CANARDO:

an on-sky experiment to validate MICADO SCAO design

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The MICADO instrument

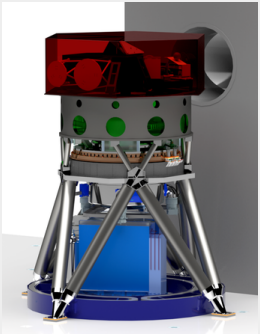
Multi-AO Imaging Camera for Deep Observations,
Germany-Netherlands-France-Austria consortium (lead: MPE)

Basic features

- First light imager
- Observing modes: imaging, astrometry, spectroscopy and high contrast imaging
- Diffraction limited in the near-IR thanks to SCAO and MCAO corrections

AO setup

- LGS+NGS MCAO system developed within MAORY consortium
- SCAO system developed within MICADO consortium
- Until MCAO is ready, MICADO will work with SCAO only with a dedicated optical relay
- When MAORY is in place later on, both SCAO and MCAO will be available



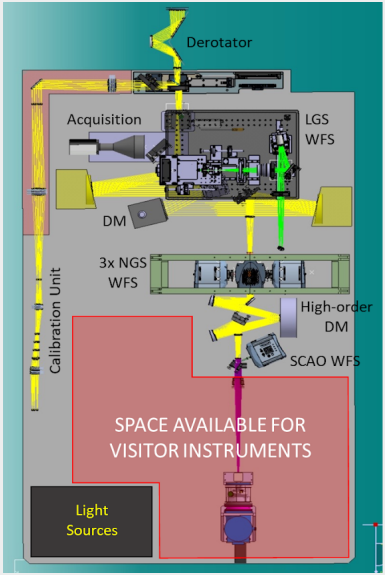
Credits: MICADO Consortium

CANARY facility at the 4.2 m William Herschel Telescope

CANARY bench

- Developed by Durham University and LESIA as an on-sky MOAO demonstrator and used to demonstrated various AO configurations (eg, two stage ELT like, off-axis LGS WFSing)
- Possibility to modify/add parts in this setup
- Very well known in the AO team at LESIA

→ allow to limit the development effort



The CANARDO experiment

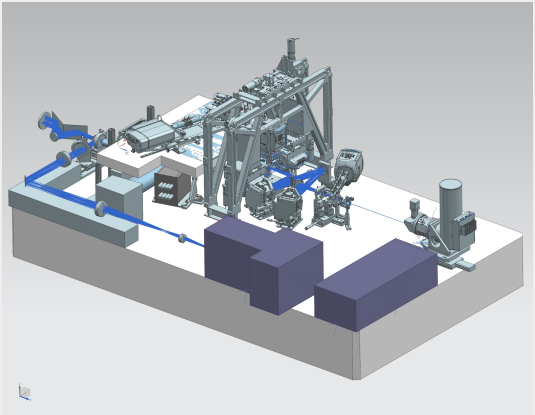
Goals

- Pyramid calibration test and on-sky validation
- test PWFS-AO control algorithms (optical gain, NCPA)
- RTC "stress test"

→ CANARDO design at ELT scale, test performed under real turbulence conditions

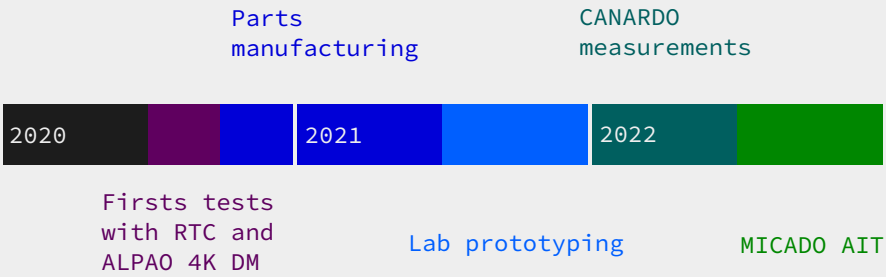
Implementation

- Replace DM with ALPAO 4K DM (3228 actuators)
- Add MICADO WFS core including the MICADO SCAO pyramid component (96×96 subaps)
- Interface the MICADO RTC prototype



Development plan

Driven by the MICADO planning.

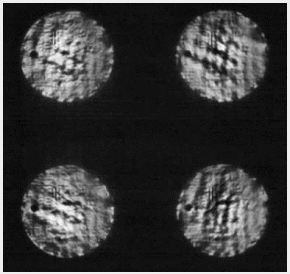


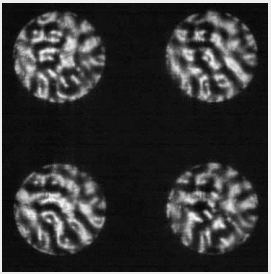
Additional experiment

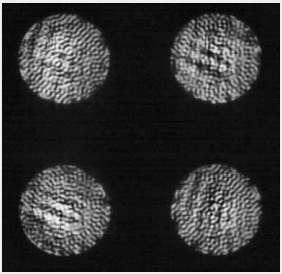
contemplated with the WOLF project (French ANR-funded project to develop and test high performance WFS) : on-going discussions to optimize the effort to lead the two on-sky test campaigns

On-going work

Working with ALPAO 4K DM







RTC integration

- DM control and calibrations and WFS image processing & calibration
- real-time acquisition sequence validation (latency, jitter measurements...)