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OTTICA  
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# Ottica, Metrologia e Termomeccanica in OAB: Progetti ed Expertise

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INAF – Osservatorio Astronomico d'Abruzzo (OAB)

Forum della Ricerca Sperimentale e Tecnologica in INAF | Bologna, 22-24 Giugno 2022

# OVERVIEW

## (AO) PROJECTS

- ERIS
- MORFEO (ex MAORY)



## EXPERTISE

- Optics
- Mechanics
- Thermal

# PROJECTS – Eris



- ESO project
- Telescope: VLT UT4
- Phase: Commissioning

## Subsystem: Calibration Unit

- Mechanical design
- Machining
- Assembly
- Alignment
- Test
- Integration



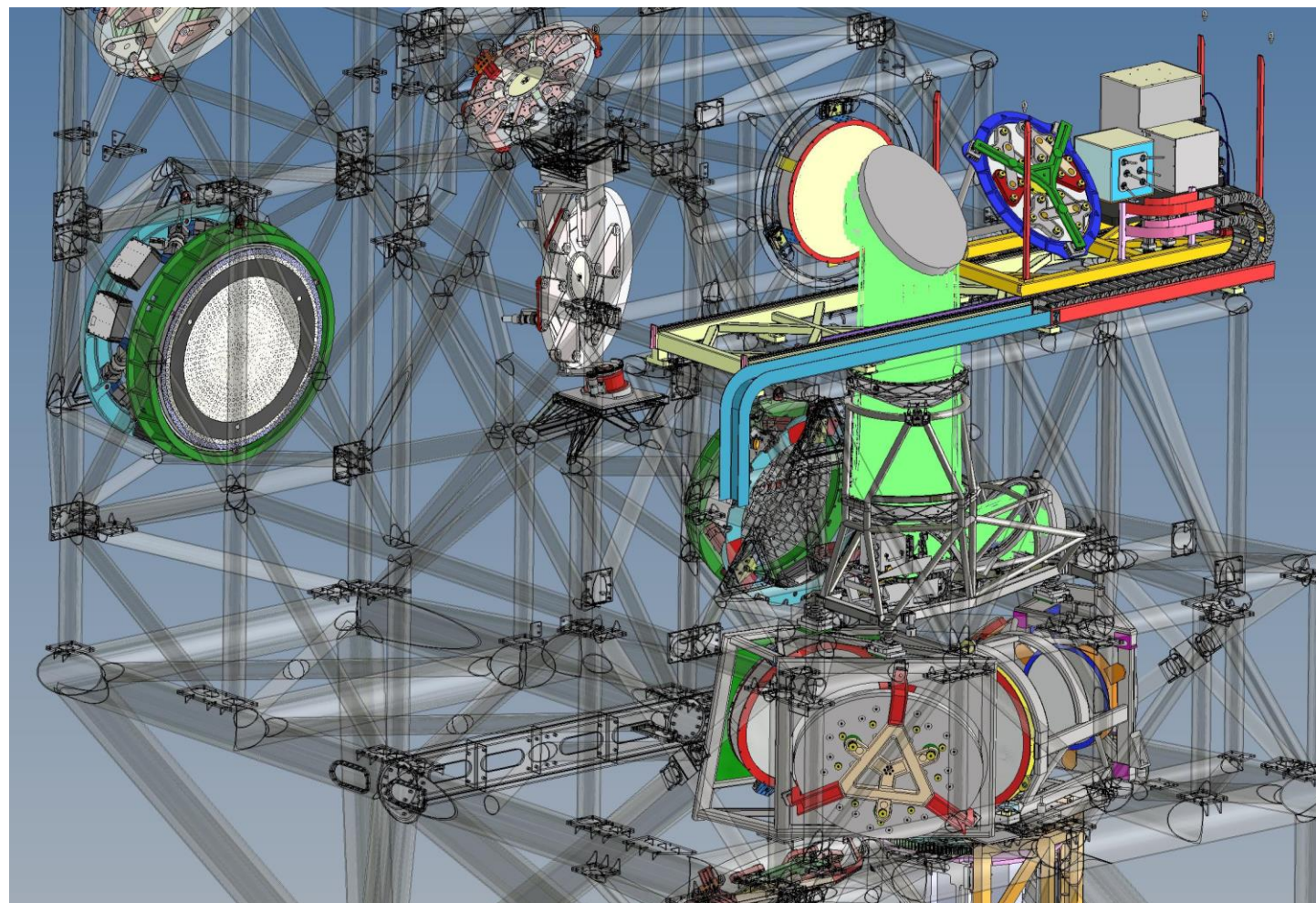
# PROJECTS – Morfeo (ex Maory)



