Rover on the lander:

* Test cameras
* Test ptu for navcam
* Test localization sensors and components individually:  
  imu, visodom, slam, mapping, wheels encoders
* Test localization drift when stationary
* Test mapping aiming at the rover/lander and compare it with known models
* Test wheels deployment motors:  
  deploy wheels and check increase in elevation and correct orientation with imu (change in roll and pitch may indicate a problem in one or more wheels)
* Test wheels motors:  
  very short traverse, check wheels rotation visually with navcam and rover position with VO
* Test turning motors:  
  turn the wheels and check wheels rotation with rover navcam where possible (solar panels might be in the way) and landers cam if available
* Test Point turn:  
  check orientation with imu
* Test short traverse:  
  check localization wheel odometry (assume slip ratio to be 0 on the lander?)

Rover descending on the ramps:

* Test short traverse on the ramps

Rover on the ground near the lander:

* Test short traverse compare localization with lander cameras
* Perform a complete point turn to check localization and also visual inspection of the rover with lander cameras
* Test an Ackermann turn
* Manually identify obstacles and test the obstacle detection
* Test then obstacle avoidance

List of equipment to be commissioned:

* ADE: Actuator Drive Electronics
* BEMA: Bogie Electro-Mechanical Assembly
* LocCam
* NavCam
* PTU
* IMU
* Software:
  + Visual Odometry (VO w/IMU)
  + Mapping
  + Wheel Odometry
  + Hazard Detection/Avoidance
* Motor encoders

|  |  |  |
| --- | --- | --- |
| **ON LANDER** | | |
| **PRE-** | **TEST** | **POST-** |
| * Communications ok | Test LocCam | * Visual inspection of the camera feed |
|  |  |  |
| * Communications ok | Test NavCam | * Visual inspection of the camera feed |
|  |  |  |
| * Communications ok * ADE checks * Test NavCam | Test PTU | * Pan and Tilt commands correspond to encoder readings and cameras view |
|  |  |  |
| * Communications ok | Test IMU | * Orientation readings correspond with the lander’s readings |
|  |  |  |
| * Communications ok * Test LocCam * Test IMU | Test VO w/IMU | * Absence of drift in the position and orientation estimates |
|  |  |  |
| * Communications ok * Test NavCam * Test PTU | Test mapping | * Mapping corresponds to known models of the rover and lander |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks | Test motor encoders | * No drift in the reading |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test motor encoder | Test wheel odometry | * No drift in the estimation |
|  |  |  |
|  | ROVER DEPLOYMENT |  |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test motor encoders * Test VO w/IMU | Test deployment motors | * Rover’s orientation is the same as before the test |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test NavCam * Test wheel odometry * Test VO w/IMU | Test wheels motors  (very short traverse) | * Check wheels rotation with NavCam * VO estimate corresponds to wheel odometry |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test NavCam * Test motor encoders | Test turning motors | * Check wheels turning with NavCam * Check wheels turning with lander cameras |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test NavCam * Test IMU * Test motor encoders * Test wheels motors * Test turning motors | Test point turn | * Check rover orientation with IMU * Check rover orientation with NavCam * Check rover orientation with lander cameras |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test motor encoders * Test wheels odometry * Test VO w/IMU | Test short traverse  (lander platform size?) | * VO estimate of rover position corresponds to wheel odometry |

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| **ON RAMPS** | | |
| **PRE-** | **TEST** | **POST-** |
| * Communications ok * ADE checks * BEMA checks * Test motor encoders * Test wheels motors * Test wheel odometry | Test short traverse  (ramps lenght?) | * VO estimate of rover position corresponds to wheel odometry |

|  |  |  |
| --- | --- | --- |
| **ON TERRAIN** | | |
| **PRE-** | **TEST** | **POST-** |
| * Communications ok * ADE checks * BEMA checks * Test motor encoders * Test wheels motors * Test turning motors * Test VO w/IMU | Test complete point turn | * Check VO estimate of rover orientation * Check lander cameras for visual inspection of the rover |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test wheel odometry * Test wheels motors * Test turning motors * Test VO w/IMU | Test short traverse | * VO estimate of rover position corresponds to wheel odometry * Compare with cameras of the lander |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test motor encoders * Test wheels motors * Test turning motors * Test VO w/IMU | Test Ackermann turn | * Check VO estimate of rover position * Compare with cameras of the lander |
|  |  |  |
| * Communications ok * ADE checks * BEMA checks * Test mapping | Test obstacle detection | * Manually identify an obstacle (also lander) and manually evaluate the obstacle detection |
|  |  |  |
| * Communications ok * ADE checks * Test motor encoders * Test wheels motors * Test turning motors * Test obs. detection | Test obstacle avoidance | * Send a goal over the obstacle and evaluate the trajectory generated (only trajectory generation and traversability map NOT moving yet) |
|  |  |  |