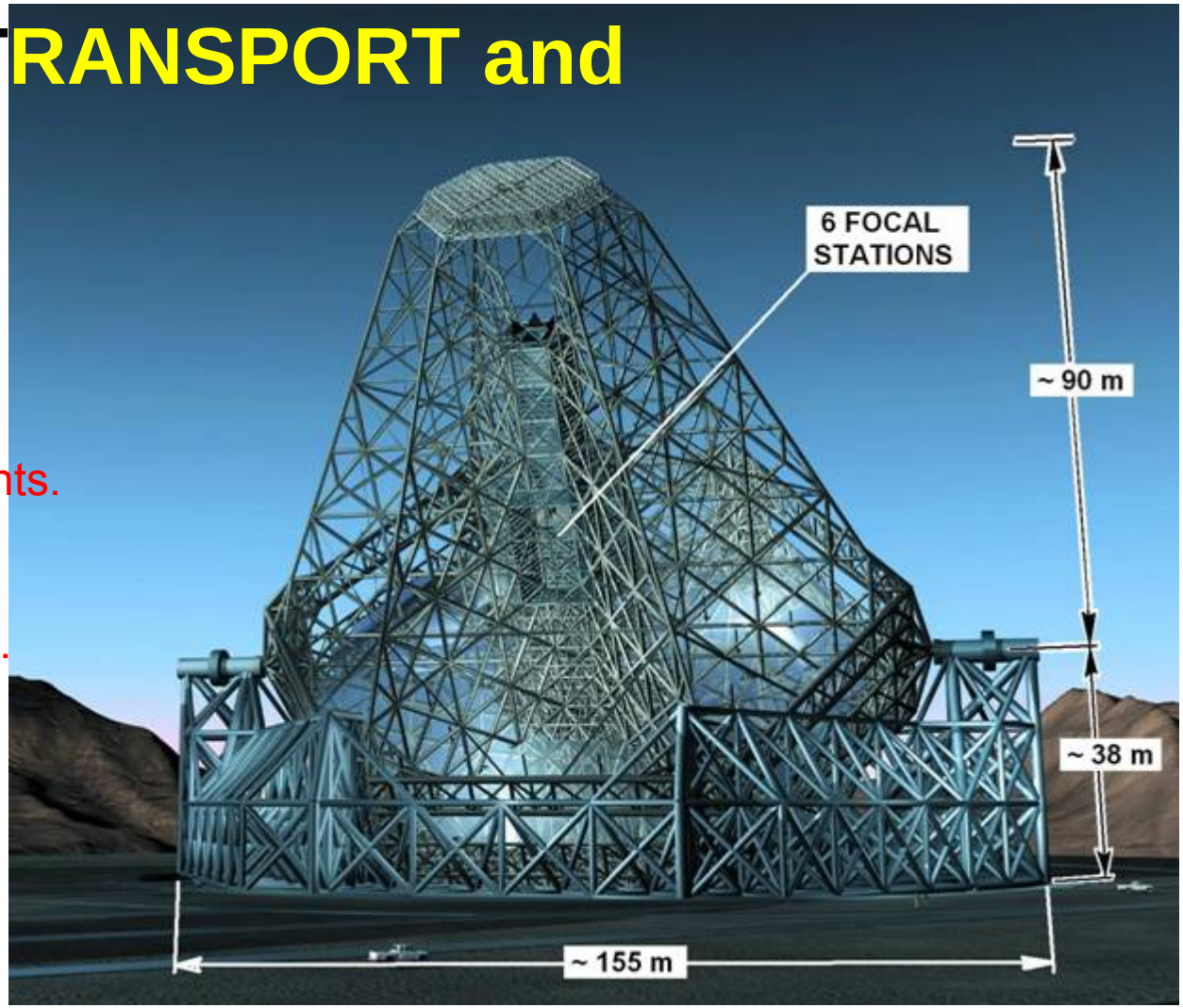
Transport & Integration

(Presented by E. Brunetto)

