

Spacewalkers equip Hubble with new computer

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In this image taken from NASA video, astronaut John Grunsfeld replaces the Wide Field Planetary Camera-2 with the updated Wide Field Camera-3. Spacewalking astronauts upgraded the Hubble telescope for the first time in seven years on Thursday, equipping the 19-year-old stargazer with a powerful new camera and science computer.

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The seven hour outing by John Grunsfeld and Drew Feustel, members of the seven-strong space [shuttle Atlantis](#) crew, marked the first of five daily spacewalks by the [astronauts](#).

"We gave Hubble a hug, and true to form Hubble gave us a few curves," Grunsfeld, a 50-year-old astronomer making his third visit to the telescope, more than any other astronaut.

Feustel, a 43-year-old geologist and a rookie astronaut, provided the muscle that freed a balk bolt that threatened to prevent the spacewalks from removing the telescope's main camera and replace it with a more capable one.

"I don't normally reveal my age, but I can tell you I'm five years older than when I came to work this morning," David Lechrone, NASA's chief Hubble astronomer, told a news briefing. "I hope the rest of the mission goes a little bit smoother."

The refurbishments are intended to extend observations with the iconic science instrument by at least five years, while equipping Hubble to search for the most distant star systems, probe the mysteries of [dark matter](#) and [dark energy](#) as well as study the formation of planets around other stars.

The ambitious agenda of upgrades includes a second new science instrument, new batteries and gyroscopes, repairs to a pair of older science instruments with internal electronics failures and protective external shielding.

Atlantis and its crew rendezvoused with Hubble Wednesday and hoisted the 13.2 meter telescope aboard using the shuttle's robot arm.

Robot arm operator Megan McArthur worked closely with the spacewalkers, moving them around the observatory on the tip of the mechanical limb.

The team work paid off as the spacewalkers struggled to replace the

telescope's Wide Field and Planetary Camera-2, a 16-year-old imager, with the new Wide Field Camera-3, a more versatile and capable instrument.

The new camera, observing in ultraviolet and infrared spectrums as well as visible light, will peer deep onto the cosmic frontier in search of the earliest star systems as well as study the planets in the solar system.

The new camera is to be joined during Saturday's [spacewalk](#) by the Cosmic Origins Spectrograph, an instrument developed to study the grand scale structure of the universe, including the star-driven chemical evolution that produced carbon and the other elements necessary for life.

The older camera was stubborn about making way for its replacement.

Grunsfeld and Fuestel reached for an assortment of ratchet tools to remove two bolts that secured the 16-year-old imager inside the telescope, throwing them about 30 minutes behind their timeline.

As Grunsfeld reached into a tool bag for one of the ratchets, a rivet floated out. The veteran spacewalker reacted quickly by reaching out and grabbing the fastener before it could float away becoming yet another piece of space debris.

The spacewalkers also worked with caution to avoid disturbing a dusting of a white material spotted near the shuttle's airlock on Wednesday. NASA feared the material might float free and contaminate the telescope's optics.

"I see a small amount of what looks like dust, but it's pretty minor," Fuestel assured Mission Control.

The installation of a new science computer proved to be a much easier

task.

The [Science Instrument](#) Command and Data Handling System experienced an electrical problem in late September. The setback prompted NASA to postpone plans to launch the Hubble mission in October so engineers could prepare a replacement.

The computer prepares each of the telescope's science instruments for astronomical observations and formats the findings for transmission to Earth.

"Great work," Mission Control told the spacewalkers as they raced through the task in 90 minutes.

The third task on the first spacewalk was the installation of a new docking system.

Although NASA has no plans for a future shuttle visit to Hubble, the new docking device would allow a robotic spacecraft with a propulsion module to latch onto the observatory.

When Hubble is no longer able to conduct observations, NASA plans to steer the space telescope into the Pacific Ocean rather than allowing it to plunge back to Earth uncontrolled, potentially endangering a populated area.

"Nice work," said Mission Control.

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