



ELT progress update

Joël Vernet (ESO)

The Dome

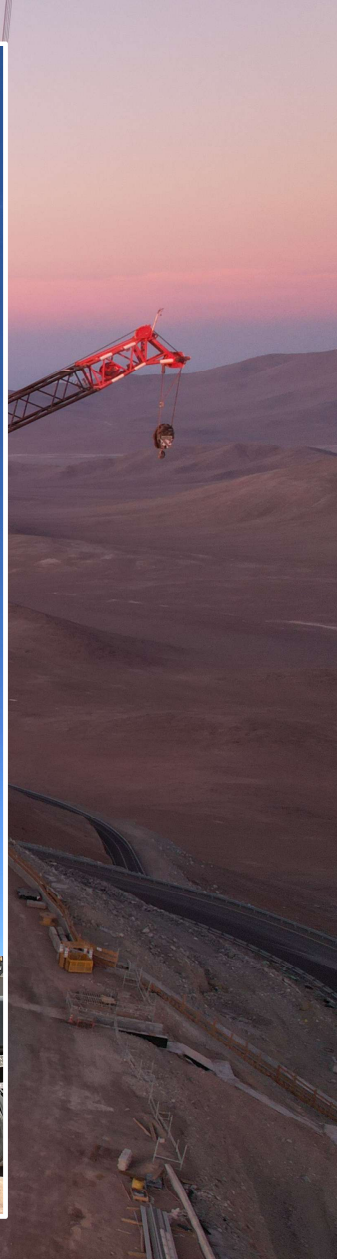
- 6100 t, 85m high, 88m diameter
- fast rotating up to $2^\circ/\text{s}$ or 5km/h outer edge
- No vibrations transmitted to the telescope
- 600t slit doors
- Powerful air conditioning



Cladding almost completed

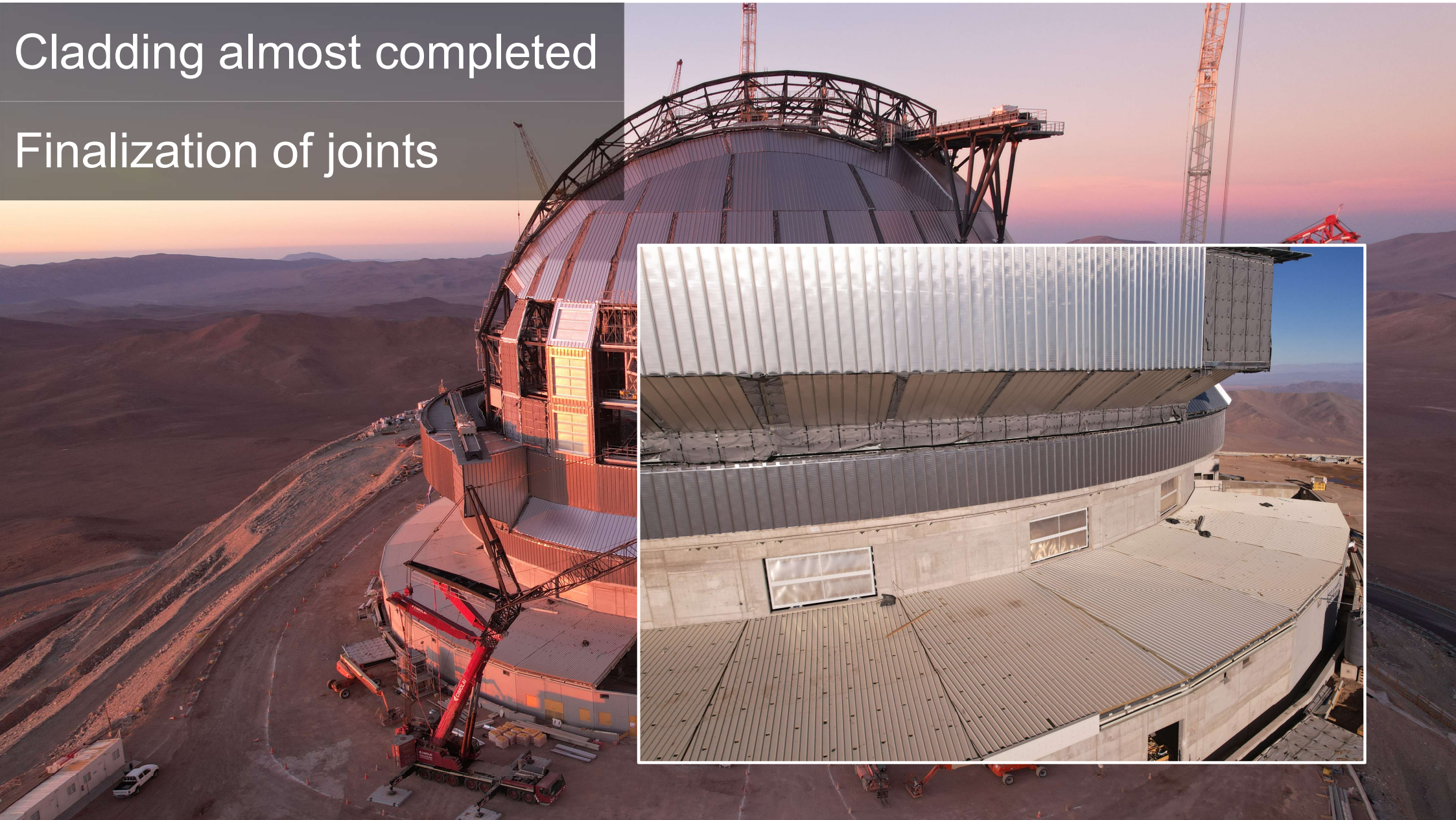


Cladding almost completed



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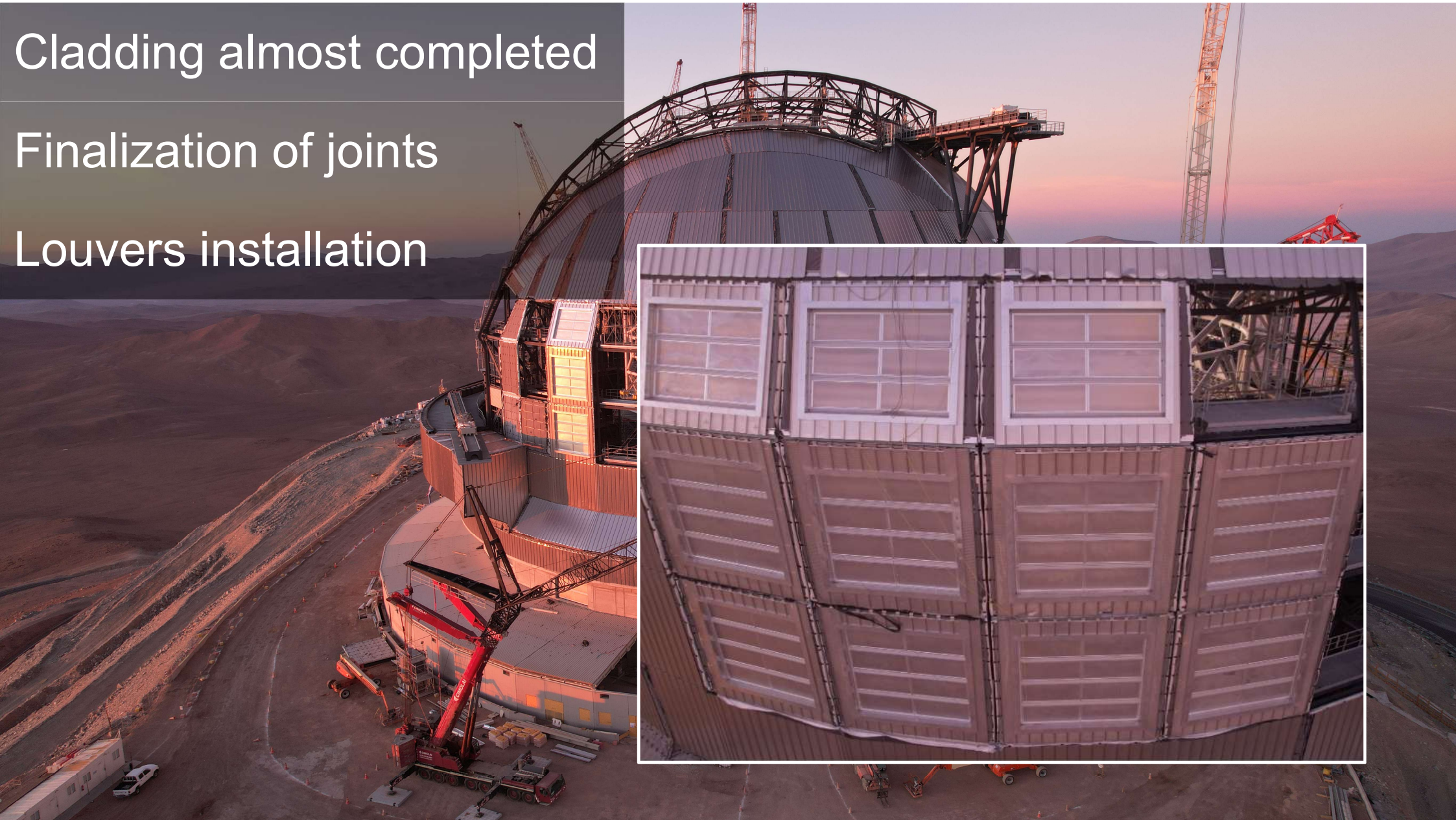
Finalization of joints



