

An Overview of the Volatiles Investigating Polar Exploration Rover (VIPER) Mission

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A critical goal to both science and exploration is to understand the form and location of lunar polar volatiles. The lateral and vertical distributions of these volatiles inform us of the processes that control the emplacement and retention of these volatiles, as well as helping to formulate in-situ resource utilization (ISRU) architectures. While significant progress has been made from orbital observations, measurements at a range of scales from centimeters to kilometers across the lunar surface are needed to generate adequate “volatile mineral models” for use in evaluating the resource potential of volatiles at the Moon. VIPER is a solar and battery powered rover mission designed to operate over multiple lunar days, traversing several kilometers as it continuously monitors for subsurface hydrogen and other surface volatiles. In specific thermal terrain types, including permanently shadowed terrain and locales that permit near-surface ice stability, subsurface samples will be examined for volatile content using a one-meter drill. This talk will provide an overview of the VIPER mission which is scheduled for flight to the Lunar South Pole in December 2022.