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# ***The Instrumentation Control Group of Inaf-OATs: a brief overview of experiences and activities***

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- **Paolo Di Marcantonio**, staff since 1998



- **Roberto Cirami**, staff since 2001



- **Giorgio Calderone**, staff since 2020



- **Igor Coretti**, staff since 2000



- **Veronica Baldini**, staff since 2020 (at INAF-IRA)



- **Valentina Alberti**, SCRUM master - SAFe SKA sw team



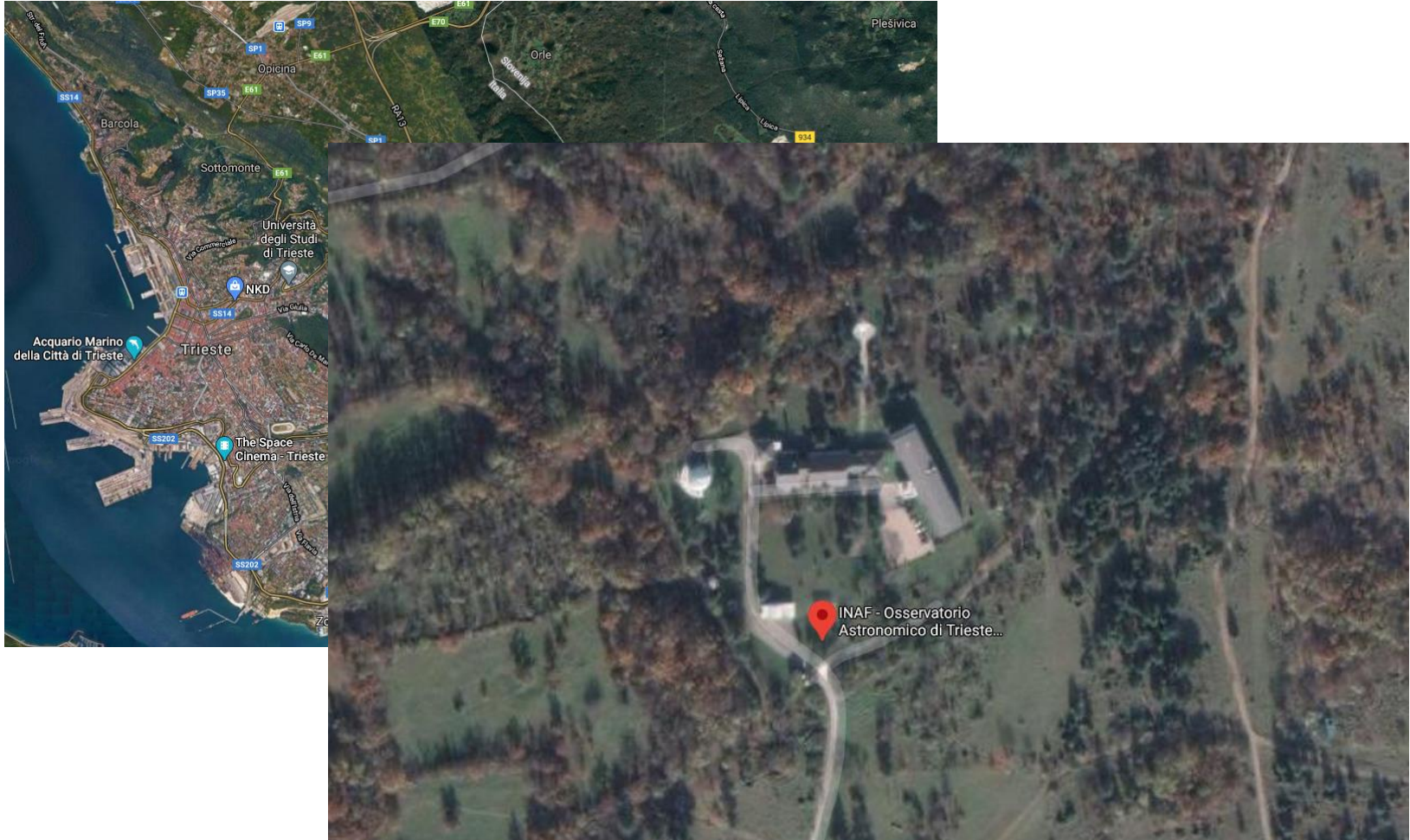
- **Guido Cupani**, data analysis



- **Alessandro Marassi**, RTOS, FPGA/GPU software design, TANGO controls and GUI design/development



*INAF-OATs Basovizza location*





Team very active, thanks to collaborations in national and international projects, various PRIN and EU funding (FP6, FP7, H2020).

