



Image Quality Analysis for Active Optics

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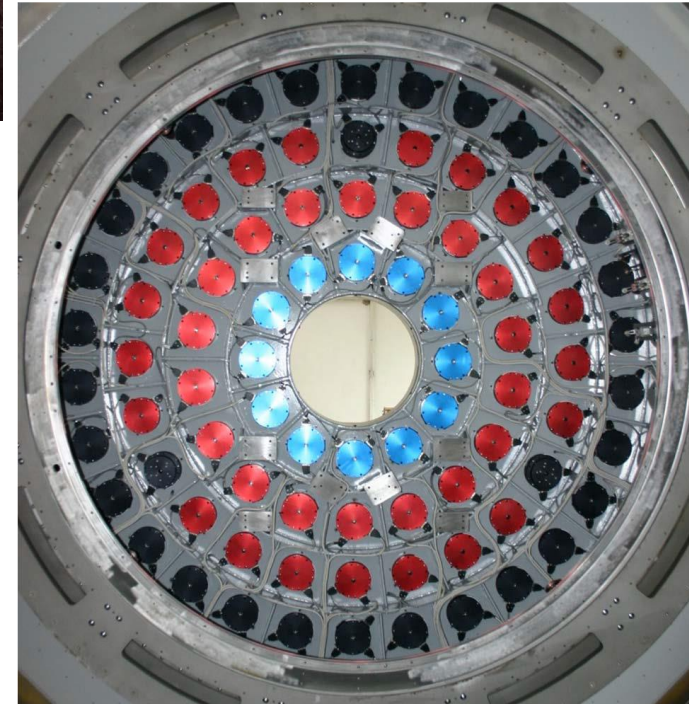
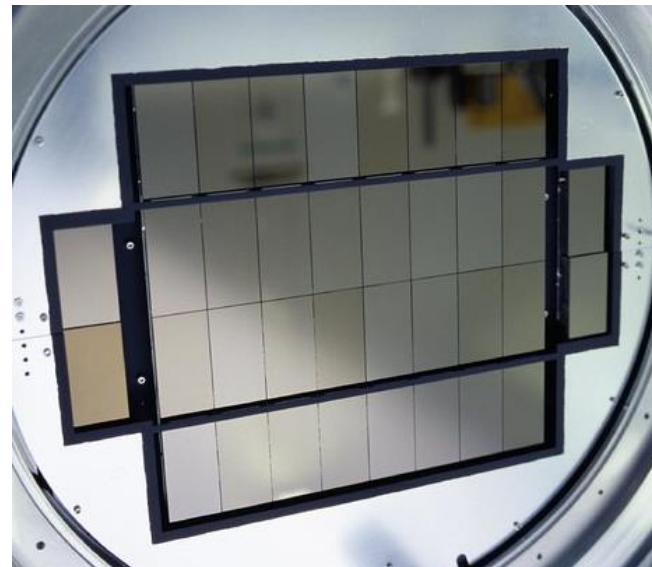
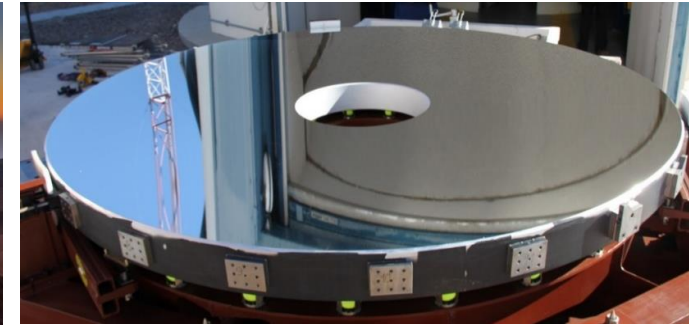
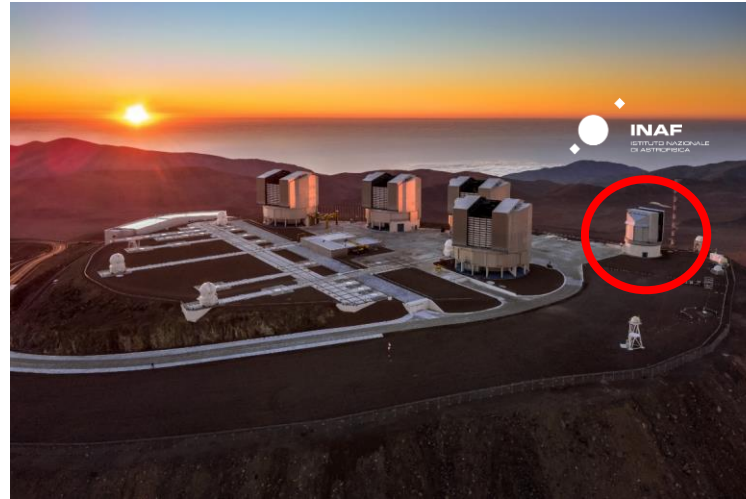
2022 June 22

