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<p><b>Hubblecast Episode 28: The fifth and final Hubble servicing mission</b></p> <p><b>FOR IMMEDIATE RELEASE 11:30 (CEST)/05:30 am (EDT) 01 May, 2009</b></p>		
<p><b>00:00</b> <b>[Visual starts]</b></p> <p><b>[Narrator]</b> Shuttle astronauts will visit the Hubble Space Telescope for the final time in May 2009. In five bold and daring spacewalks, they will upgrade Hubble's instruments allowing it to continue making remarkable scientific discoveries well into the next decade.</p>		  
<p><b>00:19</b> Standard Hubblecast Sequence</p> <p><b>00:37</b> <b>[Woman]</b> This is the Hubblecast!</p> <p>News and images from the NASA/ESA Hubble Space Telescope.</p> <p>Travelling through time and space with our host Doctor J a.k.a. Dr. Joe Liske.</p>		<p><i>Standard Hubblecast sequence</i></p>
<p><b>00:48</b> <b>[Dr. J, slightly excited]</b> To scientists and the public alike the NASA/ESA Hubble Space Telescope is an icon of scientific progress. Although more than 100 space observatories have been put into orbit over the years, Hubble remains the best known. Its success story is based on the amazing scientific results, and stunning images.</p>		<p><i>Dr. J in jumpsuit</i></p> <p><i>Rolling sequence of best of Hubble images (i.e. the</i></p>

<p>But much of this was only possible because, once in a while, astronauts went up there and paid Hubble a visit.</p> <p>Welcome to the Hubblecast! I am actually quite excited because today we are going to look at the fifth - and final - Hubble Servicing Mission.</p>	<p><i>amazing scientific results) but finish with an image of astronauts working on the Hubble</i></p>
<p><b>01:21</b> <b>[Narrator]</b> The NASA/ESA Hubble Space Telescope is a remarkable feat of engineering that enables scientists to produce the stunning results we have all come to love.</p> <p>From the very beginning, the design of Hubble allowed the various instruments to be replaced over time, as scientists on the ground developed new, more powerful instruments.</p> <p>Now a team of astronauts is making one final journey to Hubble to give it a 100 000 orbit service.</p> <p>This is the fifth servicing mission to Hubble. The first took place back in 1993 when, in a series of landmark spacewalks, astronauts corrected Hubble's nearsighted vision.</p> <p>Three further missions in 1997, 1999, and 2002 replaced various instruments and other components on Hubble.</p>	 
<p><b>02:13</b> <b>[Dr. J]</b> This fifth servicing mission has two main parts: the first is to install two new instruments and the second is to repair two existing instruments that are already on board Hubble: the ACS camera and the STIS spectrograph.</p> <p>The first new instrument, the Wide Field Camera 3, is essentially an improved digital camera – just the like the ones you and I might use for our holiday snapshots, except that this one boasts 16-megapixels, can observe in the ultraviolet, visible and infrared regimes, and it weighs several hundred kilos!</p>	  

The second new instrument is the Cosmic Origins Spectrograph, which will work in the ultraviolet. Unlike cameras, a spectrograph don't take images — instead it breaks up the light into its constituent colours to show its spectrum, a bit like a rainbow.



**03:05**  
**[Narrator]**

Because the new Wide Field Camera 3 images in several colours – making it the first panchromatic instrument on Hubble - we can learn much about the composition of distant objects.

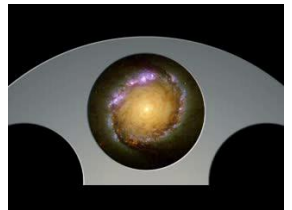
Ultraviolet light reveals hot young stars burning brightly, yellow light reveals clouds of hydrogen gas and red light reveals the glowing embers of older stars.

By combining images taken in each colour, astronomers can see structure within galaxies and begin to learn how it changes over time.

