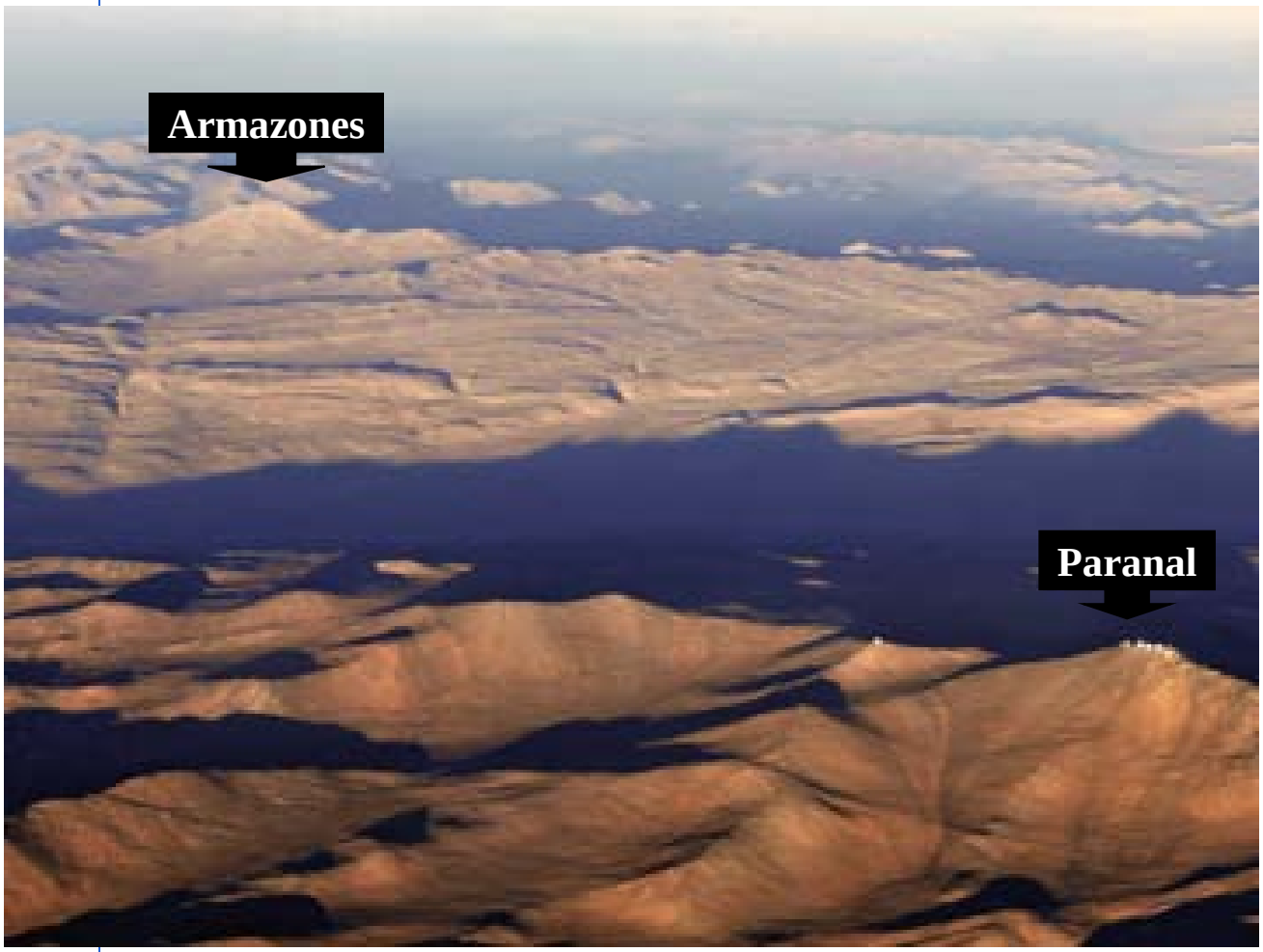
E-ELT Overview and Opportunities

Alistair McPherson
Project Manager

Where ?

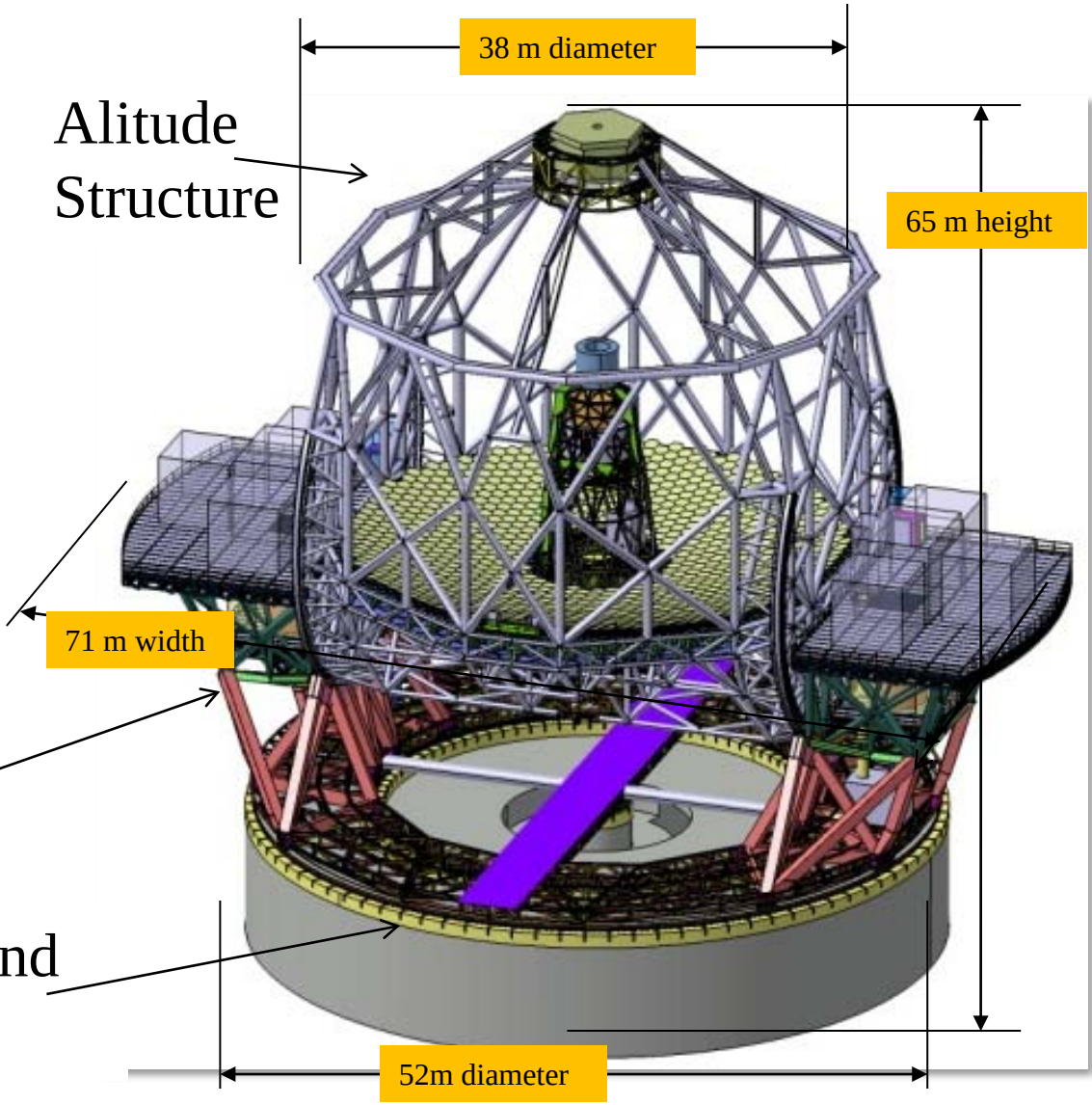
- Cerro Armazones, 2800 m, 25 km from Cerro



