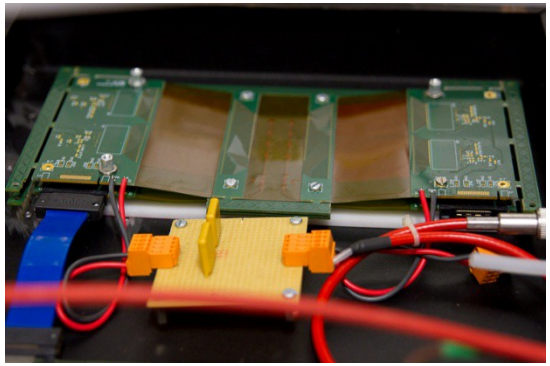
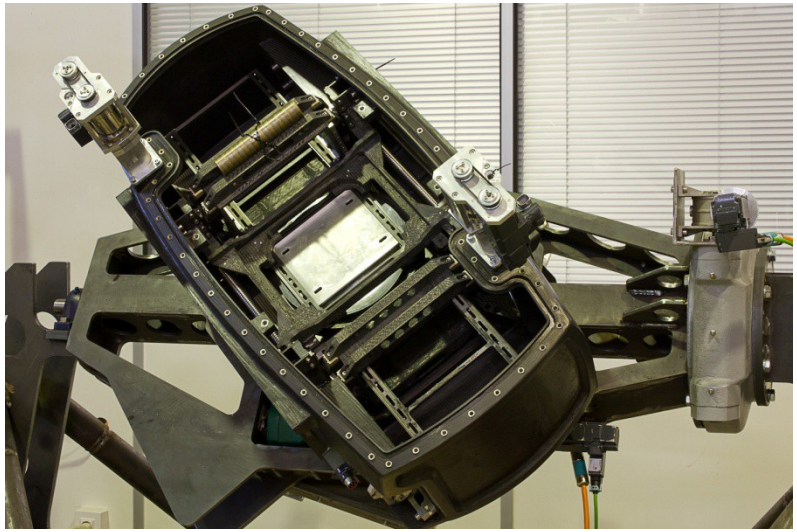
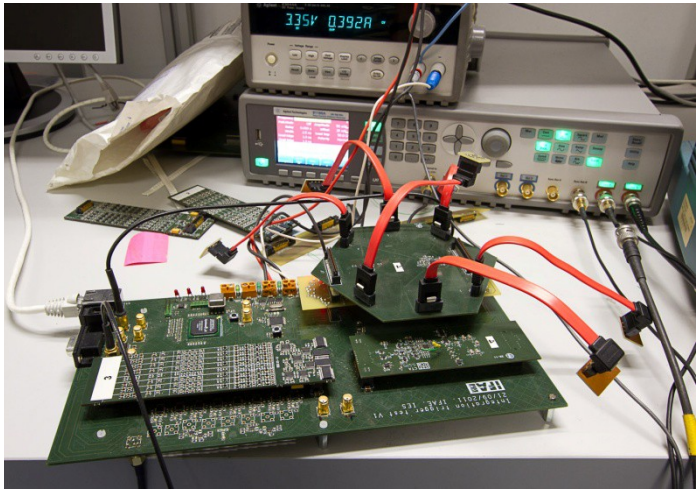
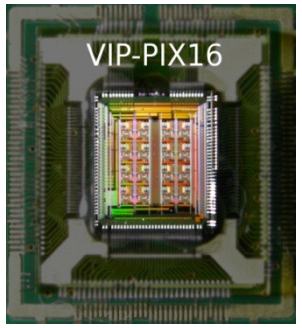
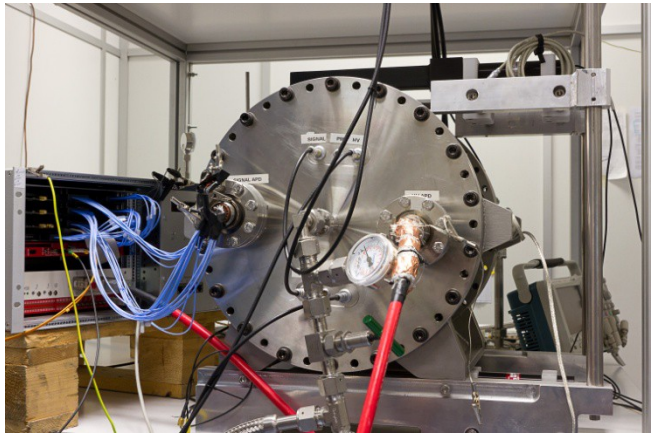
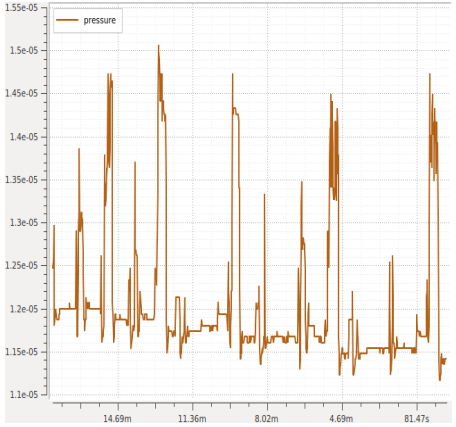










