National Aeronautics and Space Administration

NASA'S ORION SPACECRAFT

NASA is building a sustainable presence on and around the Moon as part of the Artemis Program. The journey begins with the Orion spacecraft – NASA's next generation spaceship that will launch atop the world's most powerful rocket to take astronauts on a journey of exploration to the Moon and on to Mars. Orion is part of NASA's backbone for deep space exploration, along with the Space Launch System rocket and the lunar Gateway.

To protect astronauts on these long-duration missions and return them safely to Earth, Orion engineers have woven innovative technology, advanced systems and state-of-the-art thermal protection into the fabric of the spacecraft. The team behind Orion has built upon the past 50 years of space exploration experience in human spaceflight, launch operations, robotic precursor missions, in-space construction and mission management.

ARTEMIS I

The first uncrewed, integrated flight test of NASA's Orion spacecraft and Space Launch System rocket, launching from a modernized Kennedy spaceport

1 LAUNCH
SLS and Orion lift off from pad 39B at Kennedy Space Center

2 JETTISON ROCKET BOOSTERS
Solid rocket boosters separate

3 JETTISON LAUNCH ABORT SYSTEM (LAS)
The LAS is no longer needed, Orion could safely abort

4 CORE STAGE MAIN ENGINE CUT OFF (MECO) AND SEPARATION

5 ENTER EARTH ORBIT
Perform the perigee raise maneuver

6 EARTH ORBIT
Systems check and solar panel adjustments

7 TRANS LUNAR INJECTION (TLI) BURN
Burn lasts for approximately 20 minutes

8 INTERIM CRYOGENIC PROPULSION STAGE (ICPS) SEPARATION
The ICPS has committed Orion to TLI

9 OUTBOUND TRANSIT
Requires several attitude maneuvers

10 OUTBOUND TRAJECTORY CORRECTION (OTC) BURNS
As necessary adjust trajectory for Lunar flyby to DRO

11 OUTBOUND POWERED FLYBY (OPF)
62 miles from the Moon; targets DRO insertion

Heliocentric Disposal precludes re-contact

12 ORBIT INSERTION
Enter Distant Retrograde Orbit for next 6-23 days

13 DISTANT RETROGRADE ORBIT (DRO)
Orbit Maintenance burns and solar panel adjustments; 38,000 nmi from the surface of the Moon

14 DRO DEPARTURE
Leave DRO and start return to Earth

15 RETURN POWER FLY-BY (RPF)
RPF burn prep and return coast to Earth initiated

16 RETURN TRANSIT
Return Trajectory Correction (RTC) burns as necessary to aim for Earth's atmosphere; travel time 3-11 days

17 FINAL RETURN TRAJECTORY CORRECTION (RTC) BURN
Precision targeting for Earth entry

18 ENTRY INTERFACE (EI)
Enter Earth's atmosphere

19 SPLASHDOWN
Pacific Ocean landing within view of the U.S. Navy recovery ships

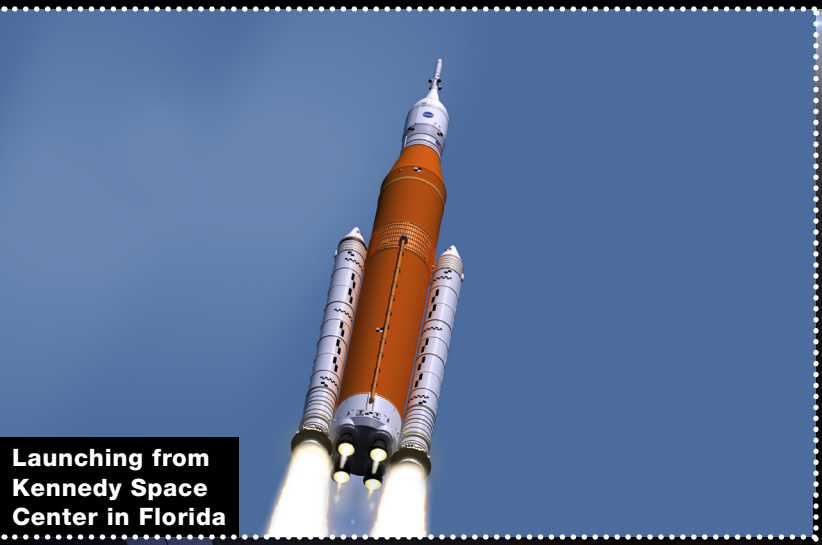
A B C D
CUBESATS DEPLOY
ICPS deploys 13 CubeSats total

ARTEMIS

Launch | Earth Orbit | Trans Lunar | Lunar Orbit | Trans Earth | Earth Re-entry | Payload Orbit/Disposal