Cladding almost completed

Finalization of joints

Louvers installation

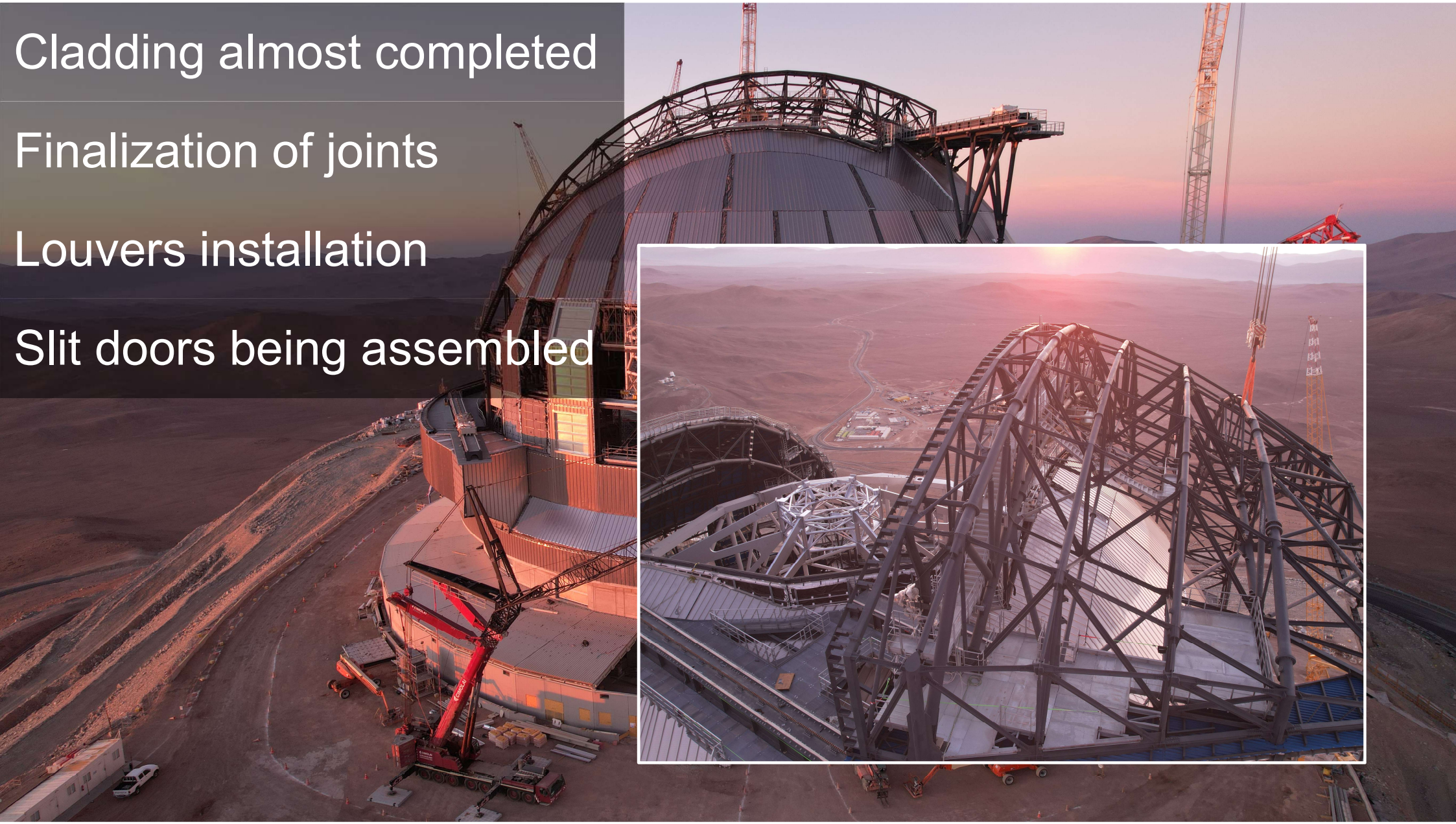


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Slit doors being assembled



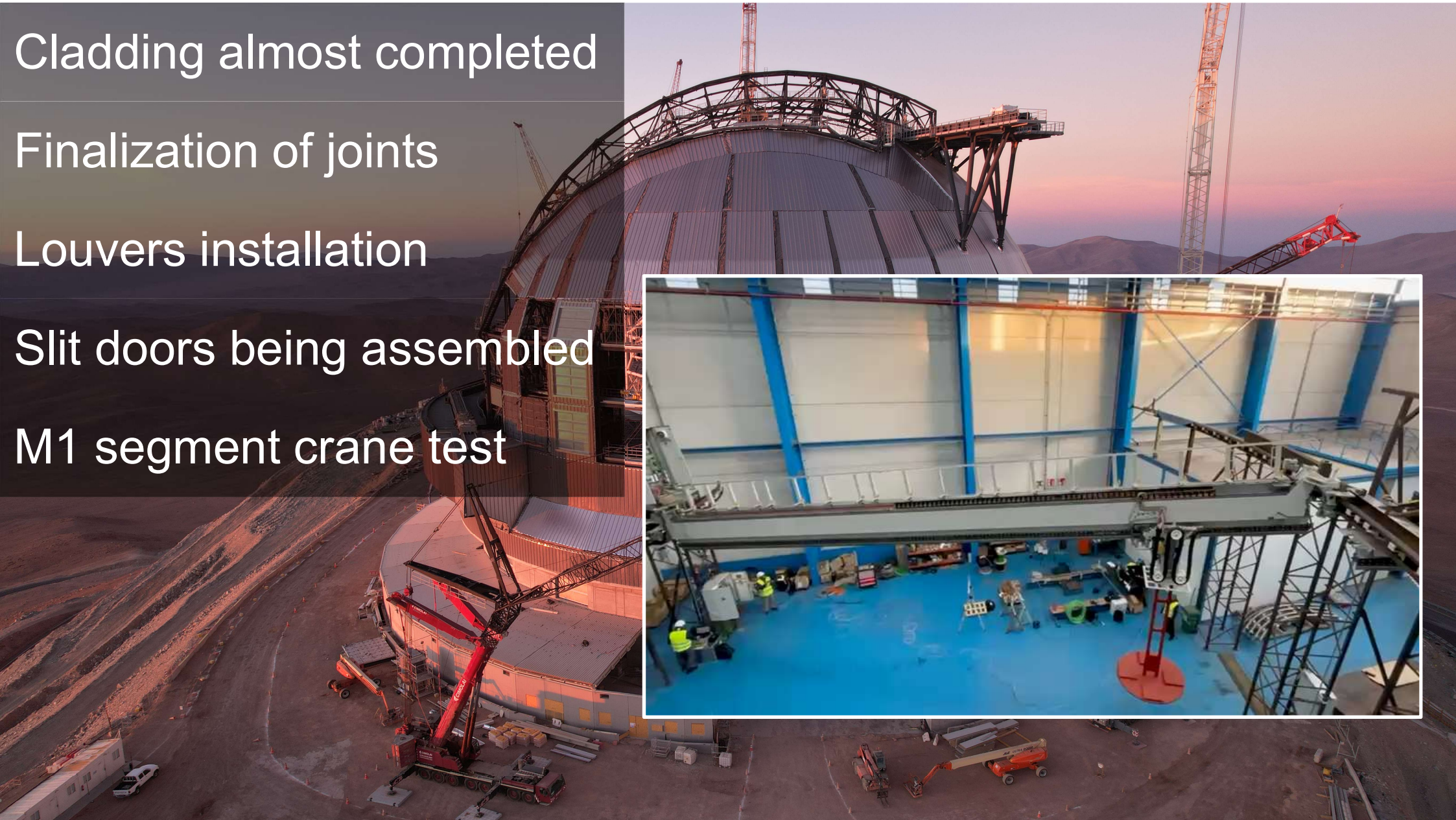
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M1 segment crane test



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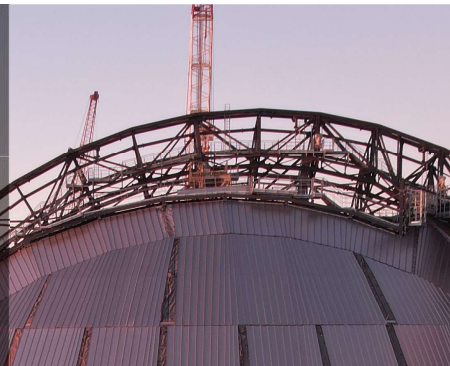
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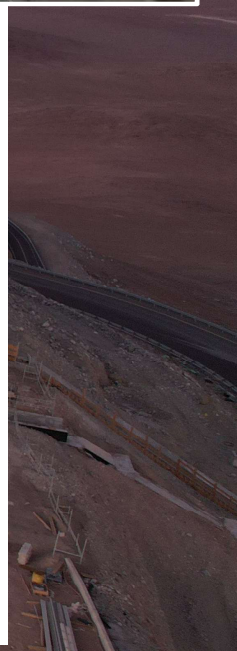
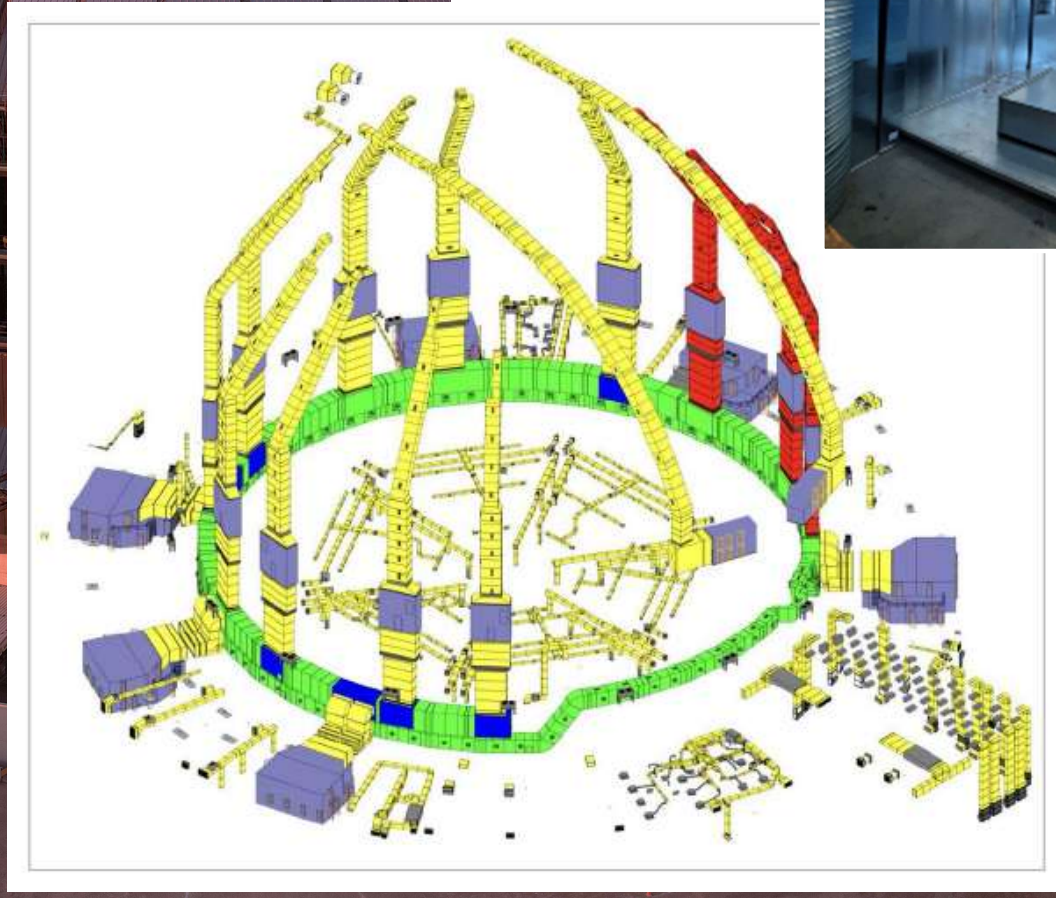
Slit doors being assembled

