NASA launching new Orion spacecraft on test flight (Update)

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In this Nov. 12, 2014 file photo, after a 22-mile journey from the Launch Abort System Facility at the Kennedy Space Center, the Orion Spacecraft arrives at Space Launch Complex 37B at the Cape Canaveral Air Force Station, in Cape Canaveral, Fla. The test flight for Orion is scheduled to launch on Dec. 4. (AP Photo/John Raoux, File)

NASA's quest to send astronauts out into the solar system begins this week with a two-laps-around-Earth test flight.

The new Orion spacecraft is not going to Mars just yet; Thursday's debut will be unmanned and last just 4½ hours. But it will be the farthest a built-for-humans capsule has flown since the Apollo moon missions, shooting 3,600 miles (5,800 kilometers) out into space in order to gain enough momentum to re-enter the atmosphere at a scorching 20,000 mph (32,000 kph).

The dry run, if all goes well, will end with a Pacific splashdown off Mexico's Baja coast. Navy ships will recover the capsule for future use.

This initial Orion is rigged with 1,200 sensors to gauge its durability for the day when astronauts do climb aboard during the decade ahead. Advertised destinations include an asteroid to be corralled in lunar orbit for human exploration in the 2020s, followed by Mars in the 2030s.

"We're approaching this as pioneers," said William Hill of NASA's exploration systems development office. "We're going out to stay eventually. ... It's many, many decades away, but that's our intent."

Lockheed Martin Corp. built the capsule and is staging the $370 million test flight for NASA.

Orion is NASA's first new spacecraft for humans in more than a generation, succeeding the now-retired space shuttles. Unlike the capsules under development by two U.S. companies for space station crew transport, Orion is meant for the long haul, both in time and space; it would be supplemented with habitats for potential Mars trips.

"We need a spacecraft that's going to be sturdy enough and robust enough" to carry astronauts well beyond low-Earth orbit for weeks and months at a time, said Lockheed Martin's Bryan Austin, a former NASA shuttle flight director who will oversee Orion's maiden voyage.

"That's how Orion really separates itself from the commercial field. They're there to get you to station and back. Of course, we're there to be hardened enough to sustain it for that long duration."

In this Nov. 11, 2014 file photo, the Orion Spacecraft moves by the Vehicle Assembly Building on its approximately 22-mile journey from the Launch Abort System Facility at the Kennedy Space Center to Space Launch Complex 37B at the Cape Canaveral Air Force Station in Cape Canaveral, Fla. The test flight for Orion is scheduled to launch on Dec. 4. (AP Photo/John Raoux, File)

For this orbital tryout, a Delta IV rocket will hoist Orion from Cape Canaveral Air Force Station. Liftoff is scheduled for 7:05 a.m. EST (1205 GMT), just after sunrise. The rocket, with Orion and its launch escape tower at the tiptop, stretches 242 feet (74 meters) high.

Future Orion launches will use the mega rocket still under development

by NASA, known as SLS or Space Launch System. The first Orion-SLS launch is targeted for 2018, unmanned, followed by the first piloted mission in 2021.

No one at NASA is pleased with such a slow pace. At best, it will be seven years before astronauts fly Orion—anywhere. By comparison, it took eight years from the time President John Kennedy announced his intentions of landing a man on the moon—before John Glenn had even rocketed into orbit—to Neil Armstrong and Buzz Aldrin's lunar boot prints in 1969.

Given the present budget situation, "it is what it is," said Kennedy Space Center's director Robert Cabana, a former astronaut. And the presidential election ahead could bring further delays and uncertainties.

But don't confuse Orion with NASA's old-time Apollo capsules.

The 11-foot (3.3-meter)-tall Orion is designed to hold four astronauts, one more than Apollo. For relatively short outings of three weeks or so, Orion could accommodate six.

"People often ask us, 'Hey, this thing looks like a capsule, it looks like Apollo,' and people will confuse that with 'it's not new,' " said Scott Wilson, NASA's Orion production operations manager. While physics drives the capsule's outer bell shape, "everything else in the capsule is state-of-the-art," he said.

"Everything, from the thrusters, from the environmental control systems, to the structure itself" is benefiting from all the advances in technology, Wilson said. With no one on board, this first Orion will have hunks of aluminum in place of seats for ballast, simulators instead of cockpit displays and, obviously, no life-support.

The heat shield on Orion's base, designed to protect the craft from the searing temperatures of atmospheric re-entry, is 16.5 feet (5 meters) across and is the biggest, most advanced of its kind ever made, according to NASA. On this flight, Orion will reach close to 4,000 degrees Fahrenheit, not quite the 5,000 degrees F that would be generated from a moon mission, but close enough for a shakedown.

That's why Orion will aim for a 3,600-mile (5,800-kilometer)-high peak altitude, more than 14 times higher than the International Space Station—to pick up enough speed to come back fast and hot.

More information: NASA: www.nasa.gov/orion/

Lockheed Martin: www.lockheedmartin.com/us/ssc/orion-eft1.html