



Expanding Horizons

Transforming Astronomy in the 2040s

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ESO stands for **inherently peaceful collaboration** between nations, communities and people.

Together we achieve things **no Member State could do alone.**

We build bridges between society, science and technology **for the benefit of all humankind.**

ESO's Mission



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



*We 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**

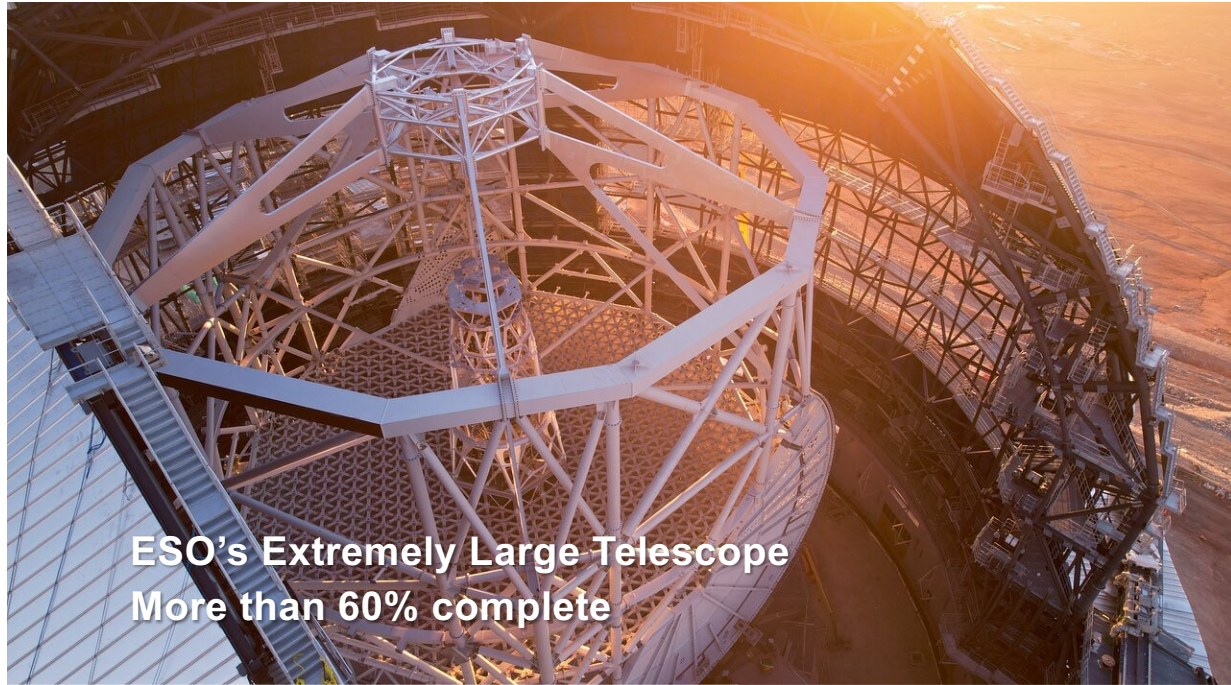


ESO's Strategy

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



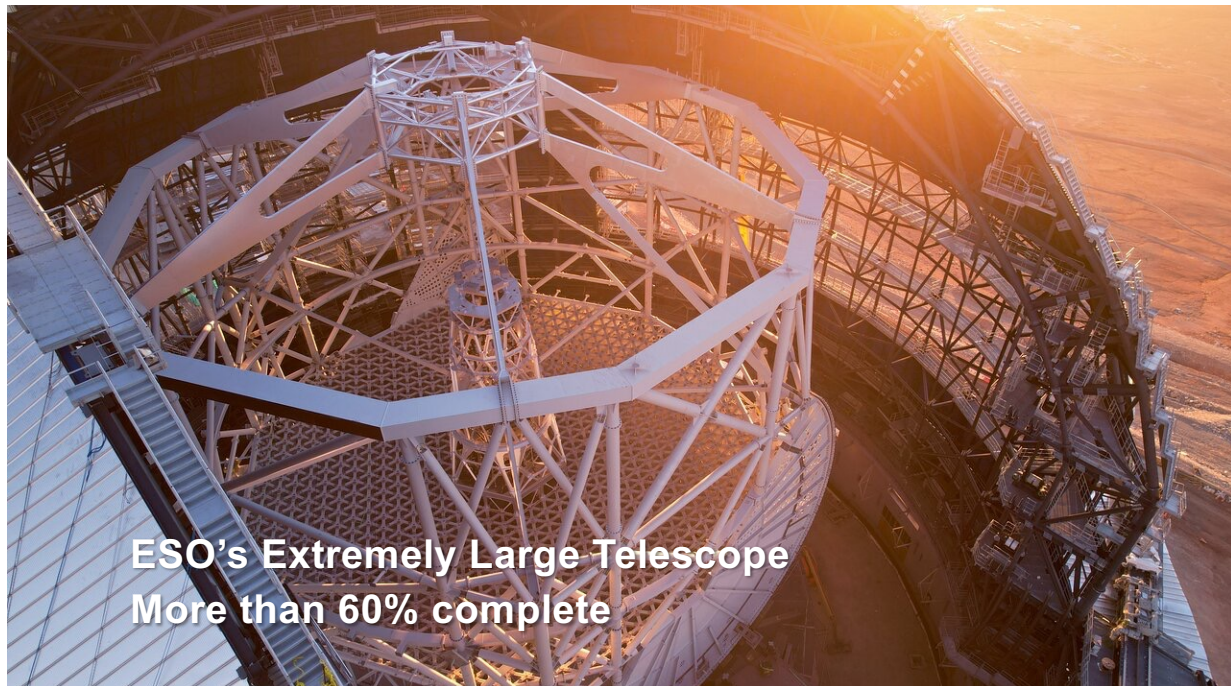
ESO's Extremely Large Telescope
More than 60% complete



25 years
Very Large Telescope



10 years
ALMA



ESO's Extremely Large Telescope
More than 60% complete



25 years
Very Large Telescope



10 years
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ESO's **Next** **Programme**

A composite image showing a modern astronomical observatory at night. The observatory has several large, illuminated structures, including a prominent dome and a large dish antenna. The background is a dark, starry sky with a bright, hazy mountain range in the distance. The overall scene is illuminated with a mix of cool blue and warm yellow/orange lights.

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<http://next.eso.org>

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**.





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.



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

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)
- Paola Caselli, MPE (Star formation)
- 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, MPA (Galaxies)



