Coaching station for FIT on-call shifters

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for the ALICE collaboration

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ALICE

Warsaw University of Technology

ALICE Fast Interaction Trigger (FIT)

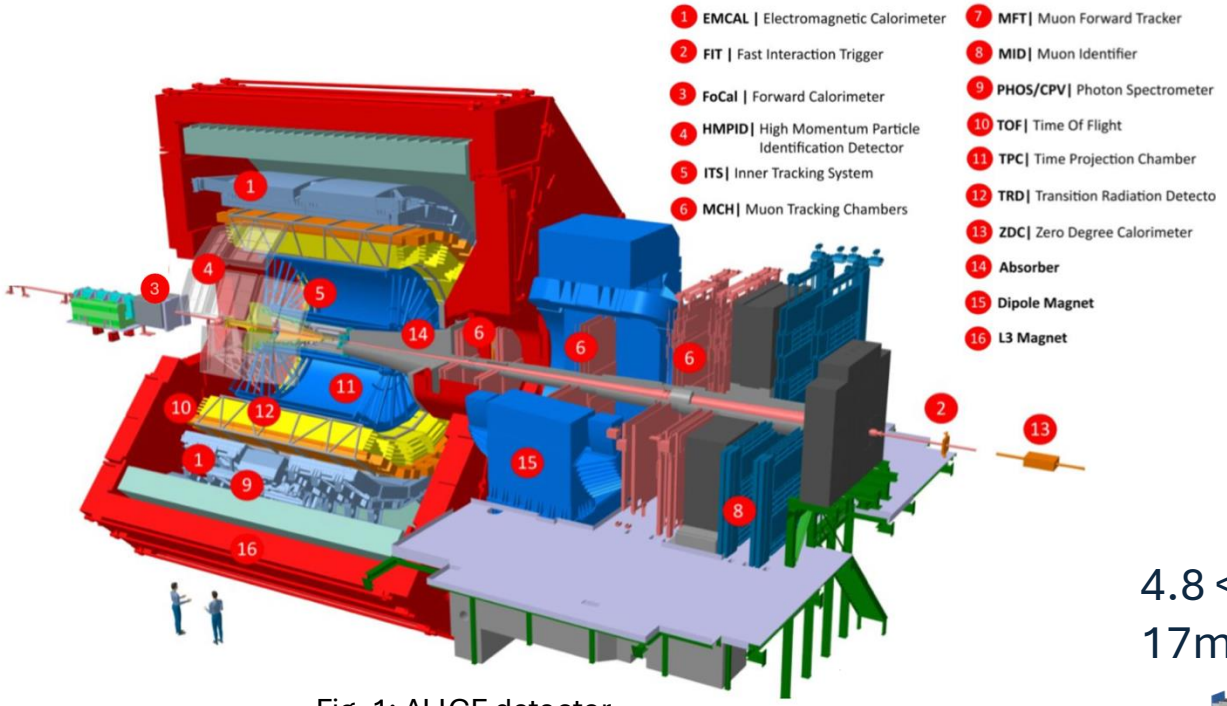


Fig. 1: ALICE detector

Delivered Functionality

- Fast min. bias collision trigger with latency < 425 ns;
- Time resolution: 5 ps in Pb-Pb and 18 ps in pp collisions;
- Luminosity and background monitor;
- Centrality measurement;
- Event plane determination;

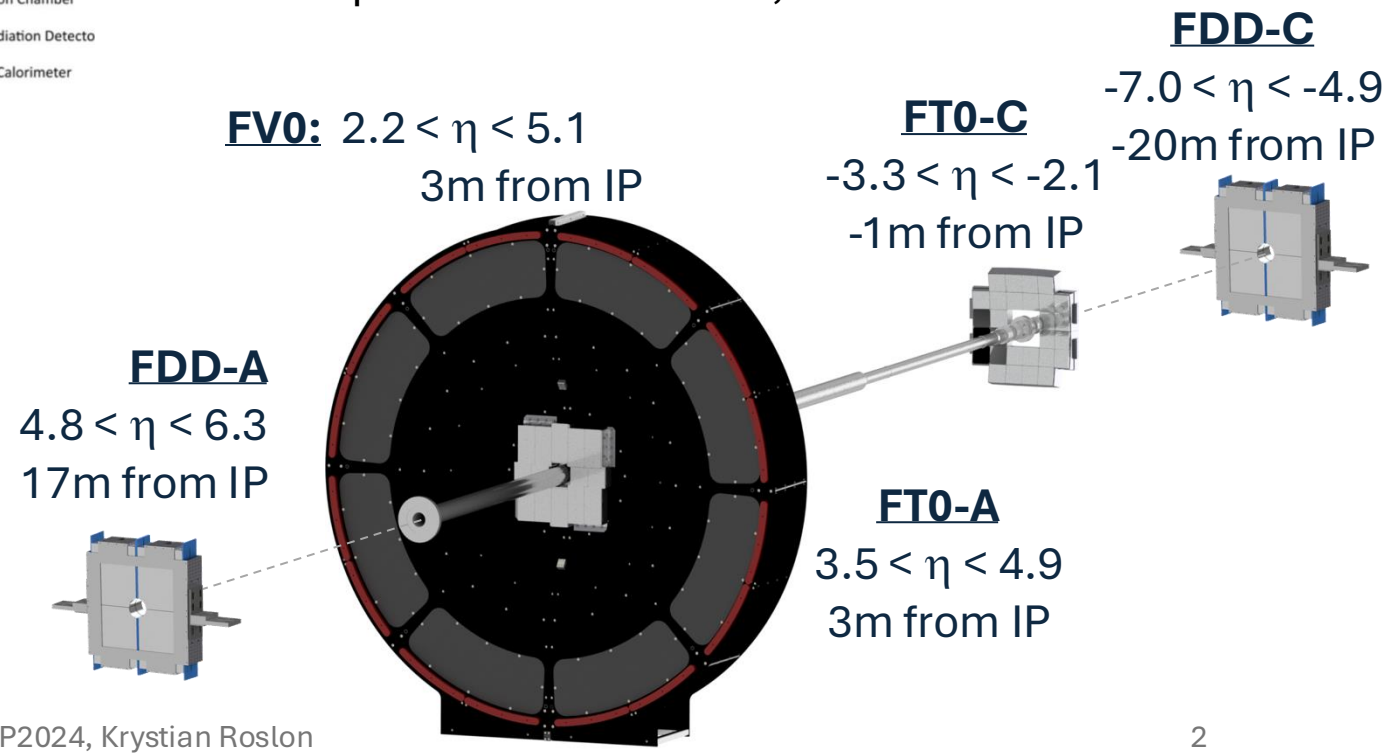


Fig. 2: ALICE FIT detector

ALICE Fast Interaction Trigger (FIT)