- ❑ ESO project
- ❑ Telescope: ELT
- ❑ End of Phase B (PDR)

## Subsystem: Calibration Unit

- Optical design
- Mechanical design
- Machining
- Assembly
- Alignment
- Test
- Integration

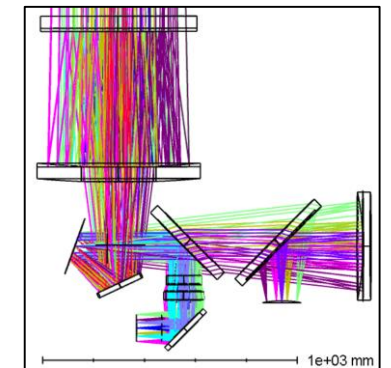
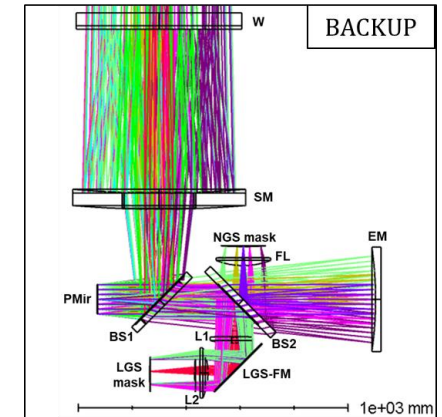
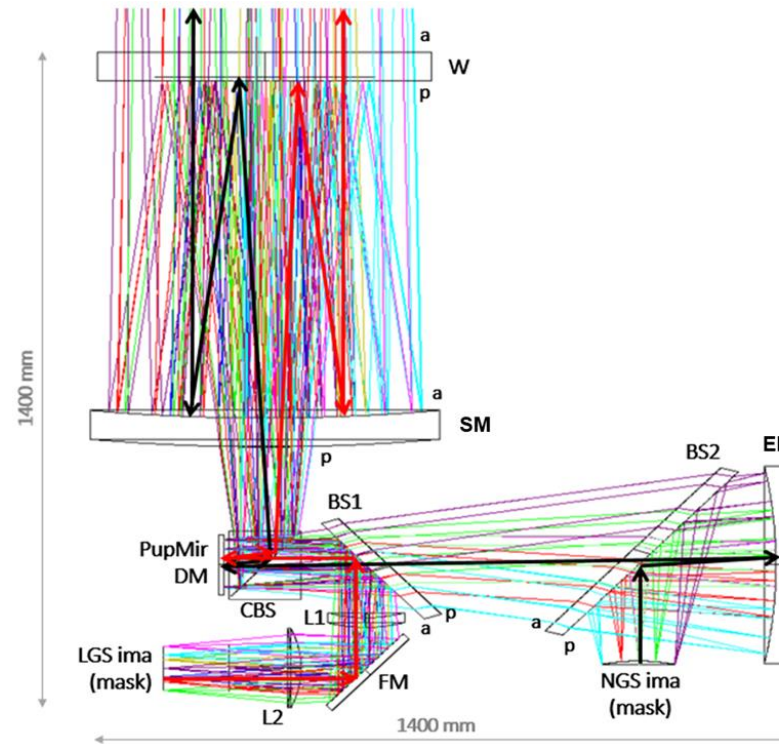