Expanding Horizons: Preparatory Phase (Q4/2024- Q3/2026)

The communication campaign

- **Objectives**

- To inform the community of the process and its timeline;
- To explain the nature of the process, i.e. open and inclusive call, transparent and fair assessment;
- To highlight that a broad range of ideas is welcome;
- To communicate the steps and activities related to the process.

- **Target audience:**

- Direct: Scientific community; Indirect: instrument builders, technology institutes, Industry and decision-makers

- **Activities:**

- Web portal, including Q&A and service desk
- Social media campaigns
- Presentations at National Astronomy Meetings, EAS, or on demand to other meetings (e.g. workshops attached to specific telescope concepts)



Steering scientific and technology debate

- **ESO Landscape 2030:** a document describing the expected scientific capabilities of ESO's facilities in the 2030s and beyond (*in preparation*);
- **Science Vision Workshops:** a series of on-line workshops where the scientific community should discuss which will be the scientific challenges of astronomy in the 2040s in different areas. Areas to be chosen with the support from the Senior Science Committee;
- **Disruptive Technologies Workshops:** a discussion of which potential disruptive technologies may become game changers for a transformational facility in the 2040s;
- **Presentation and discussion** with the community at EAS Annual Meeting 2025 in Cork and on other international and national meetings.

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 lights of the observatory and the stars of the night sky.

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Thank you!

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