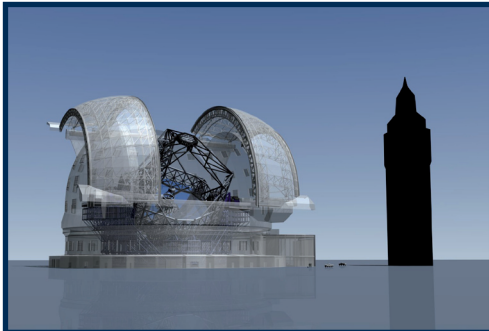


# European Extremely Large Telescope



Science & Technology Facilities Council  
UK Astronomy Technology Centre

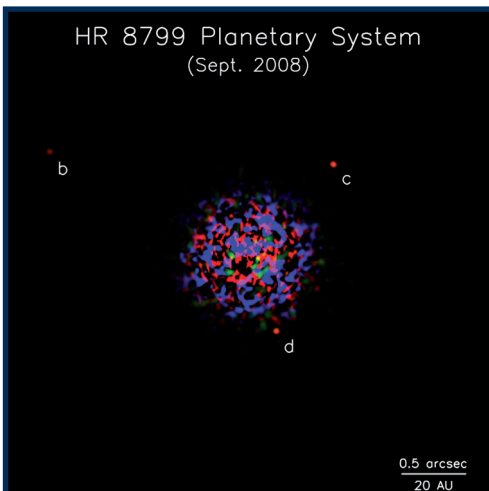
Astronomers and engineers across Europe are making plans for the next generation of ground-based telescope, five times larger and hugely more powerful than any built so far.



The European Extremely Large Telescope shown with Big Ben. It really will be extremely large.

## Astronomy in 2019

The largest optical telescopes in the world today have diameters of 8–10 metres and have given us amazing views of the Universe. However, astronomers are keen to observe even fainter targets so that we can explore the most distant galaxies formed just after



The E-ELT will study nearby stars to investigate how common “solar systems” are and to look for low-mass, Earth-like rocky planets [Credit: Massive Planets around HR8799 - C. Marois (NRC-HIA)/Keck Observatory]

the Big Bang, study individual stars in distant galaxies for the first time, and directly observe planets around nearby stars. If we want to be able to make such observations in ten years time, we have to start planning the next telescope facility now.

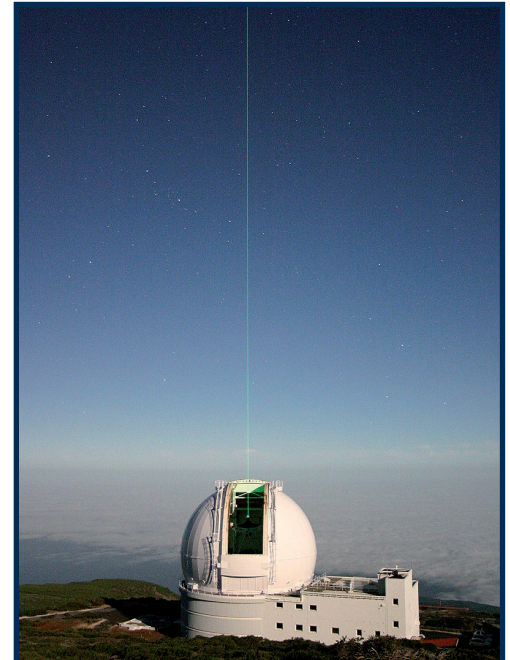
## The E-ELT Project

Europe’s plans for its Extremely Large Telescope are evolving rapidly. The design comprises an array of almost 1000 mirrors to form a 42 metre diameter primary. It also includes adaptive optics as an integral part of the telescope, which will allow astronomers to correct the images for the twinkling caused by the turbulence of the Earth’s atmosphere.

The E-ELT will revolutionise our understanding of the space around us, from our own Solar System, to the nature of the expanding Universe itself. The full construction plan for the project will be announced in 2010, including the crucial decisions of the future site of the telescope and the instruments that it will be equipped with. The sheer physical size and cost of the project is very challenging, requiring large international collaborations of astronomers and engineers.

## UK ATC Input

The UK ATC has considerable experience in the design of telescopes and instrumentation. It is using the expertise of its engineers and scientists to participate in various design studies for the E-ELT project. Of particular interest are the designs for the instrumentation which will harness the power of the telescope to provide unique observations to European astronomers.



Laser Adaptive Optics on the William Herschel Telescope in La Palma

The UK ATC is also leading the involvement of UK industry and universities to help develop new technologies for the telescope. The technical challenges being tackled for these projects include manufacturing of giant optics and correcting the effects of atmospheric turbulence with powerful lasers projected into the Earth’s atmosphere.

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