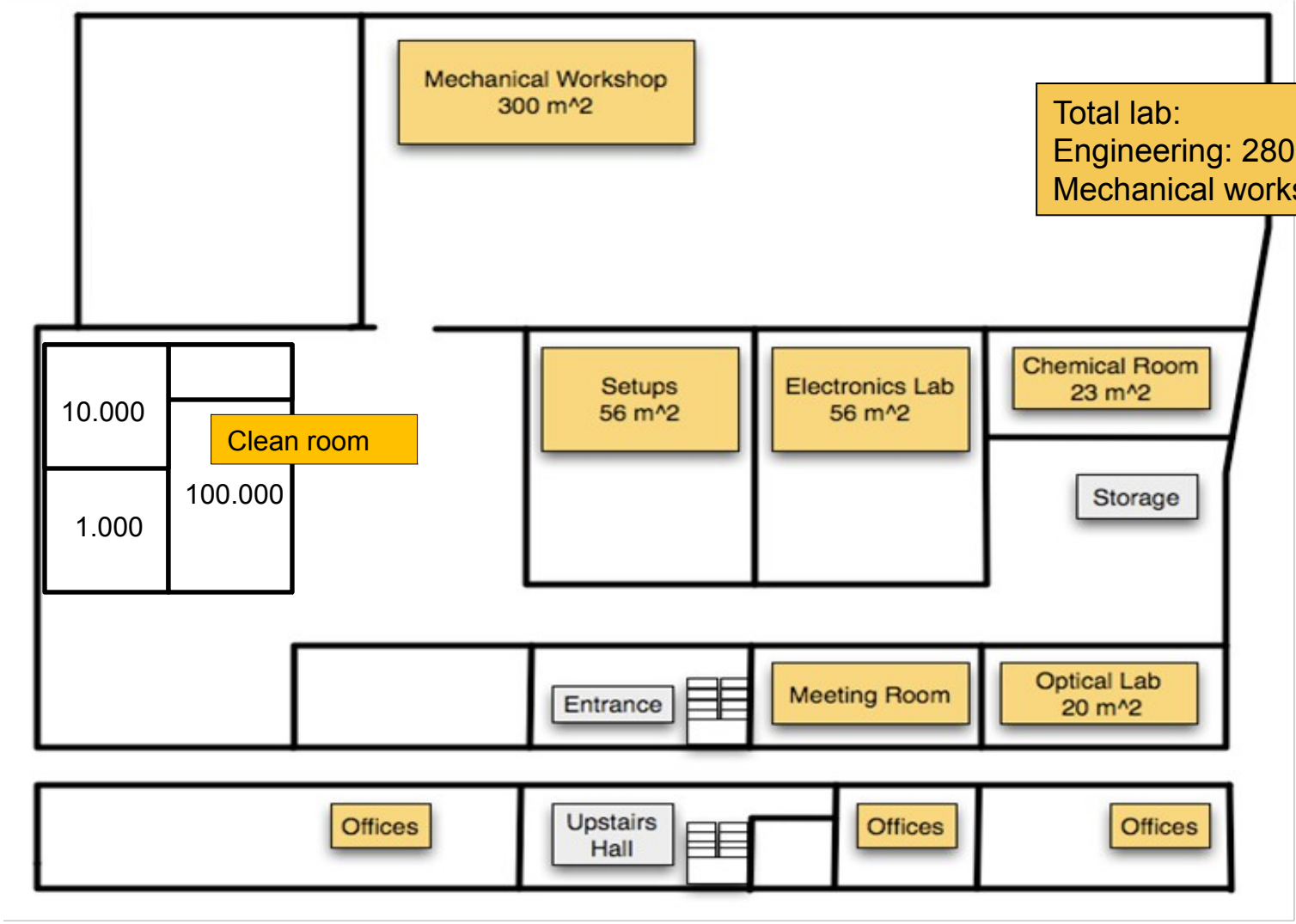


Engineering and Infrastructures

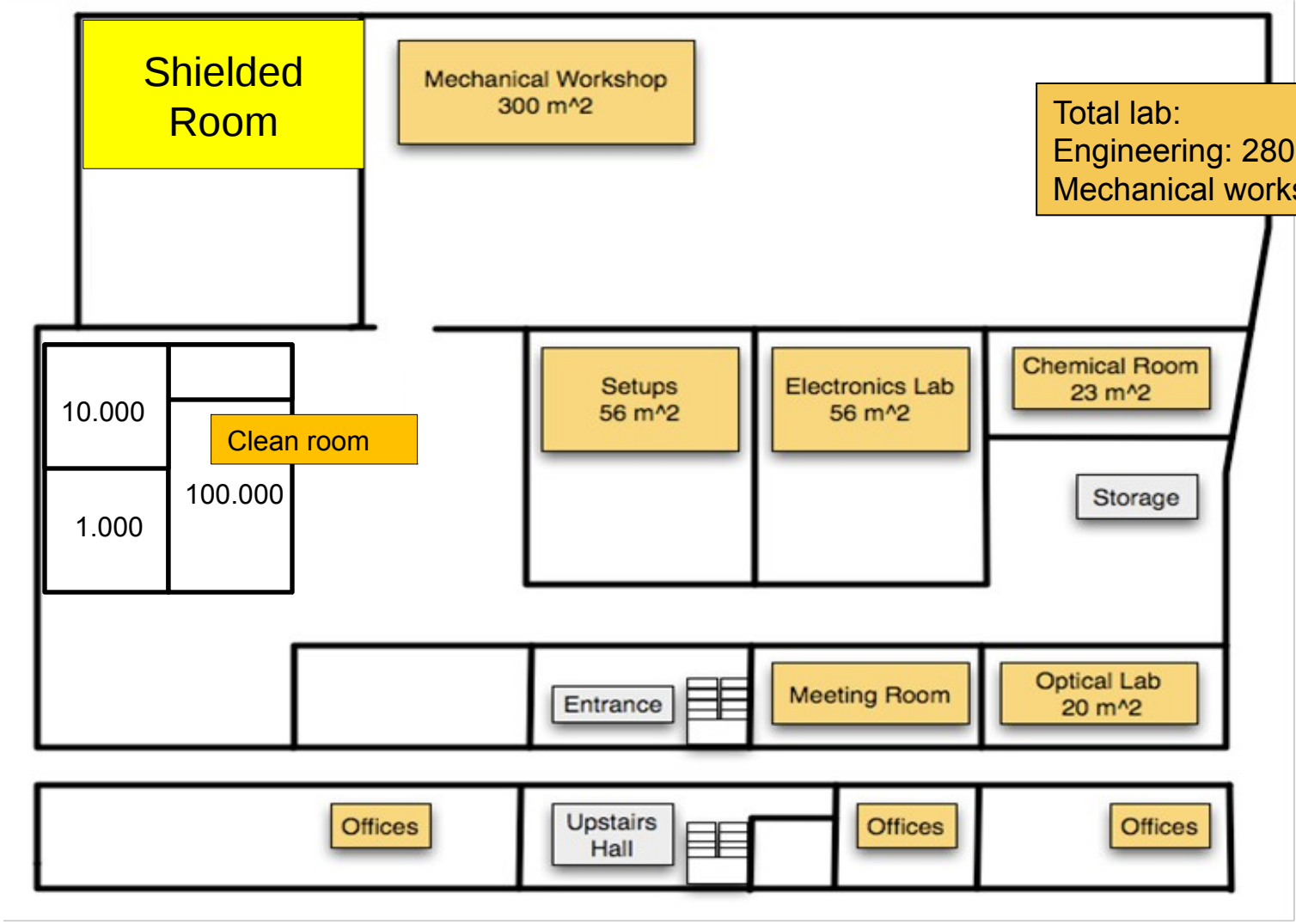
Borrow from Otger Ballester / Laia Cardiel

Oscar Blanch Bigas, IFAE

Infrastructures

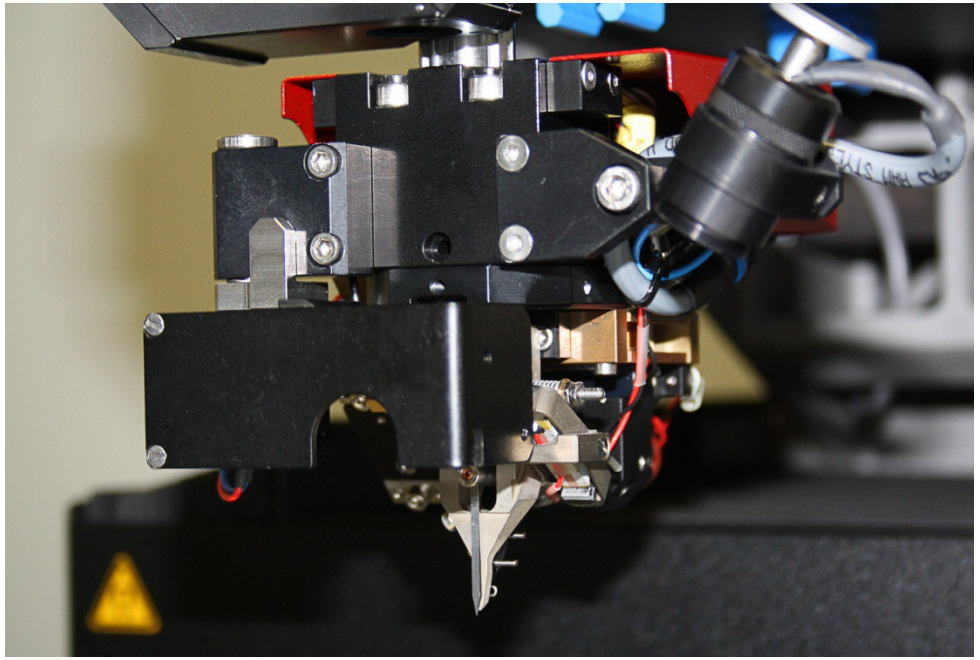


Infrastructures



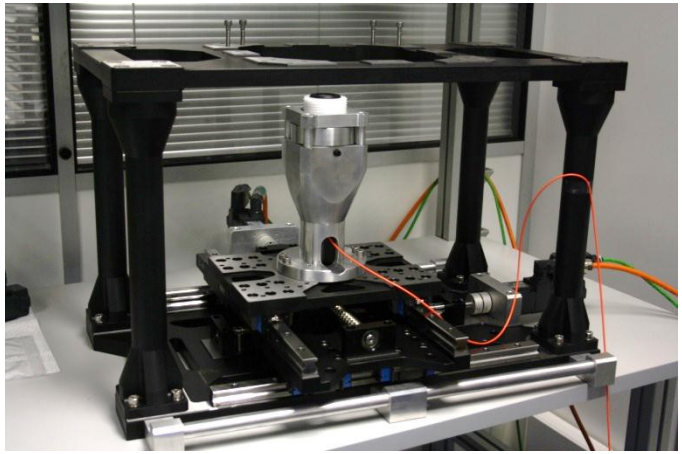
Infrastructures: clean room

- Fully operative
- Main uses:
  - Sensor manipulation/setup installation: CCDs, APDs, Pixels
  - Xray Microelectronics
  - PAUCam assembly
- New:
  - Air, N2, vacuum
  - Wire-bonding
  - Solder bump deposition



Infrastructures: others

- CNC Milling machine
  - 1300x800x800mm
  - 24 Tools
- Vacuum oven:
  - Electronic boards and mechanical small parts bakeout
- Stereo Inspection Microscope
- XYTable dedicated PLC



Engineering

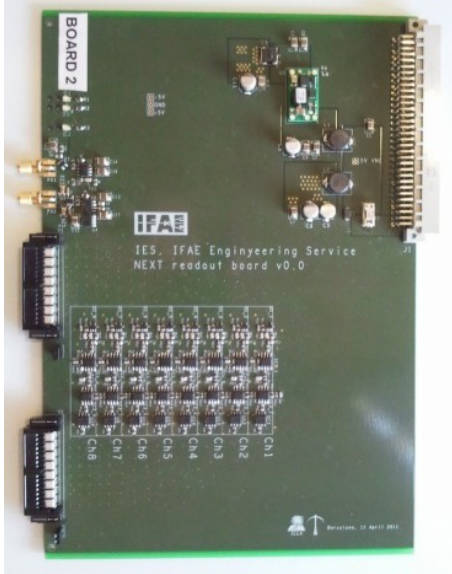
Projects

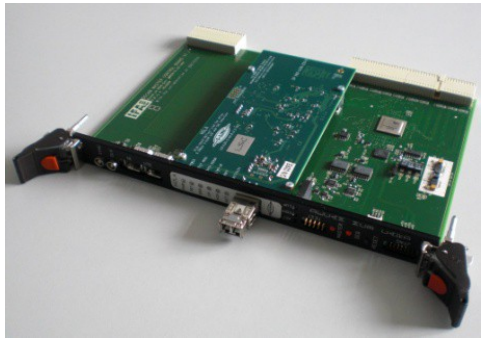
- Physics projects offer many and diverse engineering opportunities

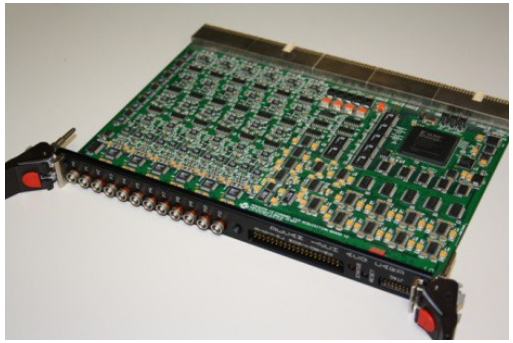
- Main lines of interest
  - Front End and Readout Electronics
  - Control Systems
  - Detectors (Design and Operation)
  - Precise movements
  - Cryogenics
  - Vacuum

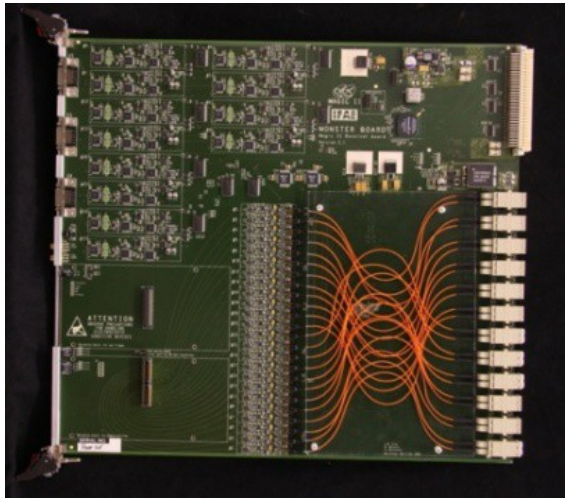
Frontend electronics

- Challenging designs for electronic engineers
- Provides Visibility
- We already have experts