Letter of agreement ESO – INAF-OATs ICG (starting from 1989):

*“... for ESO, the co-operation is of benefit for the availability of additional software manpower with specific working experience in the field of VLT/ALMA control standards. Thus these appears to be a strong rational and mutual interest for AOT and ESO to collaborate in this field ...”*

*“... ICG will take advantage of this collaboration, keeping in contact with ESO’s technology **and at the same time involving young staff in the state-of-the-art projects** ...”*

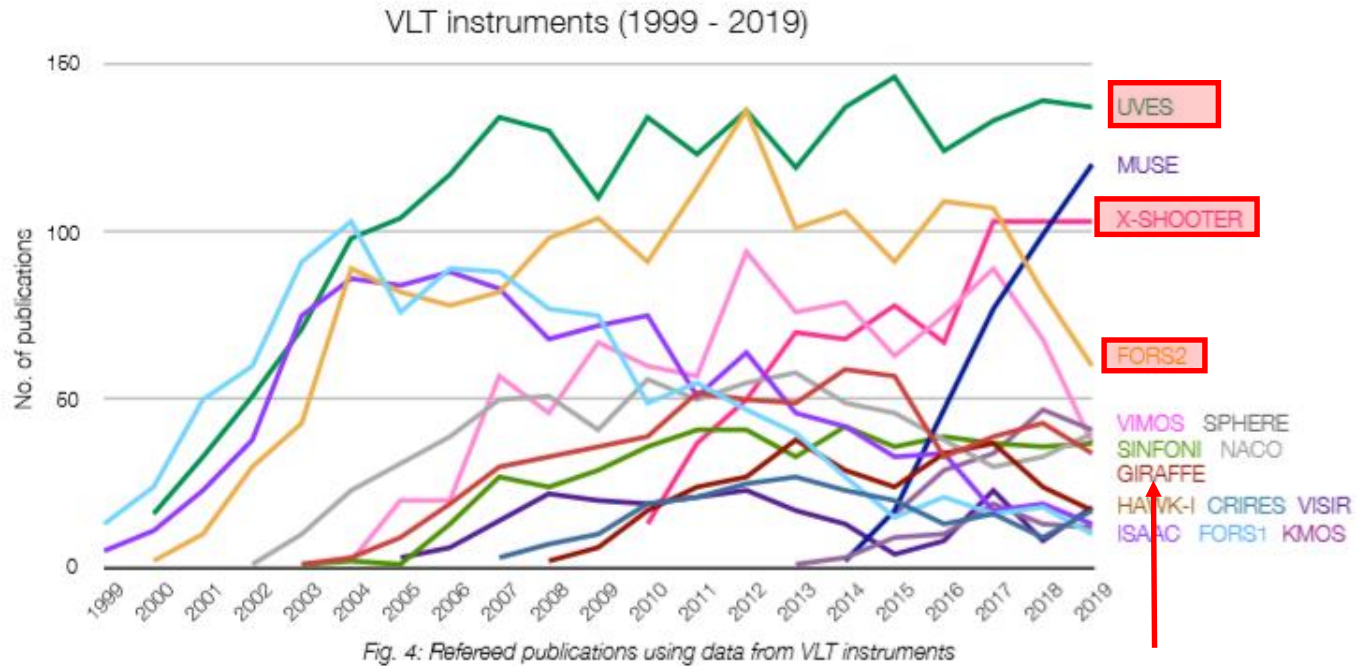
*“... both sides consider strategic this collaboration ...”*

H. Van der Laan, R. Giacconi, C. Cesarsky

Main area of expertise:

- control (software and electronics) of big astronomical instruments and facilities (all aspects)
- data flow (from observation preparation to analysis and dissemination)
- software frameworks
- software methodologies (UML, MDA)
- software system engineering
- project management

Participation to “workhorse” instruments:



