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The Mission



Orbiter: Endeavour
Mission: STS-127
Payload: ISS 2J/A
Launch: July 11, 2009
Time: 7:39 p.m. EDT
Site: Pad 39A, Kennedy Space Center, Florida
Landing: July 27 @ approx. 12:40 p.m.
Site: Shuttle Landing Facility, KSC

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- [High Definition Video](#)
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The Crew



Meet the astronauts flying aboard Endeavour's STS-127 mission.

- CDR: [Mark Polansky](#)
- PLT: [Doug Hurley](#)
- MS 1: [Chris Cassidy](#)
- MS 2: [Julie Payette](#)
- MS 3: [Tom Marshburn](#)
- MS 4: [Dave Wolf](#)
- Up: [Tim Kopra](#)
- Down: [Koichi Wakata](#)
- [Current Demographics](#)

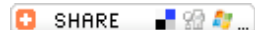
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Hydrogen leak scrubs shuttle Endeavour launch again

BY WILLIAM HARWOOD

STORY WRITTEN FOR [CBS NEWS "SPACE PLACE"](#) & USED WITH PERMISSION

Posted: June 17, 2009;
Updated with more details



After a lengthy fueling delay because of stormy weather, launch of the shuttle Endeavour on a space station assembly mission was scrubbed early Wednesday when a presumably repaired hydrogen vent line umbilical began leaking potentially dangerous vapor for the second launch try in a row.

Given the apparent severity of the problem, and the planned launch of NASA's Lunar Reconnaissance Orbiter on Thursday atop an Atlas 5 rocket, Endeavour will be grounded until at least July 11 when the next shuttle-space station launch window opens.

"We've got to step back and try to understand this problem and we will do that," said LeRoy Cain, chairman of NASA's Mission Management Team. "It's going to take us a little time. As a result of this scrub, we will be targeting our next earliest available launch opportunity ... and that'll be as early as July 11. We'll go work this problem and once we get it fixed and we're confident we have a solution that's going to work and allow us to go fly safely, then we'll proceed forward."

He said shuttle engineers "will be relentless in terms of trying to go understand what's going on with this system. We'll fix it and we'll move forward once we have determined we can get in a safe configuration to go fly."

The vent line in question, attached to the side of the shuttle's external fuel tank, carries hydrogen gas away from the shuttle so it can be safely dissipated. A leak in the same mechanism scrubbed a launch attempt last Saturday.

Engineers replaced a seal in the gaseous hydrogen vent line umbilical plate Sunday and Monday and NASA managers were hopeful that would resolve the problem. A seal replacement worked last March when the shuttle Discovery

COLBERT Patch

The special patch celebrating the space station's new COLBERT treadmill named for the comedian is available for purchase.

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Current Shuttle Mission Patch

The official embroidered patch for shuttle Endeavour's flight to finish building Japanese section of the space station.

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Hubble Patch

The official embroidered patch for mission STS-125, the space shuttle's last planned service call to the Hubble Space Telescope, is available for purchase.

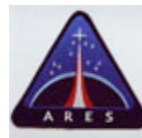
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Ares Patch

The Ares Project will develop two new rockets to launch astronauts back to the Moon under NASA's Vision for Exploration. The Ares 1 will employ a single space shuttle solid rocket booster to loft the Orion crew capsule. The gigantic Ares 5 will haul the equipment and cargo needed for such lunar voyages. This is the Ares emblem.

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STS-127: The programs



In advance of shuttle Endeavour's STS-127 mission to the station, managers from both programs discuss the flight.

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STS-127: The mission



A detailed step-by-step preview of Endeavour's STS-125 mission to install an external exposure platform on the station's Kibo science facility.

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STS-127: The EVAs



The lead spacewalk officer provides in-depth explanations of the EVAs on Endeavour's assembly mission to the station.

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STS-127: The crew



The seven astronauts launching on Endeavour meet the press in the traditional pre-flight news conference.

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was grounded by a similar leak.

