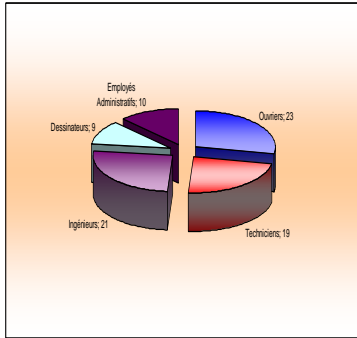
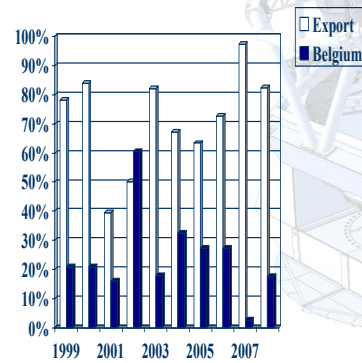


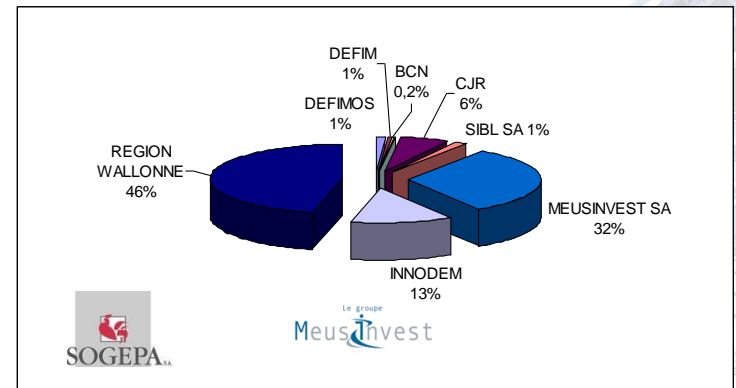
STAFF



EXPORT



Shareholder

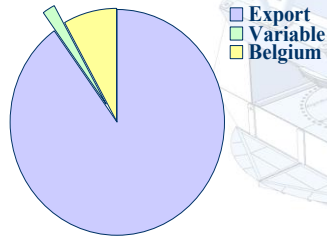
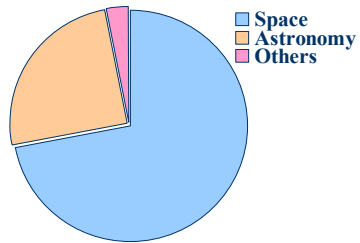




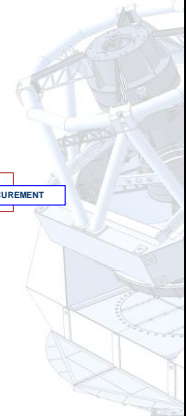
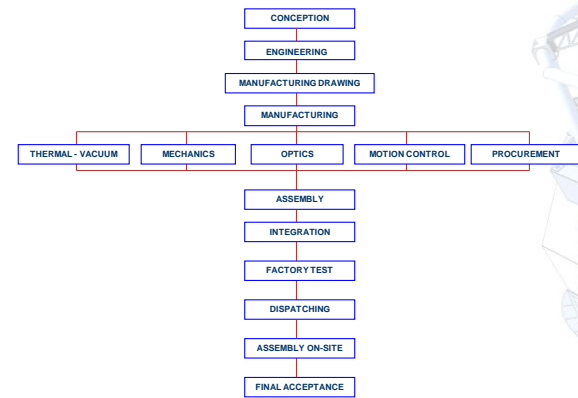
## ORGANISATION

- Design & Manufacture
- Optics & Mechanics
- Project oriented
- Space and Astronomy

- 80 people
- 12 M€
- 91 % Export – 40 % Sub
- India - USA - Europe



## Total Vertical Integration





## VACUUM CHAMBERS



BOF

ESTEC  
RESEARCH &  
TECHNOLOGY  
CENTRE  
FOR THE  
EUROPEAN  
SPACE AGENCY



XMM



Focal V



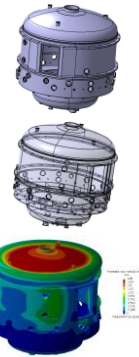
GLOVE BOX (DASSAULT)



## VACUUM CHAMBERS



### Modification Focal X : XXL

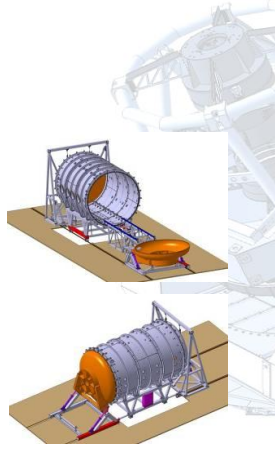




## VACUUM CHAMBERS



### CATVAC

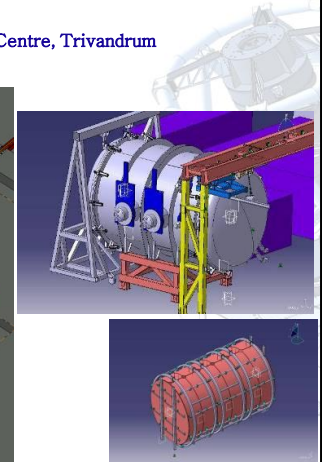
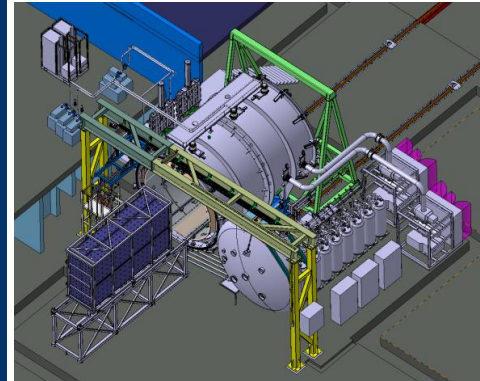