M1 segment crane test

Air handling construction



	Waiting for Production
	Production in Progress
	Produced
	Shipped



Cladding almost completed

Finalization of joints

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M1 segment crane test

Air handling in construction



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Air handling construction

Electronics & Control late



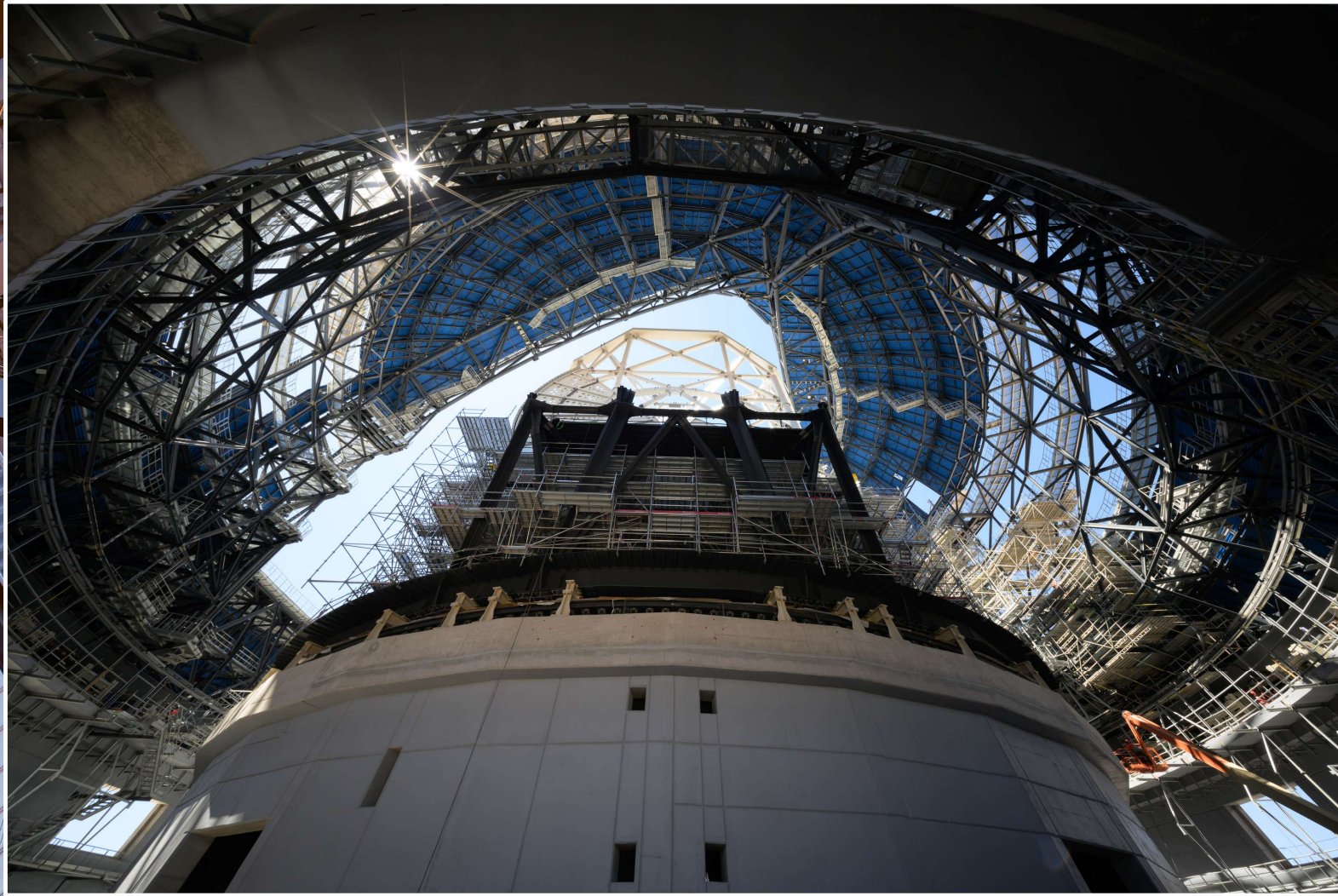




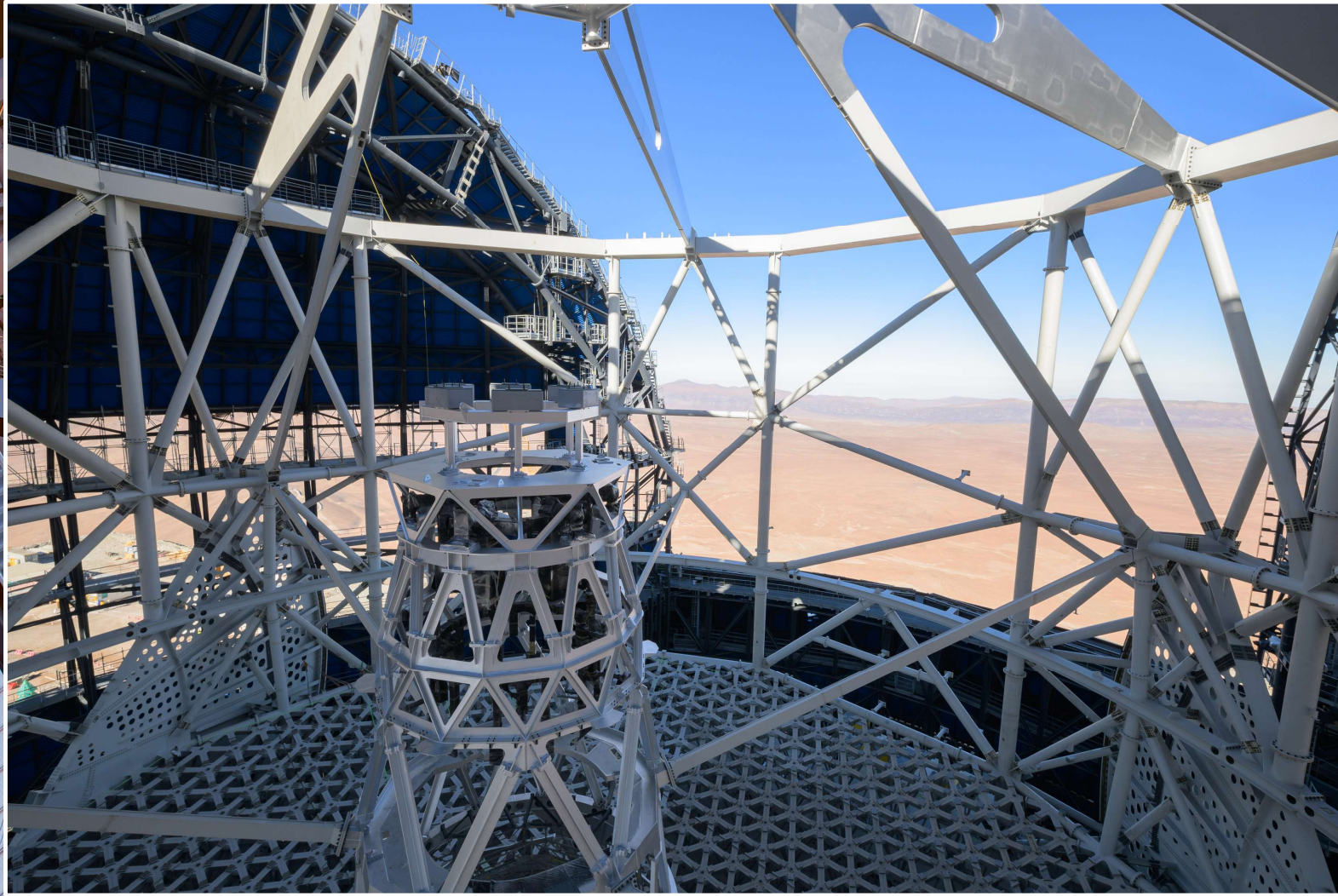
The Main Structure

- 3400 tons holding 700 tons of opto-mechanics and electronics
- Hydrostatic bearings
- Pointing accuracy: 0.3 arcsec
- New pointing in <5 min
- 2 Nasmyth platforms and a Coudé room for instruments

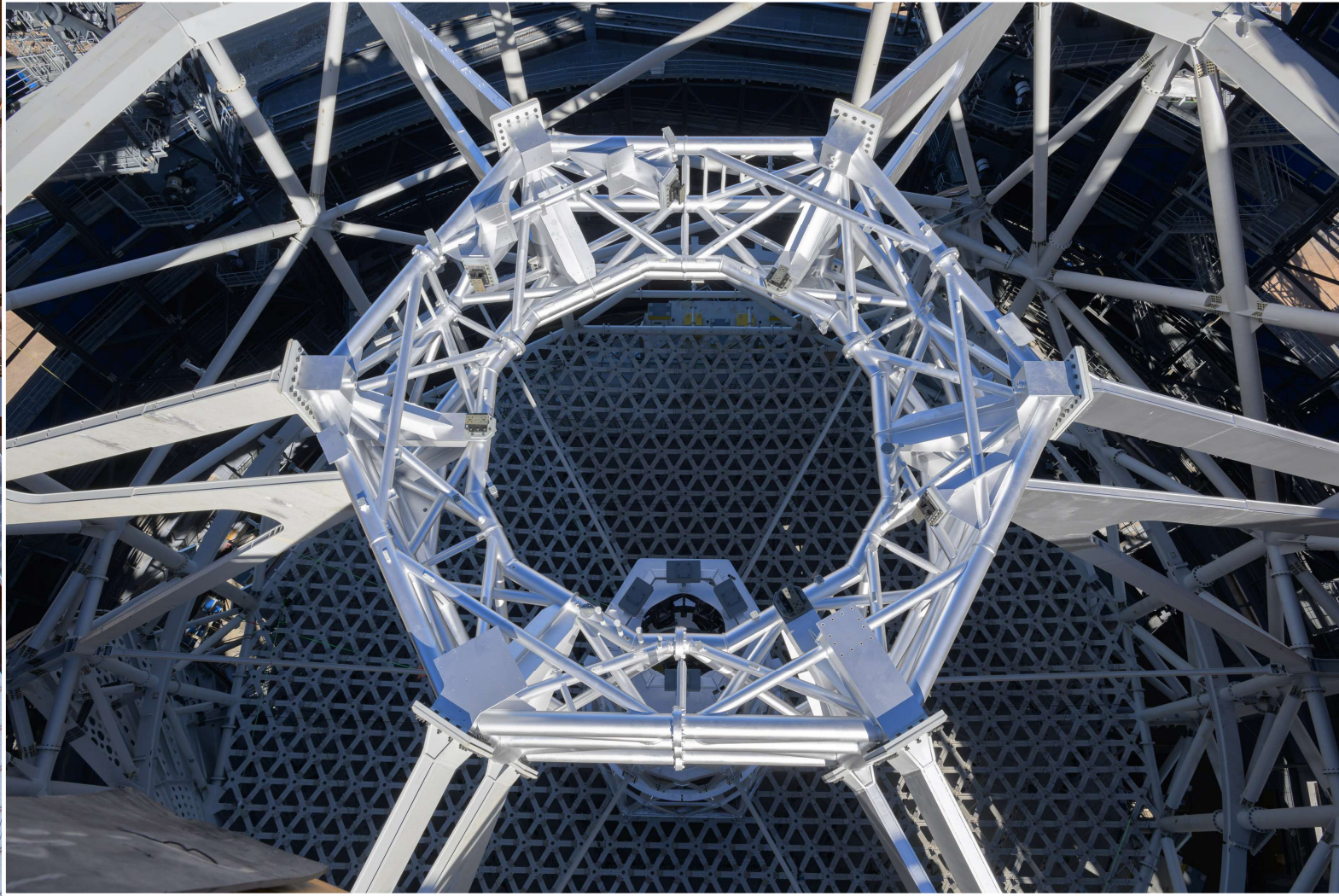
Main Structure assembly is very advanced



