MightySat II.1

a standard-interface demonstration smallsat

The MightySat II program, a joint DoD Air Force Space Test Program (SMC Det 12/ST) and Air Force Research Laboratory (AFRL) endeavor, was conceived to provide a small, economical space demonstration platform enabling the rapid transition of some of the nation's most advanced technologies in imaging, communications, and spacecraft bus components from the laboratory to space flight operations.

General Dynamics designed and manufactured an innovative spacecraft with modularized interface features, such as VME-based subsystems and a bolt-on planar payload deck that accommodated small experimental payloads economically and on a shortened schedule.

Successfully launched in July 2000 from Vandenberg Air Force Base aboard a Minotaur launch vehicle, MightySat II.1 carried ten experiments, including the Fourier Transform Hyperspectral Imager. MightySat II.1 successfully completed its one year mission and the demonstration of all experiments. The spacecraft continued to function until its natural reentry into the atmosphere in November 2002 at well over twice its design lifetime.

Features

- SMC and AFRL Joint Project
- Economical, Rapid Access to Space
- 123.7 kg (272.7 lbm) at Launch
- 330 W EOL Solar Array
- 556 km (300 naut mi) Orbit at 97.6° Inclination
- Three-Axis Stabilized, ZMB
- Modular Bus with Separate Bolt-On Payload Deck
- IEEE VME Architecture
- Launched July 2000 with One-Year Design Life
- De-Commissioned by Natural Orbital Decay in November 2002, Still Functioning, at 233% of Design Life
- 2 Gbit Solid State Recorder for Science Data
- SGLS/AFSCN Down-Links
- OSP-2 (Minotaur) Launch Vehicle

Performance Characteristics*

General	Dimensions, Stowed: 0.67m W x 0.83m L x 0.86m H (2.2 x 2.7 x 2.8 ft) Orbit: 556 km (300 naut mi) circular @ 97.6° inclination Propellant On Board: *None* Design Reliability & Life: 0.8 @1 year Launch Date and Vehicle: 19 July 2000 on a Minotaur (OSP-2)
Mass & Power	Launch Mass: 123.7 kg (272.7 lbm) Bus Mass: 87.1 kg (192.0 lbm) Power Load (OAP): 90 W bus; 60 W PL Solar Array: Si, 2-axis articulated, 330 W EOL Battery: 12 amp-hr, NiCd
C&DH	RAD6000 CPU @ 20 MIPS, IEEE VME backplane 128 MByte CPU RAM, 21.6 MBytes/sec transfer rate 2 Gbit Solid State Recorder for Science Data
ADCS	3-axis stabilized with RWA's, Zero Momentum Biased (ZMB) Sun sensor, star tracker, IMU Pointing Accuracy (3σ): 648 arcsec Pointing Knowledge (3σ): 540 arcsec Attitude Jitter (3σ): 15.7 arcsec/sec
Structure & Thermal	Composite primary bus structure Paraffin wax deployment mechanisms Passive, cold-biased system using local radiators Thermostatically controlled heaters (contingency only)
Comm Links	SGLS compatible 1 Mbps DL for payload/experiments data 2.0 kbps Command UL 20 kbps Telemetry DL
Instrument Info	Stand-Alone Experiments/Sensors: Kestrel Fourier Transform (Visible) Hyperspectral Imager Quad TMS320C40 (QC40) Floating Point Digital Signal Processor DARPA-Aerospace sponsored PicoSat Launcher Assembly Shape Memory Alloy Thermoelastic Tailoring Experiment Starfire optical reflectors for use with Kirtland's Starfire Optical Range Engineering/Experimental Bus Components: The NRL miniature SGLS Transponder (known as the NSX) The Multi-functional Composite Bus Structure Solar Array Concentrator Advanced Composite Solar Array Substrate Solar Array Flexible Interconnect

*Data reflects actual performance, or current best estimates, as of: 11/5/05, Rev A

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