## VACUUM CHAMBERS



### VSSC – Focal V

ISRO- Vikram Sarabhai Space Centre, Trivandrum





## VACUUM CHAMBERS



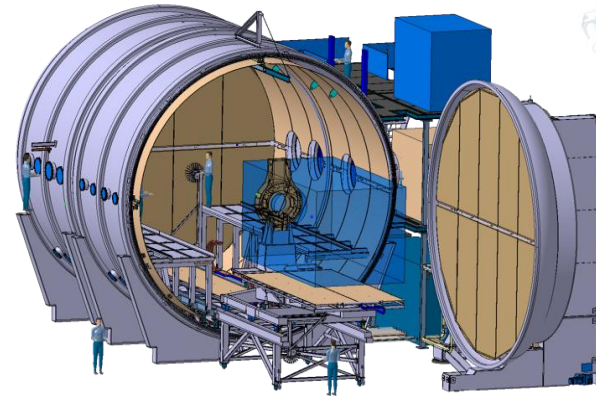
PHENIX



## VACUUM CHAMBERS



SBIK



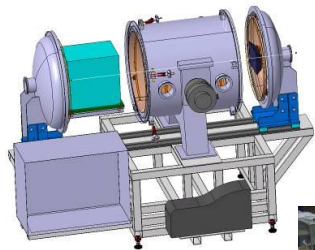




## VACUUM CHAMBERS



Submicron – BOF3



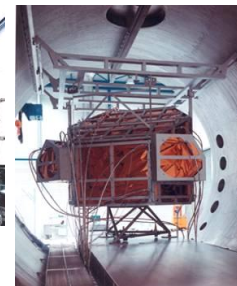
## THERMAL SHROUDS



GOMOS



HIPPARCOS



ISO

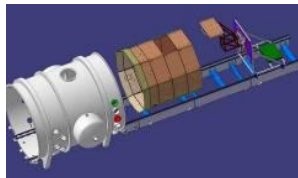




## THERMAL SHROUDS



PLANCK Cryogenic Facility – Focal V



## OGSE



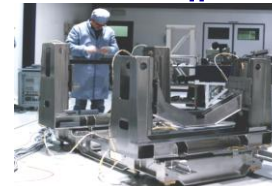
HIPPARCOS



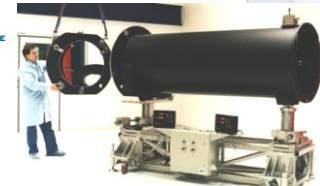
SILEX



HELIOS Support

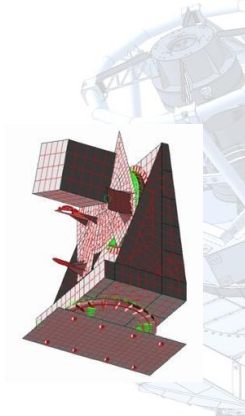
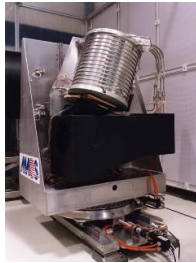


ISO

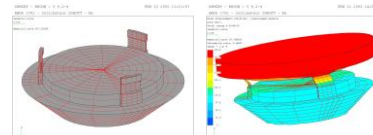




IASI



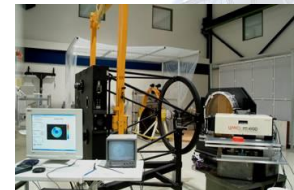
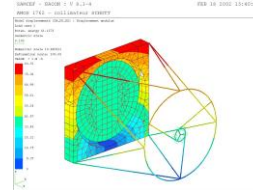
ISRO



Secondary mirror cell

Deformation of the back surface

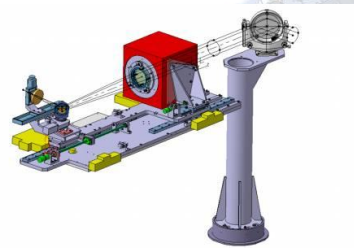
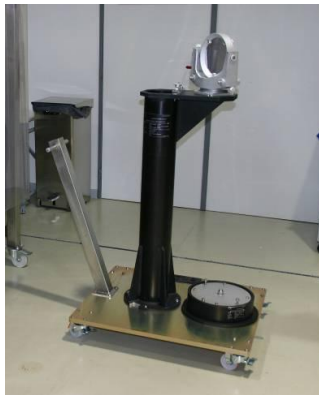
Thermal result: displacement modulus of the collimator





OGSE

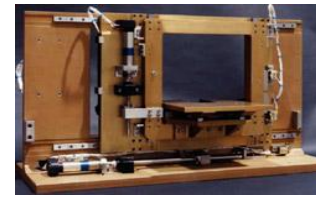
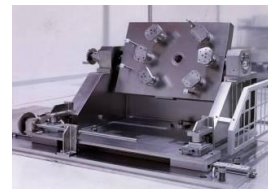
PLEIADES



MGSE



SILEX



SEVIRI (SPACEBEL INSTRUMENTATION)



VEGETATION (SPOT 4)



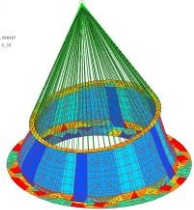
MARS EXPRESS

VTA - Finite Element

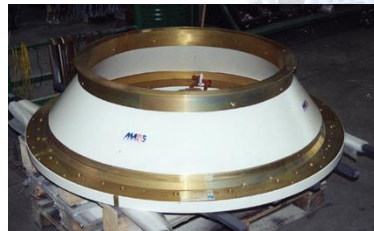
AMOS S.p.A. - Bergamo - SPACER VTA-1-04      JOB: 2 2003 34143102

Modelo: SPACER\_VTA-1-04  
Disegnato da: S. P. G. S. P.  
Data: 04/04/2003  
Scale: 1:100  
Revisione: 01/01

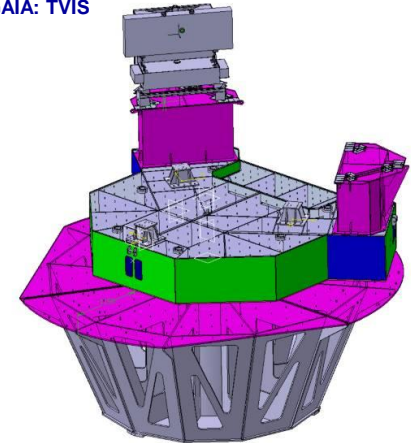
Revisione: 01/01/2003  
Definitiva: 01/01