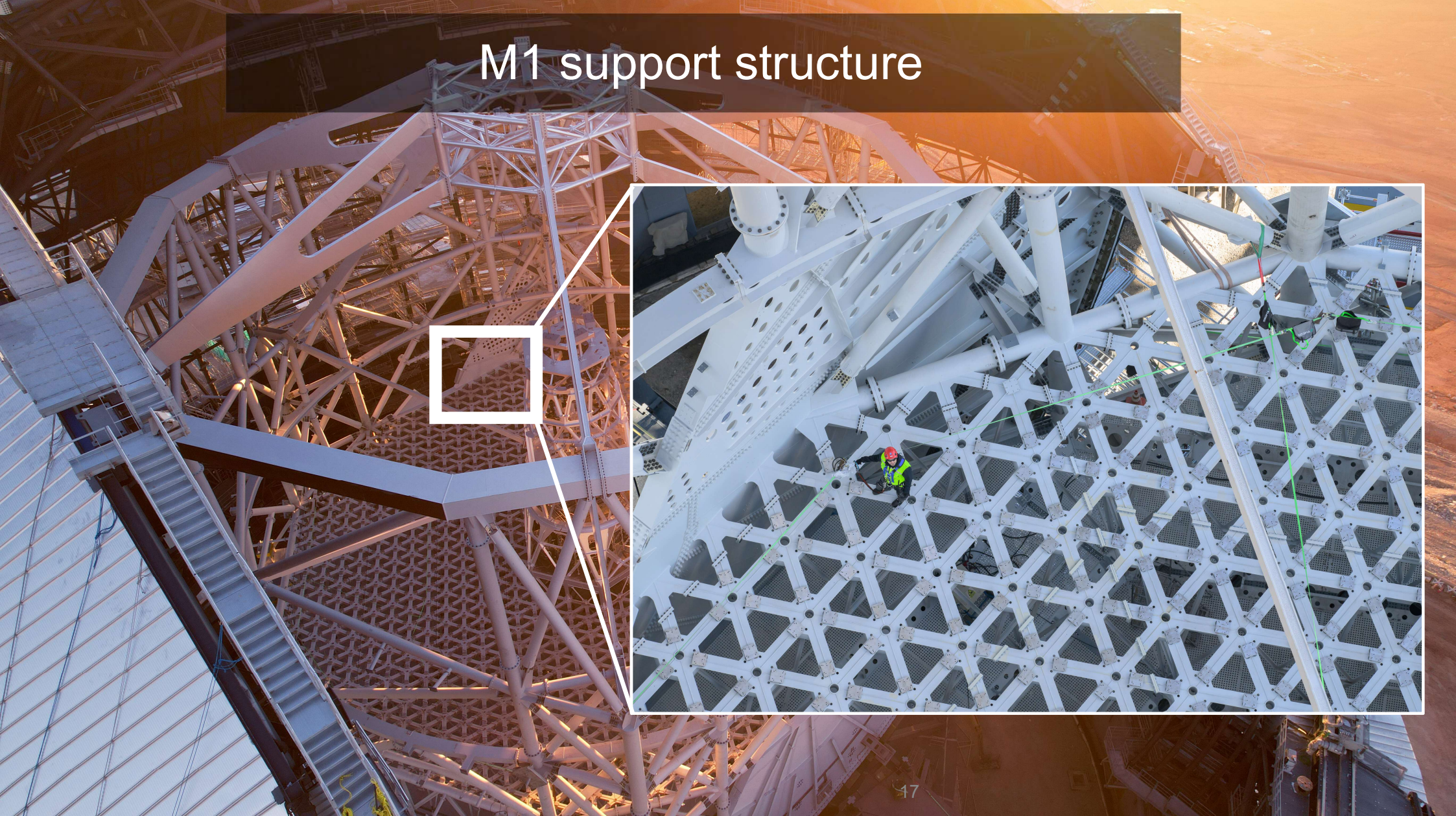
LRU Tower (M3/M4/M5)



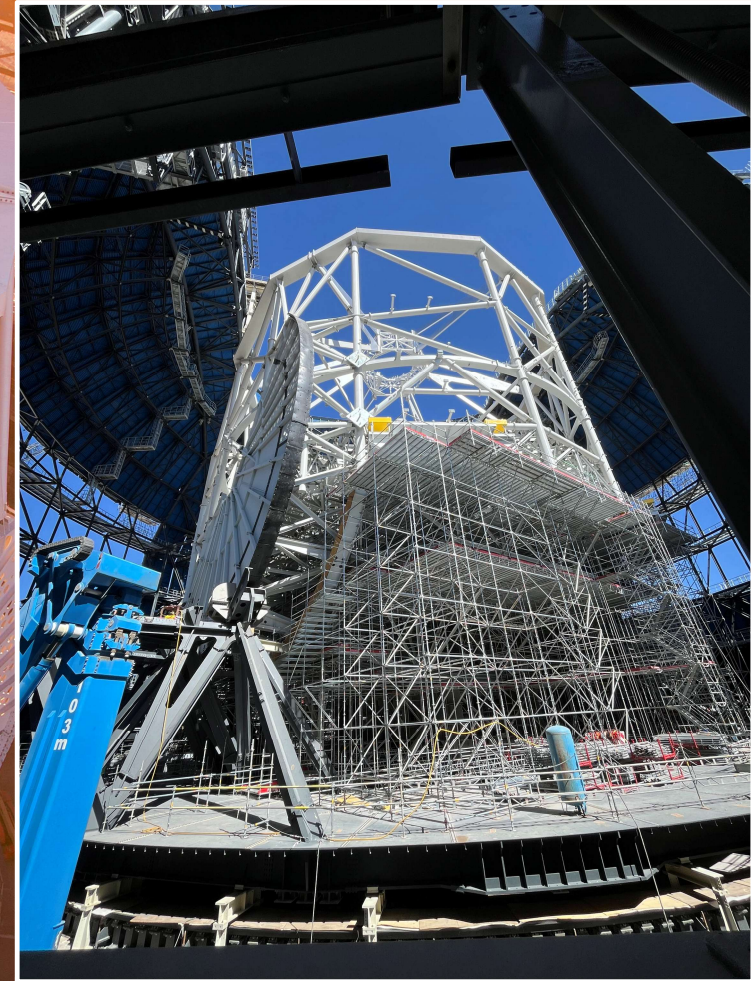
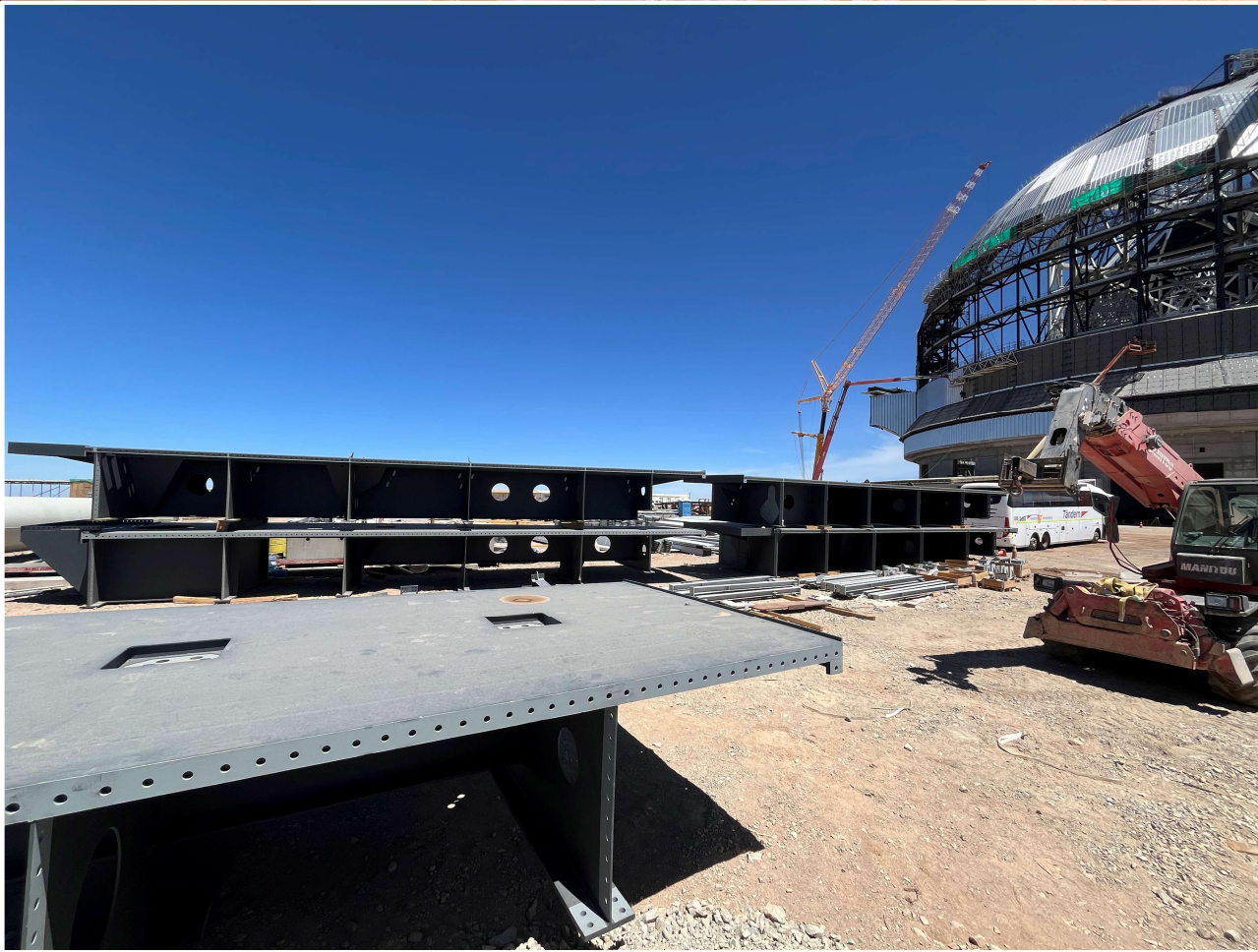
M2 Crown + Spiders