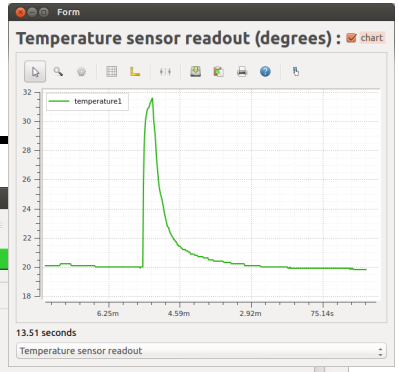


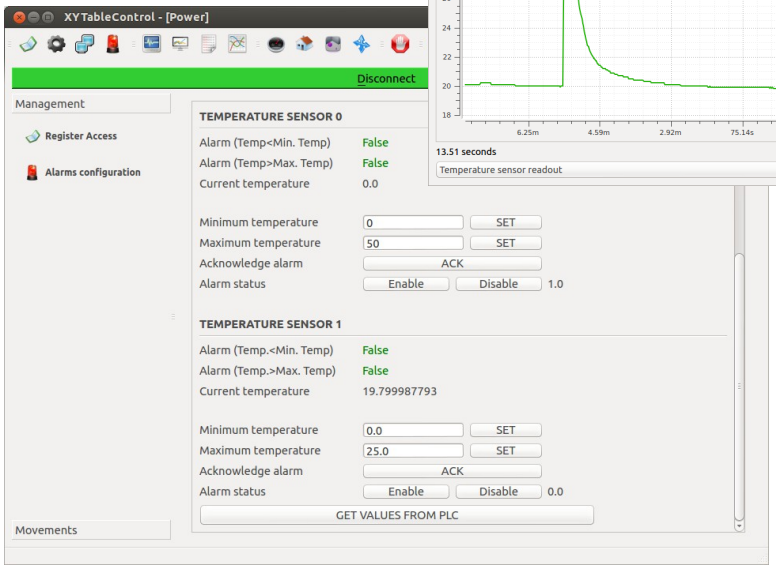


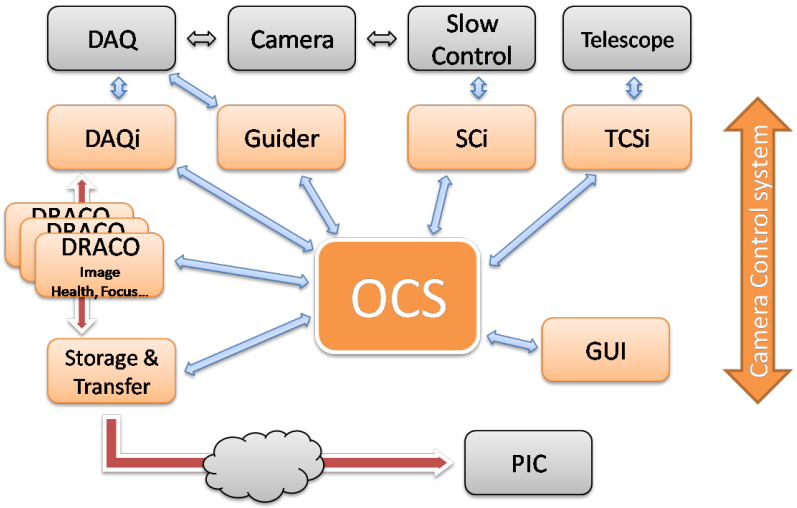
Control Systems

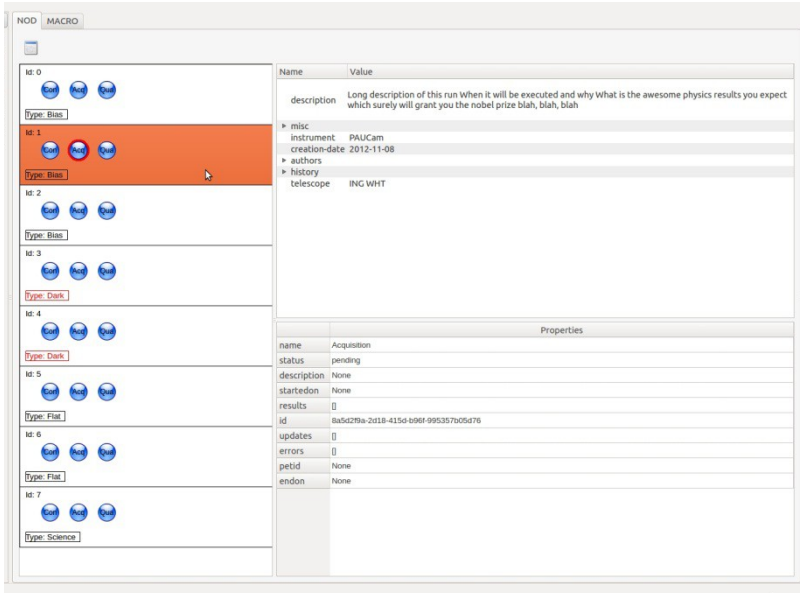
PAUCam Control System

- Complete control system:
  - TCSi, DAQi, QA, Guider, SCi, Scheduler, GUI
- Distributed system based on message distribution
  - Central Node + Satellites









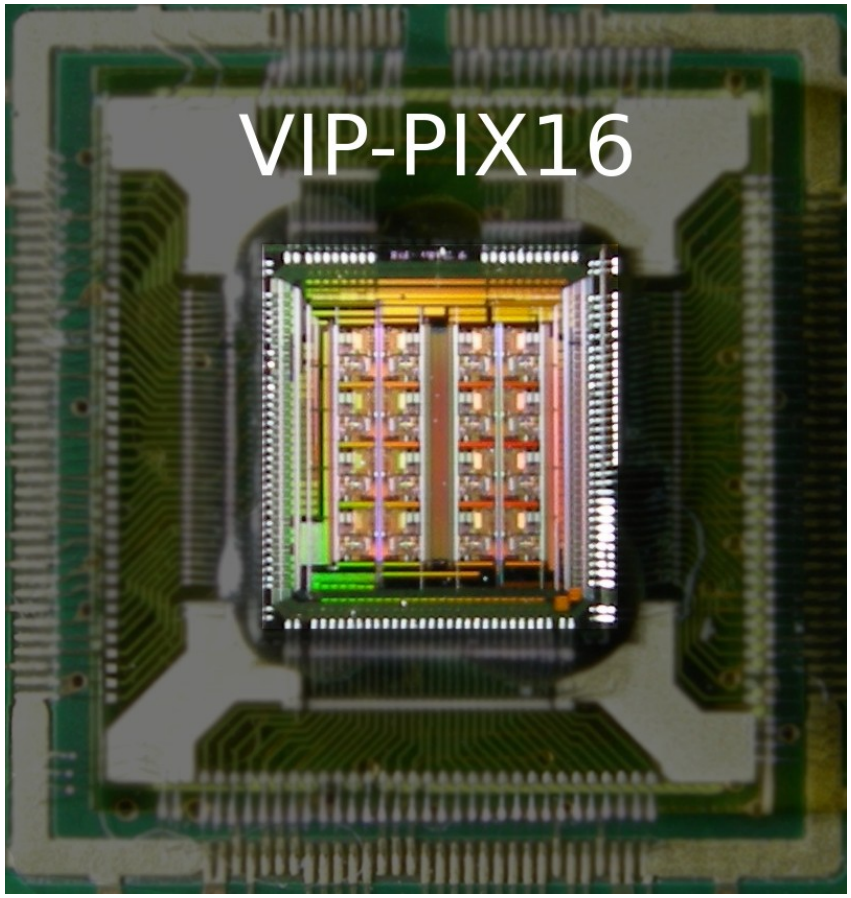
Detectors

Detectors:

- Fundamental piece of any project
- Challenging

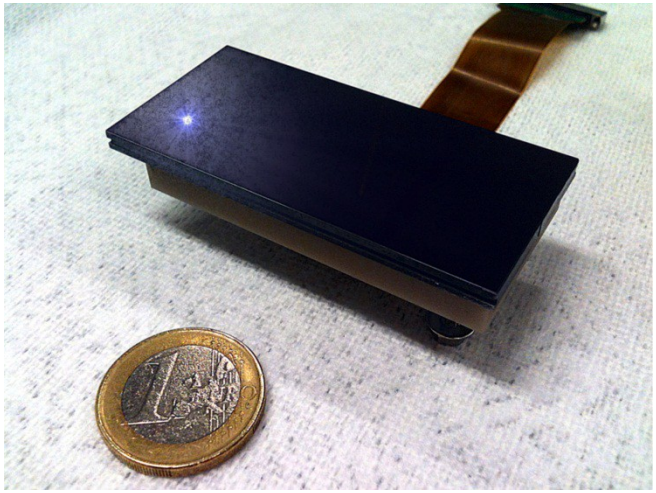
Design and production:

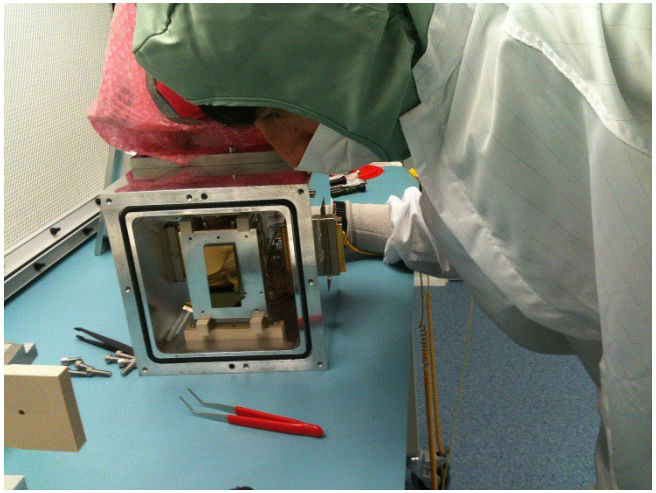
- Single Pixel Analog Front-End ASIC for PET applications
- 16 «smart» pixels 2D array readout electronics for PET applications