Basic ESO Publication Statistics, Version 11.1, March 2020, DOI 10.18727/docs/1





**FLAMES/GIRAFFE**  
control software  
(1999-2002)



**Xshooter** control software  
(2003 - 2008)

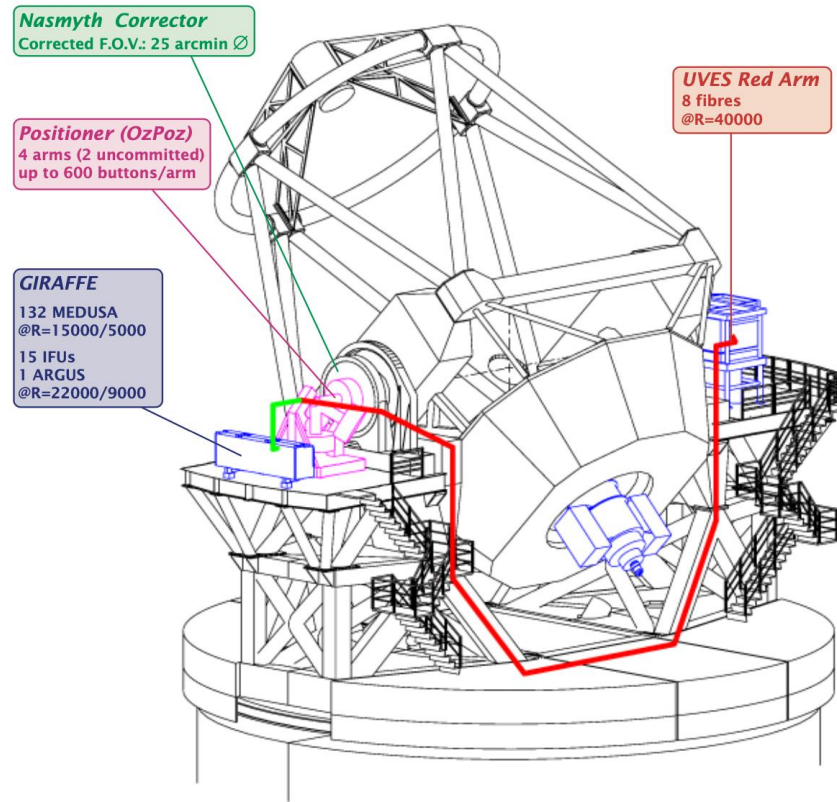


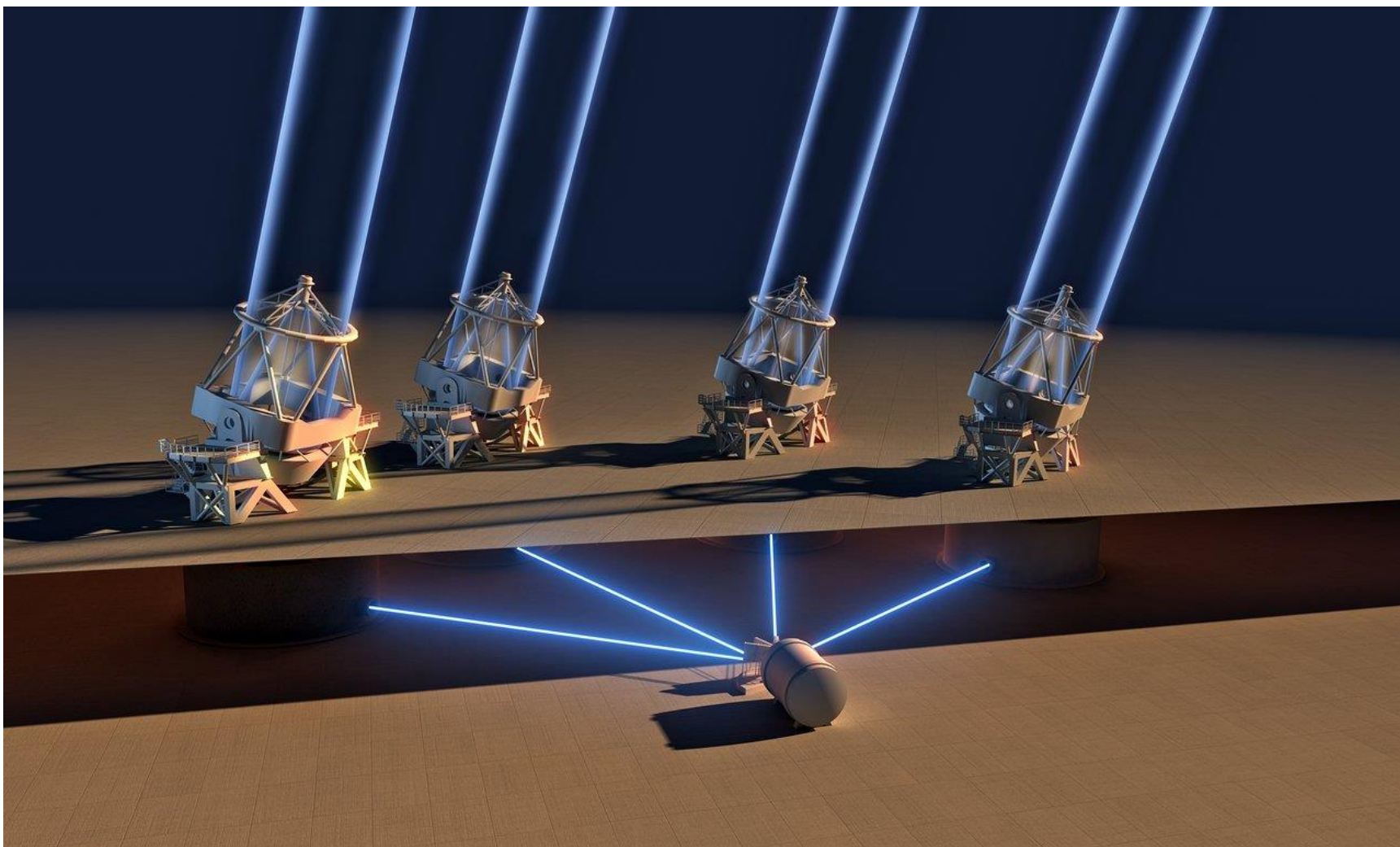
Figure 1. Scheme of FLAMES on Kueyen: all FLAMES components are indicated

