

Diagram

NEWS IN PERSPECTIVE

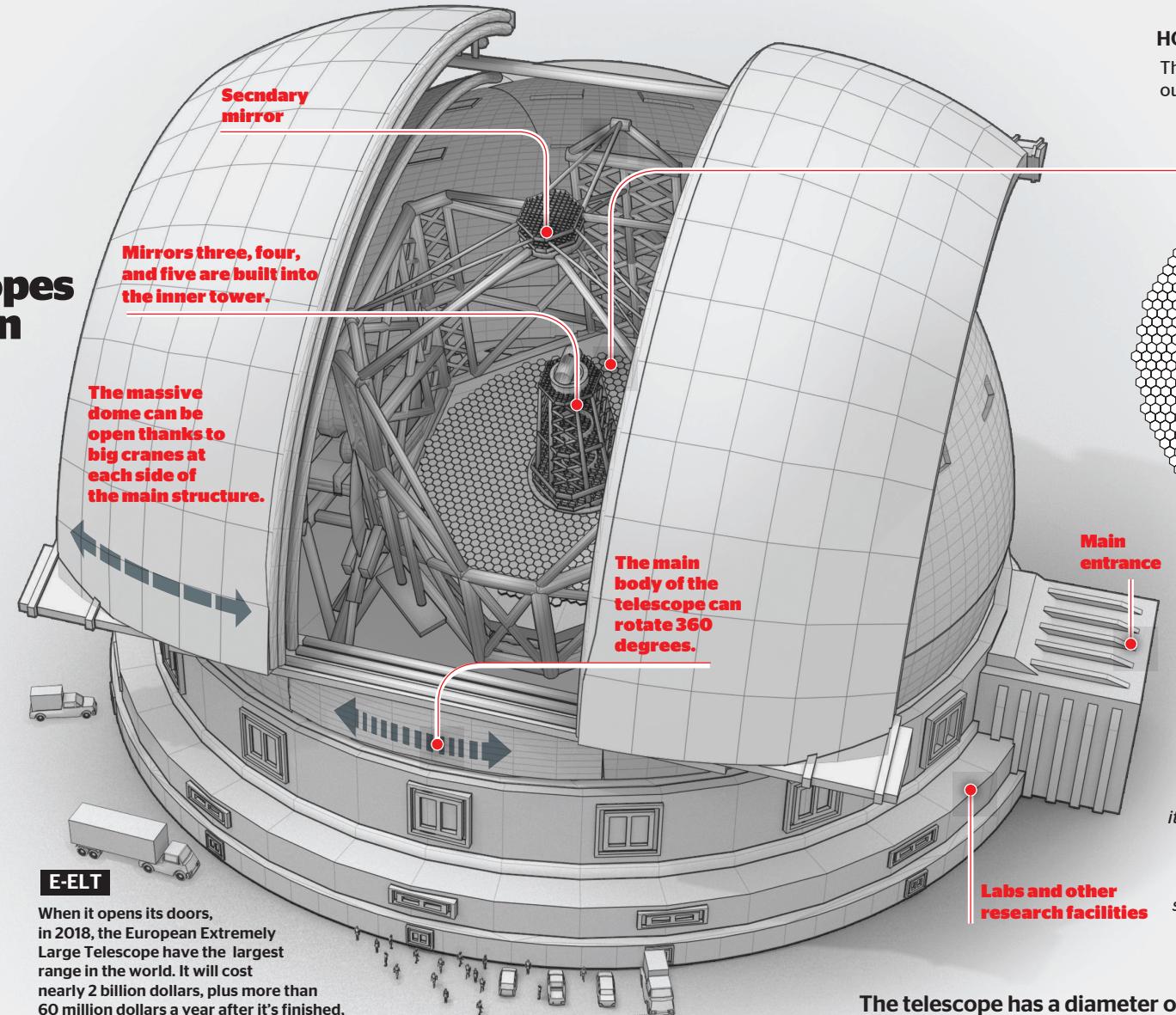
400 years after Galileo, mega-telescopes rule space exploration

A new generation of observatories is under construction. Brazil needs to decide if it's going to be part of this new revolution in astronomy.

