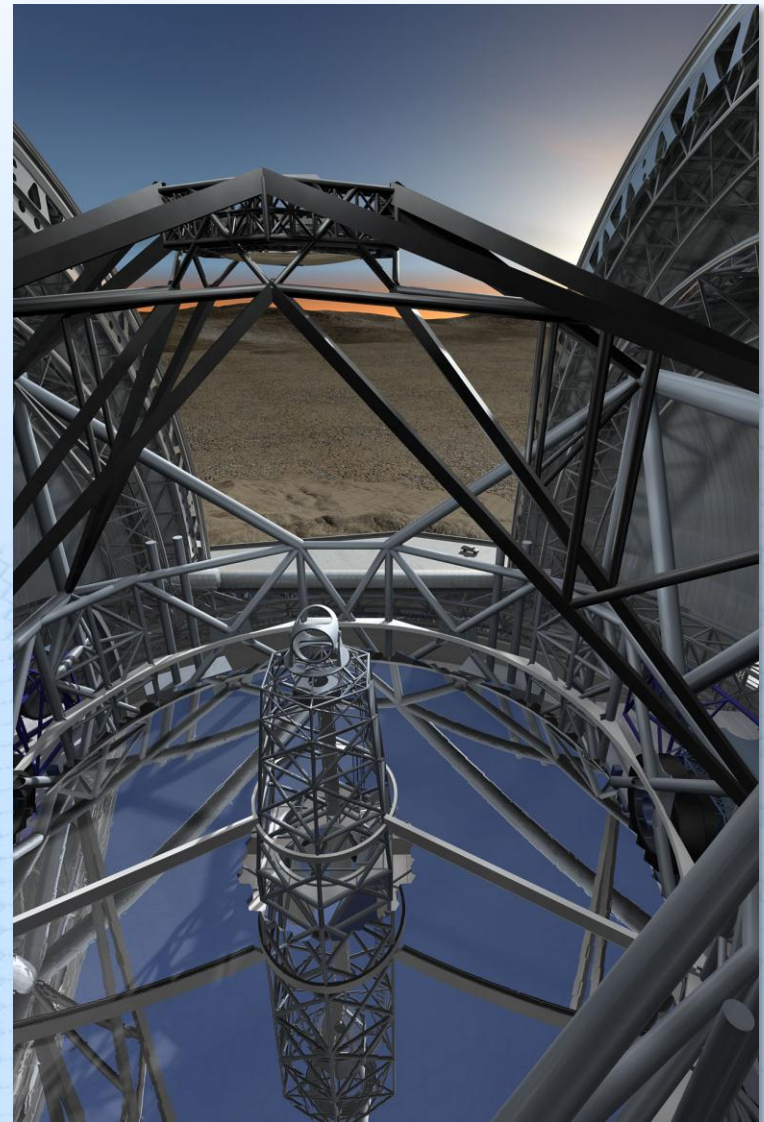


The European Extremely Large Telescope



The E-ELT

- 40-m class telescope: largest optical-infrared telescope in the world.
- Segmented primary mirror.
- Active optics to maintain collimation and mirror figure.
- Adaptive optics assisted telescope.
- Diffraction limited performance.
- Wide field of view: 10 arcmin.
- Mid-latitude site (Armazones in Chile).
- Fast instrument changes.
- VLT level of efficiency in operations.



The Science

- Contemporary science:

Exoplanets: radial velocity detections, direct imaging, transit spectroscopy, proto-planetary disks

Fundamental physics: GR in the strong field limit, variation of fundamental constants, expansion history of the Universe

Resolved stellar populations: beyond the Local Group

The physics of high-redshift galaxies

...and much more!

- Synergies with other top facilities:

ALMA

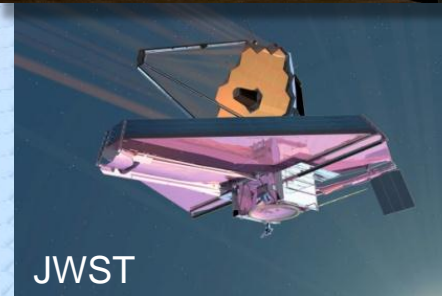
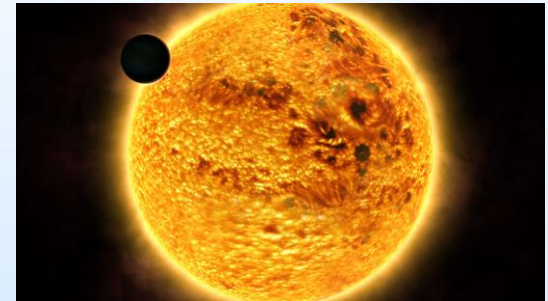
JWST

