

Overview of the ELT Construction status



ELT-Instrumentation Procurement Webinar

01 October 2025

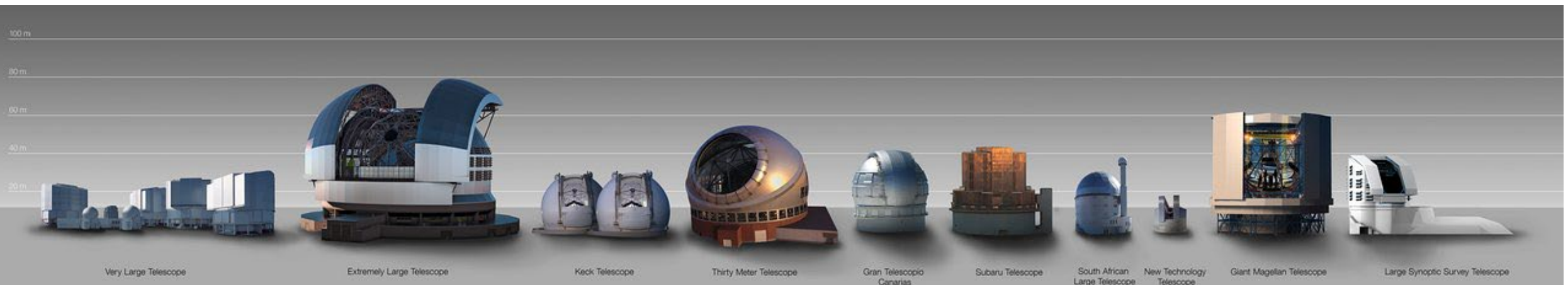
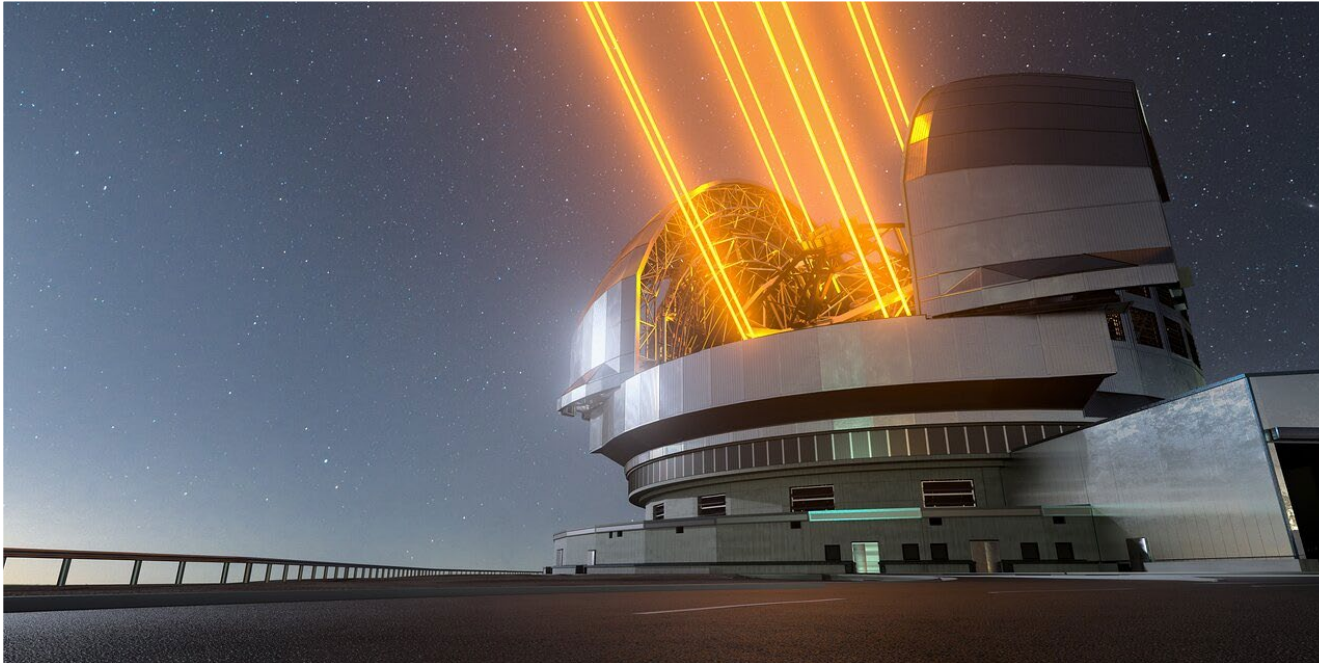


Introduction

The ELT

Will be the **largest optical/infrared telescope** ever built or planned

The most powerful telescope of the new generation, the only one with secured funding, and the most advanced in its construction



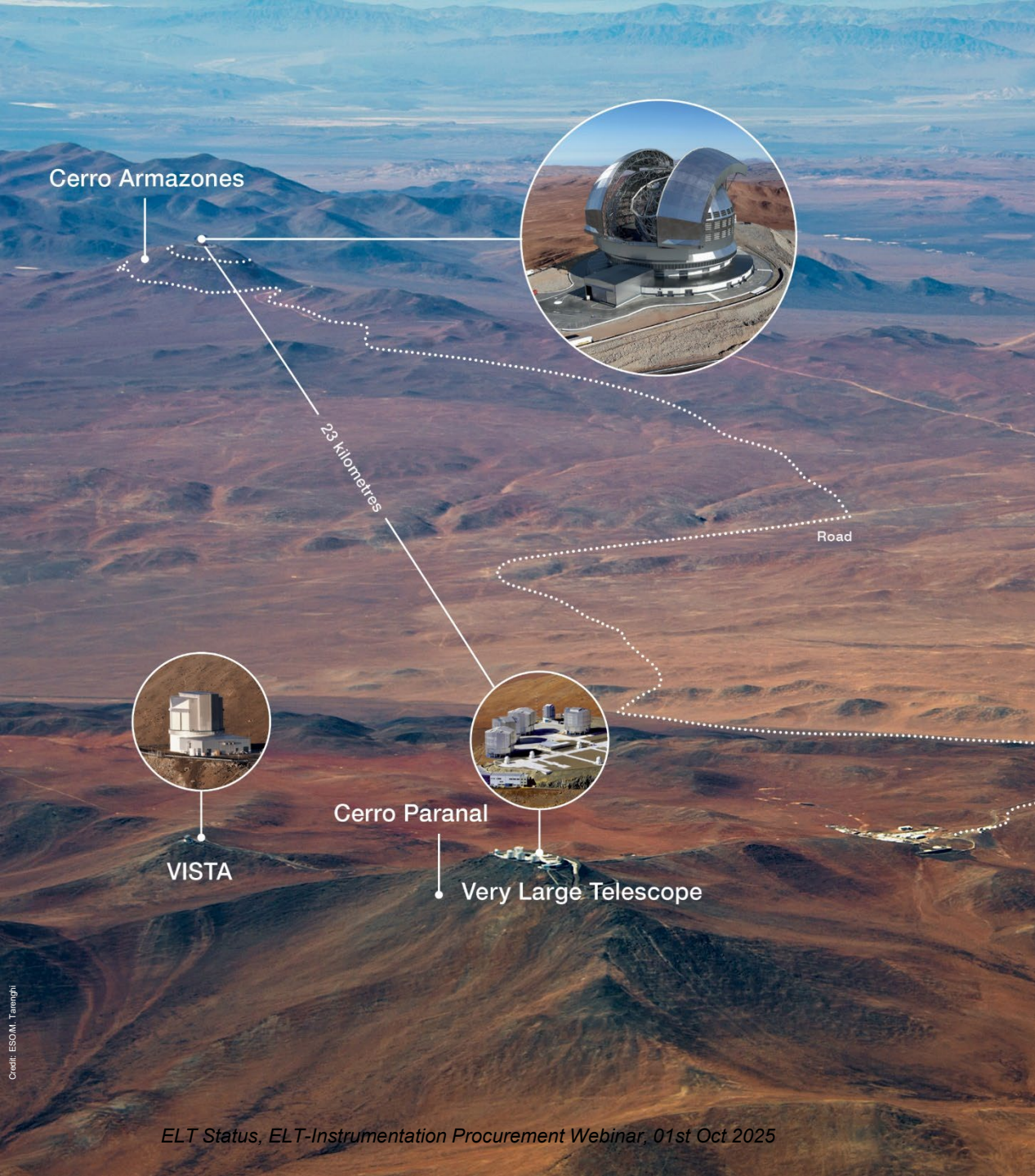
The ELT

Is being built on Cerro Armazones in the Chilean Atacama Desert, at 3046 metres altitude and just 23 kilometres from the site of ESO's Very Large Telescope (VLT) at Paranal