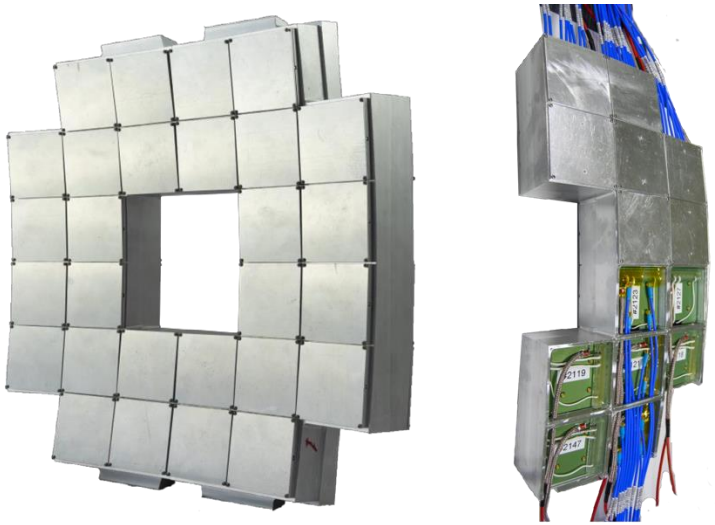


Fig. 3: FT0 – Cherenkov counter;
96+112 = 208 channels;

Fig. 4: FV0 – scintillator detector;
48 channels;

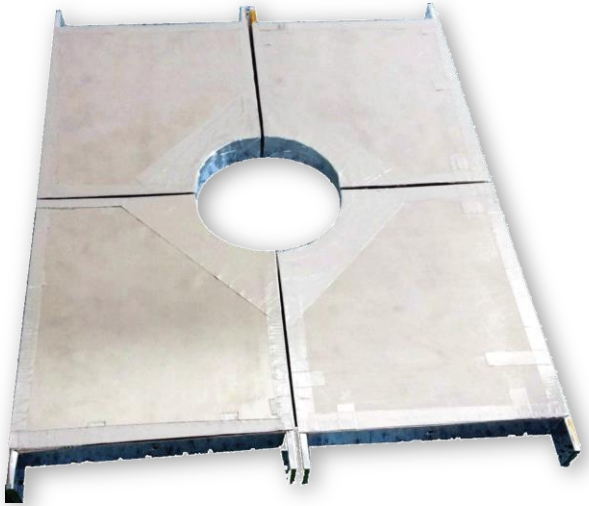


Fig 5: FDD – scintillator detector;
8+8 = 16 channels;

Motivation

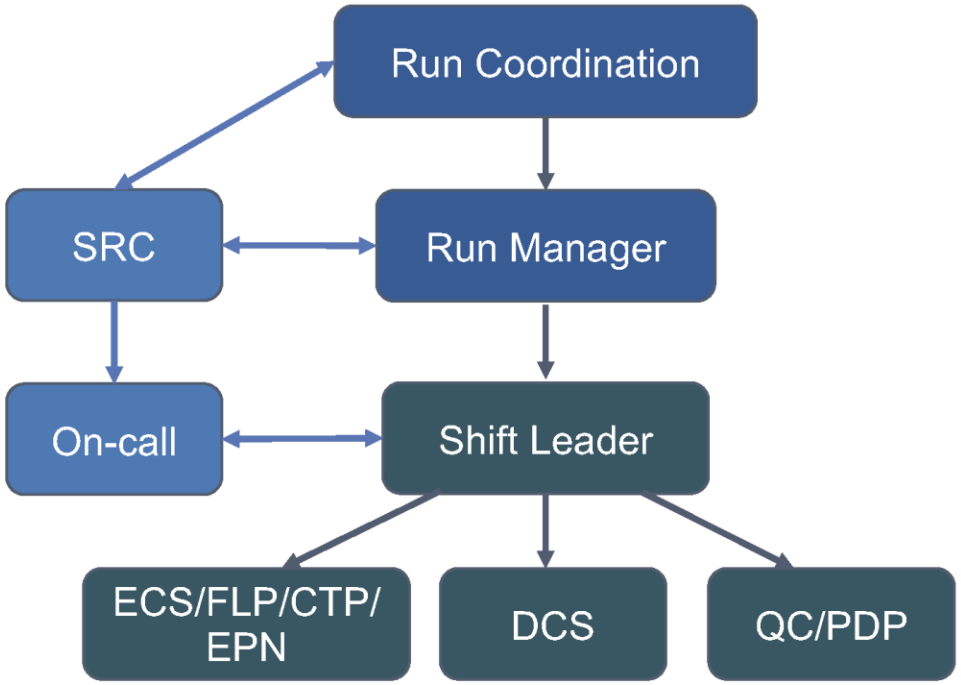


Fig. 6: ALICE experiment supervisor hierarchy

The shift crew receives support from a group of on-call specialists who can be reached by the crew when expert intervention is required. Each subsystem's on-call expert are **trained and overseen** by their respective System Run Coordinators (SRC).

Because of the 24/7 data-taking regime, it's **impossible** to schedule training sessions **during ALICE operation.**

Hands-on training can only be conducted during **beam-off periods** or when a **technical intervention** is ongoing. Such moments are scarce during the regular LHC operation.

-Is it possible to prepare the coaching station for all FIT sub-detectors?

- Yes.
- Why?

