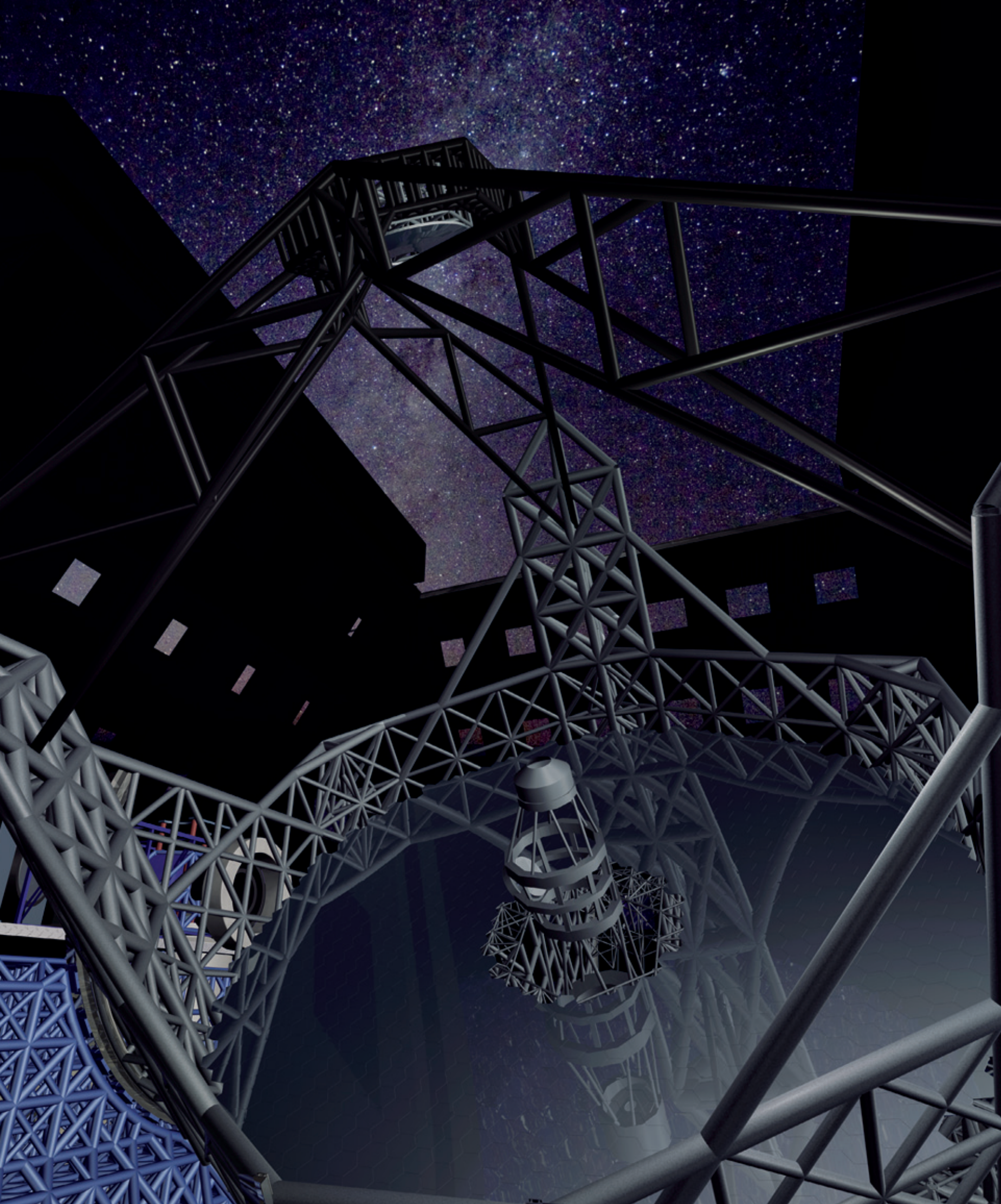




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WHAT'S NEXT?