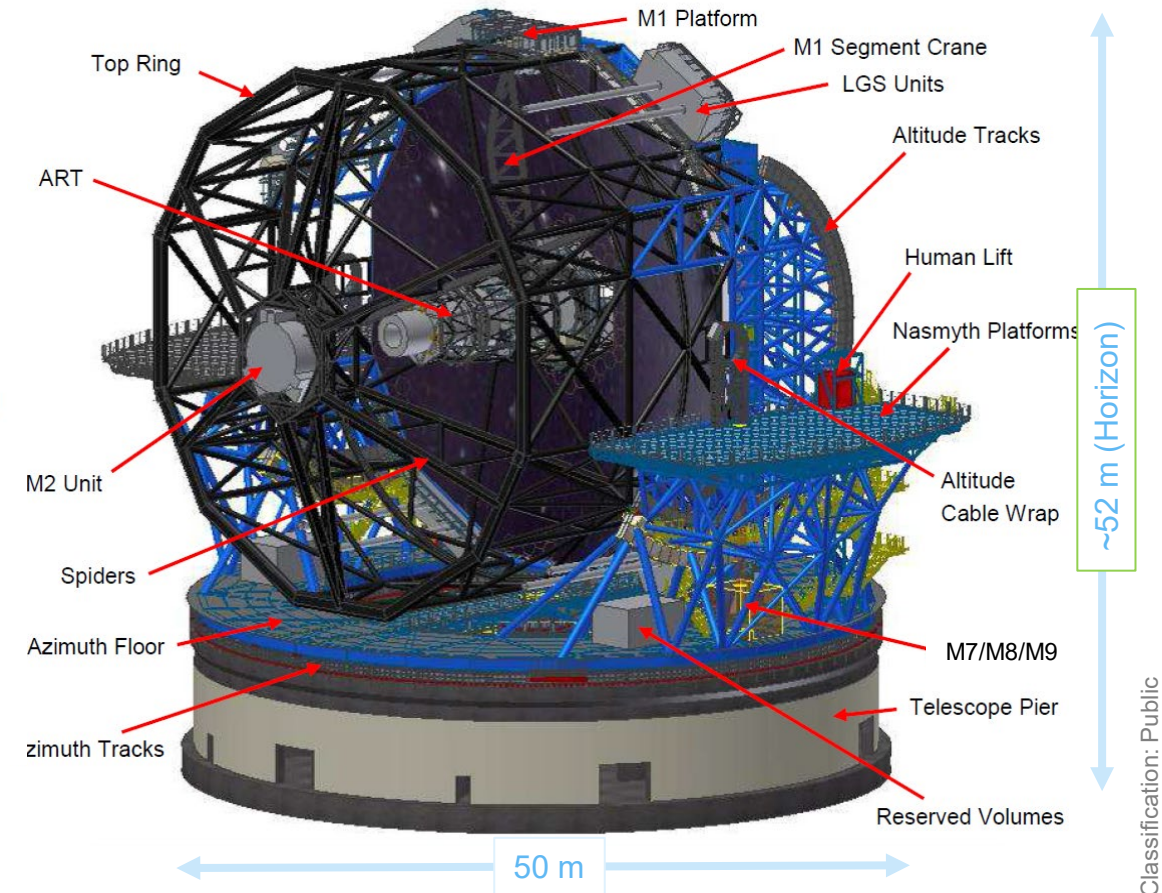
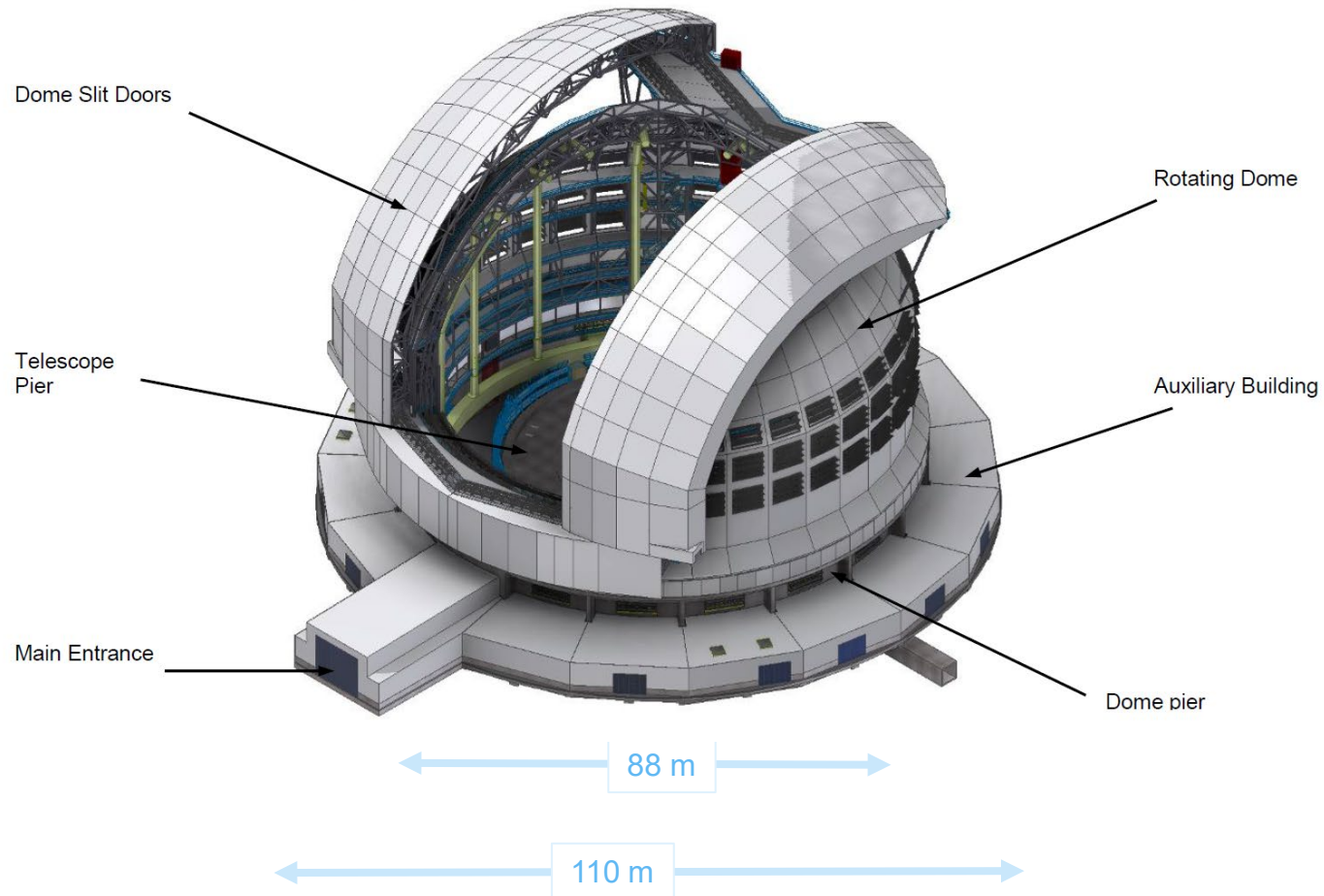
Construction 2014-2030 (~**1500 MEUR**)