M1 support structure



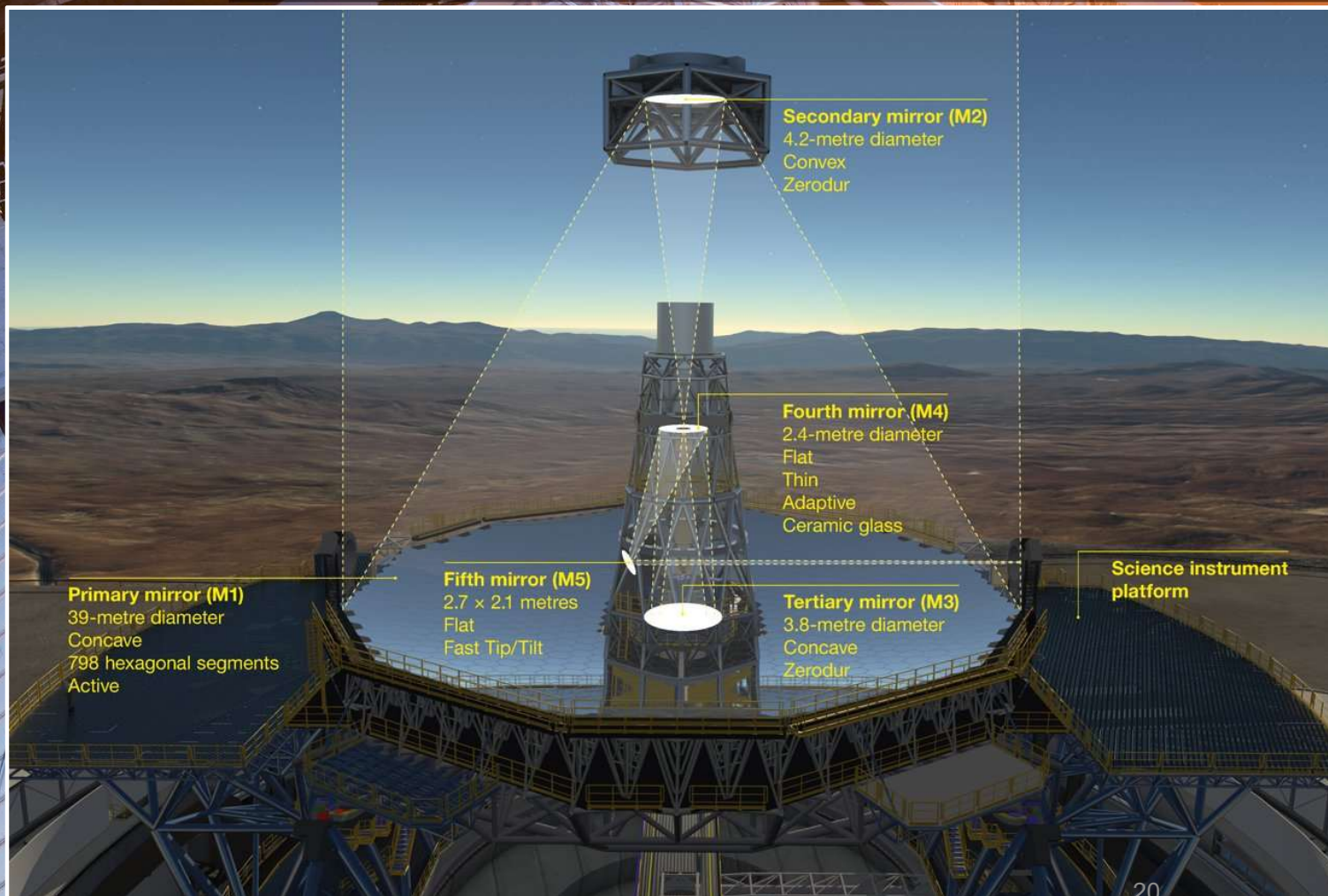
Nasmyth Platforms



Hydrostatic bearing system assembly



Opto-mechanics



M1 segments production

- All M1 blanks produced (SCHOTT)



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- All segment supports finished (VDL)



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- All positioning actuators done (PI)



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- All segment supports finished (VDL)
- All positioning actuators done (PI)
- All Edge Sensors at Paranal (micro-epsilon)



M1 segments assemblies status

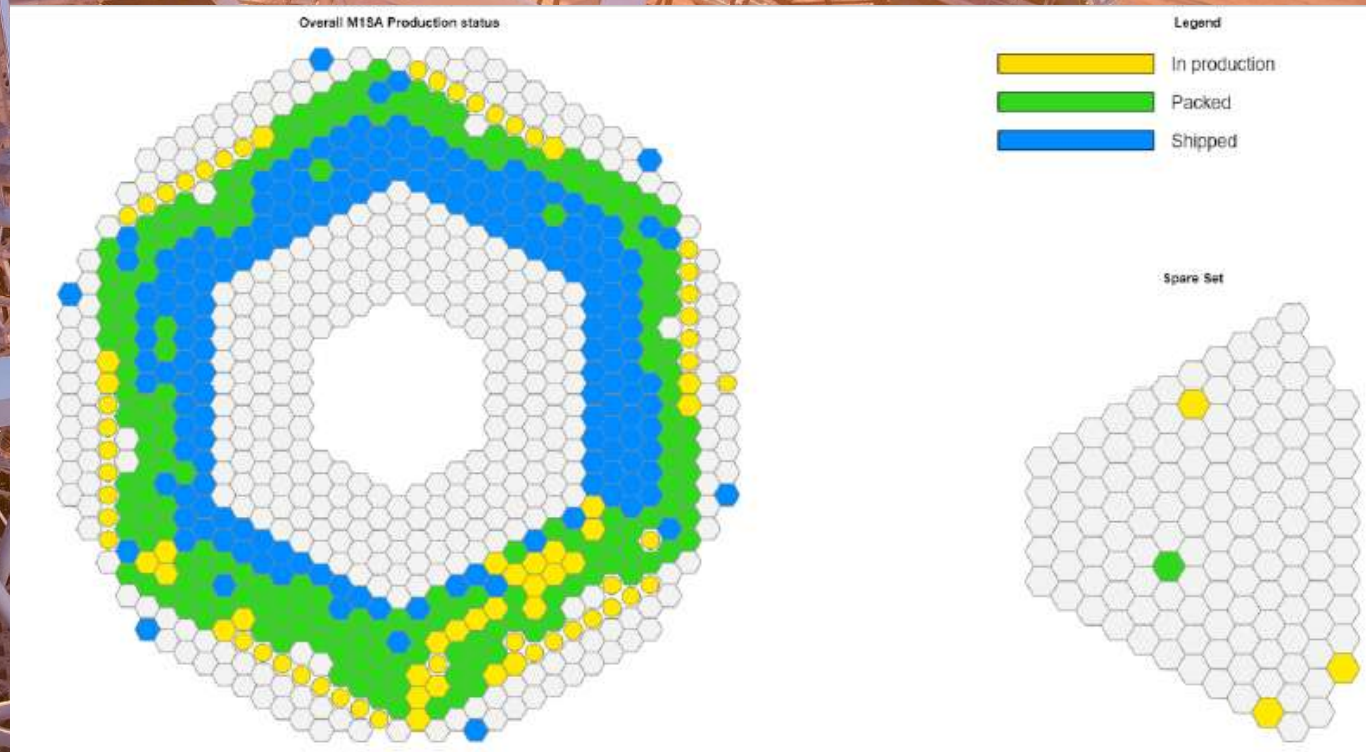
As of mid-February:

- Produced: 364 (+81 in production)
- On-site: 180
- Coated: 162 (+10 with issues)

Production 7/week at Reosc

Fantastic optical quality

Some quality issues occurred and are being solved



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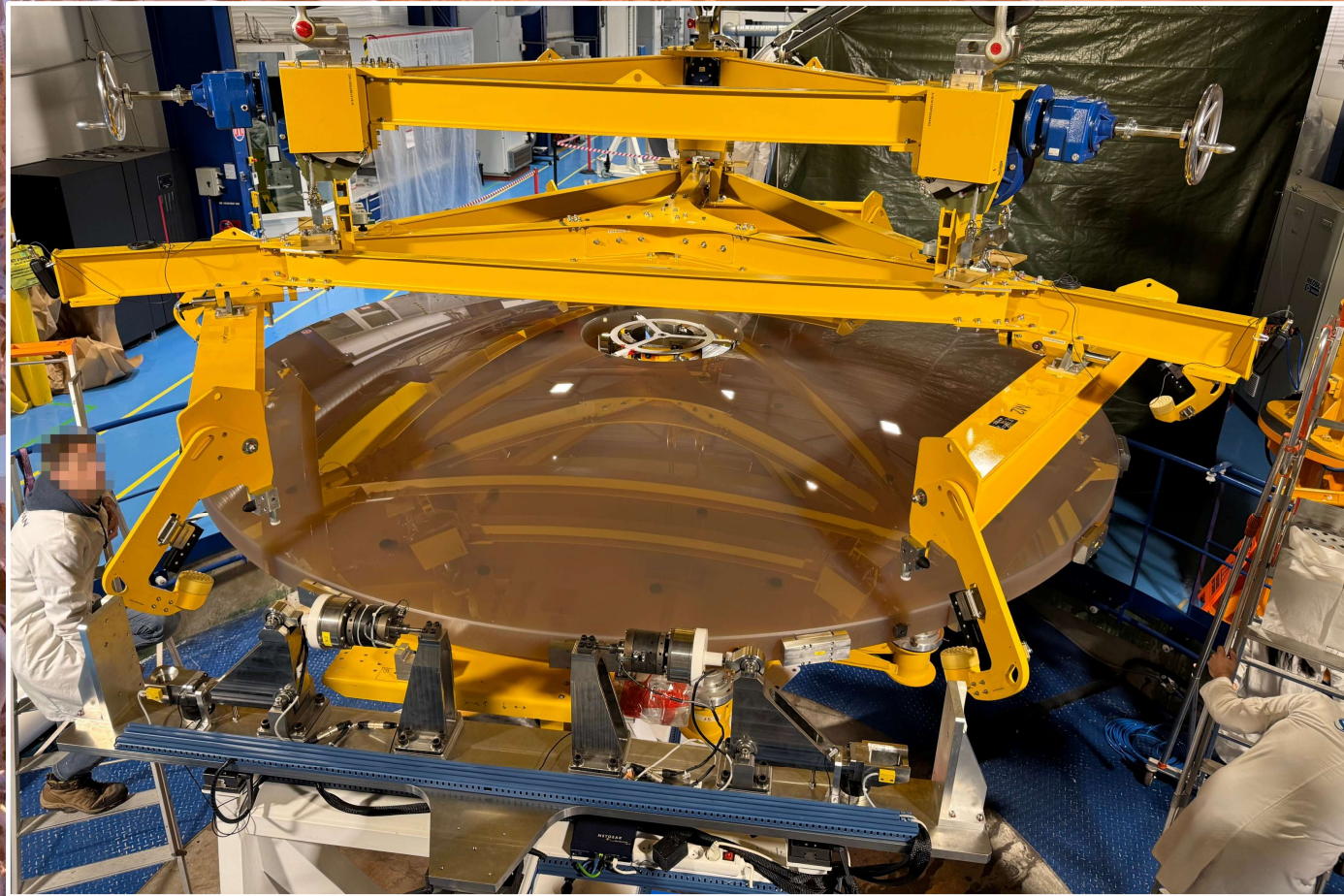
Coating plant fully operational



M2 and its cell

M2 polishing completed with excellent quality 60nm WFE

Ready for system test with its cell in April



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M2 cell verification for system tests granted

