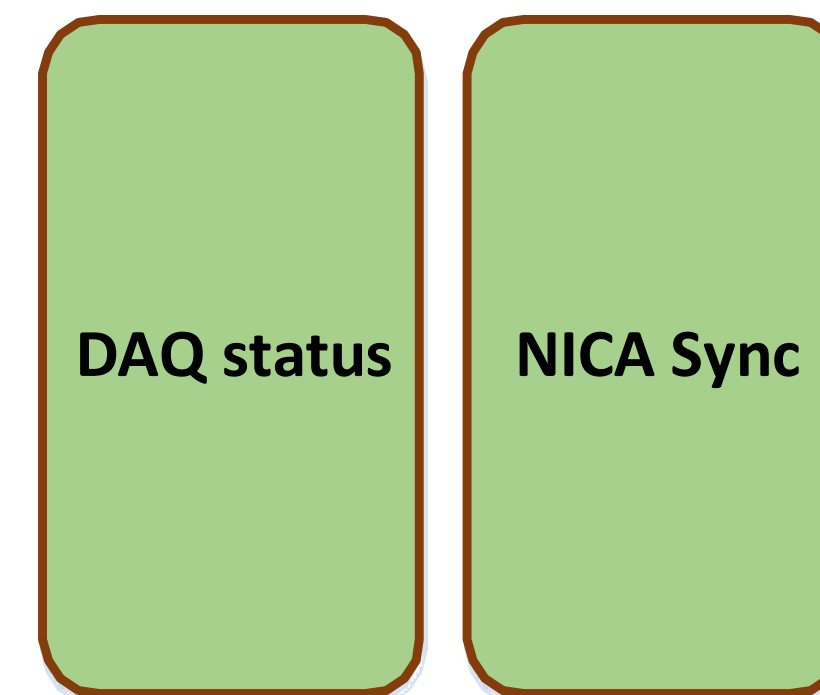
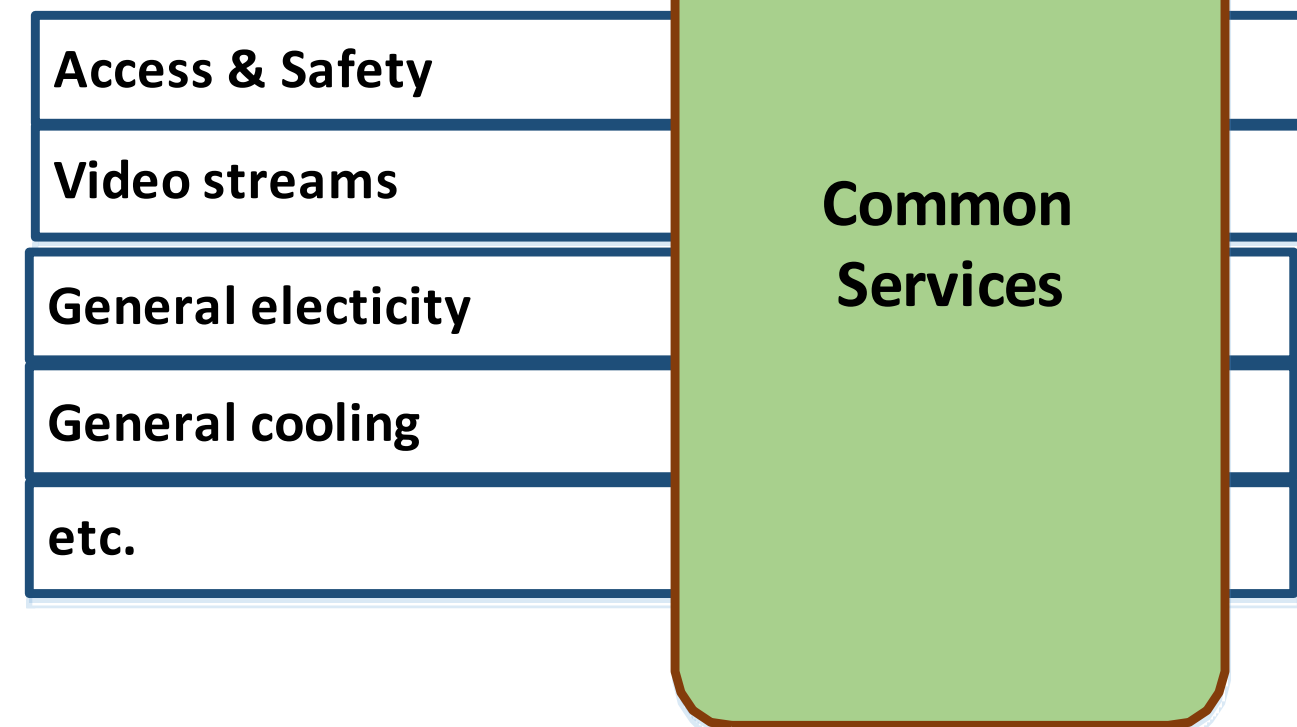
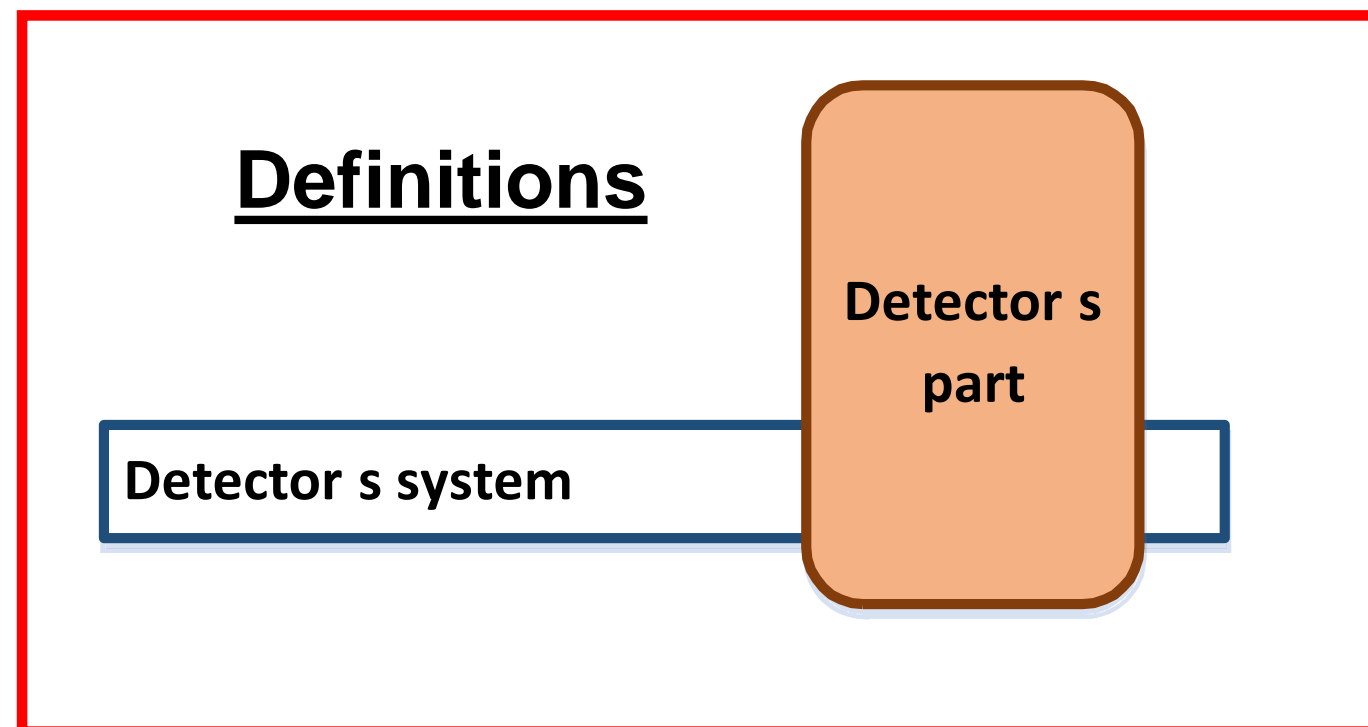
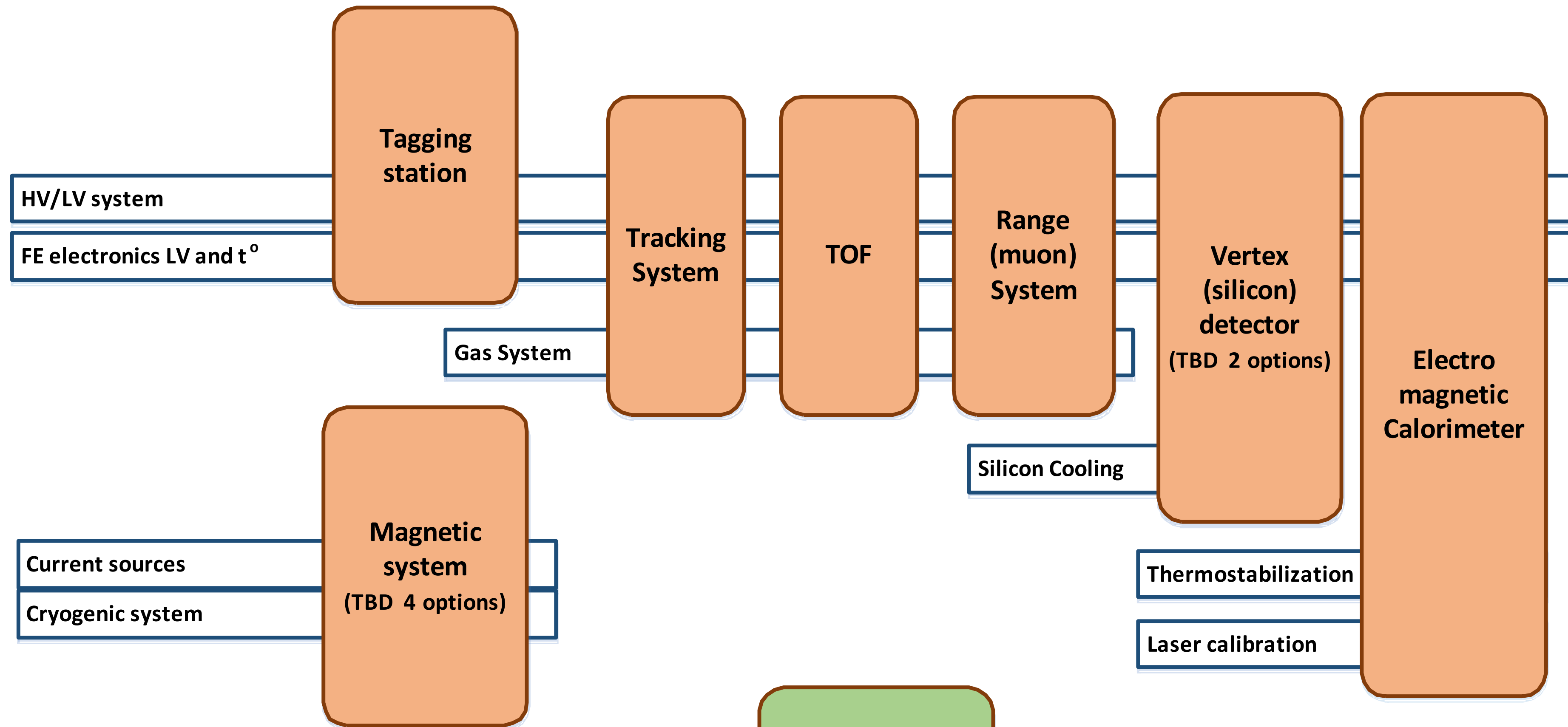


