

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Technologies to Enable Space Systems (3)

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RESOURCE MAPPING IN EXTREME ENVIRONMENTS

Abstract

Science measurements within permanently shadowed craters and along steep embankments pose extreme challenges since astronauts and rovers cannot access them. However, these areas offer the potential for the greatest science return. NASA Langley invented deployable wireless micro-spectrometer can access those challenging areas and telemetry its measurements to a receiver safely outside those extreme environments. The micro-spectrometer are designed for broadcasting by an astronaut, or a rover, or a lander flying overhead. This device can be also installed on rover tires, under the astronaut's shoes, or cane stick. The bullet-like consumable micro-spectrometer can penetrate into soil to spectrally identify the components of soil, such as water, He-3, or other minerals. The signals of soil assay data are transmitted to a mother station through telemetry system. LaRC developed micro-spectrometer bullet consists of micro-spectrometer optics with all imbedded burst-mode LED UV light source, a super-capacitor with control electronics, and telemetry electronics. Prototypes are available. Further maturation of this technology would be necessary for demonstrations on the Moon. We envision a RD program that includes other NASA Centers and interested industry partners wishing to build a business case that requires knowledge of the locations of Lunar Ice, for instance.