THE EUROPEAN EXTREMELY LARGE TELESCOPE

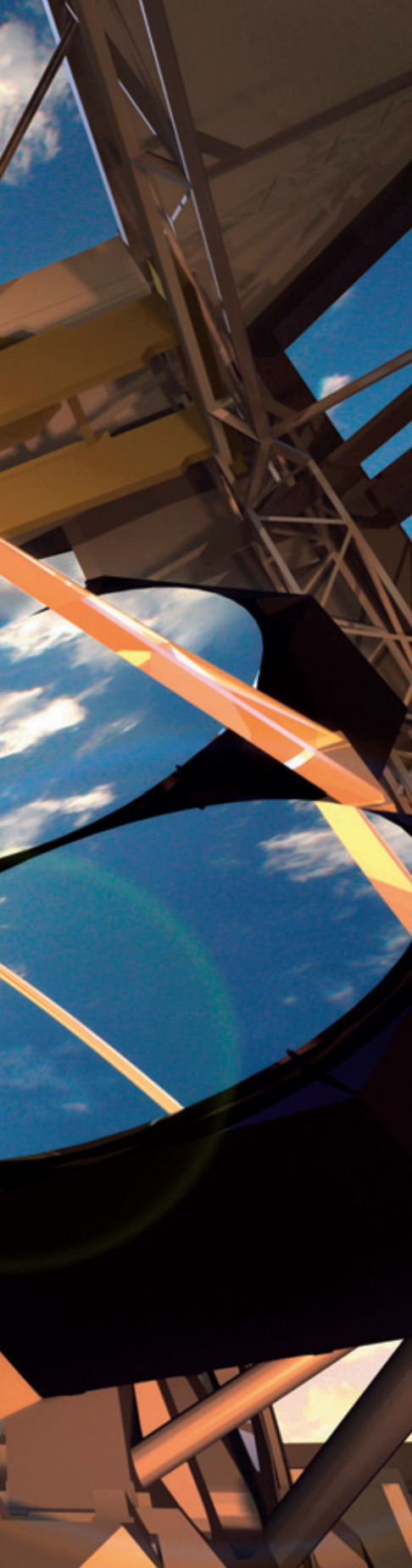
Spanning a monstrous 42 metres across, the primary mirror of the proposed European Extremely Large Telescope (E-ELT) consists of many hundreds of individual segments. When completed in 2017, the E-ELT will be by far the largest ground-based telescope for optical and near-infrared observations.

The telescope has been mankind's window on the Universe for four hundred years. It has provided scientists with unprecedented views of planets, stars and galaxies from our cosmic doorstep to the very depths of space and time. But despite their incredible performance, even the newest and most powerful telescopes leave room for improvement. Astronomers always want to venture beyond their current horizons. In this final chapter we take a look at things to come — the revolutionary ground-based telescopes and space observatories of the future. One thing is certain: there is much left to discover.



ARTIST'S RENDERING OF THE GIANT MAGELLAN TELESCOPE

Seven 8.4-metre mirrors, arranged like the petals of a flower, make up the Giant Magellan Telescope, which will be constructed at Cerro Las Campanas in Chile. Together, the mirrors will have the sensitivity and resolving power of a 21.4-metre instrument.



“Almost five hundred individual segments will make up one enormous mirror as tall as a seven-storey apartment”

We’ve come a long way since the first telescopes of Hans Lippershey, four centuries ago. And telescopic astronomy is far from finished. The best is yet to come.

The first mirror blank for the Giant Magellan Telescope (GMT) has already been cast at the Mirror Laboratory of the University of Arizona. This huge instrument will be built at the Las Campanas Observatory in Chile, which is already home to the twin 6.5-metre Magellan Telescopes. The GMT has no less than seven mirrors, arranged like the petals of a flower and each well over eight metres across. Together they will catch as much light as a 21.5-metre mirror and provide the same resolving power as a virtual 24.5-metre giant. Completion is expected in 2016.

The Californian Thirty Meter Telescope (TMT), due to be completed around the same time, is more like a giant version of Keck. Almost five hundred individual segments will make up one enormous mirror as tall as a seven-storey apartment. This will be able to collect ten times more light than the Keck Telescope and to see three times more detail. The 3.1-metre secondary mirror of the telescope — larger than the primary of the Hooker Telescope at Mount Wilson! — will be fully adaptive to compensate for atmospheric turbulence.

In Europe, plans are ready for the European Extremely Large Telescope (E-ELT) — an ambitious project led by the European Southern Observatory. This will also be a segmented-mirror telescope. But at 42 metres diameter, the E-ELT has twice the surface area of the American Thirty Meter Telescope. It has a revolutionary design that includes five mirrors and advanced adaptive optics to correct for the turbulent atmosphere. The E-ELT should become operational around 2017, probably somewhere in northern Chile.