NASA SBIR/STTR Technologies

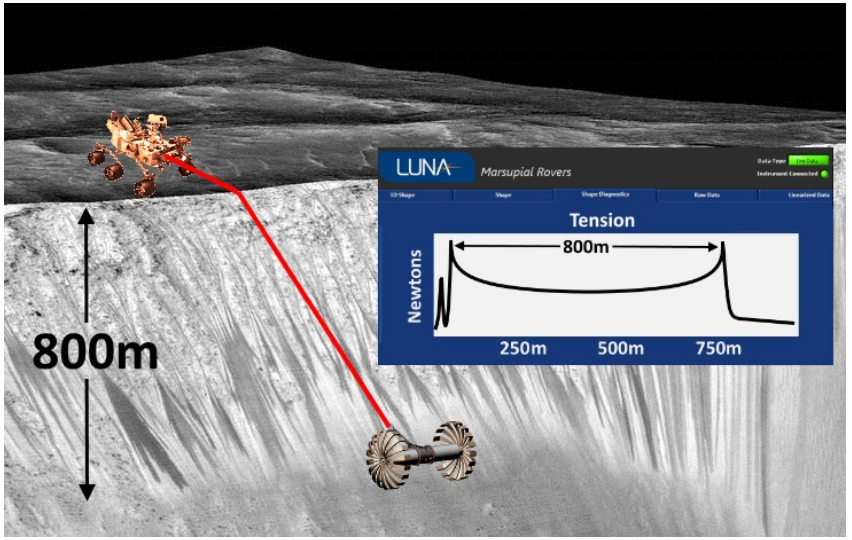
S4.02-9202 - Extended Length Marsupial Rover Sensing Tether

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Identification and Significance of Innovation

Luna proposes to continue development of its marsupial rover sensing tether by extending the length of the sensing technology out to a kilometer. By sensing the distributed tension and curvature of a tether that connects a marsupial rover to its base station the MaRS Tether can alert the base station to possible pinch points, snagged cables, or high tension. By extending the length and robustness of the sensing capabilities of the MaRS Tether, Luna will greatly increase the operating range of lightweight, highly mobile rovers enabling more complex missions.



Estimated TRL at beginning and end of contract: (Begin: 3 End: 4)

Technical Objectives and Work Plan

The primary objective of this Phase I effort is to demonstrate the feasibility of expanding the capabilities of the MaRS Tether system to enable its use in a wider variety of exploration mission scenarios.

Objective 1: Determine length, spatial resolution, update rate, and other key parameters for Phase I development.

Objective 2: Demonstrate expanded capabilities on a tension-only sensor.

Objective 3: Create performance trade off matrix.

Objective 4: Develop the transition and commercialization strategy.

To achieve these objectives, Luna has outlined the following tasks

Task 1: Kickoff project and determine metrics for success
Task 2: Develop tension measurement for long lengths
Task 3: Decrease sensitivity to motion
Task 4: Develop spot scan mode
Task 5: Demonstrate system performance.
Task 6: Create trade-off matrix the for tether design space
Task 7: Develop commercialization plan and Phase II tasks

NASA Applications

Robotic exploration missions (TA 4.1.1, TA 4.2.6) including: Mars Exploration; Astrobiology Field Lab; Network landers; Europa explorer; By extending the range of the sensing tether technology, this project will increase the scope of robotic exploration missions. For example, missions to explore the large Martian craters that show evidence of liquid water through recurring slope lineae will require tether lengths of several hundreds of meters.

Non-NASA Applications

Unmanned underwater vehicles (UUVs)
Large scale robotic manipulators
Improved operations of payload tethers from rotorcraft
Search and rescue robotics
Non destructive evaluation tool tip location
Strain sensing on large scale aircraft and other structures

Firm Contacts

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NON-PROPRIETARY DATA