



## NASA's Moon to Mars Architecture Workshop

# Why Artemis Will Focus on the Lunar South Polar Region

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## WHEN WILL WE ACHIEVE LUNAR OBJECTIVES?

Multi-decadal campaign

Support annual cadence of crewed missions

Development of permanent infrastructure

Expansion of economic sphere to the Moon

## WHO DOES THIS APPROACH INCLUDE?

NASA

U.S Government

Industry

International Partners

Academia

Public

## WHAT FOUNDATIONAL CAPABILITIES ARE NEEDED

Long-duration microgravity systems

Partial gravity destination platforms

Low Earth Orbit assets and infrastructure

## WHERE SHOULD SYSTEMS BE?

Ensure access to the Lunar South Pole

Capability for non-polar expeditions

## HOW WILL WE GET THERE AND RETURN?

Lunar Microgravity staging in NRHO

Earth ↔ NRHO ↔ Lunar surface

Surface Mobility

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## WHY EXPLORE?

### - SCIENCE -

Understand the universe  
Direct observations

### - INSPIRATION -

“Artemis Generation”  
Overcome challenges  
Succeed with hard work

### - NATIONAL POSTURE -

Enrich lives on Earth  
Technology development  
International partnerships

# VALUE OF LUNAR SCIENCE



**Apollo 11** JUL 69  
Mare Tranquillitatis  
0.67416°N 23.47314°E  
LM: 21.6 hours EVA: 2.5 hours

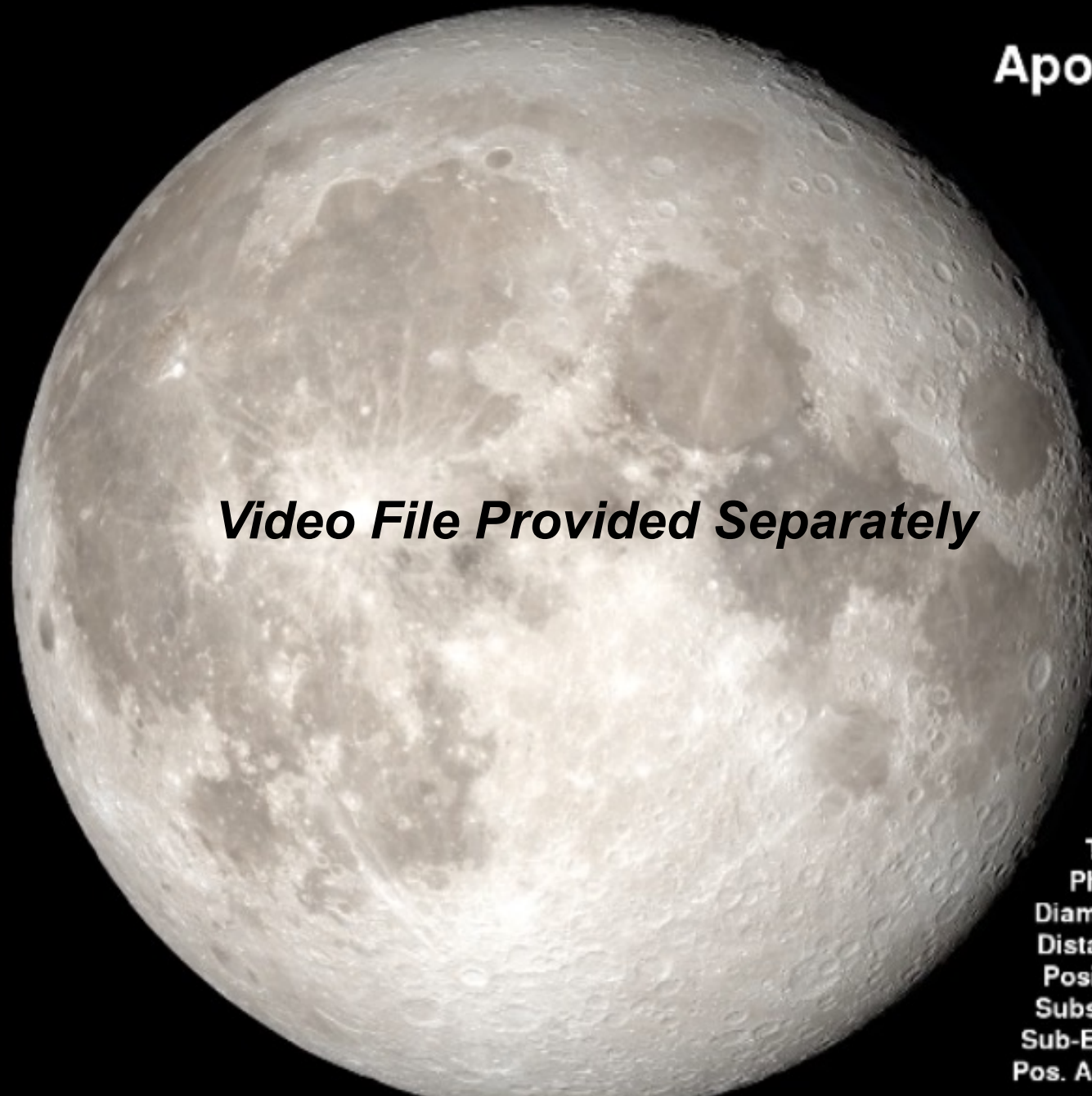
**Apollo 12** NOV 69  
Oceanus Procellarum  
3.0128°S 23.4219°W  
LM: 31.5 hours EVA: 7.8 hours