Main Structure Design

General Overview

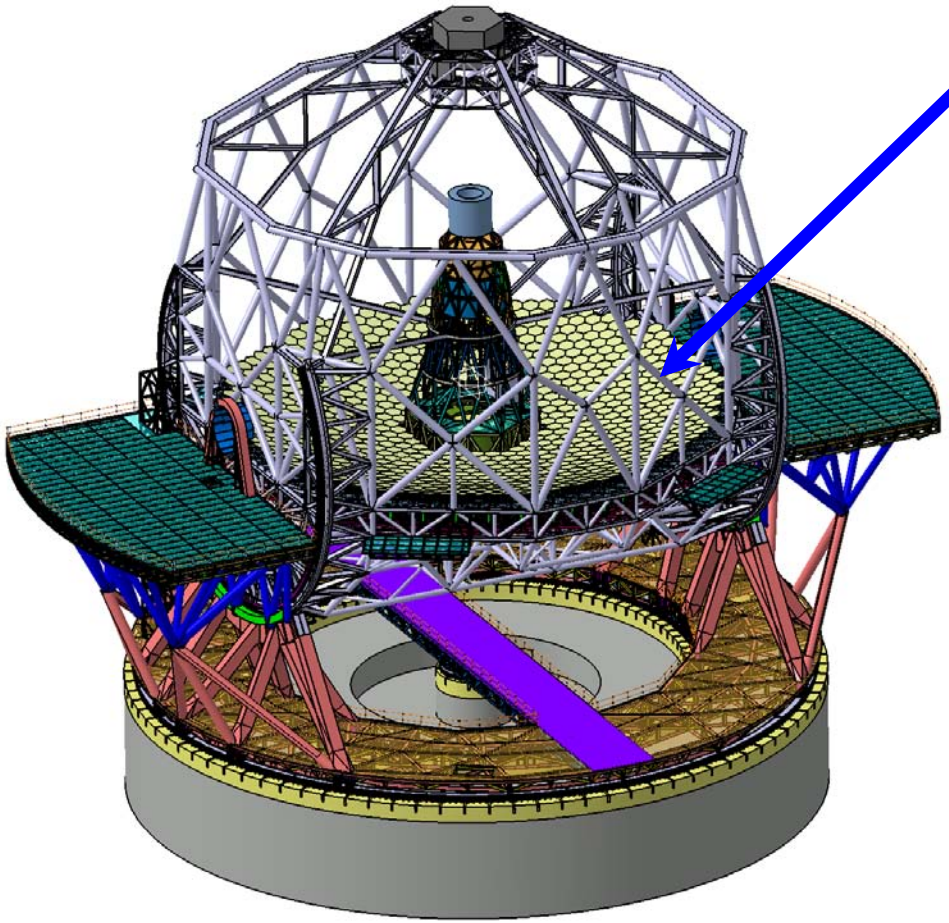
The Main Structure is about 2500 tons of steel moving 700tons of opto-mechanics and electronics around two perpendicular axes (azimuth and altitude) supported on hydrostatic bearings and driven by electrical direct drive motors with a precision of 0.3 arcsec under the maximum wind disturbance.

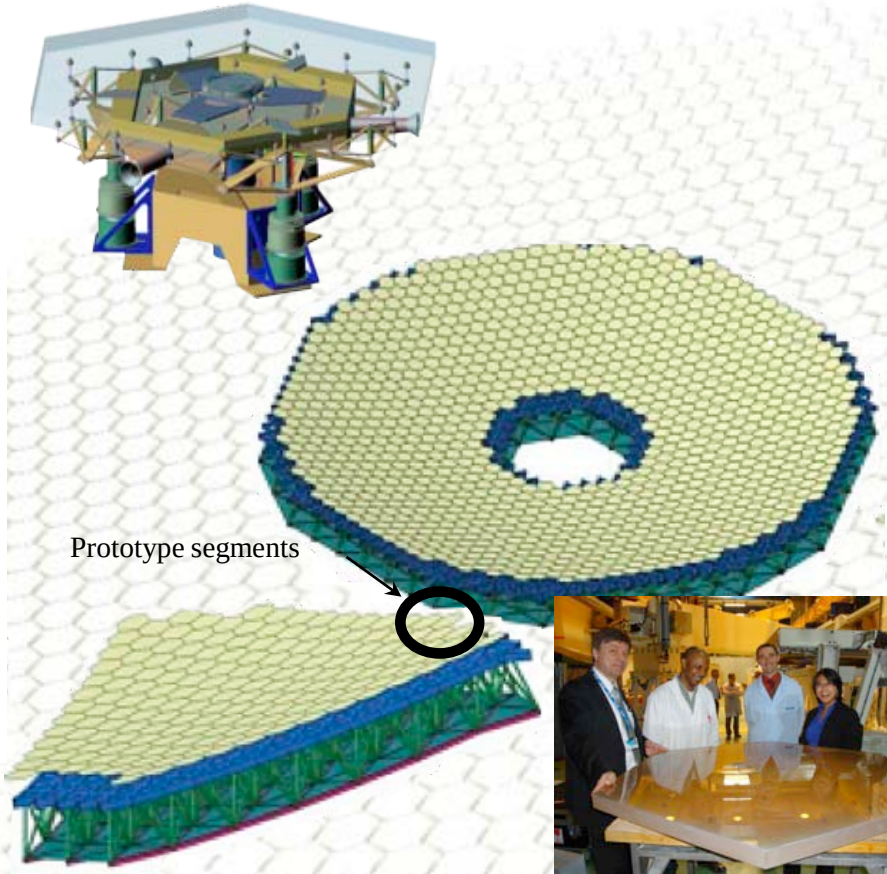


The E-ELT: overview

39m Primary Mirror

- 798 segments mirror +1/family
- 2 x 7 prototypes FEEDs
- prototype support, PACTs, edge sensors

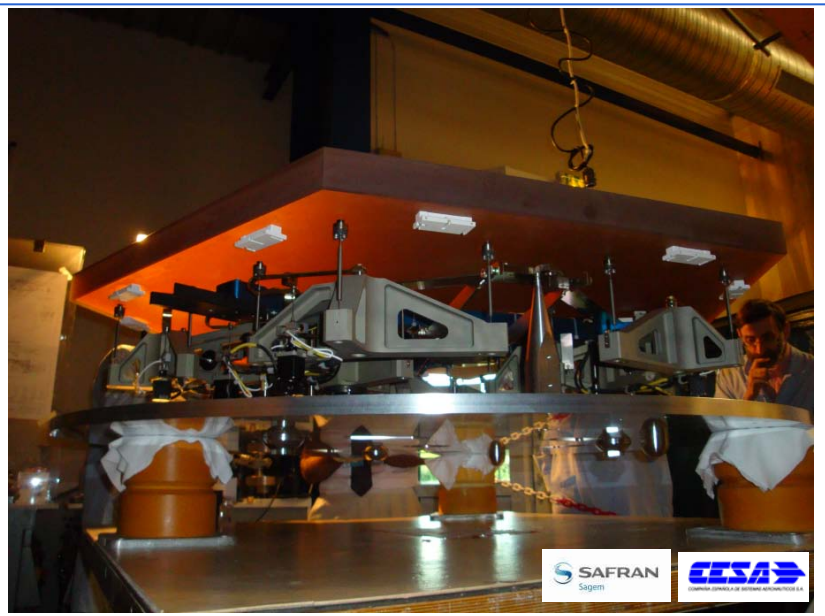


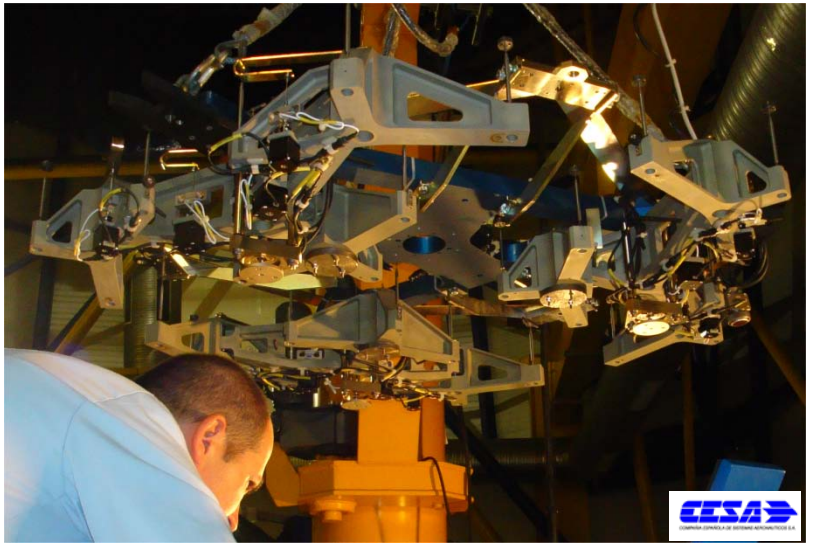


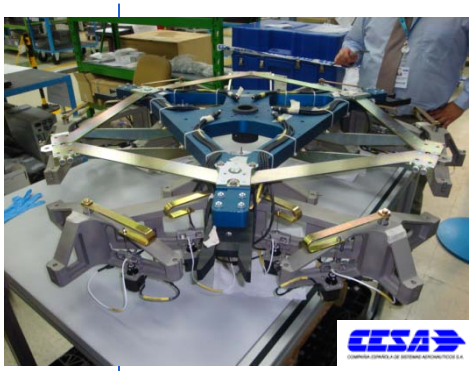
E-ELT Primary Mirror

Segment Subunit mass and stiffness

Mass	kg
Segment	165
Segment Support	90
Segment Assembly	**255**
Subcell	**115**
Segment Subunit	**370**
Total M1 (10 % cabinets, cabling, etc)	350 tons
Eigenfrequencies	**Hz**
Piston	62
Tip / Tilt	49
Lateral	52
Clocking	27







