

# 60 years of ESO and counting

Astronomy needs ground- as well as space-based telescopes. The European Southern Observatory (ESO), an example of successful international cooperation, has managed state-of-the-art observatories for the past 60 years.

Everyone is justifiably excited about the shiny new telescope at Sun–Earth Lagrange point L2, the James Webb Space Telescope (JWST). The first stunning images and early scientific data on exoplanets and high-redshift targets have shown that years of hard work and investment have paid off and will keep paying dividends. In this issue, we asked the instrument scientists of NIRCam, MIRI and NIRSpec to select their favourite image so far and explain what it means to them. These images in particular celebrate the teamwork in getting the telescope to its Christmas Day, 2021, launch. The international collaboration between NASA, ESA and CSA steered the project and kept hopes alive over three decades.

But let us not forget that JWST will need ground-based support and follow-up observations to keep pushing the limits of infrared astronomy. Of particular importance are the Very Large Telescope (VLT) — actually four 8.2-m diameter unit telescopes that can observe separately or together — and the Very Large Telescope Interferometer (VLTI) — the four unit telescopes plus an additional four moveable 1.8-m Auxiliary Telescopes — at Cerro Paranal, Chile. In interferometric mode, the VLTI can reach the equivalent size of a 200 m single telescope with an incredible milliarcsecond spatial resolution. Beyond the optical and infrared bands, the Atacama Large Millimeter/submillimeter Array provides complementary observations at (sub)millimetre wavelengths to build a more comprehensive understanding of a given target.

These ground-based telescopes are operated by ESO, the first intergovernmental organization dedicated to ground-based astronomy. It was signed into being on 5 October 1962 by five founding member states: Belgium, France, Germany, the Netherlands and Sweden. At the time all optical telescopes over 2 m in diameter were based in the Northern Hemisphere, and studies of the southern sky, including the Magellanic Clouds and the centre of the Milky Way, needed state-of-the-art observatories. In 1964 the site at La Silla, Chile, was purchased; it now hosts three ESO optical and infrared telescopes and several other facilities from partner institutes.

Nearly 60 years and 17,000 peer-reviewed publications later, ESO has grown to



Credit: ESO/H.Zodet

16 member nations and has become the largest ground-based astronomical observatory in the world, across three sites. Last month, the 2022 European Astronomical Society meeting hosted a session celebrating its history, with scientific highlights covering all facets of astronomy and astrophysics: extrasolar planets, astrochemistry and nucleosynthesis, stellar populations, black holes, cosmology, and galaxy evolution. It was also a celebration of what can be achieved when governments work together, and the ESO Convention, modelled on the CERN Convention, is in turn a model for the forthcoming Square Kilometre Array.

As recently as February 2022, Australia and ESO, strategic partners since 2017, broadened the strength of their partnership. That same month, Russia invaded Ukraine in an act of war that is still unfolding. The resulting sanctions have led to the termination of partnerships with Russia. On hold is the ExoMars mission to place the Rosalind Franklin rover on Mars as ESA seeks a non-Russian lander: there are ongoing discussions with NASA but we will know more at the European ministerial meeting

in November. Meanwhile Roscosmos is also involved in the International Space Station (ISS), but recently announced it will be pursuing the construction of its own facility, Russian Orbital Service Station (ROSS), in low-Earth orbit. Until it is ready in 2030, Roscosmos will likely maintain their collaboration with NASA and ESA in operating the ISS, whose fate beyond 2024 has not been formally agreed.

But back to ESO. There is a lot more to come. The next big project is the Extremely Large Telescope on the new site of Cerro Armazones. At 39.3 m in diameter, it will be the largest optical/near-infrared telescope on Earth — larger than the planned contemporaries, the Giant Magellan Telescope and Thirty Meter Telescope. With first light expected in 2027, and images sixteen times sharper than Hubble Space Telescope, expectations are high. With JWST keeping everyone's attention focused on astronomy, the world will be well primed for the Extremely Large Telescope. □

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