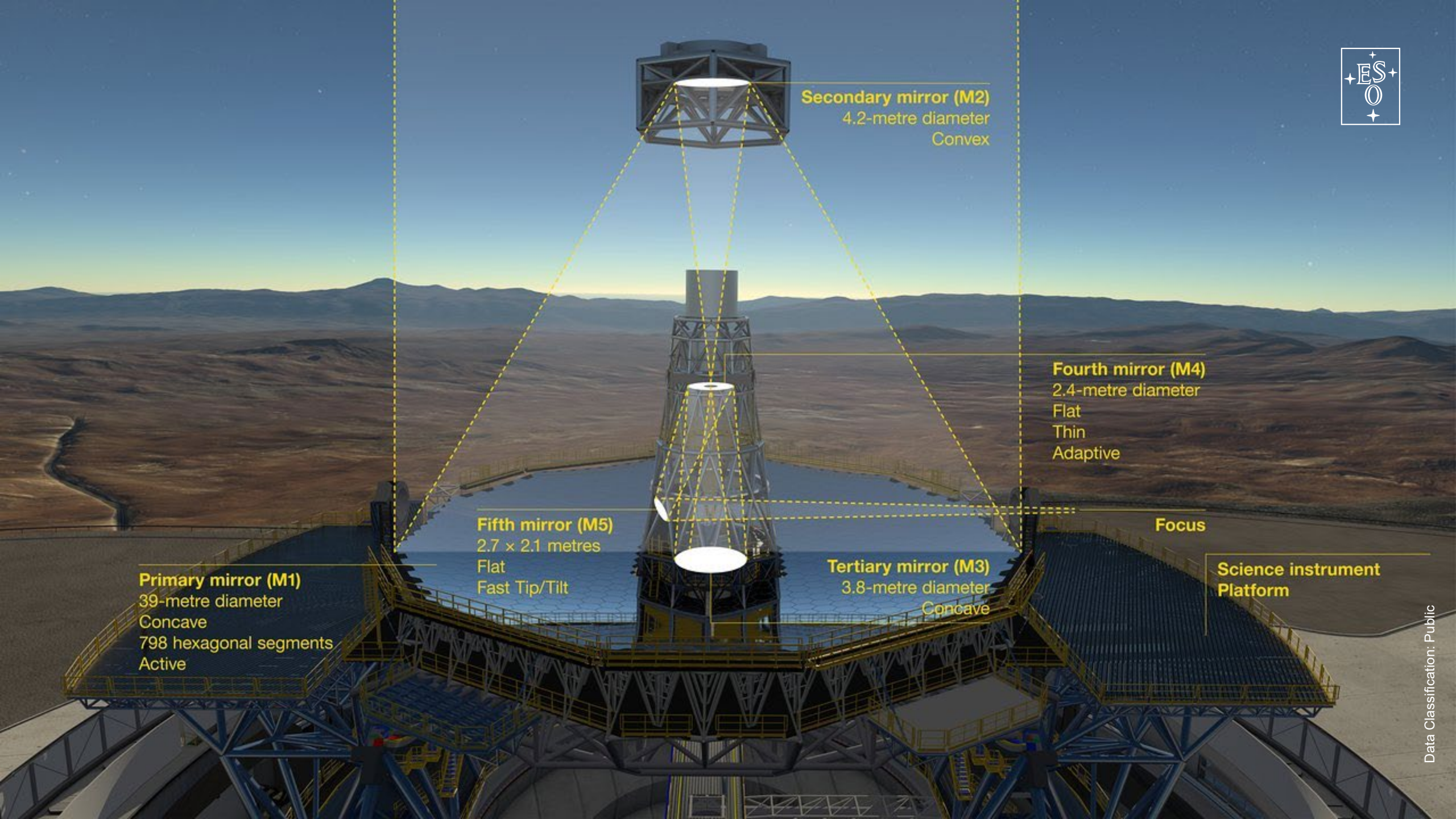
First scientific light by the end of 2030

For details and updated status, visit elt.eso.org



Dome & Main Structure (DMS)





Secondary mirror (M2)
4.2-metre diameter
Convex

Fourth mirror (M4)
2.4-metre diameter
Flat
Thin
Adaptive

Fifth mirror (M5)
2.7 × 2.1 metres
Flat
Fast Tip/Tilt

Tertiary mirror (M3)
3.8-metre diameter
Concave

Focus

**Science instrument
Platform**

Primary mirror (M1)
39-metre diameter
Concave
798 hexagonal segments
Active



Programme Status Overview

Basic Infrastructures mostly completed

Road & Platform Civil Work, ETF, Photovoltaic Plant, Power Conditioning System, ...