While Endeavour's vent line passed leak checks at ambient temperatures, the seal replacement apparently wasn't enough to resolve the problem. During the initial stages of fueling, engineers observed a relatively small leak rate that, while unexpected, was within specification.

But as the tank filled and the temperature of the vent line kept dropping, the leak worsened. Engineers stopped the flow of hydrogen and cycled a valve in the system in hopes of clearing the problem, but they were not successful.

They then resumed hydrogen "fast fill" operations to collect additional data. When the vent valve was opened again, however, higher-than-allowable levels of hydrogen gas were detected, up to 60,000 parts per million. Additional vent valve cycles also were out of limits.

Finally, at 1:55 a.m. EDT, Launch Director Pete Nickolenko, overseeing his first countdown, reluctantly ordered a scrub.

"We are scrubbing the launch attempt for today," said launch commentator Mike Curie. "The troubleshooting efforts have not resulted in a significant decrease in the amount of gaseous hydrogen that's being detected outside of the ground umbilical carrier plate, the same area where we experienced a leak the last launch attempt."

Because of the conflict with this week's launch of NASA's Lunar Reconnaissance Orbiter, NASA only had one shot at getting Endeavour off the ground before the end of its current launch window.

The shuttle's normal launch window extends through Saturday. A launch on Sunday would be possible if mission managers eliminated one of the crew's five planned spacewalks. The window is defined by temperature constraints related to the space station's orbit.

After the shuttle countdown was called off Wednesday, launch of the LRO mission, originally planned for Wednesday but bumped to Friday by the shuttle, was moved up one day to Thursday.

Had the shuttle been grounded by bad weather, it might have been possible to make another launch attempt at the back end of the window, assuming the LRO mission got off on time. But given the nature of the hydrogen leak, it was a moot point.

Endeavour's crew - commander Mark Polansky, pilot



Project Orion

The Orion crew exploration vehicle is NASA's first new human spacecraft developed since the space shuttle a quarter-century earlier. The capsule is one of the key elements of returning astronauts to the Moon.



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Fallen Heroes Patch Collection

The official patches from Apollo 1, the shuttle Challenger and Columbia crews are available in the store.



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Douglas Hurley, Canadian flight engineer Julie Payette, David Wolf, Christopher Cassidy, Thomas Marshburn and space station flight engineer Timothy Kopra - took the delay in stride and planned to fly back to Houston later in the day.

"I'm sure you all know that we postponed again," Polansky said in a Twitter feed. "It's a reminder that spaceflight is NOT routine. We will fly home to Houston this morning."

The goals of Endeavour's mission are to attach an experiment platform to a Japanese research module, to replace aging solar array batteries, to deliver critical spare parts and to ferry Kopra to the station to replace Japanese astronaut Koichi Wakata.

Wakata, launched to the space station last March aboard Discovery, was informed of Endeavour's launch delay - and his extended mission - earlier today.

"OK, it is great that this international crew will continue," he said. "Another month for me!"

With Endeavour now delayed to at least July 11, launch of the next space station assembly flight, currently targeted for Aug. 7, likely will be delayed as well in a downstream domino effect.

And that assumes engineers can resolve the umbilical plate problem in time for a July 11 launch. With today's scrub, leaks have developed at the vent line interface in three of the last five shuttle fuelings, indicating a potentially more serious problem than misalignment issues or isolated damage to a seal.

"It's too early for me to give you any idea of level of confidence," Cain said. "The direction we gave to the team today after our scrub was we need to step back from this problem and try to understand what is different in our process, if anything. Somehow, we've introduced some other variable or some change, albeit very small. But our sense is something has changed and something is different and we need to go re-evaluate."

Because of the earlier problems with Discovery in March and the leak Saturday, engineers already were looking into "the procedures, the materials, the techniques, everything - from A to Z associated with this part of the system," Cain said.

"It could be something as simple as a heat treatment to some material part in the system, it could be some change in a vendor that was done years ago that is just now being introduced because of a part number," he said.



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"I don't want to speculate, there are a whole myriad of things that it could be. But that's the whole idea of stepping back and trying to determine what it is, if anything, that has changed."

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