INAF OAAB

# Hardware e Software strumentale

**Matteo Di Carlo** on behalf of
Matteo Canzari

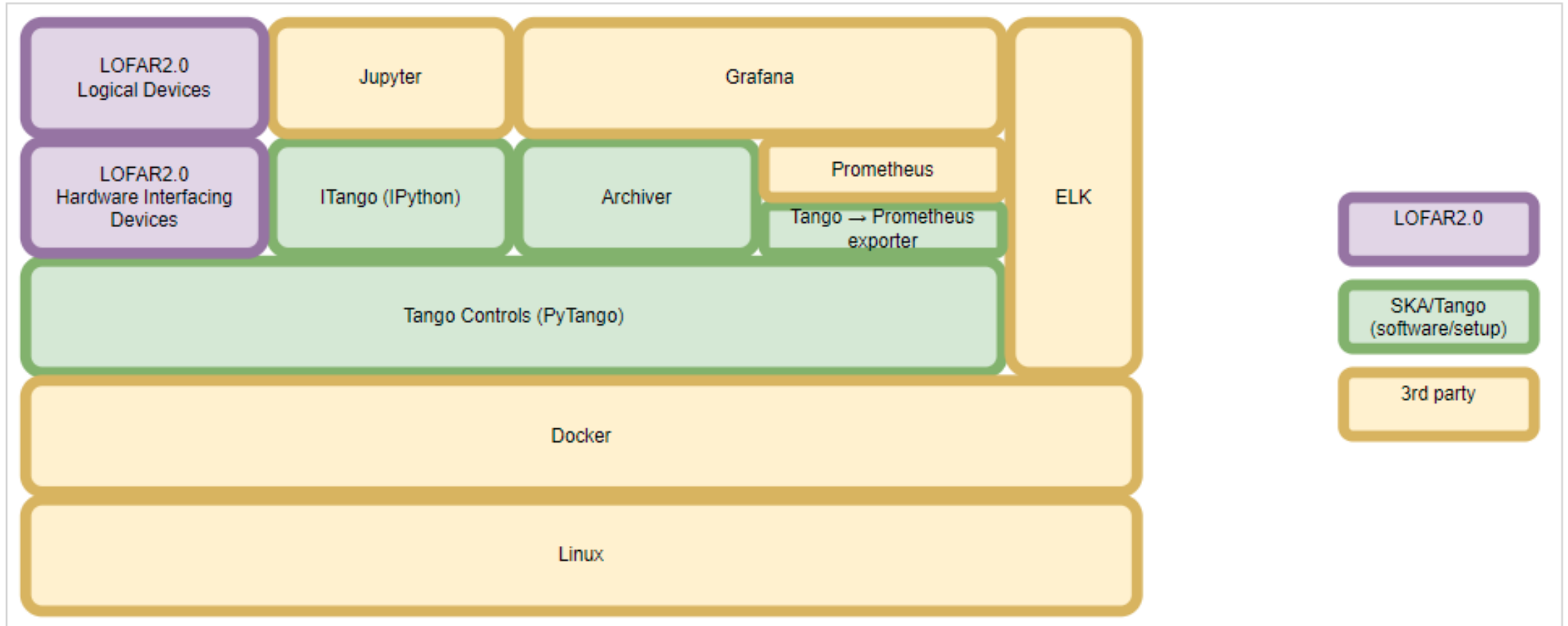
*Gruppi di lavoro*:
LOFAR
SKA Cream Team
Adaptive Optical and VIS/NIR
Instrumentation team

# Expertises

- **Agile** software development process
- Tango Controls development @SKA & @LOFAR
- Tango **archiving** (MySQL, TimescaleDB)
- Station Monitor&Control **GUI** (Grafana)