LSST and other survey telescopes

SKA

- Discovery potential:

Opening new parameter space in terms of spatial resolution and sensitivity



The E-ELT Project

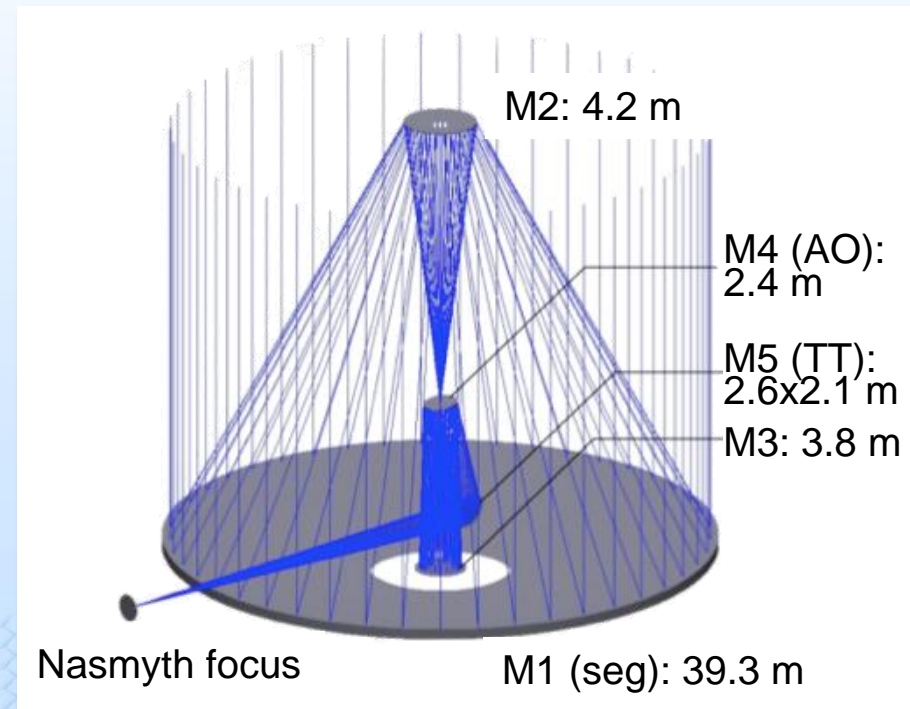
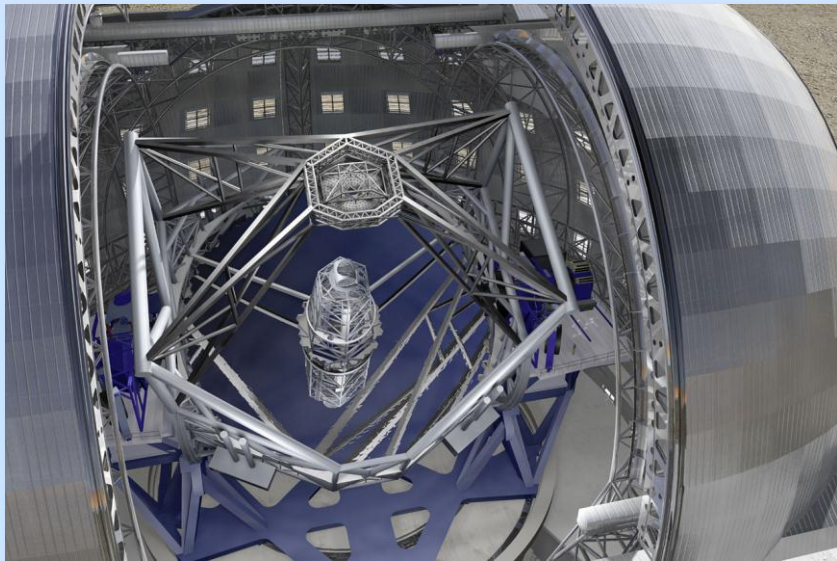


- Top priority of European ground-based astronomy (on Astronet and ESFRI lists).
- Cerro Armazones in Chile selected as the E-ELT site in April 2010.
- Detailed Design Phase completed in 2011. Construction Proposal published in Dec 2011.
- Instrument Roadmap (Nov 2011): 2 first-light instruments + plan for 1st generation.
- Project fully approved in Dec 2012.
- Construction started in 2013.
- Start of operations early next decade.
- Construction cost: 1083 M€ (including first-light instrumentation).



