer the utmost flexibility in designing comprehensive test programs.

Visit us on the Web at

http://plumbrook.grc.nasa.gov/

Cryogenic Test Complex

The Cryogenic Test Complex (CTC) encompasses the 25-ft-diameter chamber of the Cryogenic Propellant Tank Research Facility (K-Site), as well as a new, state-of-the-art facility for research, development, and qualification of cryogenic materials, components, and systems. CTC buildings and systems are ideally suited for high-energy, high-risk research on cryogenic systems utilizing liquid hydrogen, oxygen, and nitrogen. Testing includes chilldown; seal, bearing, and turbopump tests; fluid densification; and thermal-vacuum testing of spacecraft subsystems, sensors, probes, tanks, and insulation.

Hypersonic Tunnel Facility

The Hypersonic Tunnel Facility (HTF), originally designed to test nuclear thermal rocket nozzles, is presently configured as a hypersonic (Mach 5, 6, and 7) blowdown, nonvitiated (contamination free), freejet, or direct-connect facility to test large-scale, hypersonic, air-breathing propulsion systems. The HTF's large experimental infrastructure—megawatt-level thermal heating, cooling, and electrical systems and large-capacity gas storage—can be readily reconfigured for a variety of high-energy, high-risk ground-testing applications. Test articles in the 25-ft test chamber can experience multiple gas flow inputs up to 220 lb/sec at temperatures and pressures up to 3600 °R and 1200 psig and altitude conditions up to 120 000 ft.