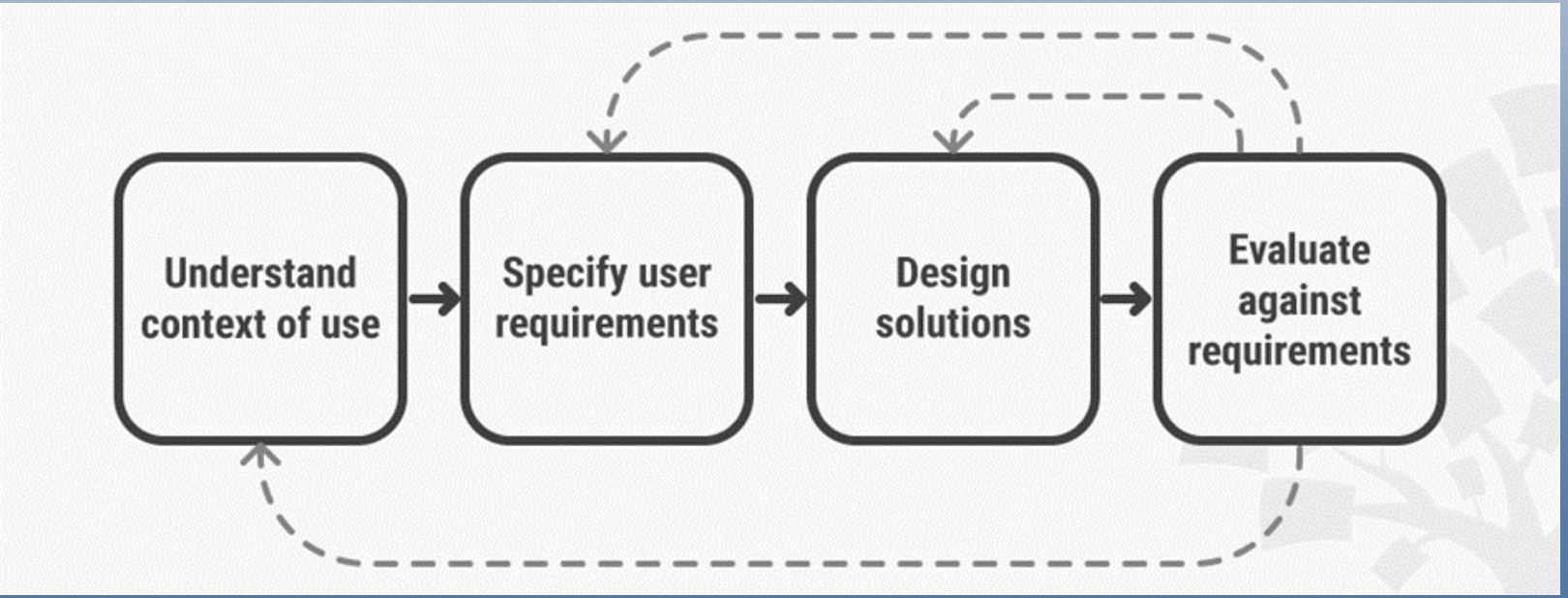
- Web development for control system interfaces
- UI/UX analysis and design
- Artificial Intelligence
- Member of the Tango **Steering committee**

# LOFAR 2.0 Software & Architecture



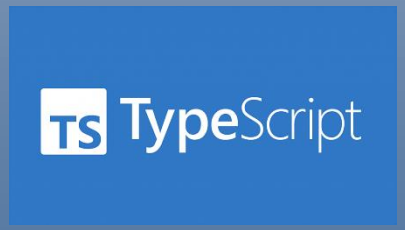
# UI/UX analysis and design

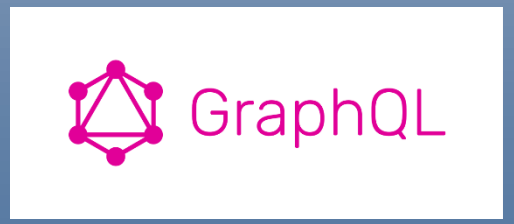
- **Analysis** of UI user requirements
- **User-centered design** approach
- Designing UI/UX using different techniques such as **mockups**, **diagrams**...



# Web development

- **Taranta** is a **web** application that allows a user to **explore Tango devices** and to **create a graphical user interface** to interact with them
- **Taranta** development (design, front-end/back-end development, testing, documentation, support ecc…)
- **Collaboration** with **external institutes** and the **Tango community**
- **Support** users developing dashboards in the integration environment





# Artificial Intelligence

- **Deep Learning** methodologies in **spectra classification**
- Early study for using **AI in a control system**

# Instrument Control Systems

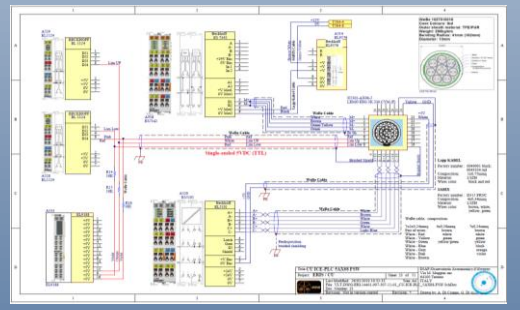
- PLC based (VLT & ELT frameworks), real-time control of multiple devices
- Motion Control (all motors and actuators technology, tuning, positioning & tracking loop)
- Monitoring, telemetry data & housekeeping (probes & sensors)