Delivery to Reosc in coming days



M3 and its cell

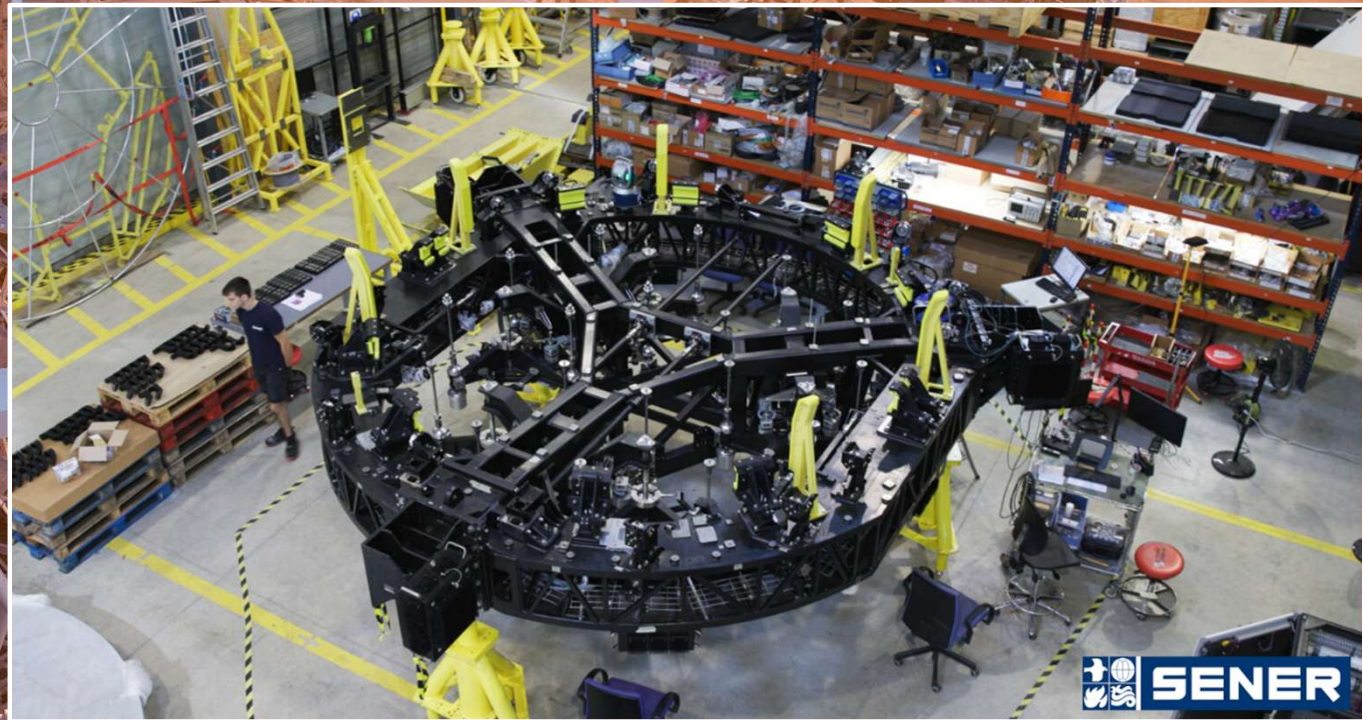
M3 polishing 3rd run on-going
– 3 more to go



M3 and its cell

M3 polishing 3rd run on-going
– 3 more to go

M3 Cell reaching end of
integration



M4 deformable mirror

All M4 shells (x12) are finished



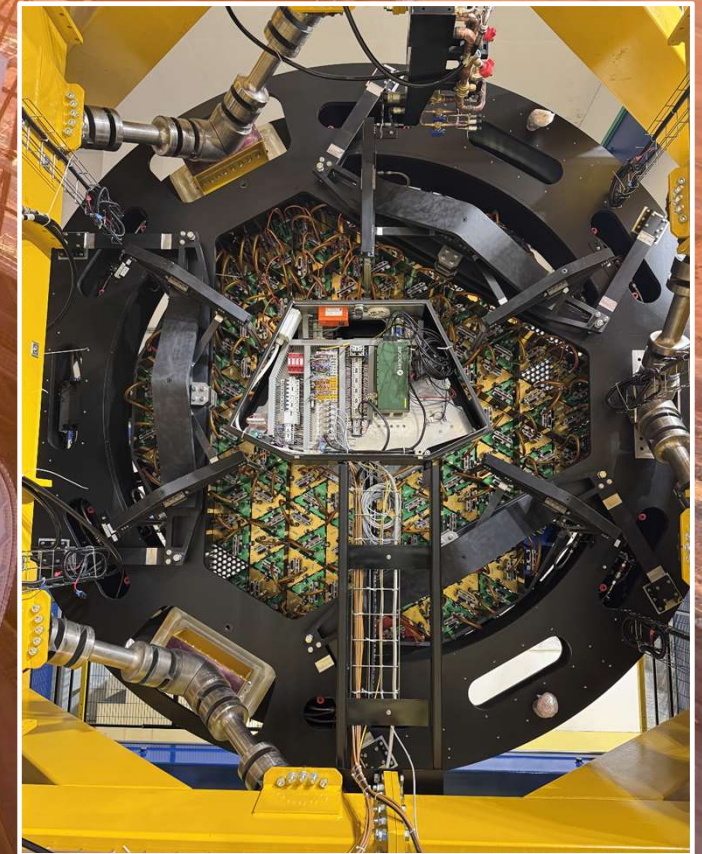
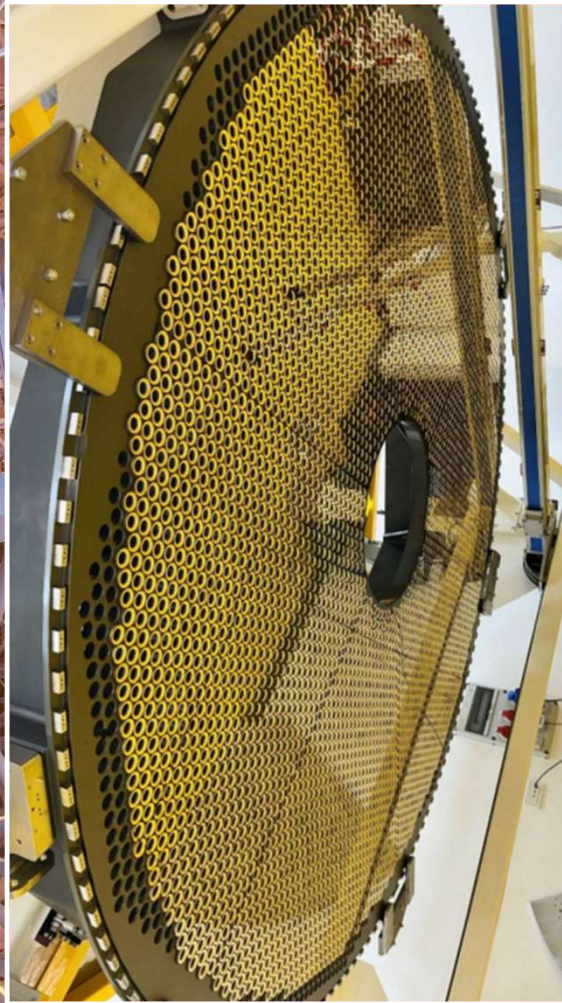
M4 deformable mirror

All M4 shells (x12) are finished

All membrane interfaces bonded

M4 arrived at Microgate

Actuators bricks being integrated



M5 tip-tilt mirror

M5 SiC blank now in polishing at Safran Reosc (very delicate process !!)

Second blank with improved CVD accepted



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M5 cell at ESO Garching for control test



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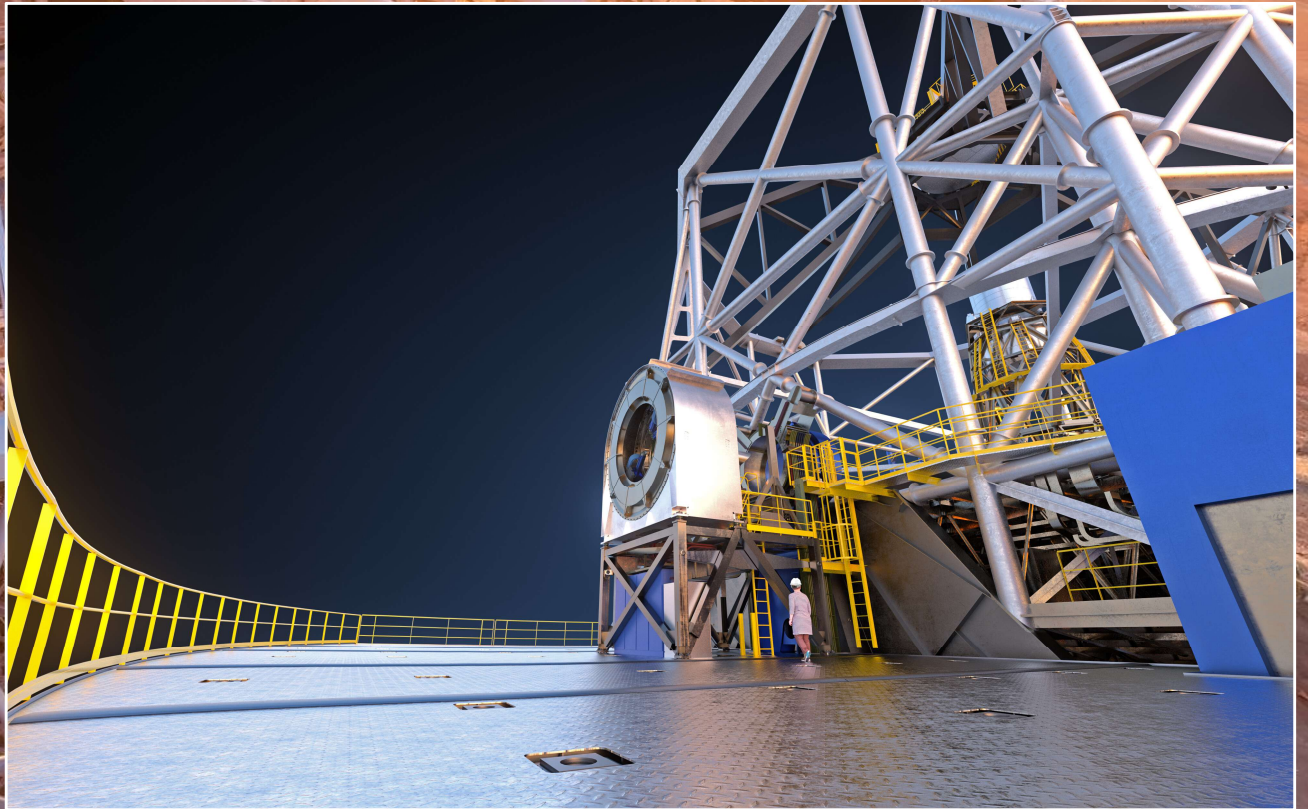
M5 cell at ESO Garching for control test

Risk mitigation: zerodur smaller commissioning M5 in production



Pre-focal stations (PFS)

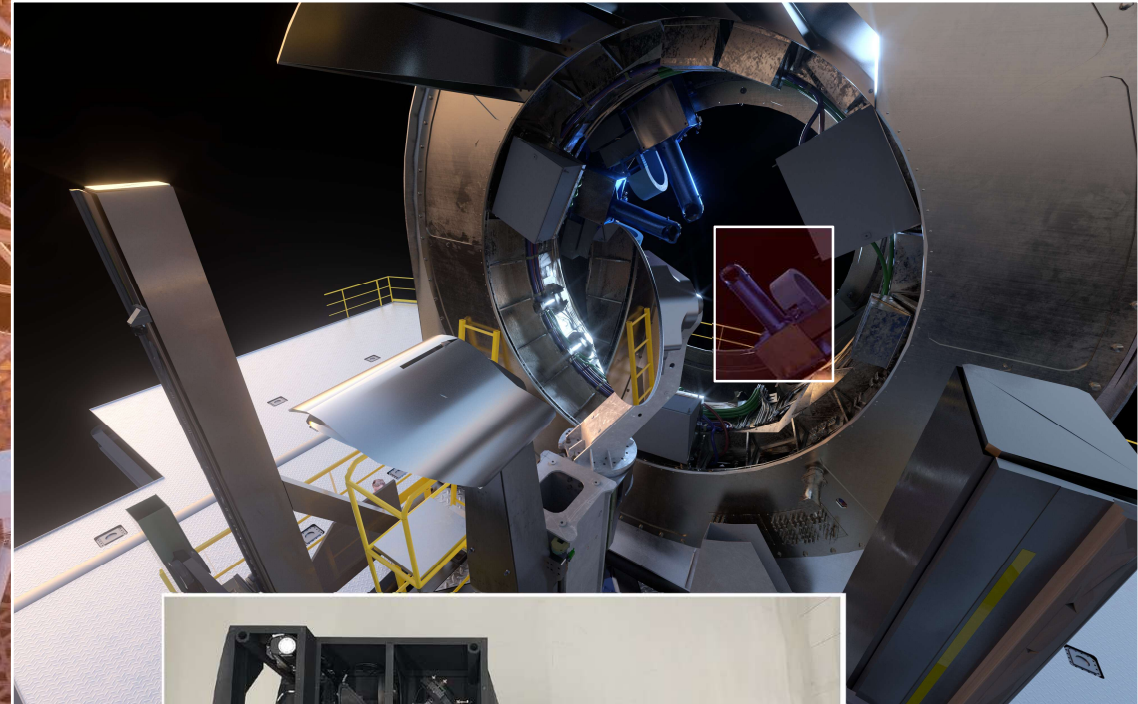
Host the 3 guide probes + M6
for lateral ports



