



Sustaining Presence on the Moon

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Deputy, Integrated Performance
Human Landing System Program

Human Landing System Update
AIAA SciTech
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ARTEMIS

Artemis is the twin sister of Apollo and goddess of the Moon in Greek mythology. Now, she personifies our path to the Moon as the name of NASA's program to return astronauts to the lunar surface including the first female on the Moon.

When they land, Artemis astronauts will step foot where no human has ever been before: the Moon's South Pole.

With the horizon goal of sending humans to Mars, Artemis begins the next era of exploration.

Artemis: A Foundation for Deep Space Exploration



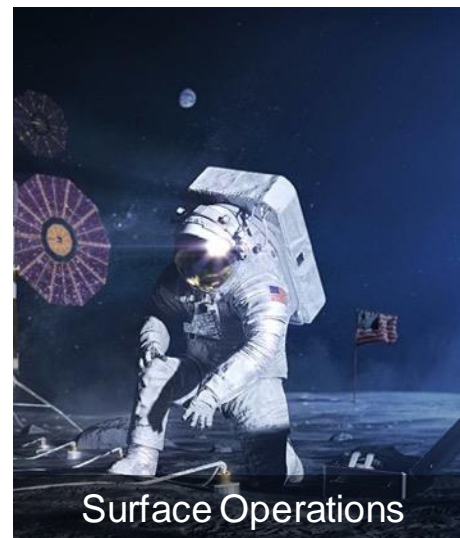
Space Launch System



Orion spacecraft



Human Landing System



Surface Operations



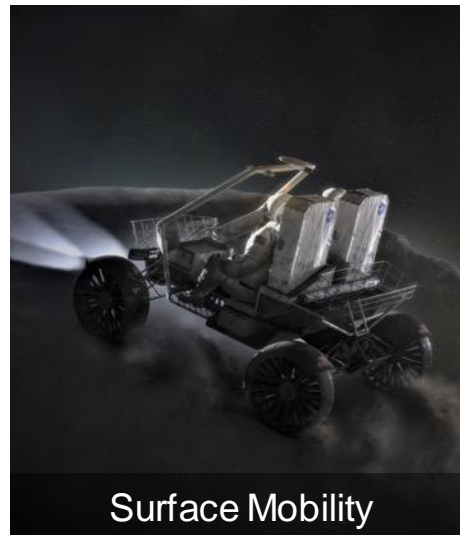
Gateway



Exploration Ground Systems



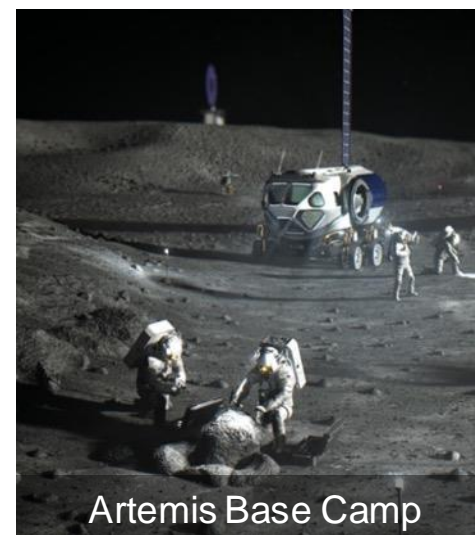
Space Communications & Navigation



Surface Mobility



Spacesuits



Artemis Base Camp



LANDING

humans and cargo on the lunar surface

- Developed by U.S. industry, based on NASA requirements
- Carries crew and cargo to the lunar surface and returns crew to lunar orbit
- Serves as a habitat on the lunar surface for early Artemis missions
- Houses equipment for surface activities including moonwalks, sample collection, and scientific experiments