VST Active Optics

- ❑ 2.6m, 1° FoV
- ❑ 2-mirrors Ritchey-Chrétien

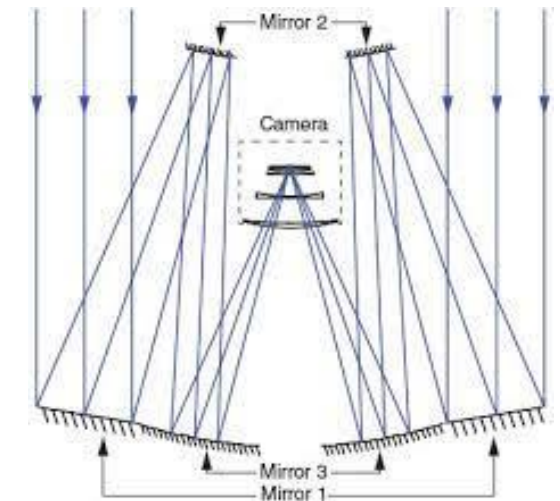
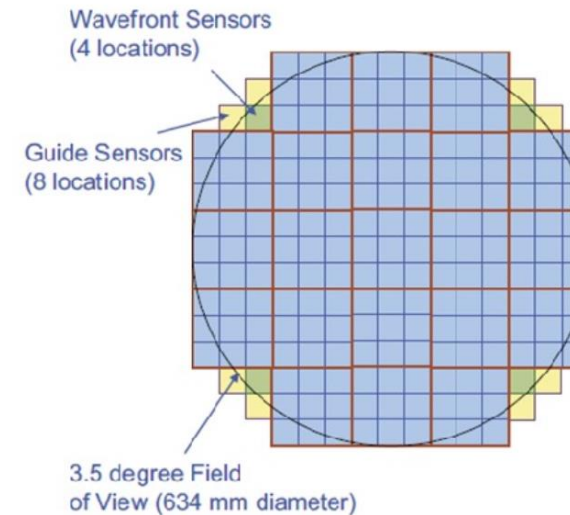
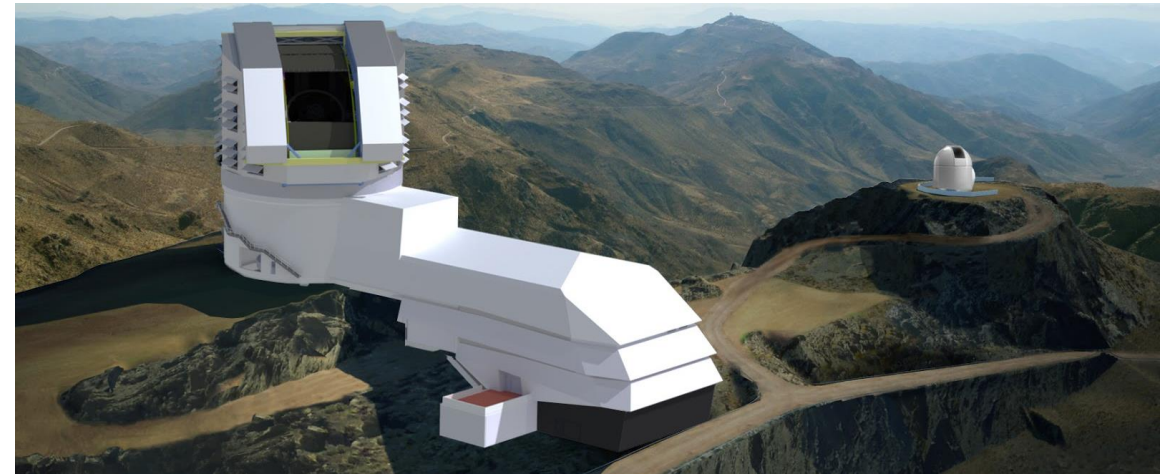
- ❑ DOF
 - Active M1 shape control (81 active axial support + 3 axial fixed points)
 - Active M2 hexapod positioning

