

Mining the Moon: A Review of Upcoming PRIME1, VIPER, and other Lunar Mining Missions

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SYNOPSIS

The Moon is becoming a very crowded place – countries are eager to further explore our celestial neighbor and groundtruth water-ice deposits that have potential of changing exploration paradigm forever.

The first mining mission is the Polar Resources Ice-Mining Experiment-1 or PRIME-1. The mission includes ice mining drill, TRIDENT and a mass spectrometer, MSolo. The main goal is to explore subsurface volatiles down to 1 m depth outside of Shackleton Crater in 2022. A year later, NASA plans to launch Volatiles Investigating Polar Exploration Rover, or VIPER to further explore lunar volatiles outside of Nobile Crater. VIPER will carry another ice mining drill TRIDENT, with Near-Infrared Volatiles Spectrometer System, or NIRVSS, MSolo mass spectrometer, and Neutron Spectrometer System or NSS.

The same year, a mission to Mare Cirsium will test new mining technologies: LISTER is a pneumatic coiled tubing drilling system that paves the way for future deep drilling missions, while PlanetVac is a pneumatic based rapid sample delivery system that has a potential to change sample delivery paradigms.

The presentation will cover these and many other exciting missions and technologies.