The Telescope

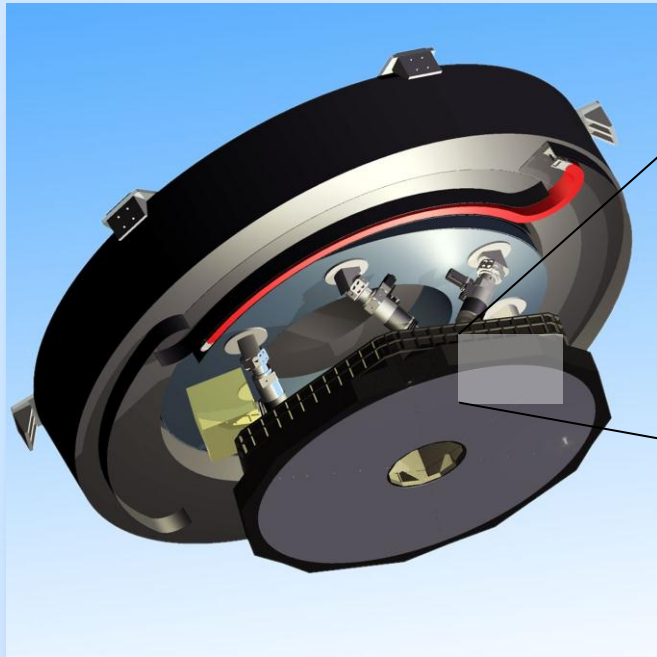
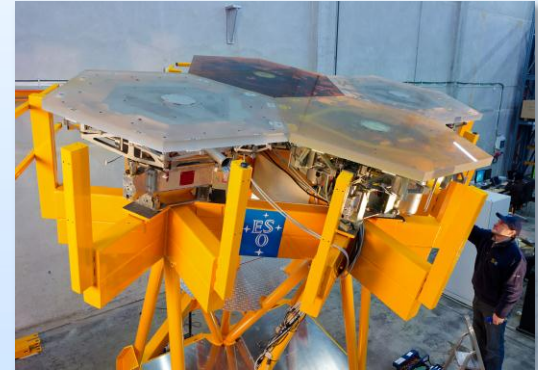
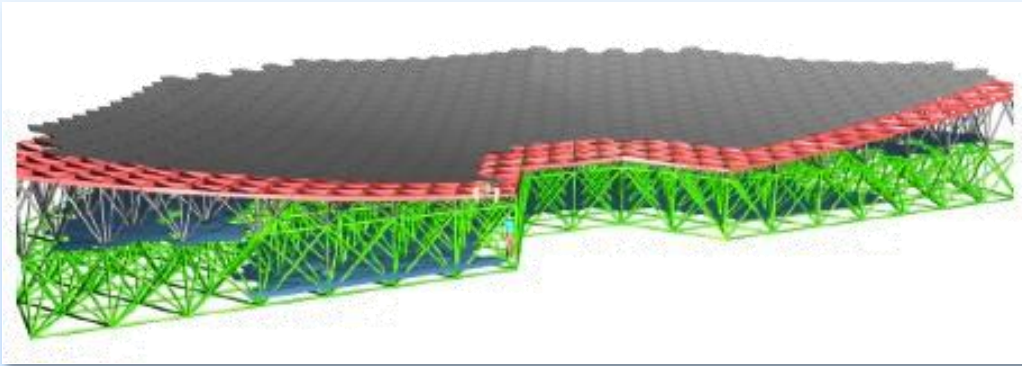
- Nasmyth telescope with a segmented primary mirror.
- Novel 5 mirror design to include adaptive optics in the telescope.
- Classical 3 mirror anastigmat + 2 flat fold mirrors (M4, M5).



