

Shuttle Atlantis blasts off on last Hubble mission

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Space shuttle Atlantis crew, from right, commander Scott D. Altman, pilot Gregory C. Johnson, mission specialist, K. Megan McArthur, mission specialist John Grunsfeld and mission specialist Andrew Feustel, mission specialist Michael Good and mission specialist Michael Massimino, leave the Operations and Checkout building enroute to board the shuttle at Kennedy Space Center in Cape Canaveral, Fla., Monday, May 11, 2009. T Space Shuttle Atlantis is scheduled to lift-off Monday afternoon on a final mission to the Hubble Space Telescope. (AP Photo/John Raoux)

(AP) -- Space shuttle Atlantis and a crew of seven thundered away Monday on one last flight to the Hubble Space Telescope, setting off on an extraordinarily ambitious repair mission that NASA hopes will lift the celebrated observatory to new scientific heights.

Atlantis rose from its seaside pad about 2 p.m. and arced out over the Atlantic, ducking through clouds. The Hubble was directly overhead, 350 miles up.

Another shuttle, Endeavour, was on a nearby [launch pad](#), primed for a rescue mission if one is needed.

After seven months of delay, the [astronauts](#) were anxious to get started on the complicated, riskier-than-usual job at Hubble.

"Let's launch Atlantis," commander Scott Altman said just before liftoff.

"Enjoy the ride, pal," replied launch director Mike Leinbach.

Atlantis should reach the orbiting telescope Wednesday.

This is NASA's fifth and final trip to Hubble, launched 19 years ago. The stakes, as well as the dangers, are higher since astronauts last visited in 2002. [Space](#) has become more littered with junk at Hubble's altitude because of satellite collisions and breakups, and NASA now knows all too well how much damage can be done at liftoff by a piece of fuel-tank foam. Columbia was brought down by the damage.

During the first few minutes of flight, Mission Control repeatedly advised Altman and his co-pilot to disregard a bad sensor and assured them that everything was fine. About 30,000 people jammed Kennedy Space Center for the launch.

Hubble scientists and managers were excited, and some were a little sad as Atlantis rocketed into orbit. "I'm feeling wistful because this is the final mission," said senior project scientist David Leckrone. "It's the end of the era of Hubble servicing."

Hubble is way overdue for a tuneup.

Two spacewalking teams will replace the 19-year-old Hubble's batteries and [gyroscopes](#), install two new cameras and take a crack at fixing two

broken science instruments, something never before attempted. Those instruments, loaded with bolts and fasteners, were not designed to be tinkered with in space.

The astronauts also will remove the science data-handling unit that failed in September and had to be revived, and put in a spare that was hustled into operation. Fresh insulating covers will be added to the outside of the telescope, and a new fine guidance sensor for pointing will be hooked up.

Five spacewalks will be needed to accomplish everything. The work is so tricky and intricate that two of the repairmen are Hubble veterans, John Grunsfeld and Michael Massimino. Grunsfeld, the chief repairman, is making an unprecedented third trip to the telescope. Altman, the commander, also has previously flown to the telescope.

"We'll give it our best," Altman said.

All told, it's a \$1 billion mission. The space telescope, over the decades, represents a \$10 billion investment. It was launched amid considerable hoopla in 1990, but quickly found to be nearsighted, producing blurred images, because of a flawed mirror.

Corrective lenses were installed in 1993 during what NASA's science mission chief, Ed Weiler, calls "the miracle in space mission." The results were stunning and included the acclaimed "pillars of creation" image of Eagle Nebula, a star-forming region 6,500 light years away.

With all the newest pieces, NASA hopes to keep Hubble churning out breathtaking views of the universe for another five to 10 years. The new cameras should enable the observatory to peer deeper into the cosmos and collect an unprecedented amount of data.

"I personally believe the stakes for science are very high," Leckrone said. "It's a very complex, very ambitious mission, and it makes the difference between an observatory that's kind of limping along scientifically and an observatory that's the best ever."

The 11-day mission, led by Altman, a former Navy fighter pilot, comes with a higher risk than usual.

Atlantis will be flying in an unusually high orbit for a space shuttle. Space is more strewn with satellite and rocket parts there, and the odds of a catastrophic strike are greater. In addition, there's always the chance the shuttle could be damaged during liftoff by a piece of fuel-tank insulating foam or other debris, which doomed Columbia in 2003.

NASA canceled this last Hubble mission in 2004, saying it was too dangerous. Atlantis would not be able to get to the international space station, which is in another orbit, and would have only 25 days of air.

The mission was reinstated two years later by the space agency's new boss, but only after shuttle flights had resumed and repair techniques had been developed. As an added precaution, another shuttle was ordered to be on standby, in case Atlantis suffered irreparable damage.

Endeavour, the rescue ship, is ready to lift off within a week to save the six men and one woman aboard Atlantis. It will remain on standby, as little as three days from launching, until Atlantis heads back home on May 22.

This is the last time a shuttle flies somewhere other than the space station, and NASA doesn't expect to have shuttles on both pads again.

On the Net:

NASA: <http://www.nasa.gov/mission-pages/hubble/main/index.html>

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