

# Astronauts take final spacewalk for Hubble repairs

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In this photo provided by NASA, astronaut Andrew Feustel, left, STS-125 mission specialist, navigates near the Hubble Space Telescope on the end of the remote manipulator system arm, controlled from inside Atlantis' crew cabin as astronaut John Grunsfeld, right, signals to his crew mate from just a few feet away, Saturday, May 16, 2009. Astronauts Feustel and Grunsfeld were continuing servicing work on the giant observatory, locked down in the cargo bay of the shuttle. (AP Photo/NASA)

(AP) -- Spacewalking astronauts ventured out Monday to finish repairs on the Hubble Space Telescope, never to be touched by human hands again.

It was the fifth and final [spacewalk](#) for the crew of shuttle Atlantis, and the fifth and final visit by astronauts, ever, to Hubble.

Keen on leaving the 19-year-old observatory in the best possible shape for gazing upon the universe, chief mechanic John Grunsfeld and Andrew Feustel got started on the work nearly an hour earlier than planned. They were tasked with giving the telescope another fresh set of batteries, a new sensor for fine pointing and steel foil sheets to protect against radiation and the extreme temperature changes.

"All righty, Drew, go and be productive," Grunsfeld told his partner.

If everything goes well, the shuttle astronauts will set Hubble free Tuesday. NASA said the telescope is better than ever thanks to the astronauts' effort over the previous four days and should keep providing dazzling views of the universe for another five to 10 years.

Only one of the first four spacewalks went smoothly. On Sunday, a stuck bolt almost prevented another team of astronauts from fixing a burned-out science instrument. Brute force saved the day, but so much time was lost that no protective sheets could be installed on the telescope.

Grunsfeld and Feustel hoped to pick up the extra work Monday.

During this mission, the Atlantis astronauts outfitted Hubble with two state-of-the-art science instruments totaling \$220 million, fresh batteries and all new gyroscopes. The new instruments should allow the telescope to peer even deeper into the cosmos, as far back as 13 billion years.

The four spacewalkers, two per team, also managed to fix two science instruments that had broken down years ago and were never meant to be tinkered with in orbit. They also installed a docking device so a robotic craft can latch on and steer the telescope into the Pacific sometime in the early 2020s.

All told, this last visit to Hubble cost more than \$1 billion.

Hubble senior project scientist David Leckrone was hoping the spacewalkers would give the telescope a goodbye hug on behalf of the "thousands and thousands of Hubble huggers all over the world."

Grunsfeld, an astrophysicist who has spent more time working on the orbiting Hubble than anyone, was expected to do the honors. He's visited Hubble twice before, and plans to use the telescope once he's back on Earth to study the moon.

Back at a launch site, meanwhile, NASA maintained its vigil in case another shuttle needed to rush to the rescue. Atlantis escaped serious launch damage a week ago, but was susceptible to all the space junk in Hubble's 350-mile-high orbit. The astronauts will perform one last survey of their ship after releasing the telescope.

NASA took unprecedented steps to have Endeavour on the pad as a rescue ship, because the Atlantis astronauts have nowhere to seek shelter if they cannot return to Earth because of shuttle damage. The space station is in another, unreachable orbit.

The increased risk prompted NASA to cancel the mission five years ago in the wake of the Columbia accident. It was reinstated two years later.

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On the Net:

[NASA: http://www.nasa.gov/mission-pages/hubble/main/index.html](http://www.nasa.gov/mission-pages/hubble/main/index.html)

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