# EXPERTISE – Optics

## Optical design

OpticStudio™

- Design from scratch
- Development from a concept
- Prototyping

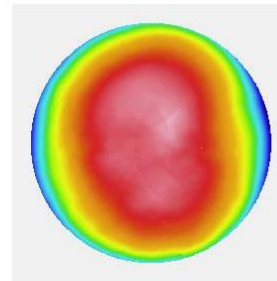


# EXPERTISE – Optics

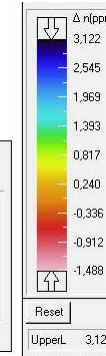
## Optical analyses

### ➤ Optical simulations

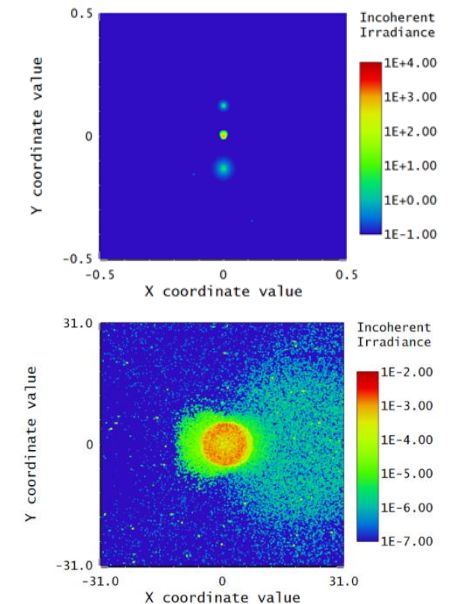
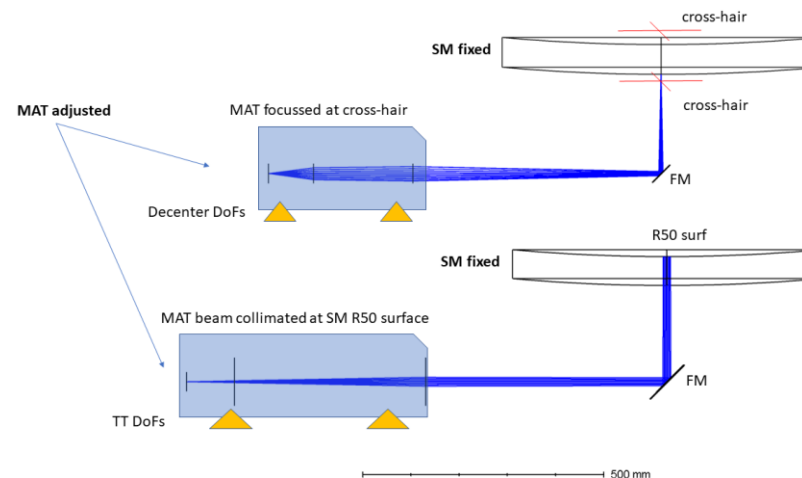
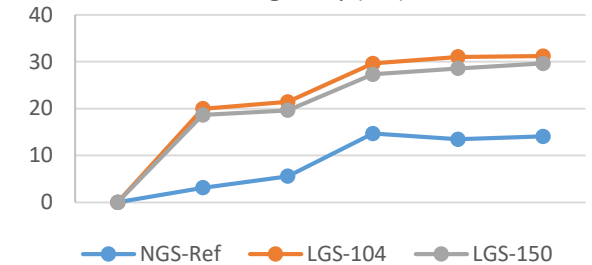
- Optical quality
- Tolerance analyses
- Ghosts/Straylight analyses
- Glass in-homogeneities
- Alignment strategies
- ...



R=270mm / P=380425 / Inv. P. = 0.00 %	
<input type="checkbox"/> All Zer. <input type="checkbox"/> Rotation	
Offset	<input checked="" type="checkbox"/> C0 = 1.3402
Tilt	<input checked="" type="checkbox"/> C1 = 2.3063 <input checked="" type="checkbox"/> C2 = 0.4693
Focus	<input type="checkbox"/> C3 = 1.5062
Astigm.	<input type="checkbox"/> C4 = 0.6977 <input type="checkbox"/> C5 = 0.1392
Coma	<input type="checkbox"/> C6 = -0.0205 <input type="checkbox"/> C7 = 0.1179
SA3	<input type="checkbox"/> C8 = 0.4220
<input type="checkbox"/> More Terms subtracted	