E-ELT Primary Mirror

Segment Support - Alternative Design

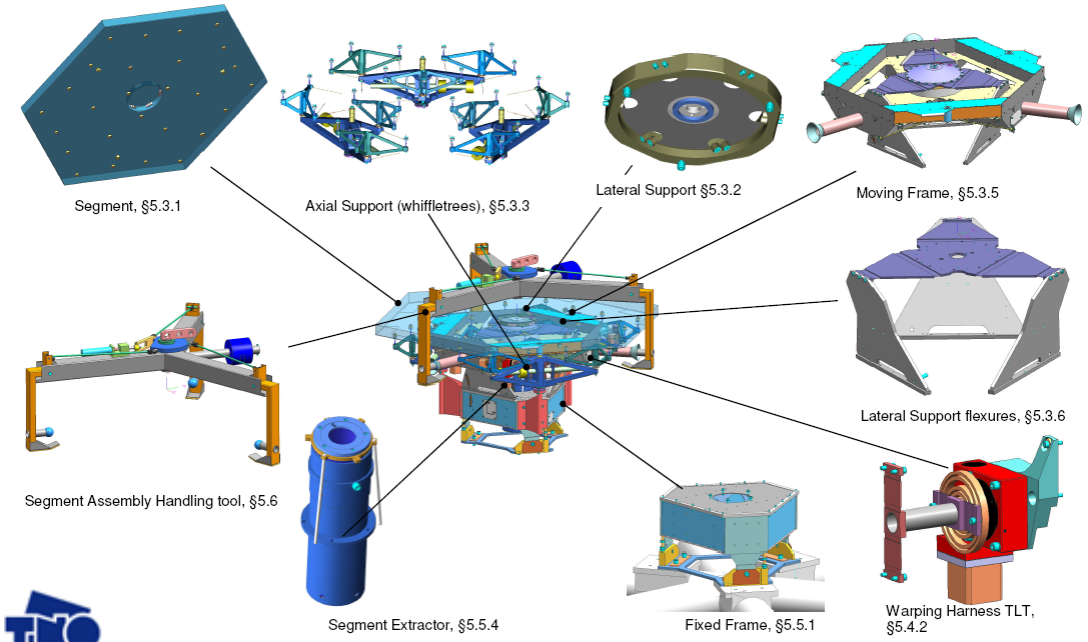
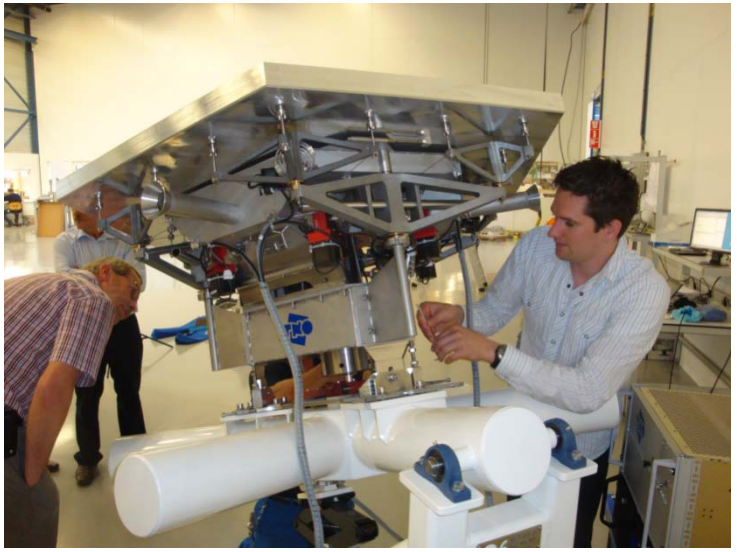
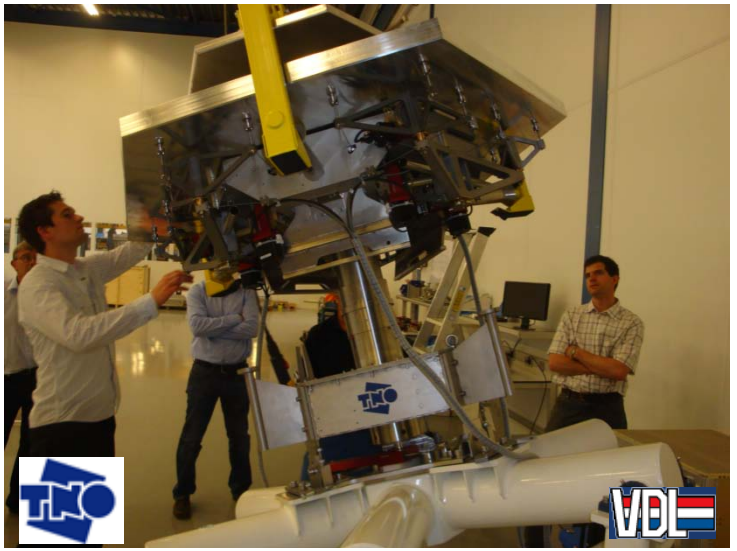
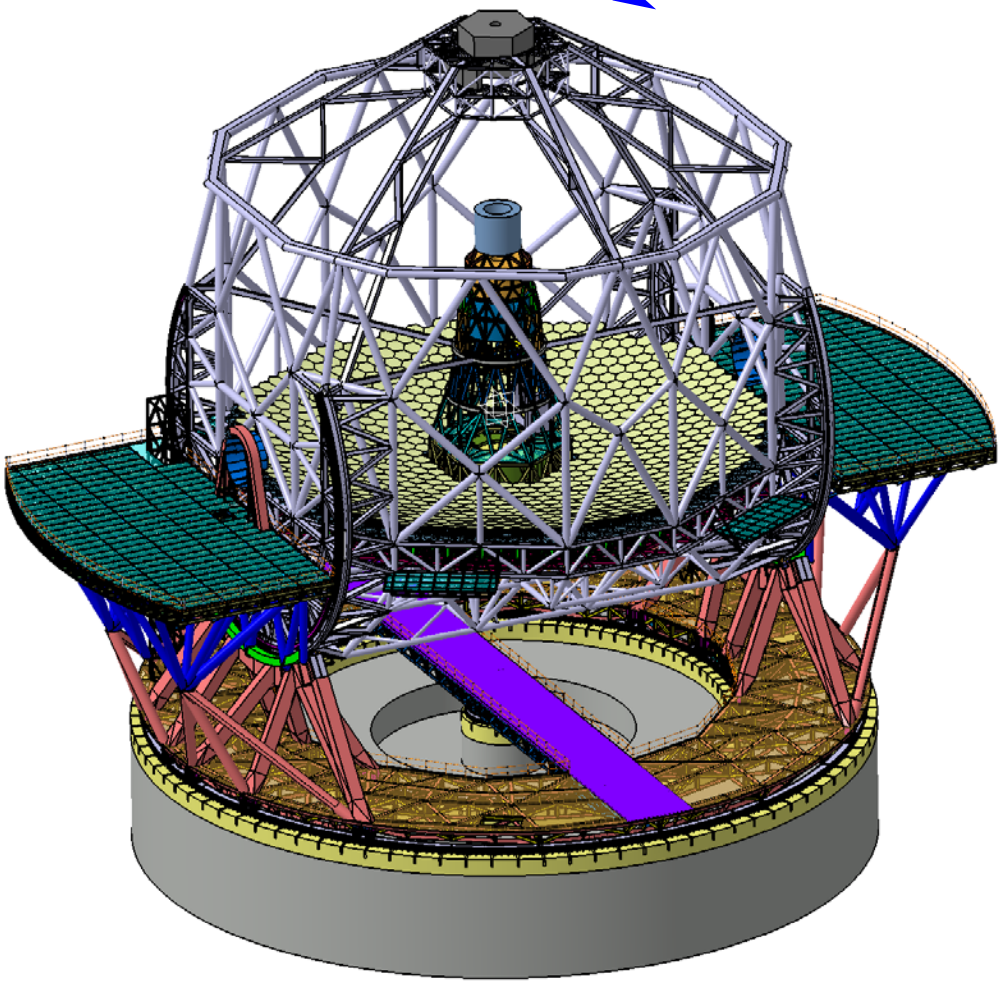