icafal



ABENGOA



SAESA
GRUPO SAESA

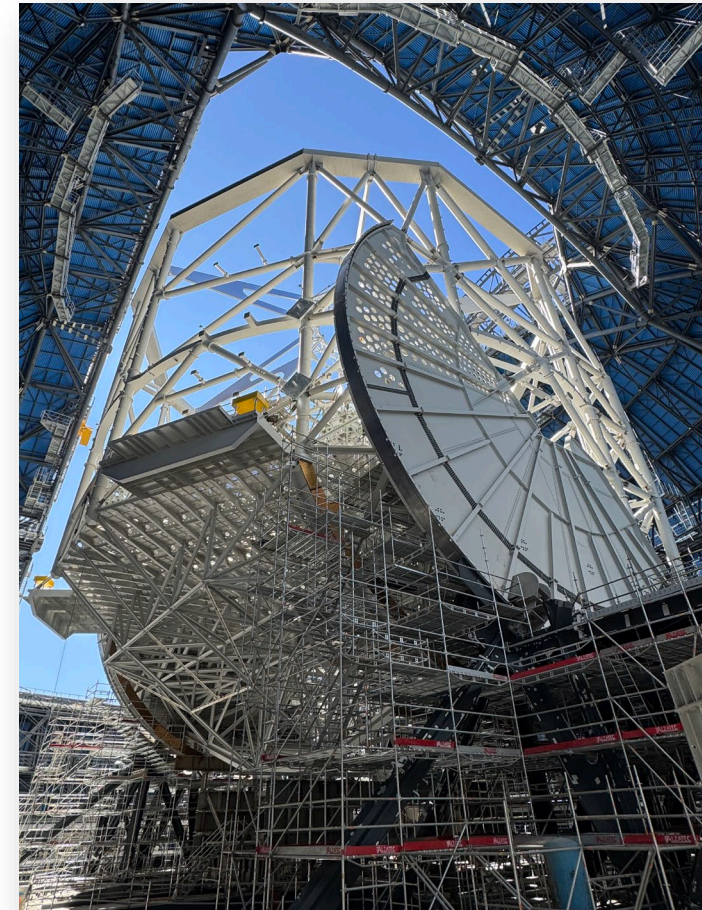


SAESA
GRUPO SAESA



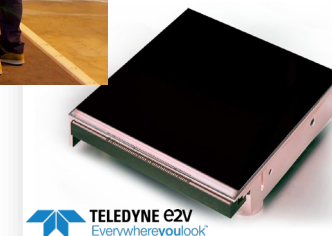
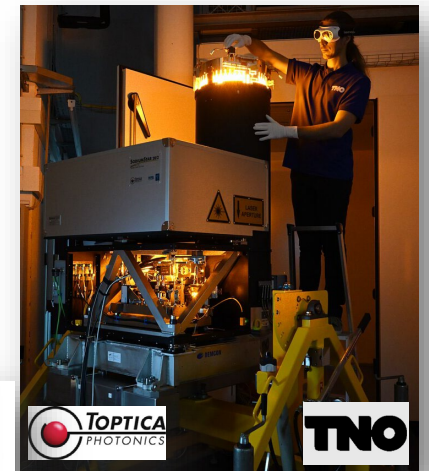
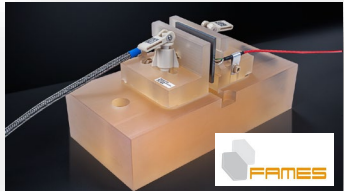
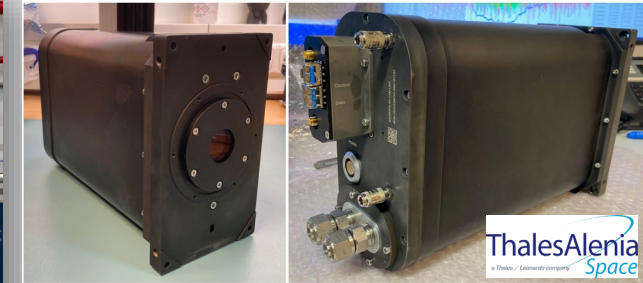
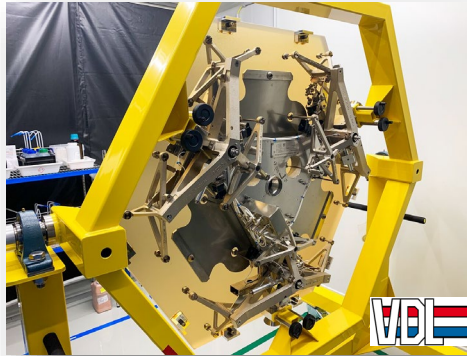
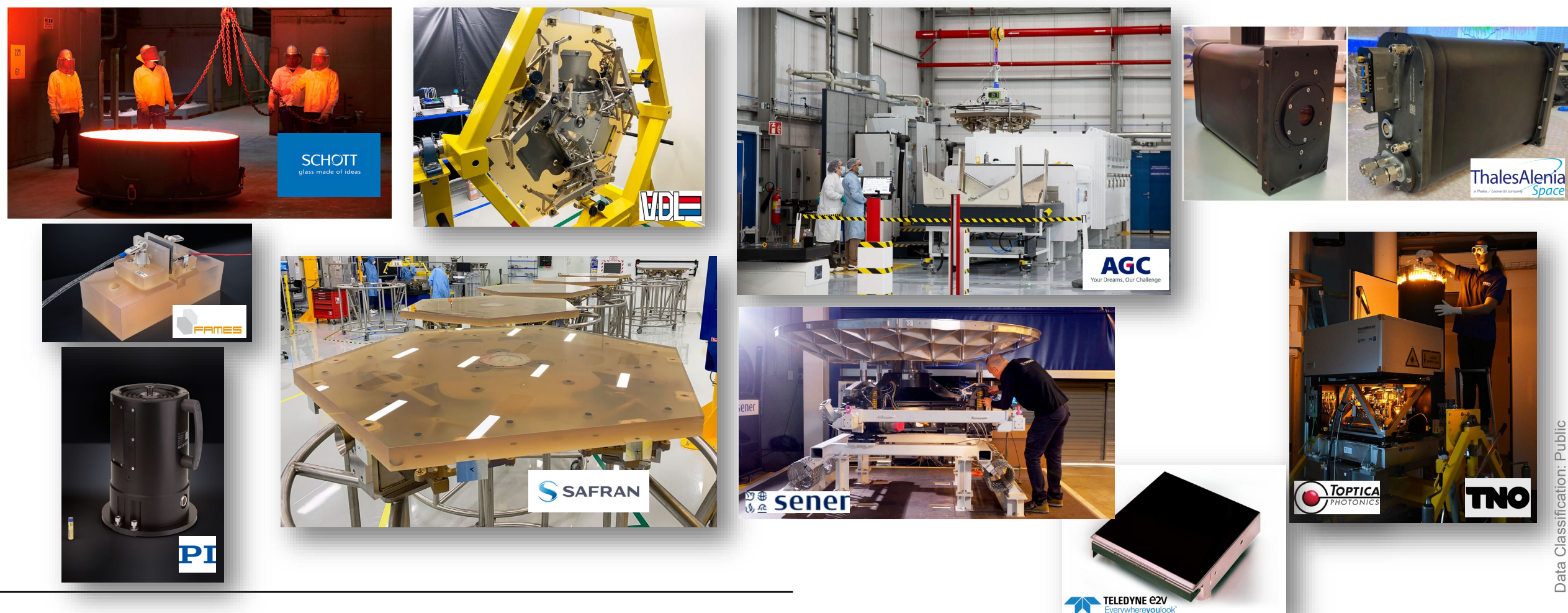
Dome and Main Structure erection on site on-going

Manufacturing in Europe almost completed, Dome & telescope structural erection almost complete



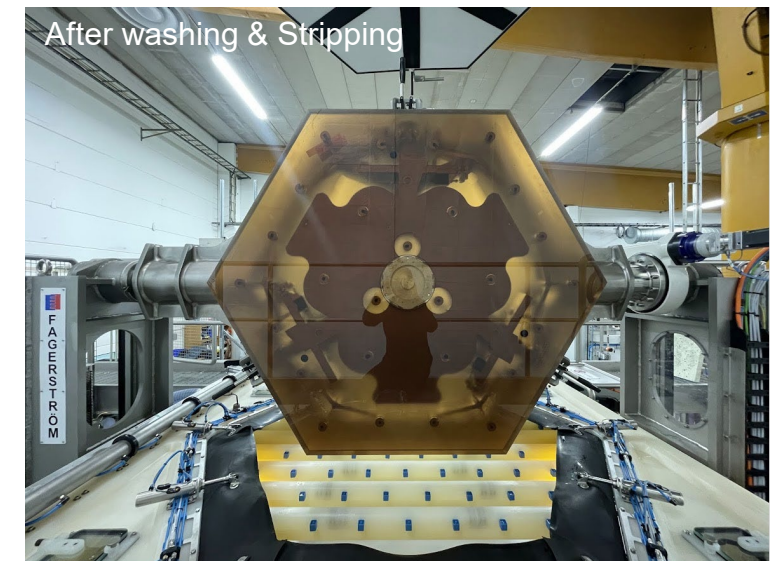
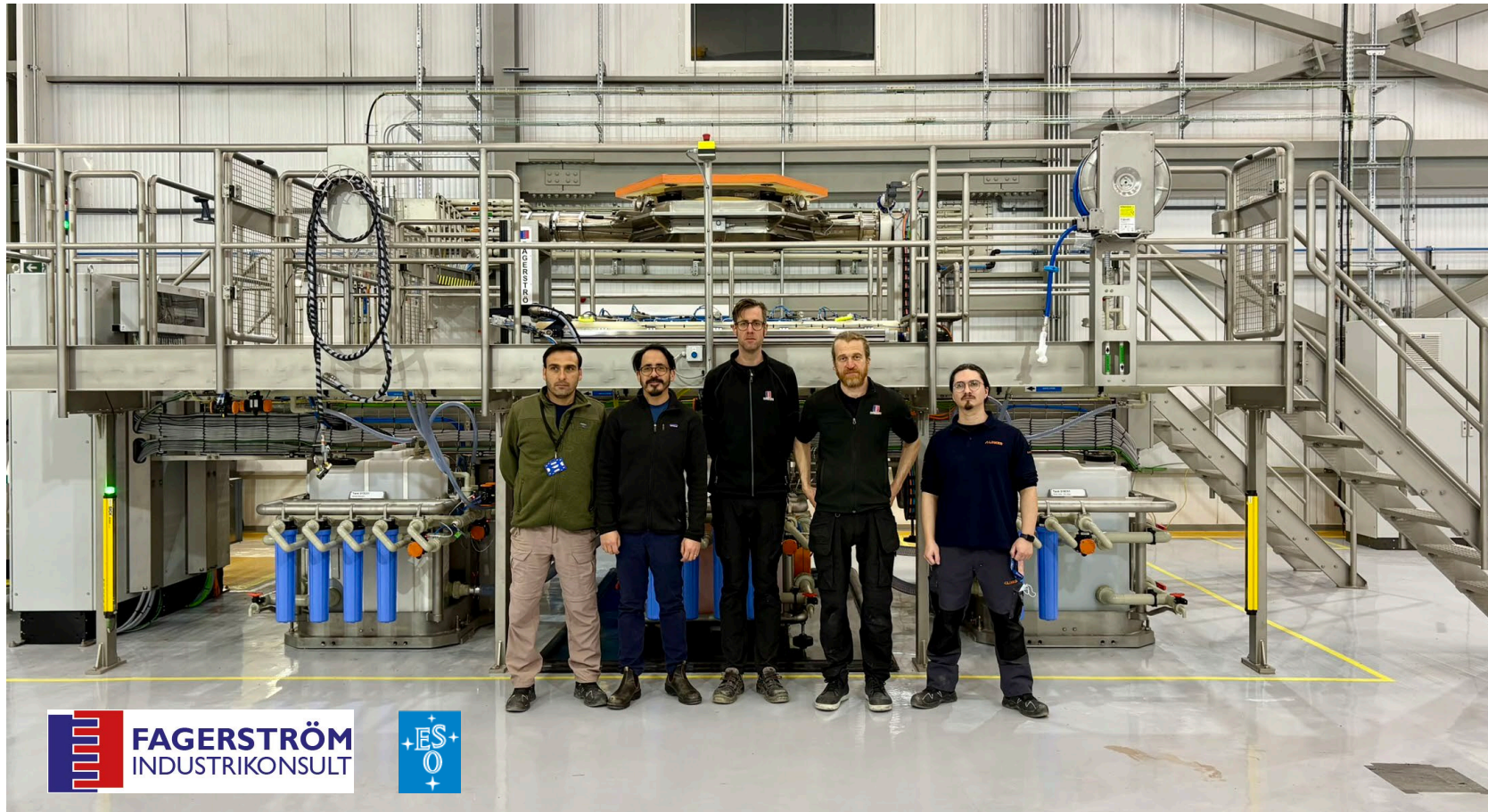
Many Subsystems already accepted & delivered

All Mirror blanks, all M1 Supports & Position Actuators & Edge Sensors; 242 polished M1 Segment Assemblies, M5 Cell, M1 Coating Plants (2x), Detectors, Laser Sources and Projectors, etc.



