

Boeing Starliner Ends Up in Wrong Orbit After Clock Problem

The company capped a bad week with a flawed test flight of a capsule built for NASA to carry astronauts to the space station.



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As an Atlas 5 rocket arced upward into the pre-dawn sky from Cape Canaveral in Florida on Friday morning, NASA's plans to finally break free of its reliance on Russian rockets for taking astronauts to orbit seemed to be on track.

On top of the rocket was Starliner, a capsule built by Boeing, part of a NASA strategy to delegate to private companies to handle the astronaut transportation.

Half an hour later, something went wrong, signaling that NASA would again face a setback to its goal of renewing human spaceflight to orbit from the United States. It was also bad news for Boeing at the end of a week when the company announced it would temporarily halt production of the 737 Max, the company's most popular passenger jet.

The Starliner test flight, which was intended to test the automated systems and did not carry any astronauts, ended up in the wrong orbit. The mission will now be cut short, without docking at the International Space Station and likely delaying plans that are already a couple of years behind schedule.

Boeing is struggling to overcome the worst crisis in its history, after 346 people were killed in a pair of crashes of the now grounded 737 Max, built by its commercial plane division. The production freeze of the jet could reverberate through the American economy. On Friday, United Airlines said it would extend the grounding of its 737 Max jets until early June, just days after Southwest issued a similar extension until mid-April.

The first test of Starliner, built by Boeing's space and defense division, was postponed multiple times this year. The Atlas 5 performed as designed, placing the capsule on an elliptical trajectory. The capsule itself was to make a final maneuver that would shift the orbit from elliptical to circular and allow it to meet up with the International Space Station on Saturday.

But somehow, the spacecraft's clock was set to the wrong time, and a flawed thruster burn pushed the capsule into the wrong orbit.

"We don't understand the root cause," said Jim Chilton, senior vice president of the space and launch division of defense, space and security segment of Boeing.

Attempts to send a command to fix the problem apparently did not reach the spacecraft because it was in between satellite communication links, and it used too much propellant to continue to the space station.

"That's safe to take off the table at this point," Jim Bridenstine, the NASA administrator, said during a news conference after the launch. "It's not worth doing given the amount of fuel we burned."

He also said that if there had been astronauts aboard, they would not have been in danger and indeed may have been able to take over and perform the thruster burn correctly.

Current plans are for the capsule to return to Earth on Sunday, landing at White Sands in New Mexico.

This mission did not have anyone aboard, although it did carry a spacesuit-wearing figure mannequin, nicknamed Rosie, after Rosie the Riveter depicted in posters during World War II, in one of the seats. The mannequin was fitted with sensors that were to measure the forces that future astronauts will feel as they ascend to space.

Even though Starliner will not dock with the space station, the successful Atlas 5 launch and a successful landing would achieve many of the goals of the mission.

"Today a lot of things went right," Mr. Bridenstine said. "This is in fact why we test."

Later, he added it was too early to know whether it would be possible for astronauts to be aboard for the next Boeing mission as currently planned. "I'm not saying yes, and I'm not saying no," he said.

Nonetheless, the problems for Starliner raise the stakes for SpaceX's next launch of its Crew Dragon capsule, currently scheduled for Jan. 11. That flight — without crew aboard — a test of the abort system, in which the rocket will be intentionally destroyed during launch. If that succeeds, SpaceX could still launch astronauts in the first half of 2020.

Boeing was also aiming for its first crewed flight in the first half of next year using a second Starliner. The Starliner currently in orbit is to be reused for the second crewed flight later in 2020.

Additional delays to Boeing's schedule increase the possibility that NASA will have to reduce the number of astronauts living in its section of the space station. Even before Friday, the space agency was already talking to Russia about purchasing one or two additional seats on Soyuz rockets, the only means for getting to the space station for more than eight years since the retirement of NASA's space shuttles in 2011.

In a shift from the space shuttles and NASA's earlier human spaceflight programs, the Obama administration decided that the agency should hire commercial companies to take astronauts to and from the space station instead of building and operating its own spacecraft. The space agency had already taken this approach for launches of satellites and robotic missions, as well as for taking cargo to the space station.

In 2014, NASA awarded contracts to Boeing and SpaceX — Boeing for up to \$4.3 billion for Starliner, SpaceX for up to \$2.5 billion for Crew Dragon. The value of the contracts depends on how many missions are flown.

The hope was that the flights carrying astronauts would begin by the end of 2017. Both companies encountered technical hurdles, including problems with parachutes that the capsules deploy when they return to Earth.

SpaceX performed its crewless flight test of Crew Dragon in March. But in July, during a ground test of the abort engines on the same capsule, the Crew Dragon exploded. No one was injured, but that pushed back SpaceX's schedule as the company figured out what happened and how to fix it.

Watchdogs in government have raised concerns about the costs of commercial crew launches. A report by the NASA Inspector General reviewing the program estimated the per seat cost at about \$55 million for SpaceX, and \$90 million for Boeing. (The Boeing cost is higher than what NASA has paid for seats on Russia's Soyuz.)

On Thursday, Mr. Bridenstine disputed that estimate, saying NASA has not negotiated those prices with Boeing or SpaceX.

The inspector general also criticized a NASA decision to pay \$287.2 million above the fixed prices for three of the Boeing missions, saying those were unnecessary.

It remains unclear whether the Starliner capsule will be recovered intact to examine what caused the mission's failure. But even if they do, the next launch could be delayed by months.

NASA officials had been careful not to promise any launch dates, saying that the schedule depends on how well Starliner performs during its flight test and how long it takes to ensure safety for its astronauts. (The losses of the space shuttles Challenger in 1986 and Columbia

in 2003 were both blamed in part on NASA officials pushing too hard to meet schedule deadlines.)

While Boeing's stock declined somewhat on Friday, that dip was likely more a reaction to the latest developments related to the 737 Max than anything else, said Ronald J. Epstein, an analyst at Bank of America Merrill Lynch. If anything, he said, the Starliner mission's outcome could represent more of a hit to the company's morale than to the bottom line.

"It would have been a very nice way to put a small, happy face on an otherwise really tough year for the Boeing company and it just didn't play out that way," Mr. Epstein said.

Niraj Chokshi contributed reporting