# Current status of control system for beam test zone (BTZ) for the SPD experiment on the NICA collider

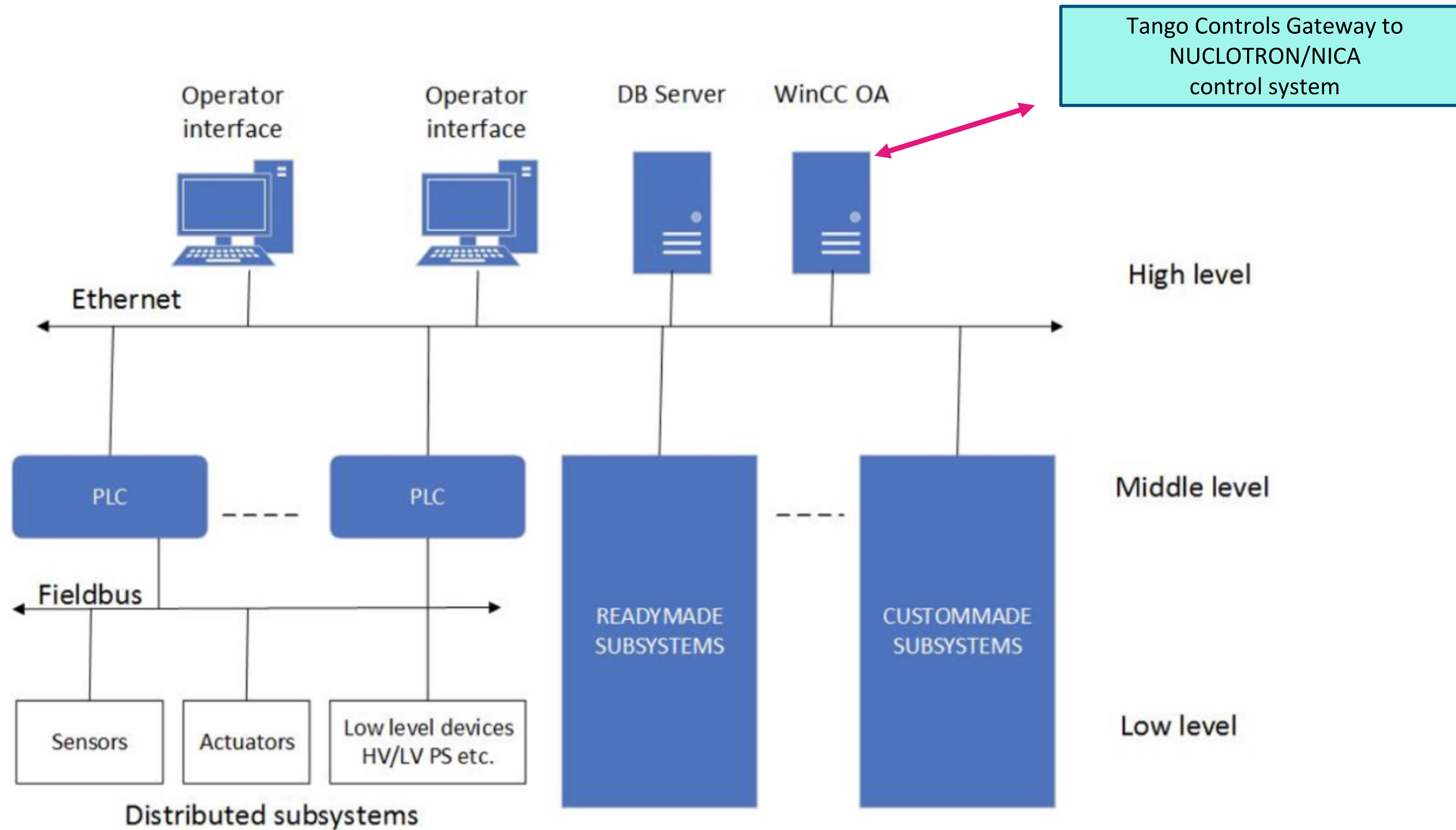
A. Chepurnov, D. Gribkov, A. Sabelnikov

23.09.2021

# SPD control system architecture



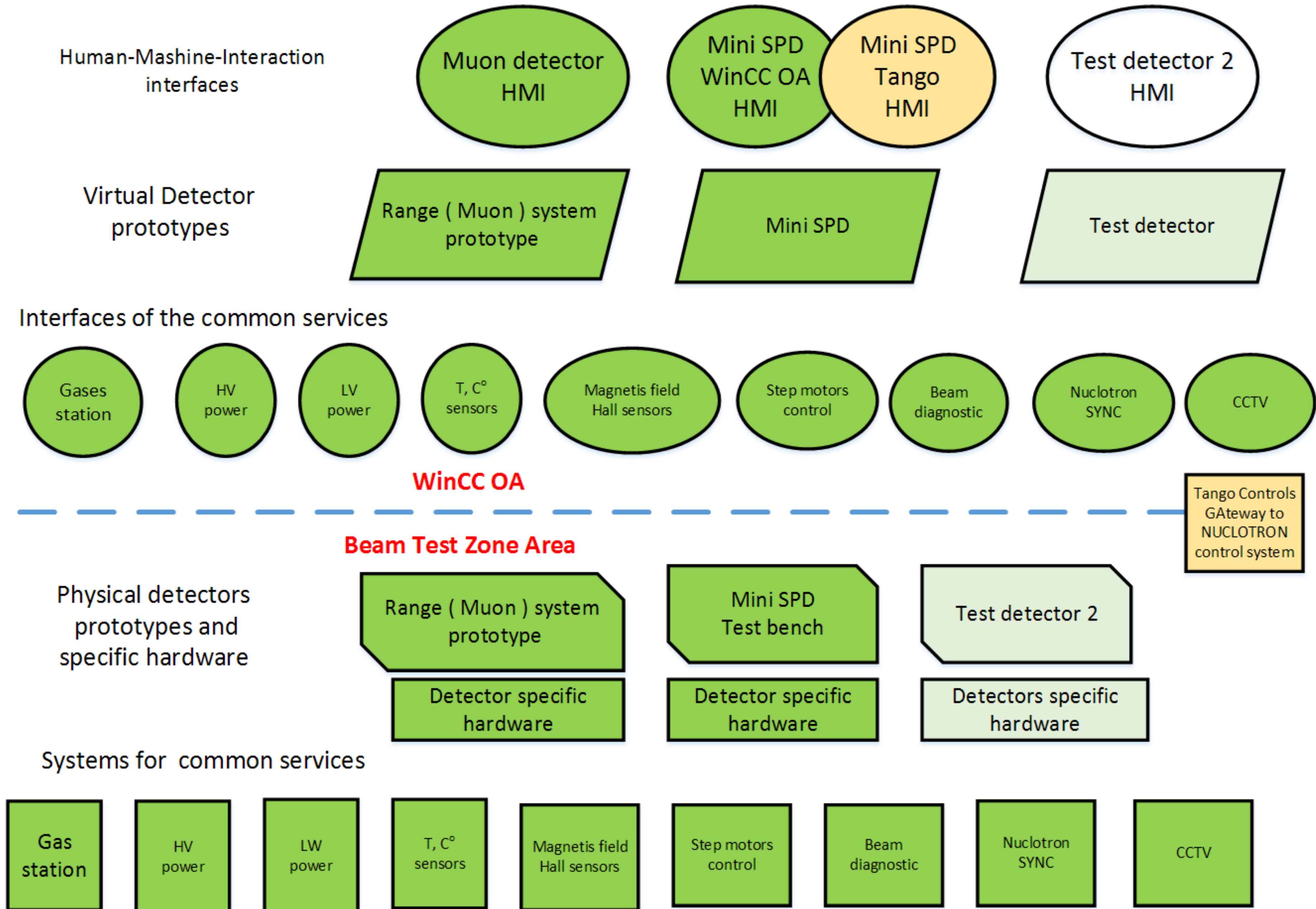
# BTZ control system architecture



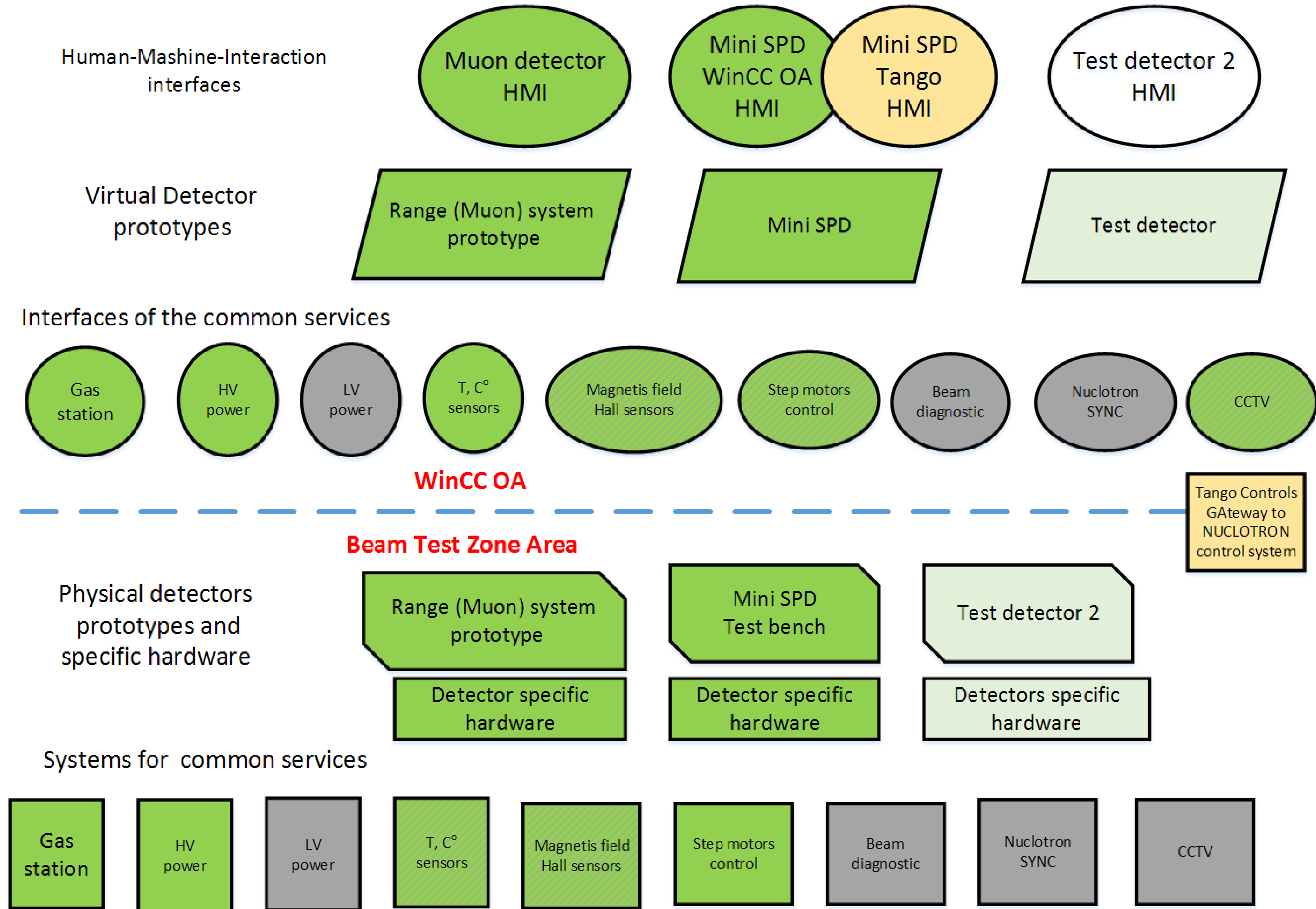
# Beam Test Zone (BTZ) control system concept

**Beam Test Zone control system is intended for the following purposes:**

1. To test prototypes of control systems for different SPD systems;
2. To test separate components of SPD DCS with WinCC OA;
3. To develop and test software prototypes for common SPD DCS services such as HMI, DB etc;
4. To test interoperability between SPD DCS of different systems;
5. To test interoperability between SPD DCS of different systems and NICA accelerator.