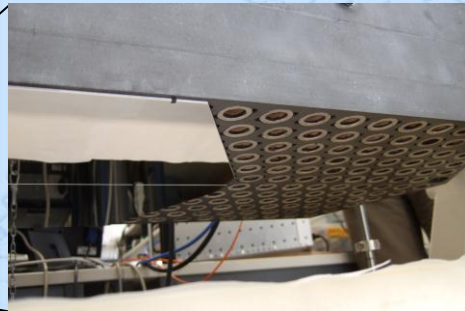
- Two instrument platforms nearly the size of tennis courts can host 3 instruments each + Coudé lab.
- Multiple laser guide stars, launched from the side.
- Nearly 3000 tonnes of moving structure.

The Mirrors

M1: 39.3 m, 798 hexagonal segments of 1.45 m tip-to-tip: 978 m² collecting area



M4: 2.4 m, flat, adaptive
6000 to 8000 actuators

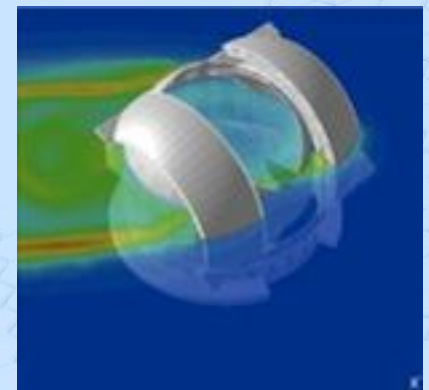
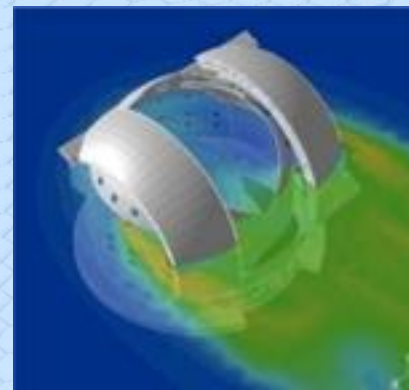
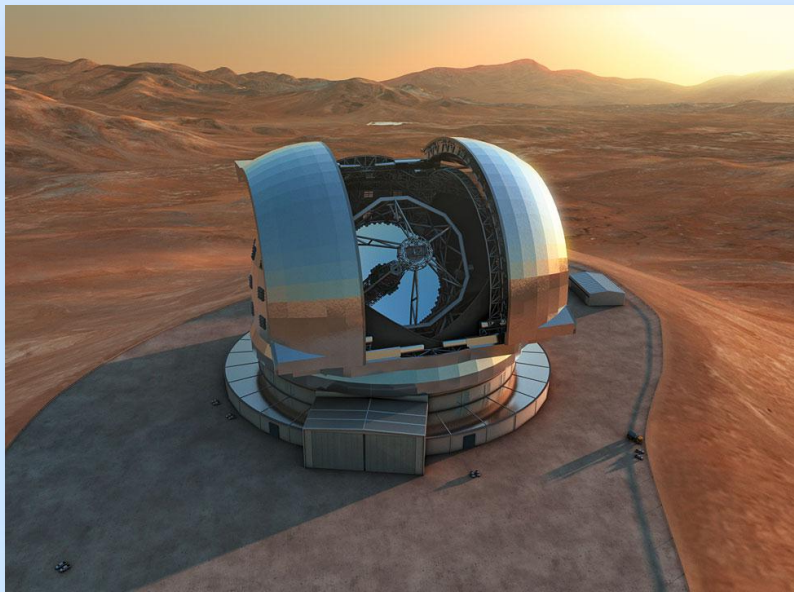
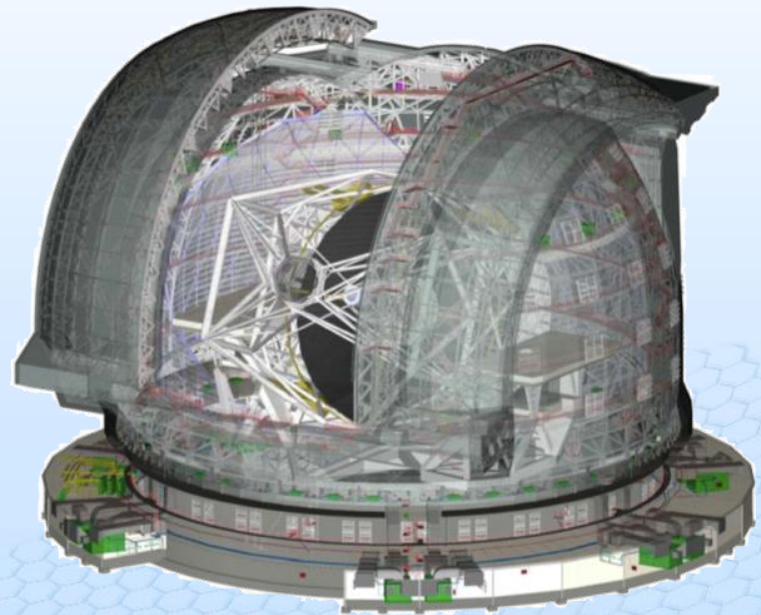


