



Expanding Horizons @ ESO



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Expanding Horizons

Transforming Astronomy in the 2040s

Marcella Marconi

For Expanding Horizons SSC





ESO's Mission

*To design, build, and
operate advanced
ground-based
observatories*



*To foster international
collaboration
for astronomy*

ESO's Vision



To advance humanity's understanding of the **Universe** by working with and for the astronomy community, providing it with **world-leading facilities**

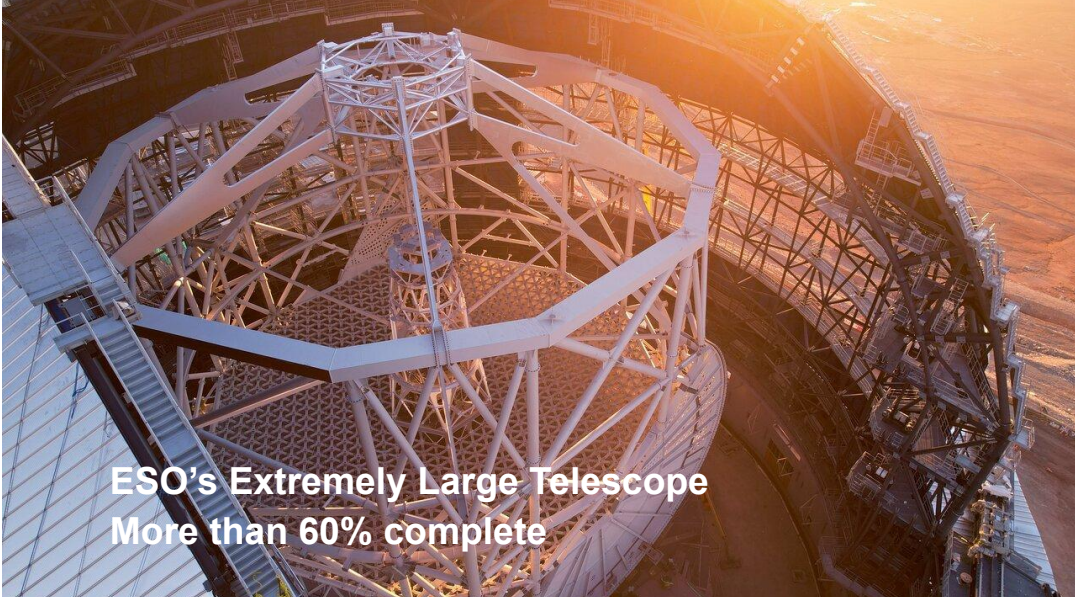


ESO's Strategy

The ESO Council has adopted the following strategic milestones for the Organisation during the decade 2021–2030:

- Implement and operate the ELT as the world-leading extremely large telescope;
- Ensure that the current facilities remain at the forefront of astronomical investigations;
- **Ensure that the Organisation is prepared for future projects when financial projections so permit;**
- **Retain ESO's leadership role in astronomy.**

Waelkens, C. et al., 2021, *The Messenger* 183



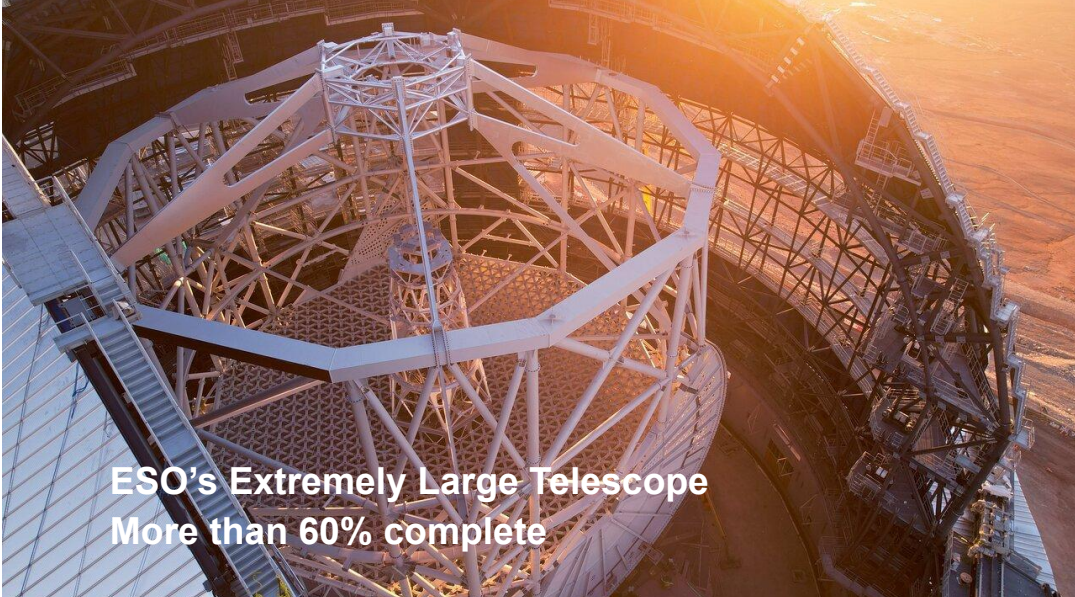
ESO's Extremely Large Telescope
More than 60% complete



25 years
Very Large Telescope



10 years
ALMA



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ESO's **Next** **Programme**

A night-time photograph of an astronomical observatory complex. The central feature is a large, modern telescope dome with a complex, lattice-like structure. To its left, there are several smaller buildings and satellite dishes. The background is a dark, starry sky with a bright, hazy mountain range in the distance. The overall scene is illuminated by the observatory's lights and the ambient light from the stars.