**Apollo 14** FEB 71  
Fra Mauro Highlands  
3.64589°S 17.47194°W  
LM: 33.5 hours EVA: 9.4 hours

**Apollo 15** AUG 71  
Hadley Rille  
26.13239°N 3.63330°E  
LM: 66.9 hours EVA: 19.1 hours

**Apollo 16** APR 72  
Descartes Highlands  
8.9734°S 15.5011°E  
LM: 71.0 hours EVA: 20.2 hours

**Apollo 17** DEC 72  
Taurus-Littrow Valley  
20.1911°N 30.7655°E  
LM: 75.0 hours EVA: 22.1 hours



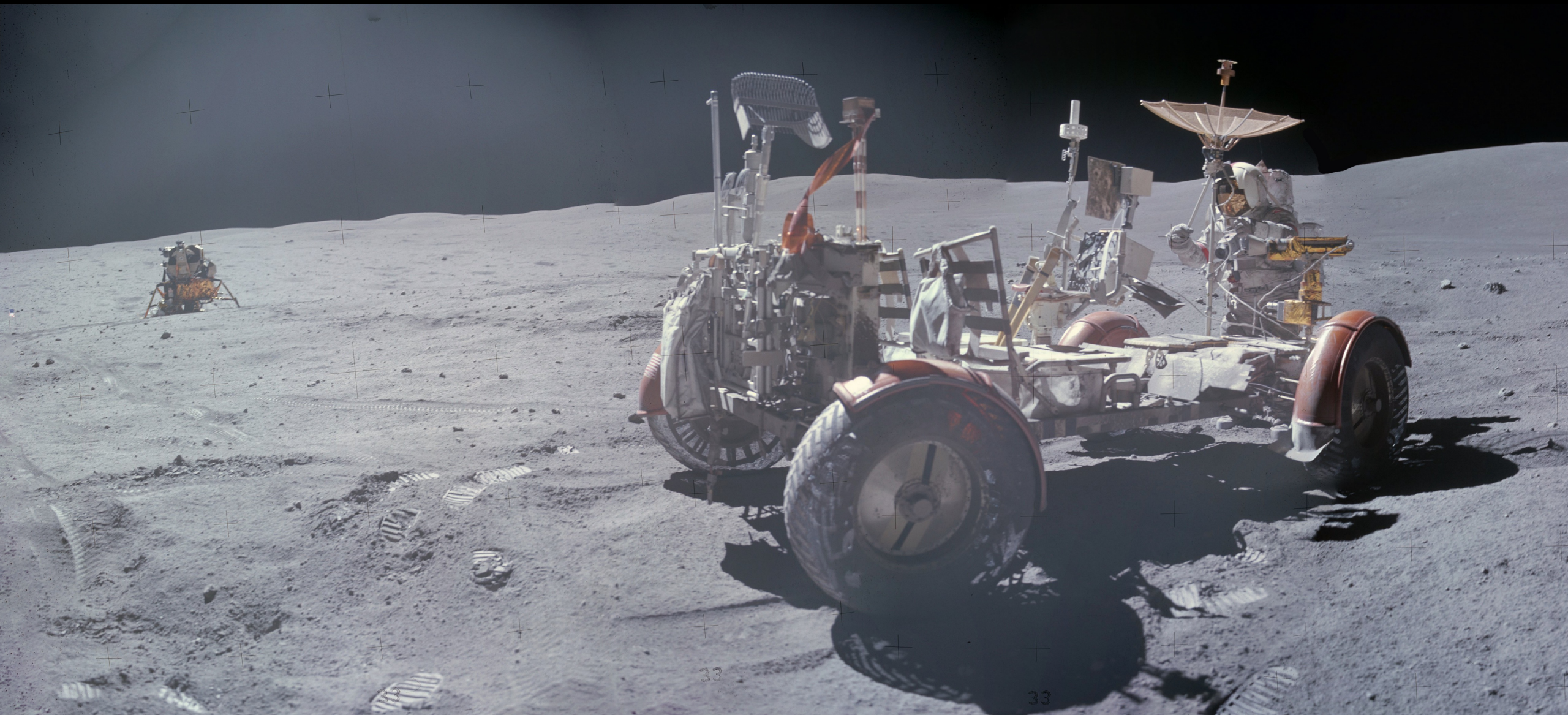
*Video File Provided Separately*

## Apollo Landing Sites



**Time:** 01 Jul 1969 00:00 UT  
**Phase:** 97.8% (16d 00h 51m)  
**Diameter:** 2002.2 arcseconds  
**Distance:** 357960 km (28.09 Earths)  
**Position:** 19h 56m 00s, 25° 08' 12"S  
**Subsolar:** 1.479°N 14.482°W  
**Sub-Earth:** 5.585°N 2.246°E  
**Pos. Angle:** 349.630°

# Lunar Lighting



# South Pole 2026



*Video File Provided Separately*

<b>Time</b>	01 Jan 2026 00:00 UT
<b>Phase</b>	91.4% (11d 22h 17m)
<b>Diameter</b>	1985.1 arcseconds
<b>Distance</b>	361045 km (28.34 Earths)
<b>Position</b>	04h 14m 05s, 26° 20' 14"N
<b>Subsolar</b>	1.346°S 32.520°E
<b>Sub-Earth</b>	6.556°S 1.279°W
<b>Pos. Angle</b>	349.893°

