

Marshall Space Flight Center: Lunar Regolith Terrain (LRT)



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Figure 1. Oblique view of MSFC's Lunar Regolith Terrain (LRT) field

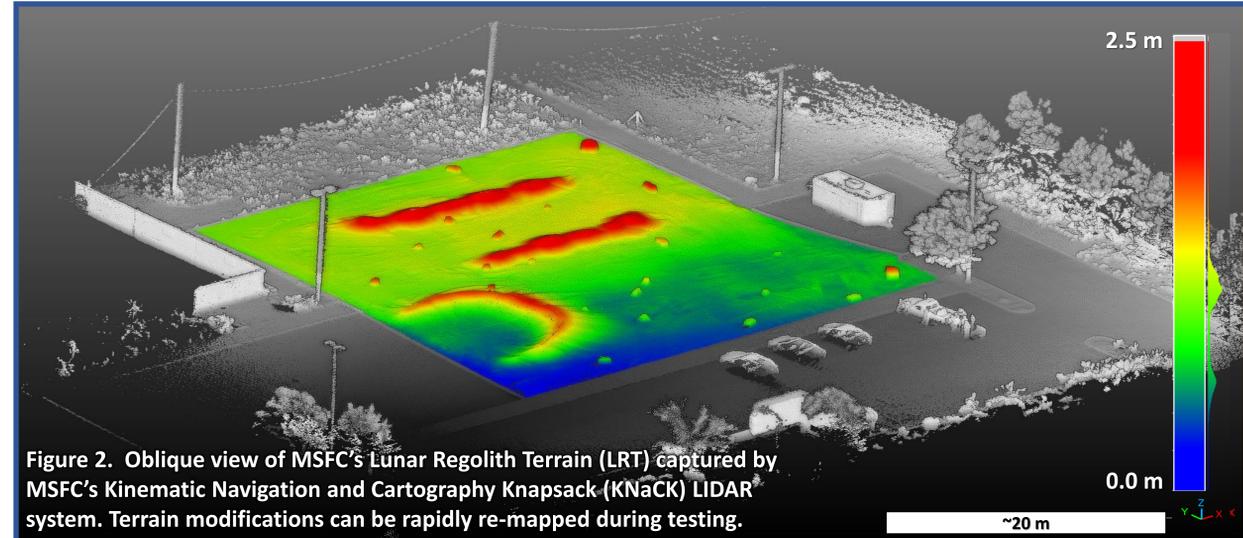


Figure 2. Oblique view of MSFC's Lunar Regolith Terrain (LRT) captured by MSFC's Kinematic Navigation and Cartography Knapsack (KNaCK) LIDAR system. Terrain modifications can be rapidly re-mapped during testing.



Figure 3. Removable Full-size Pallet Lander Mockup for rover deployment



Figure 4. Onsite tractor for rapid terrain modification.

Lunar Regolith Terrain (LRT) Description:

The Lunar Regolith Terrain field is an outdoor planetary analog environment facility located on base at MSFC:

- Applies a lunar regolith simulant of JSC-1A feedstock material (volcanic cinder sand sourced from Meriam Crater, Flagstaff, AZ) with representative geotechnical, geochemical, and optical properties of lunar mare basalt.
- Contains 500 tons of lunar regolith simulant confined within a 125 ft x 125 ft (38 m x 38 m) area with a depth range between ~5 in - ~4 ft (~13 cm - 1.2m) that can be modified to suit user needs.

Current Features of the LRT:

The LRT was designed to allow rapid modification of the terrain's topography obstacles in the field:

- The terrain can be reshaped to suite specific testing requirements that may require flat-expanses, steep hills, or heavily cratered and rocky landscapes.
- Large rocky obstacles in Fig. 1 are artificial landscape boulders (faux-rocks) that can be easily placed by users or removed entirely.
- Rapid modification capabilities for burial of additional user-specific materials to enable in-situ resource utilization detection (e.g., burial of hydrogen sources for neutron detection or other materials).

Current Features of the LRT:

Development of the LRT's capabilities continues:

- Direct radio frequency communication with the Huntsville Operations Support Center (HOSC).

Currently Available to the Community

The LRTF provides an accessible planetary analog surface environment for surface mobility testing, autonomous roving operations, developing advanced navigation techniques and operations development.

- Contact Michael.R.Zanetti@nasa.gov or Alexander.W.Summers@nasa.gov

Meets the needs of visiting research groups:

- Equipped with on-site office space: an air-conditioned and heated trailer with 120/240V power and lighting.
- Wi-Fi and Cellular signal coverage.
- On-site workspaces and secure equipment storage is available in adjacent buildings.
- Accessibility for on-site parking and delivery of instruments, payloads, and additional equipment.



Collaborative Autonomous Surface Mobility (CASM)



Neutron Detection at the Lunar Surface (NMIS) testing



NMIS Neutron Detection with "buried ice"



MSFC CAN-162 supported Shallow Seismic Instrument Development



Gravel Bed for GPR and Shallow Seismic Profiling