SDL/10-153E

NOVA TEST FACILITY

NANOSAT OPERATION VERIFICATION & ASSESSMENT TEST FACILITY

The Space Dynamics Laboratory's (SDL) advanced NOVA test facility characterizes and verifies subsystem and system performance of small satellites up to 12 kg. The NOVA test facility provides testing to reduce preflight risk and verify requirements and is designed specifically for CubeSat-sized components and systems. NOVA augments SDL's manufacturing, environmental testing, and calibration facilities, offering comprehensive testing capabilities and expertise for this class of small satellites.

Test Facility

CAPABILITIES	FOR TESTING
High-accuracy mass properties testing for measurement of mass, center of gravity (CG), & moments of inertia (MOI)	• Component mass, CG, & MOI • System mass, CG, & MOI
High-accuracy, 3-axis magnetic field generation with real-time closed-loop control & zero-gauss chamber for magnetometer calibration	• Accuracy & alignment of magnetometers • Torque & alignment from torque coils & permanent magnets
Motor speed & torque measurement	• Reaction wheel, control-moment gyro, momentum wheel, or similar system characterization & performance
Sun simulator with two-axis precision control	• Sun sensor system characterization & performance
Solar illumination simulator & NIST-traceable pyranometer	• Solar panel power output verification • System testing using self-generated power (test algorithms, controls, interfaces)
Solar array simulator & battery/charger simulator	• System testing using simulated power (test algorithms, controls, interfaces)
Hardware-in-the-loop (HWIL) system testing	• Test & verification of system interfaces, algorithms, & flight software • Component test stations provide for a high-fidelity HWIL model

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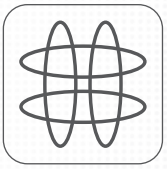
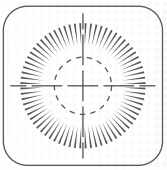


The magnetic test cell for torquer coils and magnetometers uses a 3-axis Helmholtz cage with a field which can be rotated in real time using closed-loop control to within 10 nT. The 2 m cage provides a 60 cm working volume. Dual differential magnetometers and a zero-gauss chamber will provide highly accurate results.

The reaction wheel test cell measures wheel speed very accurately using 400 MHz sampling, derives the torque analytically, and enables characterization of wheel jitter.

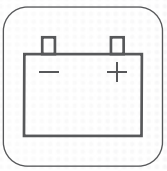
The solar panel test cell provides a continuous AM0 light source to verify the power output of the solar arrays to a class BBA (IEC 60904-9). A NIST-traceable pyranometer is used to measure the light intensity in the target area.

The solar array simulator test cell provides a programmable DC power source that simulates the output characteristics of a solar array. The simulator provides up to 2 outputs and up to 1200 W.



The sun sensor test cell uses a simulated sun source and a 2-axis gimbal with 0.002° repeatability and 0.01° accuracy.

The mass properties test cell features load cells and kinematic mounts to obtain the measurements needed to verify and refine the calculations from the CAD models, and to statically balance the spacecraft. Mass can be measured within 2 g and the center of gravity to within 1 mm.



A dual-channel battery/charger simulator provides output characteristics identical to output from traditional batteries.

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