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Hubblecast Episode 29: Mission Accomplished: Healing Hubble **EMBARGOED UNTIL 11:00 (CEST)/05:00 am EST 22 June, 2009**		
00:00 **[Visual starts]** **00:01** **[Narrator]** The fifth and final mission to the iconic Hubble Space Telescope was a long time coming. After a delay in the fall of 2008, spring brought new hope and, on 11 May, the seven Space Shuttle crew members headed for the mission of a lifetime. **00:17** Standard Hubblecast Sequence **00:36** **[Woman]** This is the Hubblecast! News and images from the NASA/ESA Hubble Space Telescope. **00:47** **[Narrator]** At nineteen years old, Hubble is ***the*** veteran of space telescopes. Opening our eyes to the Universe that hosts us, Hubble has looked far and deep to reveal fundamental scientific truths. Hubble isn't without its battle scars but the latest servicing mission has left it more capable than ever. **01:10** **[Narrator]** Astronauts had just five spacewalks to complete the Herculean tasks set before them: the installation of two completely new instruments and the repair of two others. And not to mention hundreds of smaller — but still vital — tasks. This kind of "space mechanics" was never intended and likely never even dreamed of by Hubble's creators in the 1970s. **01:35**		Atlantis launch footage Standard Hubblecast Sequence  

[Narrator]
A dedicated team of ESA engineers headed to the U.S. to support the mission by ensuring the solar arrays' drive electronics and mechanisms were functioning properly. The very lifeblood of Hubble, the panels must be monitored constantly so that astronauts can do the work that they need to do while avoiding damage to the panels themselves.

01:58
[Narrator]
But before anyone could support the mission, it first had to get off the ground. A bright, clear and powerfully hot morning with very few clouds looked promising for an on-time departure. Invited guests, scientists and engineers and the press gathered across Kennedy Space Center to watch Space Shuttle Atlantis rise with the hope of rejuvenating Hubble.

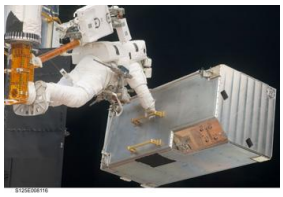
Atlantis launch footage

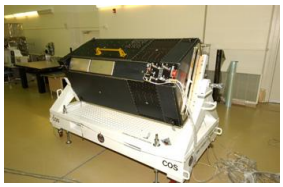
02:32
[Narrator]
At 20:01 on May 11, Atlantis roared off the launch pad and into the sky on its way to its historic rendezvous.

02:45
[Narrator]
After Atlantis was safely in the air and all that was left was its trail of smoke, the ESA Hubble Space Telescope team moved north to NASA's Goddard Space Flight Center in Maryland, where engineers there man the STOCC — the Space Telescope Operations Control Center. There, the ESA team worked closely with the Goddard team to ensure both the safety of spacewalking astronauts and the solar panels.

03:13
[Narrator]
Astronauts put in over 36 hours of spacewalks during the 13-day mission. The workhorse WFPC2 camera was replaced by its more powerful descendant, the WFC3, or Wide Field Camera 3. WFC3 will greatly enhance the observational capabilities of Hubble, providing enhanced field of view and broader waveband.

03:35
[Narrator]
Removing a refrigerator-sized instrument is no small task. Astronauts John Grunsfeld & Andrew Feustel removed Hubble's COSTAR package that was no longer needed to make way for the new Cosmic Origins Spectrograph (COS). COS will study the large-scale structure of the Universe and the formation and evolution of galaxies, stars and planets. It will also help determine the formation of elements considered essential for life, such as carbon and iron.





04:06
[Narrator]
Astronauts didn't just perform "transplant surgery"; they also did corrective operations on two existing instruments with great success. The Space Telescope Imaging Spectrograph (STIS) that combines a camera with a spectrograph, and covers a wide range of wavelengths from the near-infrared region into the ultraviolet was affected by a power failure. Astronauts had a particularly difficult time repairing STIS due to a stubborn bolt on the instrument's handrail. But after Houston gave astronaut Mike Massimino the go-ahead to "use brute force", he was able to break the handrail and access STIS.

The Advanced Camera for Surveys, another of Hubble's workhorse instruments, was also down due to a power failure. The Servicing Mission 4 repair has brought it new life.

05:09
[Narrator]
As astronaut Megan McArthur released Hubble from the Shuttle's grip and the pilots carefully manoeuvred away, it was a bittersweet moment for the astronauts as well as the NASA and ESA support personnel on the ground — the last time humans would visit the telescope that has taught us so much about our origin and our place in the vast Universe.

		produced by ESA/Hubble at the European Southern Observatory in Germany. The Hubble mission is a project of international cooperation between NASA and the European Space Agency. Credits
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