

EUROPEAN SPALLATION SOURCE

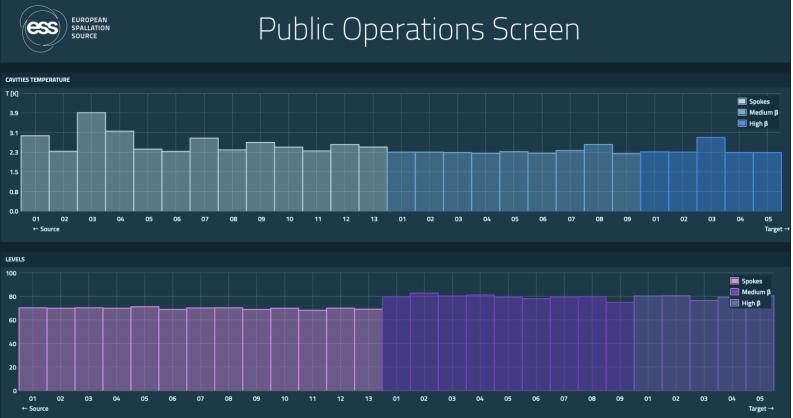


Current Status of MicroTCA at ESS

PRESENTED BY FAYE CHICKEN

2024-12-10

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 2024-12-10 PRESENTATION TITLE/FOOTER