ARTEMIS I

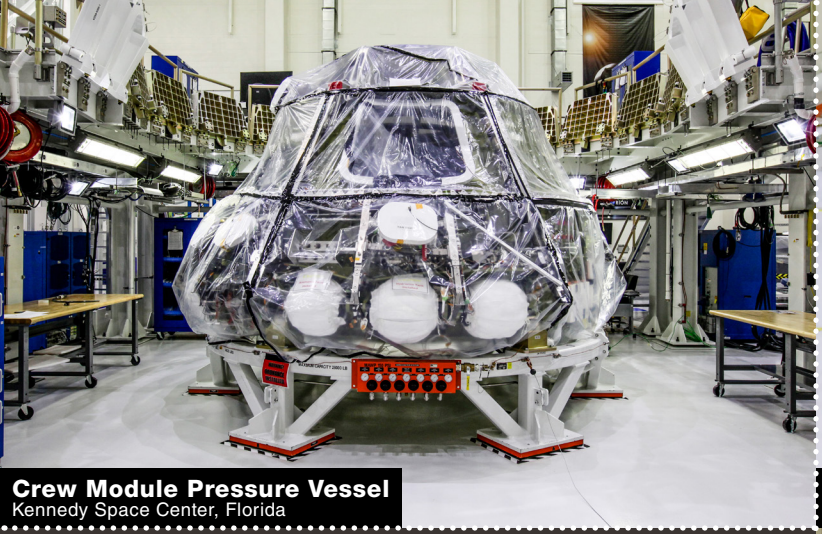
Total distance traveled: 1.3 million miles – Mission duration: 26-42 days – Re-entry speed: 24,500 mph (Mach 32) – 13 CubeSats deployed


Launching from Kennedy Space Center in Florida

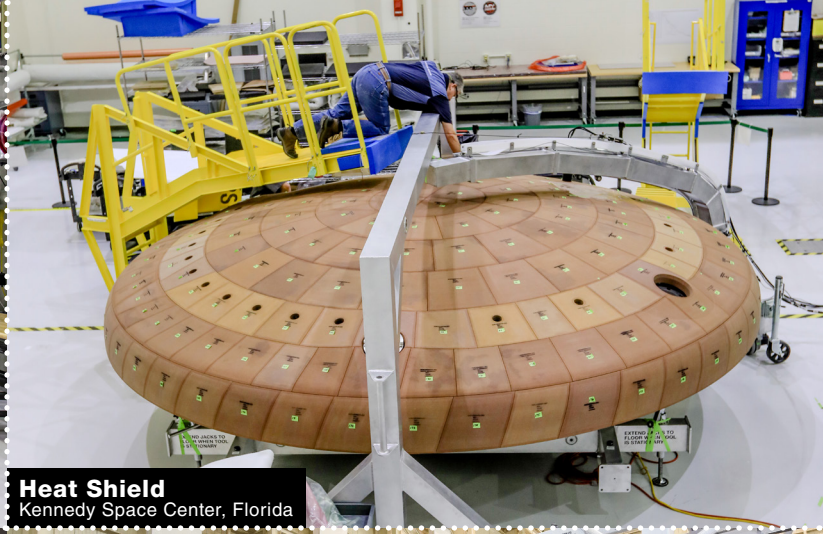

Lunar Flyby


Orion approaching the lunar Gateway


Returning to Earth at 25,000 MPH



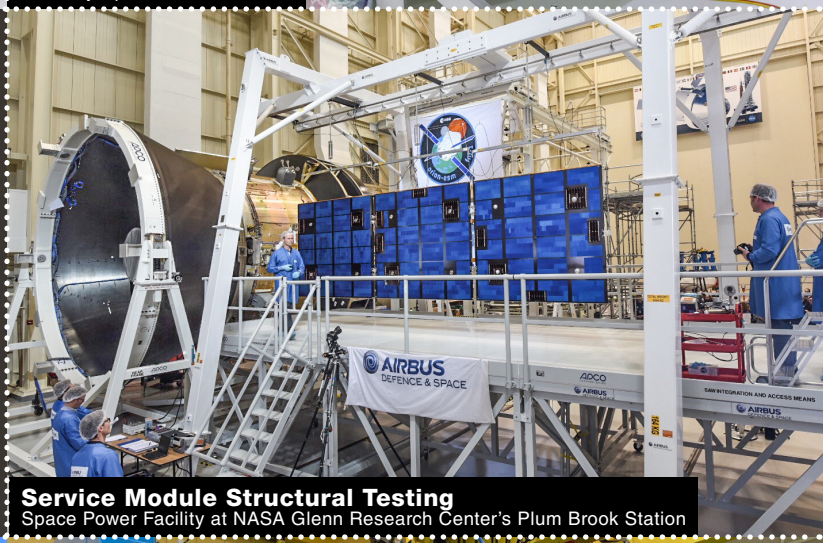
Crew Module Pressure Vessel
Kennedy Space Center, Florida



Heat Shield
Kennedy Space Center, Florida

Artemis I

The Space Launch System rocket with Orion atop is targeted to launch from Kennedy's Launch Pad 39B. Artemis 1 will send Orion on a path more than 40,000 miles beyond the Moon over a course of three weeks, farther into space than human spaceflight has ever traveled before. The spacecraft will return to Earth and safely splash down in the Pacific Ocean off the coast of California. The mission will advance and validate capabilities required for human exploration of Mars.

