The World’s Biggest Eye on the Sky
The European Extremely Large Telescope (E-ELT)

- E-ELT - a 42 m diameter, adaptive telescope
- The E-ELT will be the largest optical/near-infrared telescope in the world (its mirror diameter will be almost half the length of a football field).
The E-ELT

- Diffraction-limited images 18x sharper than the HST
- Larger collecting area: 25x more than an 8 m telescope
- Enables exciting new science!
- The E-ELT construction proposal will be submitted in 2010. If approved, start of operations will be in 2018
E-ELT’s Vision
Extremely **Exciting** Science

Exoplanets: Detection and characterisation down to Earth masses

Fundamental physics: expansion history of the universe, physics laws variations with time

Black holes: physics at the edge of black holes, evolution of black holes with cosmic time

Structure formation: watching the first galaxies form, resolving distant galaxies into individual stars

Synergies with the VLT, JWST and ALMA

The **Unknown**
The E-ELT Site Selection

- Site Selection Advisory Committee carefully studied several possible sites worldwide
- SSAC technical report concluded that Cerro Armazones in Chile was the preferred site
- ESO Council selected Cerro Armazones on 26 April 2010

Some of the other sites studied

Aklim (Morocco)  Roque de los Muchachos (La Palma, Spain)  Cerro Vizcachas (Chile)  Cerro Macón (Argentina)  Cerro Ventarrones (Chile)
Cerro Armazones
Cerro Paranal
To achieve its diameter of 42 metres, the E-ELT primary mirror will be made of almost 1000 hexagonal segments.
Five-mirror design

1. The 42-metre primary mirror collects light from the night sky and reflects it to a smaller mirror located above it.

2. The 6-metre secondary mirror reflects light back down to a still smaller mirror nestled in the primary mirror.

3. The third mirror relays light to an adaptive flat mirror directly above.

4. The adaptive mirror adjusts its shape a thousand times a second to correct for distortions caused by atmospheric turbulence.

5. A fifth mirror, mounted on a fast-moving stage, stabilises the image and sends the light to cameras and other instruments on the stationary platform.

The 5500-ton telescope system can turn through 360 degrees.
The E-ELT has wide support in the European scientific community, as shown by its inclusion as the sole optical astronomy project in the roadmap for the European Strategy Forum on Research Infrastructures. It also features as the top priority for ground-based facilities in the ASTRONET European Roadmap for Astronomy.

The E-ELT offers numerous possibilities for technology spin-off and transfer, together with high technology contract opportunities, and offers a dramatic showcase for European industry.

European leadership of this major flagship project will raise the European scientific, technological and industrial profile.
Project milestones

Design

– Mid-term review of the telescope detailed design: May 2009

– Conclusion of instrument conceptual studies: Oct. 2009 – March 2010

– External Design Review: Sep. 2010

– ESO Council makes decision on construction: Dec. 2010
Project milestones

Science

- Design Reference Mission (DRM) start: 2006

- Design Reference Science Plan (DRSP) start: 2008


- Synergy conferences:
  - ALMA: March 2009
  - JWST: April 2010

- DRM and DRSP concluding documents: April 2010