EUROPEAN
SPALLATION
SOURCE

Current Status of MicroTCA at ESS

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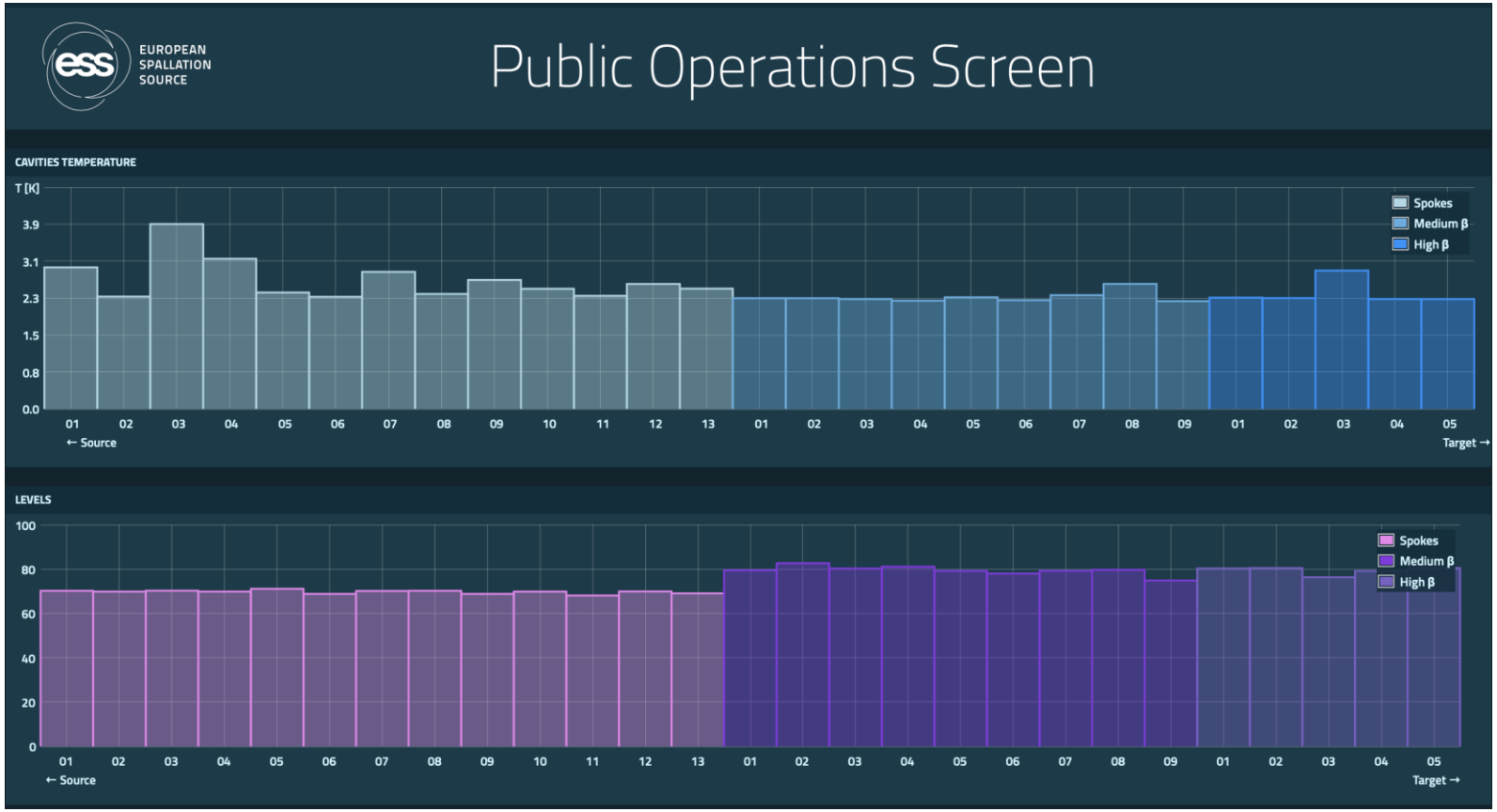
Current Status of ESS



- Currently preparing for commissioning of the accelerator to the beam dump
- Cool down of the cryo modules to 4K,and to continue ready for RF conditioning at 2K
- First Beam on Target expected late 2025
- Work on instruments continues, with first neutrons expected in 2026

Status of MicroTCA

Have around 230 systems now online and in use throughout the facility

Mostly in RF, Beam Instrumentation and Timing

Small number of systems for Fast Beam Interlock

Hardware Breakdown

Active or upcoming systems for production:

- 200 9U Chassis and 70 3U Chassis (nVent SCHROFF)
- 500 PSU (W-IE-NE-R and N.A.T)
- 280 N.A.T MCH-PYHS
- 280 Concurrent Technologies CPU (AM900 and G6 models)
- 590 AMCs (IOxOS IFC_1410 & Struck SIS8300)
- 400 RTMs (IOxOS and Struck)
- 300 Custom AMC and RTM from IK collaboration with PEG
- 135 Event Master Timing Cards
- 225 Event Receiver Cards + 2 RTMs (all timing hardware from MRF)

Recent Changes

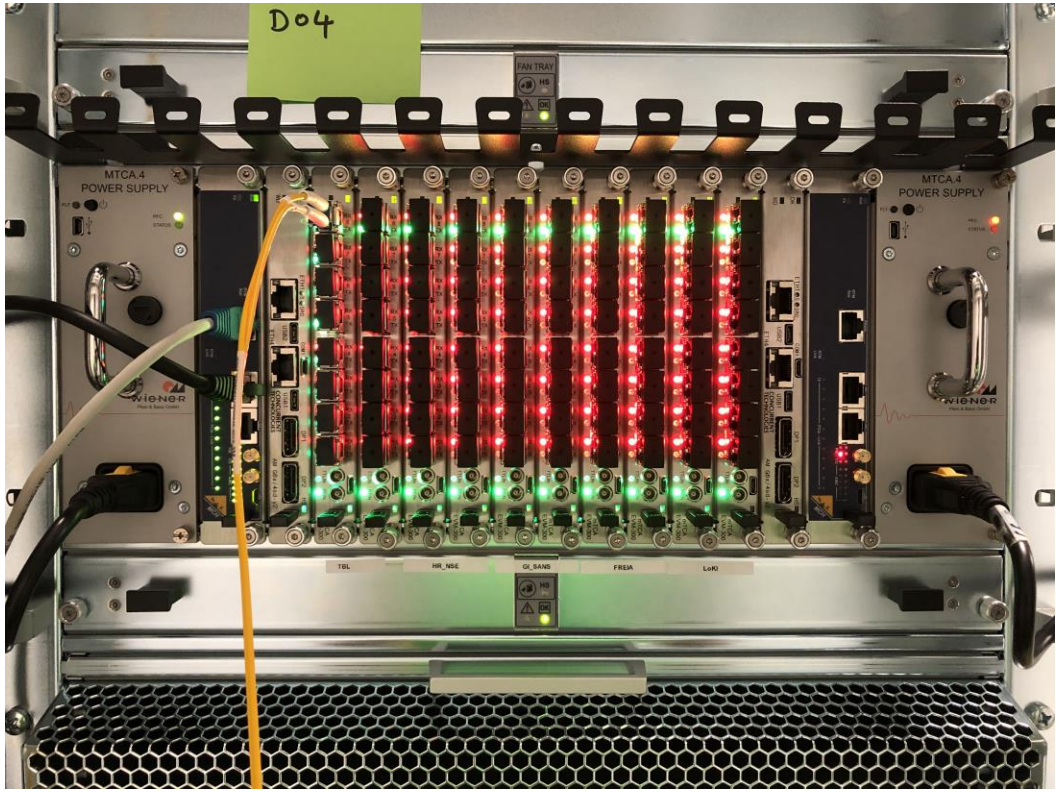
What has happened in 2024

Slow migration from CentOS 7 to Yocto based OS

New FPGA framework is now working on almost all AMCs and FMCs

Increased use of Ansible to perform larger scale changes to devices

Design of Global Timing Distribution System for Instruments finalised and prepared



Gremlins

Strange bugs and other puzzles

Unexpected failure of 1 system, root cause was with power supplies

4/150 Fast Interlock Modules (Using IFC_1410) exhibit weird behaviour on latest fw, needs to run a version behind

System running on older CPU (CCT AM900) repeatedly crashing when running our CE deploy

Systems not restarting after power outages, requiring manual intervention to restart

2 Channels not working on analogue inputs FMC, restarting the IOCs had not affect but reseating the AMC and reconnecting did

CPU Board in M4 state, but unreachable remotely. Required root login to restart OS. Ultimatley issue was full HD caused by SW tools, but took time to locate issue

Next Steps

Continue support to Acclerator stakeholders for BOD and BOT commissioning

Develop and implement timing for Instruments

Migrate to Yocto OS on all MTCA systems

Update 80 Arc Detector systems to IFC_1420 AMC and RTM

Utilise IPMI manager, collaboration with the DMCS Łódź University of Technology

Lessons Learnt

- Dependancy on single suppliers is less than ideal when running multiple applications including safety critical systems
- Knowledge sharing is key; too many systems are dependant on single integrators
- Collaboration is important; EPICs community has shown how impactful
- Cost of MTCA hardware is only getting more expensive
- Make full use of deployment tools from other groups

Thank you
Any Questions?