- ❑ Curvature wavefront sensors with intra-focal and extra-focal CCDs at the sides of the field.



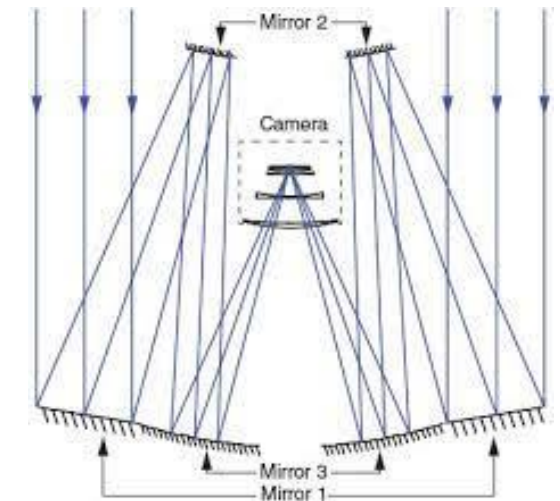
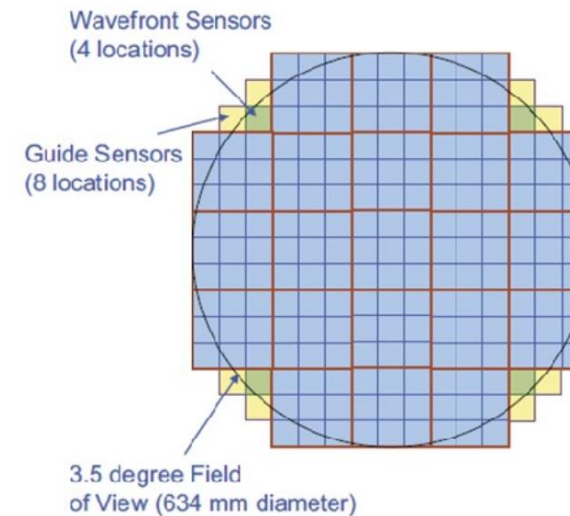
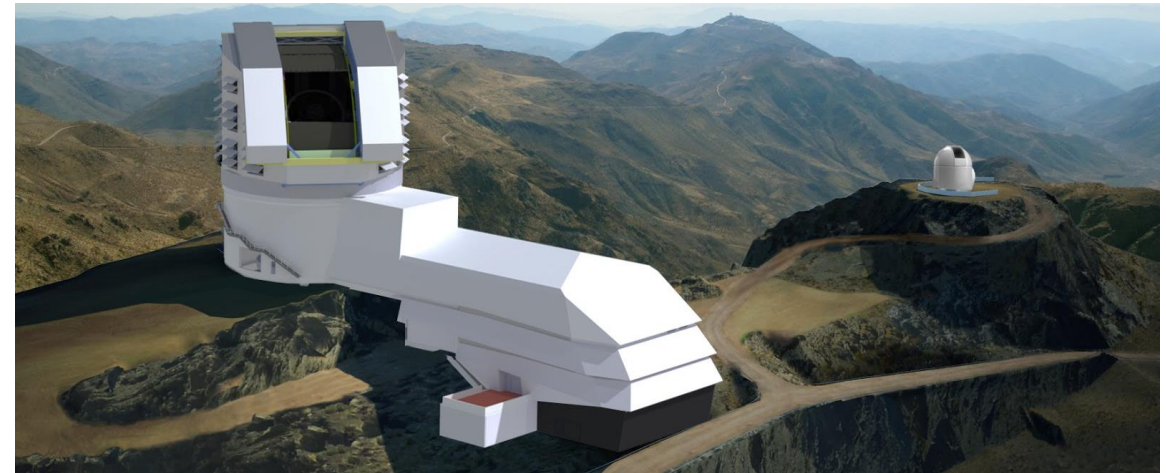
Active Optics without Wavefront Sensor at VRO

