

c/o ST-ECF
ESO, Karl-Schwarzschild-Str.2
D-85748 Garching bei München,
Germany
Telephone: +49 (0)89 3200 6306
Cellular : +49 (0)173 38 72 621
Telefax: +49 (0)89 3200 6480
hubble@eso.org

www.spacetelescope.org

**Video Podcast
Hubblecast 25 Special Edition -
Eyes on the Skies Chapter 7: What's Next?**

**FOR IMMEDIATE RELEASE 18:00 (CET)/12:00 PM EST 15
December, 2008**

00:30

[Dr. J]

Welcome to the seventh and last special episode of the Hubblecast, celebrating the International Year of Astronomy in 2009. Last time, we saw how telescopes in space have revolutionised almost every field in astronomy. This time we'll have a look at the new and amazing telescopes of the future that are currently being planned.

00:50

[Narrator]

In Arizona, the first mirror has been cast for the Giant Magellan Telescope. This huge instrument will be built at the Las Campanas Observatory in Chile. Its seven mirrors, each well over eight metres across, will be arranged like the petals of a flower. And together they will capture more than four times the amount of light any current telescope can catch.

01:14

The Californian Thirty Meter Telescope, planned for 2015, is more like a giant version of Keck. Hundreds of individual segments make up one enormous mirror as tall as a six-storey apartment.

01:29

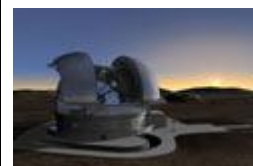
In Europe, plans are ready for a European Extremely Large Telescope. At 42 metres in diameter, its mirror will be as large as an Olympic swimming pool - twice the surface area of the Thirty Meter Telescope.

These future monsters, optimised for infrared observations, will all be outfitted with sensitive instruments and adaptive optics.

01:52

They should reveal the very first generation of galaxies and stars in the history of the Universe.

Dr. J. in virtual studio



Moreover, they may provide us with the first true picture of a planet in another solar system.

02:03

For radio astronomers, 42 meters is peanuts. They hook up many smaller instruments to synthesise a much larger receiver.

02:13

In the Netherlands, the Low Frequency Array, or LOFAR, is under construction. Fibre optics will connect 30 000 antennas to a central supercomputer. The novel design has no moving parts, but it can observe in eight different directions simultaneously.

02:31

LOFAR technology will probably find its way into the Square Kilometre Array, which is now topping the wish-list of radio astronomers.

The international array will be built in Australia or South Africa. Large dish antennas and small receivers will team up to provide incredibly detailed views of the radio sky.

And with a total collecting area of one square kilometre, the new array will be by far the most sensitive radio instrument ever constructed.

03:00

Evolving galaxies, powerful quasars, blinking pulsars – no single source of radio waves will be safe from the spying eyes of the Square Kilometre Array.

The instrument will even look for possible radio signals from extraterrestrial civilisations.

03:20

And what about space?

Well, after its fifth and final servicing mission, the Hubble Space Telescope will be on active duty until 2013 or so.

Around that time, its successor will be launched.

03:40

Meet the James Webb Space Telescope, a space infrared observatory named after a former NASA administrator.

03:50

Once in space, its 6.5 metre segmented mirror unfolds like a blooming flower – one seven times as sensitive as Hubble's.

A large sunshade keeps the optics and the low-temperature instruments in permanent shadow, allowing them to operate near a whopping minus 233 degrees Celsius.



Footage of HST servicing.



04:12

The James Webb Space Telescope won't orbit the Earth. Instead, it will be parked 1.5 million kilometres from our planet, in a wide orbit around the Sun.

04:25

Half a century ago, the Hale telescope on Palomar Mountain was the largest in history. Now, an even bigger one will be flying into the depths of space.

We can only speculate about the exciting discoveries it will make.

Stay tuned!

04:40

[Dr. J.]

Meanwhile, creative engineers come up with revolutionary designs for new telescopes all the time.

In Canada, scientists have built a so-called "liquid mirror telescope". In this kind of telescope the starlight is reflected not by a solid mirror but rather by the curved surface of a rotating reservoir of liquid mercury.

Because of their design, mercury telescopes can only look straight up, but their advantage is that they're relatively cheap and easy to build.

05:08

Radio astronomers want to put a LOFAR-like array of small antennas onto the surface of the Moon, as far away as possible from terrestrial sources of interference.

05:19

Who knows, one day there might even be a big optical telescope on the far side of the Moon.

05:25

Using space telescopes and occulting disks, X-ray astronomers hope to improve their eyesight tremendously in the future.

They may even succeed in imaging the very edge of a black hole.

05:35

[Narrator]

One day, the telescope may answer one of the most profound questions puzzling humanity: are we alone in the Universe?



Dr. J. in Virtual Studio



05:50

We know that there are other solar systems out there. We suspect there are even planets like Earth, with liquid water.

But... is there life?

06:02

Locating such extrasolar planets proves difficult. They are often hidden from astronomers by the intense light radiated by their mother stars.

Interferometers launched into the darkness of space may provide a novel answer.

Right now NASA is considering a project called the Terrestrial Planet Finder. And in Europe, scientists are designing the Darwin Array.

06:28

Six space telescopes orbit the Sun in formation. Lasers control their mutual distances to the nearest nanometre. Together they have incredible resolving power, cancelling out the light from overbearing stars so scientists can actually see Earth-like planets around other stars.

06:49

Next astronomers must study the light reflected by the planet. It carries the spectroscopic fingerprint of the planet's atmosphere.

06:59

Who knows, in 15 years time we may detect the signatures of oxygen, methane and ozone. The signposts of life.

07:09

[Dr. J.]

The Universe is full of surprises. The sky never ceases to impress.

No wonder that hundreds of thousands of amateur astronomers across the globe go out every clear night to marvel at the cosmos.

07:21

Their telescopes are much better than the instruments used by Galileo. Their digital images even surpass the photographic images taken by professionals just a few decades ago.

07:30

Astronomers' quest for cosmic understanding, their telescopic exploration of the Universe, is only 400 years old. There's still a lot of uncharted territory out there.



Dr. J. walks into view, with starry sky and behind him.

Images of amateur astronomer.



07:42

[Narrator]

We've come a long way since Galileo began charting the heavens with his telescope four centuries ago.

Today we still observe the Universe with telescopes, not only from Earth but in the limitless regions of space.

07:59

The seed of humanity lies in our seemingly endless supply of ingenuity and curiosity. We have just begun answering some of the greatest questions conceived.

We have charted over 300 planets around other stars in our own Milky Way and located organic molecules on planets around far flung stars.

These incredible discoveries may seem like the zenith of human exploration, but the best is undoubtedly yet to come...

You too can join the discoverers.

Look up and wonder.

08:38

[Dr. J.]

Thank you for joining me in this last episode of this special series and I hope you've enjoyed our small tour of the history of the telescope. This is Dr. J. signing off for the Hubblecast. Once again, nature has surprised us beyond our wildest imagination

09:15 END



Dr. J. in Virtual Studio