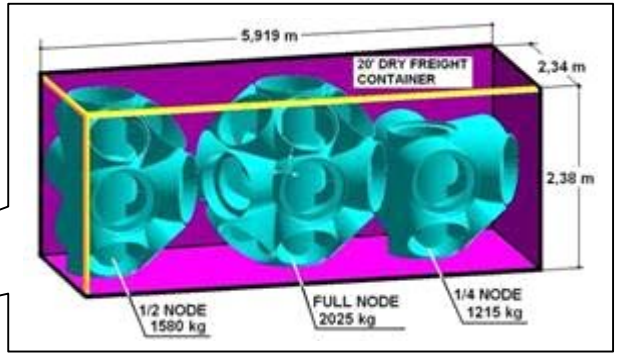
OWL

TELESCOPE TRANSPORT and INTEGRATION

- Design Provisions.
- Alignments.
- Structure Integration.
- Segment support alignments.
- Segment Integration.
- Pre-Phasing.
- Optics kinematic functions.
- Safety issues.



Design Provisions, General.

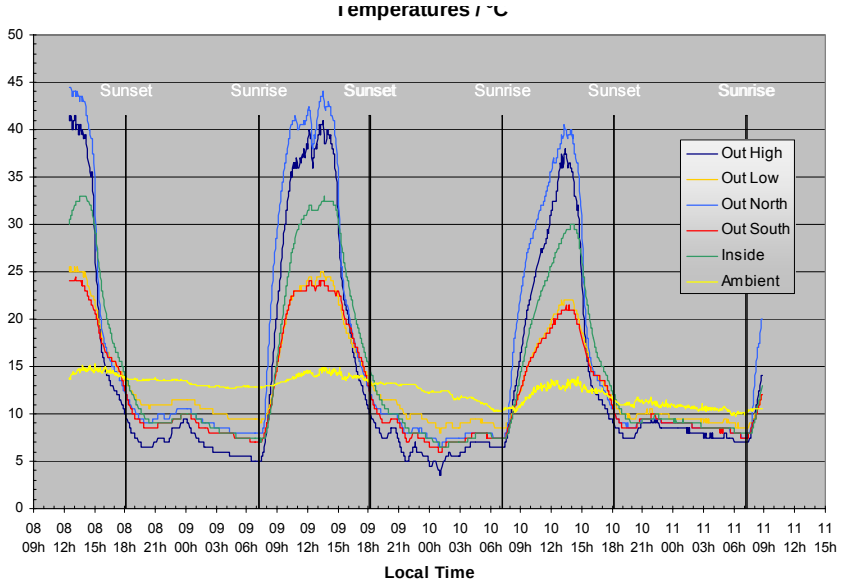


- Avoid oversize and heavy parts.
- Use of standard containers.
- Maximize standardization of parts.

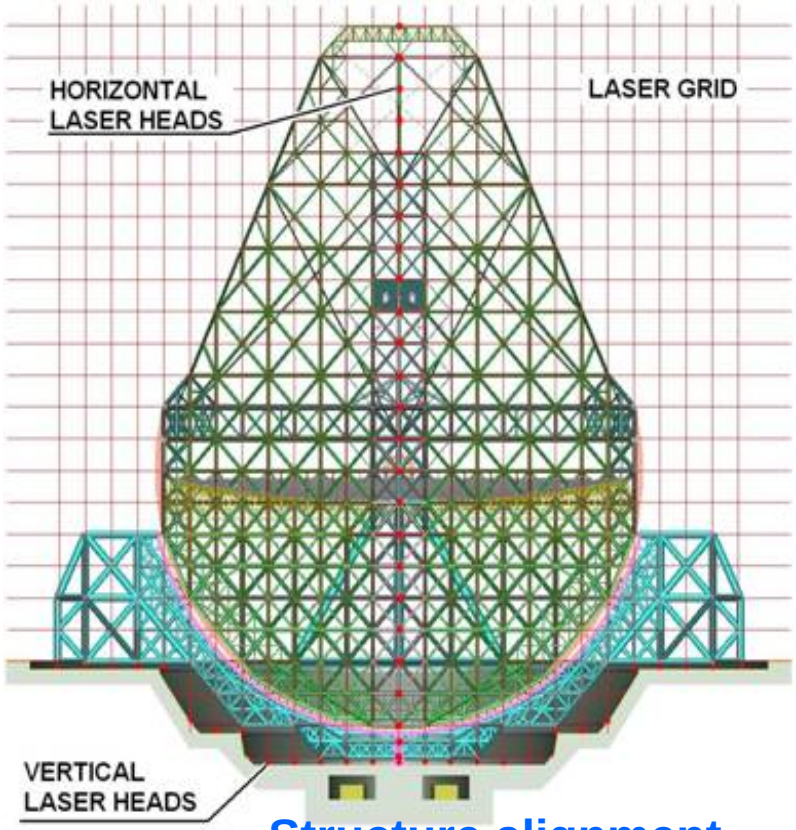
- Avoid scaffolding structures.
- Self standing structure.
- Redundancy of handling devices.
- Avoid tight assembly tolerances.
- Avoid complex metrology and alignment system.
- Avoid complex welding process.
- Allow day and night shifts, with dedicate tasks tailored to the environmental condition.