VTA for expedition to ALENIA SPAZIO



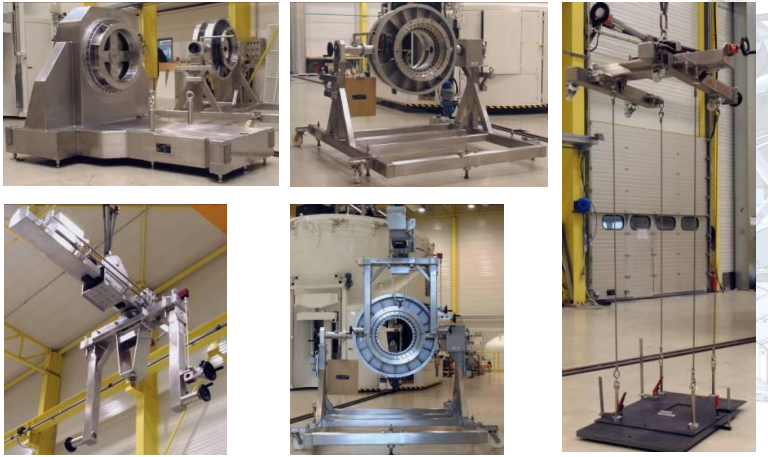
GAIA: TVIS





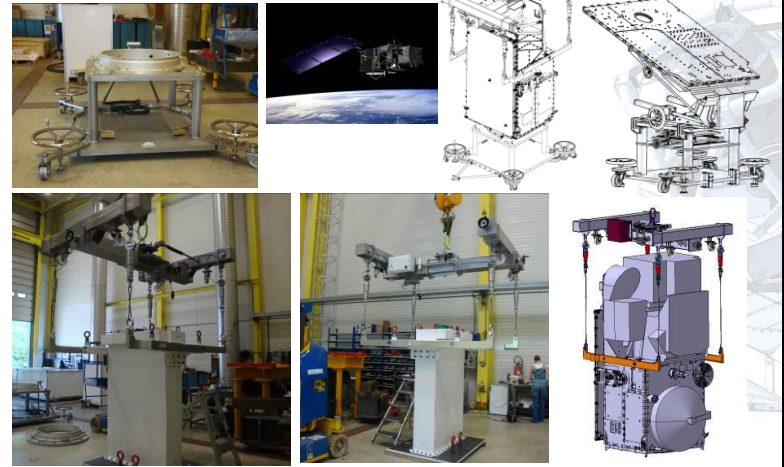
MGSE

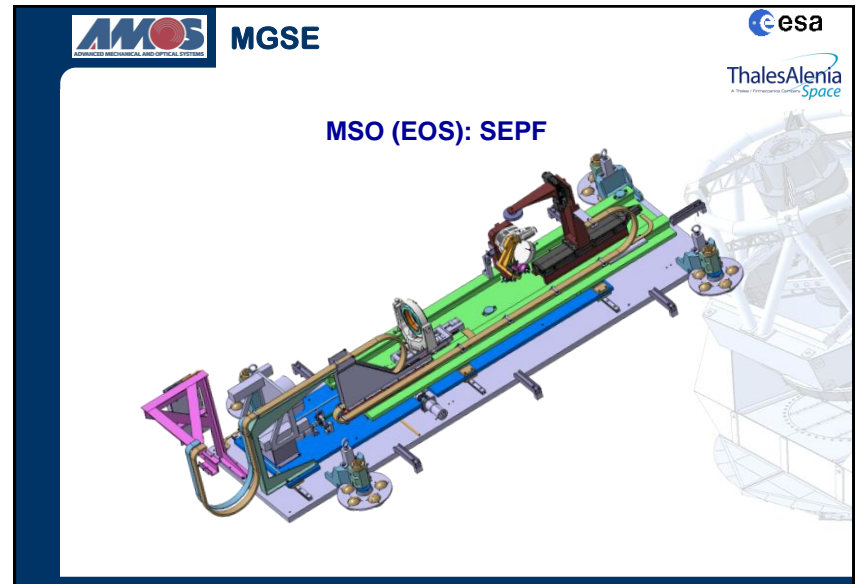
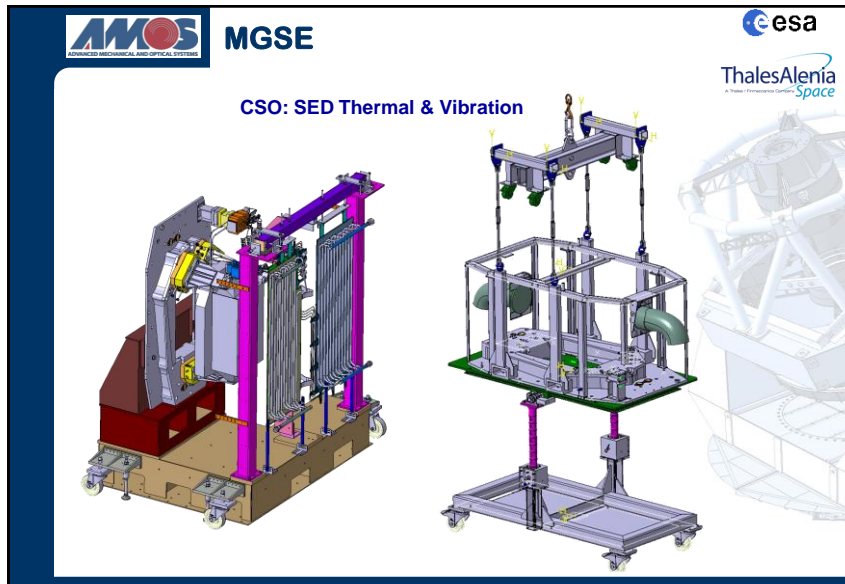
PLEIADES



MGSE

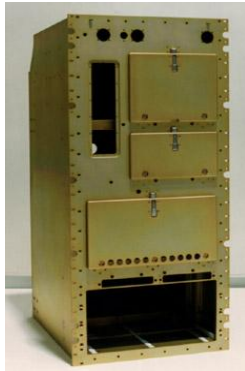
Sentinel III



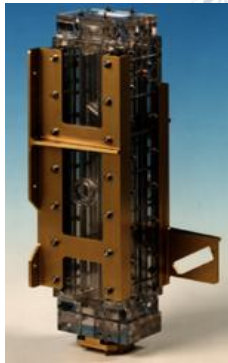


## RAMSES

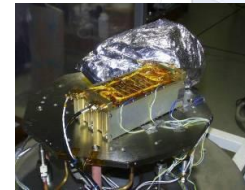
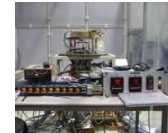
RACK SBS



CELL SBS



## ROSETTA







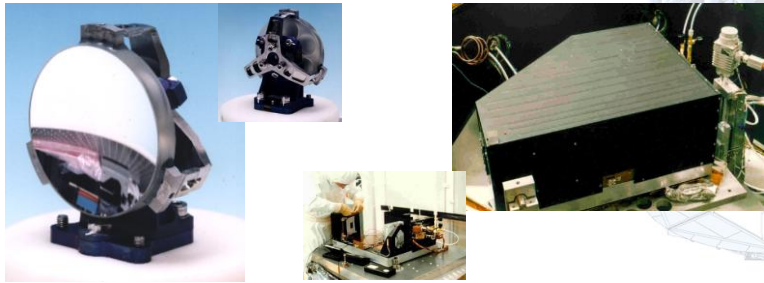
## ONBOARD EQUIPMENT

愛宕物産株式会社  
ATAGO BUSSAN Co.,Ltd.

### NOZOMI

(Toshiba and the University of Tohoku)

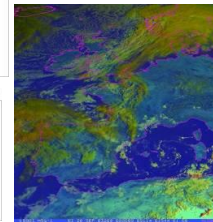
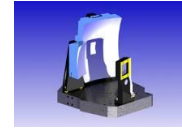
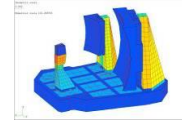
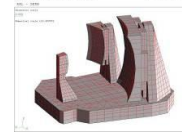
### IMAGE



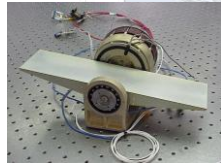
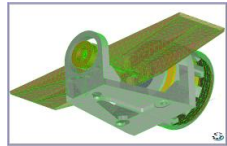
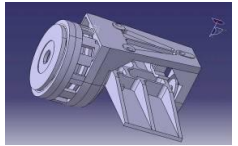
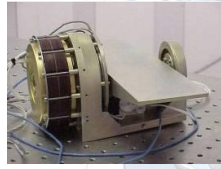
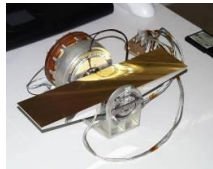
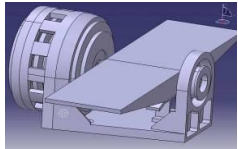
## ONBOARD EQUIPMENT



