

Design, Integration, and Testing of a Robotic Lunar Lander Test-bed

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Abstract:

The Von Braun Center for Science and Innovation (VCSI) is currently involved in the development and implementation of a Lunar Lander Test Bed (LLTB), a robotic lunar lander prototype designed to demonstrate various technological capabilities required for future robotic exploration missions to the moon and beyond. The LLTB is designed to demonstrate the ability to hover, maneuver, and land autonomously using only onboard avionics, sensors, and control algorithms. The LLTB is a precursor project to the International Lunar Network (ILN) which will mandate such capabilities.

Project Overview:

The LLTB project is being conducted in support of the International Lunar Network (ILN), a proposed network of robotic probes supported by NASA and other space agencies to be launched to the moon in the 2010s to conduct lunar science. The LLTB was designed with an "ILN-like" thruster configuration, avionics, and software environment, with the goal of demonstrating controlled autonomous flight/hover capability for 10 to 14 seconds. The LLTB will ultimately serve as a test platform for the integration of future robotic lander components and software.

Current Work:

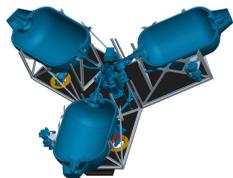
- Integration of avionics components with LLTB platform.
- Preparation of test facilities on Marshall Space Flight Center for LLTB flight testing
- Preliminary testing and debugging of system circuitry, avionics, and hardware components, including sensors, valves, pressure vessels, and thrusters.

Future Work:

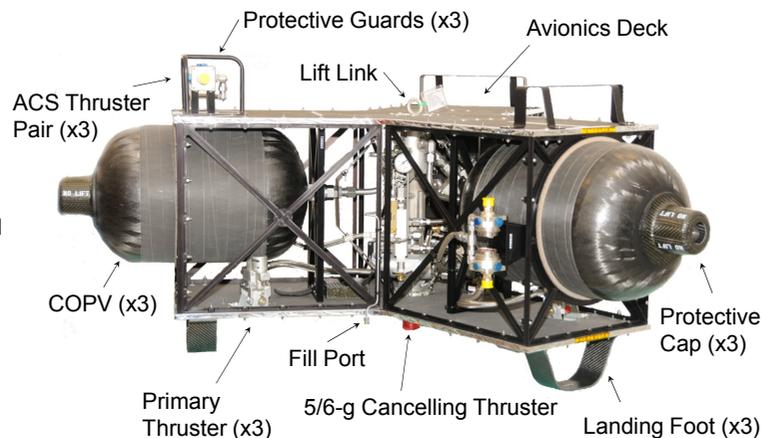
- Strap-down, tether, and free-flight testing of LLTB.
- Development and Implementation of a Second Generation LLTB platform featuring a hot-fired propulsion system capable of more massive payloads, better performance, and longer flight times.



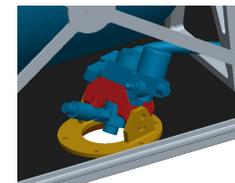
6000 PSI Composite Overwrapped Pressure Vessel



Cutaway of cold-fired propulsion system



5/6-g cancelling thruster



Primary Thruster



ACS Thrusters