figure 3: Overview of main subassemblies



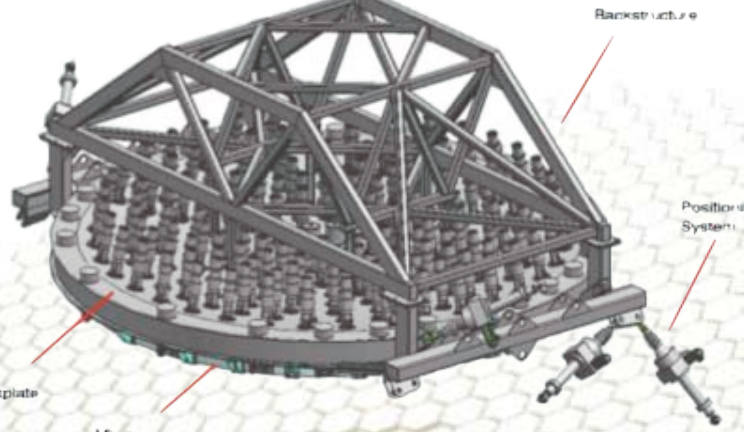


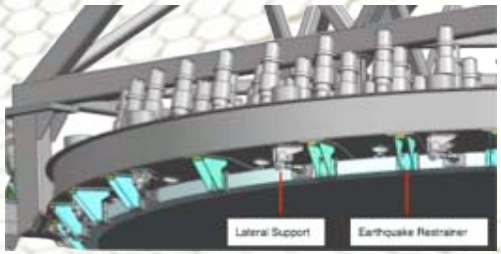
The E-ELT: overview



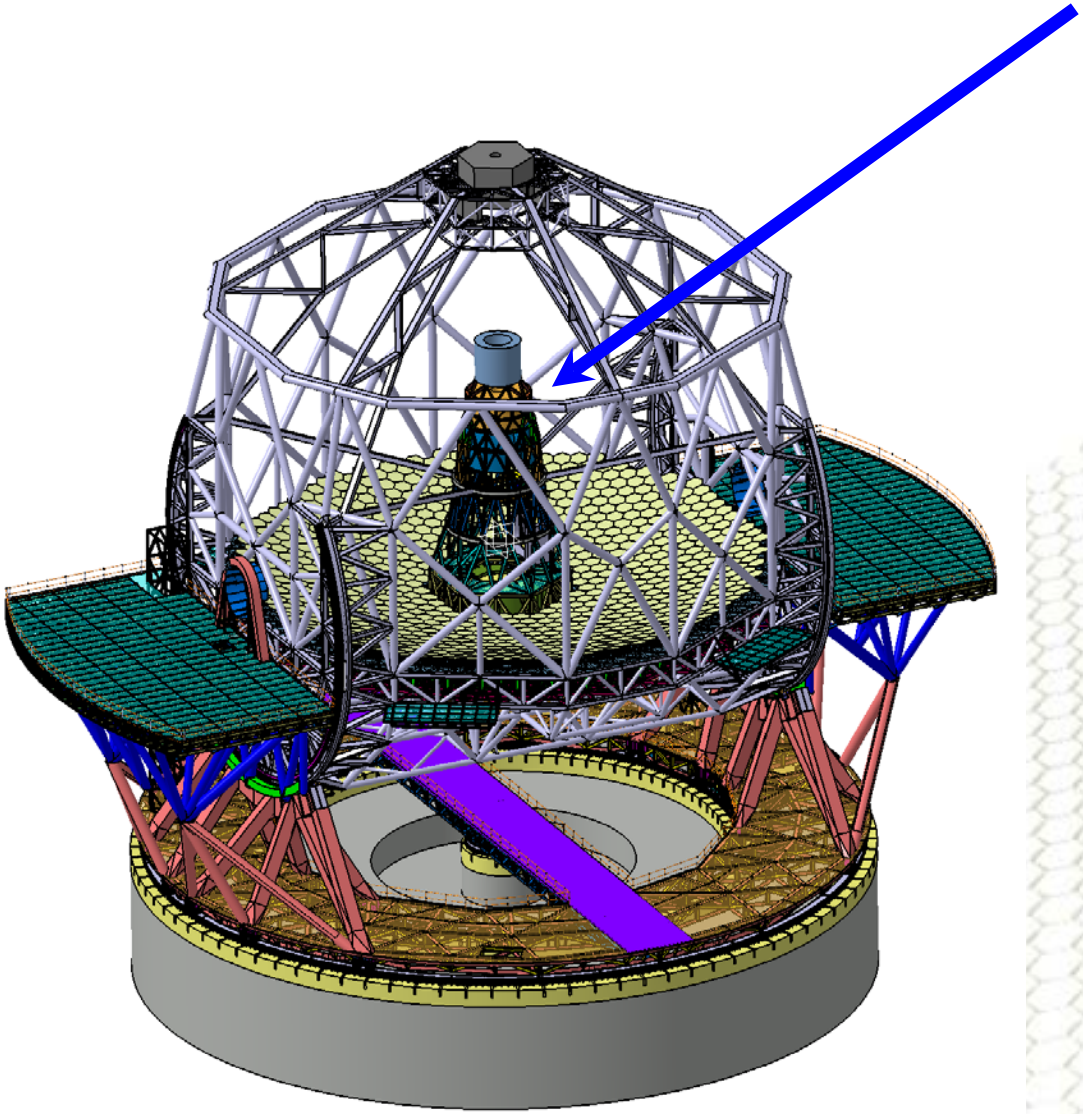
4m Secondary Mirror

- M2 unit FEED
- 3 polishing studies
- prototype actuators



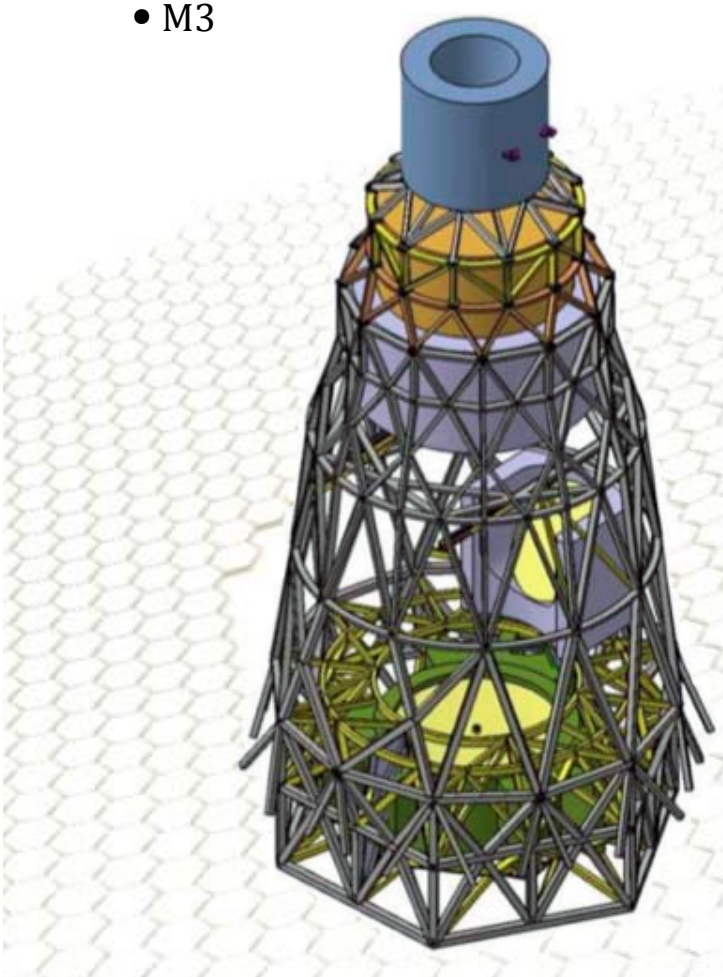


The E-ELT: overview

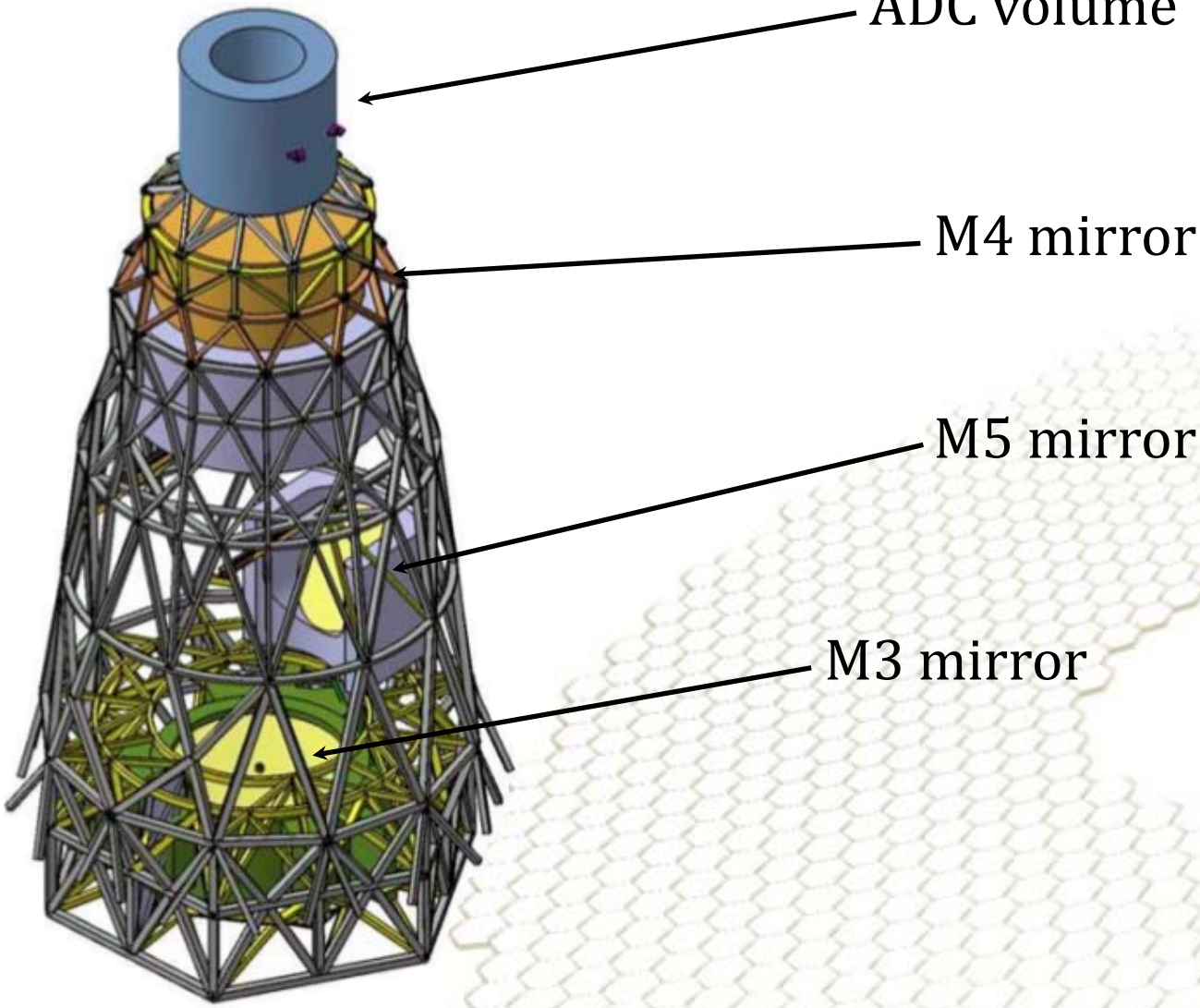


Central tower

- ADC volume
- Adaptive M4
- Field stabilization M5
- M3



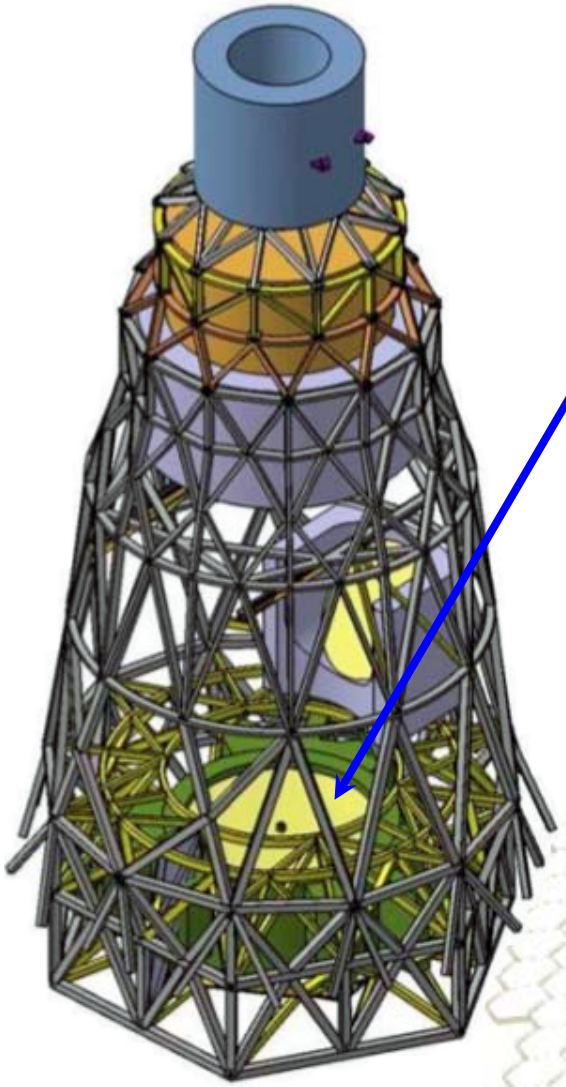
The E-ELT: overview

