

NTS Market Spotlight: Aerospace

Specialists in Satellite and Space Hardware Testing



5000 square foot Acoustic Noise Reverberation Chamber



1500 cubic foot Thermal Vacuum Chamber



Cloudsat Spacecraft Radar Antenna undergoes Force Limited Vibration Testing

Engineering and Evaluation

NTS' advanced test capabilities have allowed our participation in every major space project since the inception of manned space exploration. NTS performs research and development, testing and system evaluations on a wide range of aircraft, vehicles, systems and components. Test capabilities include dynamic response, acoustic intensity and modal analysis on aircraft structures and systems; evaluation of electronic and hydraulic systems for advanced aircraft and vehicles; severe environment and hazardous flow tests.

Extreme Environmental Simulation

NTS leads the industry in testing associated with space vehicles, hardware, and satellite technology. For fuel cells, solar panels, composite antennas, batteries and various mechanical and electronic devices, NTS can design and develop custom chambers and fixtures to conduct a complete range of space related phenomena. Capabilities include: vacuum, space simulation, vibration, shock, acoustic noise, acceleration, bake-out, thermal cycling in drive-in chambers, (including photogrammetry and low oxygen capability) and aging at 125°C/minute transition rate, structural, pressure, helium leak and EMC. Climatic and space simulation provides for demanding test requirements with combined environments of temperature, altitude and humidity. Thermal vacuum chambers provide temperature extremes from -320°F to 1000°F, with combined ambient pressures of 1×10^{-8} TORR. Salt/fog, Sulfur Dioxide, and Copper Chloride chambers are sized up to 6' x 10' x 8'. Explosive atmosphere chambers simulate 100,000 feet and temperatures to -320°F.

Precision Cleaning

NTS has extensive capabilities in the precision cleaning of component parts, assemblies, piping, pressure vessels, heat exchangers and an array of other space hardware. Other processes include pickle and passivation, deoxidation, cryogenic testing, helium leak testing, pressure testing, vacuum bake-out, and many other ancillary specialized services. NTS services range from commercial oxygen cleaning to ultra high purity processing, including analysis for particles and non-volatile residue on virtually any material including stainless steel, aluminium, titanium, beryllium and modern composites. NTS also provides specialized packaging of cleaned and tested hardware.

About NTS

National Technical Systems is a trusted partner that helps organizations to access domestic and international markets. We are your single source for a full range of integrated engineering solutions, product testing, standards compliance, project management, and managed services. Globally accredited by leading regulatory agencies, NTS can provide cost-effective programs to meet your requirements — at your site, or at one of our many U.S. or international facilities. NTS is the nation's largest independent standards compliance and product testing company, serving companies within a variety of markets.



Contamination analysis and leakage tests are critical to space programs



Large Selection of Temperature / Humidity Chambers



National Technical Systems
1536 East Valencia Drive
Fullerton, CA 92831

www.nts.com | 1.800.270.2516
sales@nts.com

Highlights and Primary Specifications

Vibration

- ▶ Range: Small (100 force pounds) to Large (dual shaker 70,000 force pounds)
- ▶ Type: Sine, Random, Classical Shock, External Pulse, Sine on Sine, Sine on Random, Random on Random, Tear Drop Sine Pulse, Transient Capture
- ▶ Displacement: Up to 1 3/4" electrodynamic and 15" hydraulic
- ▶ Instrumentation: Accelerometers, force transducers and strain gauges.
- ▶ Data Capture: 96 channels active, unlimited with digital tape deck.
- ▶ Seismic system with 10.5 inch stroke, 14,000 force-lb, DC to 500 Hertz

Acceleration

- ▶ Acceleration up to 750 g's, from 2 to 25 foot radius, 200 channels of slip rings
- ▶ Centrifuge load capacity up to 5,000 lbs

Pyro Technical and Mechanical Shock

- ▶ Simulated pyro shock (hammer and beam) to 6,000 g's
- ▶ Metal to metal impact
- ▶ True ordnance
- ▶ Drop tower 120 g's at 11 ms
- ▶ Shaker Shock UD R24 high velocity 2" displacement

Acoustic Noise

- ▶ Progressive wave, reverberant chambers: emission measurements or high level noise
- ▶ 3 Reverberation Chambers: 90, 126, 5000 cubic feet, sound levels to 165 dB
- ▶ 3 Progressive Wave Tubes, Greater than 174 dB using progressive wave tube
- ▶ Primary specifications: MIL-STD-810, MIL-STD-740, MIL-STD-1540, custom

Thermal Vacuum

- ▶ Size: Small (12" diameter) to Large (10' diameter, 12' long)
- ▶ Temperature Ranges: -170°C to +375°C, Pressure range to below: $1e^{-7}$ Torr
- ▶ Up to 300 channels mixed (voltage, thermal couple, RTD, strain, resistance, current)
- ▶ Analysis: TQCM, CQCM and RGA available
- ▶ Pumping system: Roughing: Oil free or oil with molecular trap. High Vacuum: Turbo molecular or cryogenic.

Ambient Pressure Cycling

- ▶ Size: Small (1 cu. ft.) to Large (4100 cu. ft.) Temperature Range: -185°C to +250°C
- ▶ Ramp/transition rate up to +/-125°C per minute (controlled not temperature shock)
- ▶ Dew Point: Measured to below -50°C (maximum)
- ▶ Oxygen content: Measured to less than 5 parts per million
- ▶ Up to 300 channels mixed (voltage, thermal couple, RTD, strain, resistance, current)

Explosive Decompression & Explosive Atmosphere

- ▶ MIL-STD-810 compliant (less than 100 milliseconds)
- ▶ Up to 6' diameter 20' long, MIL-STD and RTCA/DO-160 compliant

Helium Leak, Proof Pressure, Cryogenic Proof

- ▶ External Pressure to 50,000 PSI hydrostatic
- ▶ Internal Pressure to 50,000 PSI hydrostatic to 20,000 PSI pneumatic
- ▶ Ultra Test Helium Leak Test Rate 1×10^{-5} to 1×10^{-10} scc/sec
- ▶ Rupture and Burst Test