Incremental WFE (rms) due to glass homogeneity (nm)

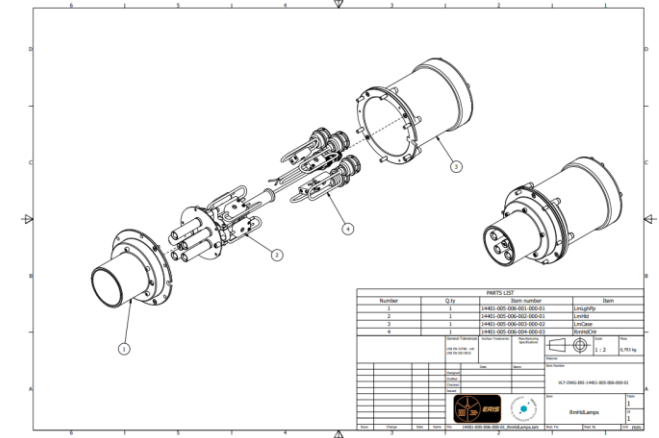
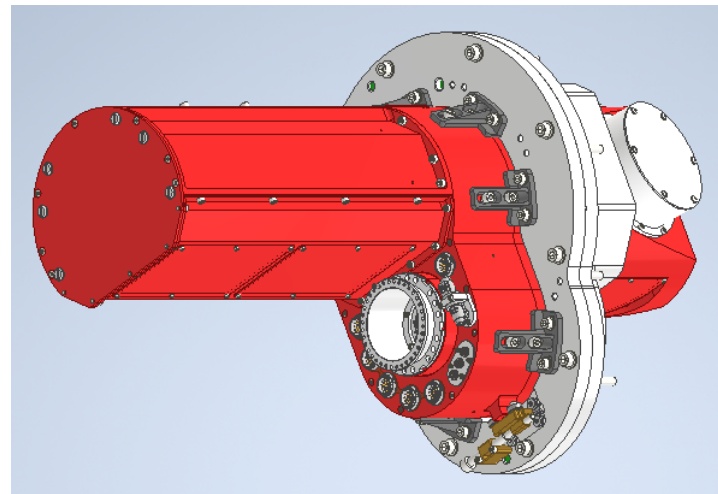
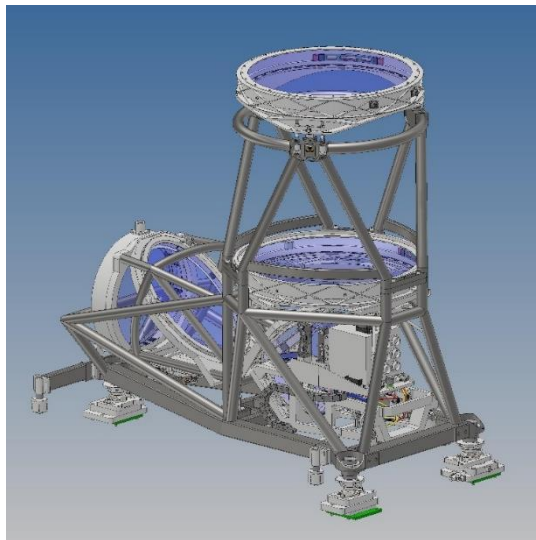
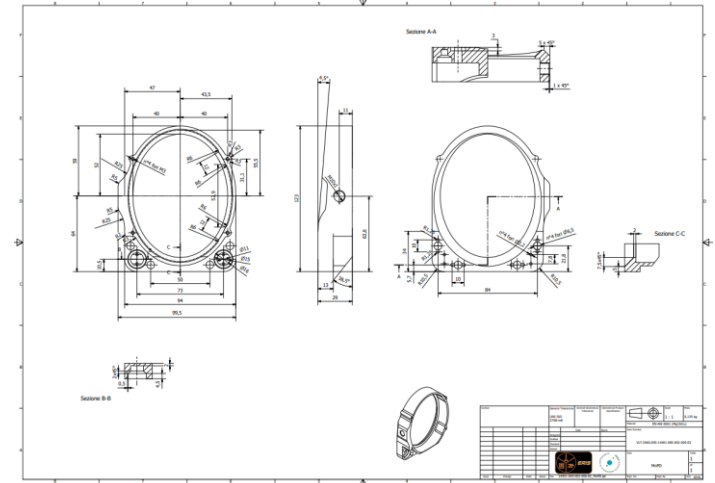
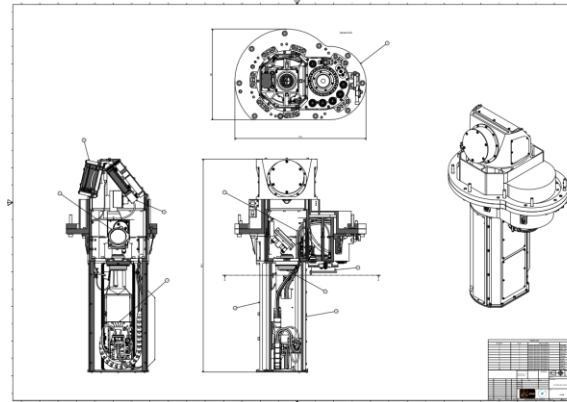