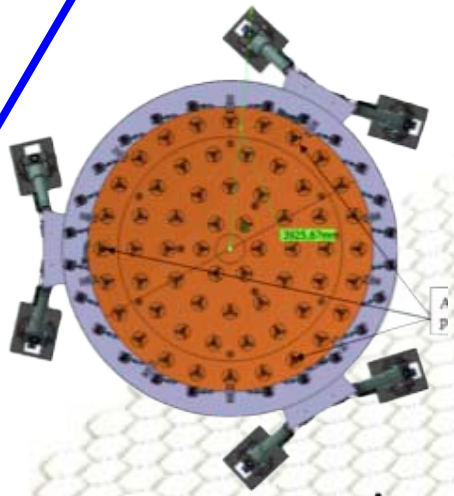


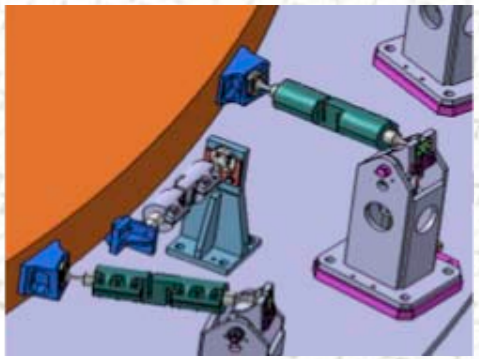
The E-ELT: overview

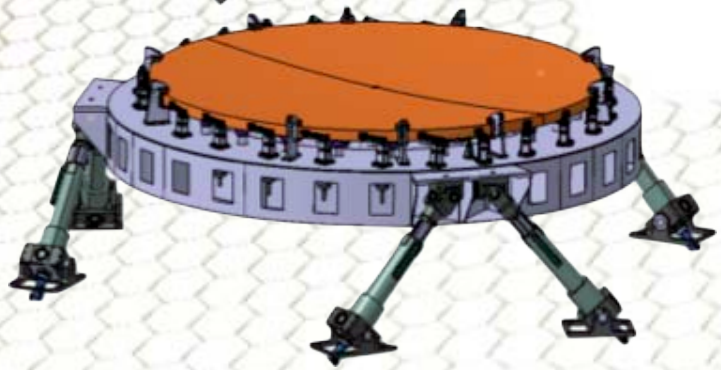
4.2m M3 unit

- Preliminary cell design concluded
- Prototype pneumatic actuators

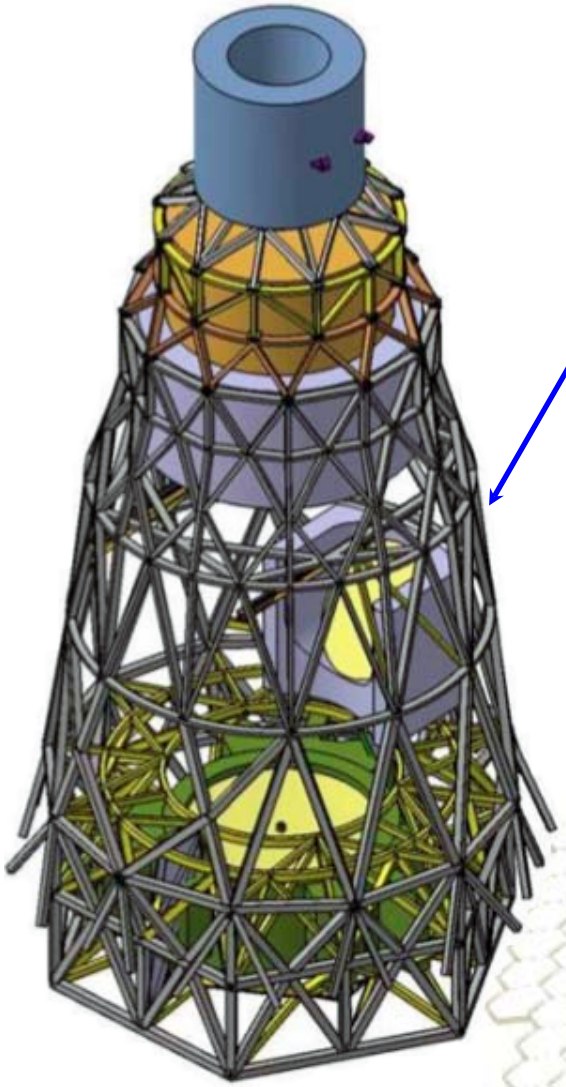






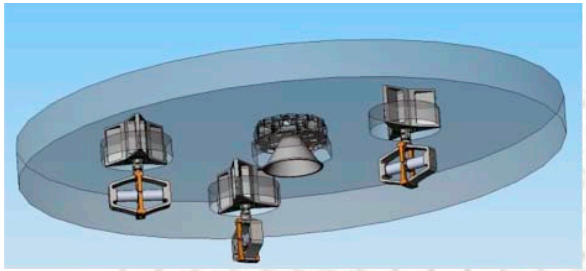


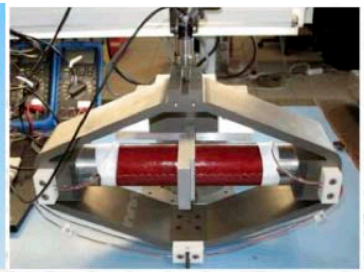
The E-ELT: overview



2.4m x 3m M5 unit

- scale-1 electromechanical prototype FEED
- final stages of testing
- 4 mirror polishing studies (including heavy option)

