A SEQUENCE FOR FUTURE LUNAR LANDINGS TO ENHANCE SCIENCE RETURNS

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SCIENCE

ARISTARCHUS PLATEAU
Study the bulk chemistry and mineralogy of the Aristarchus plateau, age date the impact melts/pyroclastics/silicic material and assess the volatile budget.
ENNG. REQUIREMENTS

MARIUS HILLS
Study the chemical and geomechanical properties of the volcanic material and determine its age.
ENNG. REQUIREMENTS

REINER GAMMA
Characterize the physical environment across the lunar swirl: Magnetic field strength, radiation and plasma environment, regolith properties and volatile abundance.
ENNG. REQUIREMENTS

GRUITHUISEN DOMES
Study the silicic volcanic material for its bulk chemistry, mineralogy, morphology, volatiles, age determination and determine the regolith geomechanical properties.
ENNG. REQUIREMENTS

PITS IN MARE TRANQUILLITATIS
Study the chemical and geomechanical properties of the volcanic material and determine its age.
ENNG. REQUIREMENTS

INA
Characterize the smooth volcanic mounds, determine its age and geomechanical properties. Landing to be on the largest mound.
ENNG. REQUIREMENTS

ENGG. CAPABILITIES

LANDING ACCURACY
- Coarse (dispersions >1 km)
- Medium (10 m to 1 km)
- Pinpoint (1 to 10 m)

HAZARD AVOIDANCE & TERRAIN-RELATIVE NAVIGATION
- Coarse retargeting, daytime landing
- Intermediate retargeting, daytime landing
- Fine retargeting, anytime landing (Use of LiDARs)

THERMAL
- Mid-latitudes, moderate daytime temperatures
- Equatorial sites (<15 N/S), requires effective heat rejection
- Polar regions (including PSRs)

Note: It is assumed that illumination requirements for vision-based navigation are met during descent and Line of Sight for communication with Earth is available.

ENGG. REQUIREMENTS

LANDING SITES

2019
Current capabilities of commercial entities

ARISTARCHUS PLATEAU
Intermediate retargeting during hazard avoidance

REINER GAMMA
Medium landing accuracy (10 m to 1 km)

GRUITHUISEN DOMES
Pinpoint landing accuracy (1 to 10 m)

PITS IN MARE TRANQUILLITATIS
Fine retargeting during hazard avoidance

MARIUS HILLS

INA

SCIENTIFIC OBJECTIVES

Mapping Engineering Capabilities to Scientific Objectives

Orbit Beyond
An Addendum to Phase 1 of Lunar Science For Landed Missions Workshop Publication