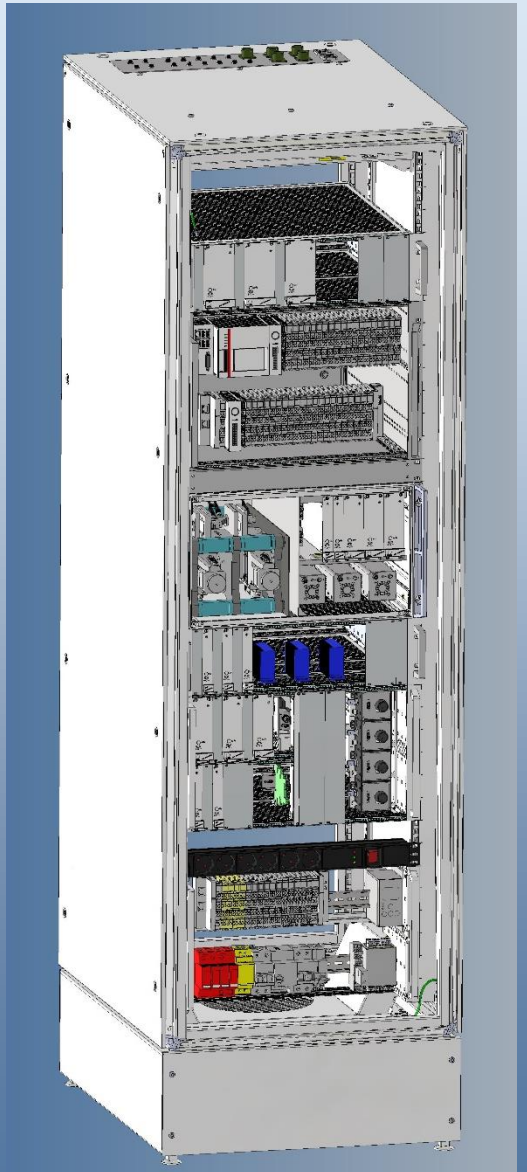
- Vendors & open industrial standards (communcation, digital & analog signals)

- Harsh environments (High-Availability, Redundancy and Fail-Over) and cryo-vacuum systems

- Design, integration, test & verification
- Electronics Design: OrCAD, Altium Designer
- Multiplatform IDE for firmware, RT and user-level source code development (ST,C++,Python)

- Breadbording & prototyping, climatic chamber tests (P-RH-T)
- special cabling & fiber termination

