



NASA'S Human Landing System: Demonstrating the Capability to Land Artemis Astronauts on the Moon by 2028

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Artemis Human Landing Systems (HLS)



STARSHIP

- 171 ft (52 m)
- Powered by 6 liquid methane/liquid oxygen Raptor engines
- Launches on SpaceX Super Heavy
- Lander is second stage of launch vehicle
- Launches from Starbase, Texas, and KSC LC-39A, Florida
- Crew compartment at top of rocket
- Crew descends to surface via simple elevator



Image Credit: SpaceX

BLUE MOON

- 52 ft (16 m)
- Powered by 3 liquid hydrogen/liquid oxygen BE-7 engines
- Launches on Blue Origin New Glenn
- Lander encapsulated in payload fairing
- Launches from KSC LC-36, Florida
- Crew compartment at aft end
- Crew descends to surface of the Moon by ladder



Image Credit: Blue Origin

Artemis Human Landing Systems (HLS)

CARGO LANDERS

Cargo variants of SpaceX and Blue Origin's crewed landers will deliver large payloads – approximately 33,000 pounds (15 mT) – to the lunar surface for sustained exploration.

NASA intends to award SpaceX the mission to deliver a pressurized rover, currently in development by JAXA, to the lunar surface no earlier than FY 2032.

NASA intends to award Blue Origin the mission to deliver a lunar surface habitat to the Moon no earlier than FY 2033.