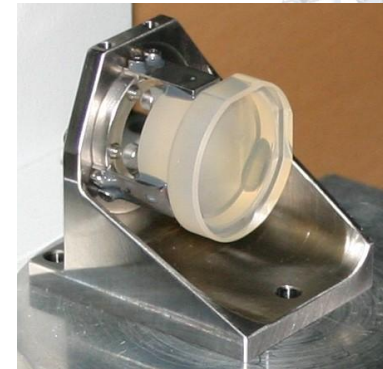
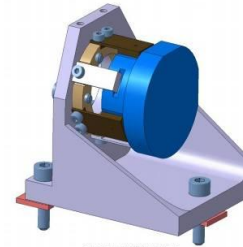
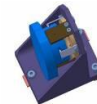
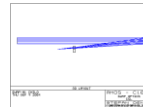
### MSG: GERB TELESCOPE EUMETSAT - RAL



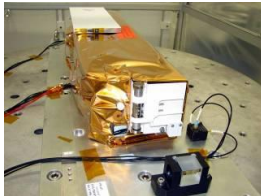
HERSCHEL: PACS



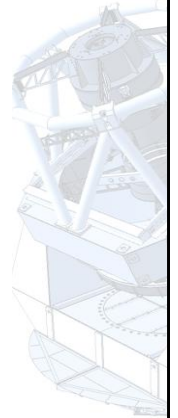
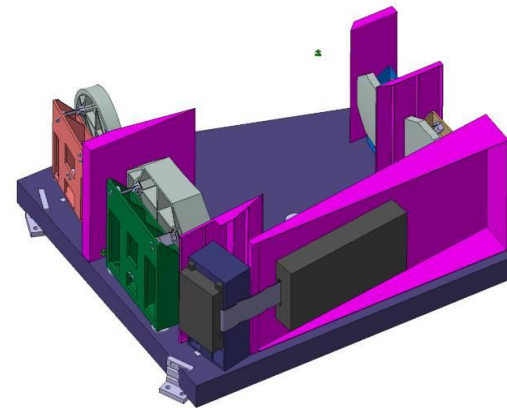
PROBA 2: SWAP Optics



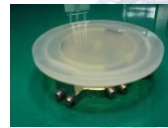
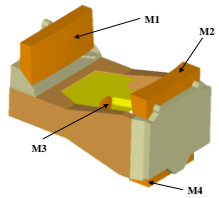
PROBA 2: SWAP Structure



R&D: 3WSA

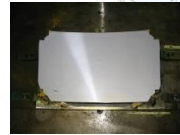
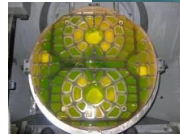
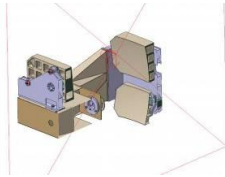


R&D: FMA (Four mirrors anastigmat)



M 1 - M 3

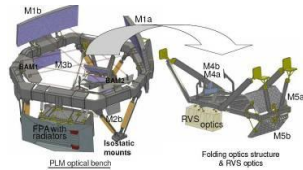
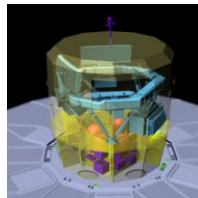
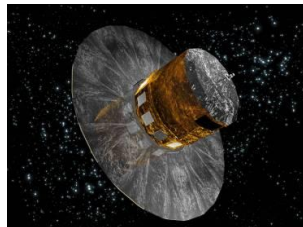
M 2 - M 4



R&D: FMA (Four mirrors anastigmat)



**GAIA: Mirrors Polishing**



**GAIA: Mirrors Polishing**

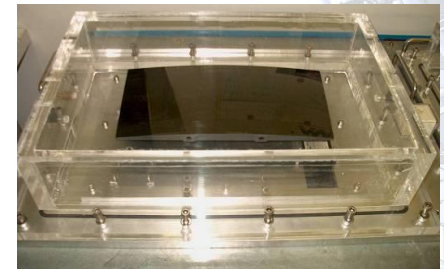
**M5: Flat: 18 nm RMS**



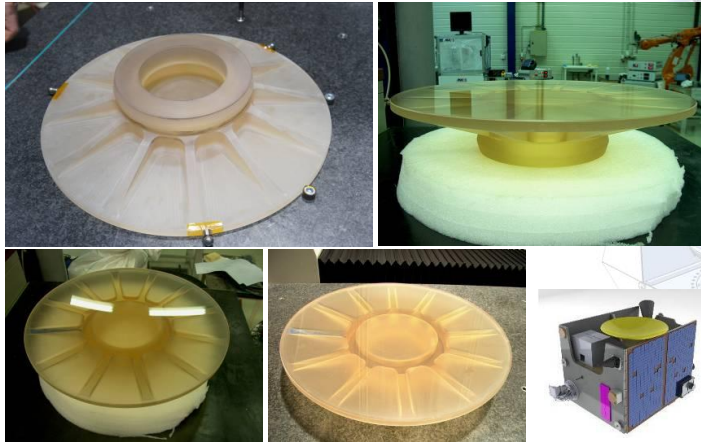
**M4: Flat: 6 nm RMS**



**M2: aspherical convex Off axis: 18 nm RMS**

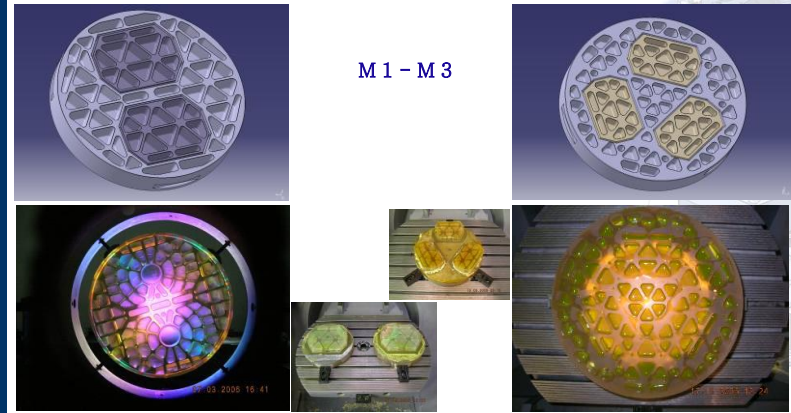


SSTL DM3 Satellite: Mirrors Manufacturing



THIS: TMA Mirrors Manufacturing

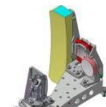
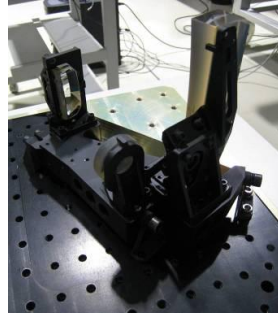
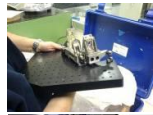
M 1 - M 3