# EXPERTISE – Mechanics

## Mechanical design



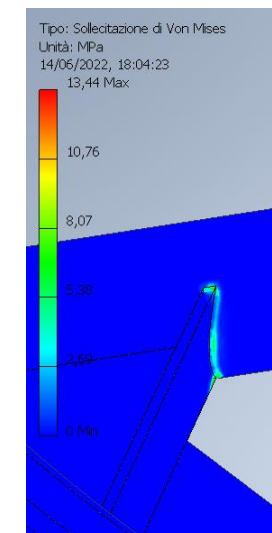
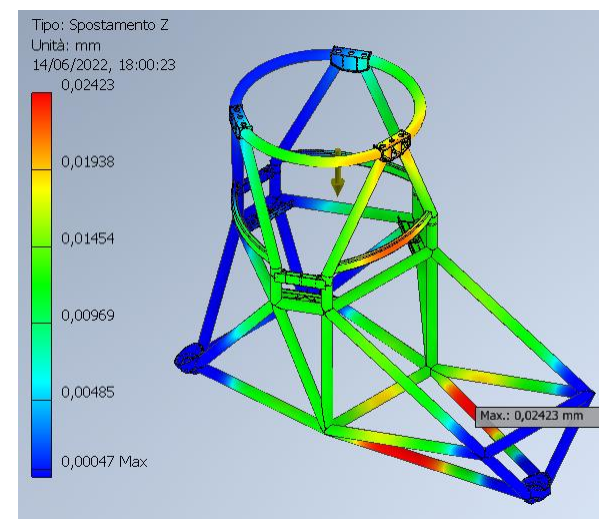
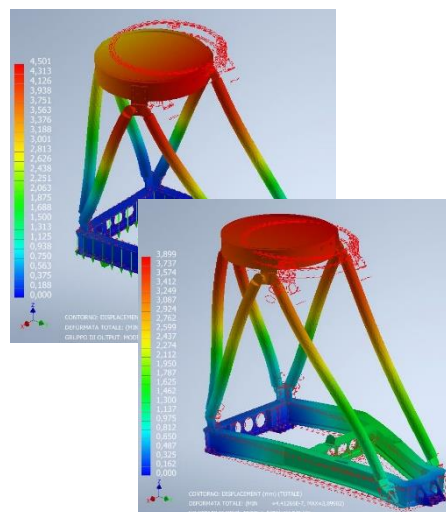
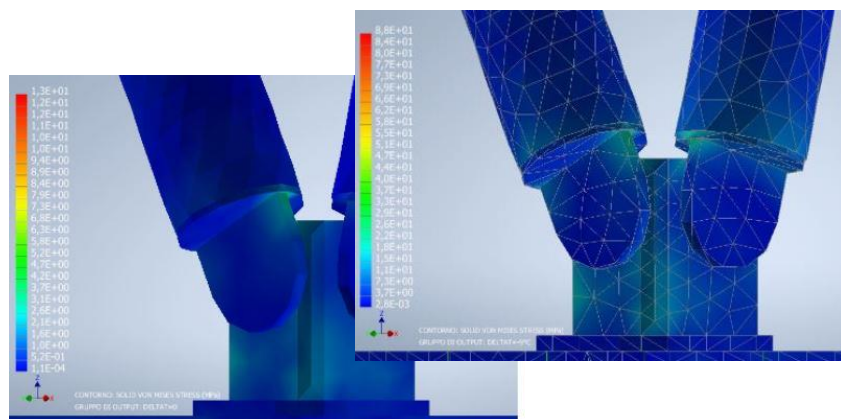
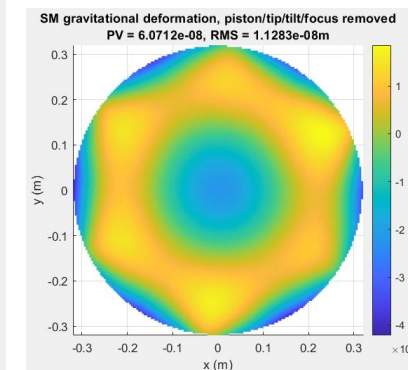
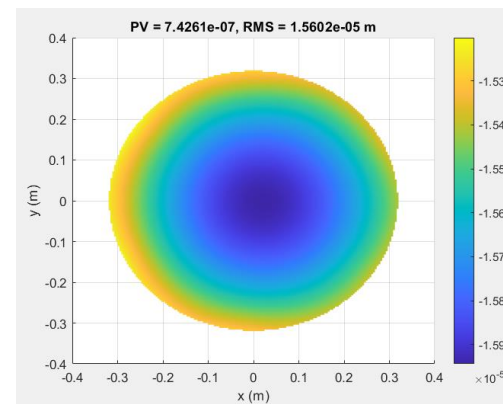
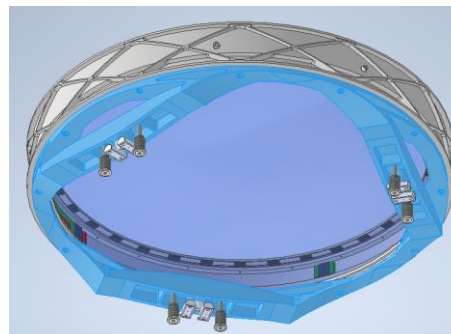
- CAD modelling
  - 3d design
  - 2d drawings