Pre-focal stations (PFS)

Host the 3 guide probes + M6
for lateral ports

Analyze the light to send
command to RTC (+10000
actuators)



Sensor arm optics box assembly

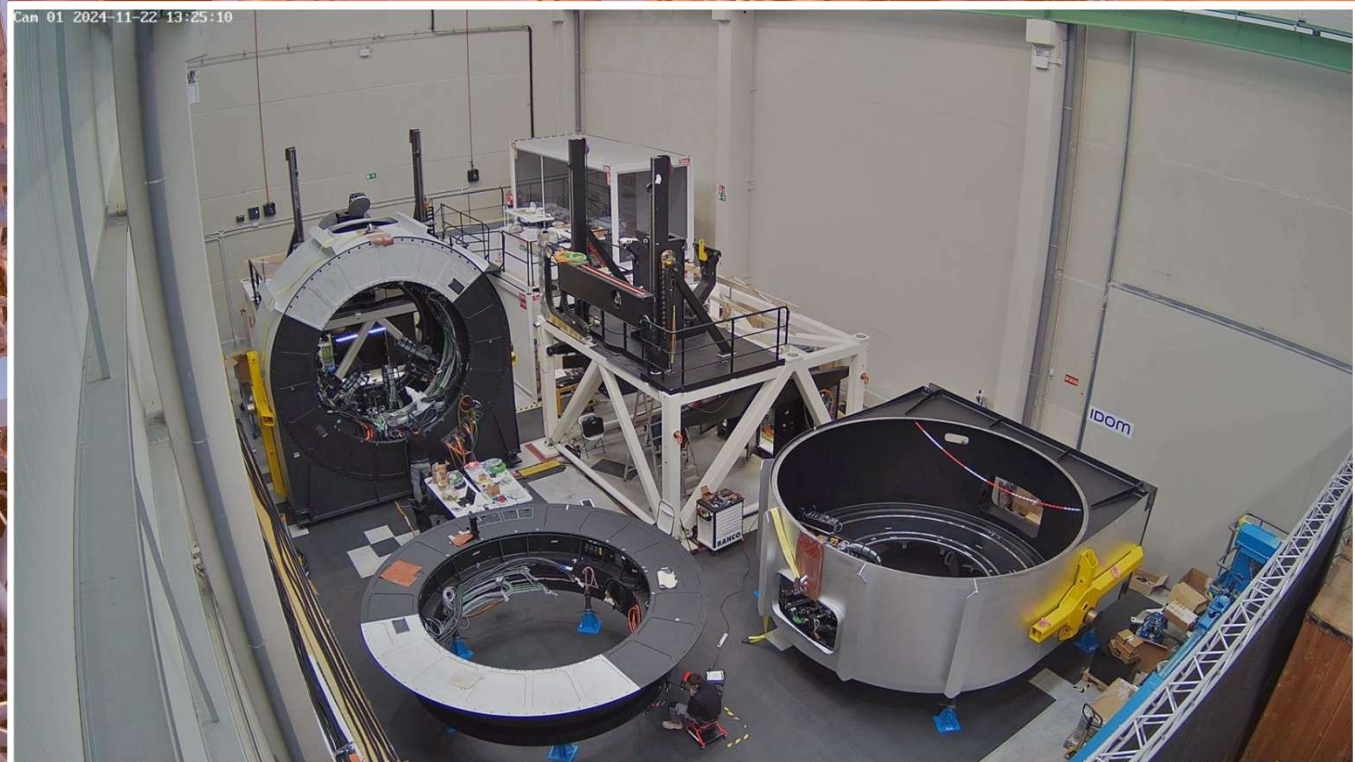
Pre-focal stations (OFS)

Host the 3 guide probes + M6 for lateral ports

Analyze the light to send command to RTC (+10000 actuators)

Factory acceptance this month at IDOM

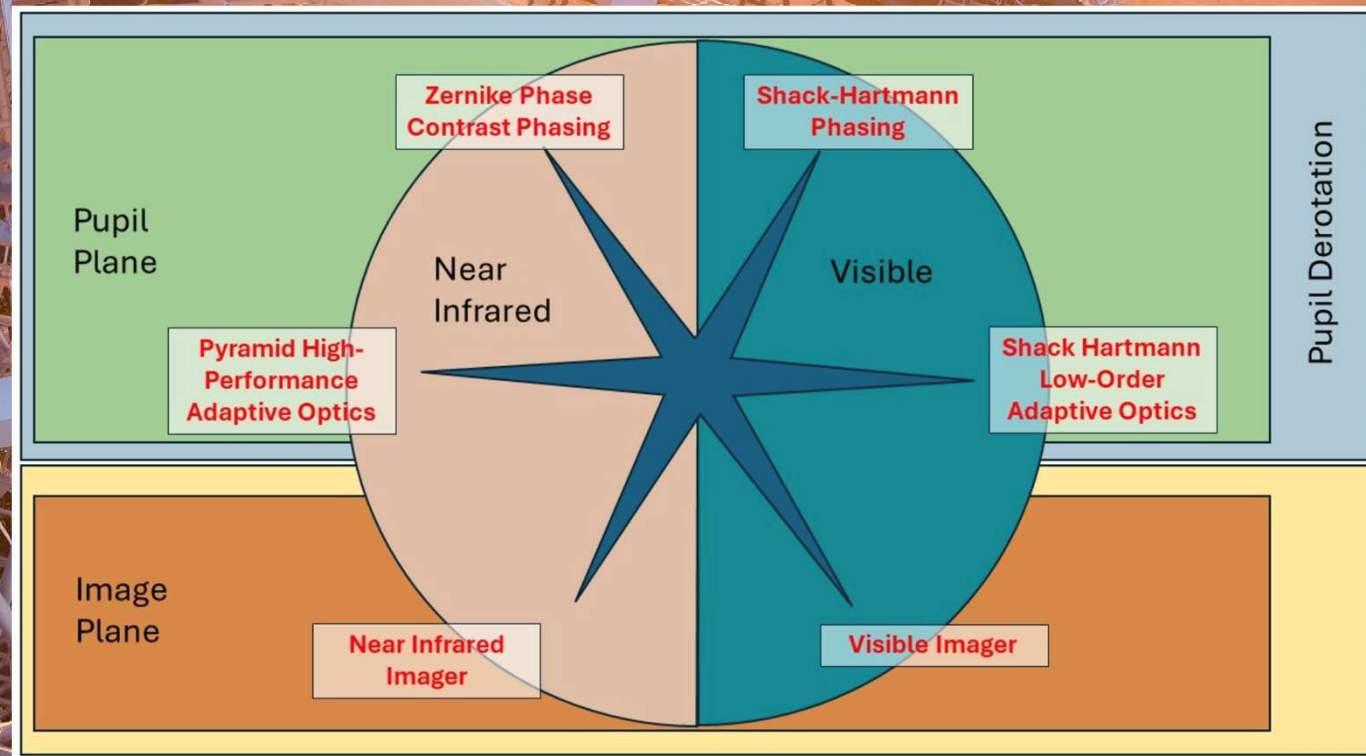
Followed ESO test campaign



Phasing & diagnostic station (PDS)

PDS is the primary metrology tool of the ELT for:

- Phasing the M1
- Demonstrating diffraction limited performance
- Commissioning + operations



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In integration at ESO
Garching

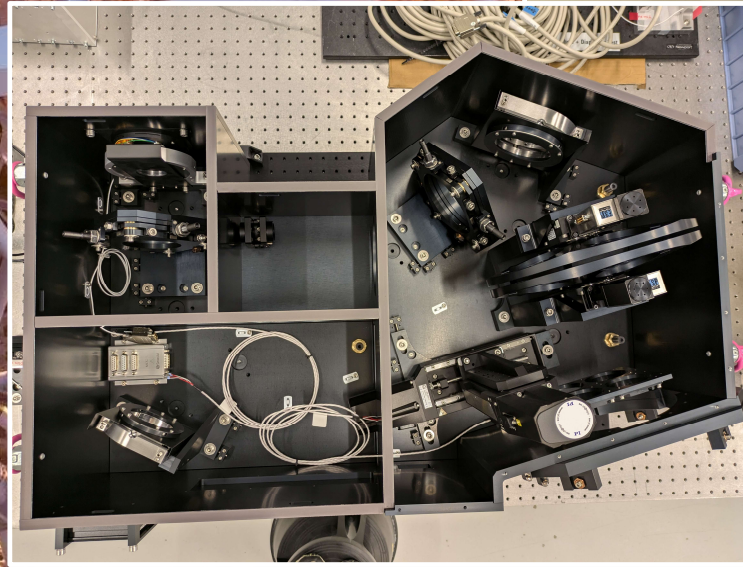


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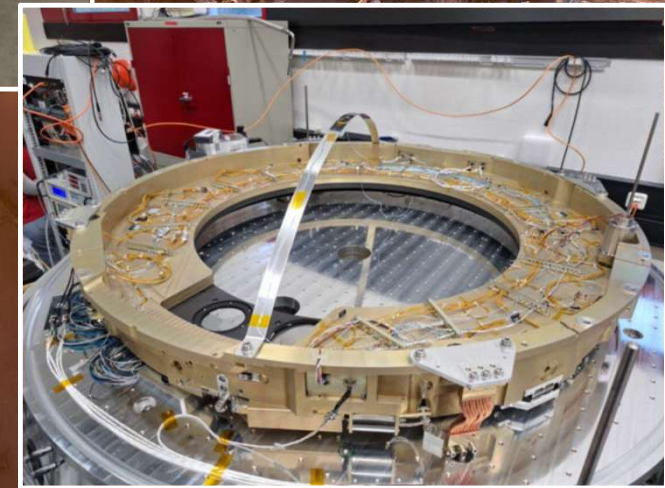
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Instruments

MICADO:

- NIR imager and spectrograph
- Passed FDR and in full construction phase
- Difficulties with cold optics but towards resolution



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- NIR imager and spectrograph
- Passed FDR and in full construction phase
- Difficulties with cold optics but towards resolution
- Observation preparation tools in development

Obs. Description Target Constraint Set Time Intervals Finding Charts Ephemeris Target Visibility ObsPrep

Pointing AO NGS PSF indicator Bright objects ELT guide stars Observing offsets

Select the AO guide stars from the list of available catalogue entries ...
Read more...