**TMA - Spectrometer hyperspectral  
2 m resolution**

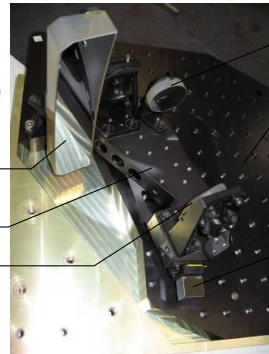
A Subsidiary of  
**Elbit**



M1 mirror

TMA bench

M2 mirror

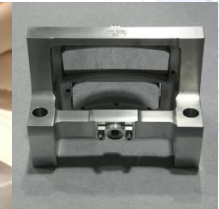
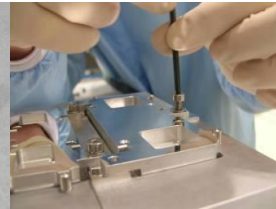
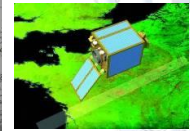
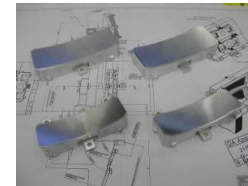
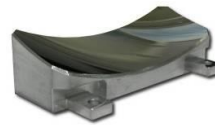


M3 mirror

NRC - plate

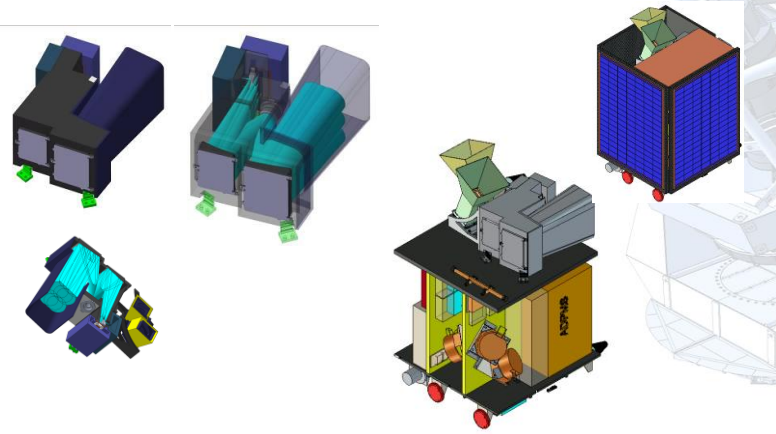
Ref. cube

**PROBA V: Telescope Manufacturing**

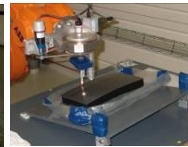
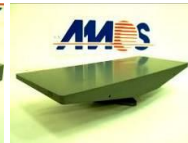
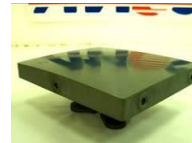




VASTsat: Telescope Manufacturing



Sentinel II: Mirrors Polishing

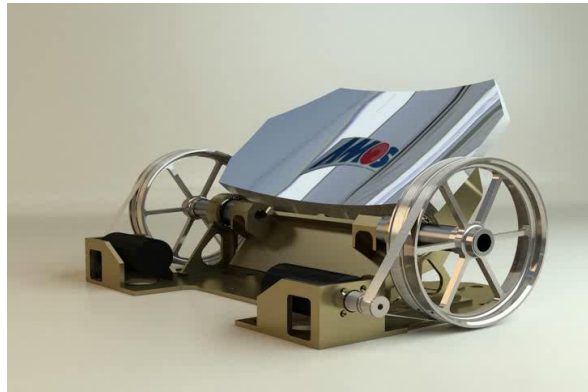




## ONBOARD EQUIPMENT



### SOCRI: MECALIB



## TELESCOPE COMPONENTS



### ISSA

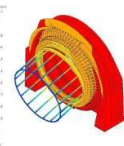
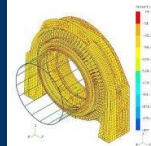


### First Steps Activity

#### Seeing Monitor



### VLT Fork



VLT:Adapter-Rotator



## TELESCOPE COMPONENTS



### VLTi: ASSIST AM1 – Mirror & Cell Manufacturing



## Telescopes

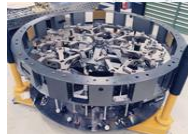
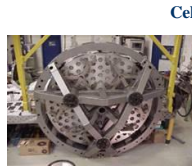
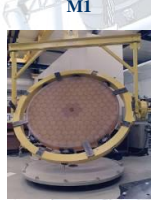
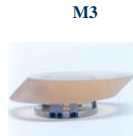
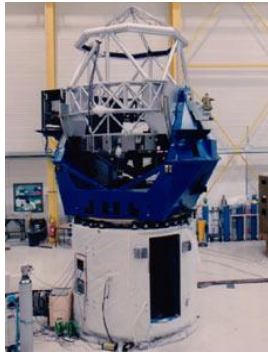


### VLTi: CERRO PARANAL

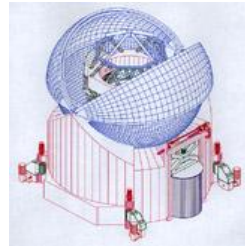


Aerial View of Paranal Observing Platform with VLTi Eight Pairs  
© 2011 ESO. All rights reserved.

VLTi: ATS (Auxiliary Telescope System)