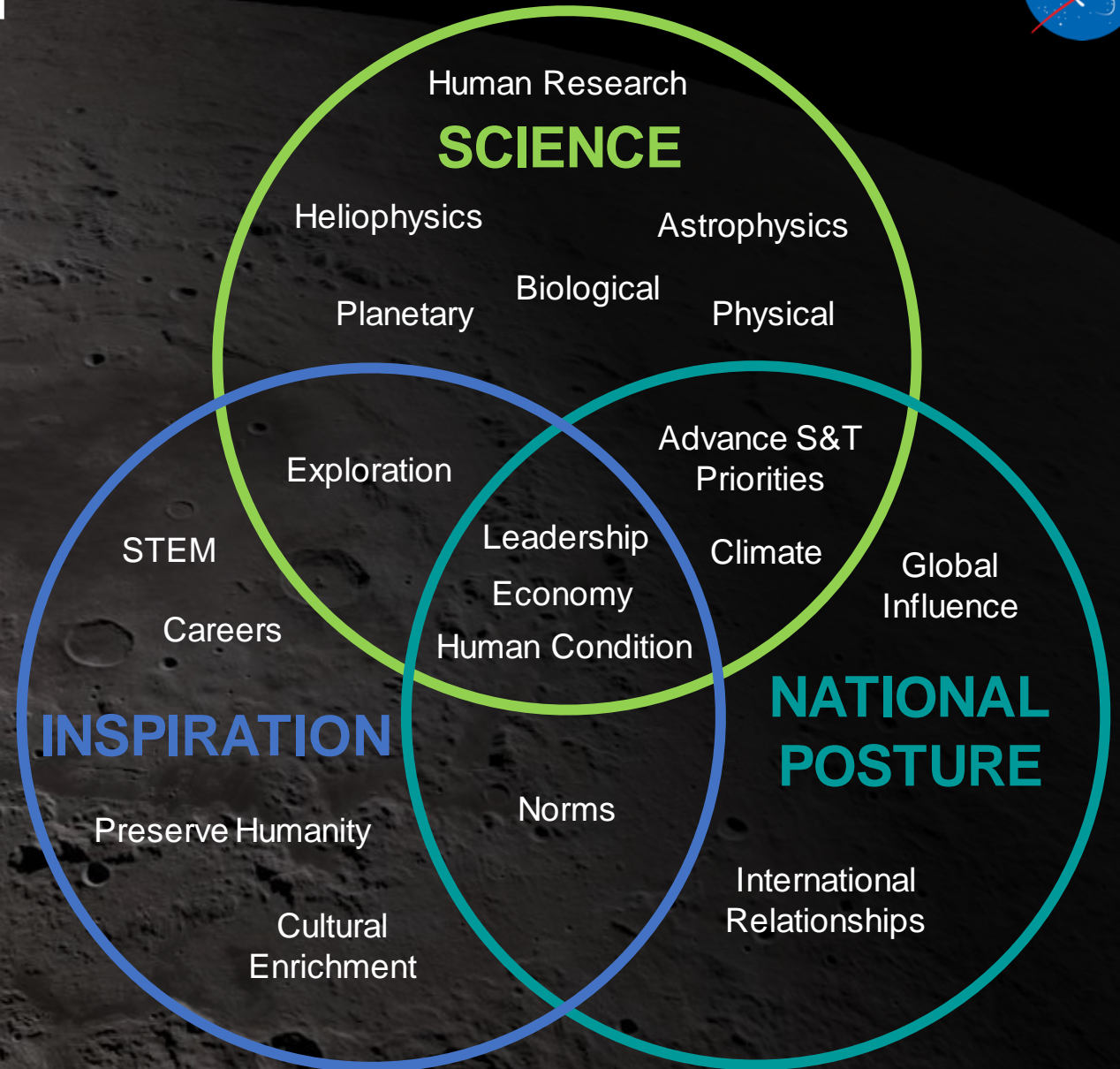



Human Landing System Benefits to Humanity

Sustaining Lunar Development



***New Provider
Coming
Summer 2023***



The background of the entire image is a deep space scene. On the left, the dark, curved horizon of a planet is visible, with a bright, glowing orange and yellow light source just behind it, creating a lens flare effect. In the upper right, a small, blue and white Earth is seen in the distance. The rest of the sky is a dark, starry expanse with a subtle gradient from purple to blue.