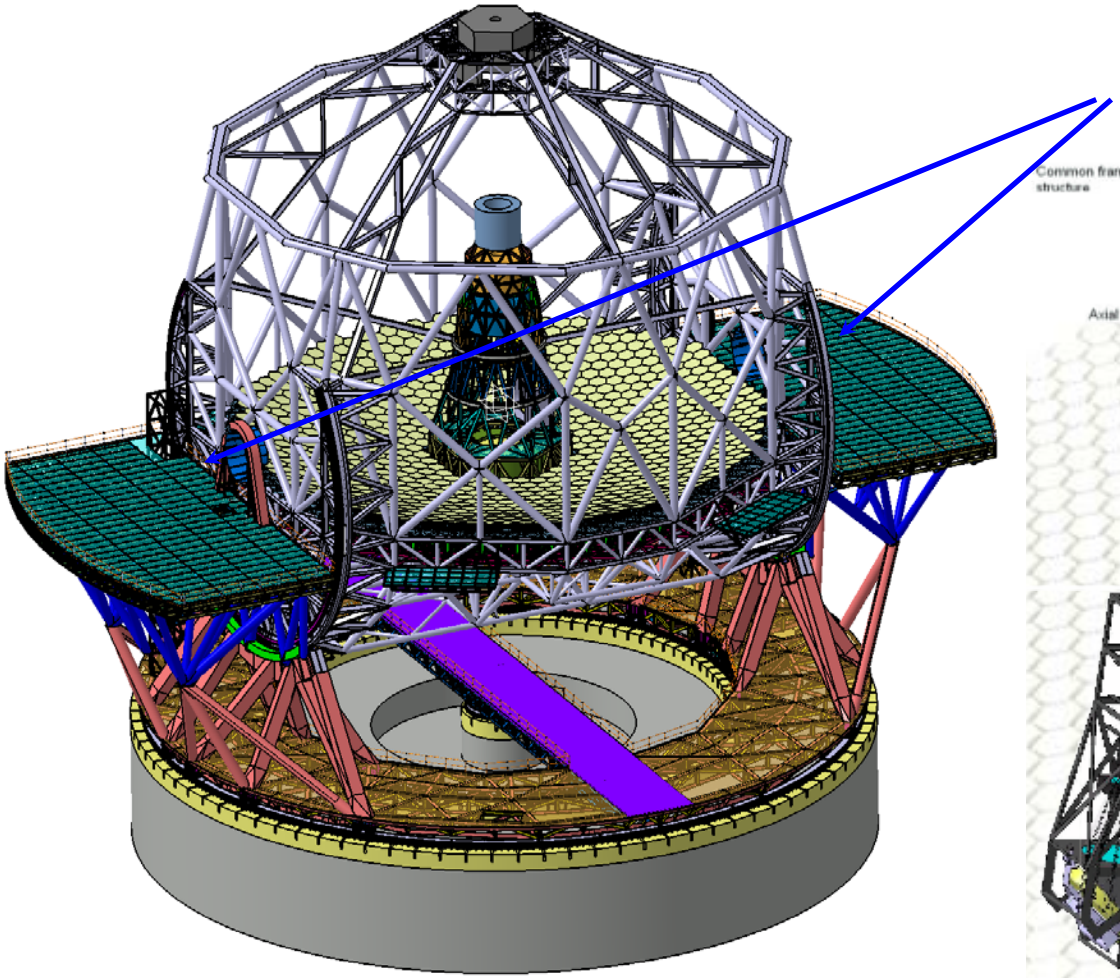


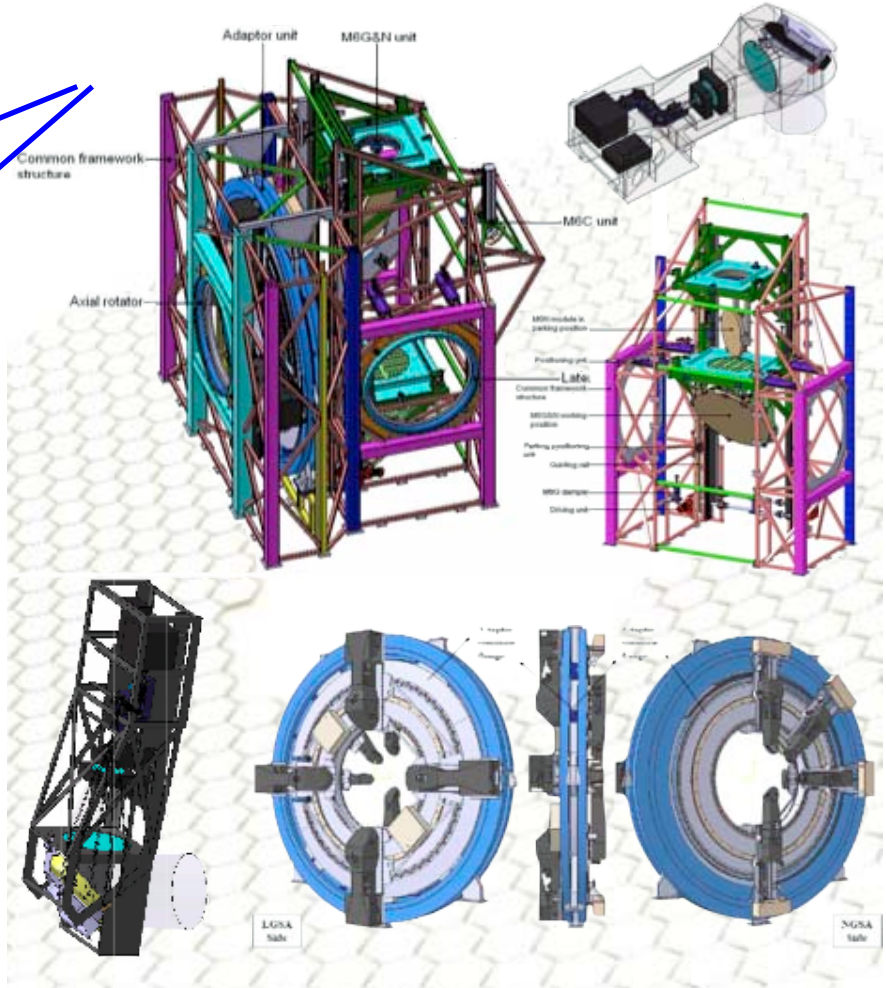


The E-ELT: overview

Prefocal station

- preliminary design concluded

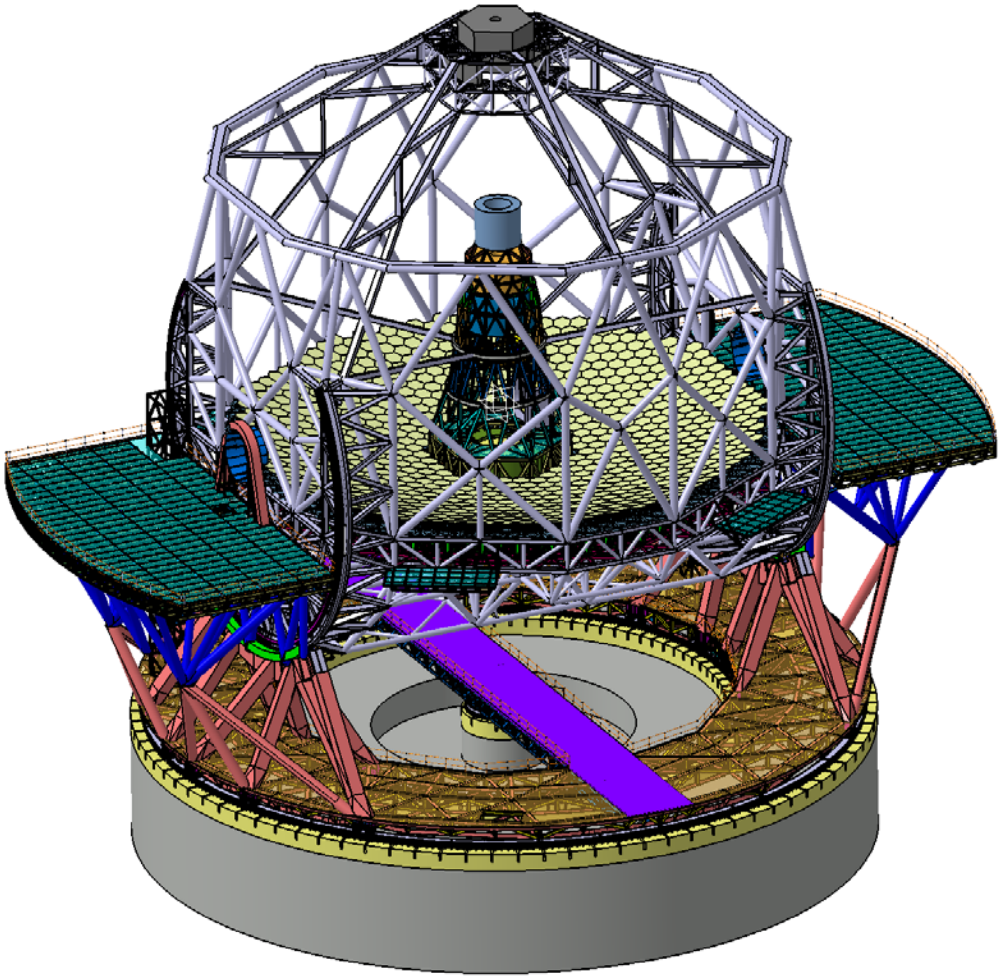




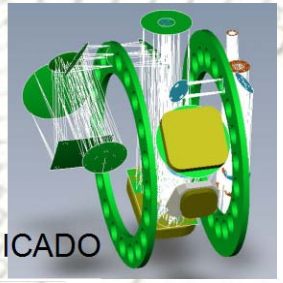
The E-ELT: overview

Instrumentation

- 8 instrument concepts Phase A concluded
- 2 post-focal AO modules Phase A concluded