# Sunlight and Volatiles



# Viewing the Earth from the Lunar South Pole

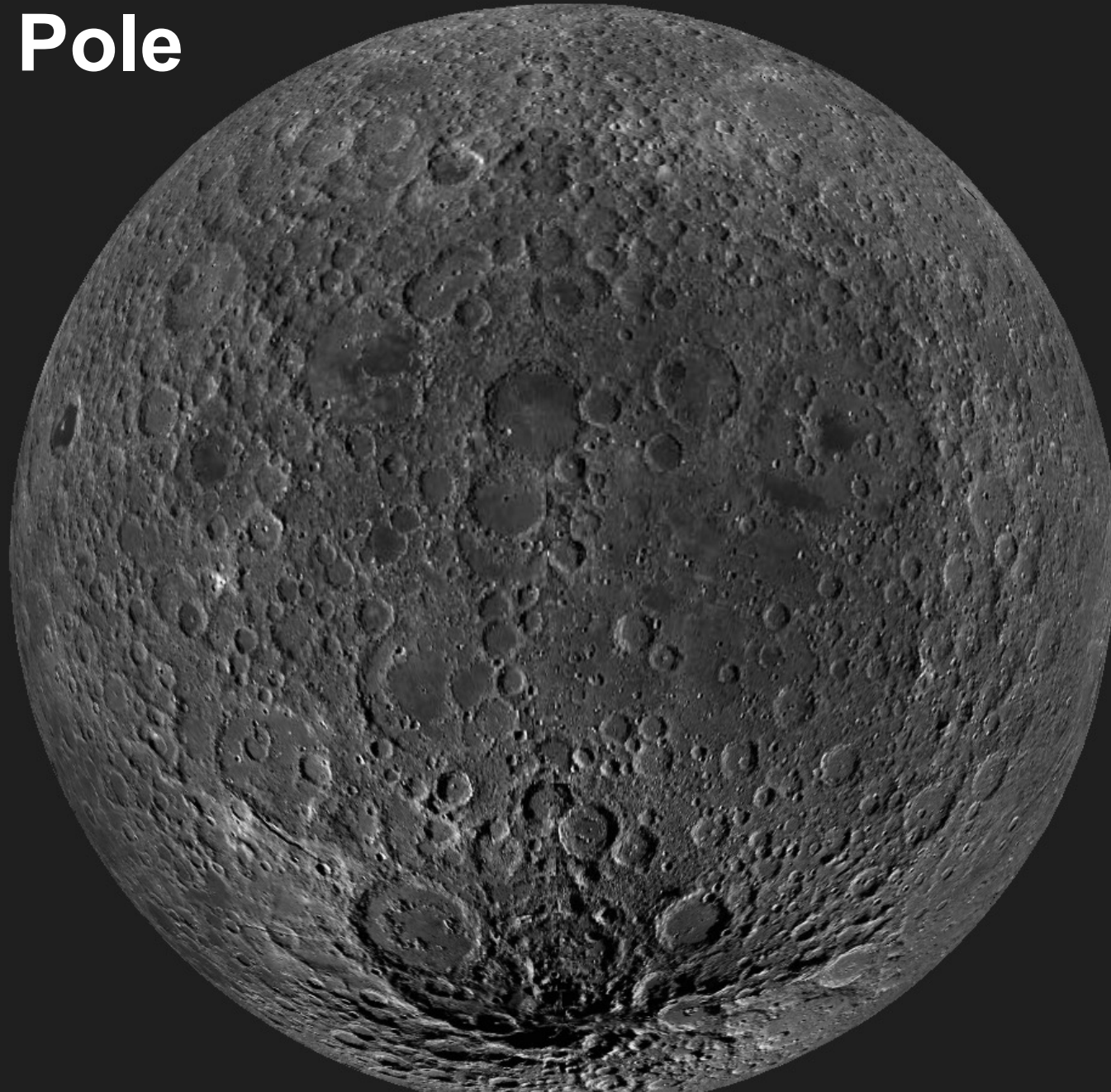