# EXPERTISE – Mechanics

## Mechanical analyses

- FEA
  - Static structural
  - Earthquake
  - Thermo-elastic
  - Modal

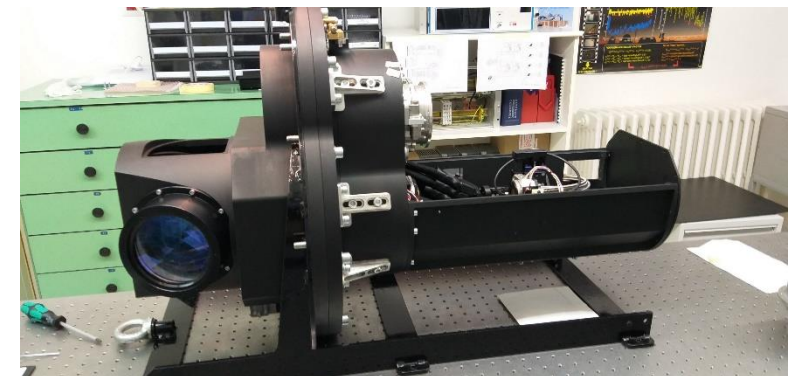
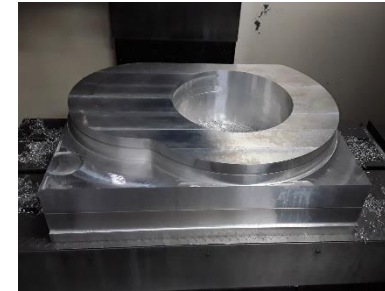




