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## 1

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.

## 2

LANDING SITES

### MAPPING ENGINEERING CAPABILITIES TO SCIENTIFIC OBJECTIVES

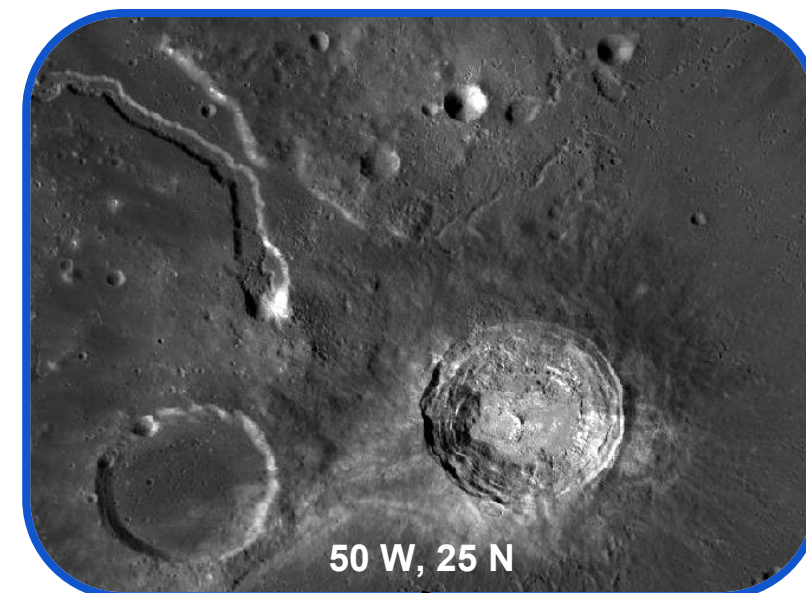
#### SCIENCE

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

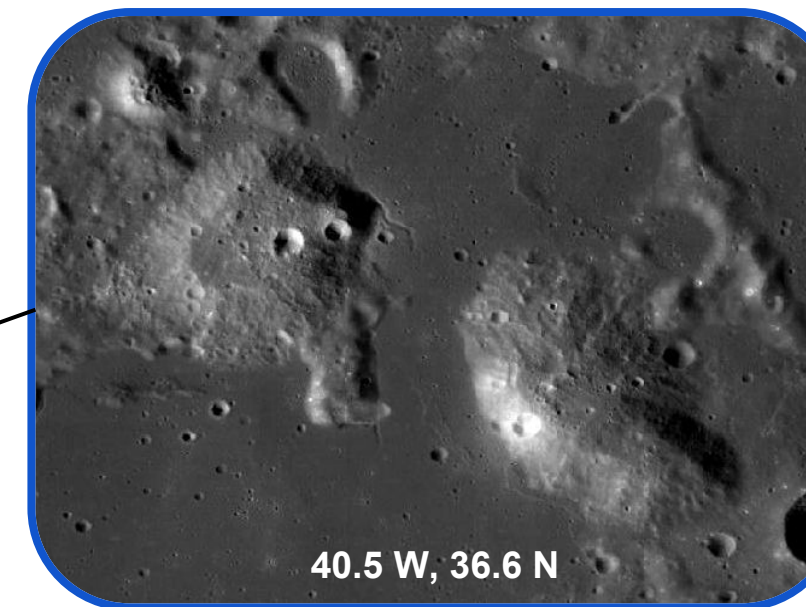
#### ENGG. REQUIREMENTS



#### ARISTARCHUS PLATEAU



#### GRUITHUISEN DOMES



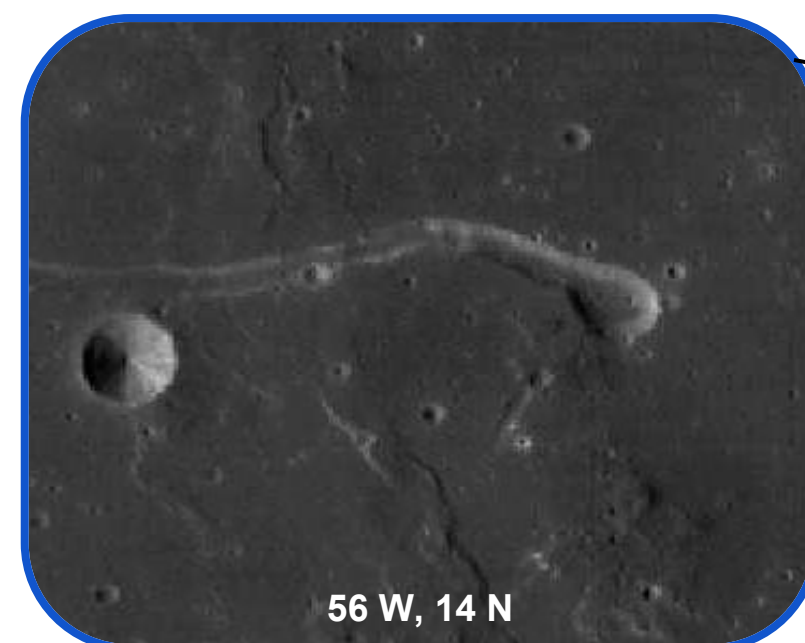
#### SCIENCE

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

#### ENGG. REQUIREMENTS



#### MARIUS HILLS



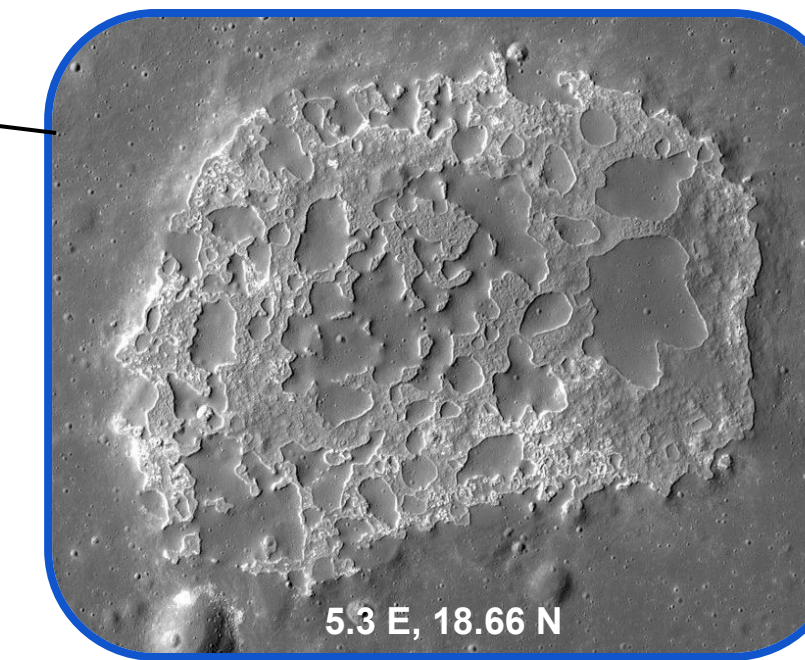
#### SCIENCE

Study the chemical and geomechanical properties of the volcanic material and determine its age.

#### ENGG. REQUIREMENTS



#### INA



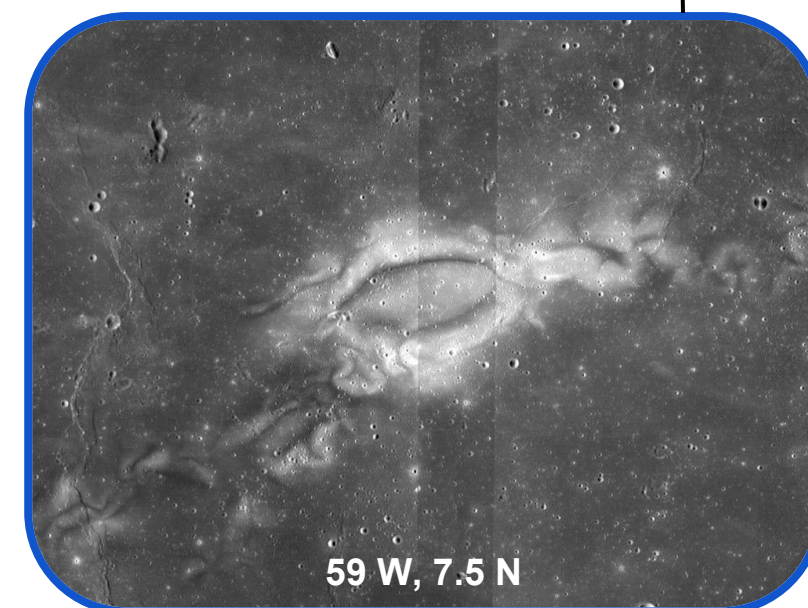