Unified FIT control system

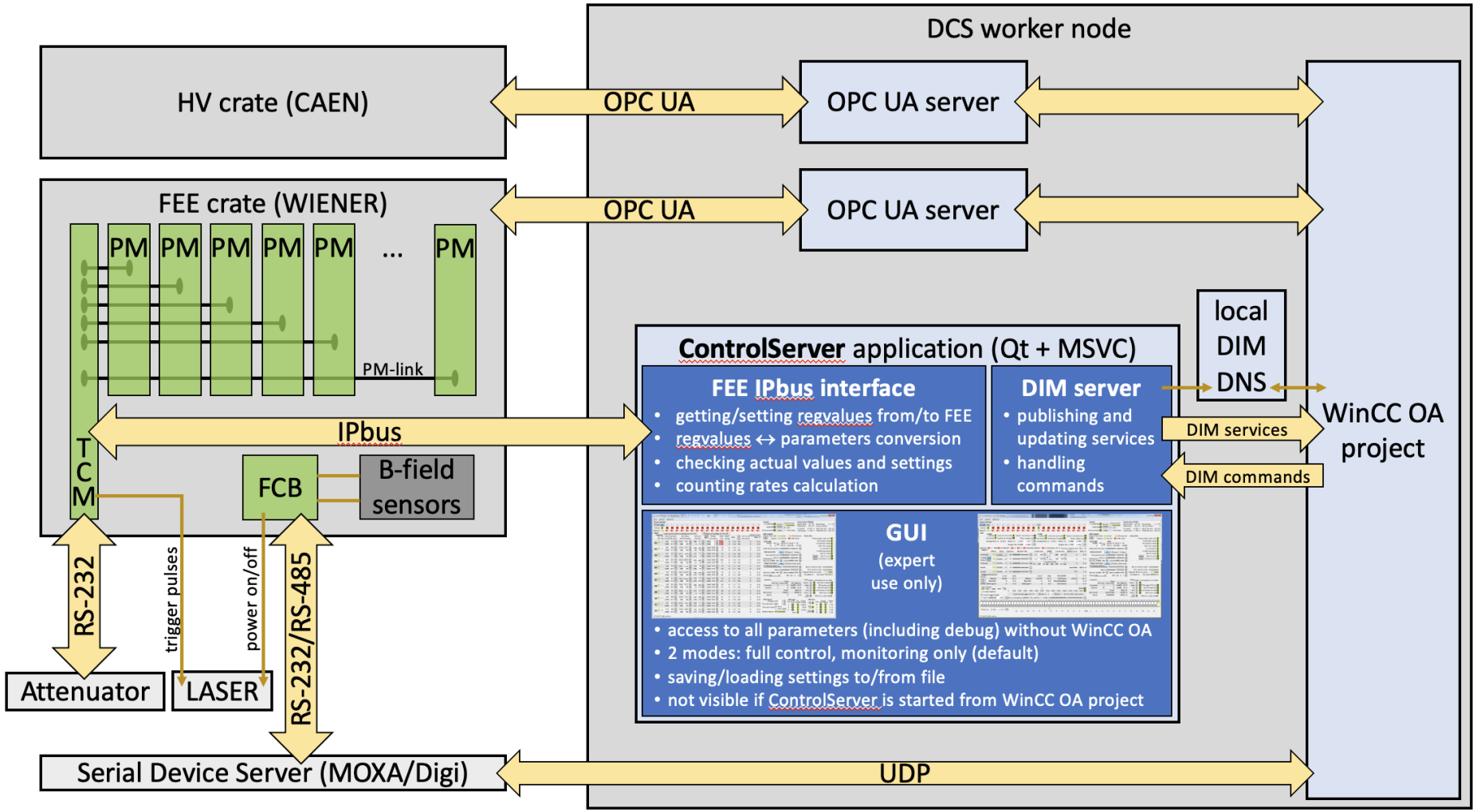


Fig. 7: ALICE FIT control system

Unified FIT WinCC Projects

Project properties:

- Individual;
- Unified;
- Modular;
- Scalable;