# EXPERTISE – Mechanics

## Mechanical parts machining and assembly

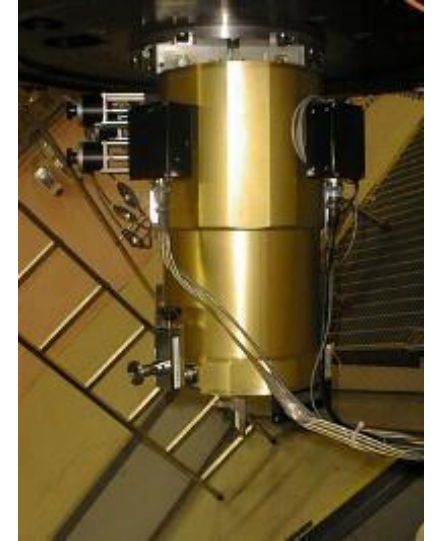
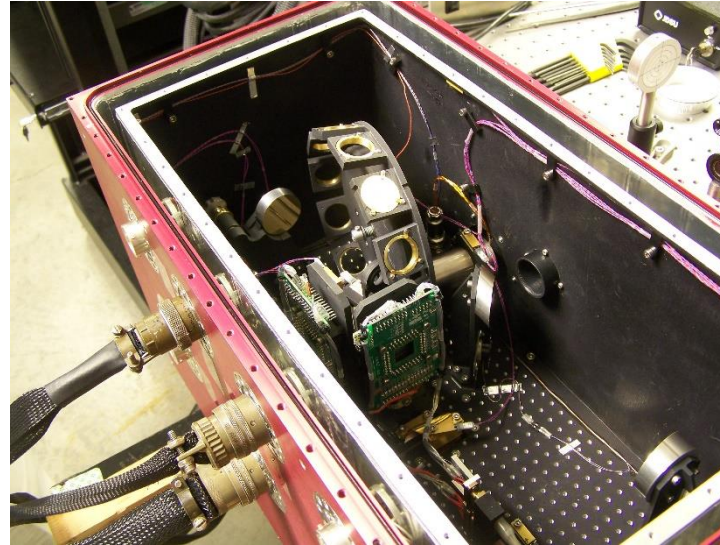
- Workshop facility
- CAD/CAM for CNC



# EXPERTISE – Thermal design & environment management

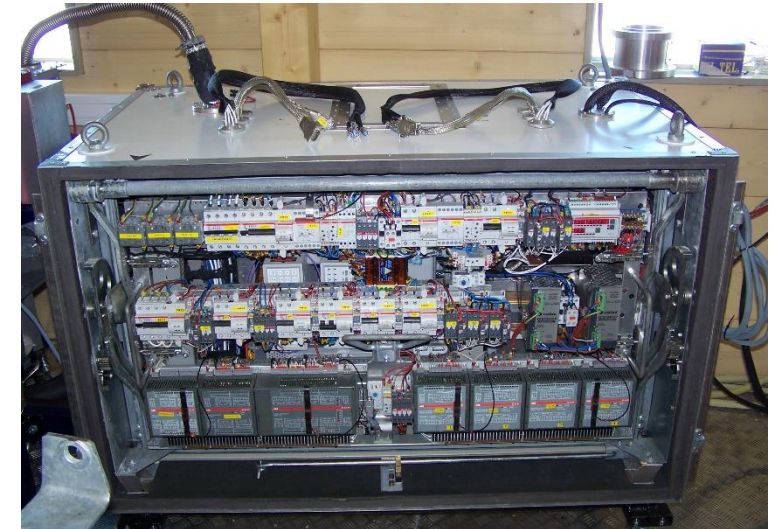
## Cryostats for NIR/MIR operations

- Design & analysis
- Characterization & Optimization
- Operation & Maintenance



## Environment simulation & harsh conditions management

- Climatic chamber design and construction
- Instrument operation in extreme environmental conditions





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**GRAZIE**

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