Alignment Design Provisions.

Temperature Variation

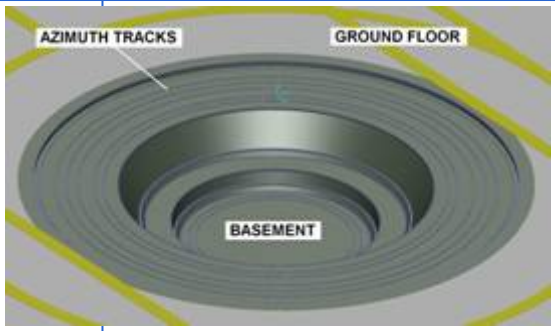


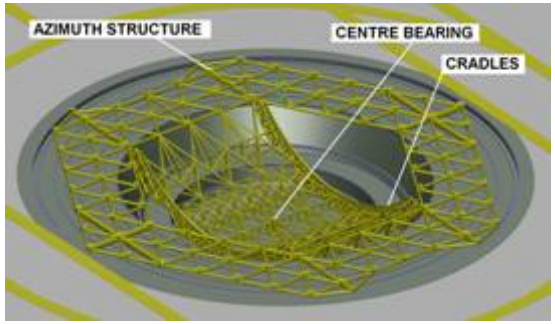
Tracks alignment

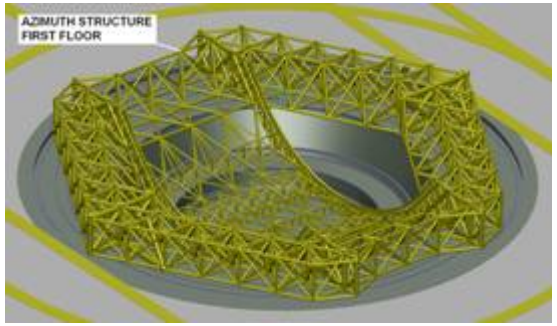


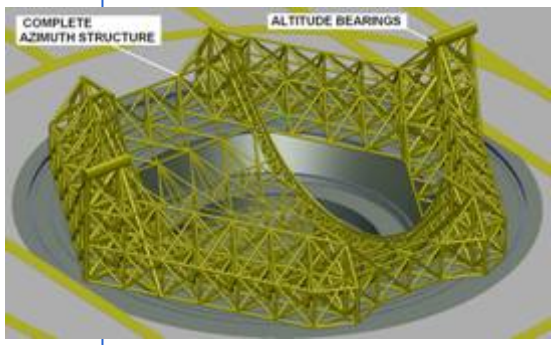
Structure alignment

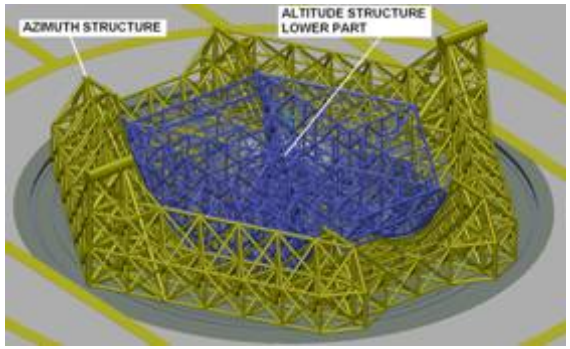
Structure Integration.