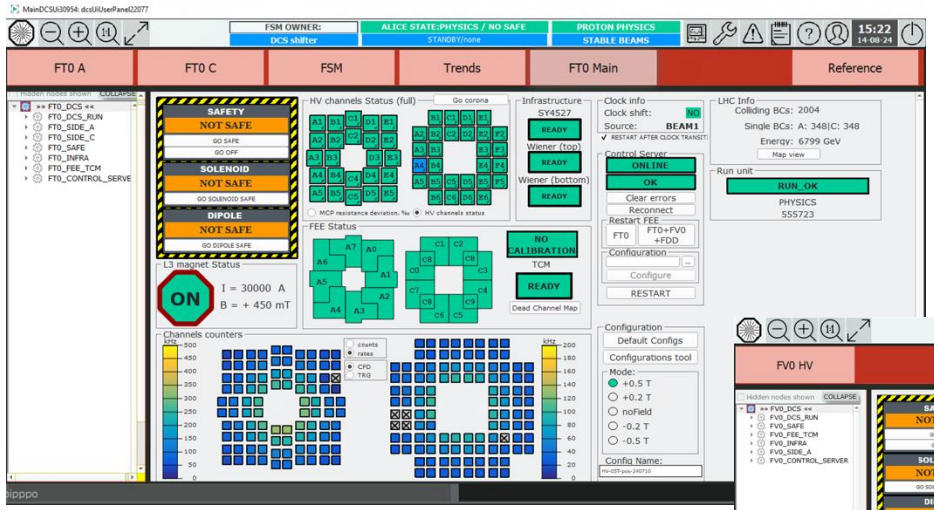


Fig. 8: FT0 – WinCC Project

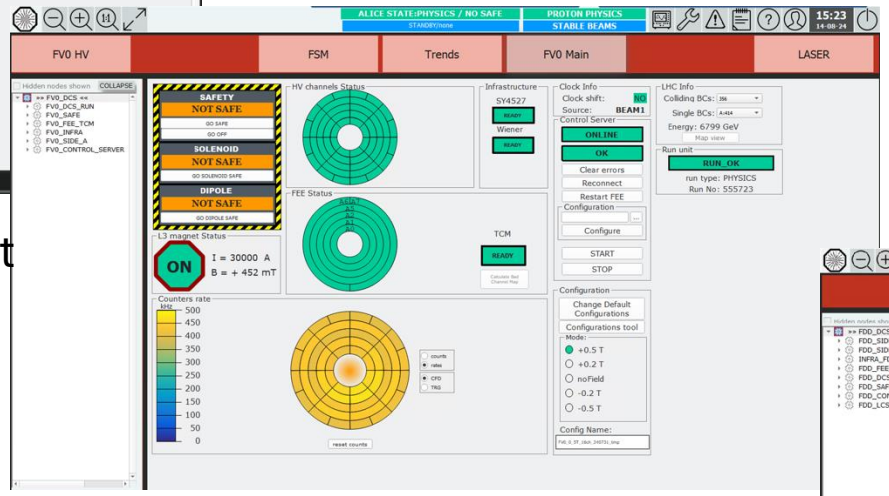


Fig. 9: FV0 – WinCC Project

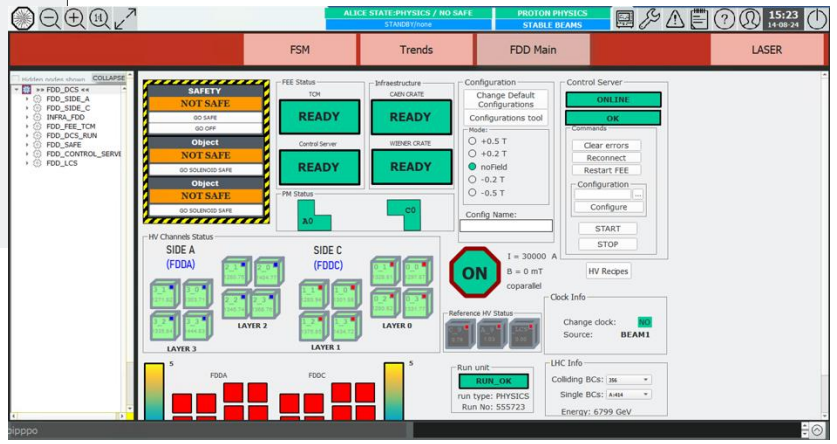


Fig. 10: FDD – WinCC Project

ALICE detector setup

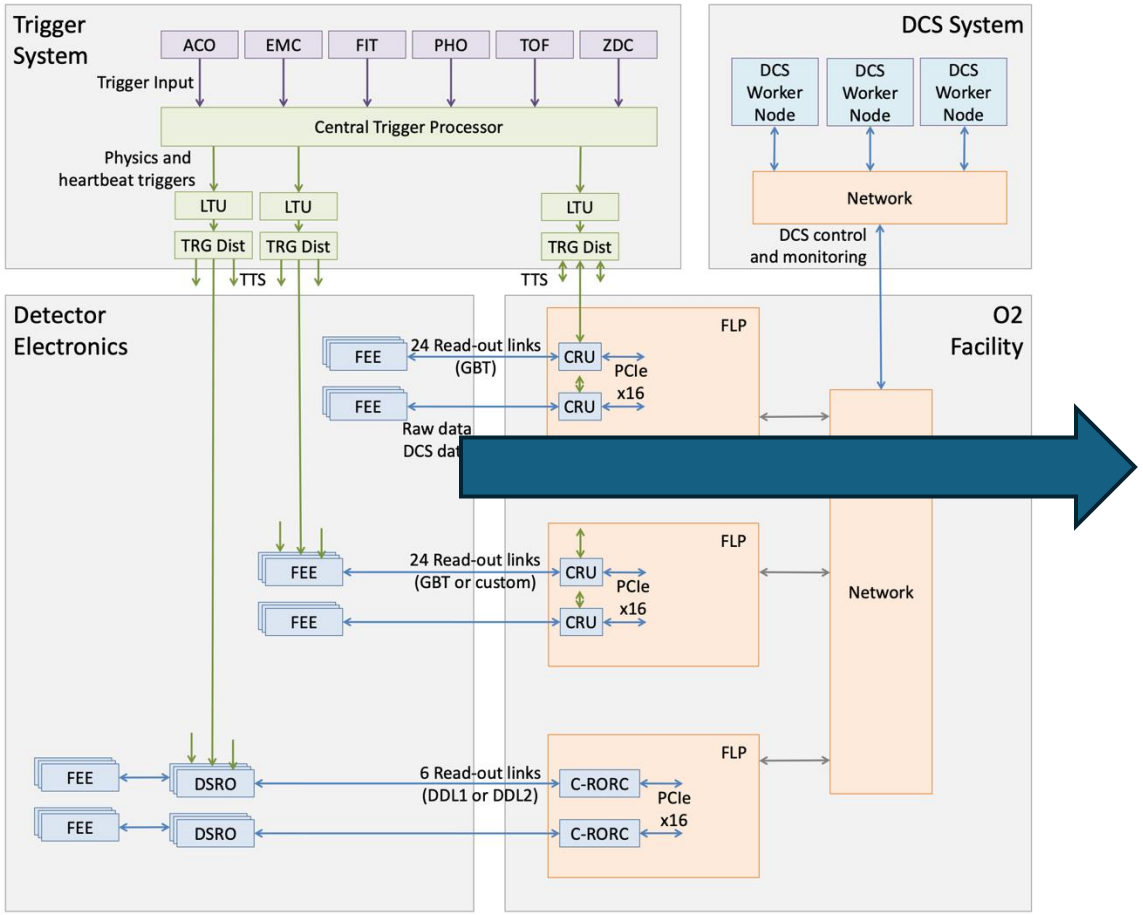


Fig. 11: Detector read-out and interfaces of the O2 system with the trigger, detector electronics and DCS.

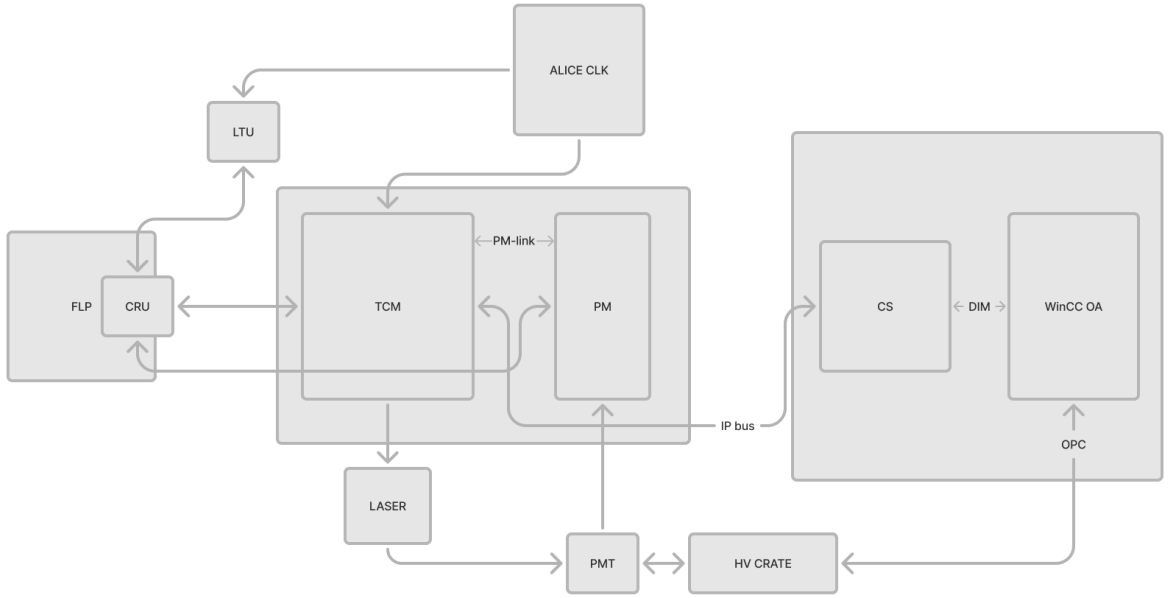
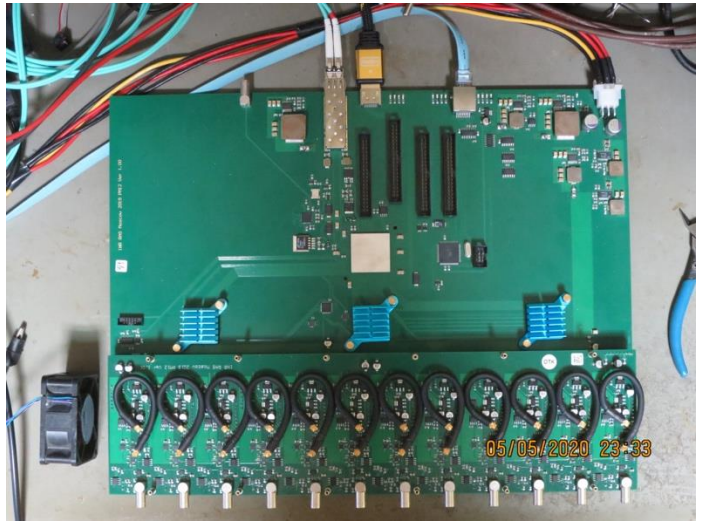


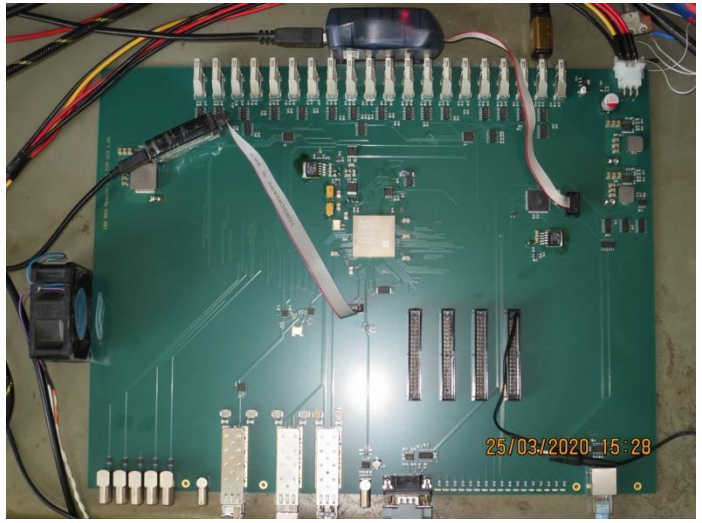
Fig. 12: Schema of the FIT laboratory setup.