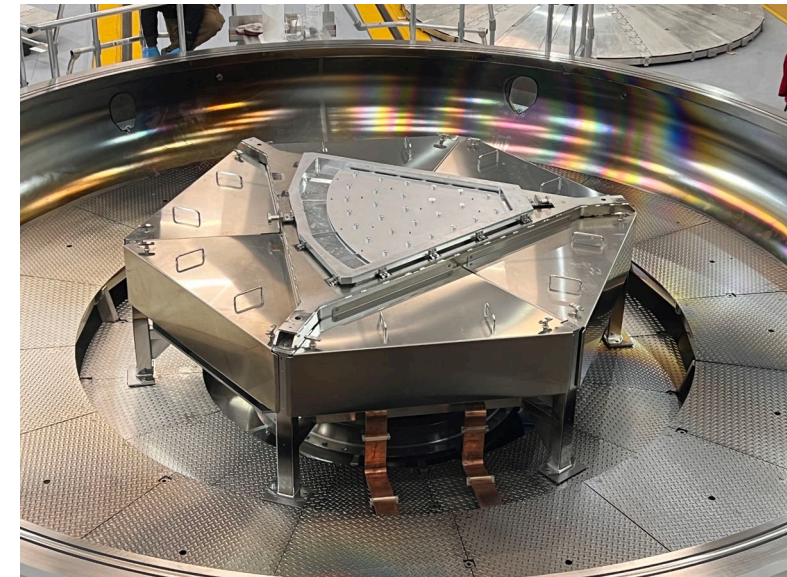
Some items fully tested pending acceptance

M1 Washing & Stripping Plant



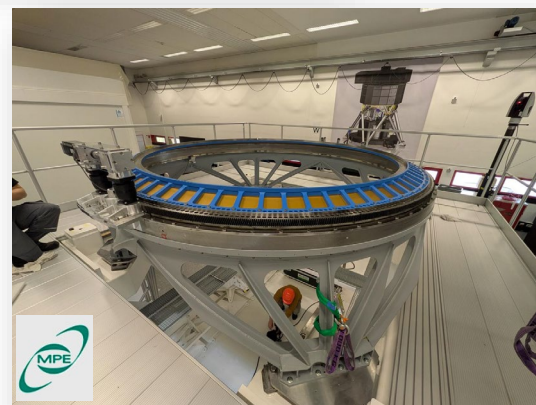
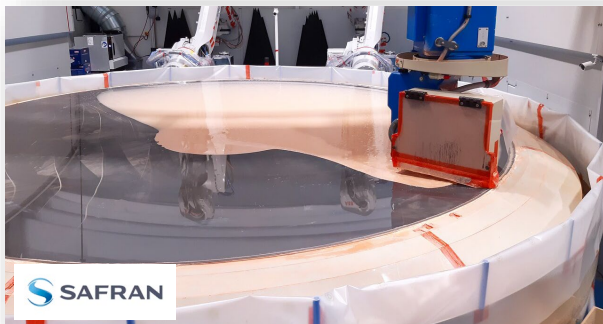
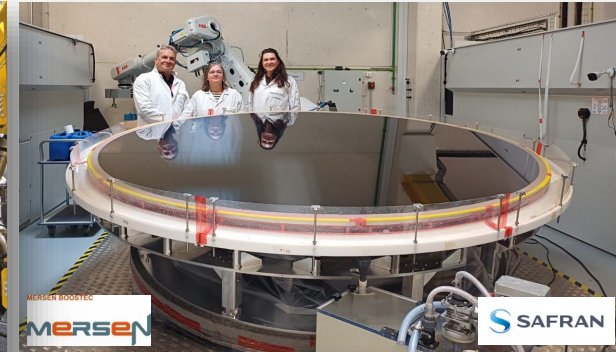
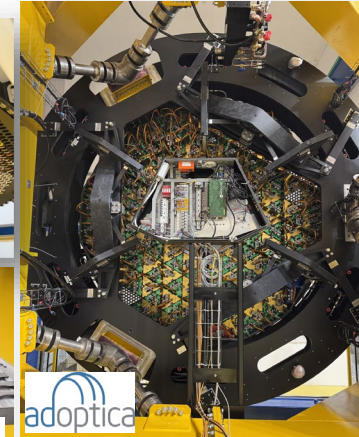
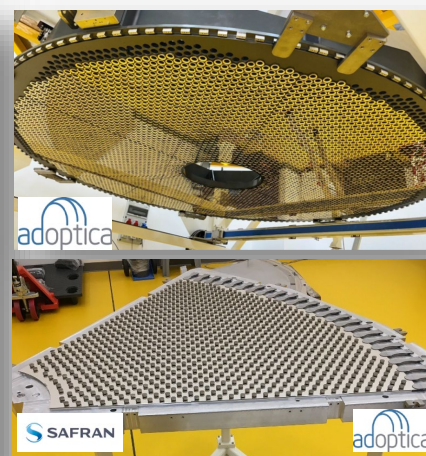
Some items fully tested pending acceptance

Large Mirror Coating Plant



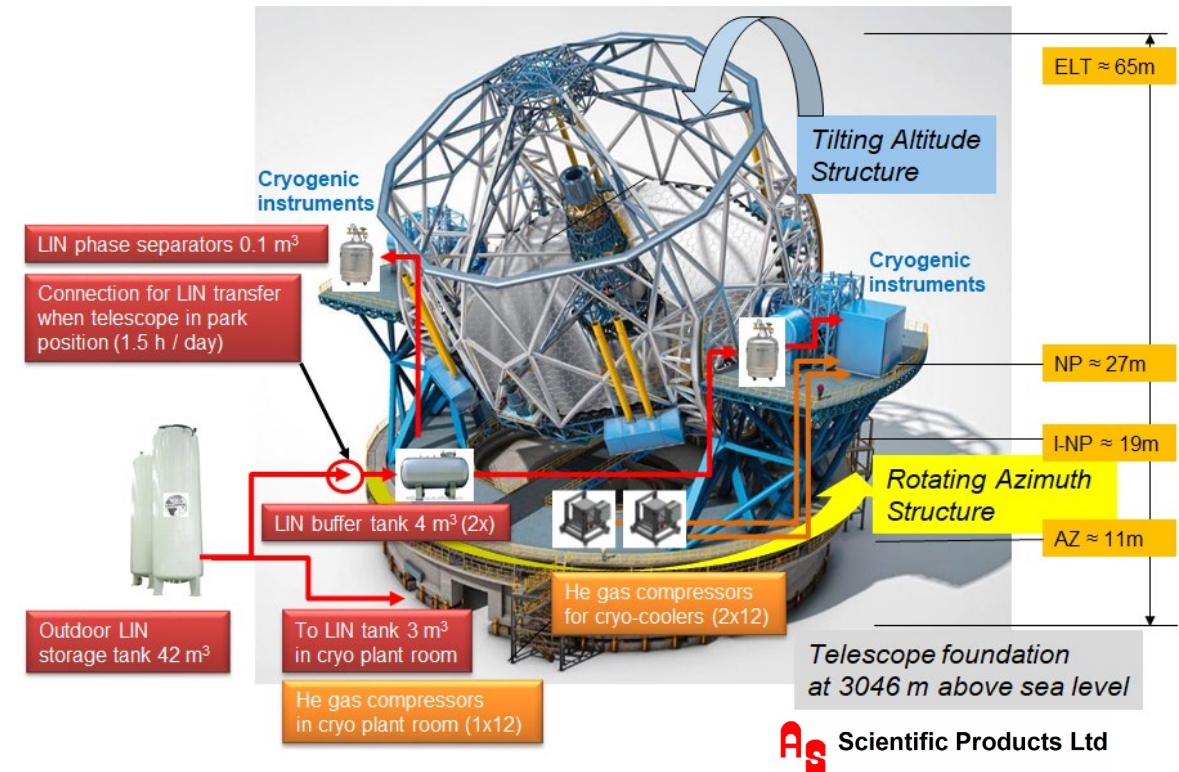
Most items in manufacturing/assembly/test phase