# BTZ control system actual status



# BTZ high level of control system actual status

All the necessary for BTZ components of WinCC OA are deployed and working.

Managers intended for programming (PARA & GEDI) are deployed at SINP.

Server for WinCC OA at BTZ



User Interface

PARA

GEDI

Developer tools installed at SINP

DB Server

DB Storage

DataBase

Event Manager

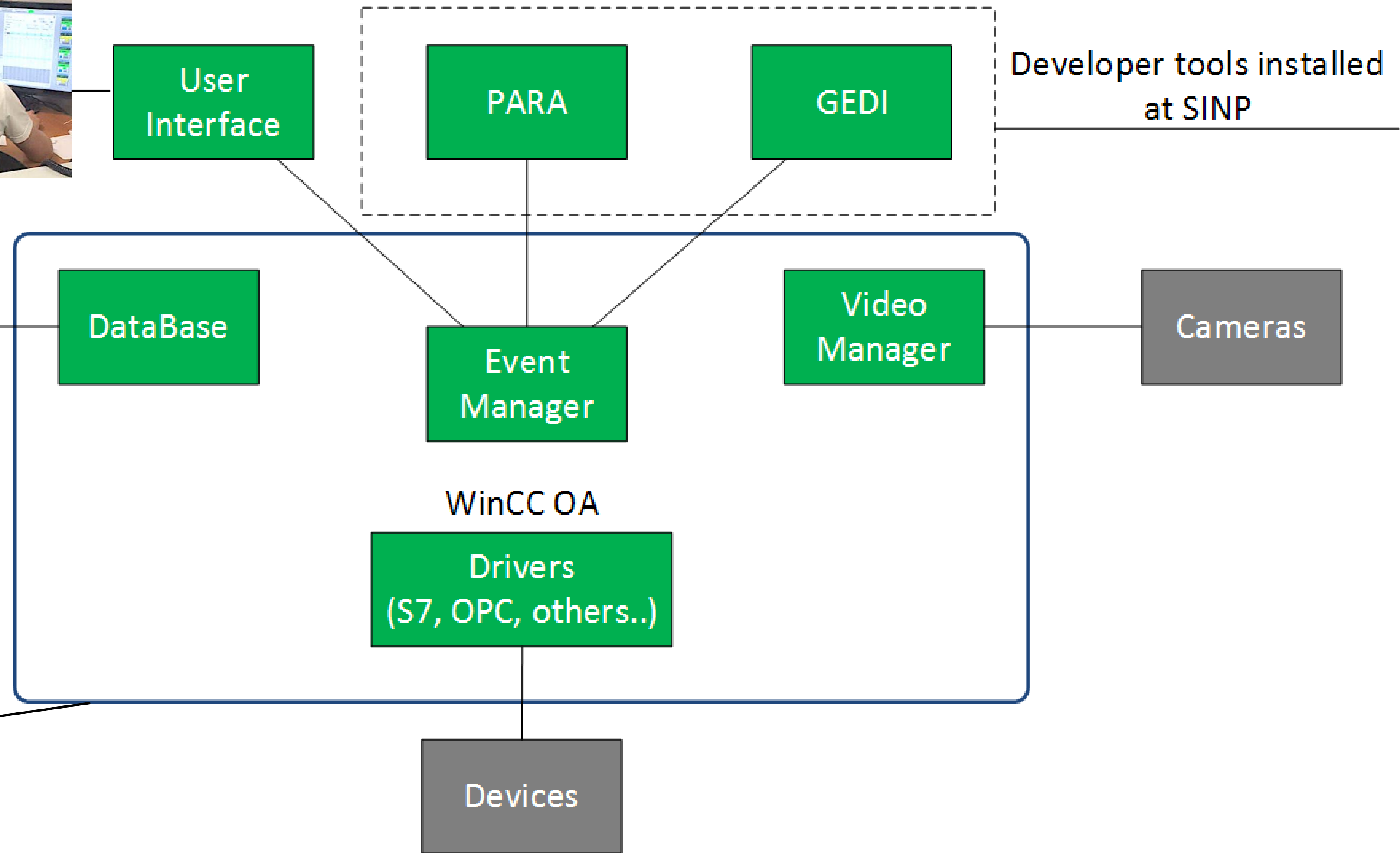
Video Manager

Cameras

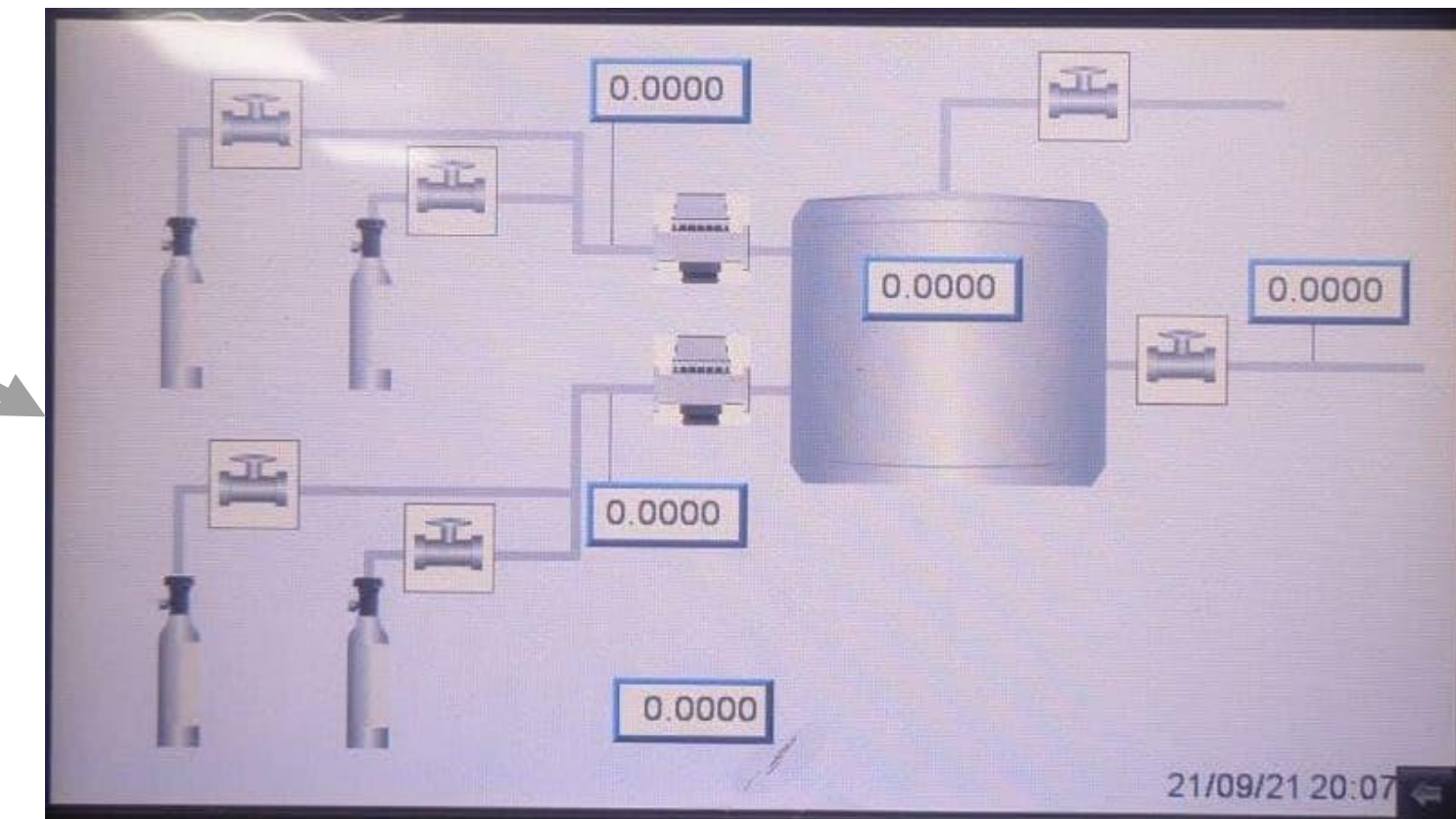
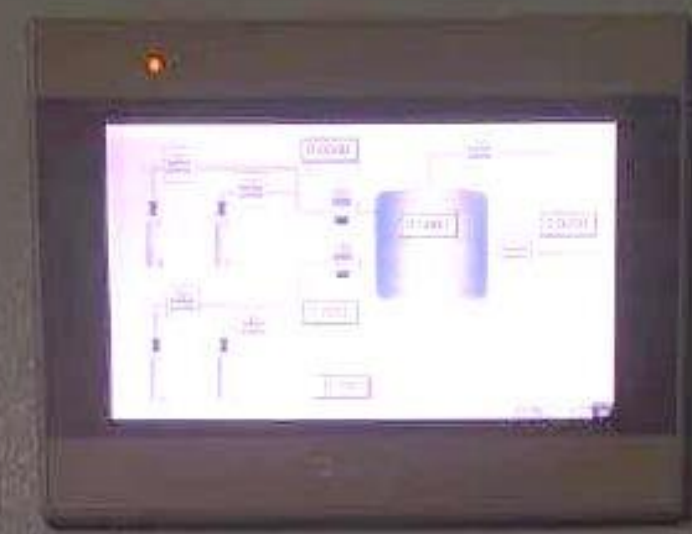
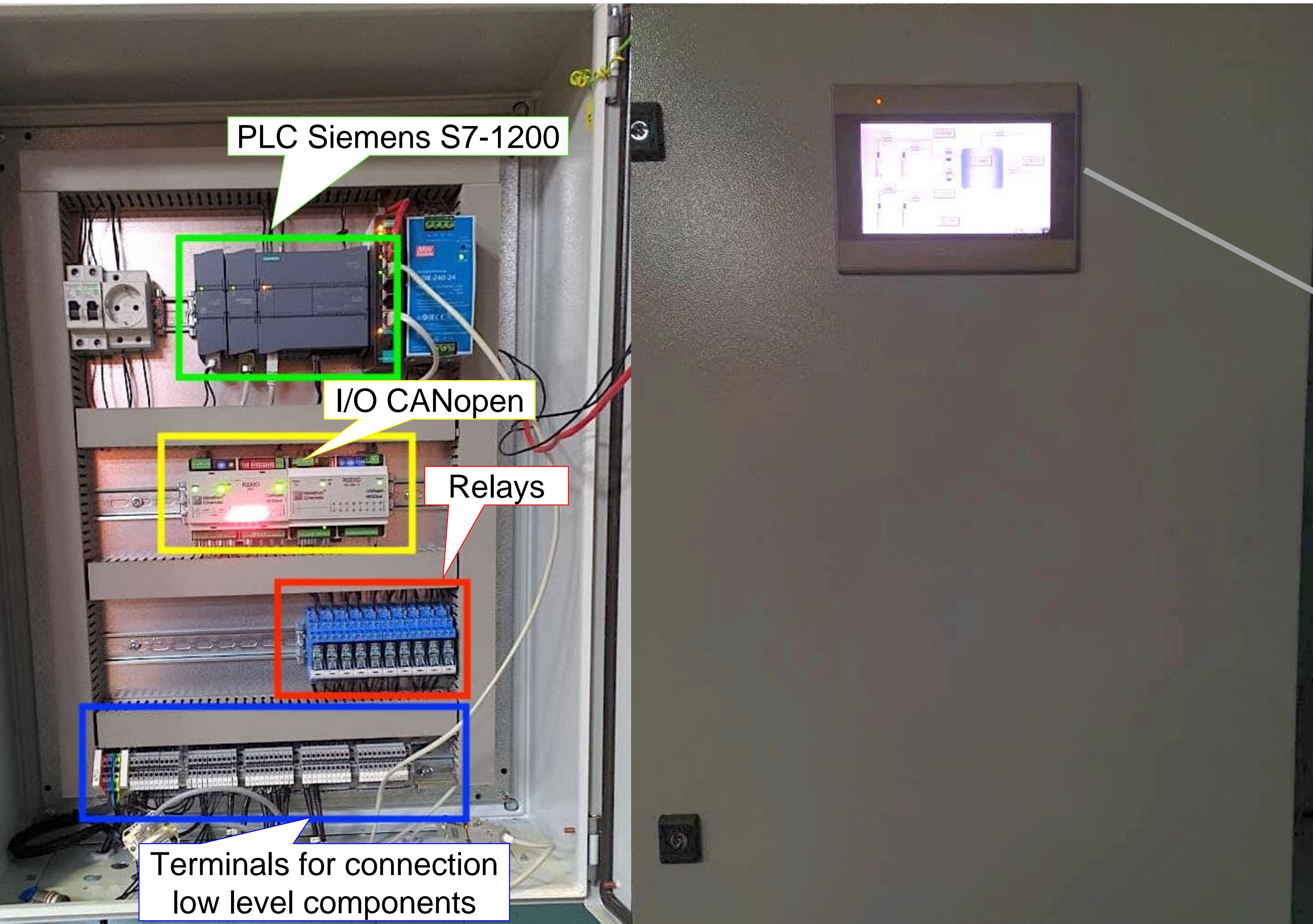
WinCC OA

Drivers (S7, OPC, others..)