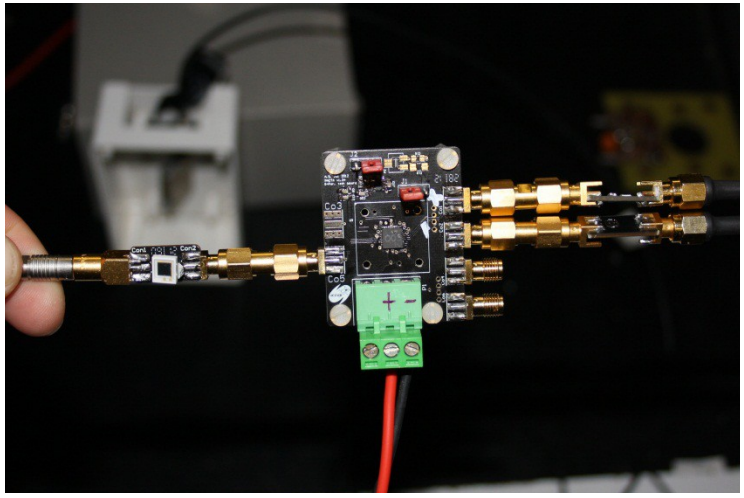
Detectors test and Characterization

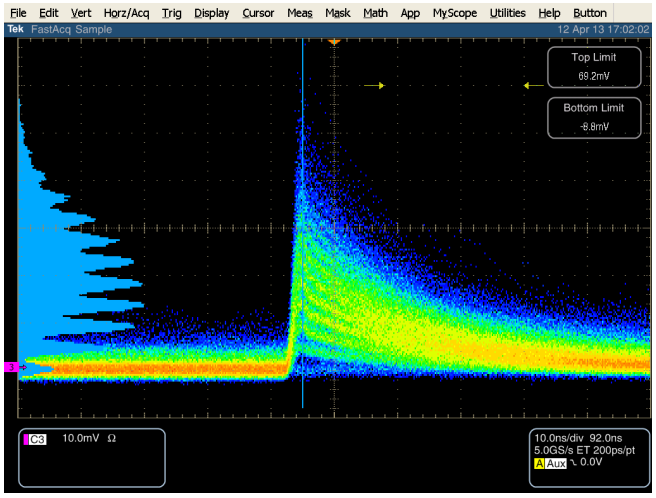
PAU CCD Characterization





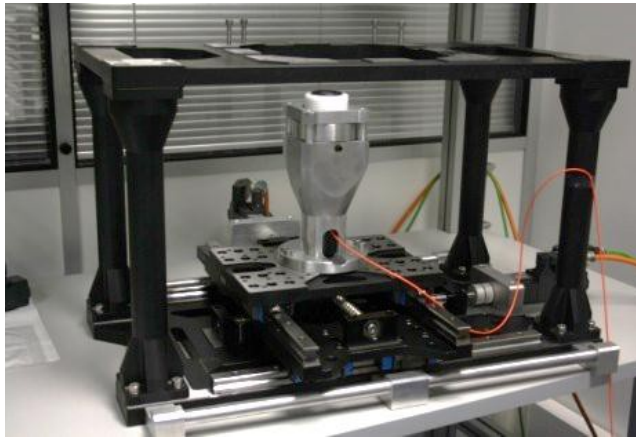
Magic Si PM test

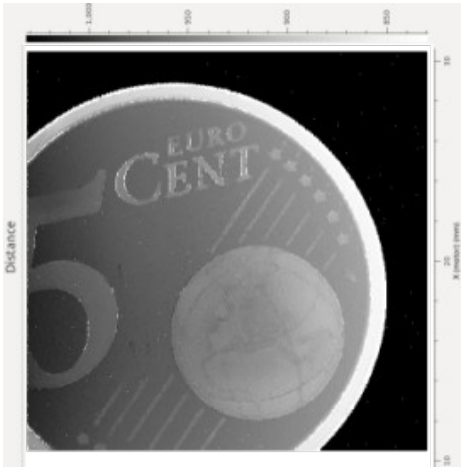


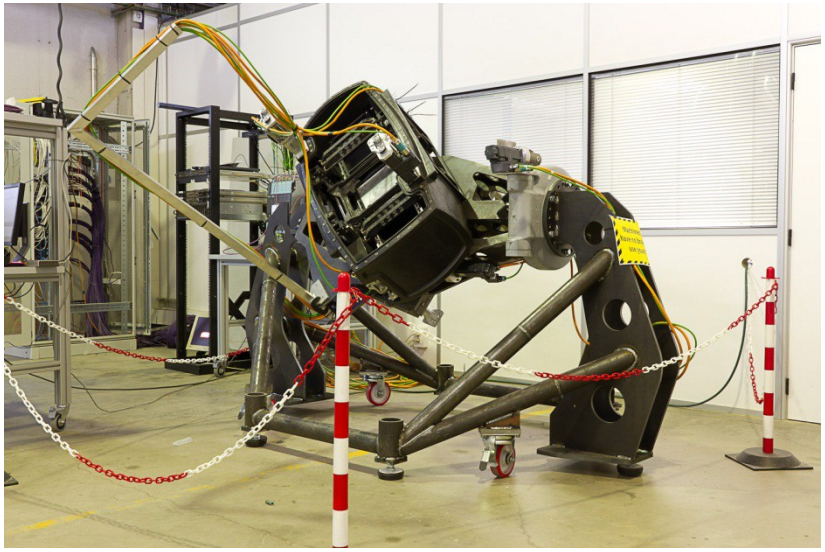


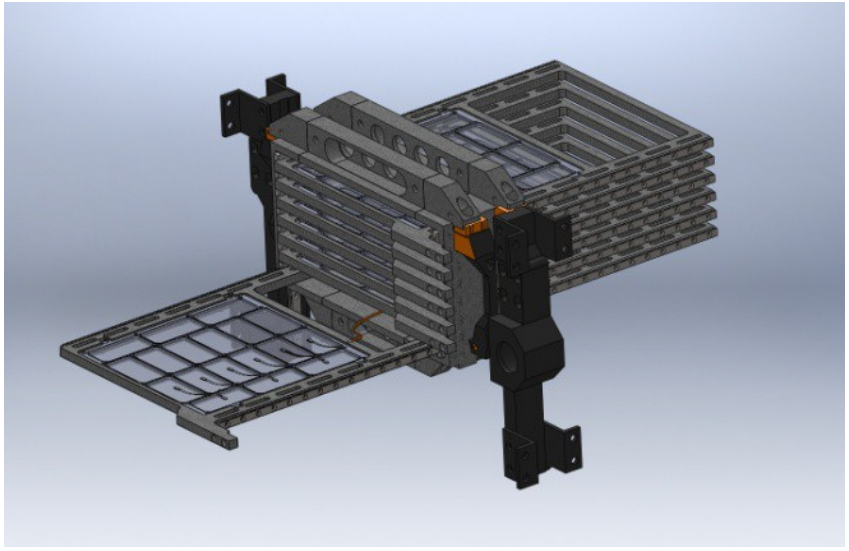
Precise Movements

XYTable
PAUCam Filter Tray System
PAUCam Shutter

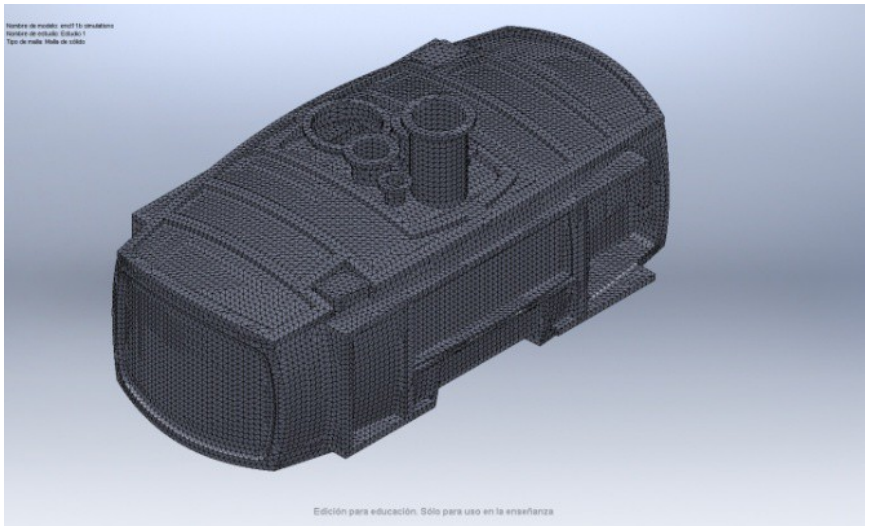


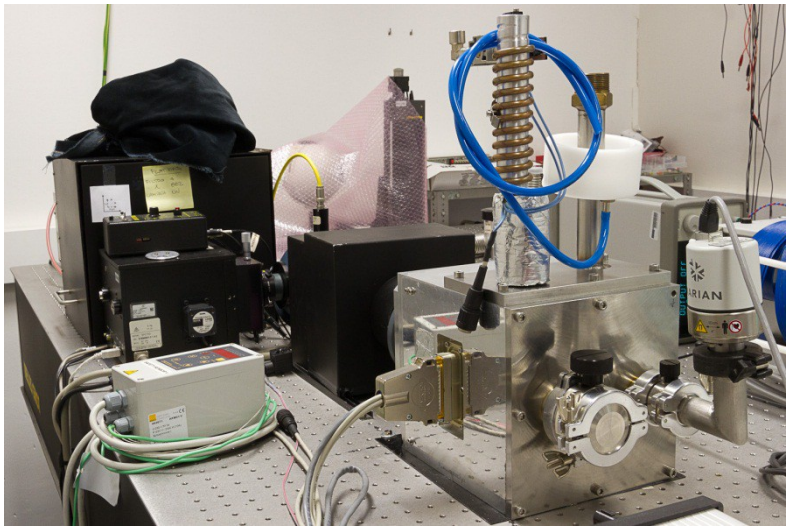


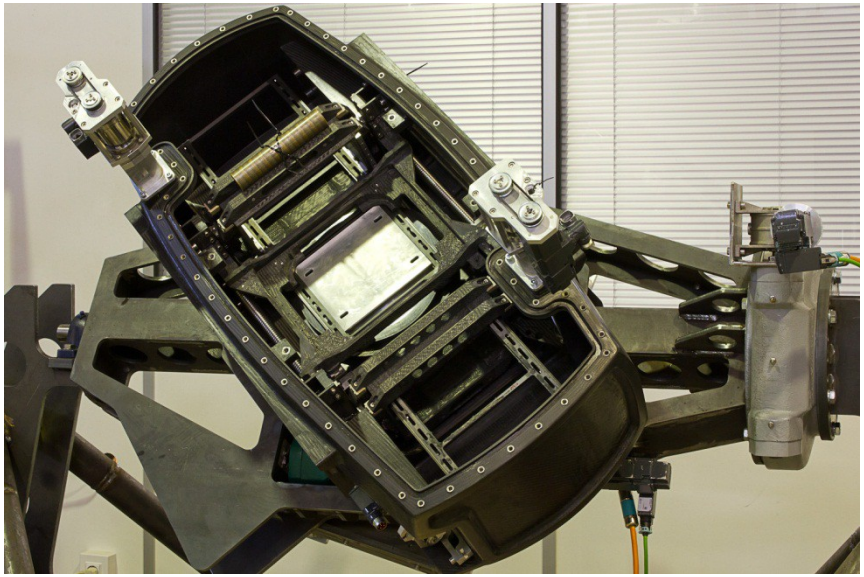