VLTi: ATS - Transporter

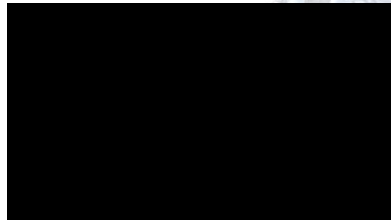




## Telescopes



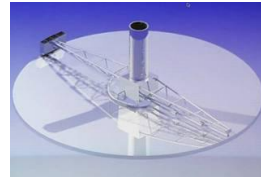
VLTi: ATS on Site CERRO PARANAL



## TELESCOPE EQUIPMENT



VLT: M1 WASHING UNIT



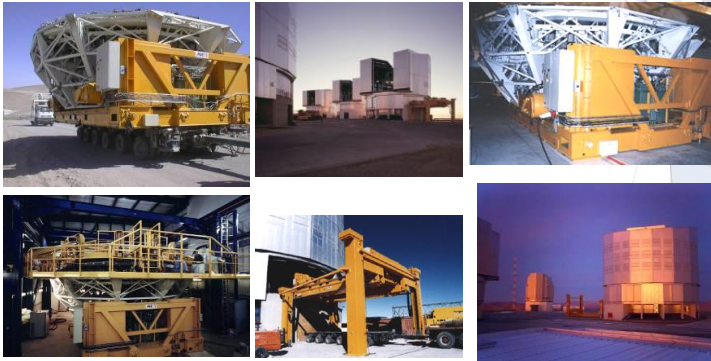




## TELESCOPE EQUIPMENT



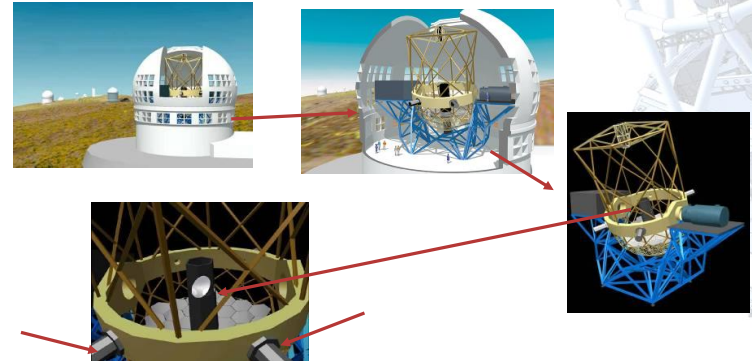
### VLT: M1 Lifting Platform & Carriage



## Telescopes



### GTC: Gran Telescopio Canarias

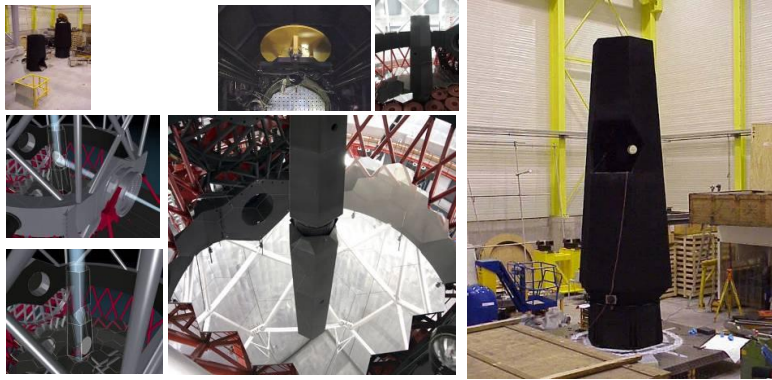




## Telescopes



### GTC: Gran Telescopio Canarias - M3 Tower



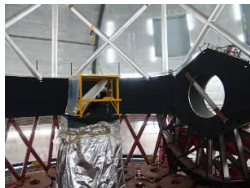
## Telescopes



### GTC: Gran Telescopio Canarias - A&G Cores

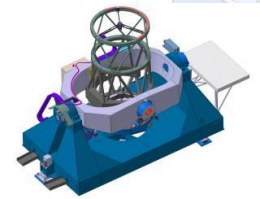
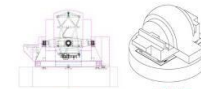
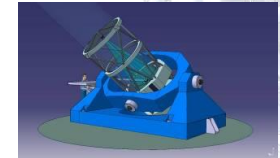


## GTC: Gran Telescopio Canarias - M3 Unit

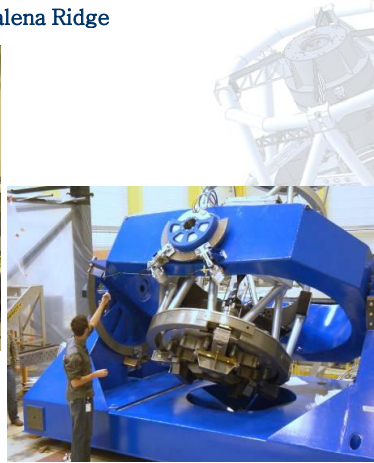


## MROi: Magdalena Ridge Observatory

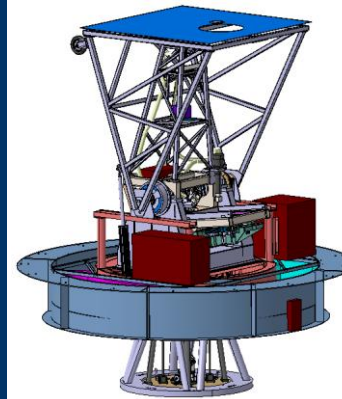
### 1,4 m telescope



MROi: Magdalena Ridge Observatory



MAST: Multi Application Solar Telescope : 0,50 m Udaipur Solar Observatory





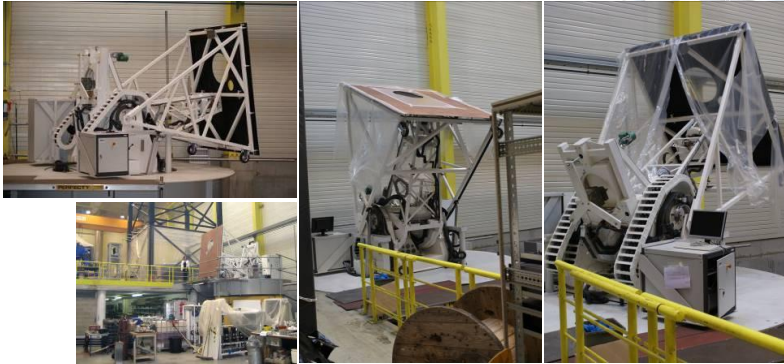


## Telescopes



Physical Research Laboratory  
भौतिक अनुसंधान प्रयोगशाला

MAST: Multi Application Solar Telescope : 0,50 m Udaipur Solar Observatory

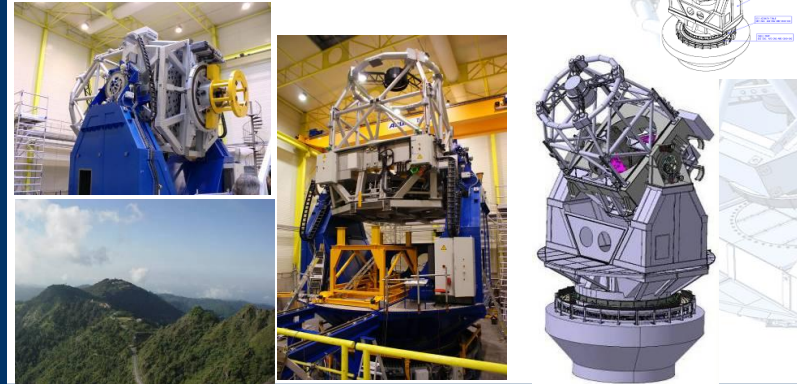


## Telescopes



Aryabhata Research Institute of Observational Sciences (ARIES)  
(An autonomous research institute under the Department of Science and Technology, Govt. of India)

Devasthal Optical Telescope 3,60 m (DOT 3.6)

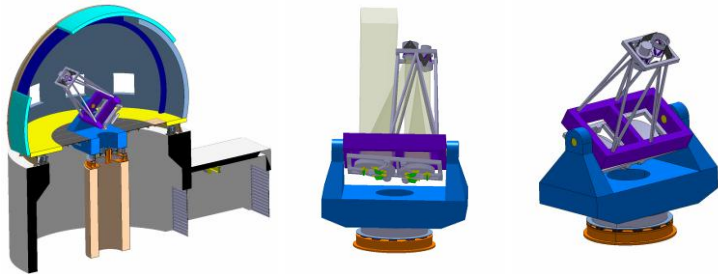




## Telescopes



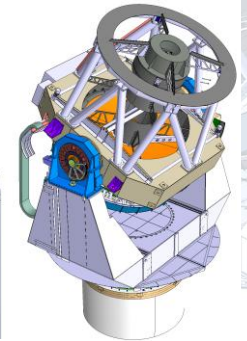
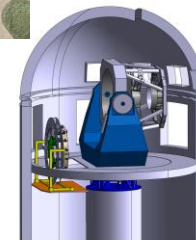
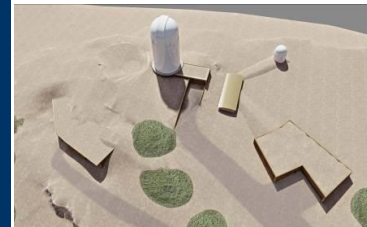
IAA: WideField 2,50 m telescope