M5: 2.6 x 2.1 m, flat,
provides tip-tilt correction



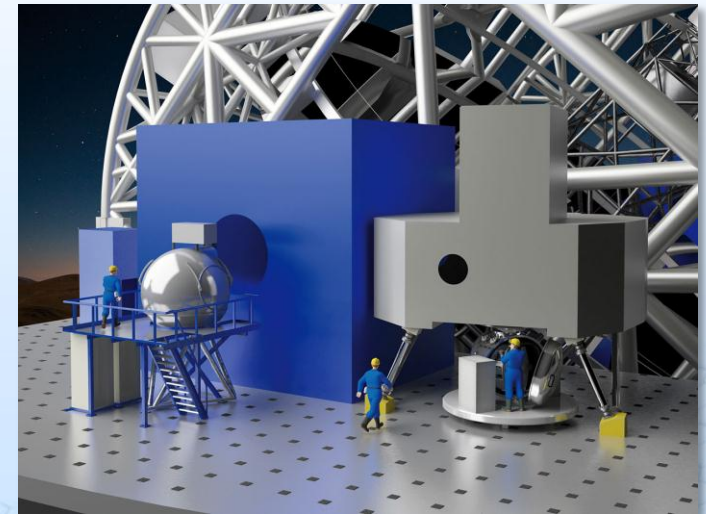
The Dome

- Classical design.
- Diameter = 86 m, height = 74 m.
- ~3000 tonnes of steel.
- Fully air-conditioned and wind shielded.



The Instruments

- The telescope can host eight instruments.
- 2007 – 2010: eight instrument and two adaptive optics module concept studies were conducted by the community.
- Instrument Roadmap (2011):
 - Following recommendations by the E-ELT Science Working Group and ESO's Scientific Technical Committee two first-light instruments have been identified: a diffraction-limited near-infrared imager and a single-field near-infrared wide-band integral field spectrograph.
 - The next group (ELT-3, 4 and 5) has been broadly identified as covering the mid-infrared, as well as multi-object and high-resolution spectroscopy.
 - Planet camera and spectrograph on separate track.
 - Flexibility is maintained by including an as yet unspecified instrument.
 - All concept studies remain in the pool of possible instruments.



Instrument Roadmap



Year	ELT-IFU	ELT-CAM	ELT-MIR	ELT-4 (MOS or HIRES)	ELT-5 (MOS or HIRES)	ELT-6	ELT-PCS
2012	Decide science requirements, AO architecture.		VISIR start on-sky	Develop science requirements for MOS/HIRES			Call for proposals for ETD
2013			TRL Review	Call for proposals for MOS/HIRES			
2014							
2015				Selection ELT-MOS/HIRES		Call for proposals	
2016							
2017							TRL check
2018							TRL check
2019						Selection	TRL check
2020							TRL check
2021							TRL check
2022 Tel technical first light							
	Pre-studies taking the form of phase A or delta-phase A work and/or ESO-funded Enabling Technology Development (ETD)						
	Decision point						
	Development of Technical Specifications, Statement of Work, Agreement, Instrument Start.						



The Site



Following an extensive site testing campaign, involving several sites in Chile, Morocco, the Canary Islands, Argentina, Mexico, etc, ESO Council selected Cerro Armazones as the E-ELT site.