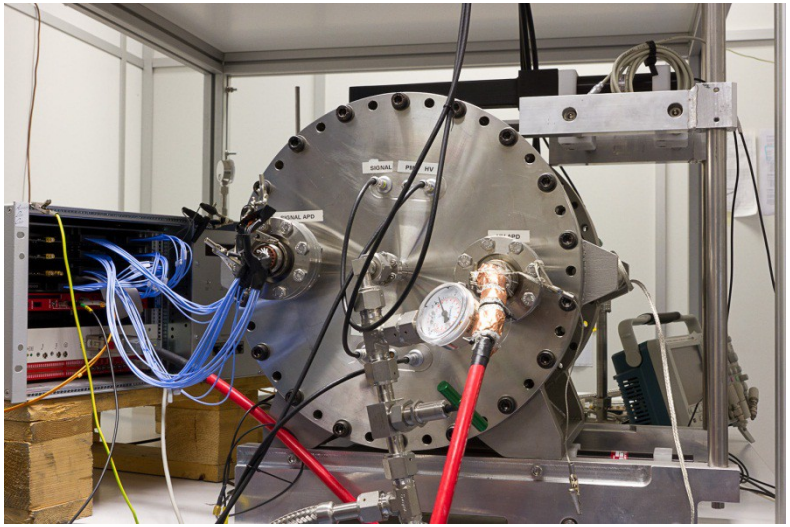


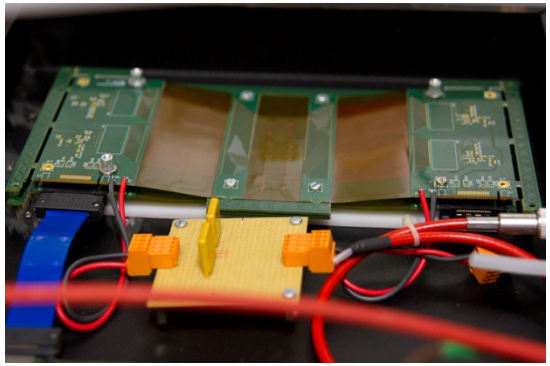
Vacuum

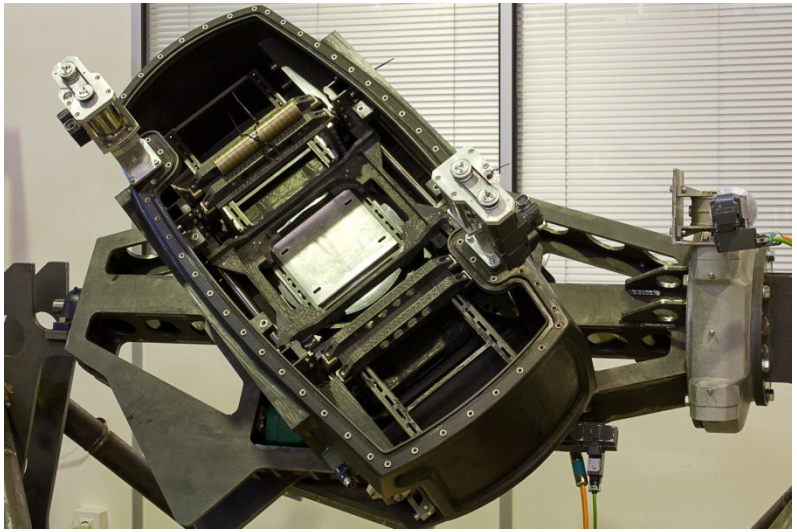


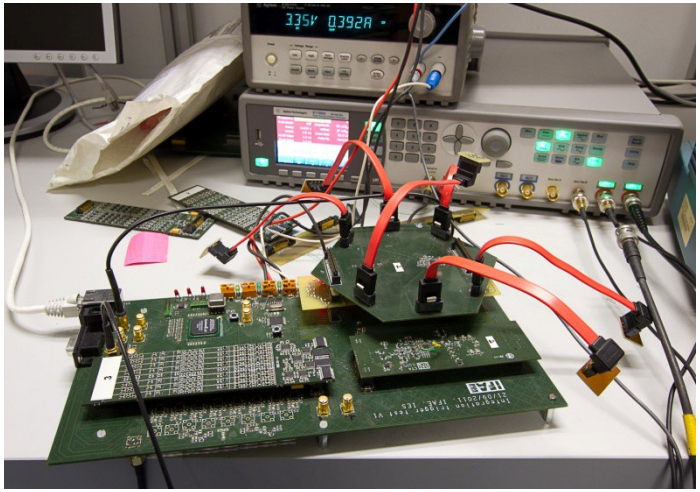


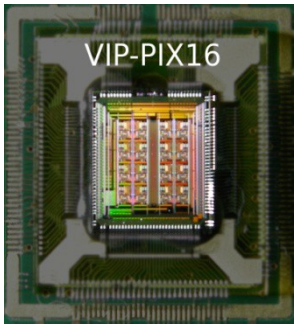


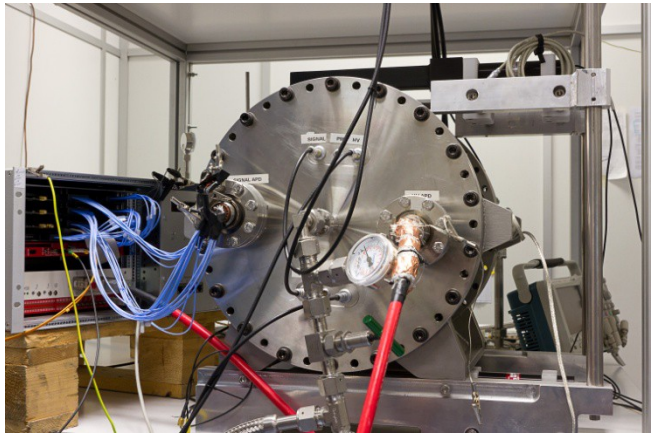


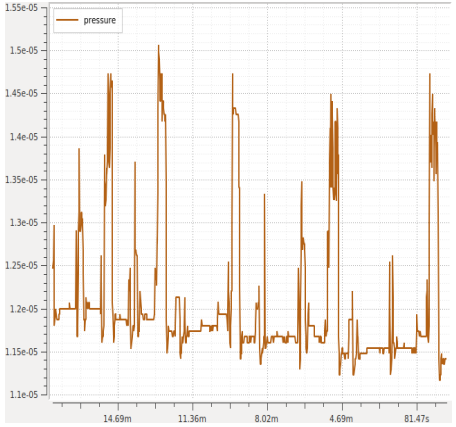






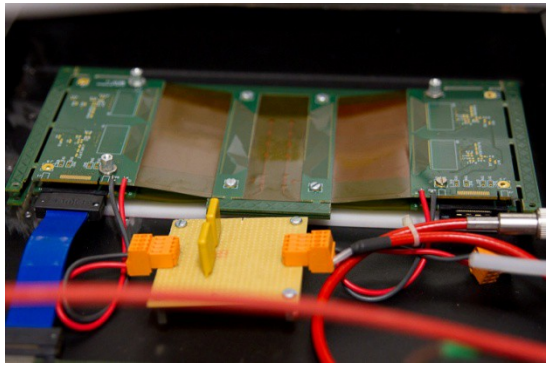




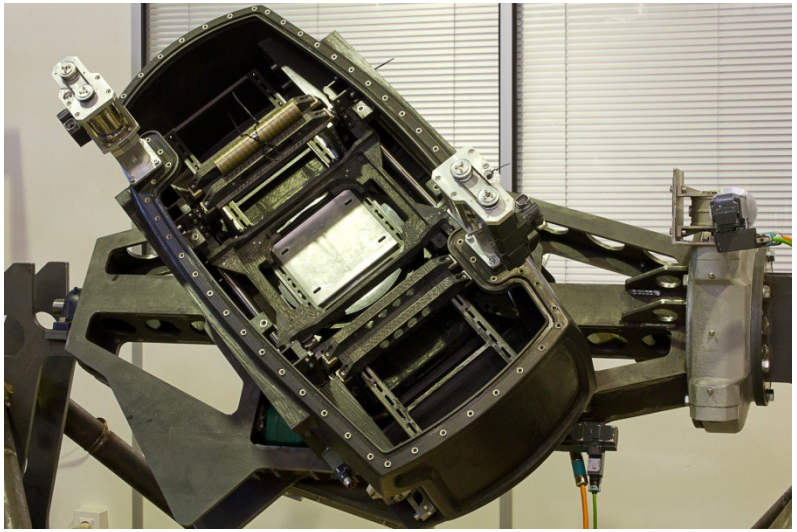


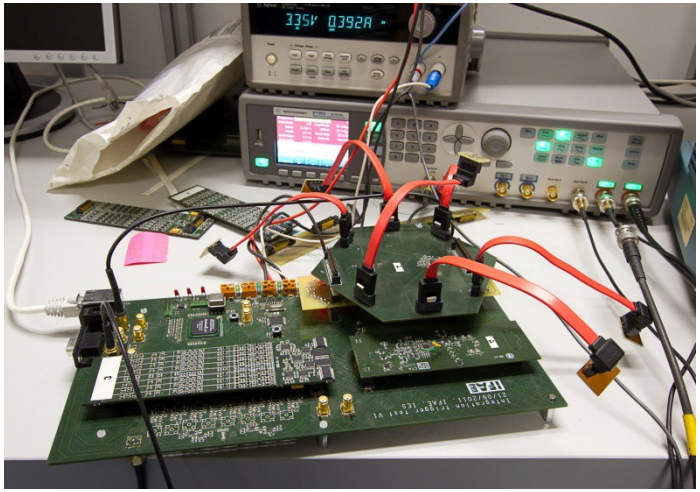
Physics

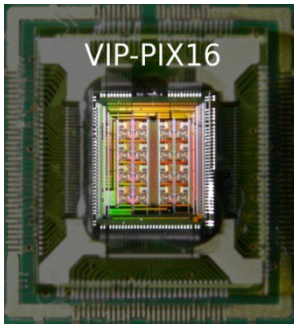
Borrow from Otger Ballester / Laia Cardiel

