

NASA returning to the Moon with mega rocket launch

November 15 2022, by Lucie AUBOURG



The Artemis 1 mission, a test flight without astronauts on board, represents the first step in the agency's plan to build a lasting presence on the Moon, taking lessons from there to prepare for a future voyage to Mars.

Third time's the charm? After two failed attempts, NASA was readying

to launch its new mega Moon rocket early Wednesday from Florida, less than a week after the massive machine withstood a hurricane.

"Our time is coming. And we hope that that is on Wednesday," said Mike Sarafin, the manager of the much-delayed Artemis 1 mission, at NASA headquarters.

The weather promises to be favorable, with an 80 percent chance of launch during a two hour window that begins at 1:04 am local time (0604 GMT).

As expected, Charlie Blackwell-Thompson, NASA's first female launch director, gave her go-ahead on Tuesday afternoon to begin fueling operations.

The Artemis 1 mission, a test flight without astronauts, represents the first step in the US space agency's plan to build a lasting presence on the Moon, and take lessons from there to prepare for a future voyage to Mars in the 2030s.

Named after the sister of Apollo in Greek mythology, the new space program comes 50 years after humans last set foot on lunar soil.

It will be the first launch of the 32-story tall Space Launch System rocket, the most powerful ever designed by NASA.

Countdown has already begun at the storied Kennedy Space Center, where the orange and white behemoth awaits its maiden flight.

The takeoff is scheduled less than a week after the passage of Hurricane Nicole, which the rocket endured outside on its launch pad.

The hurricane damaged a thin strip of caulk-like material which

encircles the Orion crew capsule atop the rocket, making it more aerodynamic. However, NASA said Monday that this posed a minimal risk.

Two backup dates are possible, if needed, on November 19 and 25.

'Extremely excited'

About 100,000 people are expected on the coast to watch the launch, with the rocket promising to light up the night sky.

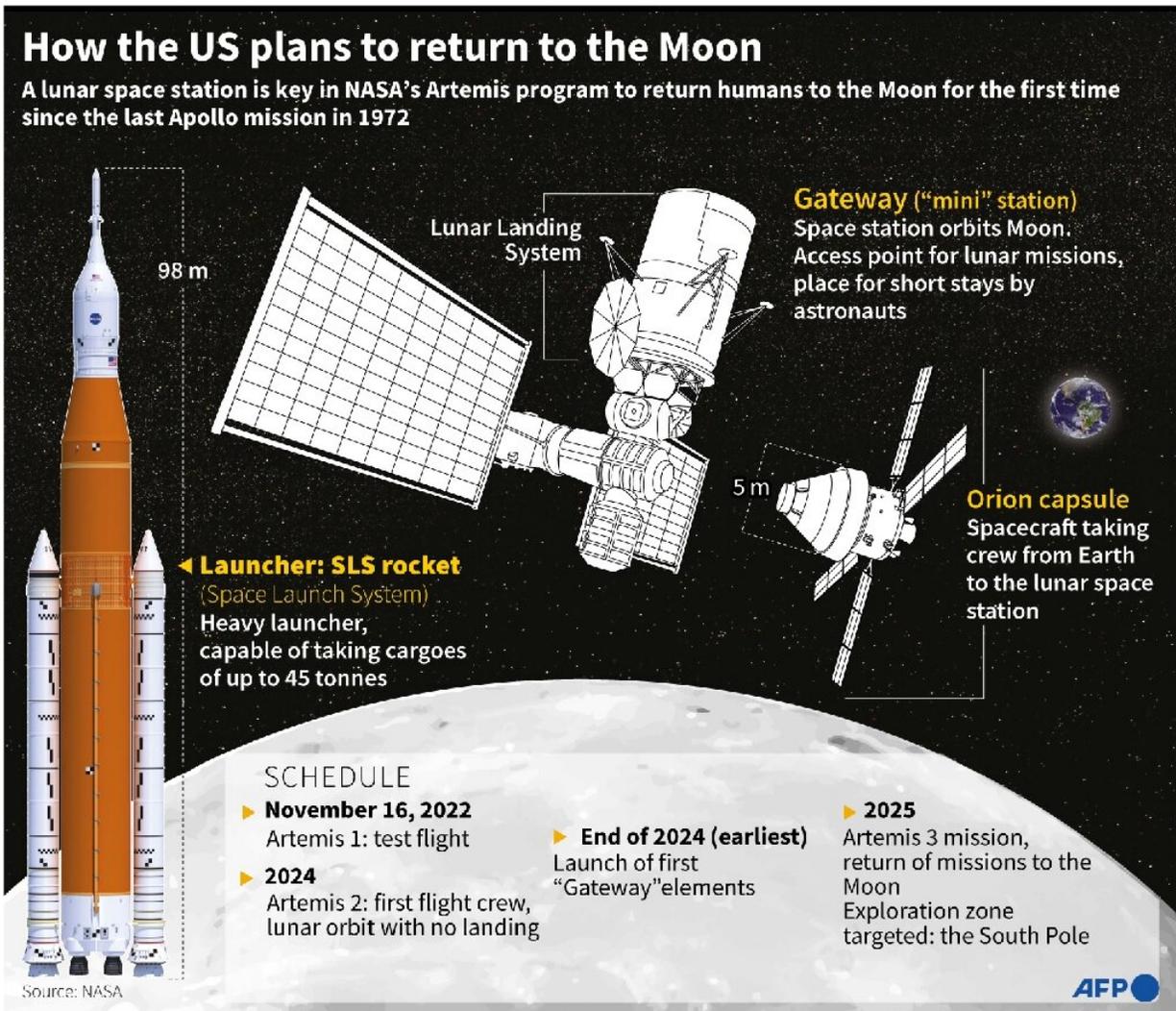
Andrew Trombley, a space enthusiast from St. Louis, Missouri, is anxiously hoping for a successful liftoff after several futile trips for the launch.