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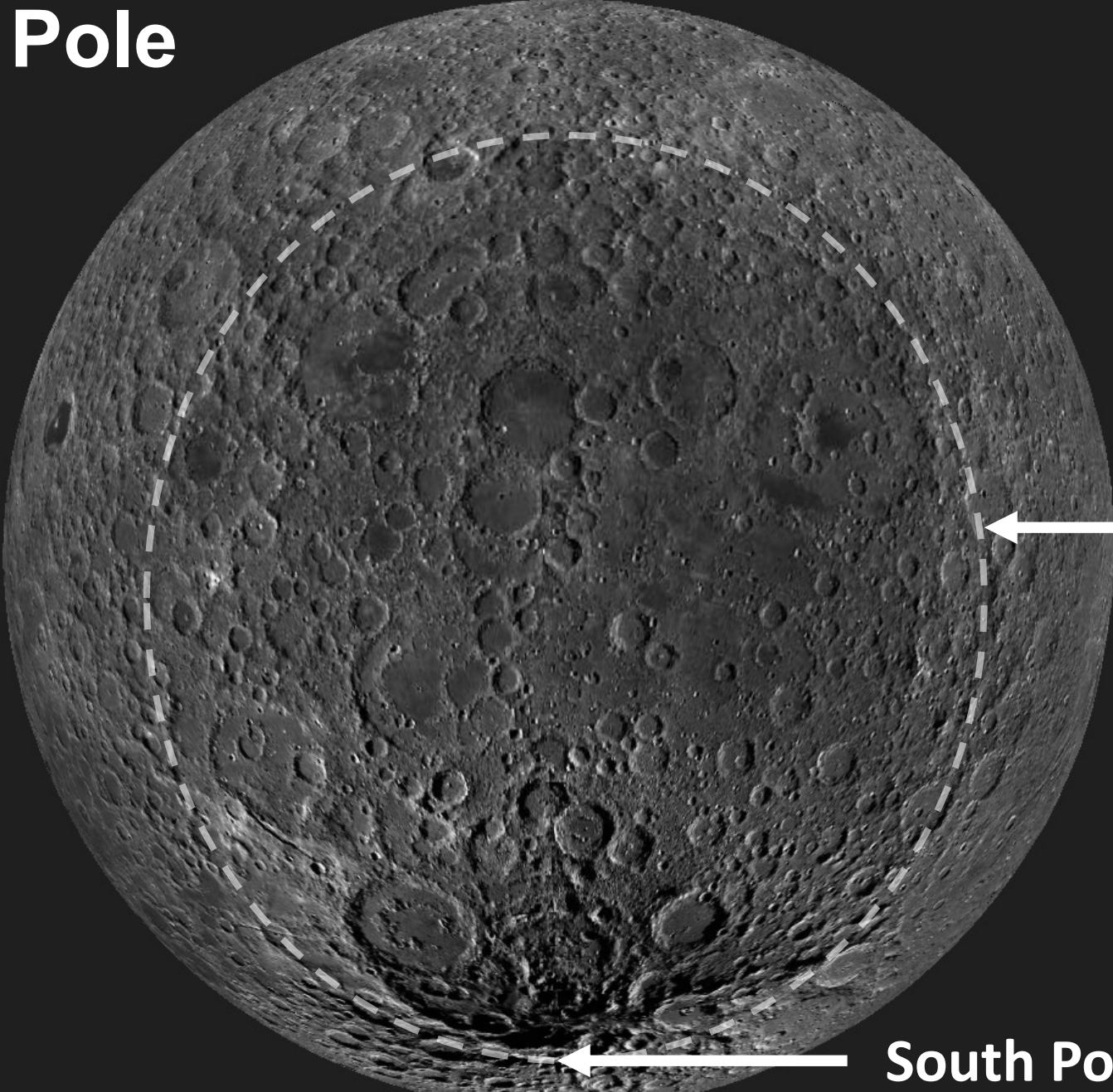




