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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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## The Crew



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

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- PLT: [Doug Hurley](#)
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## Space shuttle Endeavour launch postponed by leak

BY WILLIAM HARWOOD

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

Posted: June 13, 2009

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Launch of the shuttle Endeavour, grounded by a gaseous hydrogen leak during fueling Saturday, is off until Wednesday at the earliest, NASA officials say. But because of the already planned launch of NASA's Lunar Reconnaissance Orbiter satellite Wednesday, the shuttle team could be delayed to June 20, the last day this month Endeavour can be launched.



The file image shows the launch pad's gaseous hydrogen vent arm that connects the pad tower to the shuttle's tank. Credit: NASA TV

Mission managers plan to meet later this weekend to discuss troubleshooting and to assess their options, including negotiations with the Lunar Reconnaissance Orbiter project and the Air Force Eastern Range that provides telemetry and tracking support for all rockets launched from Florida.

"Obviously, the 17th is a range problem, there's a conflict out there with LRO/LCROSS," said Mike Moses, shuttle integration manager at the Kennedy Space Center. "We haven't even begun to work that yet. ... We'll start those negotiations tomorrow and see where we get, both with the Range and with the NASA payload."

In the meantime, shuttle engineers will press ahead with troubleshooting to figure out what went wrong during

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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



fueling.

Engineers began the three-hour fueling process at 9:52 p.m. Friday. As the hydrogen section of the tank fills up, some of the liquid turns into a gas that is carried away by a vent line. As Endeavour's tank was being topped off, sensors indicated higher-than-allowable levels of gaseous hydrogen at the ground umbilical plate, or GUP, that connects the vent line to the side of the shuttle's external tank.

The problem, which only shows up when supercold cryogenic propellants are flowing, was virtually identical to a leak in March that grounded the shuttle Discovery for four days. In that case, engineers disassembled the umbilical and replaced a critical seal. While the "root cause" of the problem was never determined, the system worked normally during Discovery's subsequent launch attempt.

"We got into tanking on time," senior Launch Director Mike Leinbach said early Saturday. "Everything was going perfectly fine, per plan. But just like on the STS-119 mission, we suffered a leak at the ground umbilical carrier plate just as soon as we got into the topping part of the sequence on the hydrogen load.

"The signature was almost identical to what we had two flows ago. The guys on console cycled the valve as they did previously, they cycled the valve four times trying to clear up that leak. In the past, every now and then that'll work for us. This time, again, it didn't work for us. We were out of spec leakage at that disconnect.

"It's a four-day scrub turnaround is what we're estimating right now," he said. "That's a preliminary plan, but I would not expect it to be any shorter than that. ... It's going to be very, very similar to what we went through last time on STS-119."



## 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.



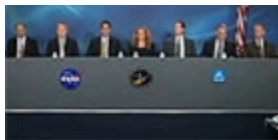
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## Fallen Heroes Patch Collection

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

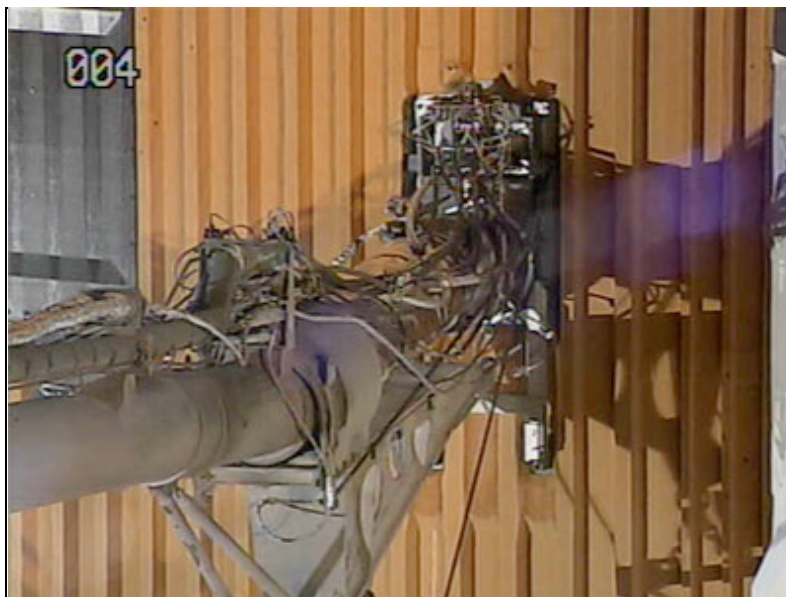


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The seven astronauts launching on Endeavour meet the press in the traditional pre-flight news conference.

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A closeup view of the ground umbilical carrier plate. Credit: NASA TV

Moses said engineers were surprised to encounter the same problem in two out of three launch campaigns. After the March leak, "we measured how that seal fits, we looked at it under a microscope, we looked at it under cryo conditions, we didn't really find anything that would tell us what common cause is."

"But obviously, something is going on, the second time in three flights, something is going on. So teams are being kicked off to go look at that. ... But really, our plan is going to be pretty much what it was last time, which is just R-and-R that seal and then we really have to tank again to see what happens."

That means Endeavour will be grounded until Wednesday at the earliest. But NASA's Lunar Reconnaissance Orbiter currently is scheduled for launch atop an Atlas 5 rocket at 3:51 p.m. Wednesday.

It takes the Eastern Range two days to reconfigure its systems to support a different launch. If the LRO mission stays on track and takes off Wednesday afternoon as planned, the next opportunity for Endeavour would be before dawn on June 20.

But in that case, NASA would only have one day to get Endeavour off the ground or the flight would slip to July 11 because of temperature constraints related to the orbit of the International Space Station.

NASA managers want to get Endeavour off as soon as possible to avoid downstream delays for upcoming space station assembly missions as the shuttle program winds down toward retirement in 2010. But the LRO mission is a high



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priority as well and it's not yet clear how NASA might ultimately resolve the conflict.

"They only have a four-day window, it's a lunar rendezvous, so they have those four days and if they don't make that they have to wait two weeks before they could go again," said Moses.

"So there are two parts to that. One, we don't want them to miss their lunar rendezvous window because that's very difficult to replan around. The other thing is, the Range is kind of backing up, especially on the Atlas pad, there are a lot of payloads that are waiting for LRO to get going and having a payload that needs to wait every two weeks for its launch window to reopen could cause some problems. We're going to have those negotiations, I can't begin to foretell how they're going to go.

"We had pretty much agreed ahead of time that we would probably not bump them off the Range, but it would all depend on why we needed to scrub in the first place," Moses said. "We didn't really talk about a failure like this, we were mostly thinking weather. So we'll go and re-talk again. But I don't expect that we'll make them go away and we'll take that whole window. But if we do, we'd try the 17th and could go all the way through the 20th."

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