| **Test** | |
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| Team I: Fall Validation Demonstration | |
| **Mission Statement** | |
| The Lunar ROADSTER uses the excavator to **groom multiple craters** and **create a circuitous path** around the Moon Yard. | |
| **Objectives** | |
| Demonstrate the rover’s full capabilities in a Lunar-accurate environment, including tasks such as identifying gradable craters, circumnavigating the Moon Yard, performing crater grading, and validating the results. | |
| **Location** | Planetary Robotics Lab Moon Yard |
| **Equipment** | Lunar ROADSTER Rover, Operations Terminal Laptop, Leica TS16 Total Station, Jetson TX2 Relay, LAN Router |
| **Subsystems** | Navigation subsystem, localization subsystem, validation subsystem, tool planner subsystem |
| **Personnel** | Ankit Aggarwal, Deepam Ameria, Bhaswanth Ayapilla, Simson D’Souza, Boxiang Fu |
| **Procedure** | |
| **Prior Setup:**   1. Prepare the Moon Yard with several craters and dunes in a circular path. 2. Perform a FARO scan of the environment and preprocess the scan to generate a map used for identifying gradable crater poses and for navigation planning. 3. Set up the external infrastructure by positioning the Leica total station at the corner of the Moon Yard, configuring the LAN router, and connecting the Jetson TX2 relay. 4. Position the rover in the Moon Yard and perform localization calibration.   **During Demonstration:**   1. Switch the rover to autonomous mode and run the start-up procedure. 2. Observe the rover autonomous grade craters and level dunes in a circular path. 3. After each dozed crater, use the ZED camera to validate whether the dozing satisfies the performance requirements. 4. Monitor the job status through the GUI, and use the emergency stop button if any unexpected behavior occurs. | |
| **Validation Criteria** | |
| **M.P.1:** Will plan a path with **cumulative deviation of <= 25%** from chosen latitude’s length  **M.P.2:** Will **follow planned path** to a **maximum deviation of 10%**  **M.P.3:** Will have a **contact pressure of less than 1.5 kPa**  **M.P.4:** Will **avoid craters >= 0.5 meters**  **M.P.5:** Will fill craters of **up to 0.5 meters** in diameter and **0.1m in depth**  **M.P.6:** Will groom the trail to have a **maximum traversal slope of 5°** | |