Devices

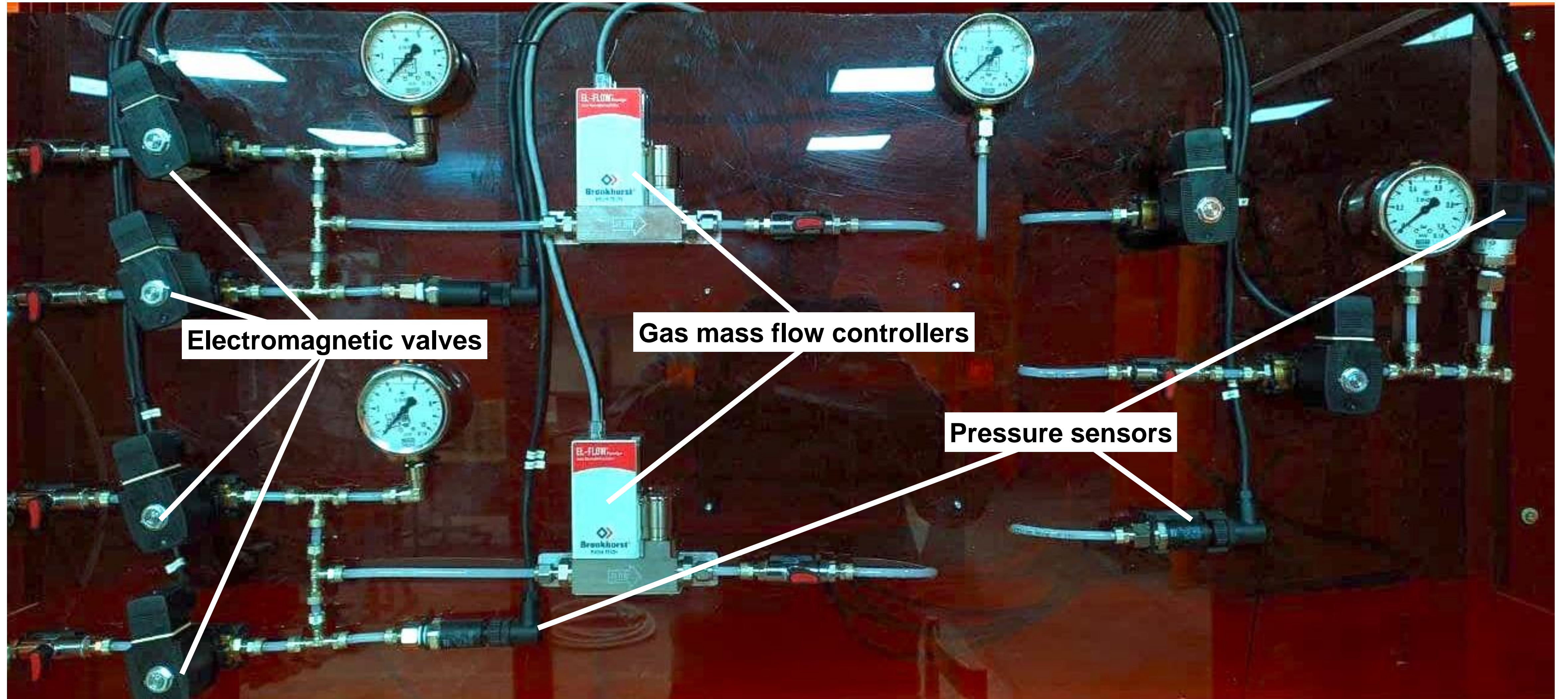


# BTZ control system - gas station control



**Touch screen for local control at the front of control cabinet**

# BTZ control system - gas station control

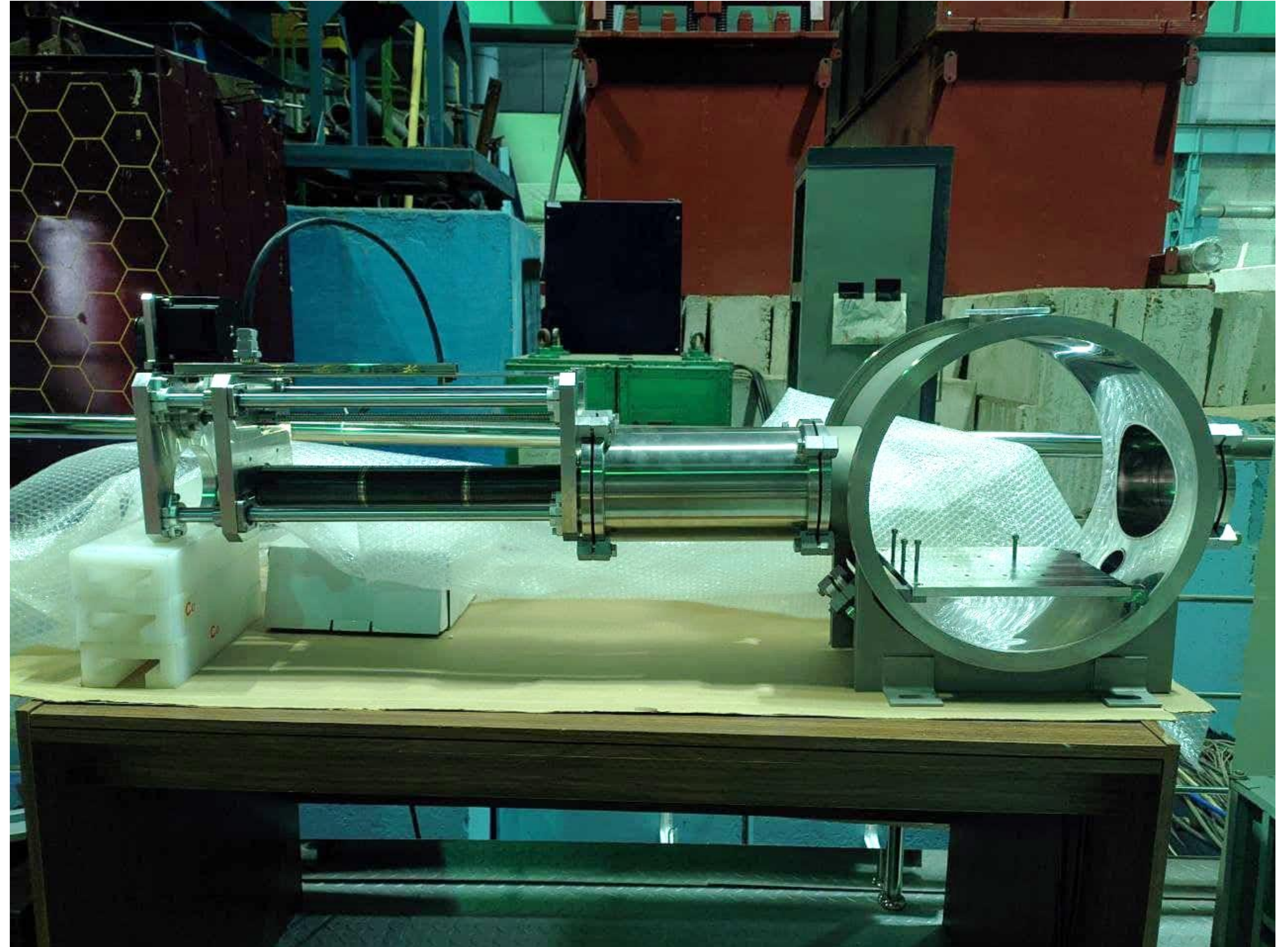


