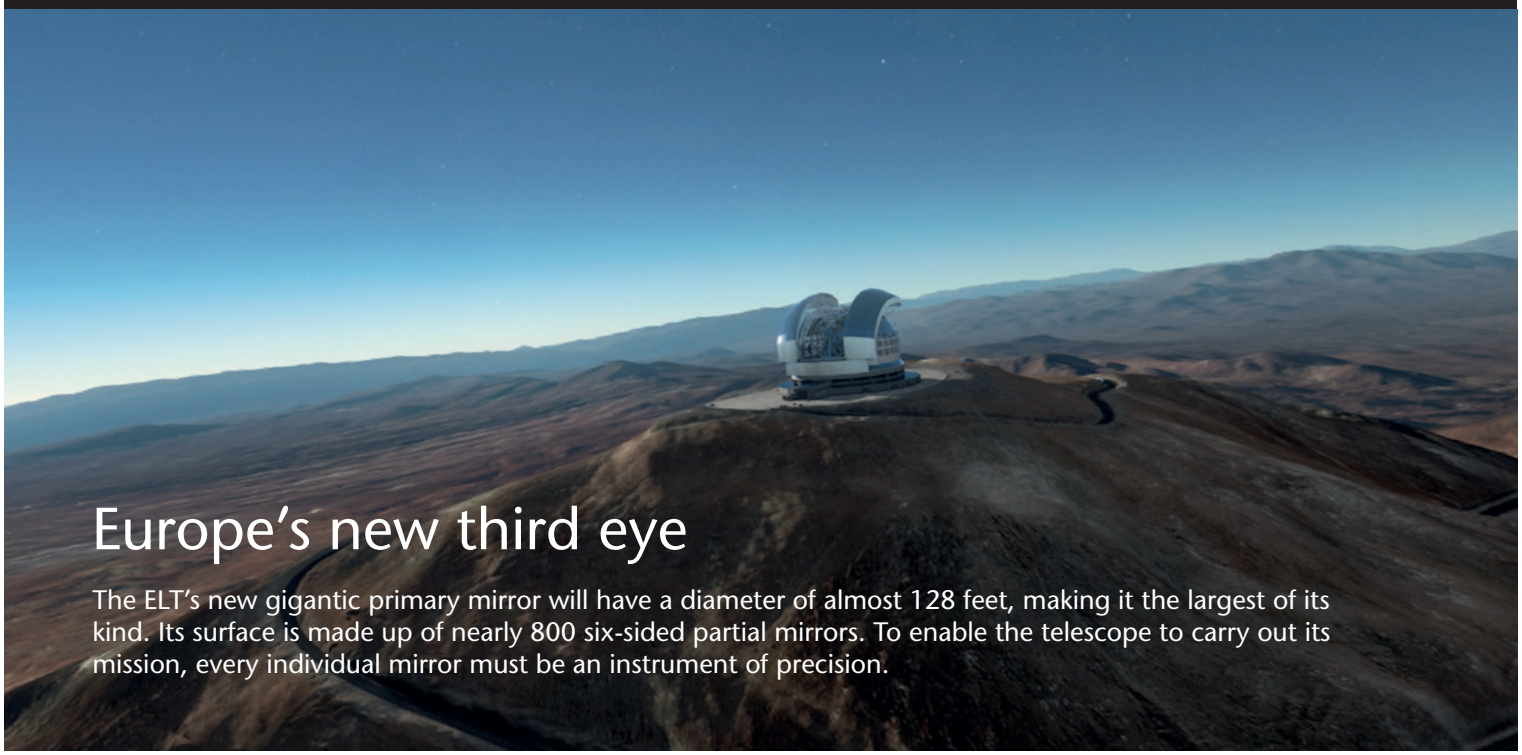
A window into distant galaxies

Astronomers are constantly looking for ways to obtain deeper insights of outer space so that they can further explore the universe. Technology such as the Extremely Large Telescope (ELT) must be able to capture as much light as possible before transferring it onto scientific instruments. To achieve this critical process, the size of the mirrors are constantly increasing and the designs for them are becoming more complex. SCHOTT's ZERODUR® glass-ceramic ensures that crisp images are available to help unlock the mysteries of the cosmos.

Challenge

It is the stuff that many astrophysicists dream about: While gazing into their telescope, they discover an Earth-like planet, or they learn more about the origins of galaxies, the possibility of extraterrestrial life and the mysterious dark energy.

With the ELT, the European Southern Observatory (ESO) is on a path to creating a new mega-telescope for more advanced space research. It is currently being built on Cerro Armazones (10,049 feet), a mountain in Chile.