- INAF VRO in-kind contribution S22: Image Quality Analysis in Commissioning and Operations led by Giuliana Fiorentino (INAF Roma).
 - Study of a novel approach to assess aberrations from science image, by comparing the stars ellipticity to an analytical optical model.
- ❑ Optical configuration
 - 8.4m
 - 3.5° FoV
 - 3-mirrors Paul-Baker
 - ❑ DOF
 - Active M1M3 shape control (156 actuators)
 - Active M2 shape control (72 axial actuators + 6 lateral)
 - Active M2 hexapod
 - Active Camera Assembly hexapod
 - ❑ Curvature wavefront sensors with intra-focal and extra-focal CCDs at 4 corners of the field.



Active Optics without Wavefront Sensor at VRO

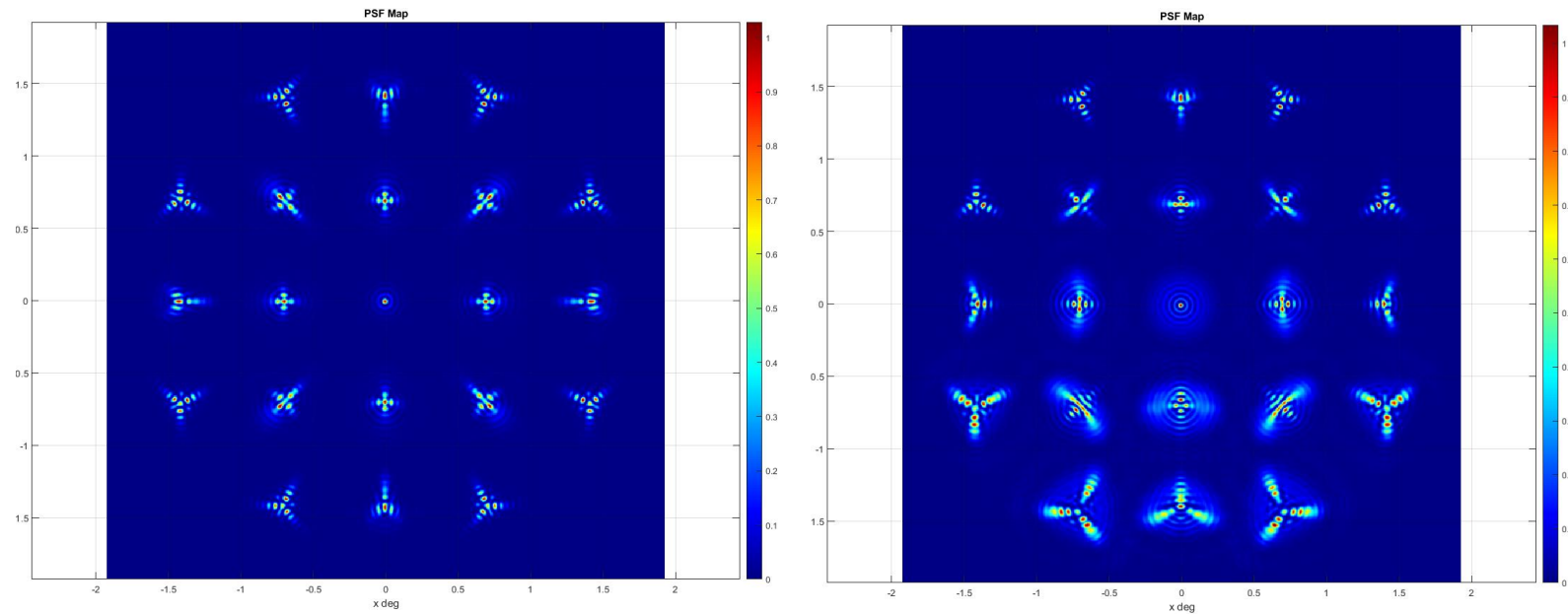
- Integrated Modelling
 - Zemax analysis.
 - PSF computation of aberrated optical system.
- Numerical modelling and HPC
- Image processing
- Numerical and on sky calibration during Telescope commissioning