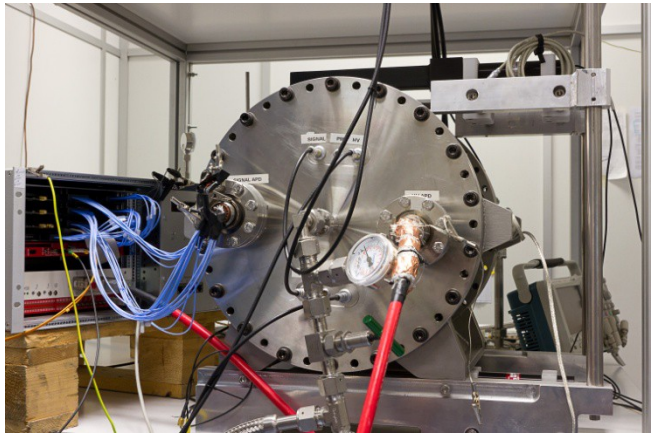


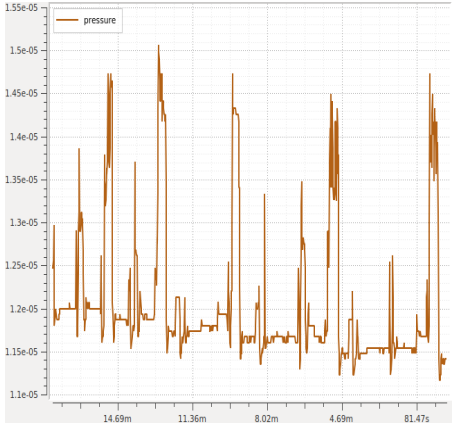

The PAU Camera






VIP-PIX16




pressure
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1.4e-05
1.35e-05
1.3e-05
1.25e-05
1.2e-05
1.15e-05
1.1e-05
14.69m
11.36m
8.02m
4.69m
81.47s

Physics

Physicist

- IFAE research lines

Experimental Division

  - Hadron Colliders
  - Neutrinos
  - Gamma-ray astrophysics
  - Medical Physics
  - Observational Cosmology

Theory Division

  - Standard Model
  - Beyond Standard Model
  - Astroparticles and Cosmology

Gamma-ray astrophysics group (>10 years exploiting MAGIC):

  - Galactic objects: PWNe, binaries
  - AGN → EBL, LIV, ALP
  - Fundamental Physics: dark matter, electron-positron spectra

  - Also background expertise on particle physics and cosmic rays

Conclusions

- Infrastructure and Machines
  - Clean and Shielded room
  - Quite complete mechanical workshop

- Engineering expertise
  - Front end electronics (analogue and digital, fast signal)
  - Hardware control
  - ASIC development
  - Mechanics for precise movements
  - Detector mechanics: vacuum, cryogenics
  - Hardware test and characterization

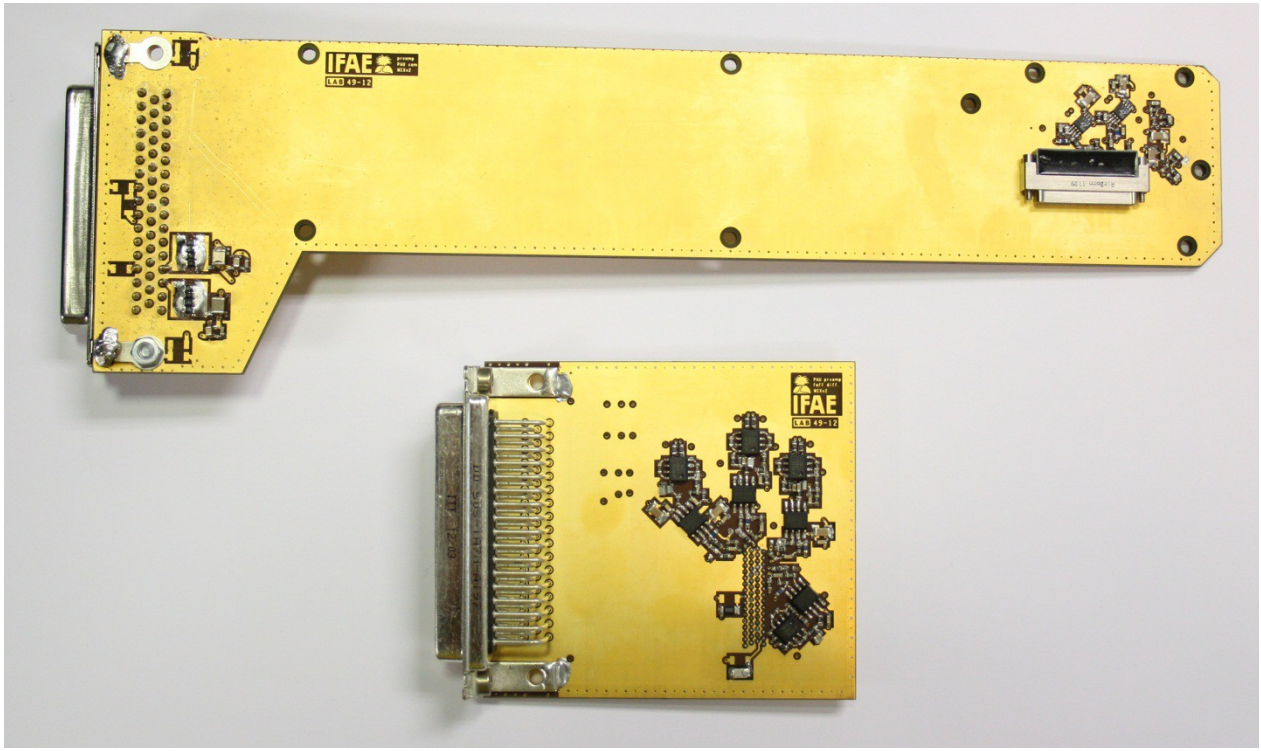
- Physics background
  - Gamma-ray astrophysics (galactic, AGNs, fundamental physics)
  - Background from “past”: particle physics, cosmic rays

Questions

Thanks for your attention!

Frontend electronics

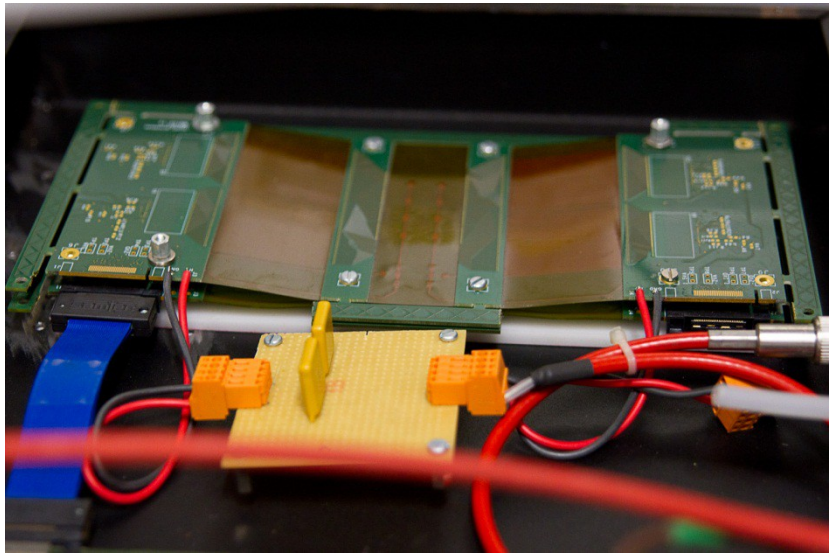
- PAUCam CCD preamplifier
  - Gold plated, low outgassing components for Vacuum
  - Diferential
  - For low noise system (<6e)
  - Low power consumption (100mW)

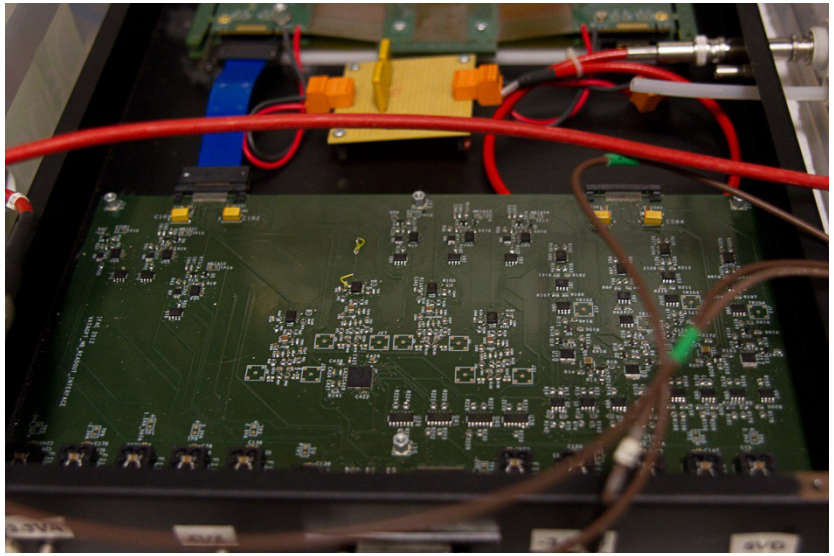


Frontend electronics

VIP

- Nuclear imaging
  - Rigiflex
  - 8 Sensor CDTe + signal conditioning
  - Control
- Sensor PCB pileup: Up to 10 -> 80Sensors

