

Team Callisto

Principal Investigators

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Scientific Objective

A lunar dust accumulation analyzer which consists of two parts: a magnetic sensor, which will provide answers about the magnetic properties of lunar dust, and a set of solar cells to determine how fast dust accumulation takes place by calculating the net voltage drop from the cells. This experiment will provide information on the possible effects of lunar dust, an important consideration for the future of energy production.

Specifications

Dimensions: $\Phi 62\text{mm} \times 116\text{ mm}$

Mass: 62 grams

Power: 3W

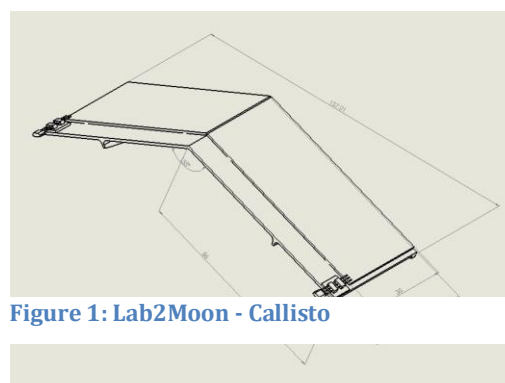
Operating Voltage: 5V

Operating Temperature: -40°C to $+60^{\circ}\text{C}$

Storage Temperature: -65°C to $+120^{\circ}\text{C}$

Data Interface: RS-485

Specimen: N/A



Mission Description

Using a current sensor and a voltage sensor, readings can be obtained from the solar cells and graphs can be plotted between time and current. As the module is being exposed to the harsh environment of the moon, dust accumulation starts occurring. As a result, an increase in net magnetization can be observed. With the use of a magnetic sensor, the change in magnetization can be plotted.

Mission Operations

The payload is located on the main deck, looking S-SW. The entire experiment will be conducted in multiple modes. Overall, the experiment is a passive one. And for the solar cells to be operable, the sun has to be incident on it, which is Day 8 to Day 11. Readouts are taken once every hour on Day 3 and Day 8 to 11 for magnetometer and solar cells respectively.



Heritage Experiments

Reference Mission Name	Reference Mission Specifics	Lab2Moon Mission Specifics
The effects of lunar dust accumulation on the performance of photovoltaic Arrays [C. Katzan, 1991]	Observes the effect of lunar dust on photovoltaic cells	Calculates rate of accumulation and magnetic flux density of lunar dust to model a sintering process. Hence, a wider range of applications
The Lunar Atmospheric Composition Experiment (LACE), Apollo Mission, NASA	Observes the composition of gases in the lunar atmosphere	Observes the dynamic nature of dust on the lunar surface, which was a tough problem during the Apollo Mission

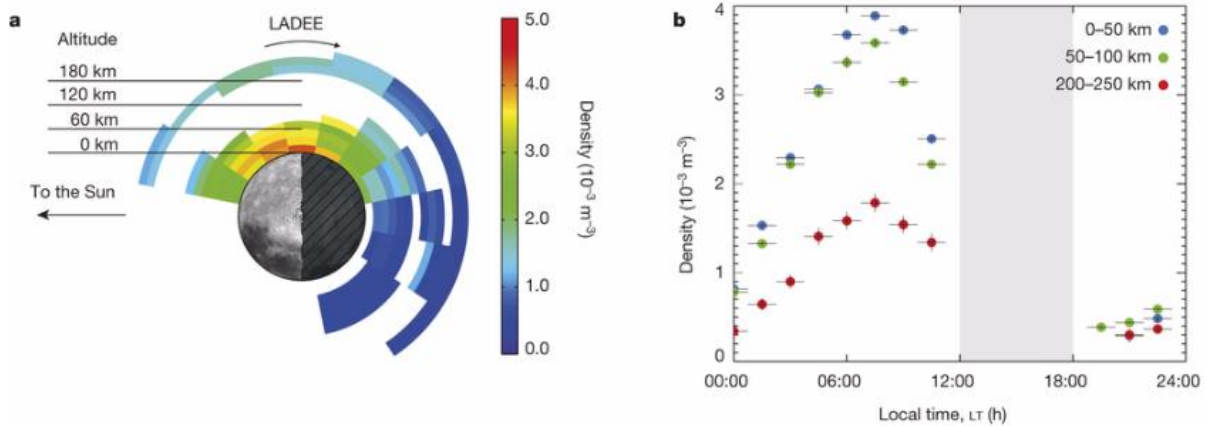


Figure 2 Lunar Dust Accumulation on the Lunar surface, Data by LADEX, NASA