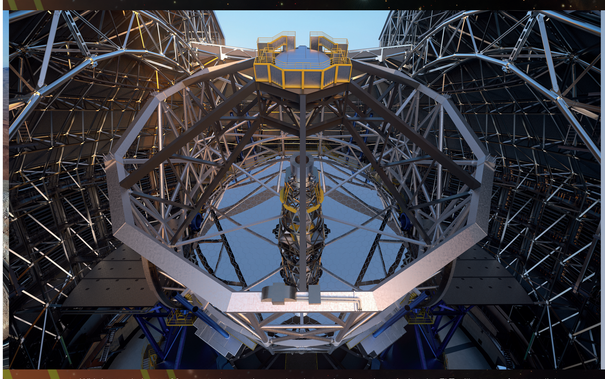




With its revolutionary 39-metre primary mirror and an innovative five-mirror design the ELT will capture far more light than any other telescope. The mirrors all have different shapes, sizes and roles but will work together seamlessly. The ELT will have the latest in adaptive optics systems, supported by up to eight powerful lasers, to correct for atmospheric turbulence, which causes the stars to twinkle. This will enable astronomers to observe finer details of much fainter astronomical objects than is otherwise possible from the ground.

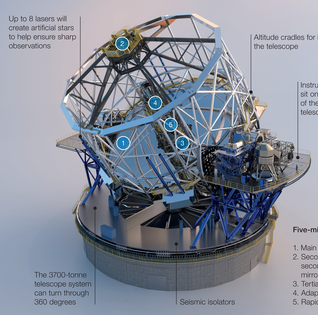
First-generation instruments:

HARMONI, a 3D spectrograph used to explore galaxies in the early Universe, study the constituents of the local Universe and characterise exoplanets in great detail.

MORFEO, an adaptive-optics module designed to help compensate for distortions caused by turbulence in Earth's atmosphere.

METIS, a mid-infrared imager and spectrograph, will focus on exoplanets, protoplanetary discs, Solar System bodies, active galactic nuclei and high-redshift galaxies.

MICADO, a dedicated imaging camera for the ELT, will have a sensitivity comparable to that of the James Webb Space Telescope and a resolution six times greater.



Five-mirror design:

1. Main mirror 39.3 m diameter
2. Secondary mirror, largest secondary (and largest convex) mirror ever produced
3. Tertiary mirror
4. Adaptive fourth mirror
5. Rapid tip-tilt fifth mirror

After the ELT's mirrors have collected, corrected and stabilised the light from astronomical objects, it is up to the instruments to analyse it in detail. The suite of instruments planned for the ELT includes cameras, to capture images, and spectrographs, which disperse light into its component colours, among other fantastic tools. Each of these will allow astronomers to observe and study the cosmos in a unique way. The four first-generation instruments will start to operate at or shortly after the ELT's technical first light. Throughout the telescope's lifetime, more instruments will be installed to study the Universe in ever more detail.

https://elt.eso.org