Peter Moon, Alberto Cairo, Gerson Mora

In 1609, Galileo Galilei perfected the telescope, created in 1608 by Hans Lippershey. Galileo's telescope had a lens of 6 inches. Today, the largest telescopes are in Hawaii and northern Chile. Equipped with mirrors 24 to 35 feet in diameter, they allow the observation of galaxies billions of light years away from us, but with little clarity. So a new generation of mega-telescopes is being built. The largest is the European Extremely Large Telescope (E-ELT), an initiative of the European Space Agency that is under construction in the Atacama Desert in Chile, and will open in 2018. The Ministry of Science and Technology of Brazil defends participation in the project, but the huge investment has unleashed concerns in other areas of the government. The total cost for Brazil would be \$650 million over 20 years.

Sources: Southern European Observatory (ESO), TMT, Gemini, Soar

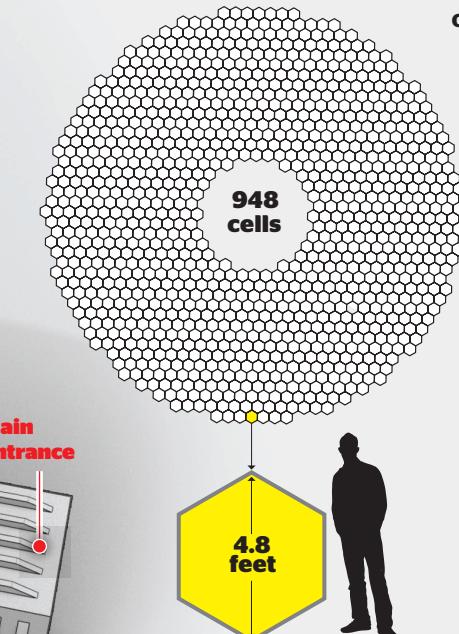


The telescope has a diameter of 330 feet and a height of 260 feet.

HOW THE E-ELT GATHERS HIGH-RESOLUTION IMAGES

The E-ELT will be the first telescope able to shoot pictures of planets outside the solar system, which will be useful for analyzing their atmospheres.