ALICE FIT laboratory setup



FIT PM (Processing Module):

- 12 independent inputs;
- Very simillar for all FIT detectors;



FIT TCM (Trigger and Clock Module):

- One TCM;
- May connect 20 PMs via an HDMI cable;
- Connected to the FIT DCS via IPbus;

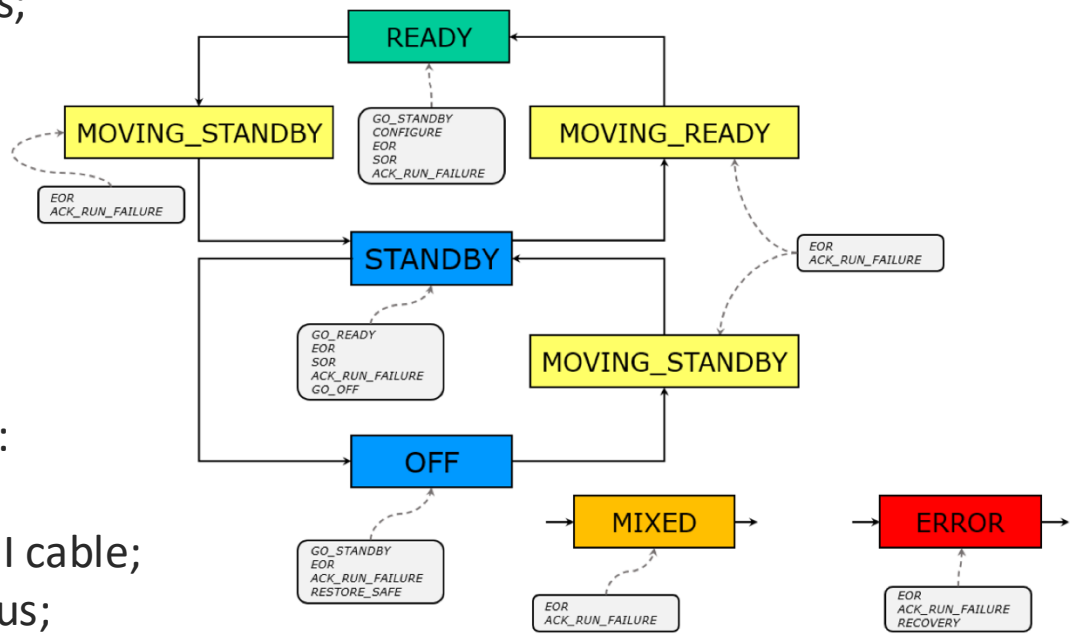
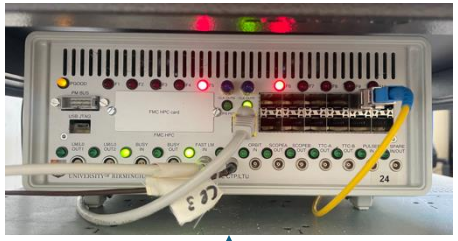


Fig. 13: Finite State Machine (FSM) of the FIT laboratory setup.