## Telescopes

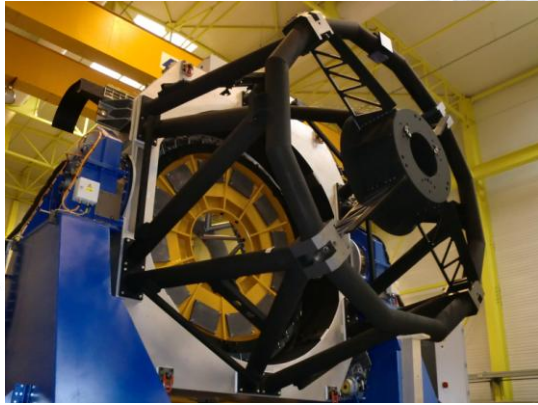
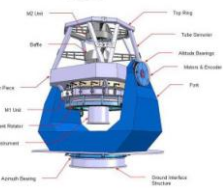


OAJ: Javalambre Observatory telescope





OAJ: Javalambre Observatory telescope T250



OAJ: Javalambre Observatory telescope – T80

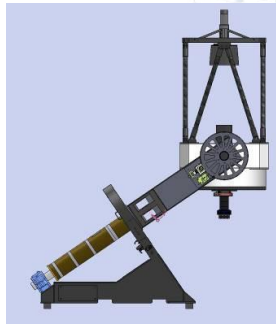
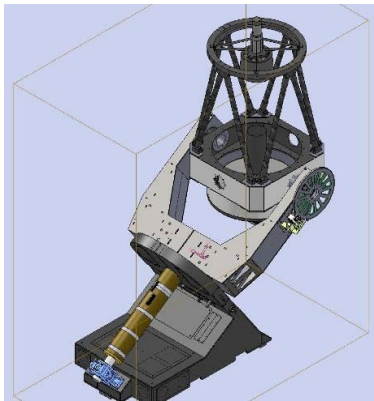




TELESCOPES



Fundação de Amparo à Pesquisa do Estado de São Paulo – T80

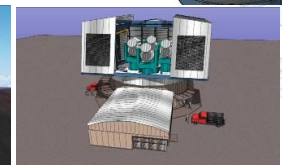
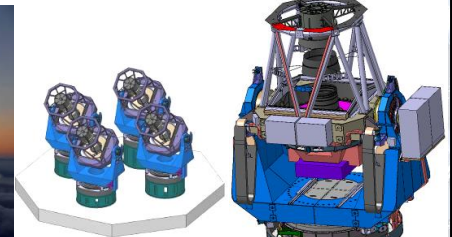


TELESCOPES



University of Hawaii - Pan-STARRS

Panoramic Survey Telescope And Rapid Response System – T1.8

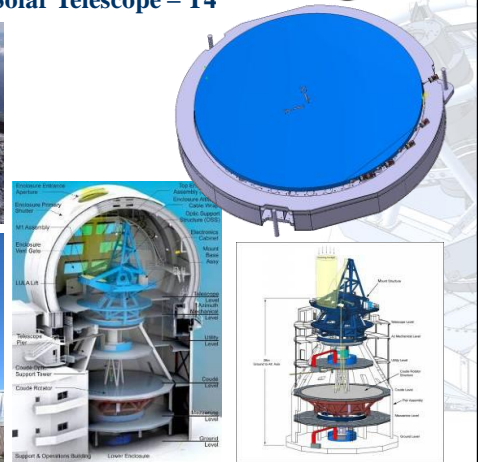




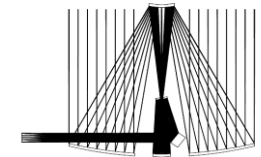
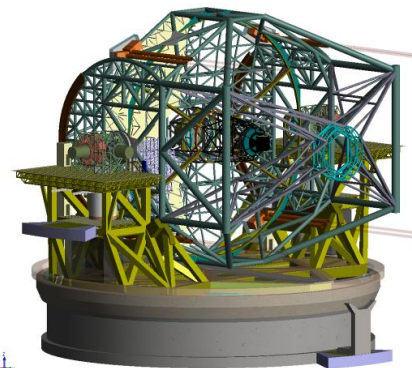
## TELESCOPES



### The Advanced Technology Solar Telescope – T4



## E-ELT Program



- M1 : Segmented 42 m
- M2 : Active mirror 6m
- M3 : Active mirror 4m
- M4 : Adaptive mirror 2.6 m
- M5 : Tip-tilt 3 m

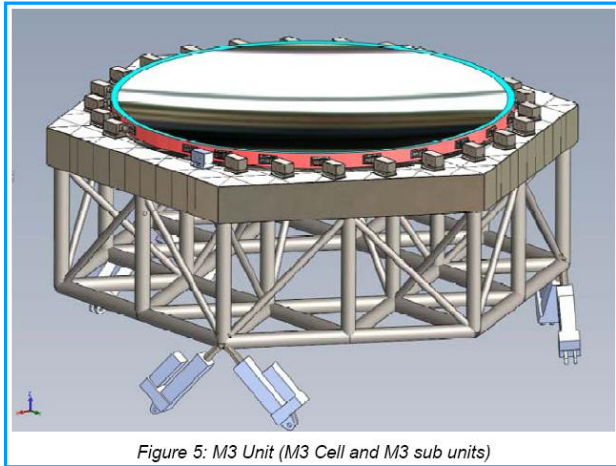
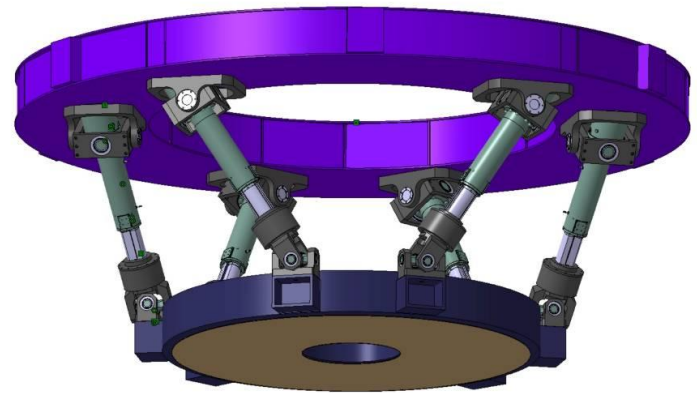


Figure 5: M3 Unit (M3 Cell and M3 sub units)





