Paper ID: 67570
oral

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 1 (2A)

Author: Mr. Daniel Andrews
National Aeronautics and Space Administration (NASA), United States

VIPER: MISSION DESIGN & DEVELOPMENT

Abstract

The NASA Artemis Program plans to return humans to the Moon to stay. Extended human stays on the Moon will require substantial resources to sustain human presence over the long-term, requiring continuous supplies delivered from the Earth. However, if some of the resources were indigenously available, substantial logistical complexity and costs could be saved by "living off the land", wherever possible.

The LCROSS, LRO and other missions have confirmed the presence of resources such as volatiles in polar regions, so the next step is to understand the scientific nature and physical distribution of those candidate resources. Those local volatiles could be processed into propellants and human life-supporting needs, reducing risk of maintaining a permanent human presence on the Moon.

The Volatiles Investigating Polar Exploration Resource (VIPER) is a surface mobility scientific platform, designed to spend 100 days mapping and surveying four different Ice Stability Regions to understand the scientific nature and distribution of water and other volatiles. VIPER will also provide scientific mineralogical context of the lunar regolith, such as the presence of silicon and light metals in lunar regolith, providing a composite picture of resource availability and sustainment.

This paper will discuss the latest development progress by the VIPER team, following our initial introduction to this mission at IAC2021. The VIPER team has passed both its NASA Preliminary Design Review (PDR) and Critical Design Reviews (CDR), and is now looking to performing significant testing of engineering units representing the design, prior to the team turning its attention to building the flight hardware.

VIPER is managed within NASA's Science Mission Directorate (SMD), utilizing the Commercial Lunar Payload Services (CLPS) delivery model with partner, Astrobotic, Inc.