M2 & M3 Mirrors and Cells, M4 Adaptive Unit, M5 mirror, Pre-focal Stations (PFS), Instruments, etc,



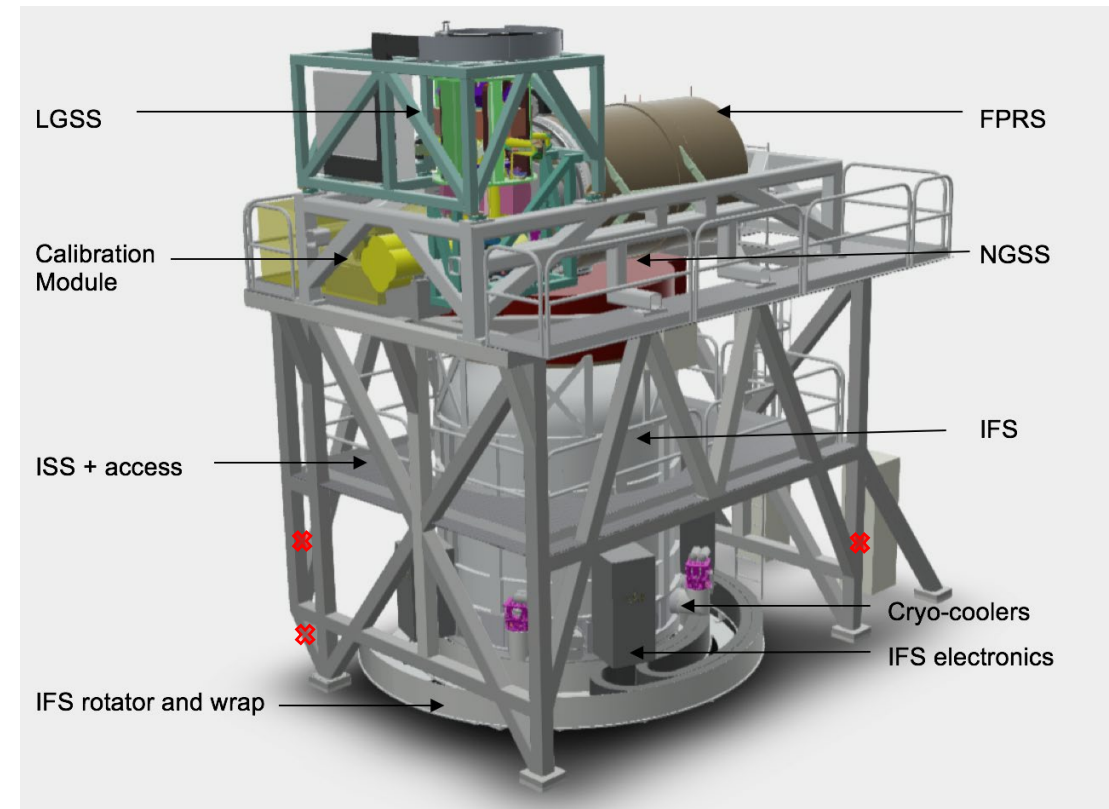
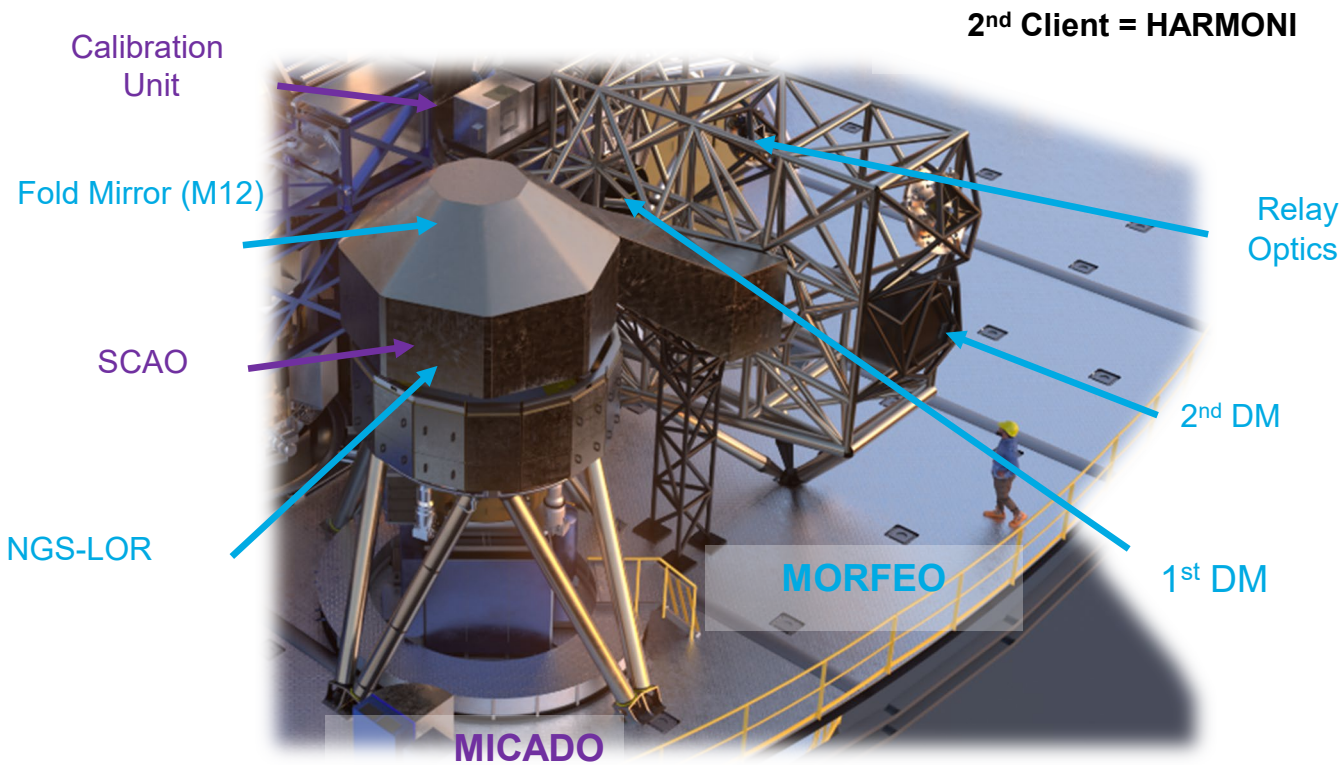
Only few Telescope items still in design phase

Recently signed contracts: M5 commissioning mirror (blank ready), LIN Infrastructure (just passed FDR)