NASA has released a solicitation, Appendix P,
for the development of a second industry-provided
human landing system in addition to SpaceX.

COMING SOON

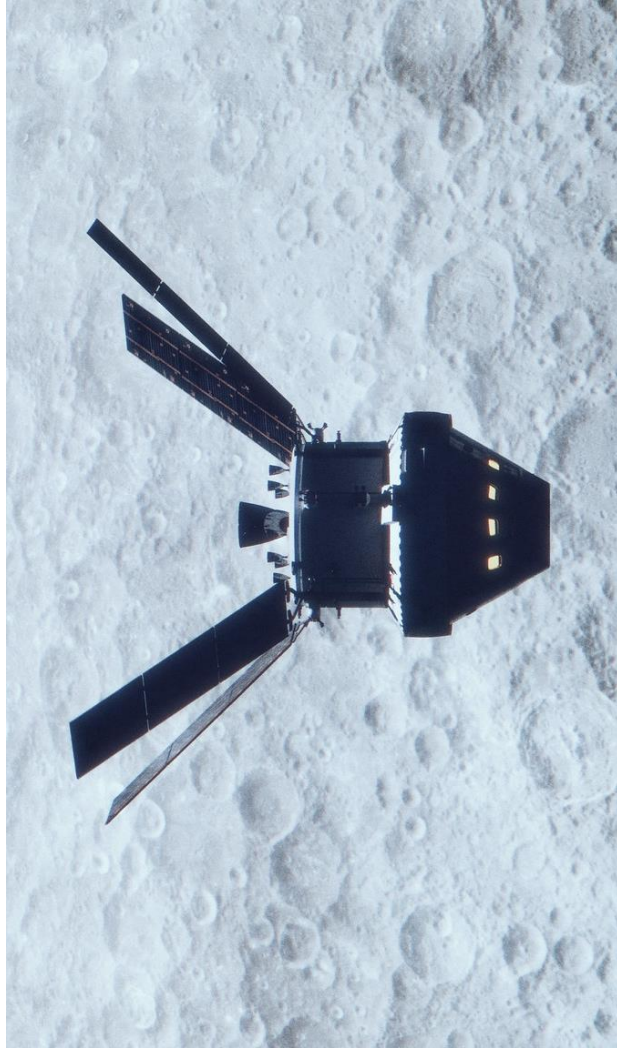
Together, these concurrent lander development
efforts will meet NASA's needs for recurring,
long-term access to the lunar surface.



Artemis I: 2022

Uncrewed Flight Test

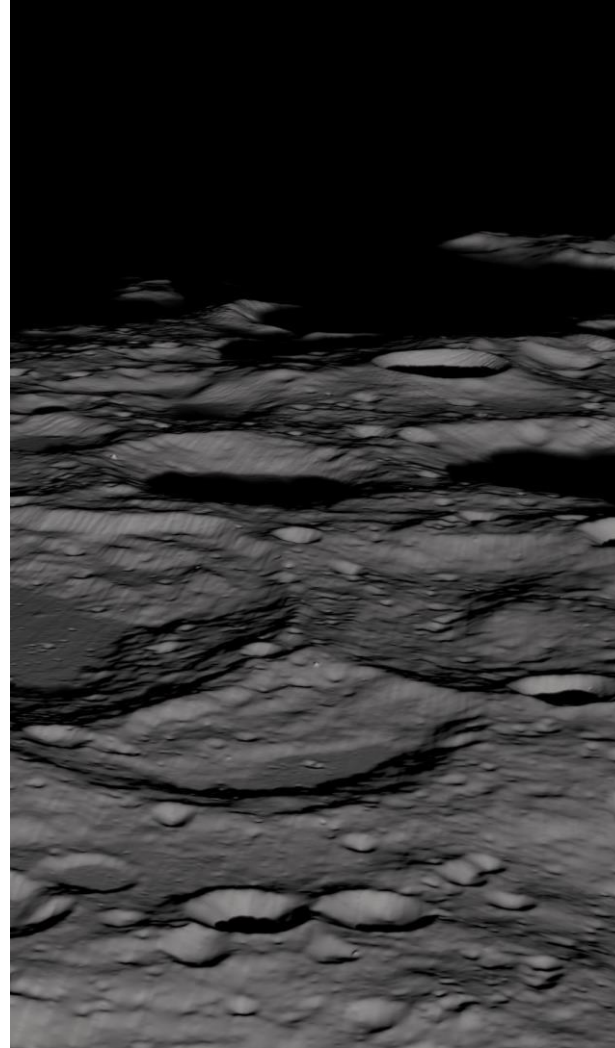
*Space Launch System
& Orion Spacecraft*