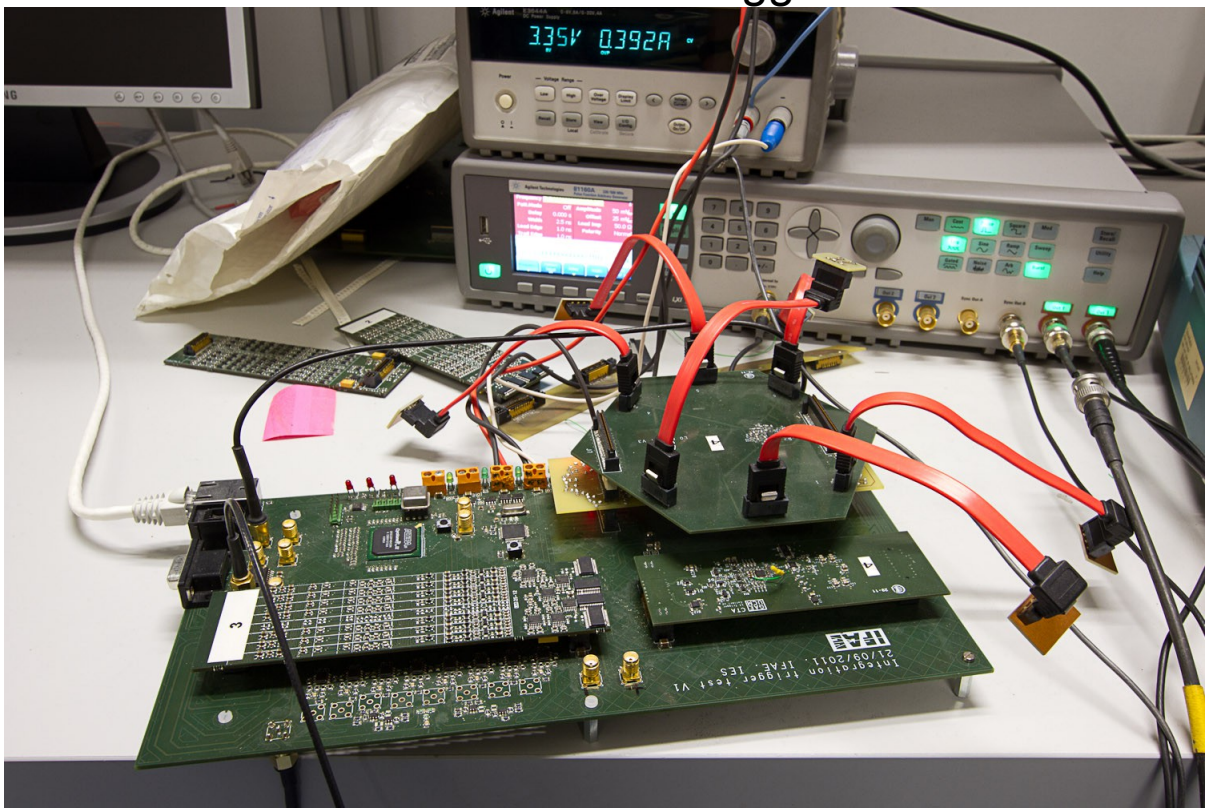




Frontend electronics

CTA

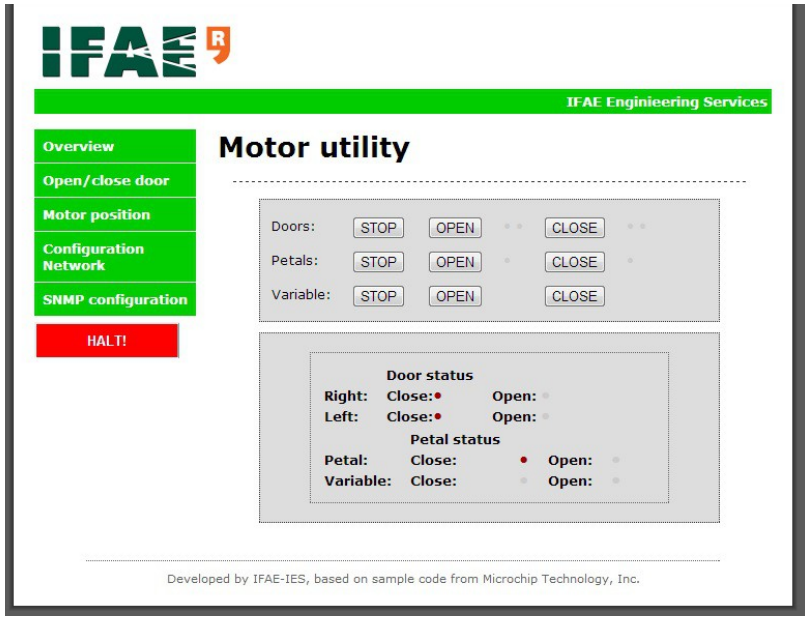
- SumTrigger boards new design with delay lines
  - 8 channels
- Characterization and calibration of sum trigger test boards



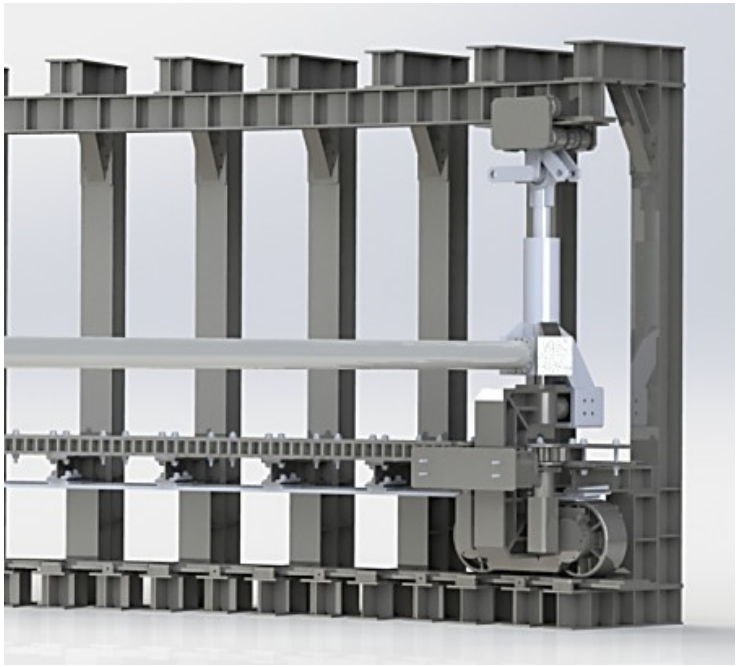
Control Systems

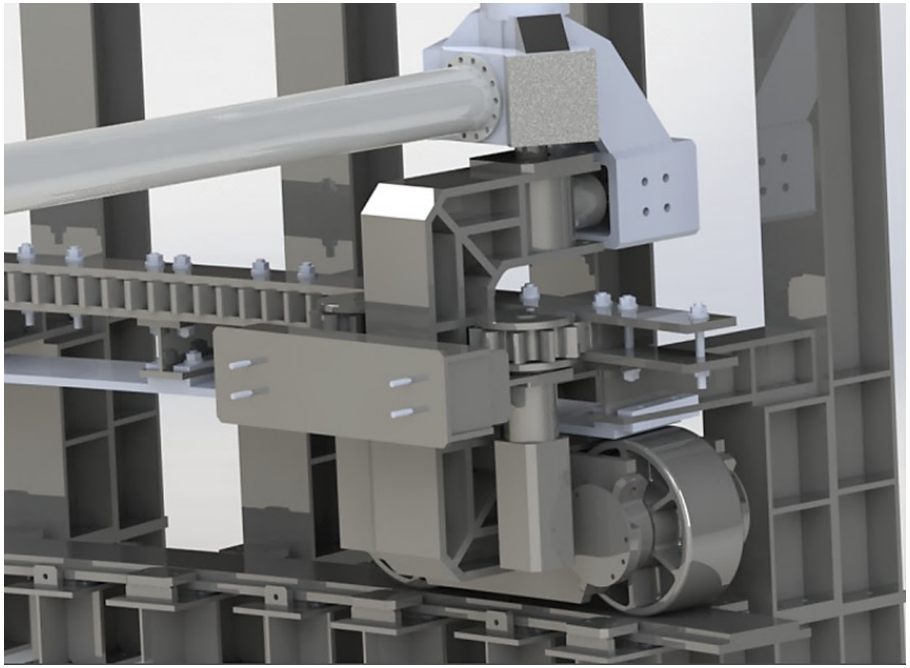
Control systems:
- Interesting and useful
- Mechanics, electronics and software

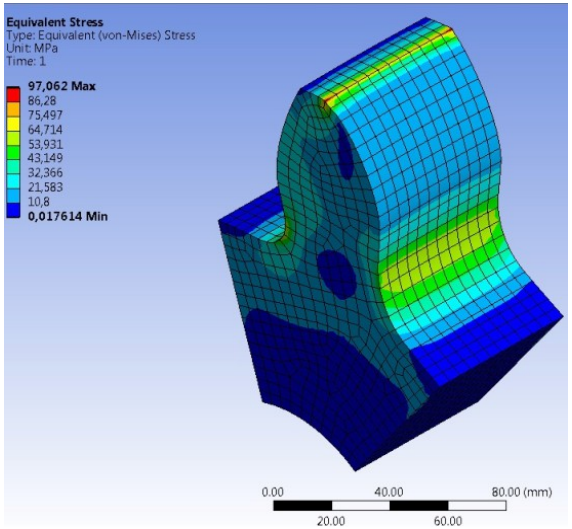
CTA LIDAR
- XY laser alignment
- Container motors control
- Web interface + API