ALICE FIT laboratory setup



LTU

Node

FIT FEE

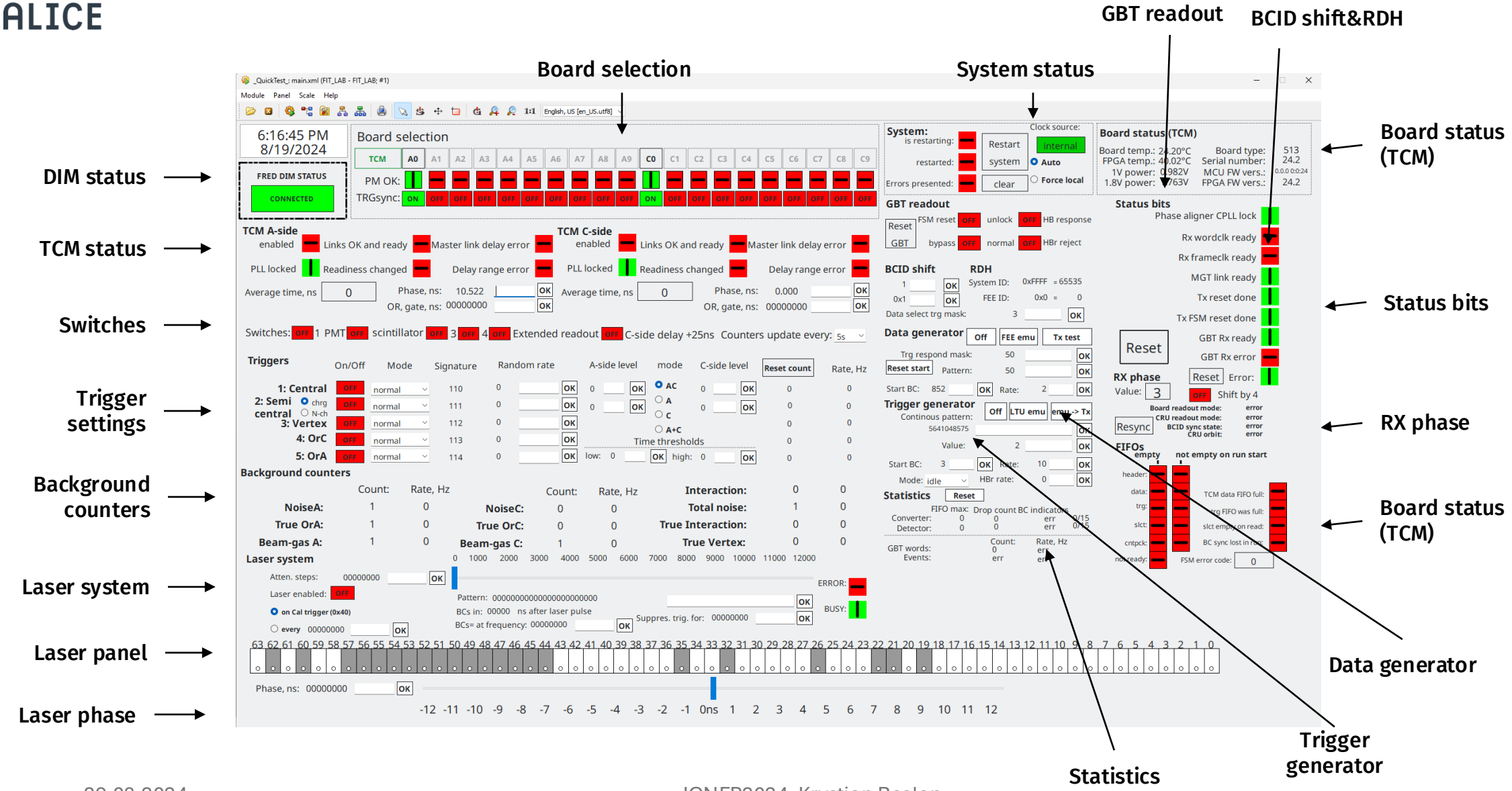
FLP with CRU

PMT BOX

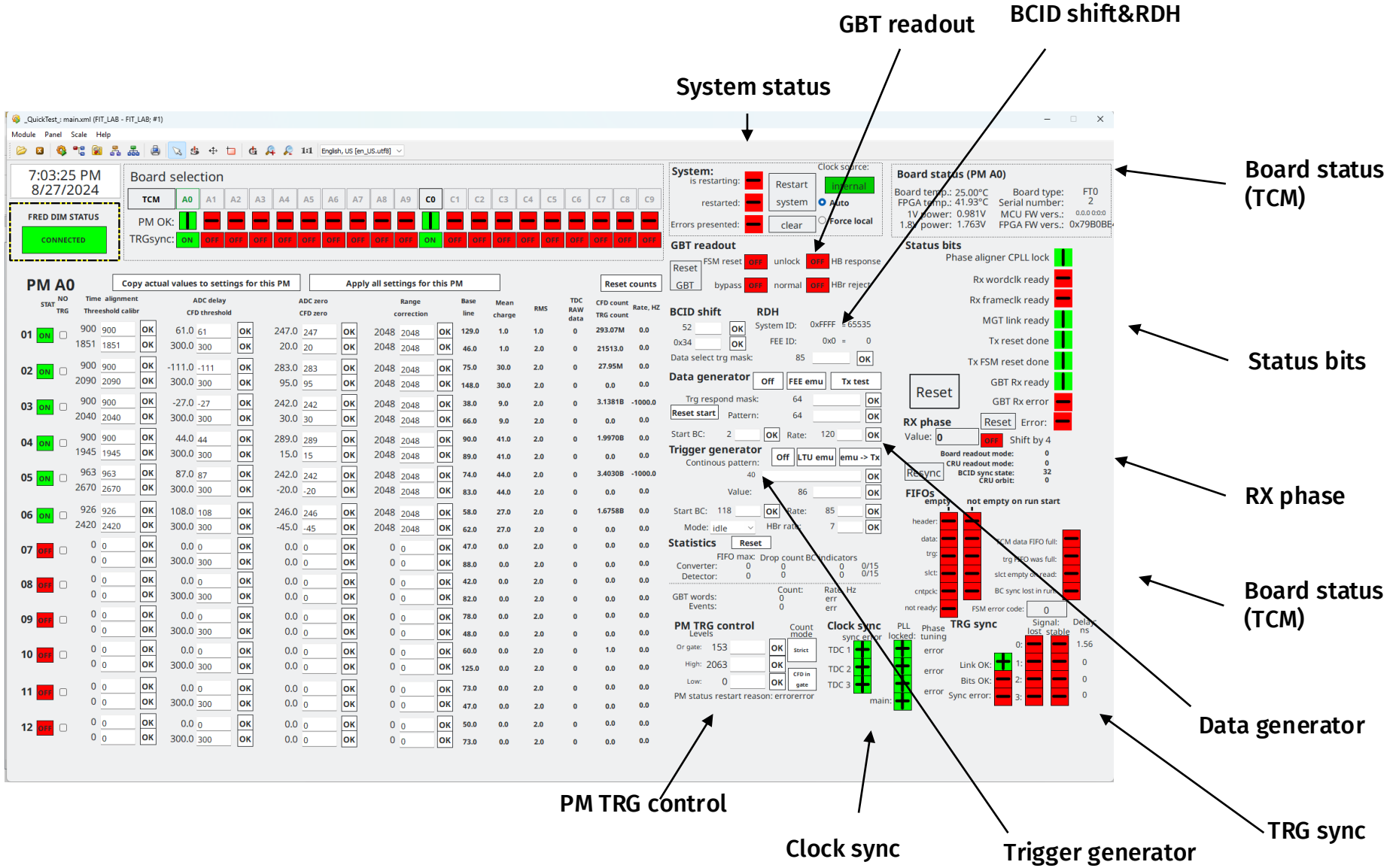
LASER SYSTEM

HV CRATE

TCM Module


GBT readout
BCID shift&RDH
Board selection
System status
DIM status
TCM status
Switches
Trigger settings
Background counters
Laser system
Laser panel
Laser phase
Board status (TCM)
Status bits
RX phase
Board status (TCM)
Data generator
Trigger generator
Statistics
FRED DIM STATUS
CONNECTED
Board selection
TCM A-side
TCM C-side
Triggers
Background counters
Laser system
System:
Board status (TCM)
GBT readout
Status bits
BCID shift
RDH
Data generator
Trigger generator
RX phase
FIFOs
Statistics

PM Module


GBT readout
BCID shift&RDH
System status
Board status (TCM)
Status bits
RX phase
Board status (TCM)
Data generator
TRG sync
Trigger generator
Clock sync
PM TRG control
PM options
PM A0
Board selection
FRED DIM STATUS
CONNECTED
System:
GBT readout
Board status (PM A0)
Status bits
BCID shift
RDH
Data generator
Trigger generator
RX phase
FIFOs
Statistics
PM TRG control
Clock sync
TRG sync

