

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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AROUND THE MOON IN 80 DAYS - INFLATABLE ROVERS

Abstract

A fast reconnaissance vehicle capable of going at least 50km/h across wild terrains. The vehicle will be less than a 1m³ sized canister when stowed and as big as a car in its deployed state. The operational range limited only by the lifetime of its inflatable structure, electronics, communication link or level of autonomy. As the rover will not have a defined top or bottom nor a rear or front it will be completely recoverable and functional in any orientation or circumstance it find it self. The inflatable rover will have a wide and varied applications. Notably reconnaissance and searchresque of hostile regions and environments. Scientific rapid reconnaissance will prove a niche market which is already evident within the drone community applied to other areas. Earth testing will demonstrate the power of this generic tool in lunar exploration establishing the virtually ‘The Go Anywhere’ philosophy. Never before has there been a rover of any type able to venture beyond the range of the manned rovers in the Lunar Apollo missions (35.9 Km). The inflatable rover can be easily and cheaply built in large numbers and deployed on the Moon surface to cover quickly vast distances. It is small in delivery, large when deployed, cheap to launch. As a taster it will prove its versatility by circumnavigating the Moon in 80 days between the poles whilst reconnoitering sites of scientific interest and for new landing locations. Such a fast reconnaissance vehicle will carry the basic science package to increase its applicability in the field. Comprised of a spectrum analyzer (to interrogate surface soil and rocks), laser induced ignition/ablation and a robotic probe/scoop will move top soil and rocks for subsurface sampling. Such regolith samples could be also delivered to pre-situated specialized science instruments on the lunar surface from prior or future space missions. Front and back stereoscopic cameras for virtual reality aided remote control and 3D terrain mapping, enhanced with LIDAR ranging, in turn collects data essential for future missions. The concept and goals shown here are novel. The authors propose to, with the aid of Industry-university-agency, design and build a full sized prototype to be used in lunar/mars analogue, SAR and reconnaissance studies as well as to investigate exploration applicabilities for other planets and moons. From the prototype a flight model will be derived for its first space mission: ‘Around the Moon in 80 days’.