Catalogue query

Server/band: GAIA DR2
Search radius: 0.0 0.5 arcmin
Brightness: G 16.0 7.0 mag
Search

Available NGS

ID	RA	Dec	pmRA	pmDec	px	mag
4689627477151369440	00:24:26.317	-72:05:51.86	+7.71	-3.67	1.51	11.98
4689637991231173248	00:23:49.511	-72:05:29.83	+5.11	-2.47	0.12	11.84
4689638064254544256	00:23:56.548	-72:04:21.20	+4.78	-2.24	0.30	11.21
468963946869968384	00:24:08.447	-72:04:35.95	+4.24	-2.08	0.12	11.81

Selected NGS

ID	RA	Dec	pmRA	pmDec	px	mag
468963926844741376	00:24:05.127	-72:04:54.41	+5.01	-2.42	0.30	11.37

AO performance

AO parameter: Strehl ratio Min: 0.12 Max: 0.75 Average: 0.32
Band: G Calculate

Obs. Description Target Constraint Set Time Intervals Finding Charts Ephemeris Target Visibility ObsPrep

Pointing AO NGS PSF indicator Bright objects ELT guide stars Observing offsets

Field centre coordinates and position angle can be modified by editing ...
Read more...

Time of observation

Epoch: 2025-01-01T03:30:00.00
Hour angle: +00:46:36.45

Field centre

Right ascension: 04:45:56.9230
Declination: 21:44:23.060

Field orientation

Fixed pupil angle
 Parallaxic angle
 Fixed sky position angle
+0.00

Wavelength coverage

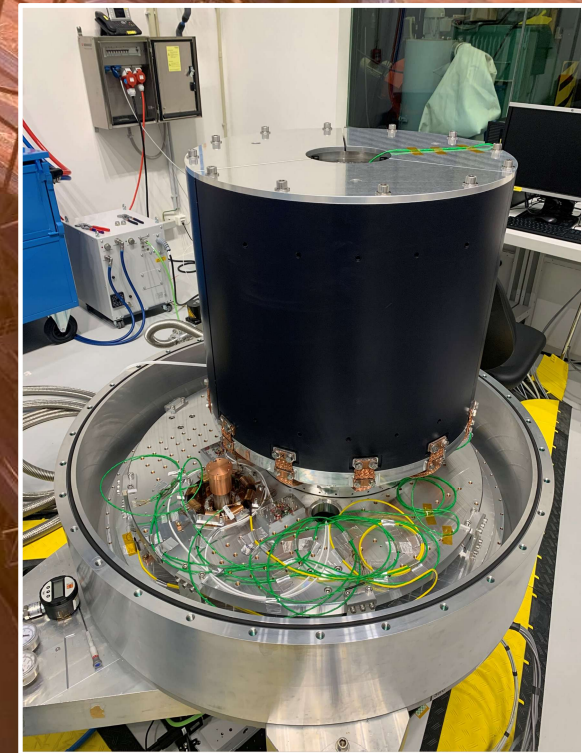
λ_{min} / μm : 1.15
 λ_{centre} / μm : 1.25
 λ_{max} / μm : 1.34

atmospheric transmission vs λ / μm

Instruments

METIS:

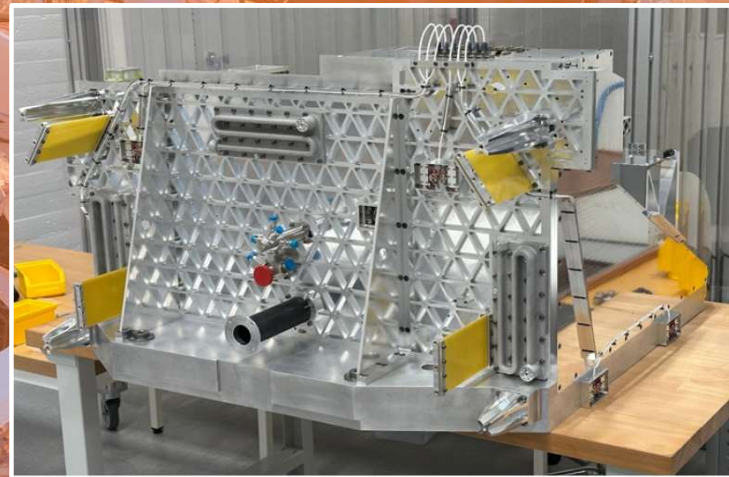
- Mid-IR imager and spectrograph
- In full construction phase
- New Geosnap detector was procured



Instruments

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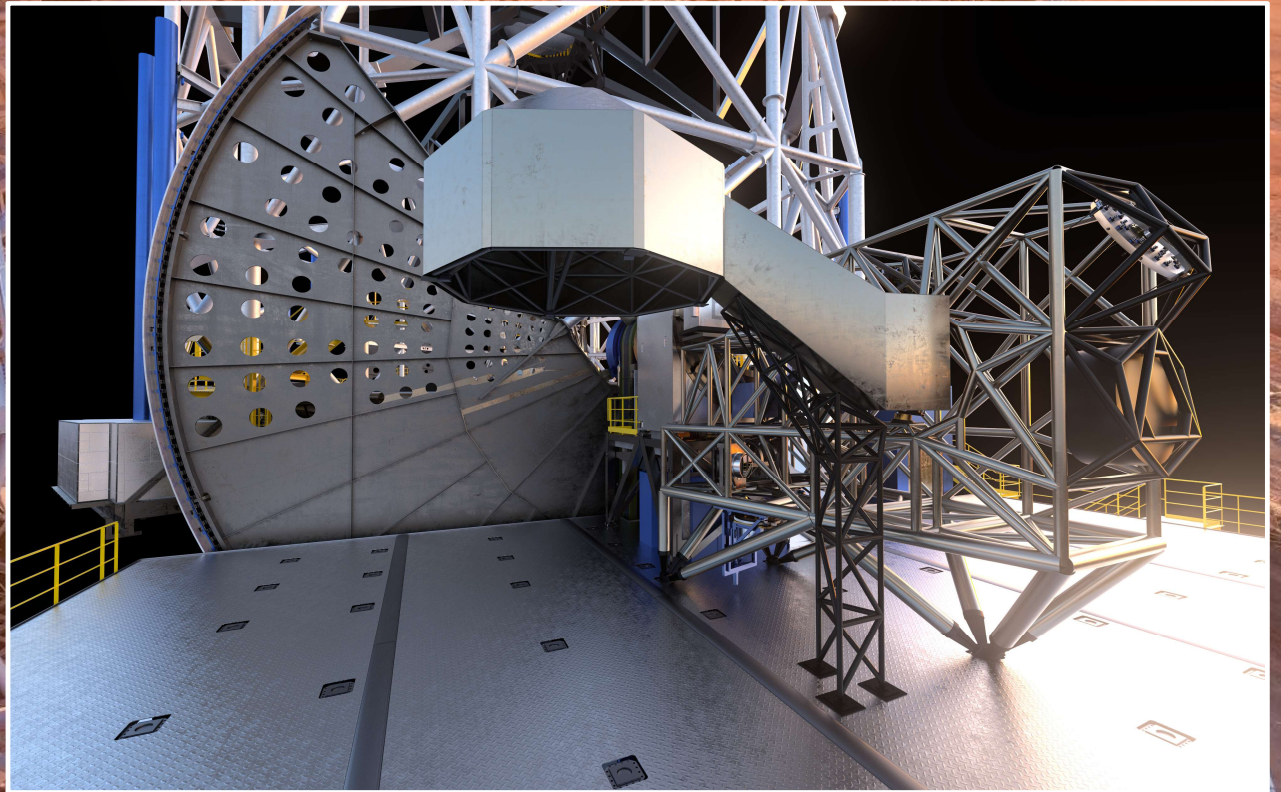
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MORFEO:

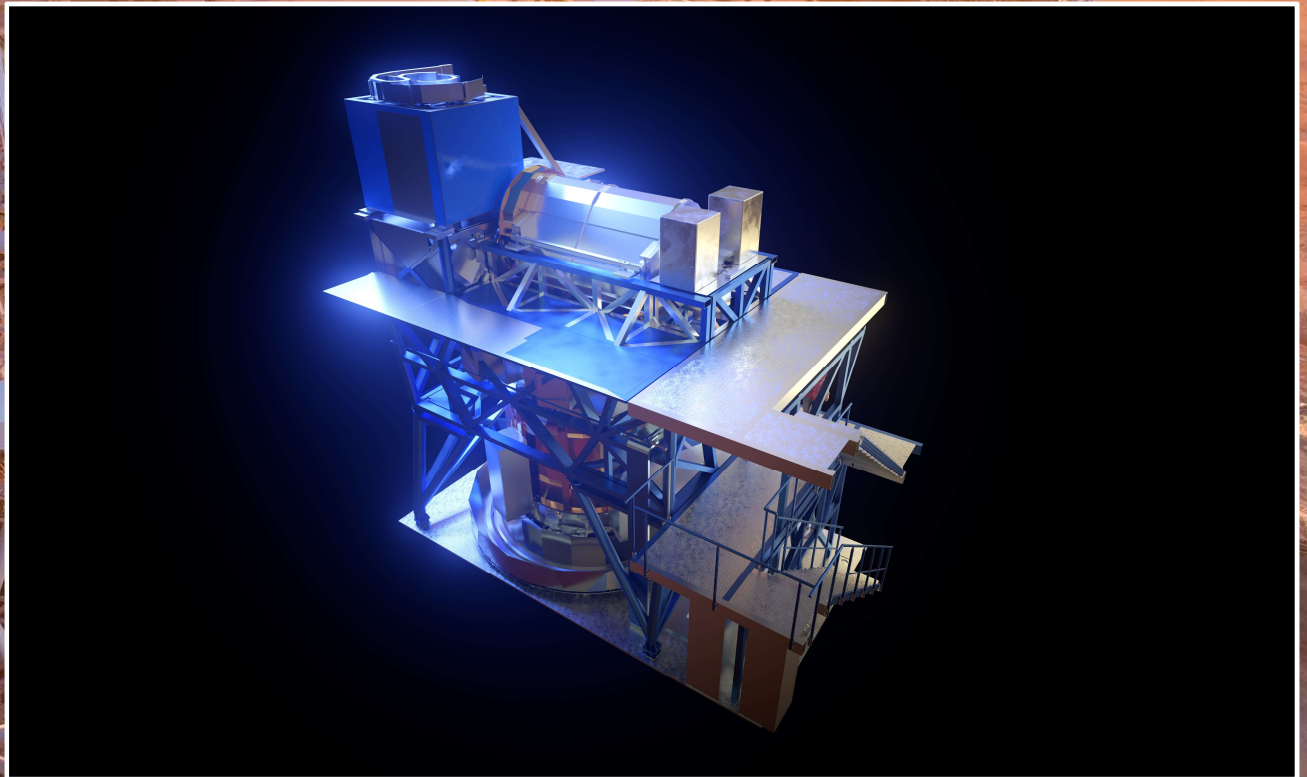
- The MCAO module for MICADO (and HARMONI)
- Passed optics FDR - large optics being procured
- Two large DMs passed FDR
- Preparing full FDR end of this year



Instruments

HARMONI:

- Vis/Near-IR diffraction limited IFU
- In rescoping phase
- Assessing move behind MORFEO



Instruments

ANDES:

- High resolution visible and near-IR spectrograph
- Preparing for PDR

MOSAIC

- Vis and near-IR MOS
- In System Architecture review