WinCC Project

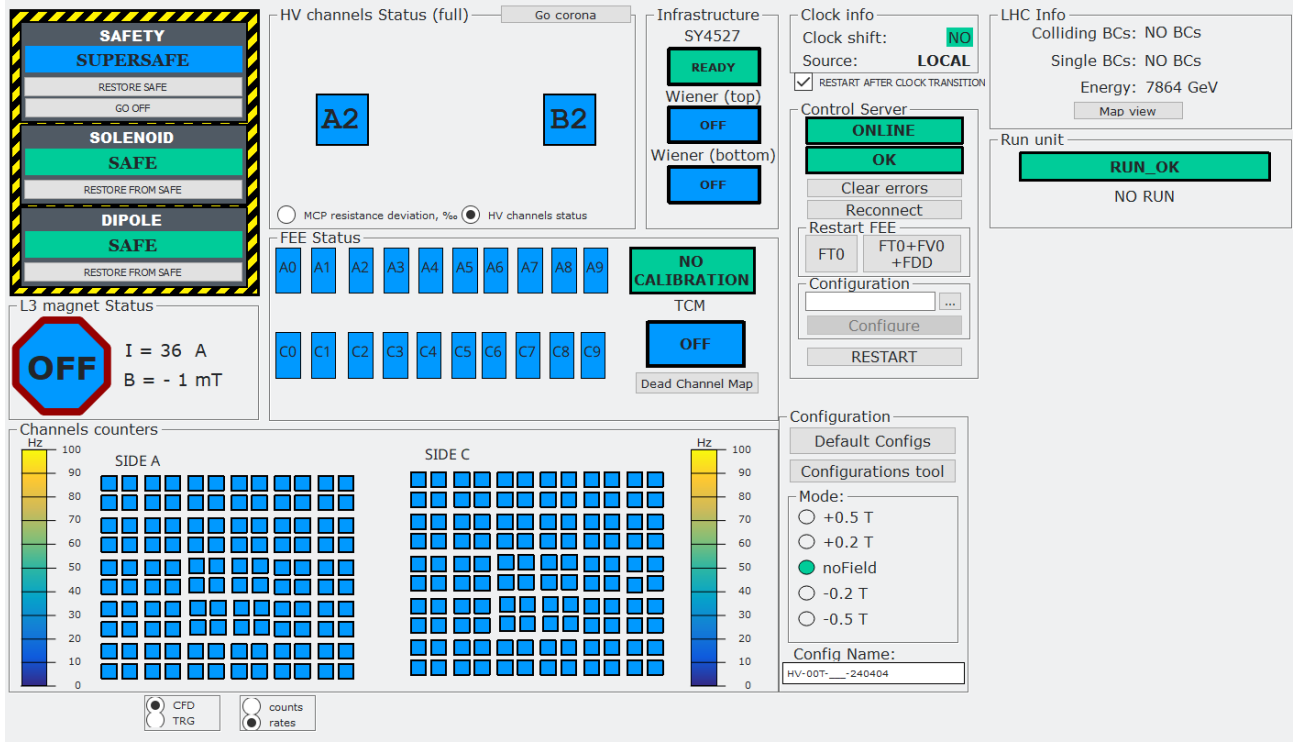


Fig. 14: LAB – WinCC Project

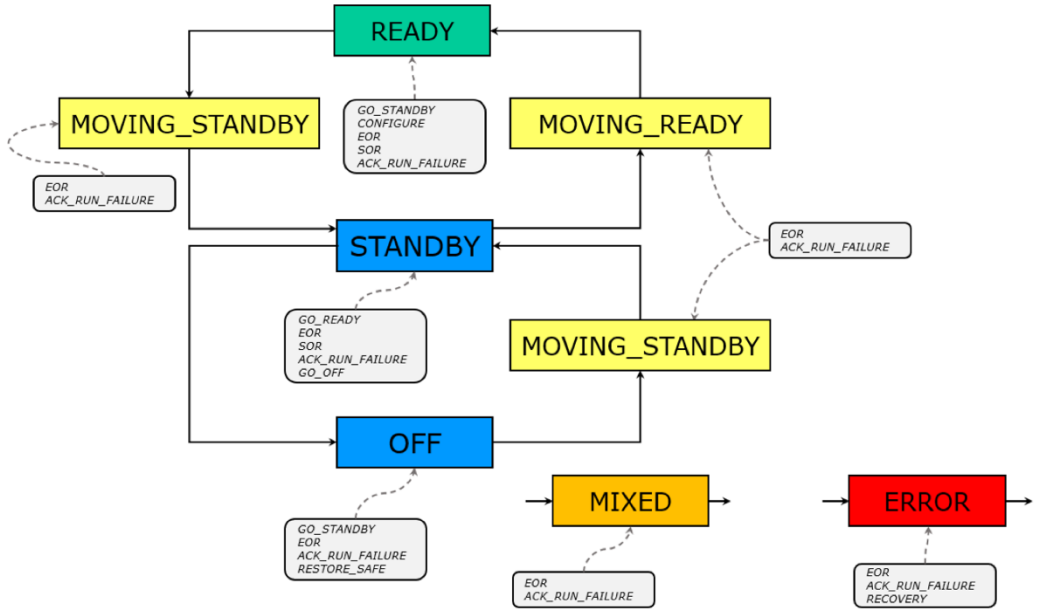
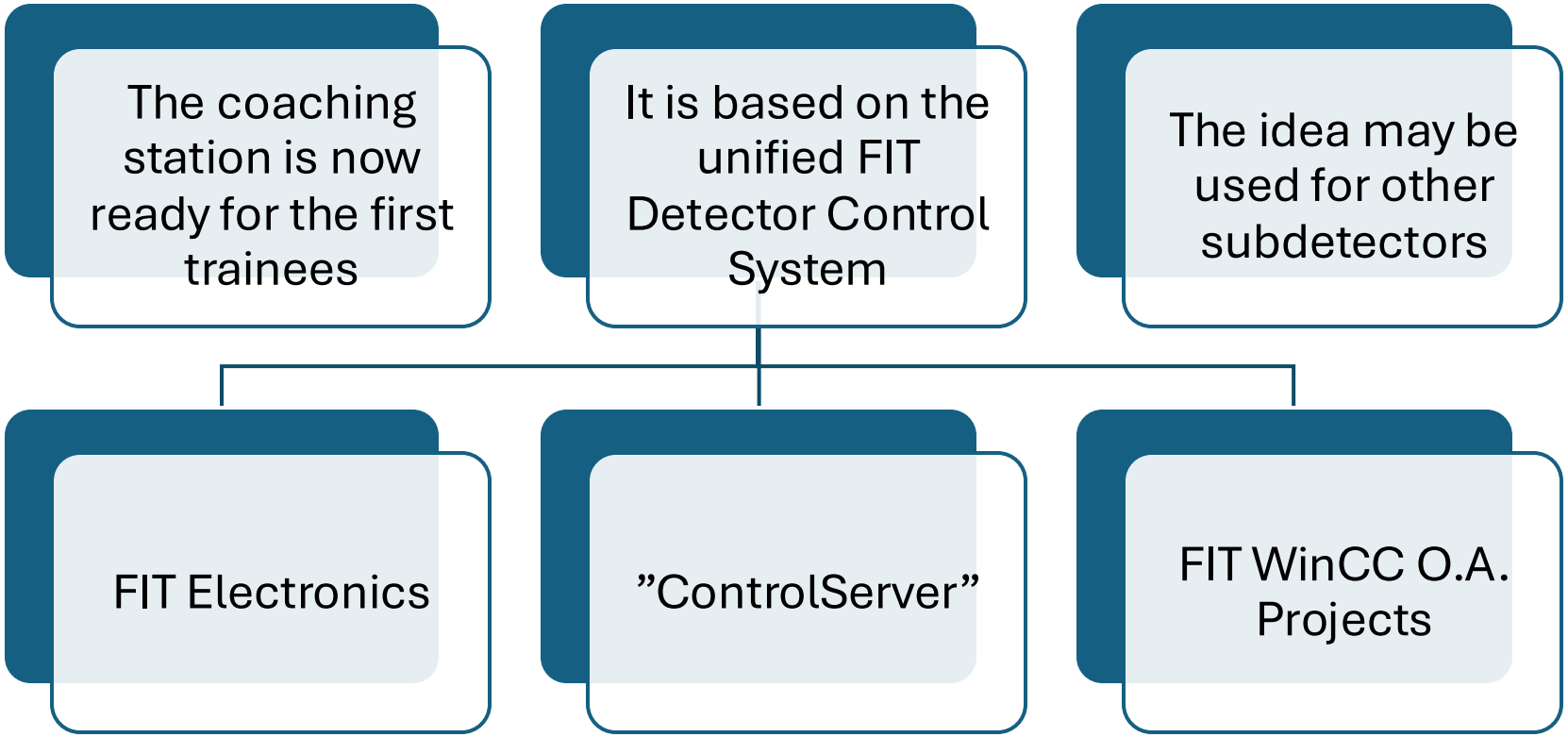
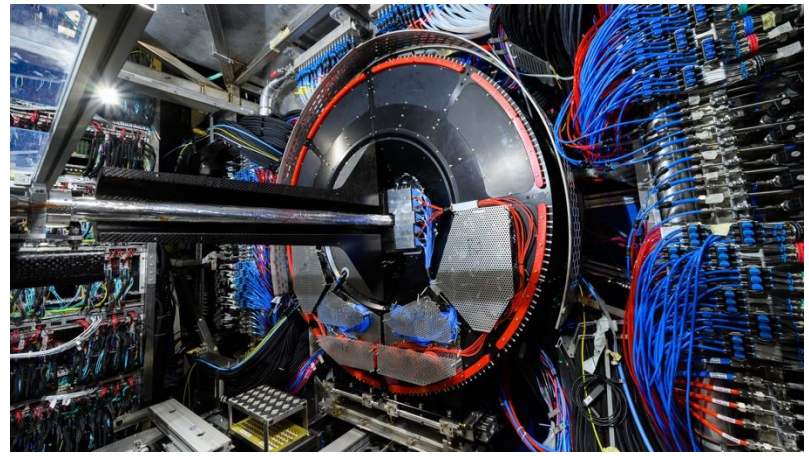