Artemis II: 2024

Crewed Flight Test

*Space Launch System
& Orion Spacecraft*



SpaceX Uncrewed Demo

Uncrewed Starship
Demonstration to the
lunar surface



Artemis III: 2025

Crewed Starship
Demonstration to the
lunar surface

Human Landing System (HLS)

STARSHIP

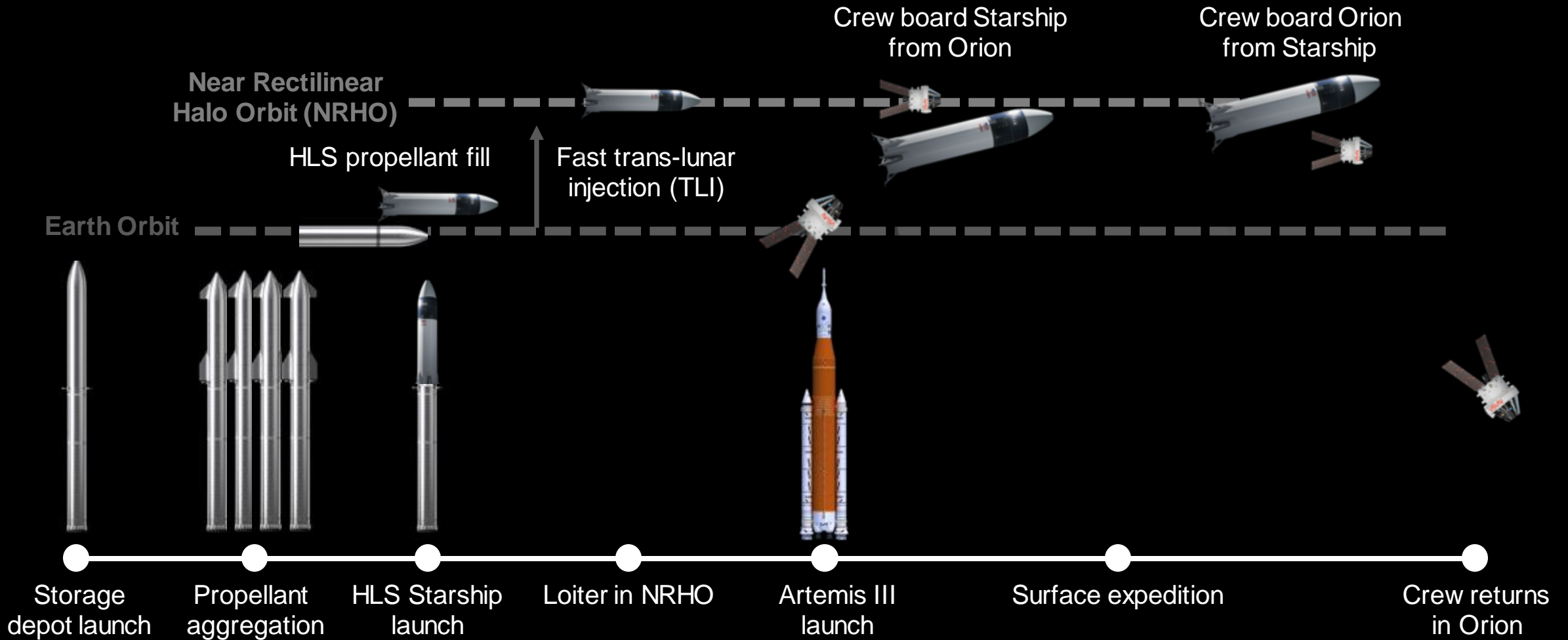
NASA has awarded two contracts to SpaceX:

- Option A – develop its HLS Starship for use on Artemis III, the mission that will put the next two Americans on the surface of the Moon
 - SpaceX Uncrewed Lunar Demo-A
 - SpaceX Crewed Lunar Demo-A (Artemis III)
- Option B – Further develop the HLS Starship to an extended set of requirements
 - SpaceX Crewed Lunar Demo-B (Artemis IV)

Image Credit: SpaceX



Human Landing System (HLS) Starship Artemis III Concept of Operations











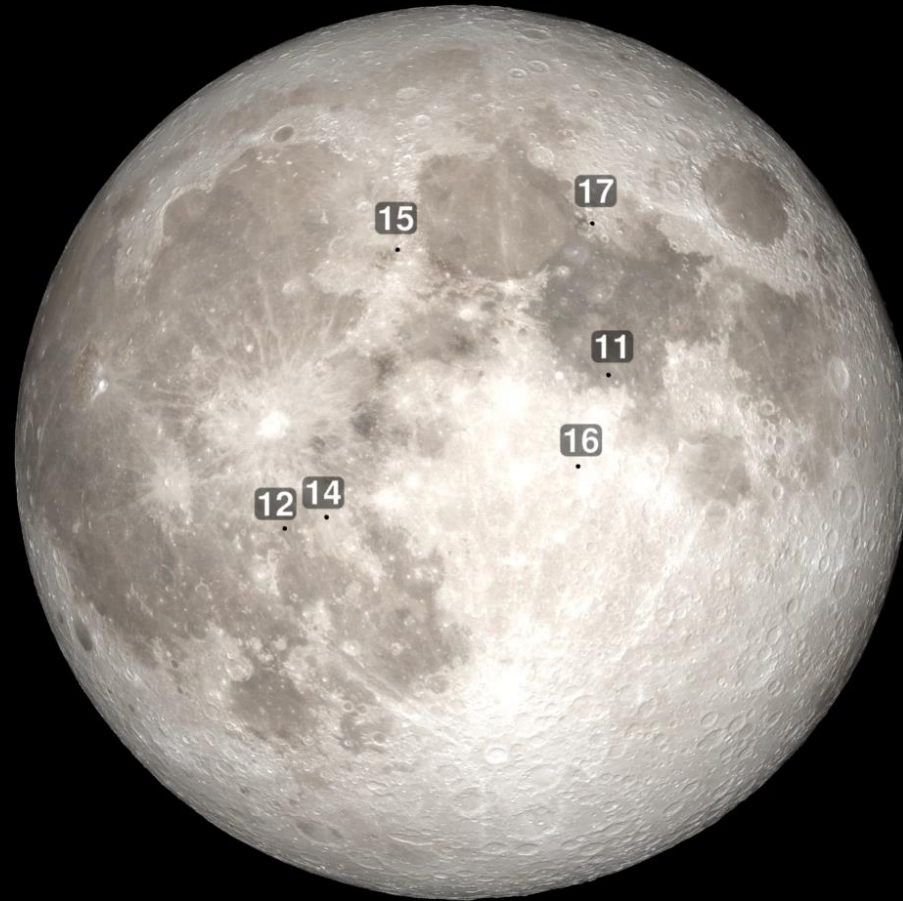
SN8 Launch



SN15 Landing



LUNAR SOUTH POLE



Artemis III Candidate Landing Regions