Other developments



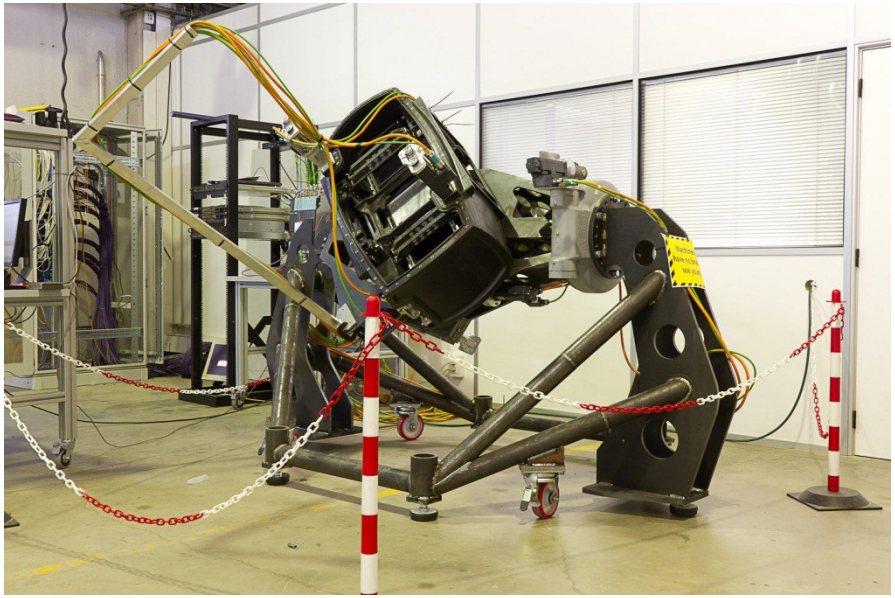


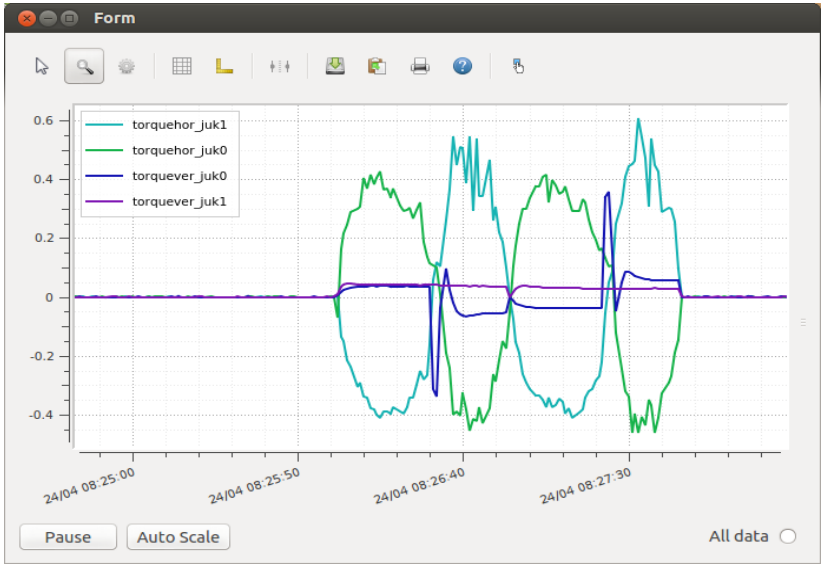


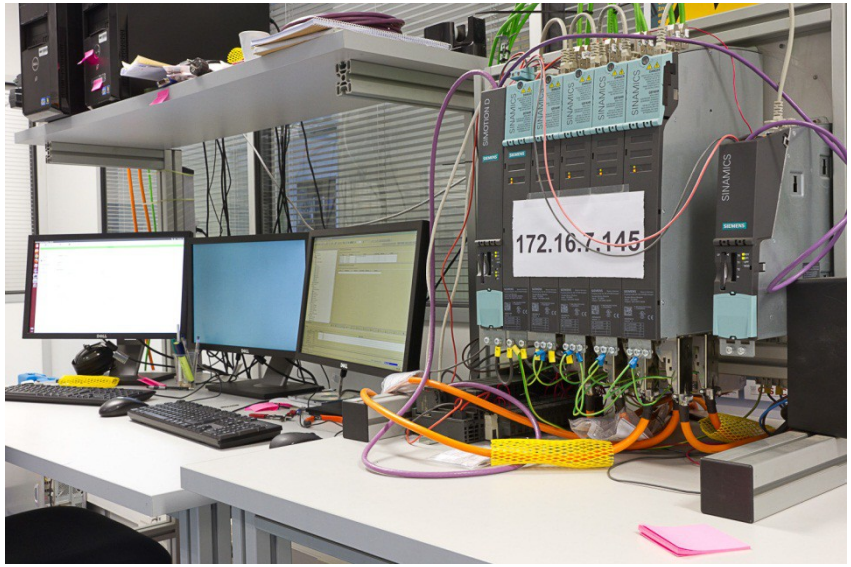
Control Systems

PAUCam Slow Control

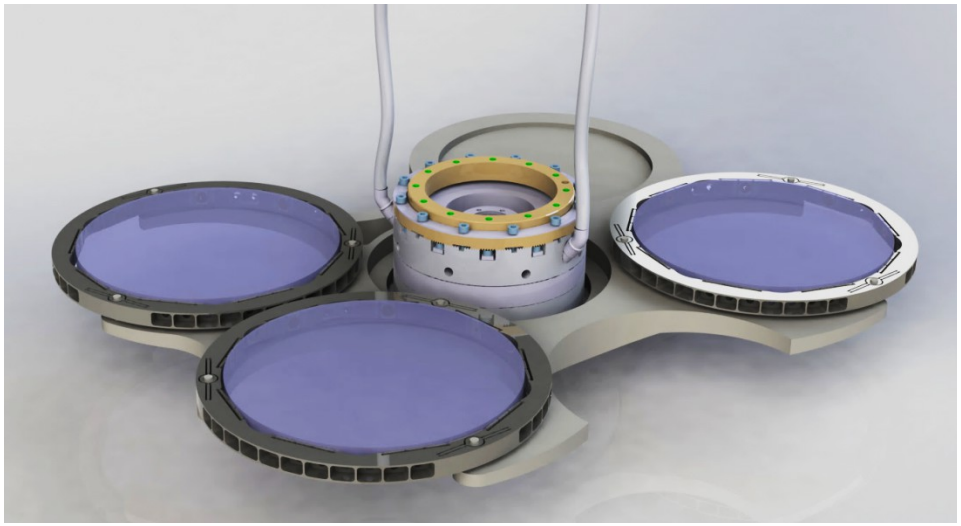
- Motion Control
- Software
- Integration into PAUCam CS

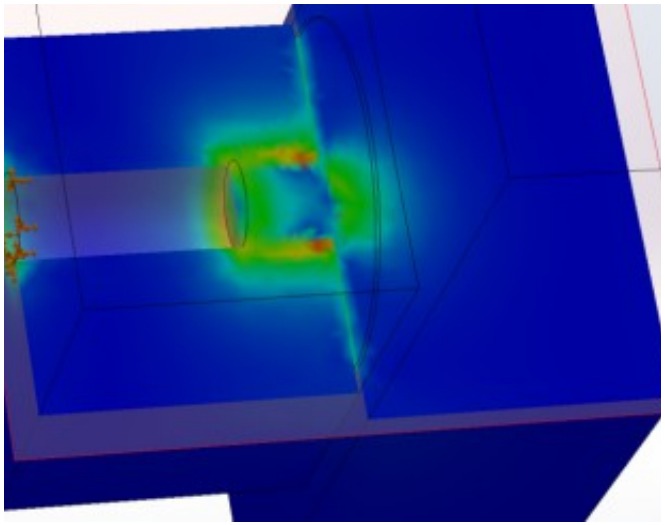


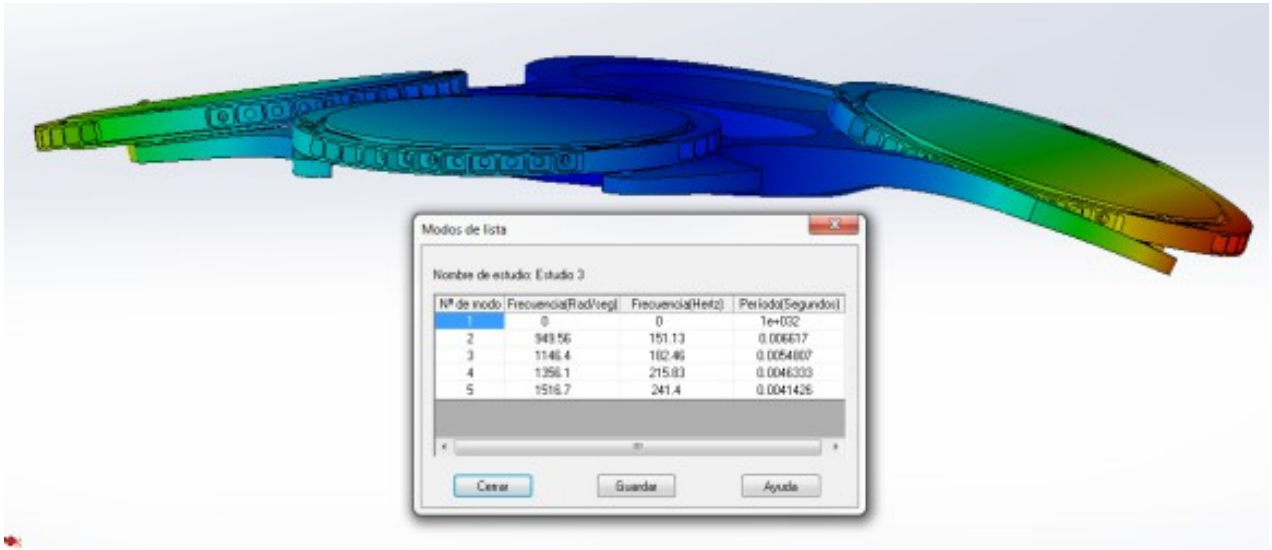




Other developments







Other developments