xPED: THE EXPLORATION PORTABLE ELECTROSTATIC DETECTOR. T. L. Jackson[1,2] ,
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Introduction: Astronauts and rovers, while exploring dynamic environments, can experience charge buildup through tribo-charging (contact electrification). Charge levels can become substantially high, especially in areas where photoelectric and plasma currents are reduced (e.g. lunar polar crater). Tribo-charging in areas that have little to no charge dissipative path can be severe, leaving an astronaut or roving object to remain charged for extended periods of time [1]. Charge buildup on space suits and/or rovers is expected to present significant hazards to missions, possibly even leading to electrostatic discharge and arcing, dust adhesion to space suits/equipment, and destruction of equipment [2]. The avoidance of hazards associated with charge buildup is critical for future NASA missions to near Earth objects, the Moon and Mars. The Exploration Portable Electrostatic Device (xPED) will allow astronauts to determine their charge state, and also characterize the electrical environment from their excursions [3]. This work involves the advancement of the xPED system to support the DRATS (Desert Research and Technologies Studies) effort.

Figure 1. Early xPED system used for mock EVA at DRATS test site.

This presentation will address the xPED system results and observations obtained at the DRATS site in Flagstaff, AZ during September 2011. The data collected shows that xPED detects local tribo-charging due to roving in a dusty environment while an observer performs a mock EVA, as well as changes in the local electrostatics of the environment during a thunderstorm.

References: [1] W. M. Farrell et al. (2008) *Geophys. Res. Lett.* [2] Jackson, T. J. et al. (2011) *J. Spacecraft and Rockets*. [3] Jackson, T. J. and Farrell, W. M. (2006) *IEEE TGRS*, pp. 11-18.