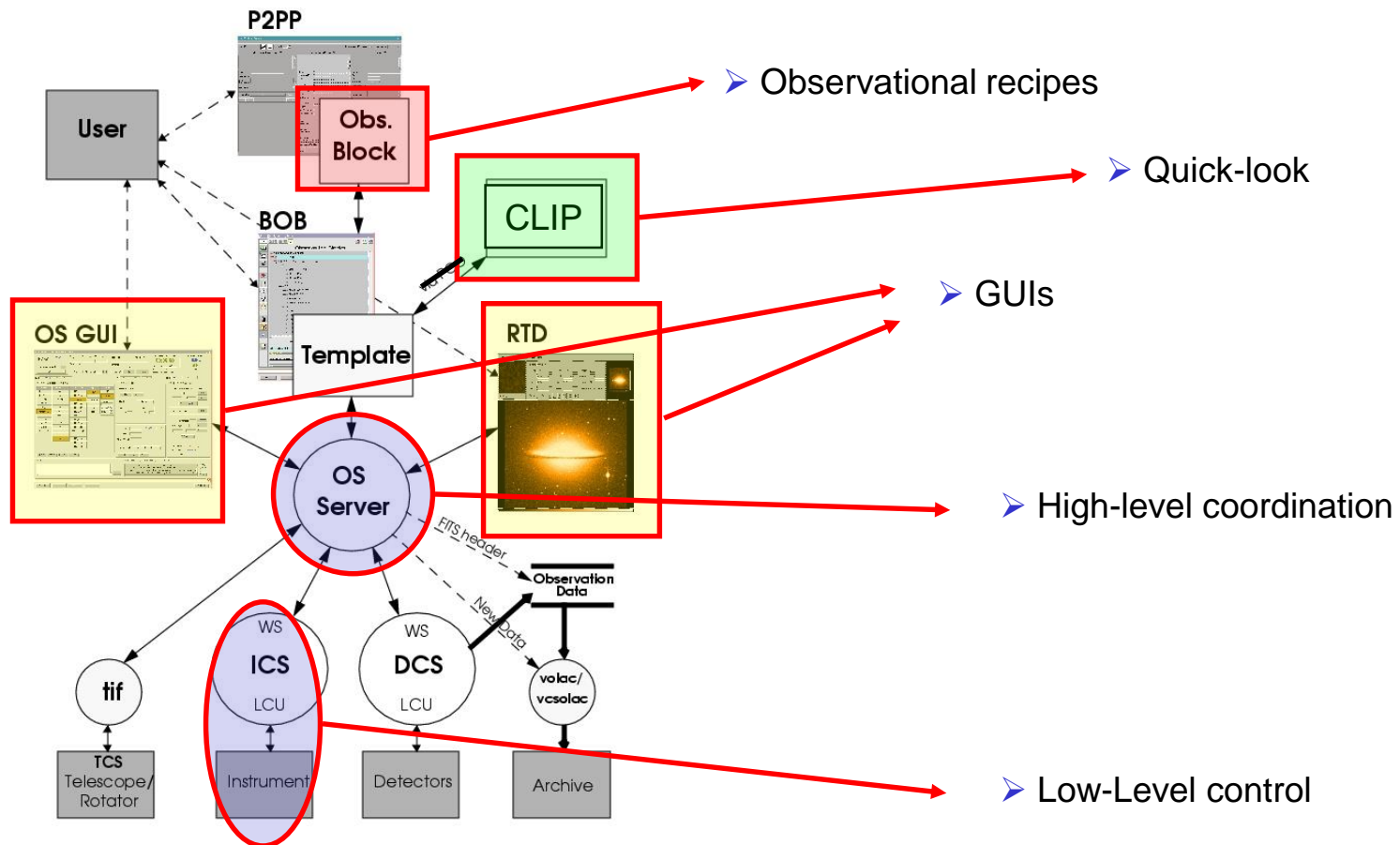


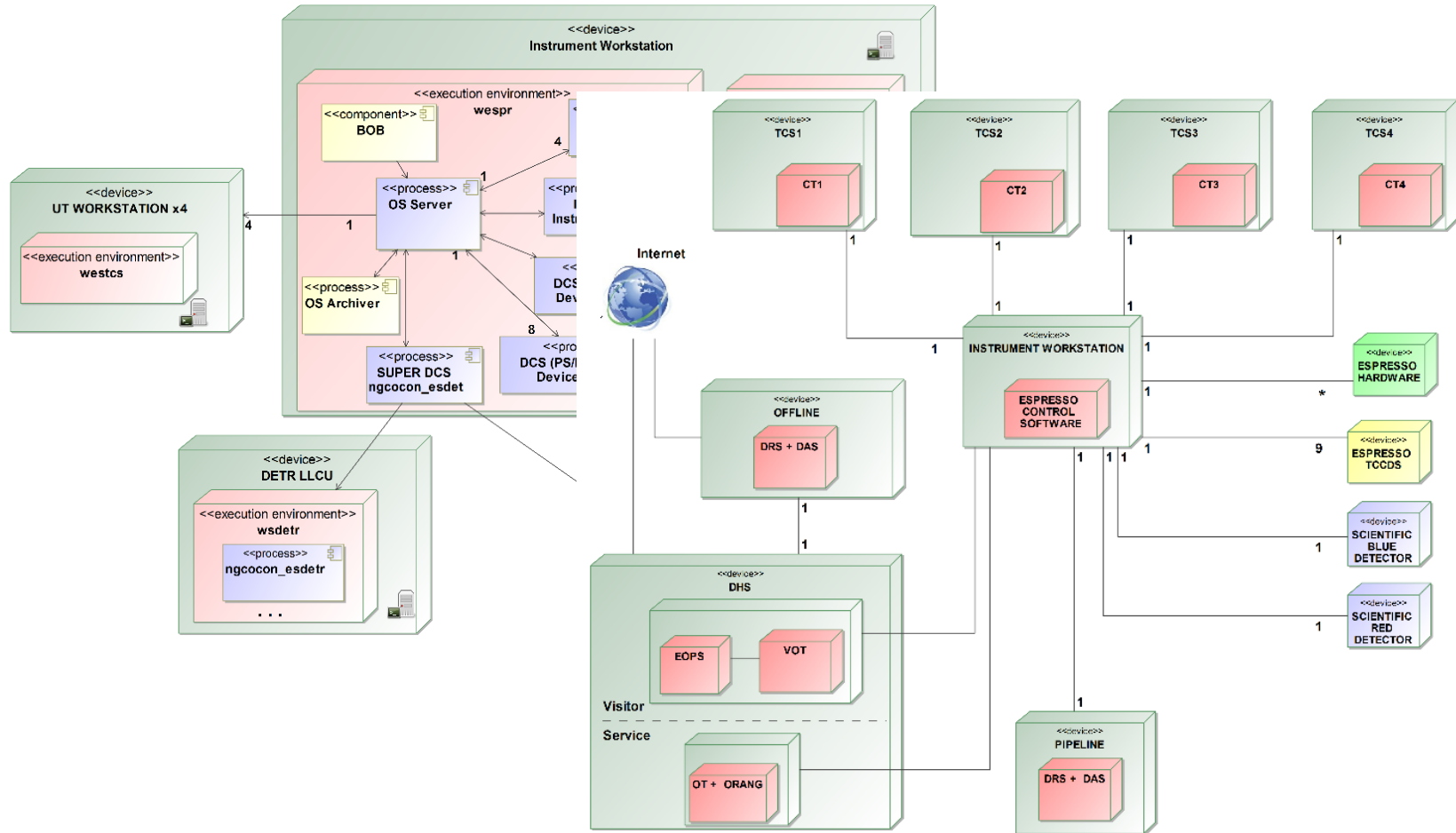
**UVES** control  
software  
(1992-1999)



**ESPRESSO** software  
(2011-2017)









**ESPRESSO -- TCCD Operations -- @wespr**

Cursor Information: X: [ ] Y: [ ] VALUE: [ ]

Field stabil. status: **ON**    Pupil stabil. status: **OFF**

**Field stabilization**

Detector: **FS4**    Real CCD  
State: **ONLINE**    Exposure  
Exp. time: 0.10    Filter: **FSND10**  
Flux corr. [2] [1]    Set    Reset

Fiber finding: Manual  Auto  
Mask radius: 2.079 (")    Set  
Corrections: Skip  Apply  
Amount: [1] (pix)  
Stabil status: **ON**

Baryc.	Fiber ref.	Mean	Std. dev.
X 110.6	112.0	-0.01	0.09
Y 111.4	111.1	0.00	0.07

Plot units:  arcsec     pixel    Legend: Errors (fiber pos. - ba)

Harps-n-ag    la Notte - FGG    TNG Active Optics

file:///home/tng/Desktop/fag-core/gui/index.html

HARPSN-AG    TCCD engineering    Field stabilization    Stabilization status    Algorithm

Status: **GUIDING OK**

OFFLOAD

Detector: Real camera    Exp. status: video  
Exp. time [s] (0.2): 1.0    Set    Radius mask [arcsec] (3): 3    Set

Fiber Mode (Manual): X: 220 Y: 268  
X: 220    Y: 268    Auto    Manual/Click    Defaults    Set