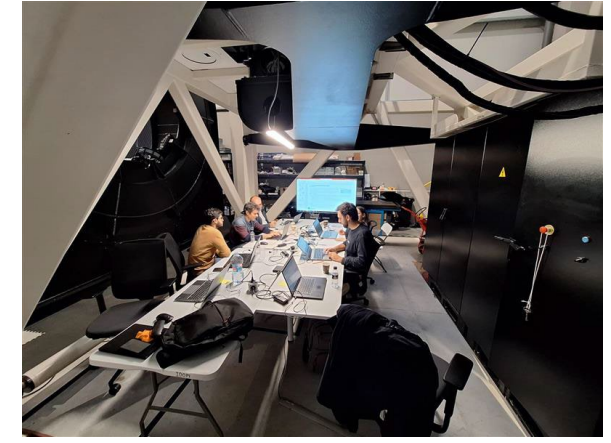
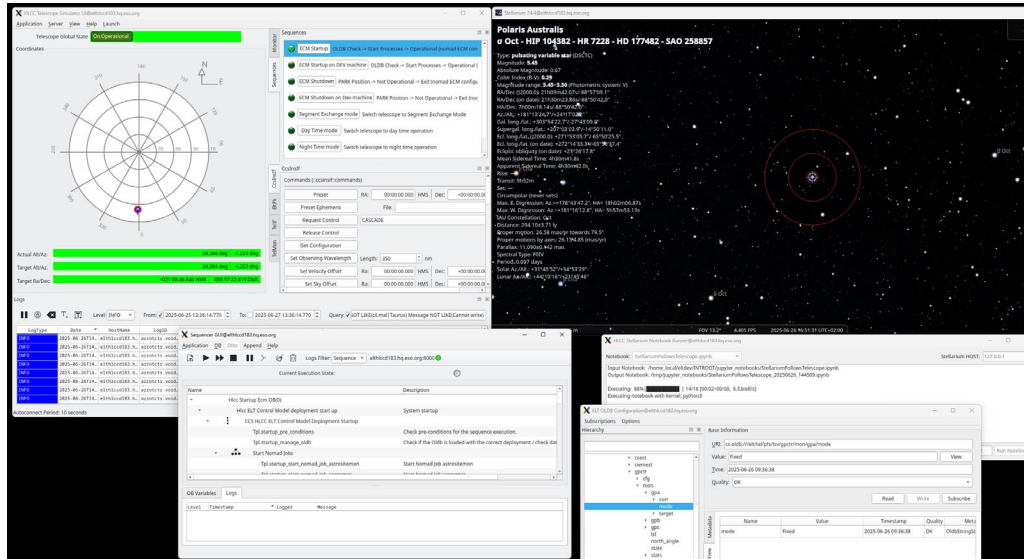


Two Instruments still in design phase

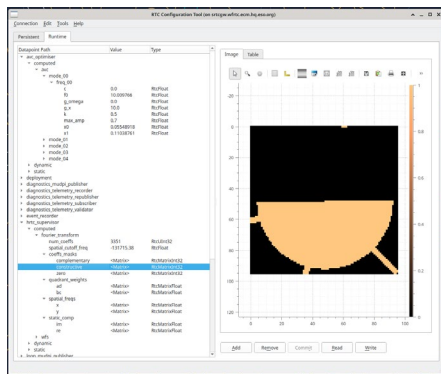
MORFEO & HARMONI



Control System Development and Follow-up



M2/M3 and PFS Control System Follow-up



Central Control System Development

Including platforms for INS and RTC development.



M5 Cell Test and Integration in the LIH



Large Contracts Status

95-100%

50-95%

<50%

Closed or under warranty

- Design : only 2 instruments and 2 recently started contracts still in design phase
- Manufacturing: majority very close to completion (>80%)
- Integration: about 1/3rd completed
- Three items remain to be procured:
 - Turbulence Monitoring System
 - Supplementary cooling distr.
 - Armazones Support Building (tbc)

Description of Work	Contract Signature Date	Contractor	Status	Design	Manuf.	Integration
PA Consultancy Services	Jan-16	ISQ	On-going	N/A	N/A	N/A
ISVV Consultancy Services	Jan-16	Critical Software	On-going	N/A	N/A	N/A
Construction All Risks Insurance	Mar-18	SCOR	On-going	N/A	N/A	N/A
Freight Forwarding Services	Oct-20	DSV	On-going	N/A	N/A	N/A
Consultancy Support	Jun-13	Ramboll	On-going	N/A	N/A	N/A
Consultancy Support - On site activities	May-23	CyD	On-going	N/A	N/A	N/A
DM&S Design and Construction Contract	May-16	ACe Consortium	On-going	100%	97%	68%
M4 Phase 1 Preliminary Design	May-12	AdOptica	Closed	100%	100%	100%
M4 Unit Final Design and Manufacturing	Jun-15	AdOptica	On-going	100%	100%	91%
M1 Segment Supports - Qual. Units	Jan-15	VDL	Closed	100%	100%	100%
M1 Segment supports - Qual. Units	Feb-15	CESA	Closed	100%	100%	100%
M4 Mirror Shells Supply	Jul-15	Safran Reosc	Closed	100%	100%	N/A
M2 Mirror and Auxiliary Equipment Supply	Jul-16	Safran Reosc	On-going	100%	99%	N/A
M2 Blank Supply	Jan-17	Schott	Closed	100%	100%	100%
M3 Blank Supply	Jan-17	Schott	Closed	100%	100%	100%
M3 Mirror and Auxiliary Equipment Supply	Feb-17	Safran Reosc	On-going	100%	55%	N/A
M2 and M3 Cell Design and Manufacturing	Jan-17	Sener	On-going	100%	100%	94%
M1 Edge Sensors Design and Manufacturing	Jan-17	FAMES	Under warranty	100%	100%	N/A
M1 Mirrors Polishing	May-17	Safran Reosc	On-going	100%	53%	31%
M1 Blanks Supply	May-17	Schott	Under warranty	100%	100%	N/A
M1 Position Actuators	Jun-17	PI	Under warranty	100%	100%	100%
M1 Segment supports - Production	Apr-18	VDL	On-going	100%	98%	NA
M5 Blank Supply + Polishing	Mar-19	Safran Reosc	On-going	100%	92%	45%
M5 Cell Design and Manufacturing	Nov-19	Sener	Under warranty	100%	100%	100%
M5 Commissioning Mirror - Blank	Mar-24	Schott	On-going	N/A	100%	100%
M5 Commissioning Mirror - Polishing	Jun-24	Glyndwr Innovations	On-going	20%	5%	0%
M1 Segment Assemblies Manipulator	Jan-21	Sener	On-going	100%	100%	65%
M1 Segment Assemblies Local Coherencer	May-21	IDOM	On-going	100%	95%	45%
Core Integration Infrastructure	Jul-17	Cosylab AB	Closed	100%	100%	100%
M1LCS Cabinets Procurement and AIV	Dec-20	PROCON	Under warranty	100%	100%	100%
M1LCS Cabinets Heat Exchangers	Nov-20	AAVID Thermalloy	Under warranty	100%	100%	100%
CSW Outsourcing Contract	Mar-23	N7 SPACE Sp. z o.o.	On-going	N/A	N/A	N/A
Road and Platform	Dec-13	ICAFAL	Closed	100%	100%	100%
Paranal ELT Technical Facility Design and Construction	Mar-18	Abengoa	Closed	100%	100%	100%
Supply, and installation of ABC Power Substations (23kV + 0.4 kV)	Oct-16	SIEMENS	Closed	100%	100%	100%
M1 Coating Plants Supply	Jun-18	AGC	Under warranty	100%	100%	100%
Large Mirrors Coating Plant Supply	May-21	AGC	On-going	100%	100%	100%
M1 Mirror Washing & Stripping plant Supply	Jan-20	Fagerström Industriekonsult	On-going	100%	100%	100%
Power Conditioning System	Nov-19	SAESA	On-going	N/A	N/A	N/A
ELT LN2 Infrastructure	Nov-23	AS Scientific Products Ltd.	On-going	100%	45%	0%
Armazones Computer Room Outfitting (Power and Racks)	Jun-25	Aselcom Energia SpA	On-going	15%	0%	0%
Dataflow Software Components for ELT	Nov-18	Etamax	On-going	N/A	N/A	N/A
MICADO Construction	Oct-15	MPE	On-going	100%	50%	0%
HARMONI Construction	Oct-15	STFC	On-going	80%	0%	0%
METIS Construction	Oct-15	NOVA	On-going	100%	60%	0%
MORFEO Construction	Feb-16	INAF	On-going	95%	20%	0%
IR Detectors for HARMONI, MICADO, METIS	Jul-18	Teledyne	On-going	100%	92%	N/A
C-RED Cameras for MAORY	Jul-18	FLI	Under warranty	100%	100%	100%
CCD-220 Detectors for MAORY, MICADO, HARMONI, PFS-A, PDS	May-19	Teledyne	Under warranty	100%	100%	100%
MUSE type detectors	Sep-19	Teledyne	Under warranty	100%	100%	N/A
AOWFS Cameras Production	Dec-22	TAS-E	On-going	100%	45%	15%
PFS-A Main system Design and Manufacture	Apr-18	IDOM	On-going	100%	100%	90%
Laser Sources	Dec-17	Toptica	Under warranty	100%	100%	100%
Laser Projection Subunits	Dec-20	TNO	On-going	100%	95%	35%
PDS Powered Optics	Feb-23	Bertin	On-going	100%	75%	N/A
Laser Trackers	Oct-21	Hexagon Wetzlar	Under Warranty	N/A	100%	NA

