A Possible Limit on Roving Speed for Resource Prospector, W. M. Farrell[1] and A. Colaprete[2], 1. NASA/Goddard Space Flight Center, Greenbelt, MD. 2. NASA/Ames Research Center, Moffett Field, CA (William.M.Farrell@nasa.gov)

The Resource Prospector (RP) mission will land a rover to the lunar surface with the objective to make the first landed investigation of the surface and subsurface volatile resources in the polarregions. Onboard will be a set of volatile sensing systems including a visible and IR spectrometer, neutron spectrometer, onboard drilling, sample handling, sample heating, and mass spectrometry capability. It is expected that the rover will move from sunlight into shadowed regions. Permanent shadowed regions have also been targeted for investigation.

However, as RP roves into cool, shadowed regions the underlying ground is expected to be a poor conductor and the local solar wind plasma may be obstructed due to local topography – that same local terrain that provides the shadowed environment also obstructs plasma inflow. The loss of these electrical 'grounds' limits the ability of the rover to dissipate charge build-up.

The situation is complicated by that fact that the RP wheel will also be collecting charge due to its tribo-electric interaction with the regolith.

We will demonstrate that in shadowed regions, the RP rover wheel may loose charge equilibrium between the tribo-charging build-up and plasma dissipative losses. To maintain equilibrium, we show that the wheel has to remain at or below a certain limiting speed: If the wheel moves faster than this critical speed, excess charge build-up will occur. We will define this environmentally-defined speed limit, and discuss methods for remediating charge build-up - some rather simple. We also suggest that an electrometer should be placed near the RP wheel to investigate its charged state as the system roves.