

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Interactive Presentations - IAF SPACE EXPLORATION SYMPOSIUM (IP)

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ANALYSIS, TEST AND SIMULATION OF LANDING SYSTEM TOUCHDOWN DYNAMICS

**Abstract**

The future exploration of the solar system is driven by the accessibility of scientifically interesting sites on surfaces of extra-terrestrial bodies with lower gravity than on earth. This applies to the touchdown of landing vehicles as well as to the surface operations of roving vehicles. In order to support the design, development and operation of those vehicles on an experimental basis, the DLR Institute of Space Systems has developed the Landing and Mobility Test Facility (LAMA). The rationale of this facility is to provide a test bed to study full scale vehicle-soil interactions, like tip-over stability of landing vehicles or terrain accommodation of rovers, in a reduced gravity environment by weight offloading with an industrial robot system, but same inertia mass. The advantage of the weight reduction is the similarity of lander body's geometry, mass distribution and local gravity comparing to the real environment.

In addition, the department of Landing & Exploration Technology of the DLR Institute of Space Systems is also focusing on the development and verification of analytical methods for the investigation of the touchdown dynamics of landing system and its capabilities for embedding into the landing site assessment. This poster outlines the test facility, simulation and analysis tools developed by the department and their use for recent landing missions.