Telescope offset Move [px]: 0

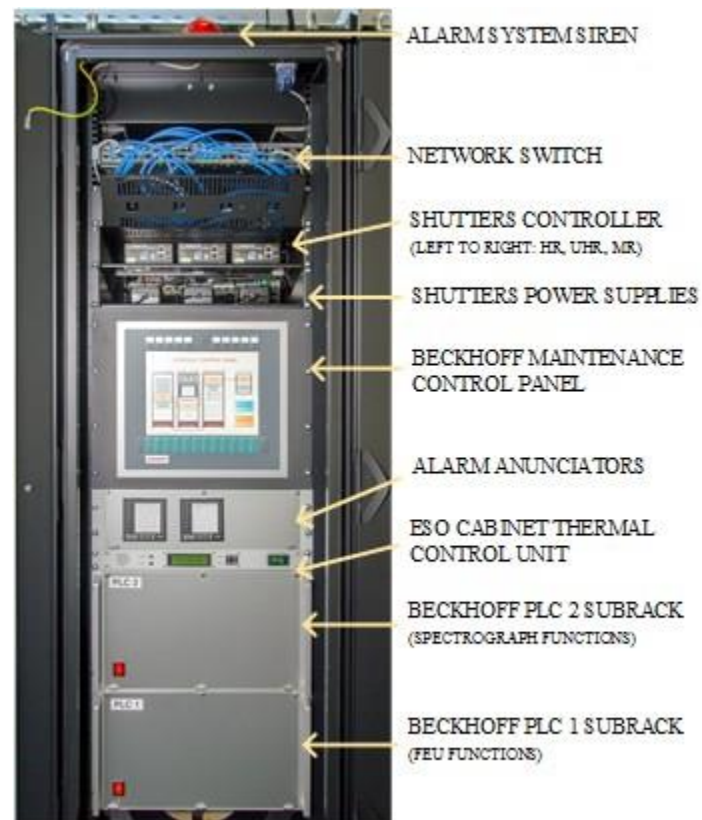
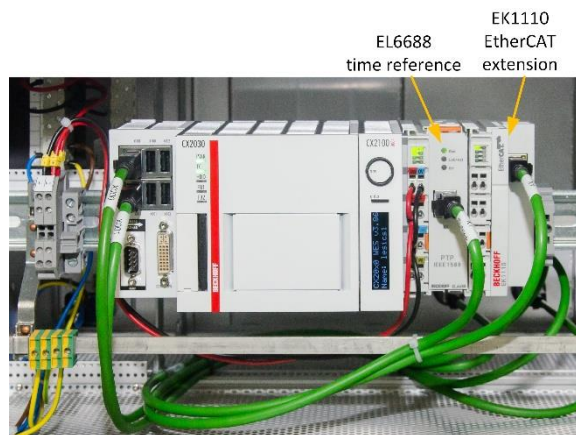
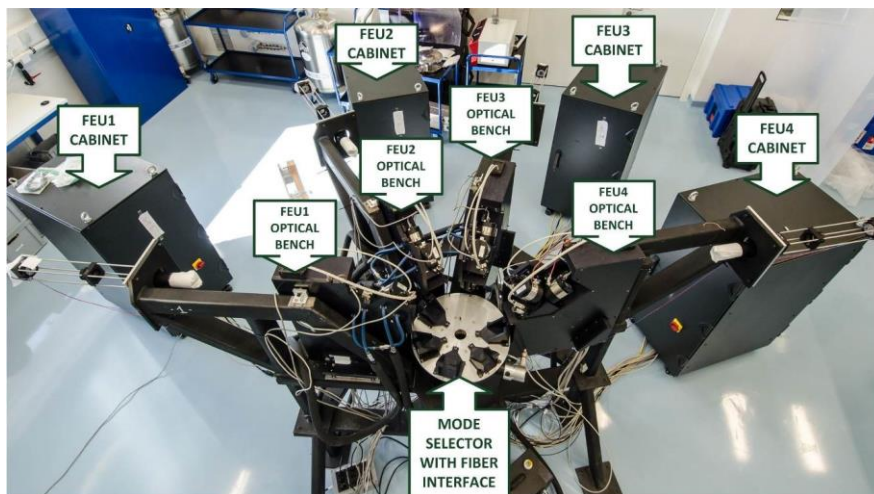
Corrections Barycenter: X: 216.39 Y: 268.42

Live Image    Fib.    Mask    Bar.    N-E    Cuts

Integrated Image    Fib.    Cuts

Mean [arcsec]    X: -0.000147    Y: -0.000087    Std. Dev. [arcsec]    X: 0.15943    Y: 0.202769

*Expertise: low-level & electronics*



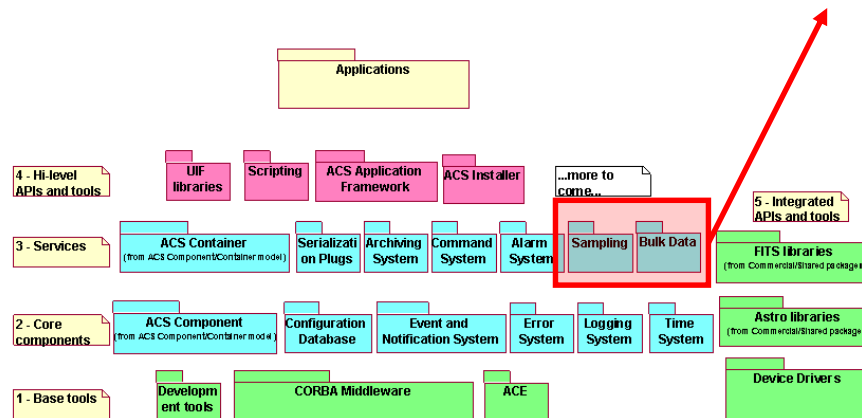
**UVES:** important contributions to the VLT Instrumentation framework (high level part, ADCs, A&G)