"I've been down here a couple of times already to watch this thing go up and have it canceled so, this is like, whatever, the third trip down here for this, so I'm excited to see it go," said the network engineer.

"I was too little for the Apollo missions, so ... I wanted to be here in person."

How the US plans to return to the Moon

A lunar space station is key in NASA's Artemis program to return humans to the Moon for the first time since the last Apollo mission in 1972



98 m

Launcher: SLS rocket
(Space Launch System)
Heavy launcher, capable of taking cargoes of up to 45 tonnes

Lunar Landing System

Gateway ("mini" station)
Space station orbits Moon. Access point for lunar missions, place for short stays by astronauts

5 m

Orion capsule
Spacecraft taking crew from Earth to the lunar space station

SCHEDULE

- ▶ **November 16, 2022**
Artemis 1: test flight
- ▶ **2024**
Artemis 2: first flight crew, lunar orbit with no landing
- ▶ **End of 2024 (earliest)**
Launch of first "Gateway" elements
- ▶ **2025**
Artemis 3 mission, return of missions to the Moon
Exploration zone targeted: the South Pole

Source: NASA

AFP

Graphic on NASA's Artemis program to establish a mini-space station orbiting the Moon before landing on the surface in 2024.

The launch has attracted hordes of tourists, as well as locals.

Kerry Warner, 59, a grandmother and semi-retired educator who lives in Florida, is fired up for liftoff, which she said was "part of America and what America is all about."

"Third time's the charm, we're hoping for it."