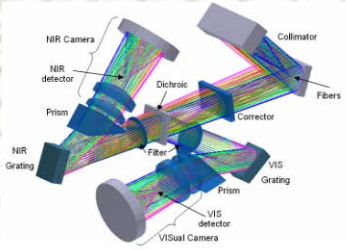


Possible instruments location

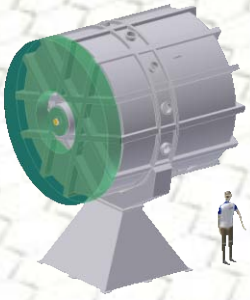


MICADO

EAGLE



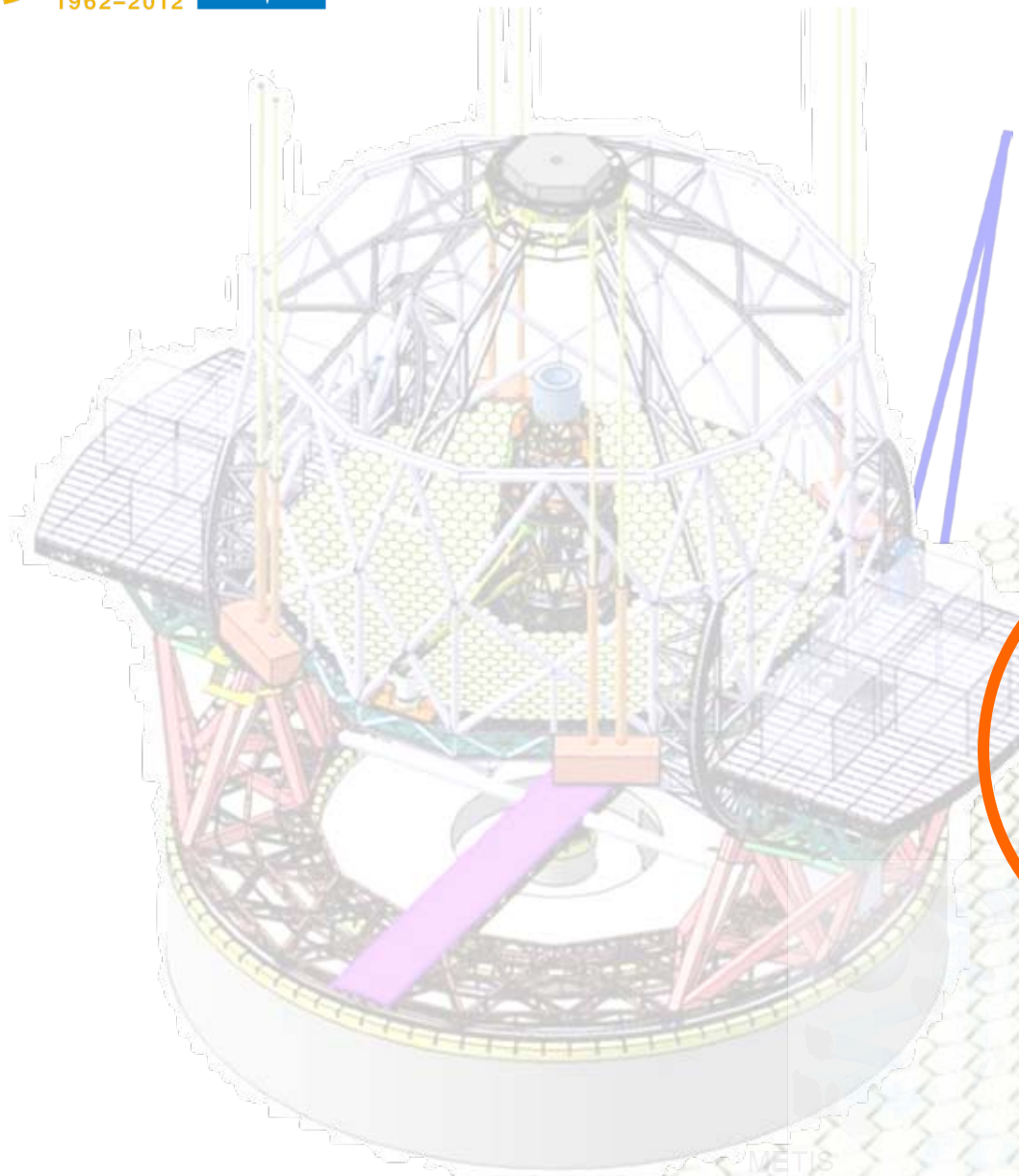
OPTIMOS/EVE



HARMONI

IS

The E-ELT: overview

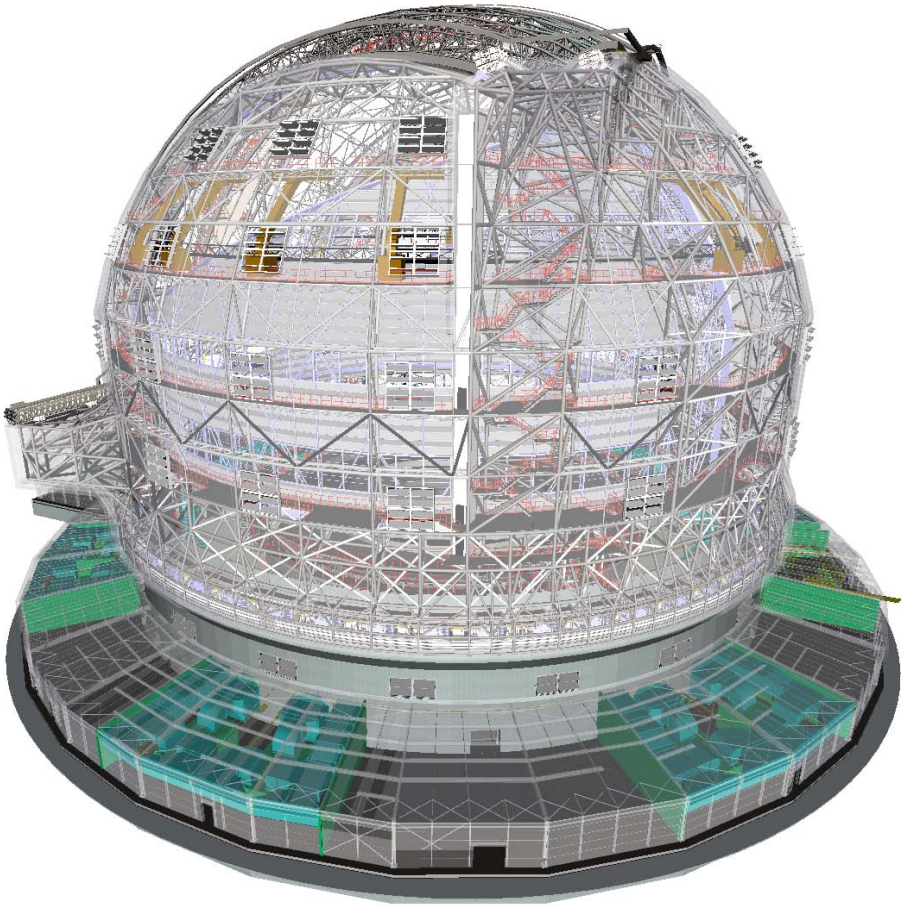


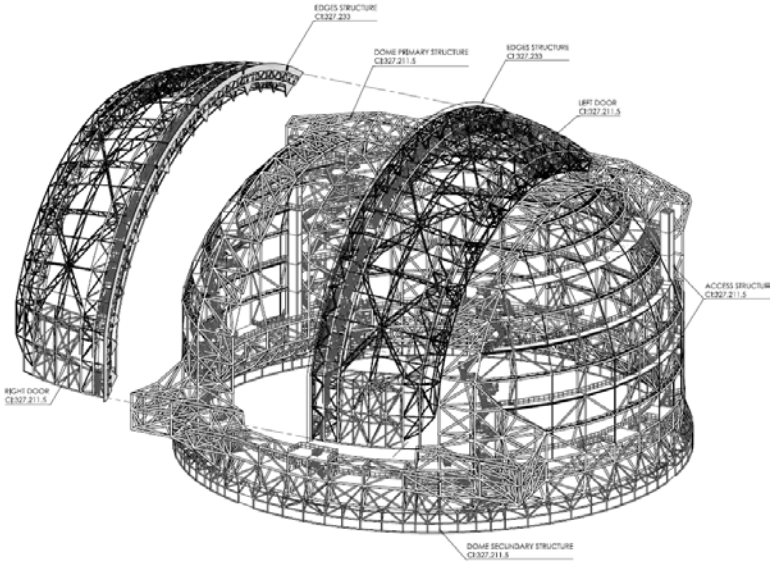
Instrumentation

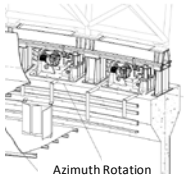
- 8 instrument concepts Phase A concluded
- 2 post-focal AO modules Phase A concluded

First Light Instruments

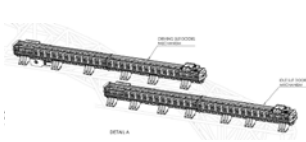
Dome



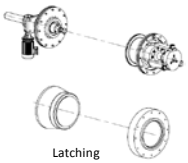




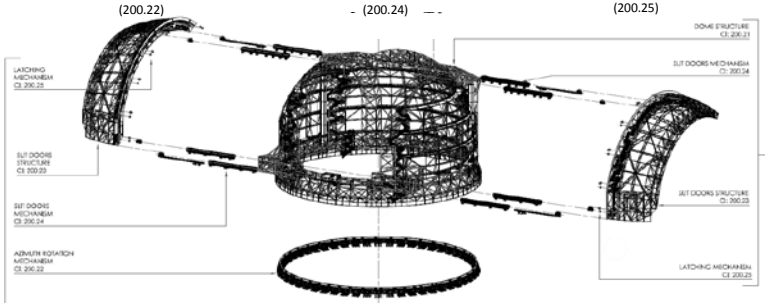
Azimuth Rotation Mechanism (200.22)



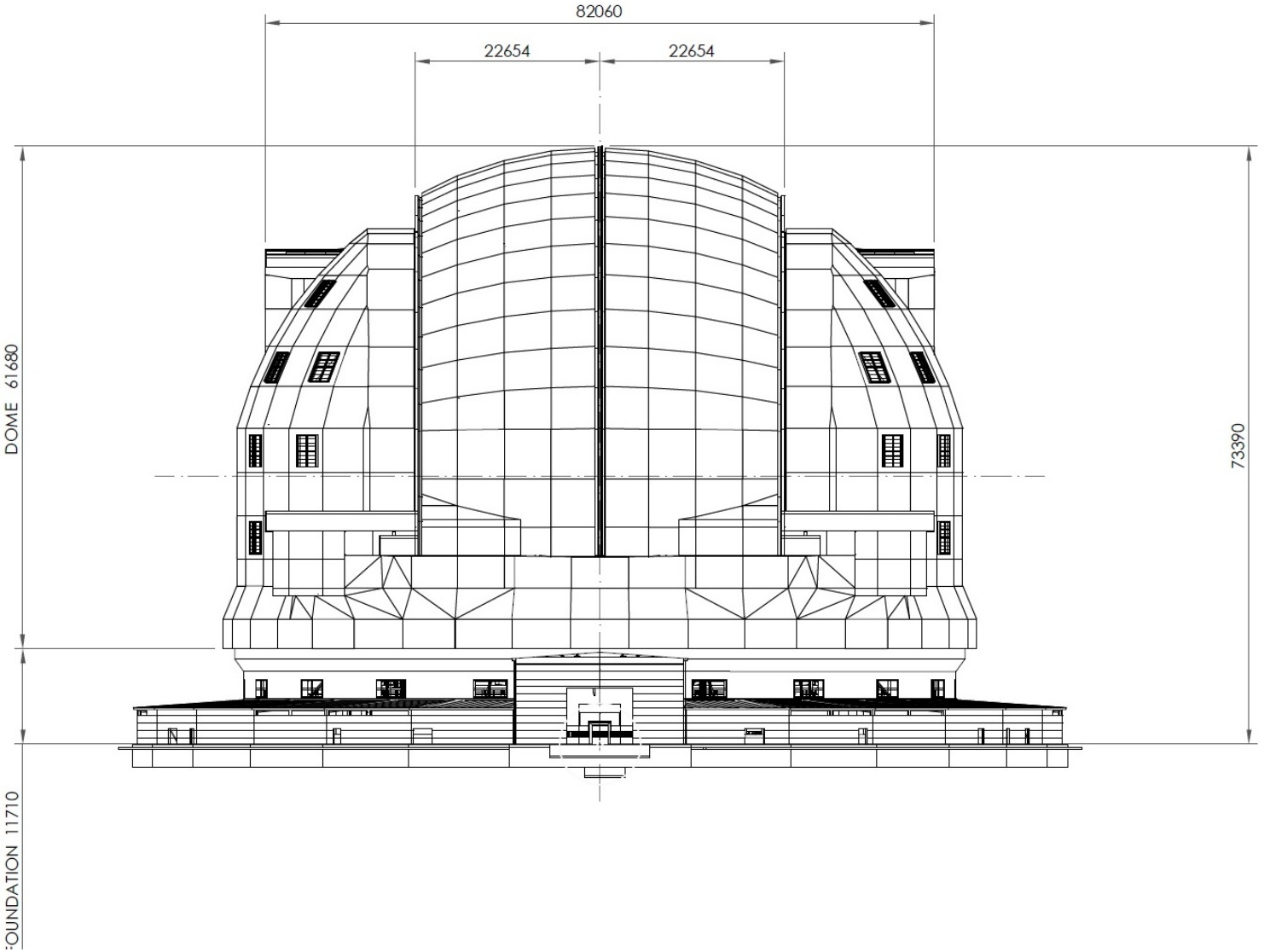
Slit Doors Mechanisms - (200.24) — -



Latching Mechanism (200.25)



Dome Dimensions



Areas of Interest for Industry

- Electronics and IT
  - Detectors
  - Control Electronics
  - Safety & Interlocks
  - Software
  - IT Hardware
- Infrastructure
  - Stand-by Power Generation
  - Coating Plant for 1.4m segments
  - Coating facility for large mirrors (4m diameter)
  - Handling equipment

Areas of Interest for Industry

- Mechanical Engineering
  - Steel Structures
  - Actuation & Metrology
- Civil Engineering
  - Dome civil construction
  - Civil Works
  - Roads & Infrastructure
  - Consultancy
- Optics
  - Small Optics
  - Large Optics
  - Coatings

Areas of Interest for Industry

- Cryogenics & HVAC
  - Cryogenic storage and handling
  - Compressors & Cooling Engines
  - Vacuum Equipment

Up-coming Contracts

- Road Construction And Platform Preparation
- Final Design and Construction of Dome
- Final Design and Construction of Main Structure
- Procurement of 6000 Edge Sensors
- Procurement of 900 Segment Support Structures


Questions