HLS Provider Progress Toward Artemis Missions



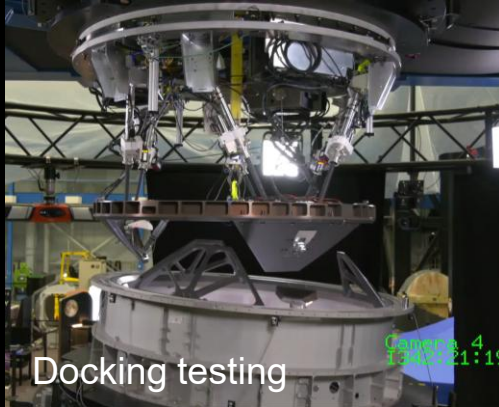
Blue Origin Development Progress



Thruster testing



MK1 systems,
manufacturing
commonality



Docking testing



Crew Cabin prototype



NBL testing



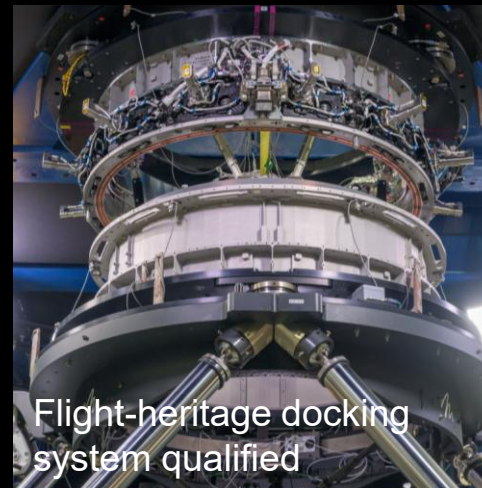
ARGOS testing



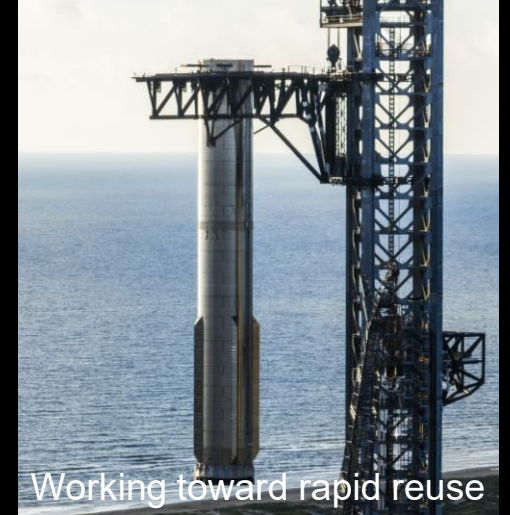
Flight testing



Raptor dev, production



Flight-heritage docking
system qualified



Working toward rapid reuse



Crew-in-the-loop testing

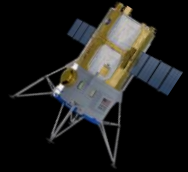


Cape launch capabilities

SpaceX Development Progress

ARTEMIS III

Concept of Operations



Low Earth Orbit

Earth

Blue Moon
HLS Launch
on New Glenn

Blue Moon
HLS test
article in
orbit

SLS / Orion
Launch
with Crew

Orion in
Orbit

Orion – Blue Moon
rendezvous &
docking operations

Orion & Blue
Moon
undock

Starship HLS
launch

Starship
HLS test
article in
orbit

Orion transit
to Starship

Orion - Starship
rendezvous &
docking
operations

Orion –
Starship
undock

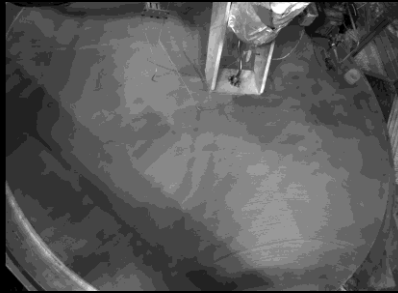
Orion return,
landing & crew
recovery

**All three launches expected from Cape Canaveral, FL*

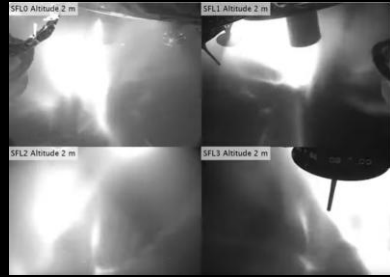
HLS Program-Provider Partnership Drives Outcomes



Risk Reduction Testing



Plume-surface interaction testing at LRC

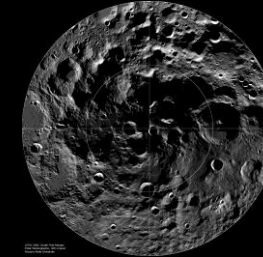


SCALPSS PSI data from CLPS

Collaborations



Thermal analysis at MSFC

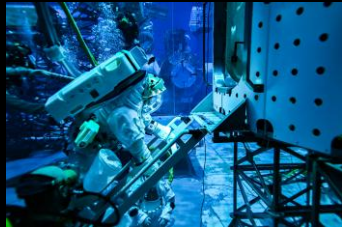


Lunar landing site selection



Blue Origin LC-36B Rebuild

Government Task Agreements



Provider NBL runs at JSC



Wind tunnel testing at ARC



Lunar lighting studies at MSFC



Docking qualification at JSC

Training & Certification



NASA-provider integrated sims



Lander-specific training from providers



NASA-provided foundational training

Q4 2026

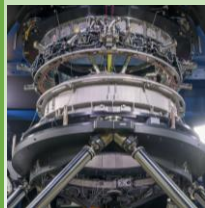
Q1 2027

Q2 2027

Q3 2027

Q4 2027

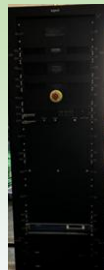
Artemis III Starship Test Article Build



Passive
Docking
Mechanical
Fit Check



Docking System &
Aerocover Integration



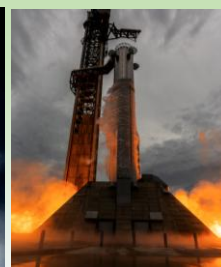
Emulator
Delivery



Comms Systems
Complete



Ship,
Booster Cryo



Ship, Booster
Engine Install,
Static Fire



Barge to Cape



Artemis III
Mission

**Some images representative
of flight hardware
*Images and renderings
courtesy of SpaceX, Orion*

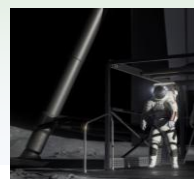
“Cabin One” Flight-Like Crew Compartment Build at Starbase



Cabin One
Build Complete



Cabin One
Operations Testing



Landing Leg
Demo



Cabin One
Airlock Demo

Launch Infrastructure & Flight Testing



First
Orbital
Flight



1st v3
Booster
Catch



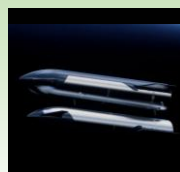
First
Ship
Catch



First
Cape
Flight



First v3
Booster
Reuse



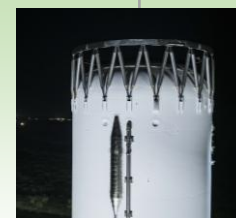
Prop
Transfer
Demo



2nd Pad at
Cape (LC37)
Complete



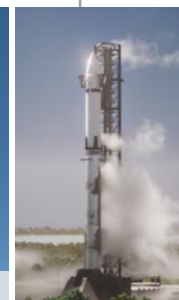
Ongoing
Flight
Tests



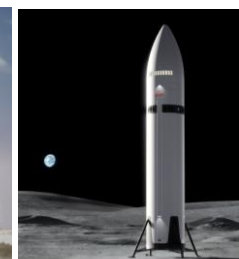
Tank
Pressurization
Upgrades



UCD
First
Tanker
Flight



UCD
Lander
Launch



Uncrewed
Demo
Mission

Q4 2026

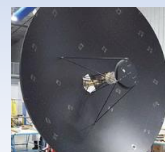
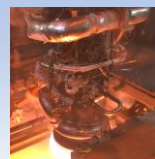
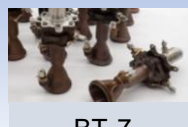
Q1 2027