**FLAMES/GIRAFFE:** development of “super-coordination software”

**Xshooter:** MDA development, first usage of PLCs

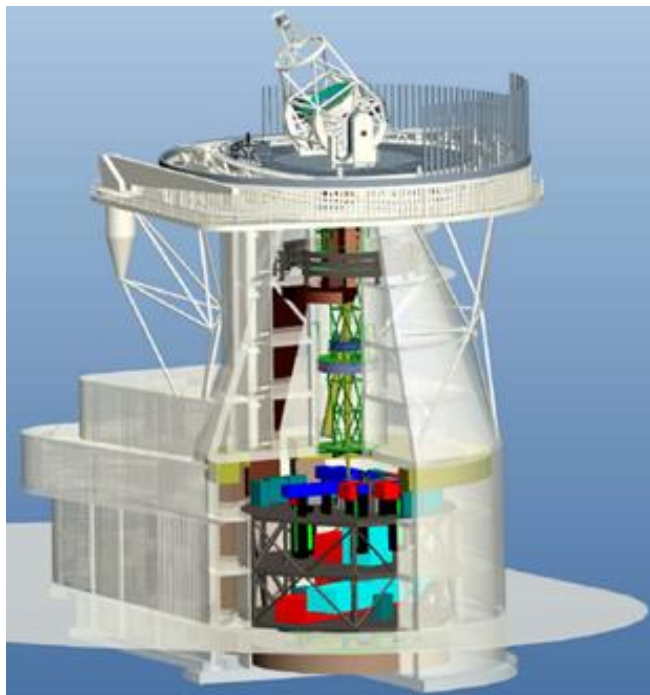
**ESPRESSO:** adoption of new standards; see Roberto’s talk

**Software frameworks:** implemented some of the core functionalities of ALMA/ACS

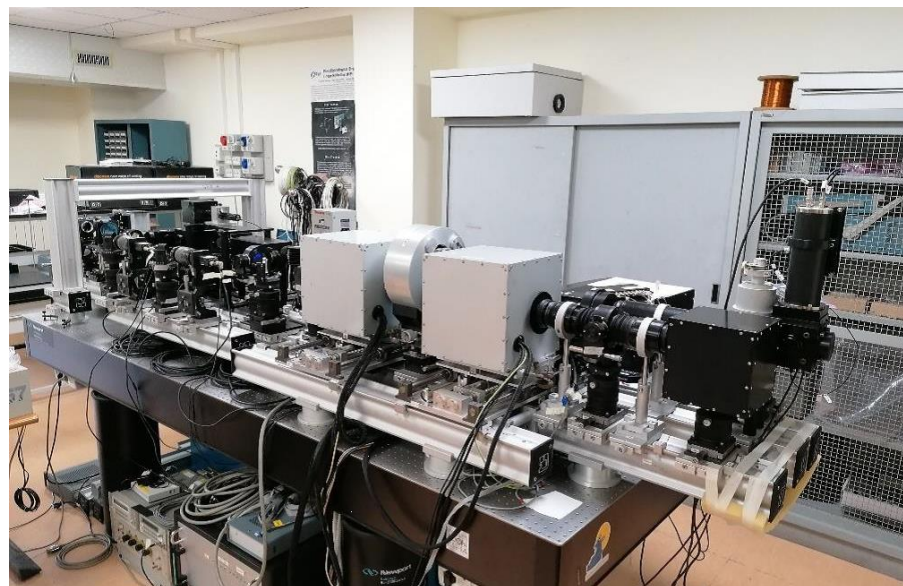




European Solar Telescope (2008 - 2010; FP7 funded)



*Interferometric Bldimensional Spectrometer 2.0  
(IBIS2.0)*



**The TSRS 1.0 system:** a set of two multi-channel radio-polarimeters, which detected the solar radio emissions in the metric band by a 10-meter diameter parabolic dish (figure on the left), and in the decimetric one by a 3-meter parabolic dish (figure on the right), at frequencies 237, 327, 408, 610, 1420, 2695 MHz, with very high temporal resolution (1 ms standard) and accurate circular polarization measurements.

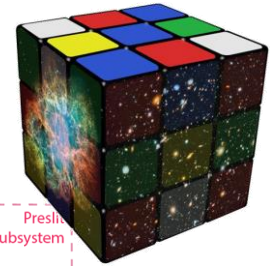
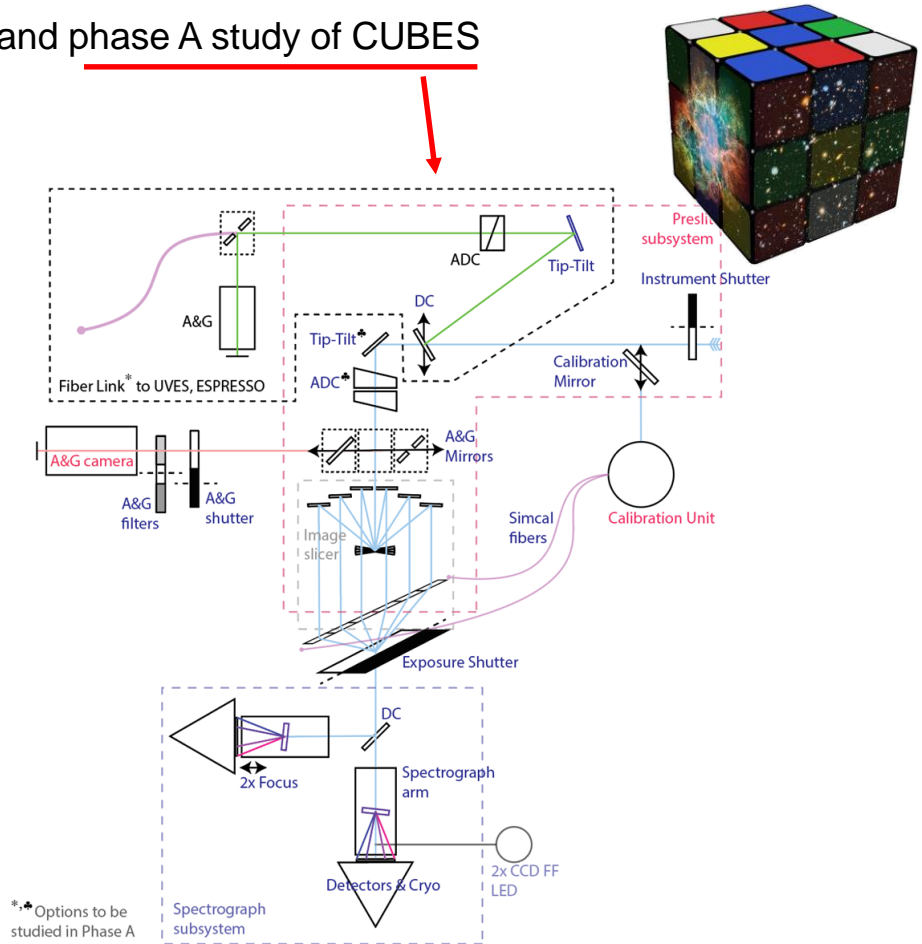