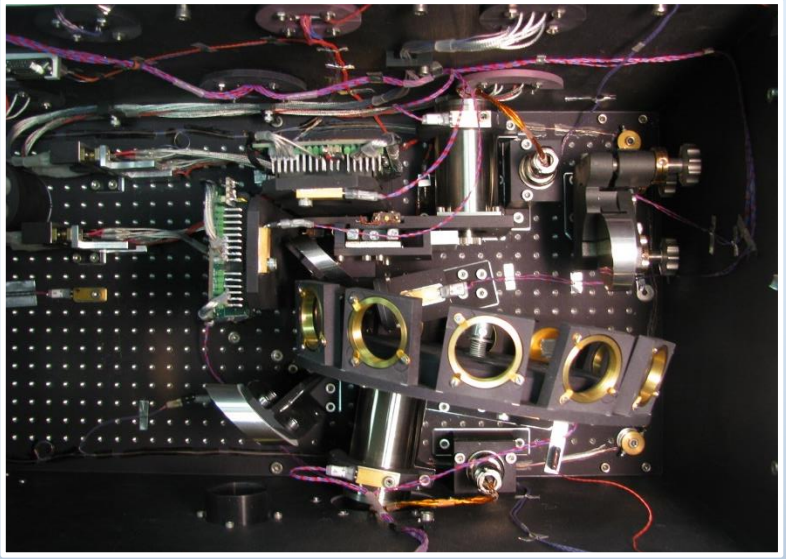


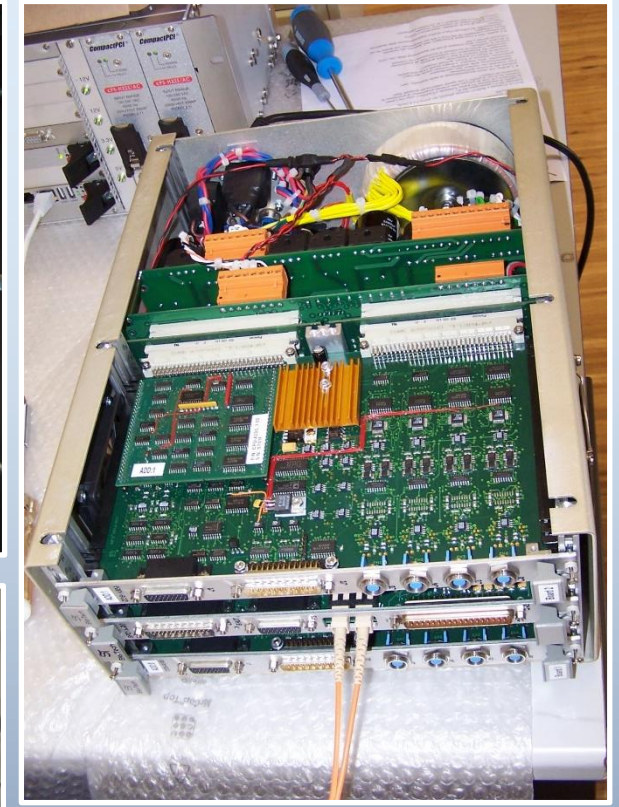


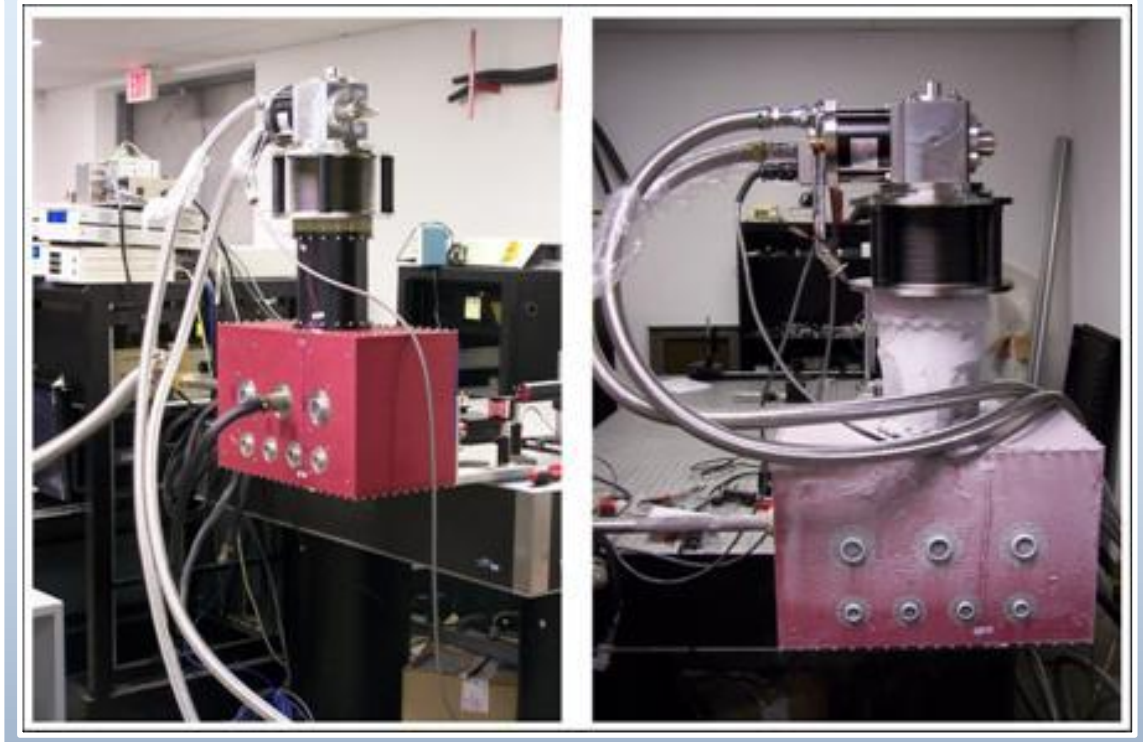
**VIS/NIR HW&SW Group:**
- S. Benedetti
- A. Di Cianno
- G. Di Rico
- A. Valentini

