The Lunar Regolith Terrain (LRT) Field: A New Lunar Surface Planetary Analog Facility at NASA Marshall Space Flight Center (MSFC). A. W. Summers and M. R. Zanetti. National Aeronautics and Space Administration's Marshall Space Flight Center (NASA MSFC), 4600 Rideout Road, Huntsville, Alabama 35812, United States. (Contact: alexander.w.summers@nasa.gov; michael.r.zanetti@nasa.gov)

Introduction: NASA is moving toward a new age of exploration and resource utilization of the lunar surface. Challenges related to exploration, resource utilization, and construction at the Lunar South Pole will require advanced technology and well-designed mission concepts and operations. NASA Marshall Space Flight Center (MSFC) has added new capabilities to support surface mobility and construction activities to meet industry, academia, and NASA research and development goals for lunar applications. The Lunar Regolith Terrain (LRT) field is a new, large-area, lunar regolith simulant planetary analog testing ground for users interested in surface mobility and lunar construction activities. The LRT complements NASA MSFC's other lunar environment testing facilities such as the Lunar Surface Simulator (V20 dirty vacuum chamber), the Lunar Environment Testing System (LETS), among many others.

Lunar Regolith Terrain (LTR) Description: The Lunar Regolith Terrain field is an outdoor planetary analog environment facility located on base at MSFC. The lunar regolith simulant is JSC-1A feedstock material (volcanic cinder sand sourced from Meriam Crater, Flagstaff, AZ). The field contains more than 500 tons of lunar regolith simulant confined within a 125 ft x 125 ft (38 m x 38 m) area. The field is placed ~50% over paved parking lot and ~50% over a natural ground. Currently, the depth of regolith ranges between ~5 in - ~4 ft (~13 cm – 1.2m) but can be modified to suit user needs. The lunar regolith simulant that makes up the field has representative geotechnical, geochemical, and optical properties of lunar mare basalt. An area within the LRT of lunar highlands terrain simulant is planned.

Additional 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 suit 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. Areas of the field also contain buried fiducials, large sheets, bar stock, and pipes of various composition and dimensions to allow for possible ground penetrating radar and shallow seismic studies. Rapid modification capabilities will also allow 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). The field is also equipped with on-site office space with an air-conditioned and heated trailer with 120/240V power and lighting. The site has Wi-Fi and Cellular signal coverage. Direct radio frequency communication with the Huntsville Operations Support Center (HOSC) is in development. Additional on-site workspace and secure equipment storage is available in adjacent buildings. Accessibility to the field is straightforward with on-site parking and access for delivery of instruments, payloads, and additional equipment.

Community Availability: The LRTF provides an accessible planetary analog surface environment for surface mobility testing, autonomous roving operations, developing advanced navigation techniques and operations development. Interested parties can contact the abstract authors for additional details, tours, and scheduling.

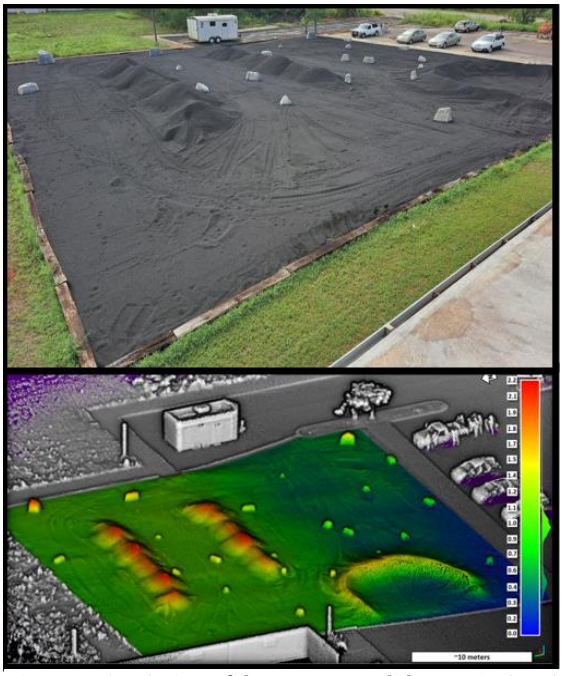

Figure 1: (Top) view of the Lunar Regolith Terrain (LRT) field, a 125ft x 125ft (38m x 38m) planetary analog surface mobility environment at NASA MSFC (M. Zanetti). (Bottom) A digital elevation model from MSFC's Kinematic Navigation and Cartography Knapsack (KNaCK) LiDAR system showing current topography of the LRT (M. Zanetti)