ELT Overall Status

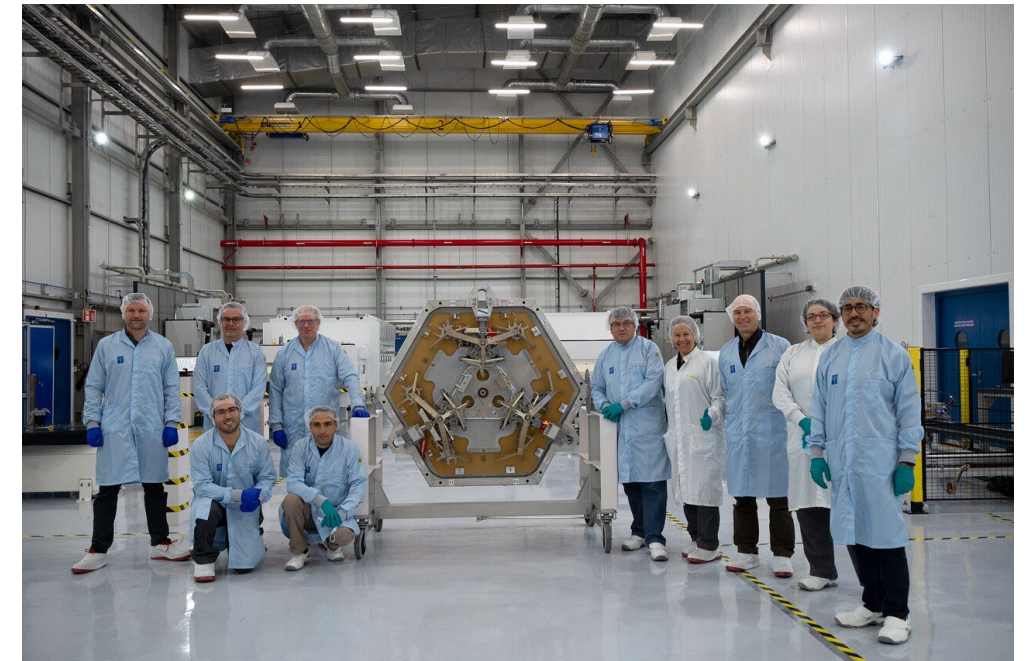
... and many **consulting service contracts** running throughout the years:

- PA/QA Consultancy Services 
- Independent SW Verification Consultancy Services 
- Consultancy Support for DMS follow-up (Civil, Specialties, inspections, etc.) 
- Construction All Risk Insurance  
- Freight Forwarding Services 
- Control SW Outsourcing Contract 
- Dataflow Software Components for ELT 
- Chilean Electricity Consultancy Services 

ELT Overall Status

The overall ELT **System Assembly, Integration and Verification (AIV)** is under ESO responsibility.

- Experience from La Silla, Paranal, ALMA and other ESO projects
- Its preparation is well advanced (Workflows/procedures, Tools and handling equipment, configuration processes, Team management structure, System Engineering and Safety organization, etc.)
- Its core activities have started with the coating of M1 Segments. A new way of working for ESO (series).



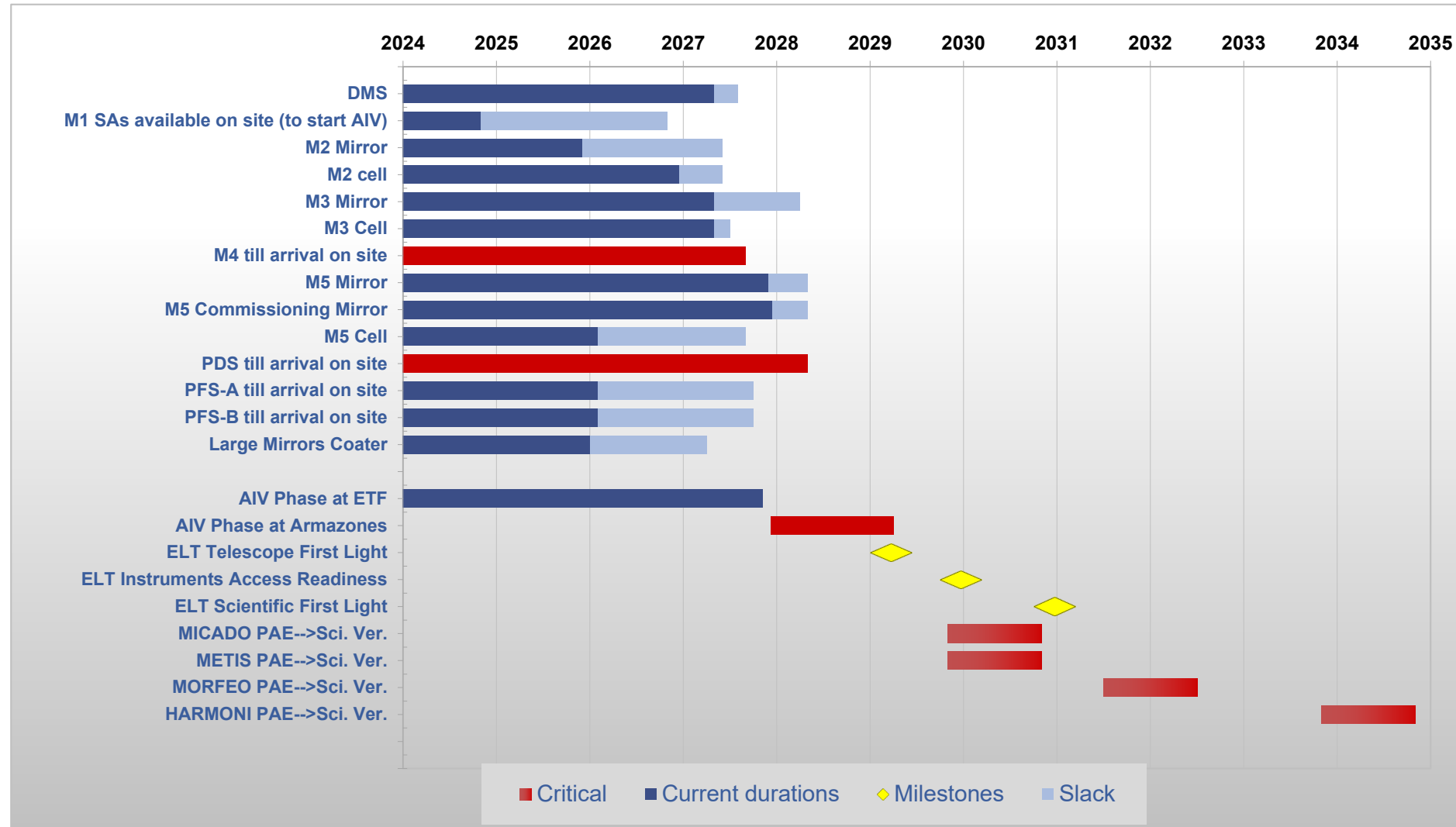
ELT Storage at Paranal





Schedule

Overall ELT Schedule (Top Level)





Conclusions

Conclusions



- **Overall ELT construction** progress **beyond 70%** (from the EVM analysis)
- **Technical progress** on ELT components **satisfactory, deliveries** continue
- **Recurring delays** in various contracts forced us to **re-baseline schedule (TFL 03.29)**
- Preparation for **AIV & Telescope Commissioning** continues
 - All detailed installation procedures are available, incl. good draft for first instruments
- **Good collaboration** between all partners (+ governing bodies) remains key to success
 - Collaboration with industrial partners and instrument consortia can be particularly valuable in times of stress, when joint efforts and constructive dialogue help us move forward together
 - Positive feedback received after Roofing Ceremony (16 April 2025)



Questions?



Credit: Juan Beltrán (ESO)

Thank you!

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