EPSC Abstracts,
Vol. 2, EPSC2007-A-00399, 2007
European Planetary Science Congress 2007

Bringing Terramechanics to bear on Planetary Rover Design

L. Richter (1) and the ISTVS Rovers Technical Group

(1) DLR, Institute of Planetary Research, Berlin, Germany (lutz.richter@dlr.de / Fax: +49 2203 61471 / Phone: +49 2203 601 4568)

Thus far, planetary rovers have been successfully operated on the Earth's moon and on Mars. In particular, the two NASA Mars Exploration Rovers (MERs) ‚Spirit' and ‚Opportunity' are still in sustained daily operations at two sites on Mars more than 3 years after landing there. Currently, several new planetary rover missions are in development targeting Mars (the US Mars Science Lab vehicle for launch in 2009 and ESA's ExoMars rover for launch in 2013), with lunar rover missions under study by China and Japan for launches around 2012. Moreover, the US Constellation program is preparing pre-development of lunar rovers for initially unmanned and, subsequently, human missions to the Moon with a corresponding team dedicated to mobility system development having been set up at the NASA Glenn Research Center.

Given this dynamic environment, it was found timely to establish an expert group on off-the-road mobility as relevant for robotic vehicles that would involve individuals representing the various on-going efforts on the different continents. This was realized through the International Society of Terrain-Vehicle Systems (ISTVS), a research organisation devoted to terramechanics and to the ‚science' of off-the-road vehicle development which as a result is just now establishing a Technical Group on Terrestrial and Planetary Rovers. Members represent space-related as well as military research institutes and universities from the US, Germany, Italy, and Japan. The group's charter for 2007 is to define its objectives, functions, organizational structure and recommended research objectives to support planetary rover design and development. Expected areas of activity of the ISTVS-sponsored group include: the problem of terrain specification for planetary rovers; identification of limitations in modelling of rover mobility; a survey of existing rover mobility testbeds; the consolidation of

mobility predictive models and their state of validation; sensing and real-time processing issues; improvements in modelling of vehicle slippage and traction; study of methods to achieve rover design robustness.

This paper will present the charter of the ISTVS Rovers Technical Group and its upcoming activities and therefore will be of a programmatic nature.