KEY LANDING REGION CONSIDERATIONS

Proximity to the South Pole

Gentle slope for landing and moonwalks

Constant view to Earth for communications

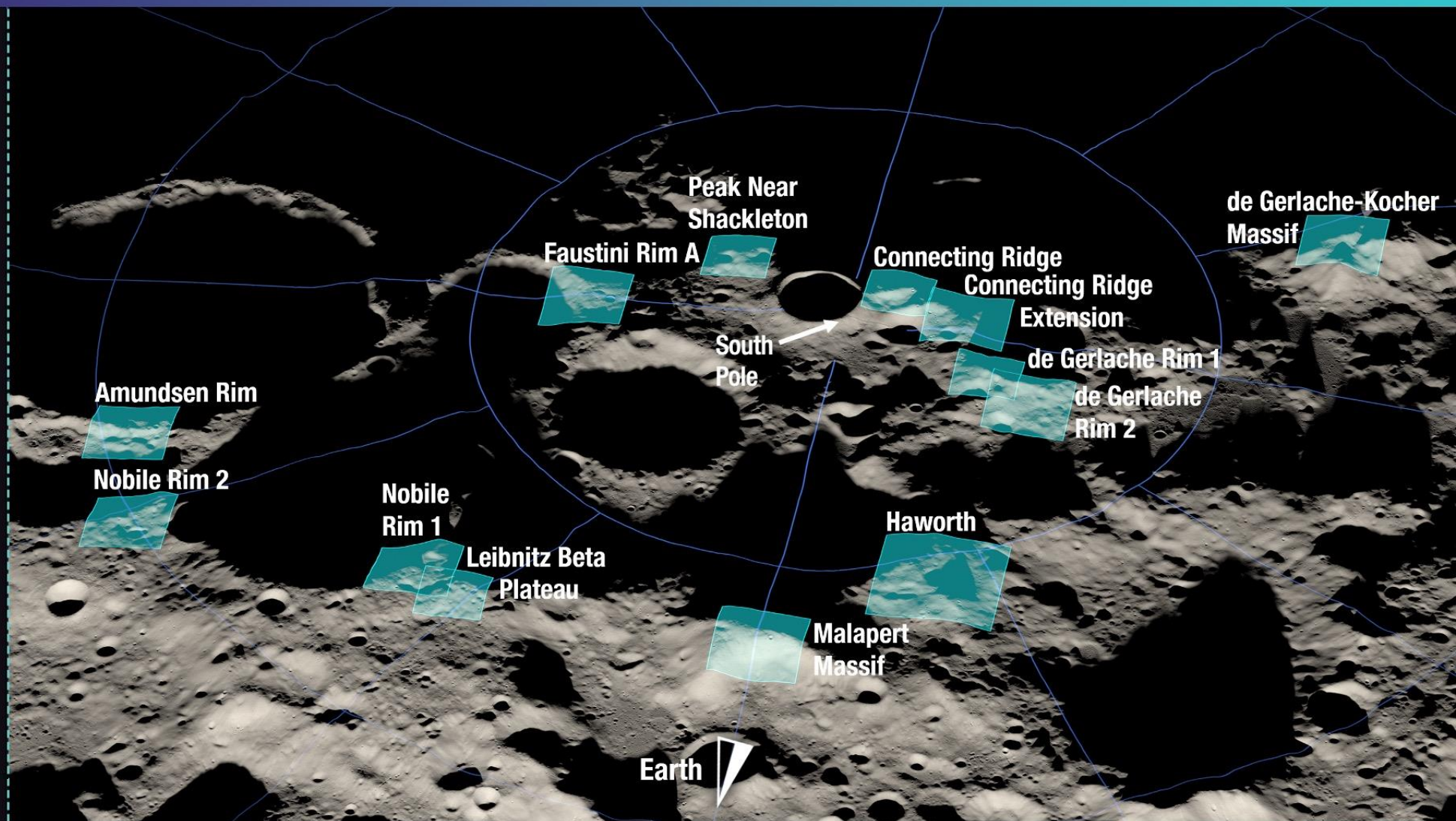
Continuous sunlight throughout the surface expedition of about 6.5 days

Landing Accuracy

Surface data resolution

Combined mission vehicle capabilities: Space Launch System, Orion spacecraft, Starship Human Landing System

A landing *region* is approximately 15 km². Each landing region includes multiple potential landing sites.







Follow the missions

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