The **Trieste Solar Radio System 2.0 (TSRS 2.0)** is the project for a new, state-of-the-art solar spectropolarimeter dedicated to the continuous surveillance of the solar radio emission in the range 1-19 GHz.

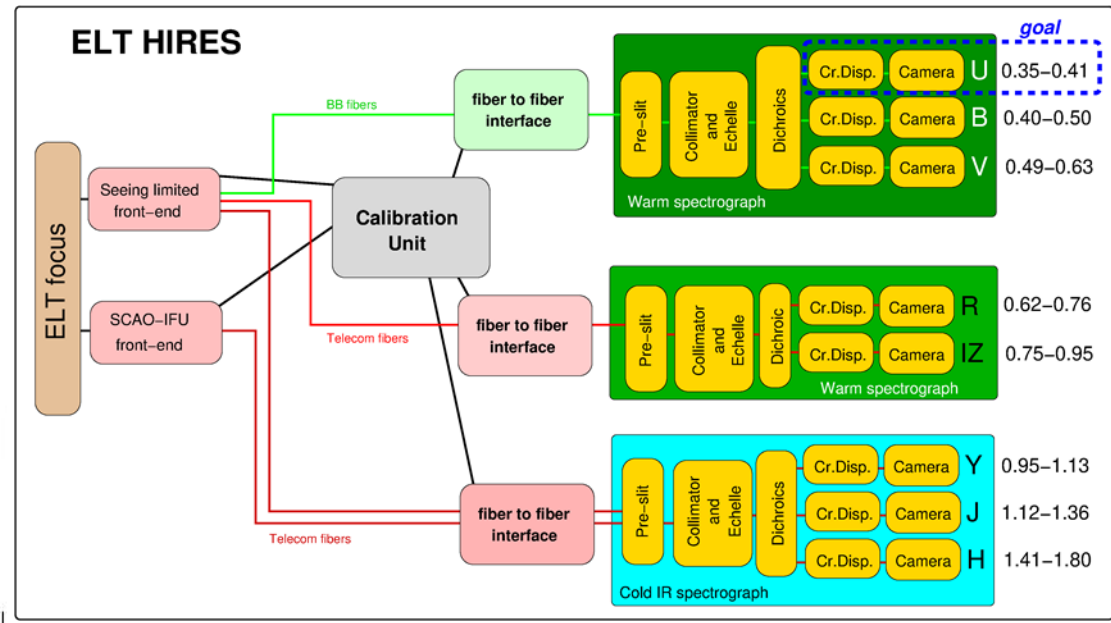
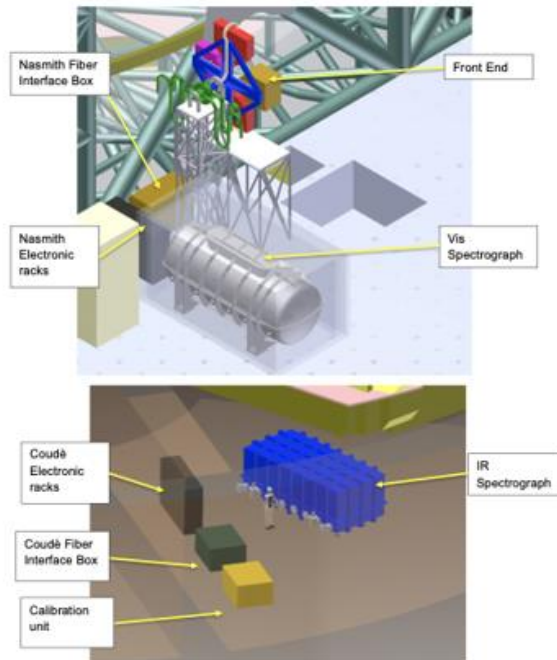


Ongoing collaborations with ESO:

- VLT instrumentation: upgrade of FORS2 and phase A study of CUBES



➤ ELT instrumentation: HIRES



➤ Solar instruments activities



- Looking forward to participate and collaborate in TETIS initiative / “articolazione INAF”!