Q2 2027

Q3 2027

Q4 2027

Q1 2028

Artemis III Build**Flight Software**Flight Software Final
Release**Forward, Mid, Aft Modules****Lunar Crew Module**Dome & Tunnel
Machine & Coat
CompleteBarrel
Panels
Form,
Machine,
Coat
CompleteWeldment
Complete,
Proof
TestingComms
Systems
CompleteAssembly
Integration
& TestingIntegration &
Encapsulation
with New
Glenn**Artemis III Mission**MK2 UCD, supporting
systems build**Some images representative of
flight hardware
*Images and renderings courtesy
of Blue Origin, Europa Clipper*BE-7
TestingBT-7 Build,
Qual, Test**Propulsion**BT-7
Thruster
DeliveryUCD BE-7s
deliveredBE7 engine
qualification completeArtemis III
IDR2028 Landing Mission
CDRUCD MK2
Launch**Uncrewed
Demo
Mission****Launch Infrastructure & Precursor Missions**New Glenn 7x2
Return to FlightNG 9x4 Vertical
Integration
Facility OnlineBlue Moon
MK1 CLPS FlightNG 9x4 (LC-
36B) Pad
CompleteFirst
New
Glenn
9x4
FlightBlue
Moon
MK1
Flight 2Blue
Moon
MK1
Flight 3

Resilient Artemis Architecture Blends the Best of NASA, Industry



Artemis III (2027)

Test Orion with both landers in Earth orbit

Artemis IV (early 2028)

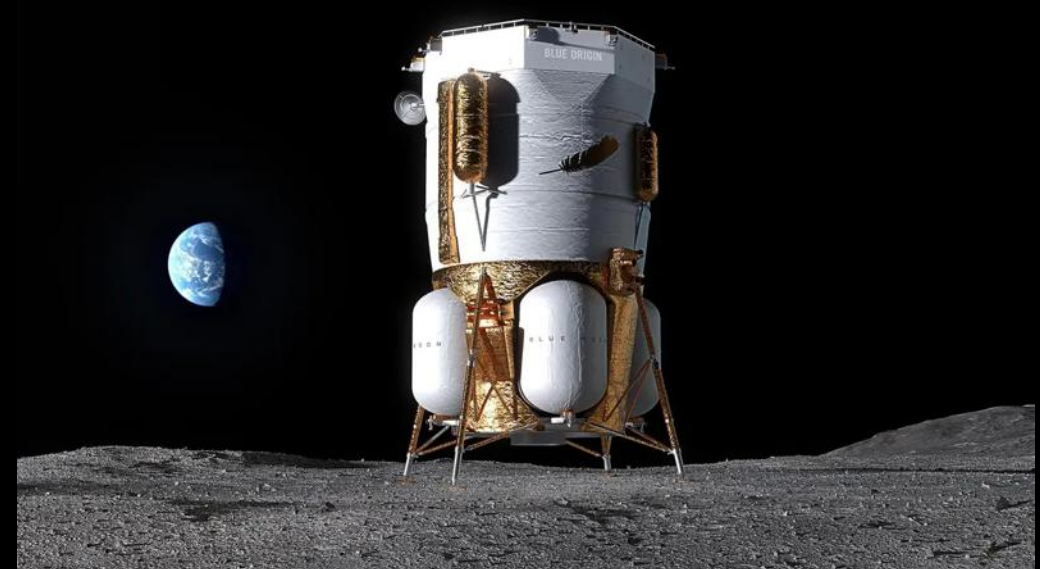
First crewed lunar landing since 1972
TBD which lander will be used

Artemis V (late 2028)

Second crewed lunar landing

Other major HLS milestones

Starship v3 flight testing
Starship long-duration orbital test +
Starship large-scale cryogenic propellant transfer test
Blue Origin Blue Moon MK1 lunar landing
Uncrewed lunar landing demonstrations from both providers





Artemis is Bringing Moon Joy to the World

@NASAARTEMIS



Total estimated broadcast reach for Artemis II:

570 million+