

NASA gears up for Artemis I tanking test for shot to launch next week

September 19 2022, by Richard Tribou, Orlando Sentinel



Credit: NASA

The fixes have been addressed, so now it's time to add some stress to ensure NASA's Artemis I mission success.

NASA says it has repaired fuel lines running from the mobile launcher into the Space Launch System rocket at Kennedy Space Center's Launch Pad 39-B in the last week. Now, it will run through a full propellant load, targeting 7:15 a.m. Eastern time Wednesday as part of a test that could give the [space agency](#) a shot to launch as early as Sept. 27 to send the Orion spacecraft on a multiweek mission to orbit the moon.

Artemis I is an uncrewed flight that will push the extremes of the capsule sending it farther out beyond the moon and bring it back home to Earth faster than any other previous human-rated spacecraft to make sure it will be safe for astronauts on future Artemis missions.

Getting SLS and Orion off the ground, though, has proved difficult, with a variety of problems surfacing during two previous launch attempts. The most recent involved a large leak of the cryogenic [liquid hydrogen](#) on one of the supply lines.

Similar but smaller leaks have given NASA headaches on both the first launch attempts and during wet dress rehearsals this past spring.

Mission managers said there were signs of debris in the fuel line that could have led to damage to seals and the resulting leak. Part of that could have been from the pressure and thermal shifts during fill operations.

"We're going to be doing what we call the kinder, gentler kind of loading operations," said NASA's Tom Whitmeyer, deputy associate administrator for Common Exploration Systems Development. "We're going to lower that pressure a little bit at the beginning of the chill-down procedures, up through the transition to fast fill, and we think that will really help with the pressure and temperature transitions in the system."

Wednesday's test looks to fully load the core stage and Interim

Cryogenic Propulsion Stage with more than 730,000 gallons of liquid hydrogen and [liquid oxygen](#), and the plan looks to adjust just how quickly those cryogenic fuels are sent into the hardware.

The Wednesday test will also let NASA run through one other countdown issue called the kick-start bleed test, during which some of the liquid hydrogen is used to cool down the four RS-25 engines at the base of the core stage to minus 423 degrees Fahrenheit so that they're not stressed when the cryogenic fuel begins flowing through them at launch.

NASA never got to that portion of the countdown during the last attempt because of the hydrogen leak, but in its first launch attempt in August, a malfunctioning sensor said one of the four engines was about 40 degrees shy of the target temperature.

Wednesday's test, which will run until about 3 p.m., has the potential to give NASA managers the satisfaction that everything is flowing as it should.

With that, NASA also has been seeking a waiver for a battery check of its self-destruct mechanism, call the flight termination system, or FTS, from the U.S. Space Force's Space Launch Delta 45, which controls the Eastern Range, the area over which rockets fly during launches.

The existing agreement between NASA and the Eastern Range only gave Artemis I a 25-day window to fly before having to recheck the FTS batteries. That can only be done at the Vehicle Assembly Building, which would require a rollback of the massive 5.75 million-pound, 322-foot-tall combination of rocket, launcher and spacecraft.

The FTS was last checked before Aug. 16 when Artemis I last rolled to the launch pad from the VAB.

"There's been continued dialogue, very good dialogue," said John Blevins, chief engineer for the Space Launch System Program. "They have the responsibility of public safety and so they've asked for additional information. We provide that additional information. ... We'll let them do what they do."

If the test goes well and the Eastern Range grants the waiver, then NASA can stay on the launch pad and shoot for two opportunities in the next two weeks.

The first is Tuesday, Sept. 27, a 70-minute window that opens at 11:37 a.m. that would fly on a nearly 40-day mission that would land back on Earth on Nov. 5. The second is Sunday, Oct. 2, a 109-minute window that opens at 2:52 p.m. and fly for roughly a 41-day mission and land on Nov. 11.

"All of the dates that we talked about are for planning purposes. We have to plan ahead," said Artemis mission manager Mike Sarafin. "We have to have a marker that we've asked the team to work for, for a whole host of reasons, and those dates that I provided are all pending—and pending the decision from the Range—and that said, we are internally marching ahead."

2022 Orlando Sentinel.

Distributed by Tribune Content Agency, LLC.

Citation: NASA gears up for Artemis I tanking test for shot to launch next week (2022, September 19) retrieved 18 April 2024 from <https://phys.org/news/2022-09-nasa-gears-artemis-tanking-shot.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.