Far side of Moon

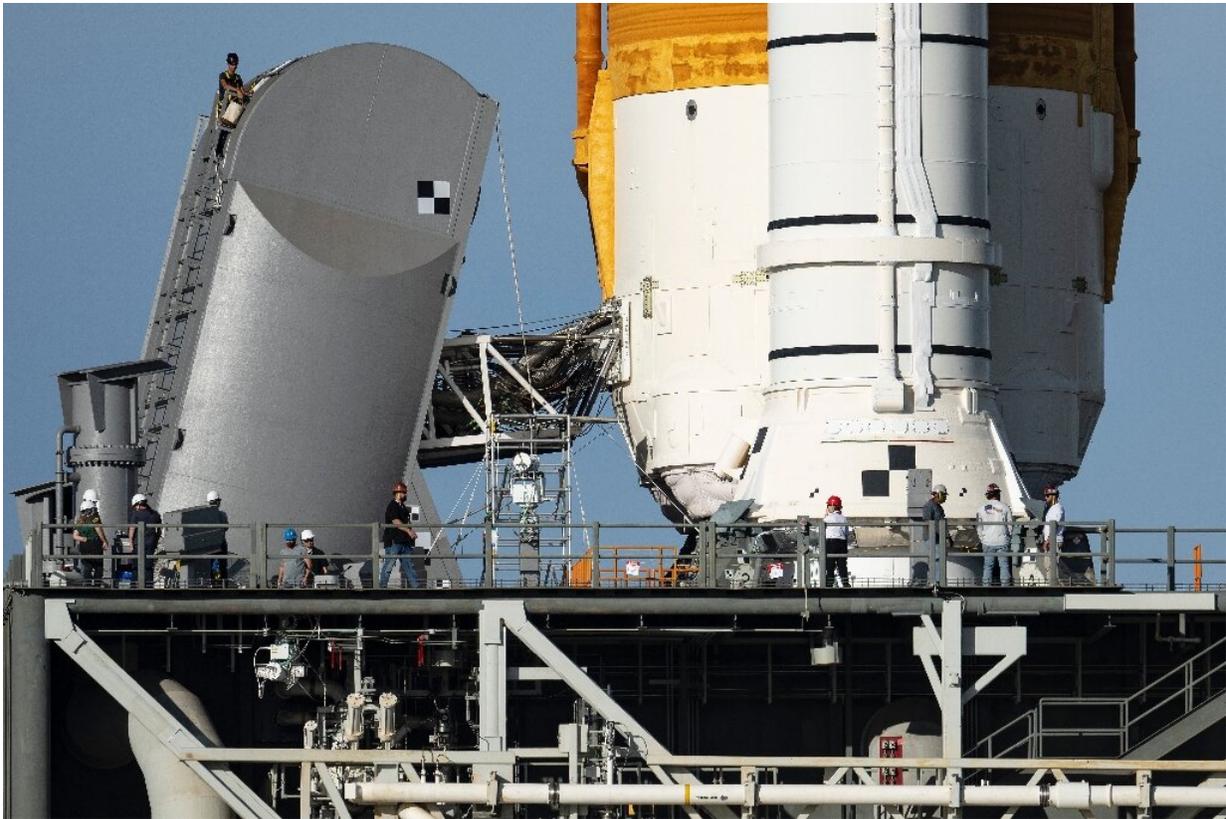
At the end of September, the rocket had to be wheeled back to its assembly building to be sheltered from another hurricane, Ian.

Before these weather setbacks, two launch attempts were canceled for technical reasons.

The first failure was related to a faulty sensor, and the second to a fuel leak when filling the rocket's tanks. It runs on ultra-cold, ultra-volatile liquid oxygen and hydrogen.

NASA has since replaced a seal and modified its procedures to avoid thermal shock as much as possible.

The Orion capsule will be lifted by two boosters and four powerful engines under the core stage, which will detach after only a few minutes.



Engineers work on the Tail Service Mast Umbilical of the Artemis I unmanned lunar rocket as it sits on launch pad 39B at NASA's Kennedy Space Center.

After a final push from the upper stage, the capsule will be well on its way, taking several days to reach its destination.

Rather than landing on the Moon, it will assume a distant orbit, venturing 40,000 miles (64,000 kilometers) beyond the far side—further than any other habitable spacecraft so far.

Finally, Orion will embark on the return leg of its journey. When passing through the atmosphere, the capsule's heat shield will need to withstand a temperature half as hot as the Sun's surface.

If takeoff happens Wednesday, the mission will last 25 and a half days, with a splashdown in the Pacific Ocean on December 11.

NASA is banking on a successful mission after developing the SLS rocket for more than a decade. It will have invested more than \$90 billion in its new lunar program by the end of 2025, according to a public audit.

Artemis 2 will involve a flyby of the Moon with astronauts in 2024.

Boots on the ground should happen during Artemis 3, no sooner than 2025, with the crew set to include the first woman and first person of color on the Moon.

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