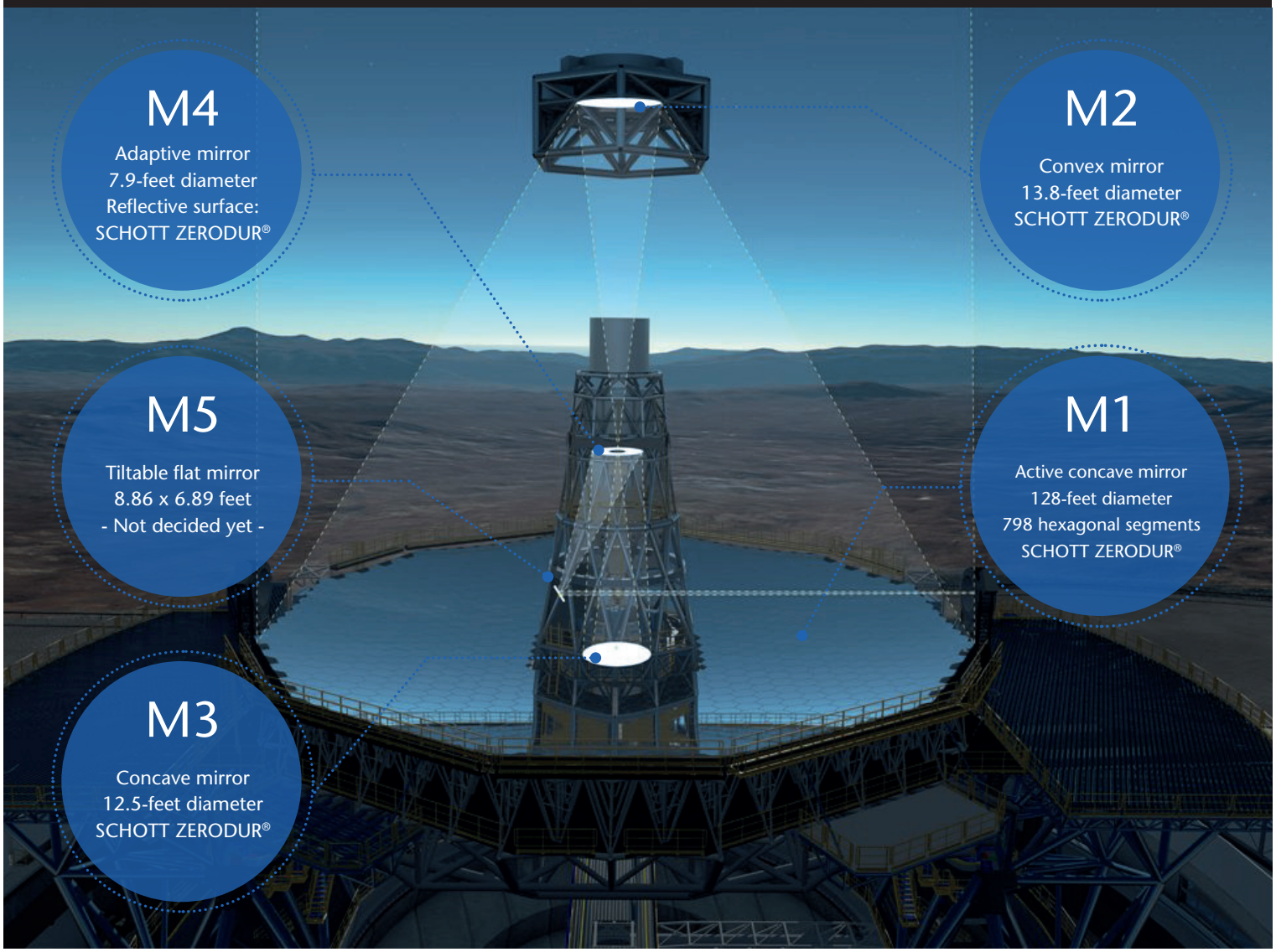
Europe's new third eye

The ELT's new gigantic primary mirror will have a diameter of almost 128 feet, making it the largest of its kind. Its surface is made up of nearly 800 six-sided partial mirrors. To enable the telescope to carry out its mission, every individual mirror must be an instrument of precision.

Zero expansion. Sharp images.

SCHOTT's ZERODUR® glass-ceramic is being used for the ELT's mirror substrates. The material has a very low coefficient of thermal expansion during temperature changes. For telescope operation, this is crucial. Because if the mirror surface experiences even the slightest fluctuation during the opening of the telescope dome, the resulting images would be blurred.

A revolutionary reflexion



Innovation

4 out of the 5 mirrors in the sophisticated optical system of the huge telescope are based on ZERODUR® glass-ceramic. Several hundred individual components come precisely together to work as a reliable team so that the light reaches where it is needed most – the ELT's cameras and spectrographs.

People

„The mirror substrates have very demanding specifications which really test the limits of what is technically feasible. However, our glass-ceramic is extremely well prepared to meet the challenge"

—— Thomas Werner,
Project lead/head ELT at SCHOTT

The crucial phase

Technology experts venture into unchartered territory, making the unthinkable now possible: mass production of highly precise mirror substrates – a total of 949 pieces with exactly identical material properties. And by 2024, the day will have finally arrived when the world's biggest "eye" in the sky will be ready to cast its first glance into outer space, with the ability to "see" 15 times greater than its predecessor.

Production of the secondary mirror, with a diameter of 13.9 feet, recently got underway in mid-May of 2017. After grinding, the raw material is transformed into a strongly curved mirror – just ten centimeters or 3,94 inches thin.

Let's work together to shed more light on the dark mysteries of the universe!

What is your next milestone?

Contact

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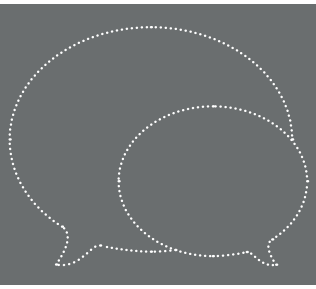

Links

- SCHOTT Microsite ELT
- SCHOTT ZERODUR
- The Extremely Large Telescop (ESO website)