Active Optics without Wavefront Sensor at VRO

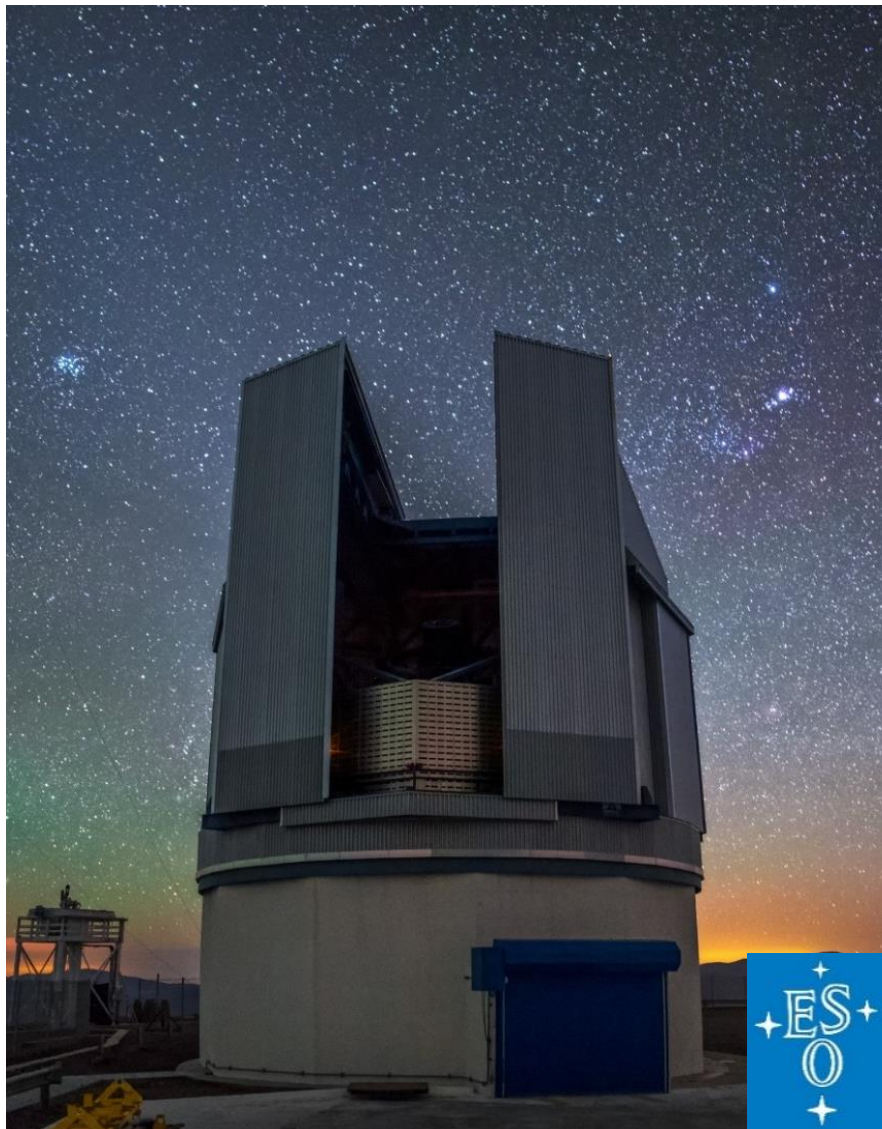
- Very large FoV leading to strong field dependence.
- High number of DOF.
- Tight alignment tolerances.
- Inverse problem.
- Computational time.

PSF Map of VRO Field:



Nominal

Aberrated



GRAZIE DELL'ATTENZIONE