

NASA's Return to the Moon

National Aeronautics and
Space Administration



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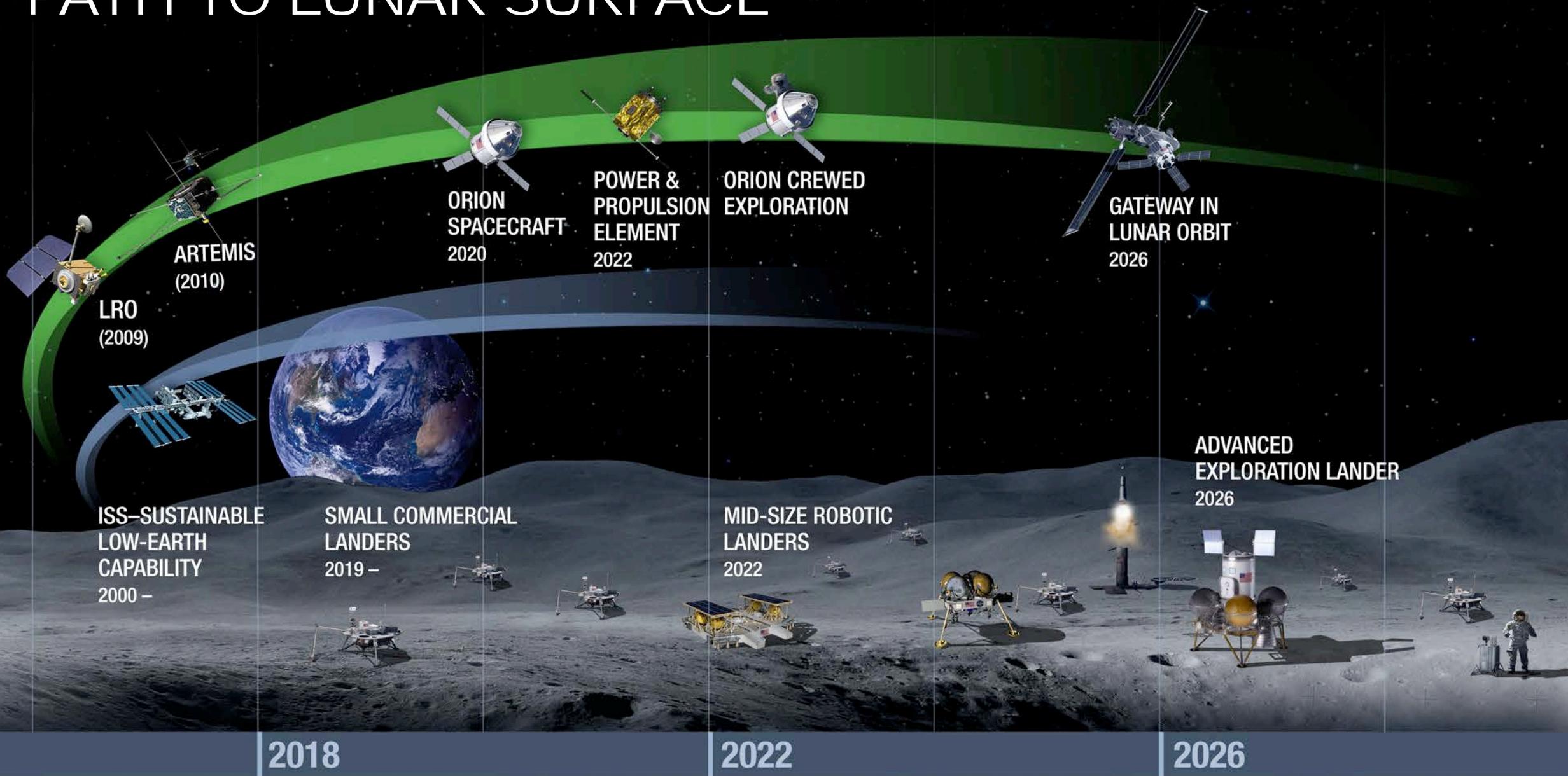


SPACE POLICY DIRECTIVE-1

“Lead an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and to bring back to Earth new knowledge and opportunities.