A young proto-galaxy in the early Universe blazes brightly in the ultraviolet. This light travels for 13 billion years to reach us, by which time this light is shifted into the red and near-infrared part of the spectrum, and allows astronomers to see galaxies in the early stages of evolution.

The powerful new Cosmic Origins Spectrograph, COS, will investigate the gas between galaxies to learn more about its chemical composition and the early growth of stars in the Universe. It will do this by looking at how the light from very distant quasars is absorbed as it passes through the gas.

Closer to home, this improved spectrograph can also detect young stars, burning hotter than our Sun, embedded in the thick dust clouds that gave rise to their birth, clarifying the phenomenon of star formation.



**04:30**

**[Dr. J]**

The second task on this mission is going to be a huge challenge for the astronauts. They have to repair two instruments that are already on board Hubble, but which haven't been working properly for some time now. The problem is that these instruments were never designed to be repaired in space! That means that some very clever people had to invent new and dexterous tools to help them carry out the repair.

The second problem is that it is actually not that easy to play electrician in space. Astronauts wear really thick gloves.

For them, any task is kind of like trying to peel an egg with really thick oven gloves.

...except for them, it will be even harder. For example, they will have to undo more than one hundred screws without losing any.

I'm sure they'll be doing a better job than me ...



*Dr. J upper torso only.....Dr. J lifts his hands wearing thick oven gloves & tries to peel an egg*

**05:21**

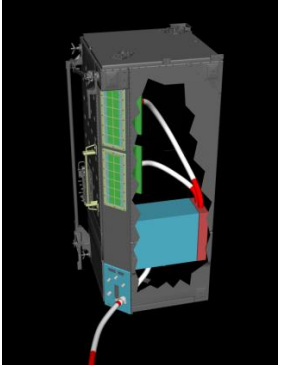
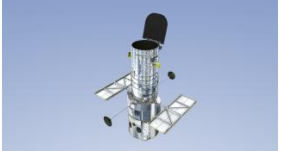

**[Narrator]**

The repaired STIS instrument will obtain spectra from objects – but at different wavelengths to the new COS instrument.

For the first time, scientists will be able to simultaneously see spectra from across a wide range of wavelengths.

Even with the introduction of the new Wide Field Camera, the repaired ACS instrument remains Hubble's most sensitive in the visible-light range.



<p>It will continue to capture stunning images and help scientists unravel the mysteries of the Universe.</p>		
<p><b>05:53</b>  <b>[Dr. J]</b>          In addition to the work on the instruments, Hubble itself will also get a service. Just like your car, after 100 000 orbits, Hubble needs the equivalent of an oil change and a new set of tyres. Astronauts will carry out extra spacewalks to replace some parts that will keep Hubble flying hopefully well into the next decade. They will also attach a special mechanism that will allow a future robotic spacecraft to dock with Hubble in order to steer it to a peaceful, final resting place in the ocean when its time has finally come.</p>		
<p><b>06:24</b>  <b>[Narrator]</b>          Upgrades to the power and guidance systems will give Hubble a new lease of life.</p> <p>A rejuvenated Hubble will allow astronomers to continue making remarkable discoveries for many years to come.</p>		 <p><i>Astronomical images</i></p>
<p><b>06:45</b>  <b>[Dr. J]</b>          Impressive, isn't it? It looks like this servicing mission is going to make Hubble better than ever. I'm already looking forward to bringing you the exciting discoveries from these instruments later this year. Look out for updates on the servicing mission on our website at <a href="http://spacetelescope.org">spacetelescope.org</a>.</p> <p>This is Dr. J signing off for the Hubblecast. Once again nature has surprised us beyond our wildest imagination.</p>		<p><i>Dr J. either waves, stands still, or looks up at the Shuttle</i></p>
<p><b>07:12</b>  <b>[Outro]</b>          Hubblecast is 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.</p> <p>Thanks to: ESO</p> <p><b>07:30 END</b></p>		