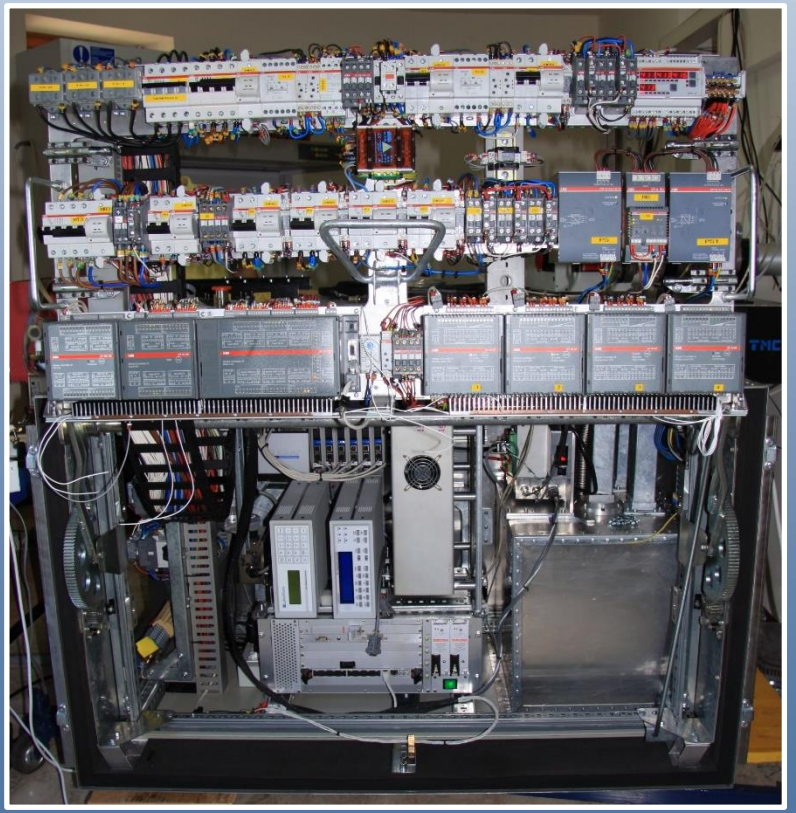
**Current Projects:**
- ✓ ERIS AO & CU
- ✓ MAORY CU
- ✓ GW follow-up (OAAb telescopes)

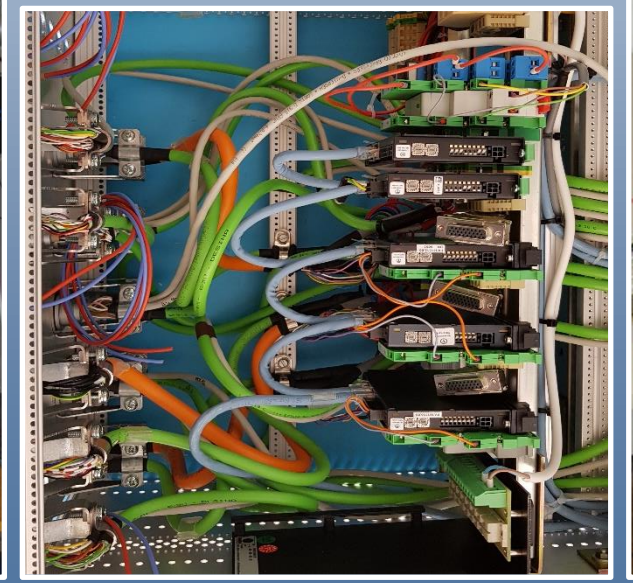
**New involvements (TBC):**
- ET & LGWA
- SHARP@ELT
- ORCAS (Nanosat+GroundAO)