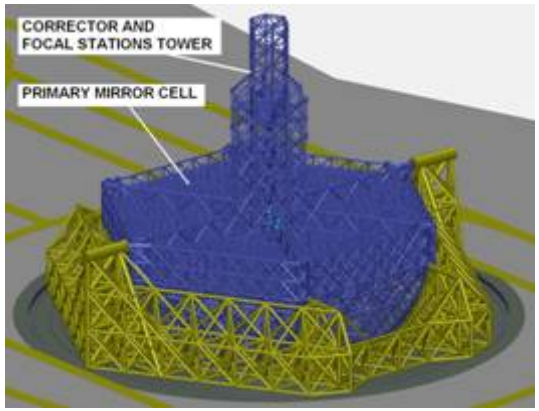


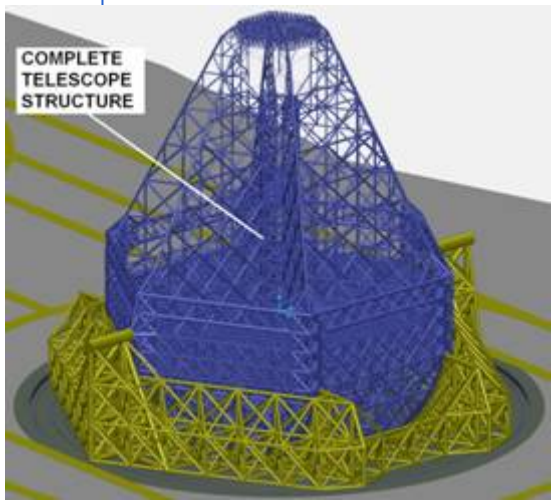








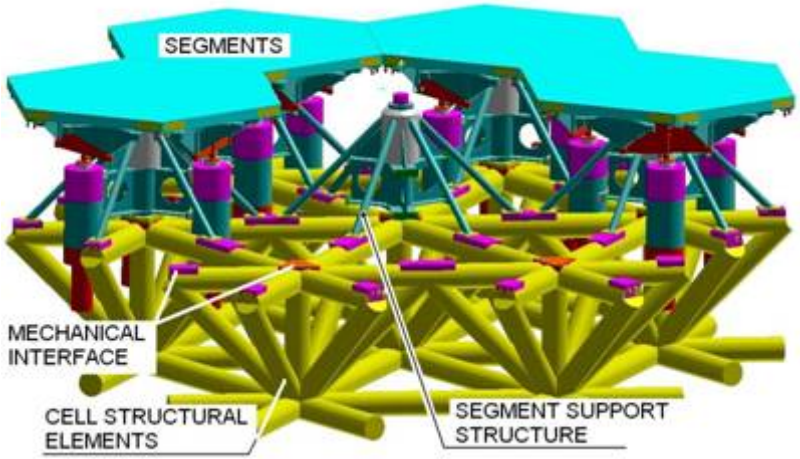




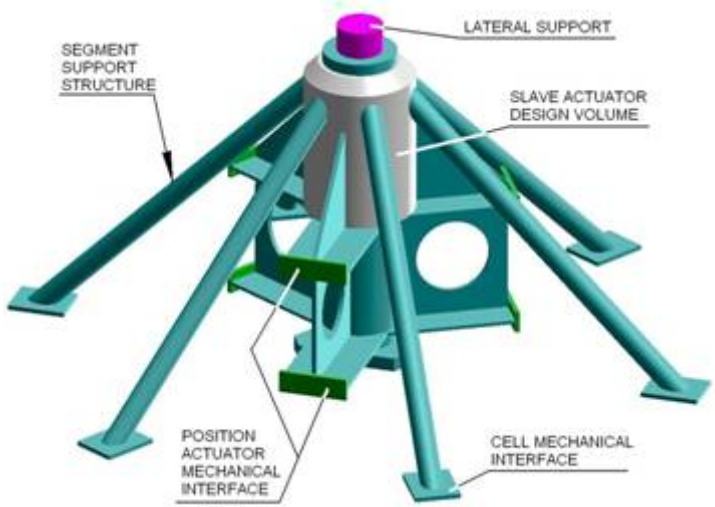
- Day time → Transport to final location.
- Day time → Rough alignment.
- Night time → Fine alignment.
- Night time → Spot weld or other preliminary joints techniques.
- Day time → Final weld and local annealing
- Night time → Final dimensional check.