**Gas station control**

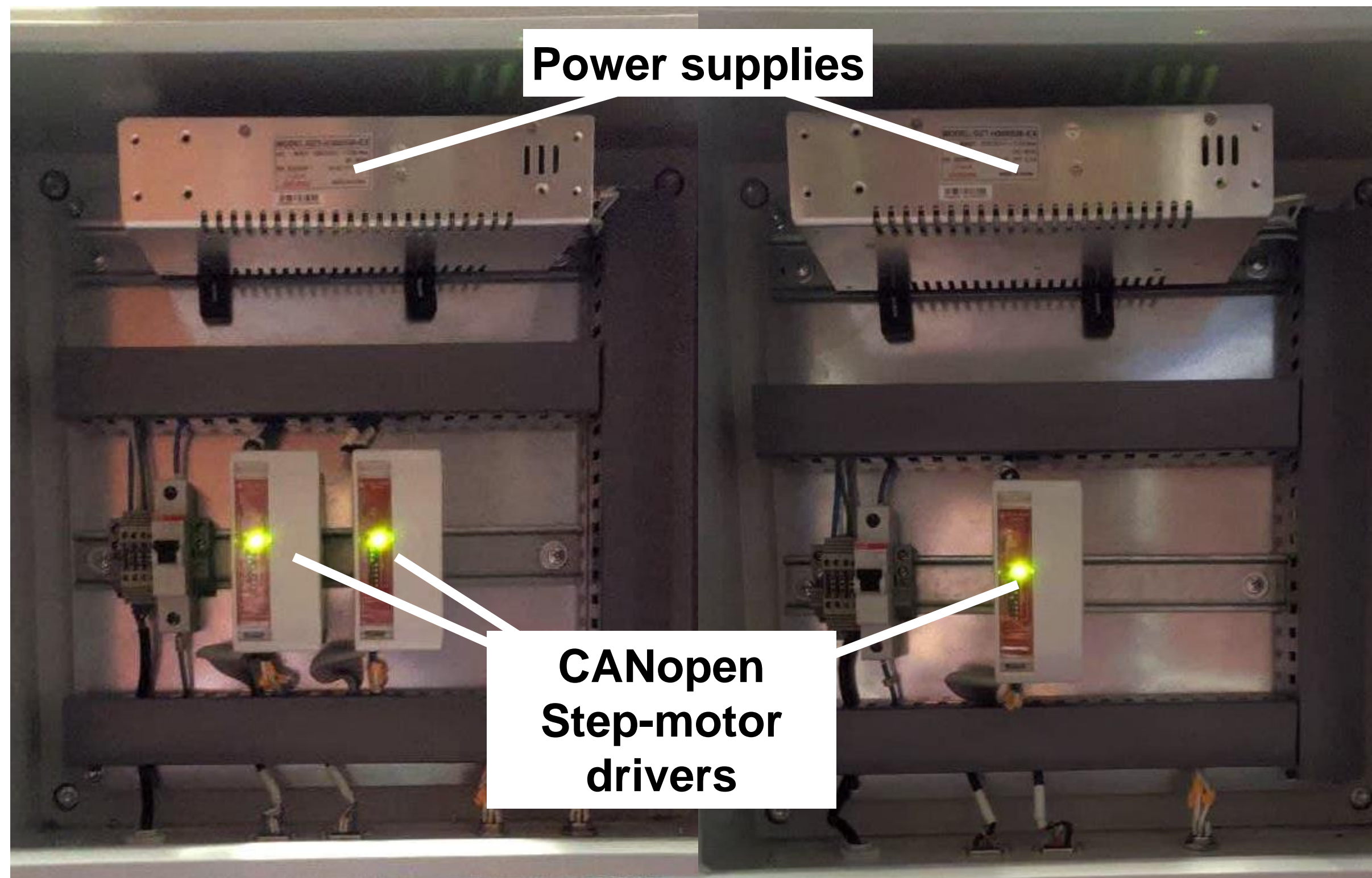


# BTZ control system - target station motion control

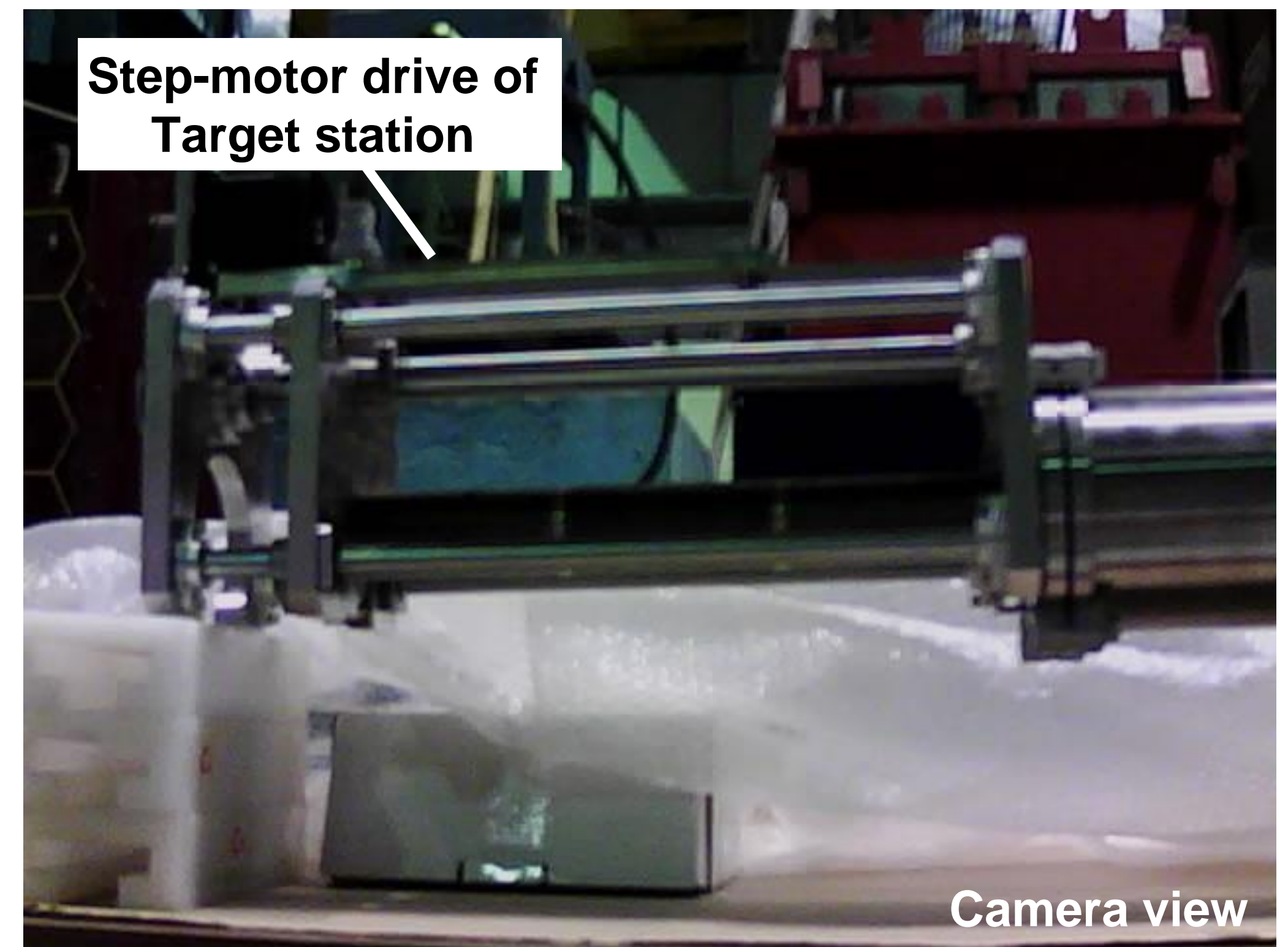
**Stand for debugging control  
program for target station online**