#### SCIENCE

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

#### ENGG. REQUIREMENTS



#### REINER GAMMA



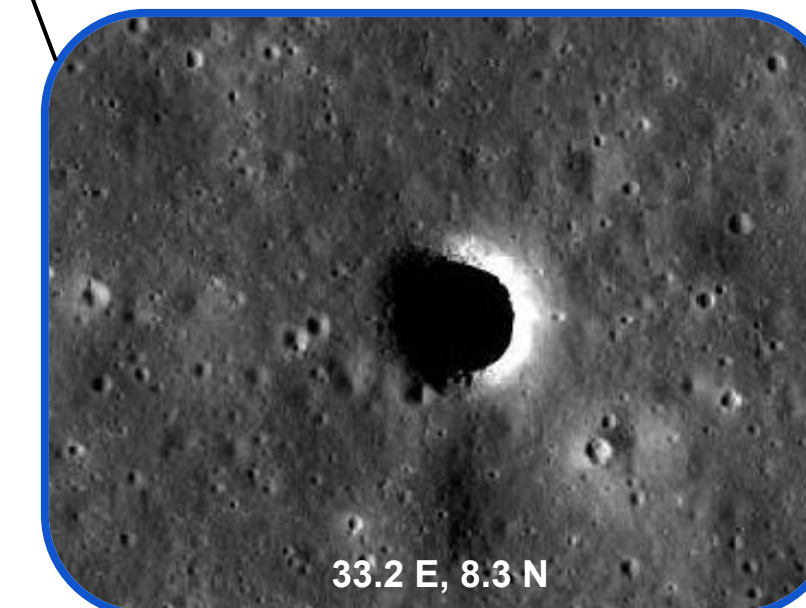
#### SCIENCE

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

#### ENGG. REQUIREMENTS



#### PITS IN MARE TRANQUILLITATIS



#### SCIENCE

Study the physical and chemical nature of effusive lava flows and map a lunar pit. Landing is within mobile range of the pit.

#### ENGG. REQUIREMENTS



## 3

SEQUENCE

2019

Current capabilities of commercial entities

Intermediate retargeting during hazard avoidance

Medium landing accuracy (10 m to 1 km)

Pinpoint landing accuracy (1 to 10 m) +

Fine retargeting during hazard avoidance

ARISTARCHUS PLATEAU

REINER GAMMA

GRUITHUISEN DOMES

PITS IN MARE TRANQUILLITATIS

MARIUS HILLS

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