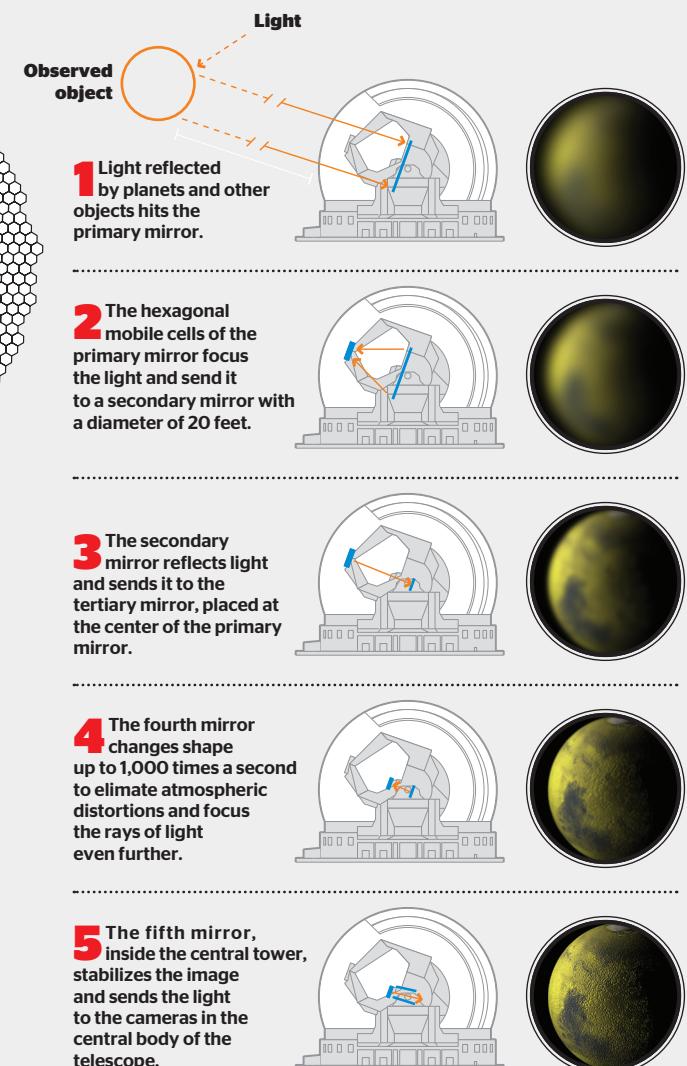
PRIMARY MIRROR



Why is the telescope so large?

The sensitivity and acuity of a telescope depend on how well it gathers light reflected by objects that sometimes are many light years away from Earth.

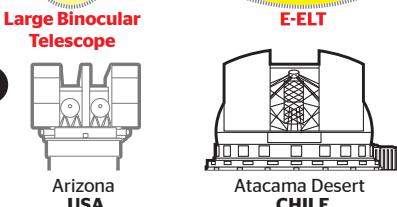
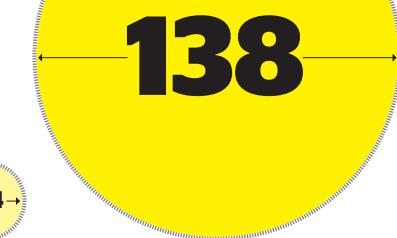
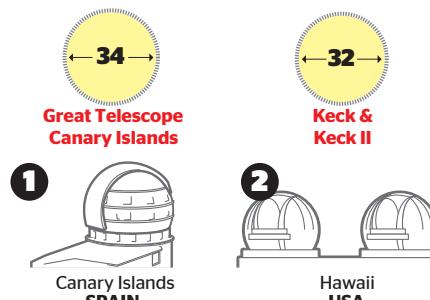
The larger the reflecting surface of the telescope's primary mirror, the more photons of light it will be able to capture.



THE SUPER TELESCOPE RANKING

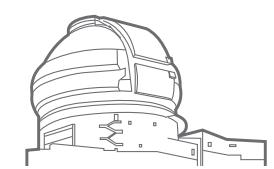
The E-ELT is a giant compared to the existing mega-telescopes. Its primary mirror is four times the size of the one in the largest telescope, in the Canary Islands, Spain.

Mirror diameter in feet.



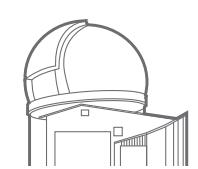
TELESCOPES WITH BRAZILIAN INVOLVEMENT

Brazil participates on just two of the largest telescopes.



Gemini

Built in Cerro Pachón, Chile, and the Mauna Kea volcano, Hawaii, these twin telescopes have mirrors with a diameter of 26.5 feet. Brazil participates by covering 2.4% of the total cost in exchange for the right of using them for observations.

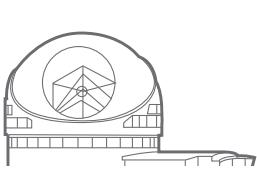


Soar

Built in Cerro Pachón, Chile, the Southern Astro Physical Research Telescope has a mirror with a diameter of 13.5 feet. The Brazilian National Scientific Development Council covers a great portion of its costs.

OTHER LARGE TELESCOPES UNDER CONSTRUCTION

Besides the E-ELT, there are other projects in development.



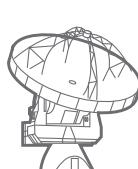
Thirty Meters Telescope (TMT)

Opening: 2018
Cost: \$1 billion
Mirror: 98 feet
Place: Hawaii
Built by: USA, Canada, China, India



Telescopio Gigante Magalhães (GMT)

Opening: 2018
Cost: \$600 million
Mirror: 80.4 feet
Place: Chilean Andes
Built by: USA, Australia, South Korea



Atacama Large Millimeter Array (ALMA)

Opening: 2012
Cost: \$1.3 billion
Place: Atacama, Chile
Built by: European Union USA, Canada, Japan Taiwan, Chile



Radio telescope 66 antennas