IN PARALLEL WITH ENCLOSURE INTEGRATION

Segment Support Alignment.

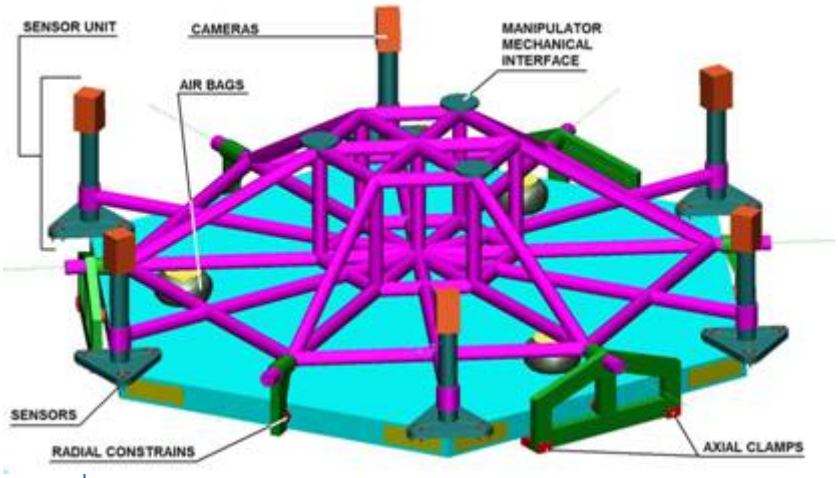


Segmented Mirror cell



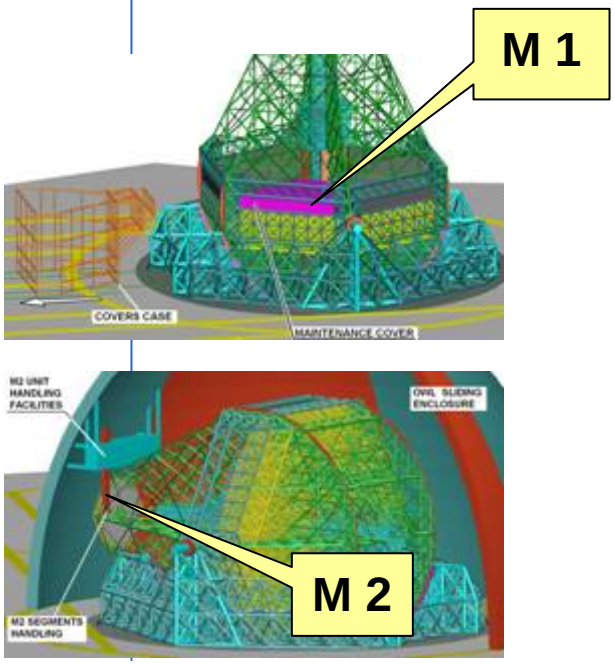
Segment Support Structure

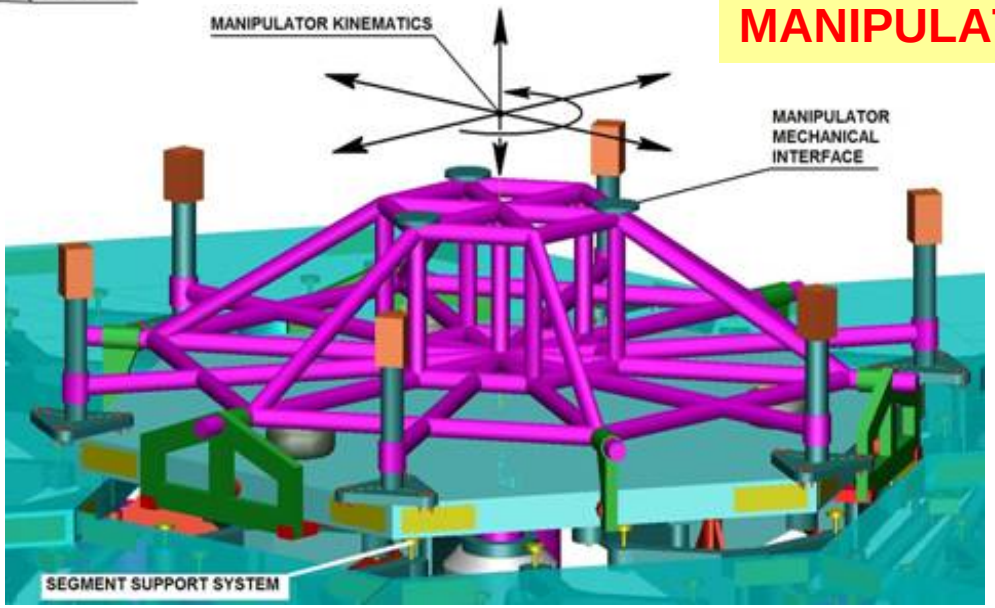
Segments Integration.



- 3 pairs of axial clamps. With a clamp and unclamp kinematic function
- 3 radial constrains. With a on-off kinematic function
- 3 air bags. Safety against handling tool failures.
- 6 sensors units. With 150 mm stroke and accuracy of ± 1mm.
- 36 pre-phasing sensors with stroke of 3 mm and resolution of ±1 µm