# BTZ control system - target station motion control

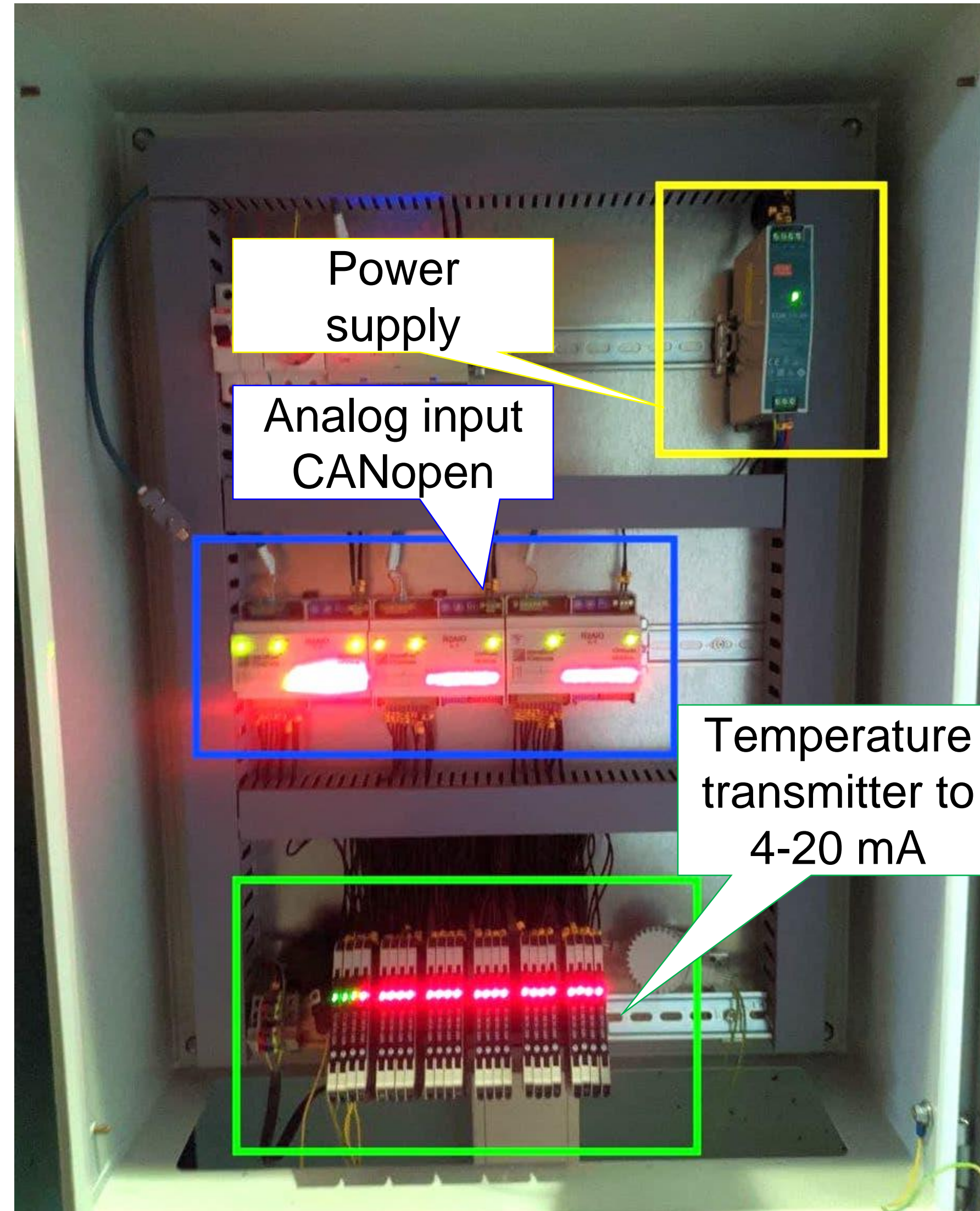


**Control cabinet for 2 target stations & profilometer**



**View from IP-camera installed at BTZ, for online debugging step driver program from SINP**

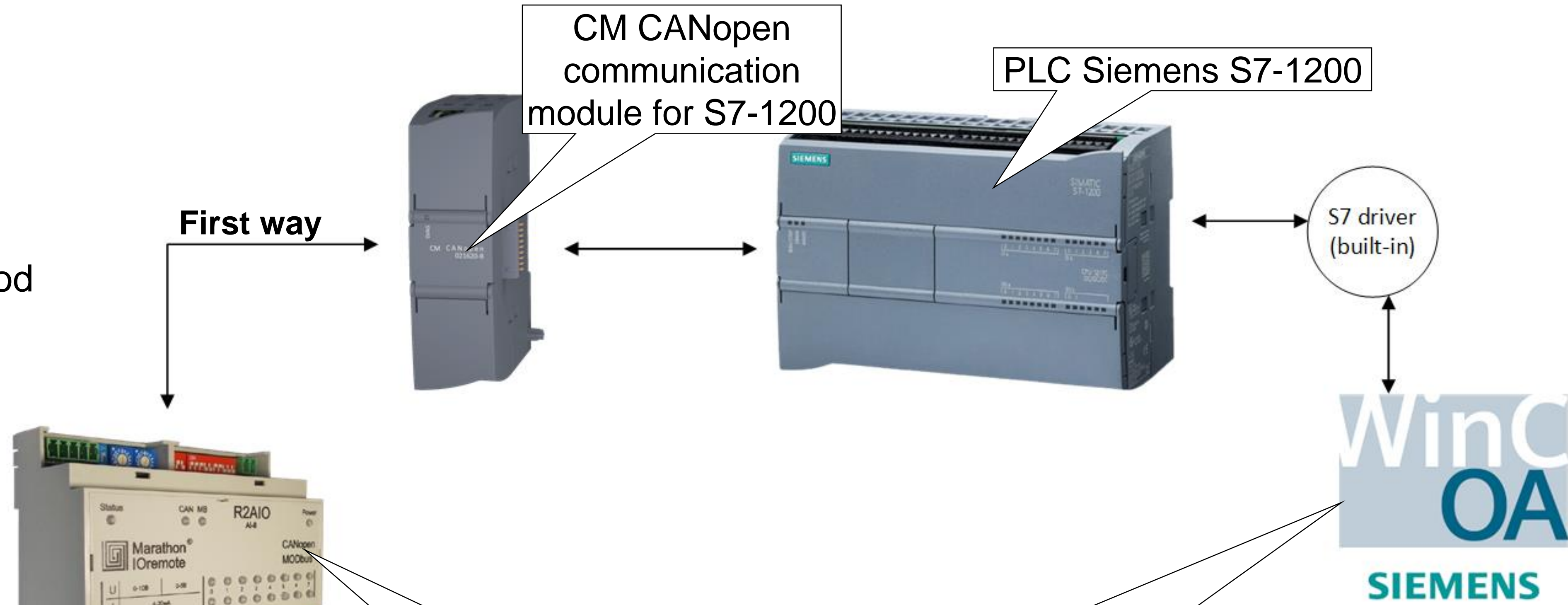
# BTZ control system - thermometry system control



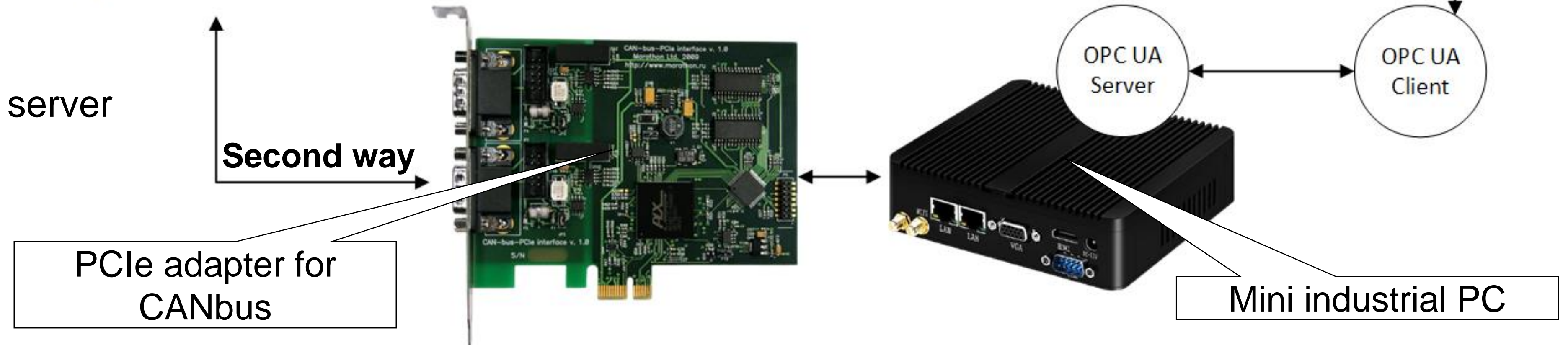
T, C° measurement

# CANopen – WinCC OA connection

## 1. «Siemens-friendly» method



## 2. Atlas CANopen OPC server









# Conclusion

Current status of BTZ control system:

- The high level of control system is fully deployed, it consists of WinCC OA server, database, video-server, user interface (UI). There is now a ready-to-work WinCC OA configuration at BTZ operator room.
- The middle level of control system consists of Siemens S7-1200 controller (PLC), it is installed at BTZ. Now we are debugging and checking the operation of PLC program in real conditions.
- The low level of control system is now installing at BTZ for gas station, thermometry, target stations and magnets subsystems. We debug and check PLC and WinCC OA programs sequentially, after connecting each subsystems.