

# Astronauts to undertake fourth walk to repair Hubble telescope

May 17 2009, by Mark Carreau

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In this image obtained from NASA video, astronauts work to service the Hubble space telescope. US astronauts will undertake a fourth in a series of five daily spacewalks intended to equip the 19-year-old Hubble Space Telescope for at least another five years of valuable scientific work

US astronauts on Sunday will undertake a fourth in a series of five daily spacewalks intended to equip the 19-year-old Hubble Space Telescope for at least another five years of valuable scientific work.

Fellow spacewalkers Mike Massimino and Mike Good will attempt an intricate repair of Hubble's Space Telescope Imaging Spectrograph, a black hole hunter.

The spectrograph was installed in the telescope during a 1997 shuttle

mission but has been inactive since a 2004 power failure.

The repair plan is similar to the one that revived the Advanced Camera for Surveys on Saturday. However, Massimino must extract 111 small screws without losing a single one.

The spacewalk is scheduled to begin at 9:16 am EDT (1316 GMT) and will last approximately six and a half hours.

On Saturday, another pair of astronauts, John Grunsfeld and Drew Feustel, revived the crippled camera and installed a second new scientific instrument aboard the Hubble.

Since hoisting Hubble into Atlantis's cargo bay last week, the shuttle's seven astronauts have achieved six of the mission's highest priorities.

In addition to the Saturday's camera revival and installation of the new Cosmic Origin Spectrograph, the list of achievements include the addition of the Wide Field Camera-3, a new [science computer](#), [gyroscopes](#) and power storage batteries.

Hubble, a cooperative project between NASA and the European Space Agency, is headed for a new scientific summit, a perch from which astronomers can search for the oldest star systems, map the large scale structure of the universe and study planet forming processes around other stars.

"We are batting 1,000," said Dave Leckrone, NASA's chief Hubble astronomer, told a news briefing. "We have just an extraordinary capability to image the universe, much more powerfully that what we had before by far."

Saturday's spacewalk breathed new life into the camera for surveys, a

seven-year-old instrument that was crippled by a short circuit in January 2007.

The breakdown slowed a campaign to unravel the mysteries of [dark matter](#) and [dark energy](#), two little understood forces that influence the structure and expansion of the universe.

During the repair, Grunsfeld, a 50-year-old astronomer, and Feustel, a 43-year-old geologist, opened the camera to extract and replace four circuit boards and attach a new external power source.

Grunsfeld, who is visiting the space telescope for a third time, removed 32 tiny screws using an assortment of hand ratchets and cutters to revive the imager. A custom cover plate kept the tiny fasteners from floating into the telescope, where it could have caused harm.

Saturday's outing began with the installation of the new Cosmic Origins Spectrograph, an instrument that analyzes the light from stars, planets and other astronomical objects rather than taking pictures.

The new instrument will rely on the light from distant quasars to illuminate the vast web-like structures that extend across the universe encircling regions of interstellar gas and dust.

The new spectrograph promises to aid astronomers as they track the stellar genesis of carbon and the other chemical elements needed for life.

The spacewalkers made room for the spectrograph by removing an optical module installed in Hubble in 1993.

Astronauts on the long ago mission equipped the observatory with the Corrective Optics Space Telescope Axial Replacement, an instrument that overcame an optical flaw in the telescope's light gathering mirror.

The flaw surfaced in the weeks following Hubble's 1990 launch.

In Saturday's [spacewalk](#) there was a notable absence of the stuck bolts and equipment misalignments that marred spacewalks on Thursday and Friday and pushed the outings well beyond their planned six and a half hour limits.

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Citation: Astronauts to undertake fourth walk to repair Hubble telescope (2009, May 17)  
retrieved 24 April 2024 from  
<https://phys.org/news/2009-05-astronauts-fourth-hubble-telescope.html>

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