

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
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CONCEPT FOR A HELIOSTAT ON-BOARD A ROVER TO ENABLE EXTENDED SURFACE  
OPERATIONS IN SHADOWY AREAS ON THE MOON

**Abstract**

The exploration of the polar regions of the Moon is of great importance due to the presence of water in these areas. While being attractive targets for surface missions, in particular rovers, high latitude exploration poses strong constraints on the operation of surface missions. In the case of small missions, which do not carry radionuclide heating systems, the thermal and electrical power management are challenging. To complicate the situation further, at high latitudes the shadows generated by surface structures will be very long and thus affect the operation of small missions even further. On the other hand, areas which remain in a shadow during major parts of daytime can be suspected to hold frozen volatiles even close to the surface. But those areas might be inaccessible to small rovers. To overcome these issues, the concept of a heliostat on-board a rover is outlined. The advantages of such a small reflector which directs the Sun light onto the rover's body to provide additional heat and electrical power are discussed, and a concept design for such a device on-board a micro-rover is presented. Also, if made steerable, the light beam from such a heliostat can be directed onto the ground thereby increasing the soils temperature. A thermal study of such a use case was conducted and preliminary results will be presented.