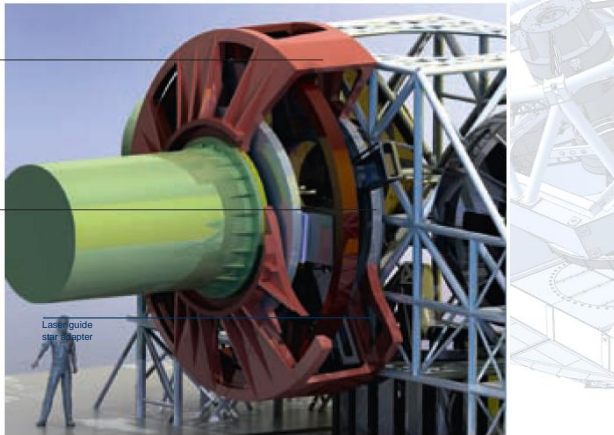
### E-ELT Program – Pre Focal Station



Adapter/Rotator

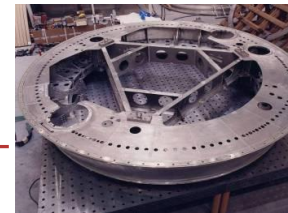
Natural guide  
star adapter

Laser guide  
star adapter



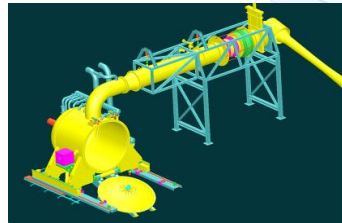
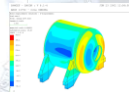
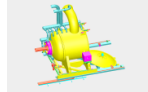
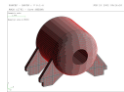
### MAIV – Cones

THALES





## Test bench for VINCI (ARIANEV)







## MAIV – Vacuum Chambers



## MAIV – Vacuum Chambers



### Cuve Magnesium



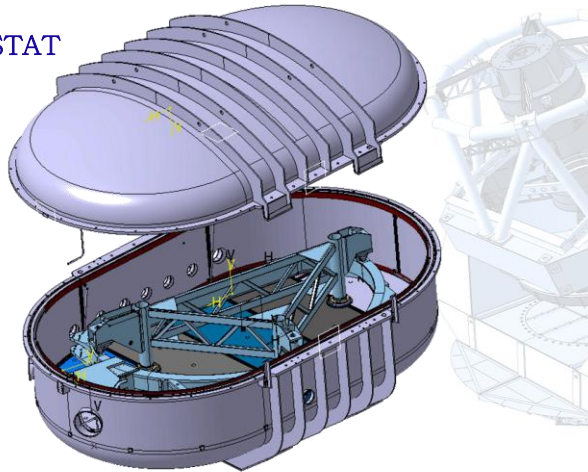


## MAIV – Vacuum Chambers

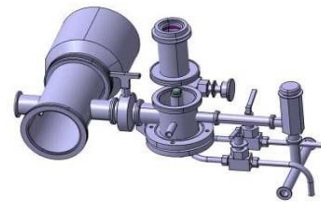


CRYOSTAT

L=11m  
l=7.5m  
h=5m  
71T



## MAIV – Vacuum Chambers



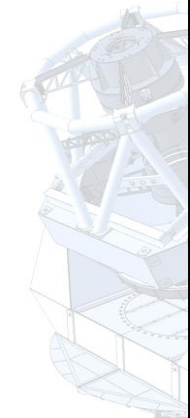
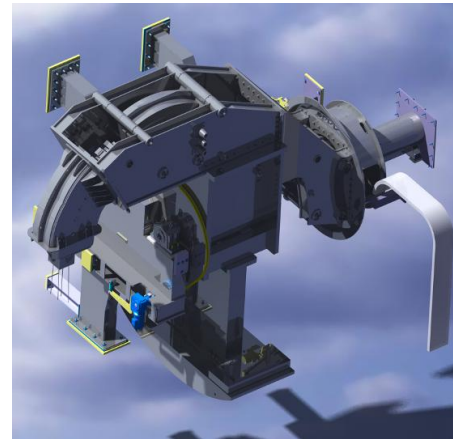


### MAIV – Vacuum Chambers

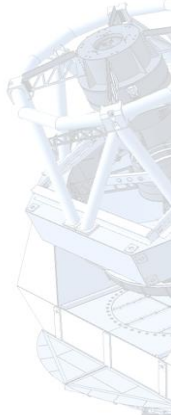
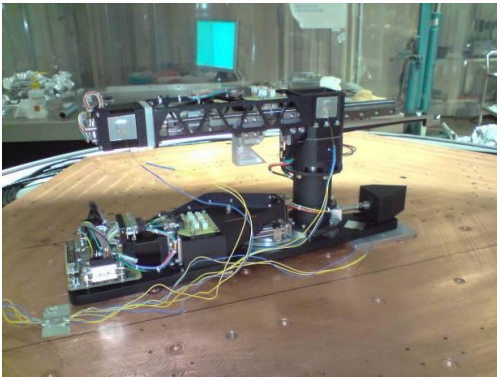


### MAIV – R&D

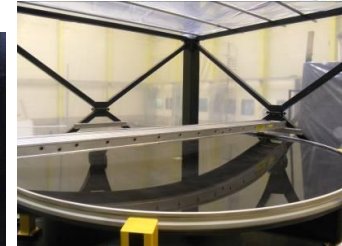
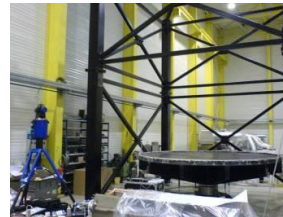
#### GANTRY



KMOS Pick Off Arms



Liquid Mirror Telescopes

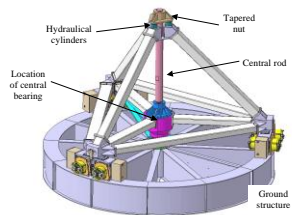




## R & D – Friction Drives



(Bogies)



## SPACE INDUSTRY

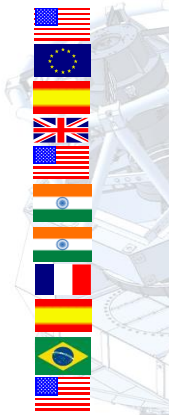
- SSTL
- Thales Alcatel Alénia Space
- ESA
- ASTRIUM – EADS
- Atago Bussan
- Centre Spatial de Liège
- ISRO
- Rutherford Appleton Laboratory (RAL)
- SAFRAN
- SATRECI
- ELOP
- Sener (Espagne)





## Astronomy

- > AURA - Gemini
- > ESO - VLTi
- > GHESA - GTC
- > UK ATC - VISTA
- > New Mexico Tech - MROi
- > ARIES - Derasthal 3,6 m Telescope
- > PRL - Udaipur Solar Telescope
- > CILAS - M4 Unit ELT
- > CEFCA - OAJ
- > FAPESP - T80
- > Hawaii University - Pan-STARR
- > NSO/AURA - ATST



## Other Industries

- > ARCEO
- > THALES
- > ARCELORMITTAL
- > CEA
- > CRM
- > AGC Flat Glass (GLAVERBEL)