# The South Pole



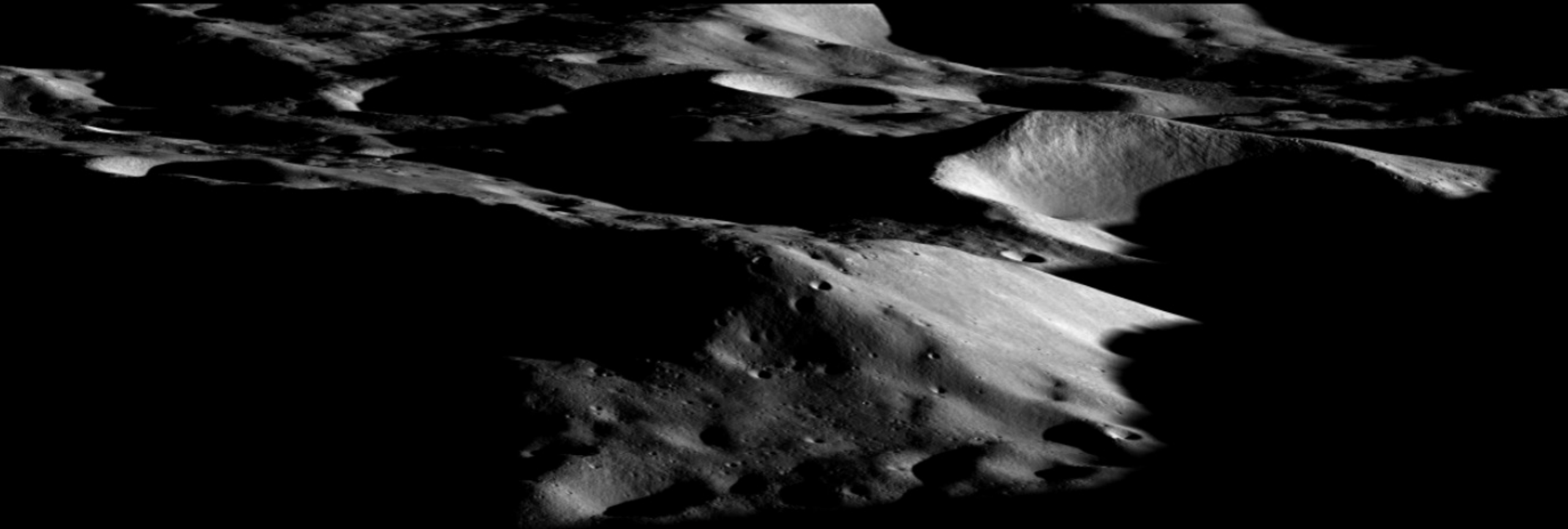
# The South Pole



**South Pole-Aitken Basin**

**South Pole**

# Artemis and the Lunar South Polar Region



**Panel: Joel Kearns (SMD), Emily Judd (ESDMD), Jacob Bleacher (ESDMD)**

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# Summary

- Lunar polar regions provide access to longer than average amounts of sunlight and permanent darkness
- Environmental conditions are conducive to preserving lunar volatiles at the surface
- The South Pole region intersects with the largest impact basin in the Solar System, the South Pole-Aitken Basin



Access the white paper with this QR code or at [www.nasa.gov/MoonToMarsArchitecture](http://www.nasa.gov/MoonToMarsArchitecture)