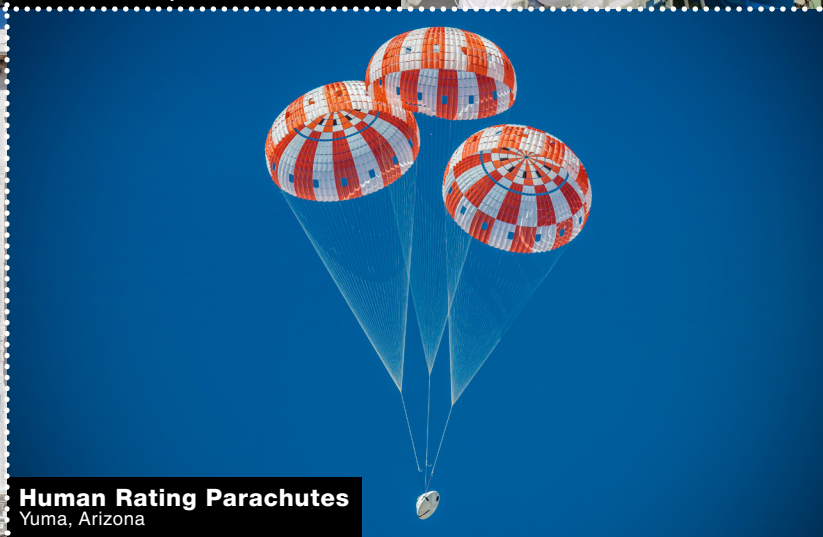


Service Module Structural Testing
Space Power Facility at NASA Glenn Research Center's Plum Brook Station

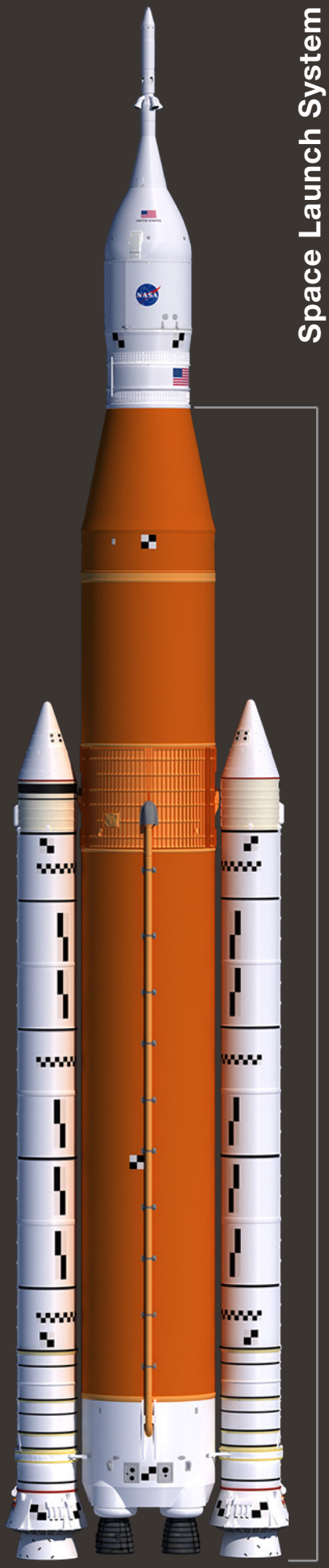
Jettison Motor Test
Sacramento, California

Service Module Flight Article
Bremen, Germany

Propulsion Qualification Module Testing
White Sands Test Facility, New Mexico



Human Rating Parachutes
Yuma, Arizona



Space Launch System

The Space Launch System is a powerful launch vehicle, which will expand human presence to celestial destinations beyond low-Earth orbit and throughout the solar system. SLS is the only rocket that can send Orion, astronauts and supplies to the Moon on a single mission.

Orion Spacecraft

1 **Launch Abort System**
The launch abort system, positioned on a tower atop the crew module, can activate within milliseconds to propel the vehicle to safety and position the crew module for a safe landing.

2 **Crew Module**
The crew module is capable of transporting four crew members beyond the Moon, providing a safe habitat from launch through landing and recovery. Inside the familiar deep-space capsule shape are advances in life support, avionics, power systems, and advanced manufacturing techniques.

3 **Service Module**
Created in collaboration with ESA (European Space Agency), the service module provides support to the crew module from launch through separation prior to entry. It provides in-space propulsion for orbital transfer, power and thermal control, attitude control and high altitude ascent aborts. While mated with the crew module, it also provides water and air to support the crew.

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