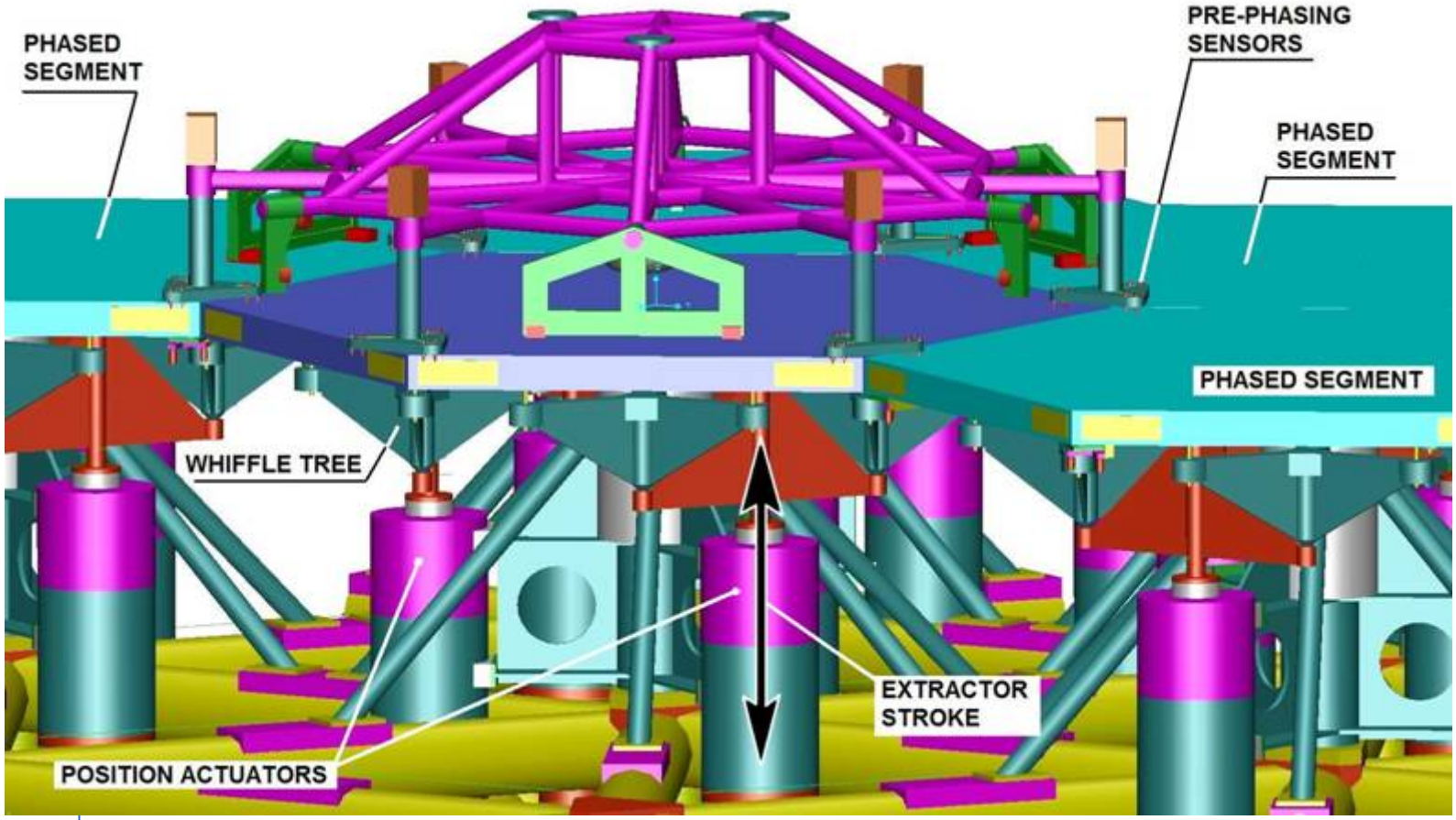
5 AXES MANIPULATOR



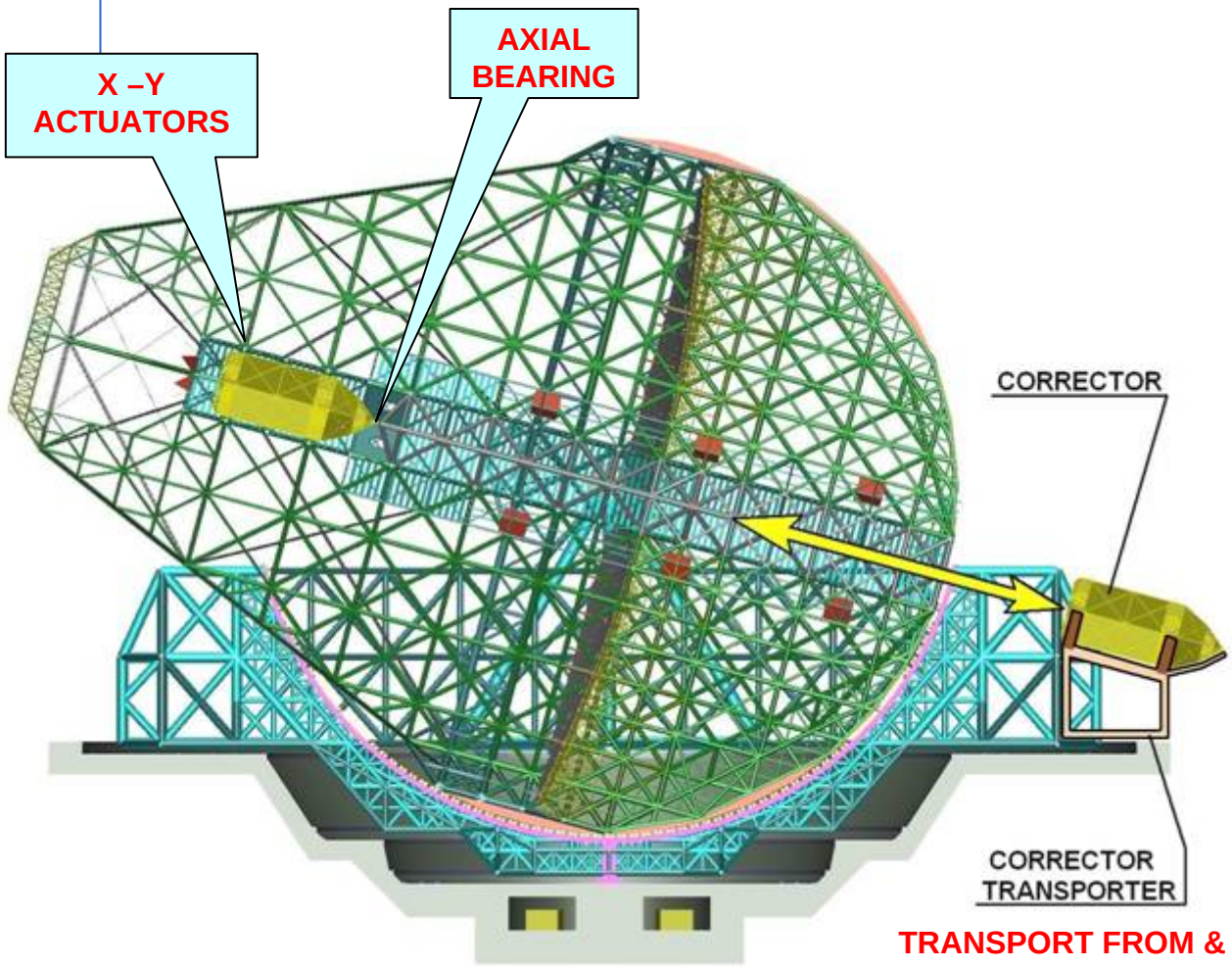


Exchange of up to 5 Segments per day

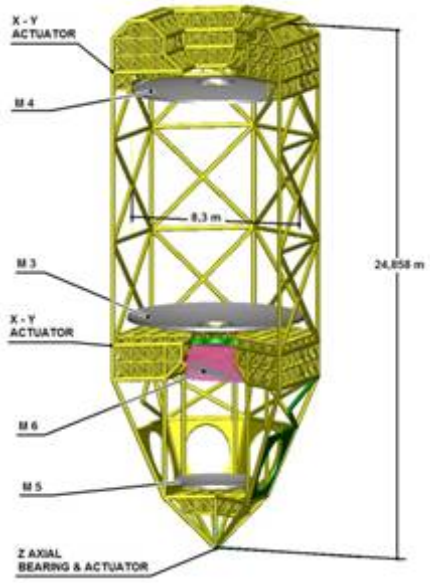
Pre-Phasing.


PHASED SEGMENT
PRE-PHASING SENSORS
PHASED SEGMENT
PHASED SEGMENT
WHIFFLE TREE
EXTRACTOR STROKE
POSITION ACTUATORS

Corrector Integration.



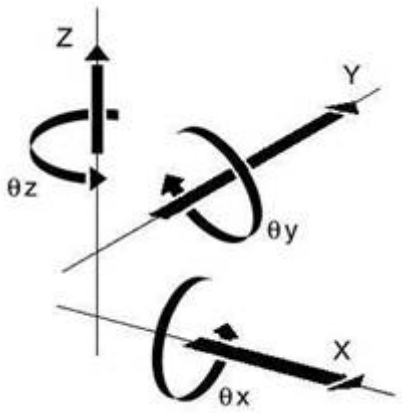
TRANSPORT FROM & TO
MAINTENANCE BUILD



Mass ~ 130 tons

Optical Alignment Kinematics.

	Phasing	Rot X Rot Y	X	Y	Z Optical axis
M1	●	○			○
M2	●	●			●
Corrector		●	●	●	●
M5					●
M6		●			



Optical Alignment Functions

Safety During Integration and Maintenance.

Main Axes Rotation !

- Safety stations equipped with emergency push buttons and safety card inserted in to locking/emergency stations. That inhibits the telescope main axes rotation.
- In addition the following surveillance and emergency devices are implemented:
  - Transceiver (GPS localizer).
  - Signal reflectors embedded in the clothes of the personnel, similar to those for avalanche rescue.
  - WEB camera, thermal cameras and infrared sensors.
  - Audio devices: Microphone, Loudspeakers.
  - Optical devices: Emergency and flash lights.

Conclusions

Transport and Integrations provisions
are implemented into
OWL conceptual design