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<http://next.eso.org>

What ESO's next programme could be

The next ESO Programme should be identified **in line with ESO's vision and strategy**. It should be a **transformational facility in the 2040s landscape** that enables scientific benefits in several areas and serves a **large part** of the astronomical community. It could be:

- A new telescope facility at an existing or new observatory site;
- A significant upgrade of an existing facility that is (co-)owned by ESO;
- Other ideas or combinations.

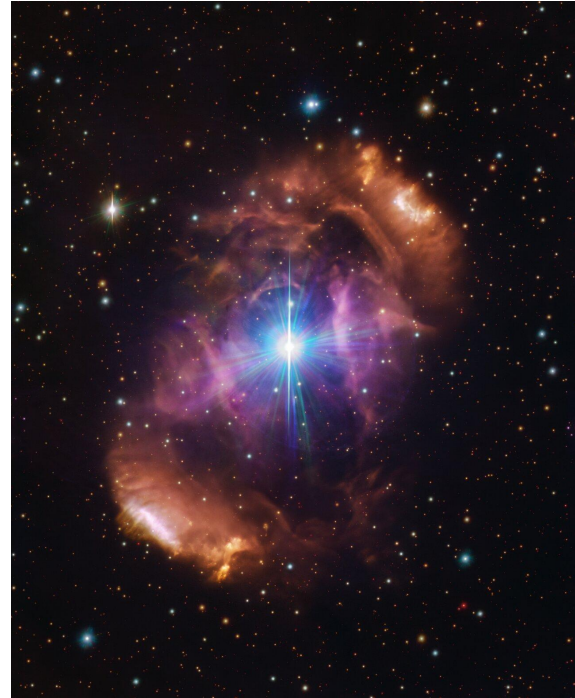
Important: ESO does not operate as a funding agency. The new facility will be **led and owned** by ESO or in **partnership** with other organisations.

How ESO's next programme will be selected

A transparent selection process

Expanding Horizons is an **open and inclusive call** to ESO's community

- Call for ideas to **motivate convergence** among the community;
- Assessment of the proposals will be made based on **scientific drive** and **organisational factors**;
- Ample **preparation time and activities** foreseen to incentivise the community and **foster dialogue and debate**.



Selection criteria for ESO's next programme

Recommendation to Council will be prepared by ESO's Executive, including input by a Senior Science Committee (appointed by Council), based on:

- **Scientific drive:** Which fundamental problems in astronomy are expected to be addressed? How broad impact the new facility will have? What synergies are there with other ESO facilities?
- **Organisational ability:** Are competencies and skillsets available to own the design and development of the new facility? Is the organisation able to fulfil its operational requirements?
- **Sustainability:** To what degree the new facility could be designed, built and operated in an environmentally, socially and financially sustainable manner?
- **Institutional model:** Should the new facility be developed in a partnership with another organisation?
- **Risks assessment**

Expanding Horizons timeline



July 2024–Q3 2026

- Present and explain the process to the community
- Trigger dialogue about astronomy challenges & disruptive technologies in 2040s

Q3 2026–Q2 2027

- Launch of call: Q3 2026
- Letters of Intent due 1 Dec 2026
- Proposals due: 1 Jun 2027

Q3 2027–Q3 2028

- Performed by SSC and ESO Executive
- Transparently share what ideas are being proposed at a dedicated community workshop

Q3–Q4 2028

- Presented at STC and Finance Committee
- Council decision
- Decision is **not** the start of the new Programme

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Q3 2027–Q3 2028

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Q3–Q4 2028

- Presented at STC and Finance Committee

- Call for White Papers on Scientific Challenges in the 2040s will open around the time of the EAS Annual Meeting.
- It will be open for about 4 months. These white papers will be independent of any future proposals that will be submitted during the Call for Ideas for facilities in 2027.

The Senior Science Committee (SSC)

The SSC is a **diverse group** of experts in a broad variety of areas of astronomy. It provides independent and unconflicted advice on the **scientific drive** of the new programme.

Mandate of the SSC – Preparatory Phase

- Helping to identify scientific challenges in astronomy for the 2040 and support community engagement activities to discuss them;
- Provide guidance on which disruptive technologies may enable transformational science in 2040 or beyond.

Mandate of the SSC – Call for Ideas, Assessment and Decision Phase

- Provide independent scientific assessment of the proposals in response to the Call for Ideas

The SSC may also be tasked with other support activities related to the *Expanding Horizons* process, as requested by the ESO Director General or ESO Council.

Senior Science Committee (SSC)

- Angela Adamo, University of Stockholm (STC)
- Joss Bland-Hawthorn, University of Sydney (Astrophotonics)
- Marica Branchesi, Gran Sasso Science Institute (Multi-messenger)
- Paul Callanan, University College Cork (Council)
- Heather Cegla, University of Warwick (Life & Habitability)
- Stéphane Charlot, Institute d'Astrophysique de Paris (Cosmology)
- Vik Dhillon, University of Sheffield (Council)
- Marcella Marconi, INAF- Osservatorio Astronomico di Capodimonte (STC)
- Nanda Rea, Institut de Ciències de l'Espai – CSIC (Transients & high-energy)
- Hans-Walter Rix, MPIA (Galaxies)
- ...

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