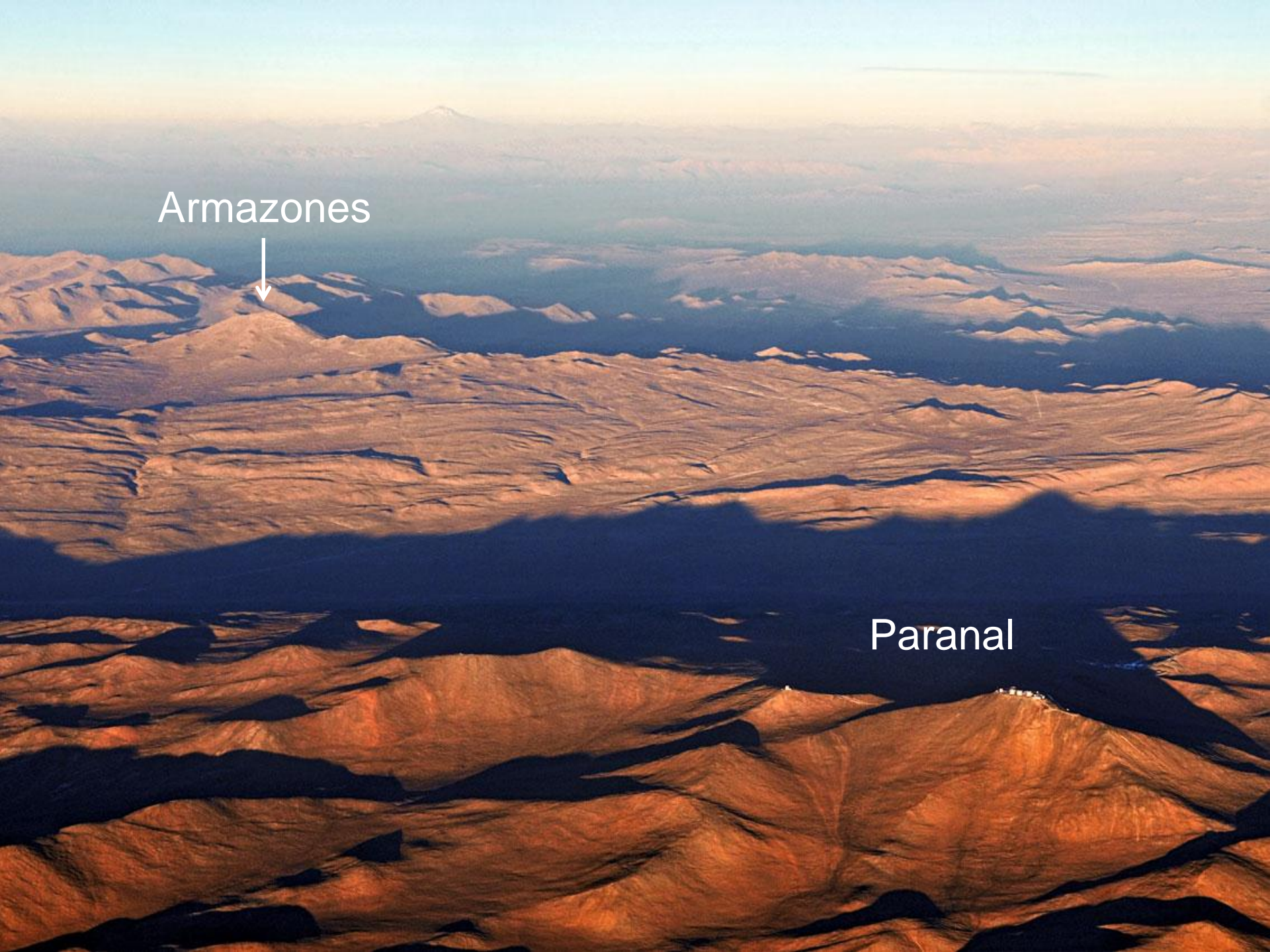
Selection criteria: impact on science, outstanding atmosphere, but also construction and operations logistics (roads, water, electricity, nearby cities, ...).



Armazonas



Paranal



More information

The science users web pages:

www.eso.org/sci/facilities/eelt

The E-ELT Construction Proposal:

www.eso.org/sci/facilities/eelt/docs/eelt_constrproposal.pdf

The E-ELT Science Case:

www.eso.org/sci/facilities/eelt/science/doc/eelt_sciencecase.pdf

The E-ELT Design Reference Mission:

www.eso.org/sci/facilities/eelt/science/doc/drm_report.pdf

The public web pages:

www.eso.org/public/telesinstr/eelt.html

Brochures, Posters, etc:

www.eso.org/public/products/brochures/

Gallery:

www.eso.org/public/images/archive/category/eelt/