Fig. 13: Finite State Machine (FSM) of the FIT laboratory setup.

Conclusions



Thank you for your attention



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ALICE

CERN

BACKUP slides

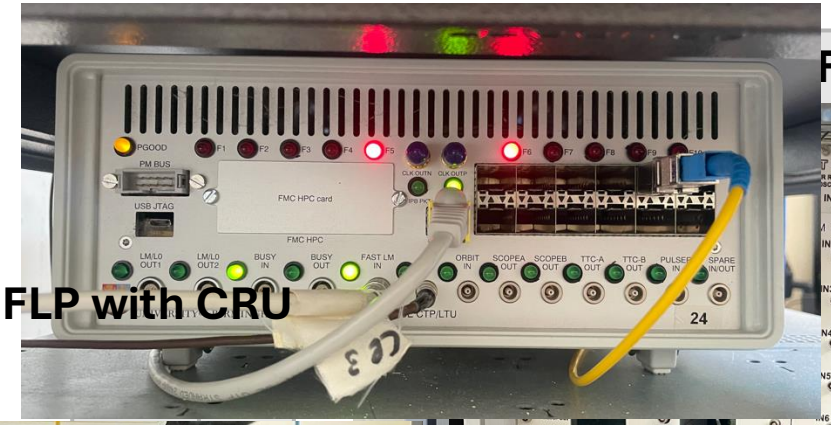
Laboratory setup

LTU

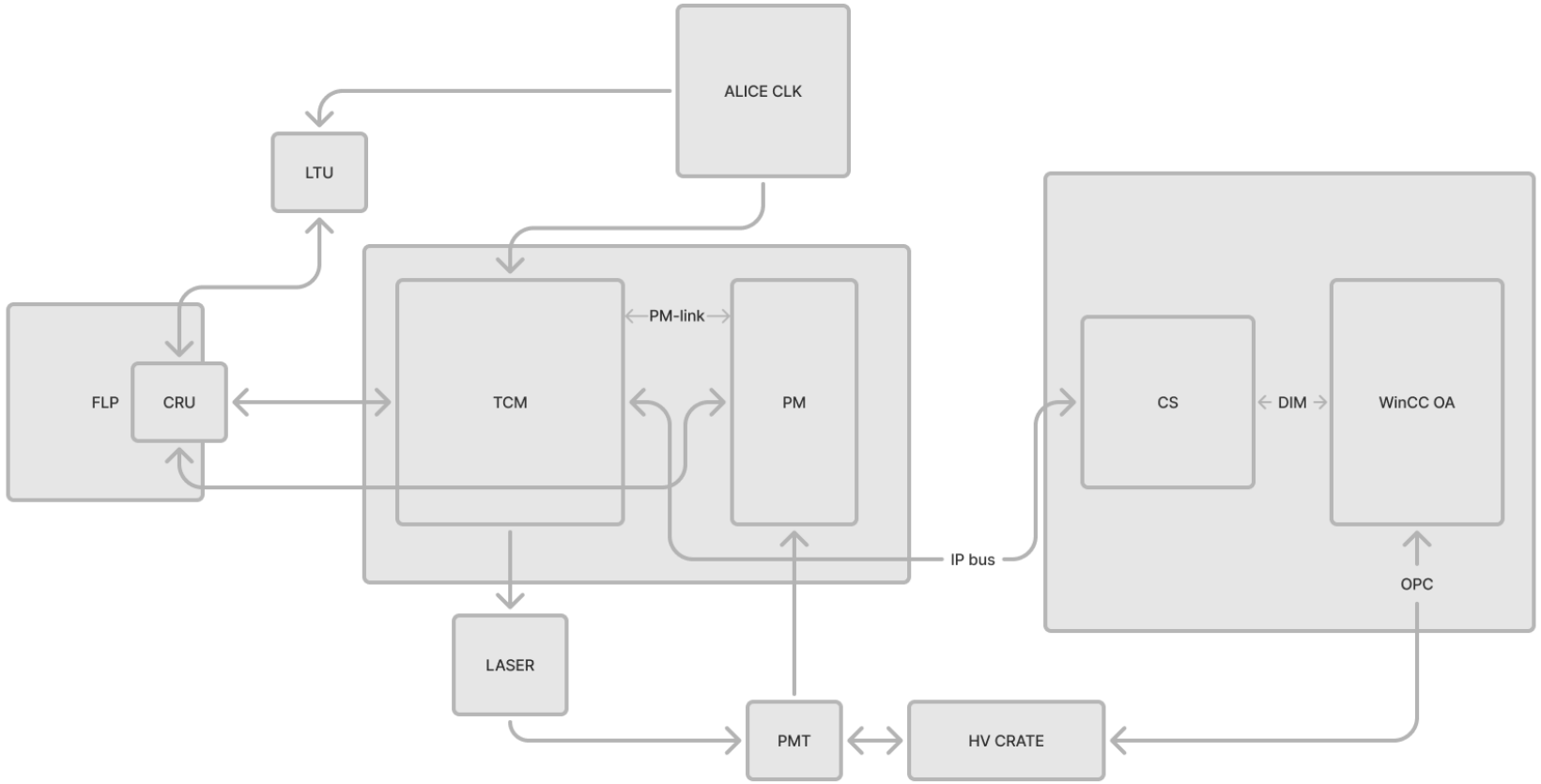
FEE

Node

FLP with CRU



SYSTEM



Schema of the FIT laboratory setup.