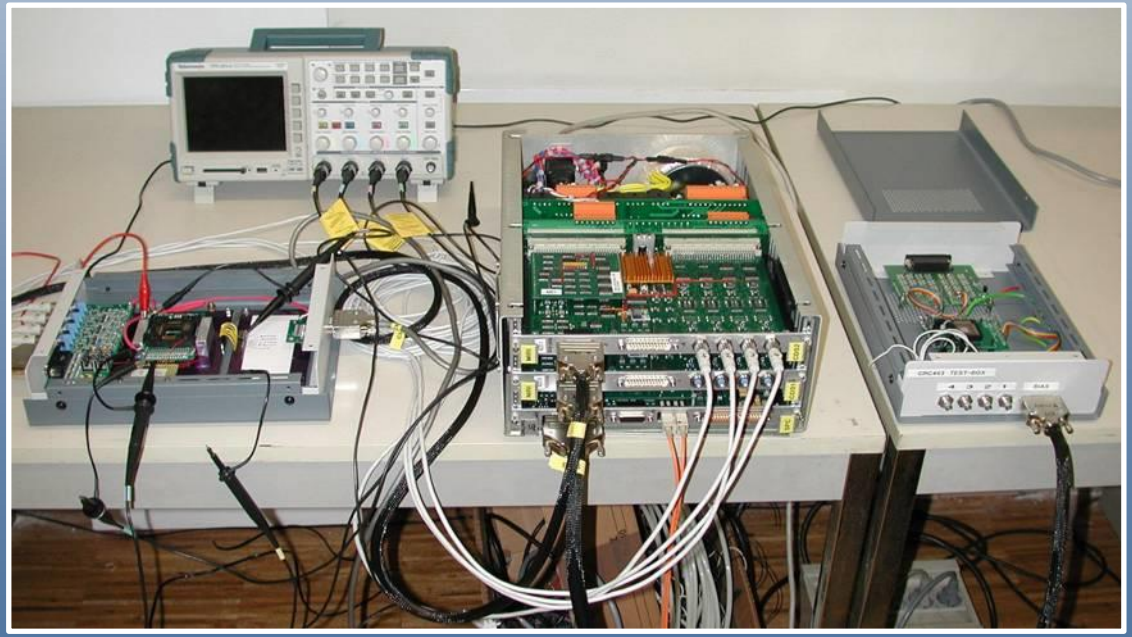


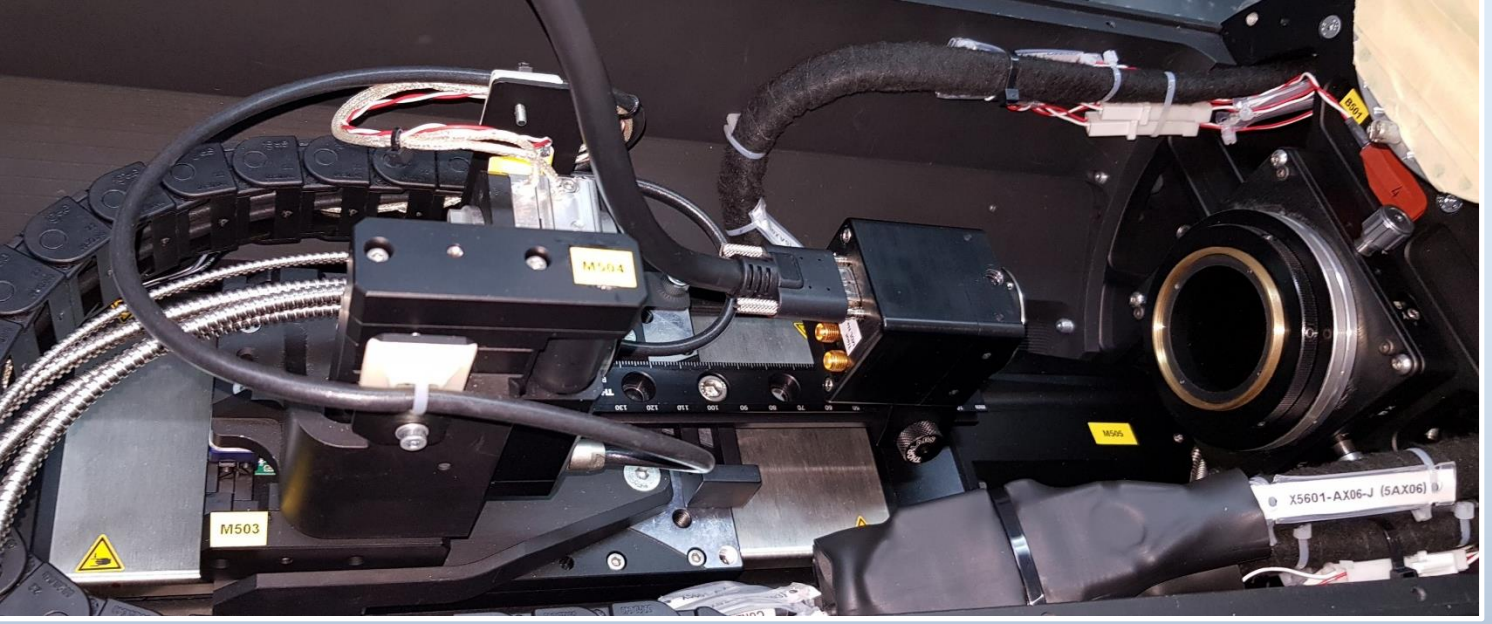


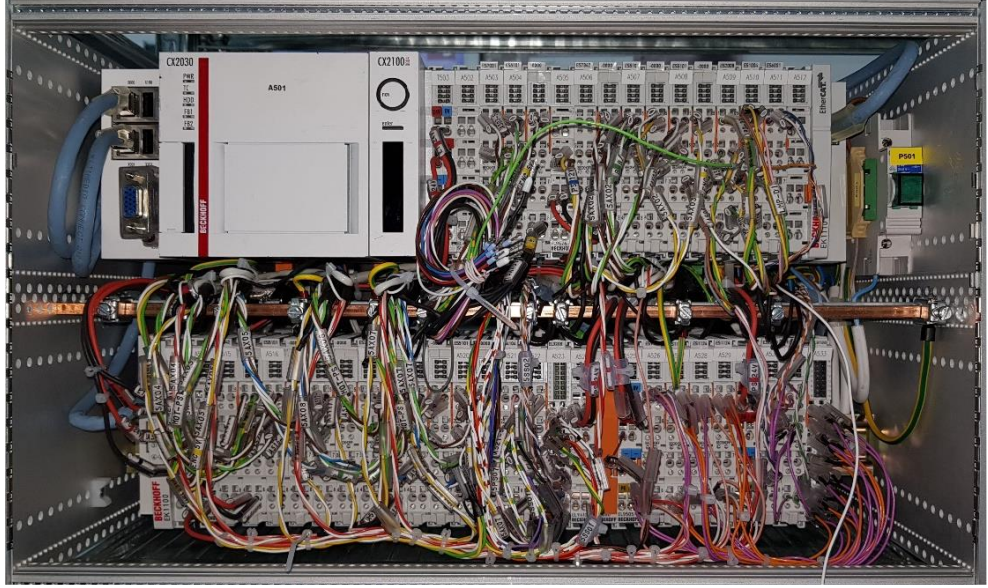


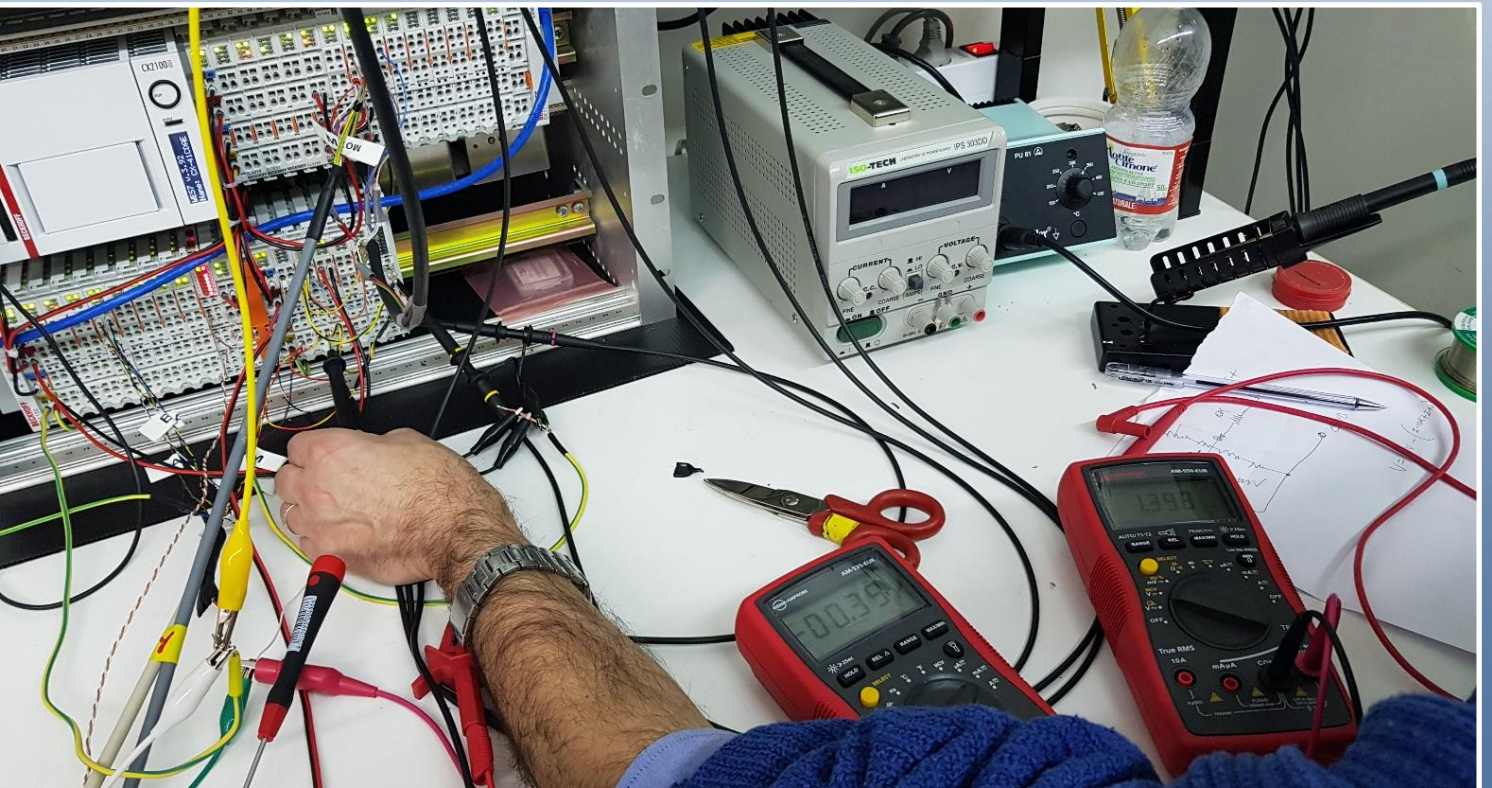




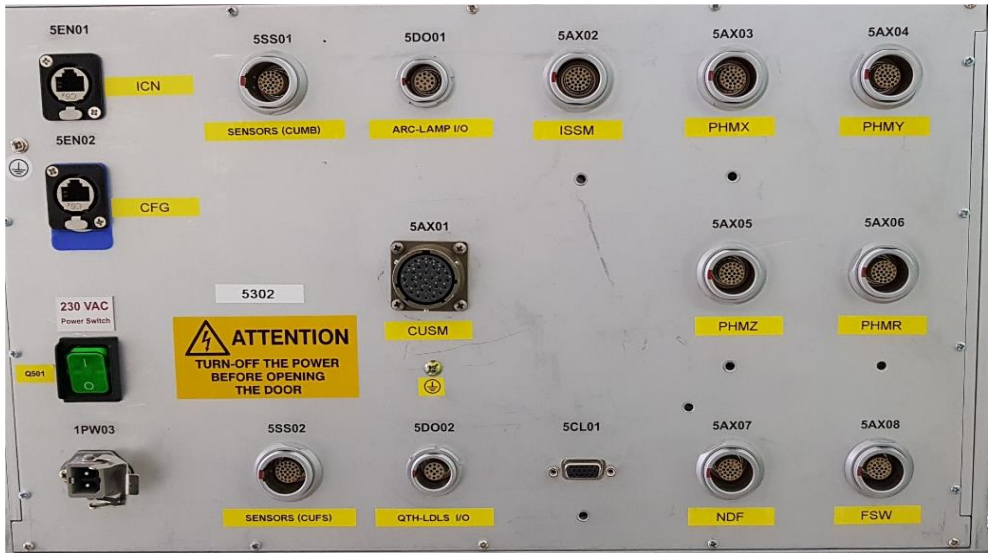



M504
M505
M503
X5601-AX06-J (5AX06)


CX2030
CX2100
A501
BECKHOFF


ISO-TECH
IPS 3030D
CURRENT
VOLTAGE
True RMS

3AX18
3AO01
3AO02
3PW01
1PW04
3AI03
3EN05
3AO04
3AO05
3AI06
LGS
NGS


5EN01
ICN
5SS01
SENSORS (CUMB)
5DO01
ARC-LAMP I/O
5AX02
ISSM
5AX03
PHMX
5AX04
PHMY
5EN02
CFG
5AX01
CUSM
5AX05
PHMZ
5AX06
PHMR
5302
230 VAC
Power Switch
Q501
ATTENTION
TURN-OFF THE POWER
BEFORE OPENING
THE DOOR
1PW03
5SS02
SENSORS (CUFS)
5DO02
QTH-LDLS I/O
5CL01
5AX07
NDF
5AX08
FSW

# Thanks