Beginning with missions beyond low-Earth orbit, **the United States will lead the return of humans to the Moon for long-term exploration and utilization, followed by human missions to Mars and other destinations.”**

PATH TO LUNAR SURFACE



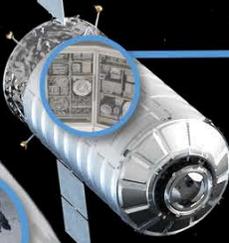
GATEWAY

A spaceport for human and robotic exploration of the Moon and beyond



HUMAN ACCESS TO & FROM LUNAR SURFACE

Astronaut support and teleoperations of surface assets.



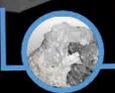
U.S. AND INTERNATIONAL CARGO RESUPPLY

Expanding the space economy with supplies delivered aboard partner ships that also provide interim spacecraft volume for additional utilization.



SAMPLE RETURN

Pristine samples robotically delivered to the Gateway for safe processing and return to Earth.



INTERNATIONAL CREW

International crew expeditions for up to 30 days as early as 2024. Longer expeditions as new elements are delivered to the Gateway.

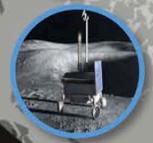


SCIENCE AND TECH DEMOS

Support payloads inside, affixed outside, free-flying nearby, or on the lunar surface. Experiments and investigations continue operating autonomously when crew is not present.

COMMUNICATIONS RELAY

Data transfer for surface and orbital robotic missions and high-rate communications to and from Earth.



SIX DAYS TO ORBIT THE MOON

The orbit keeps the crew in constant communication with Earth and out of the Moon's shadow.

A HUB FOR FARTHER DESTINATIONS

From this orbit, vehicles can embark to multiple destinations: The Moon, Mars and beyond.

GATEWAY SPECS



50 kW Solar Electric Propulsion



4 Crew Members



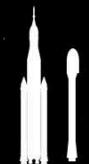
30-90 Day Crew Missions



125 m³ Pressurized Volume



Up to 75 mt with Orion docked



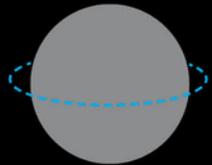
384,000 km from Earth

Accessible via NASA's SLS as well as international and commercial ships.

GATEWAY ORBIT

Cislunar space offers innumerable orbits for consideration, each with merit for a variety of operations. The Gateway will support missions to the lunar surface and serve as a staging area for exploration farther into the solar system, including Mars.

ORBIT TYPES



LOW LUNAR ORBITS

Circular or elliptical orbits close to the surface. Excellent for remote sensing, difficult to maintain in gravity well.

» Orbit period: 2 hours

DISTANT RETRO-GRADE ORBITS

Very large, circular, stable orbits. Easy to reach from Earth, but far from lunar surface.

» Orbit period: 2 weeks

HALO ORBITS

Fuel-efficient orbits revolving around Earth-Moon neutral-gravity points.

» Orbit period: 1-2 weeks

NEAR-RECTILINEAR HALO ORBIT (NRHO)

1,500 km at its closest to the lunar surface, 70,000 km at its farthest.



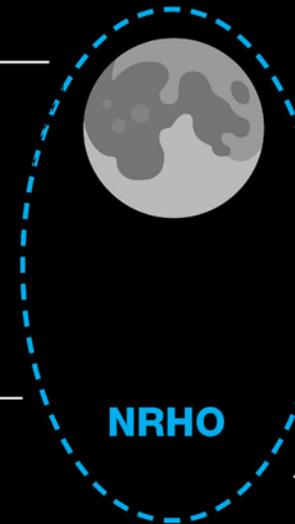
ACCESS

Easy to access from Earth orbit with many current launch vehicles. Staging point for both lunar surface and deep space destinations.



ENVIRONMENT

Deep space environment useful for radiation testing and experiments in preparation for missions to the lunar surface and Mars.



SCIENCE

Favorable vantage point for Earth, sun and deep space observations.



COMMUNICATIONS

Provides continuous view of Earth and communication relay for lunar farside.



SURFACE OPERATIONS

Supports surface telerobotics, including lunar farside. Provides a staging point for planetary sample return missions.



EXPLORE