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

• (?) TD-EVR	► (2) HBL-100RFC RFS-EVR-101		
A2T-010Row:Ctrl-EVR-101	• () HBL-100RFC:RFS-EVR-201	PBI-BCM03:Ctrl-EVR-101	PBI-IMG02:Ctrl-EVR-101
A2T-010Row:Ctrl-EVR-102	 (2) HBL-100RFC-58FS-EVR-201 (2) HBL-100RFC-58FS-EVR-301 	PBI-BCM04:Ctrl-EVR-101	PBI-IMG03:Ctd-EVR-101
DTL-010:RFS-EVR-101	 (2) HBL-100RFC:RFS-EVR-401 	PBI-BCM05:Ctrl-EVR-101	PBI-IPM01:CtrI-EVR-101
DTL-020:RFS-EVR-101	 (1) HBL-110RFC.RFS-EVR-101 (2) HBL-110RFC.RFS-EVR-101 	PBI-BCM06:Ctrl-EVR-101	PBI-IPM02:Ctrl-EVR-101
DTL-030.9FS-EVR-101	(1) HEL-110REC.RES-EVR-201	PBI-BCM07:Ctrl-EVR-101	PBI-IPM03:Ctrl-EVR-101
DTL-040.RFS-EVR-101	 (1) HBL-110RFC:RFS-EVR-201 (2) HBL-110RFC:RFS-EVR-301 	PBI-BPM01:Ctrl-EVR-101	PBI-WS01:Ctrl-EVR-101
 DTL-0403#S-EVR-101 DTL-0503FS-EVR-101 	 (2) HBL-110RFC:RFS-EVR-401 (2) HBL-110RFC:RFS-EVR-401 	PBI-BPM01:Ctrl-EVR-201	
 FBIS-DLN01:Ctrl-EVR-01 	Bite-TimConCtrl-EVR-101	PBI-BPM02:Ctrl-EVR-101	PBI-WS02:Ctrl-EVR-101
FBIS-DLN02:Ctd-EVR-01		PBI-BPM02:Ctrl-EVR-201	PBI-WS03:Ctrl-EVR-101
FBIS-DLN02:0th-EVR-01	 MBL-010RFC/RFS-EVR-101 MBL-010RFC/RFS-EVR-201 	PBI-BPM03:Ctrl-EVR-101	PBI-WS04:Ctrl-EVR-101
FBIS-DLN04:Ctrl-EVR-01	MEL-OTORFC/RFS-EVR-301	PBI-BPM04:Ctrl-EVR-101	PBI-WS05:Ctrl-EVR-101
 FBIS-DLN05:Ctrl-EVR-01 	MEL-OTORFC/RFS-EVR-401	PBI-BPM05:Ctrl-EVR-101	PBI-WS06:Ctrl-EVR-101
FBIS-DLN06:Ctrl-EVR-01	MBL-020RFC:RFS-EVR-101	PBI-BPM06:Ctrl-EVR-101	PBI-nBLM01:Ctrl-EVR-101
FBIS-DLN07:ctrl-EVR-01	MBL-020RFC RFS-EVR-201	PBI-BPM07:Ctrl-EVR-101	PBI-nBLM02:Ctrl-EVR-101
O RST-DLN01:Cttl-EVR-01	MBL-020RFC-RFS-EVR-301	PBI-BPM08:Ctrl-EVR-101	PBI-nBLM03:Ctrl-EVR-101
HBL-010RFC:RFS-EVR-101	MBL-020RFC/RFS-EVR-401	PBI-BPM09:Ctrl-EVR-101	
HBL-010RFC:RFS-EVR-201	MEL-030RFC RFS-EVR-101	PBI-BPM10:Ctrl-EVR-101	PBI-nBLM04:Ctrl-EVR-101
HBL-010RFC:RFS-EVR-301	MBL-030RFC RFS-EVR-201	PBI-BPM11:Ctrl-EVR-101	PBI-nBLM05:Ctrl-EVR-101
HBL-010RFC:RFS-EVR-401	MBL-030RFCRFS-EVR-301	PBI-BPM12:Ctrl-EVR-101	PBI-nBLM06:Ctrl-EVR-101
HBL-020RFC:RFS-EVR-101	MEL-030RFCRFS-EVR-401	PBI-BPM13:Ctrl-EVR-101	PBI-nBLM07:Ctrl-EVR-101
HBL-020RFC/RFS-EVR-201	MBL-040RFC:RFS-EVR-101	PBI-BPM13:Ctrl-EVR-201	PBI-nBLM08:Ctrl-EVR-101
HBL-020RFC:RFS-EVR-301	MEL-040RFC RFS-EVR-201	PBI-BPM14:Ctrl-EVR-101	PBI-nBLM09:Ctrl-EVR-101
HBL-020RFC:RFS-EVR-401	MEL-DAORFCIRES-EVR-301	PBI-BPM14:Ctrl-EVR-201	PBI-nBLM10:Ctrl-EVR-101
HBL-030RFC:RFS-EVR-101	MEL-040RFC RFS-EVR-401	PBI-COLL01:Ctrl-EVR-101	RFQ-010:RFS-EVR-101
HBL-030RFC:RFS-EVR-201	MBL-050RFC/RFS-EVR-101	PBI-DPL01:Ctrl-EVR-101	
HBL-030RFC:RFS-EVR-301	MEL-050RFC-RFS-EVR-201	PBI-EMU01:Ctrl-EVR-101	Spk-010RFC:RFS-EVR-101
HBL-030RFC:RFS-EVR-401	MEL-050RFC/RES-EVR-301	PBI-EMU02:Ctrl-EVR-101	Spk-010RFC:RFS-EVR-201
HBL-040RFC:RFS-EVR-101	MBL-050RFC:RFS-EVR-401	PBI-FC01:Ctrl-EVR-101	Spk-020RFC:RFS-EVR-101
HBL-040RFC:RFS-EVR-201	MBL-060REC/RES-EVR-101	PBI-FPM01:Ctrl-EVR-101	Spk-020RFC:RFS-EVR-201
HBL-040RFC:RFS-EVR-301	MBL-060RFC:RFS-EVR-201	 PBI-FPM01:Ctrl-EVR-201 	Spk-030RFC:RFS-EVR-101
HBL-040RFC:RFS-EVR-401	MBL-060RFC/RFS-EVR-301	PBI-FPM02:Ctrl-EVR-101	Spk-030RFC:RFS-EVR-201
HBL-050RFC:RFS-EVR-101	MEL-060RFC:RFS-EVR-401	PBI-FPM03:Ctrl-EVR-101	Spk-040RFC:RFS-EVR-101
HBL-050RFC:RFS-EVR-201	MBL-070RFC/RFS-EVR-101	PBI-GRD01:CM-EVR-101	Spk-040RFC:RFS-EVR-201
HBL-050RFC:RFS-EVR-301	MBL-070RFC RFS-EVR-201	PBI-IBS01:Ctt1-EVR-101	Spk-050RFC:RFS-EVR-101
HBL-050RFC:RFS-EVR-401	MEL-070RFC:RFS-EVR-301	PBI-IBS02:Ctrl-EVR-101	
⑦ HBL-060RFC:RFS-EVR-101	MBL-070RFC RFS-EVR-401	PBI-ICBLM01:Ctrl-EVR-101	Spk-050RFC:RFS-EVR-201
INDE-060RFC:RFS-EVR-201	MBL-080RFC:RFS-EVR-101	PBI-ICBLM01:Ctrl-EVR-201	Spk-060RFC:RFS-EVR-101
⑦ HBL-060RFC:RFS-EVR-301	MBL-080RFCRFS-EVR-201	PBI-IC8LM02:Ctrl-EVR-101	Spk-060RFC:RFS-EVR-201
P BL-060RFC:RFS-EVR-401	MBL-080RFCRFS-EVR-301	PBI-ICBLM03:Ctrl-EVR-101	Spk-070RFC:RFS-EVR-101
P (2) HBL-070RFC:RFS-EVR-101	MBL-080RFC/RFS-EVR-401	PBI-ICBLM03:Ctrl-EVR-201	Spk-070RFC:RFS-EVR-201
P (2) HBL-070RFC:RFS-EVR-201	MBL-090RFC:RFS-EVR-101	PBI-ICBLM04:Ctrl-EVR-101	Spk-080RFC:RFS-EVR-101
Participation (1997) HBL-070RFC:RFS-EVR-301	MBL-090RFC/RFS-EVR-201	PBI-ICBLM05:Ctrl-EVR-101	Spk-080RFC:RFS-EVR-201
P (2) HBL-070RFC:RFS-EVR-401	MBL-090RFC:RFS-EVR-301	PBI-ICBLM06:Cttl-EVR-101	Spk-090RFC:RFS-EVR-101
P (2) HBL-080RFC:RFS-EVR-101	MBL-090RFC/RFS-EVR-401	PBI-ICBLM07:Ctrl-EVR-101	Sok-090RFC:RFS-EVR-201
P (2) HBL-080RFC:RFS-EVR-201	MEBT-010:Ctdi-EVR-001	PBI-ICBLM08:Ctrl-EVR-101	
P (2) HBL-080RFC:RFS-EVR-301	MEMT-010:RFS-EVR-101	PBI-ICBLM09:Ctrl-EVR-101	Spk-100RFC:RFS-EVR-101
⑦ HBL-080RFC:RFS-EVR-401	MEBT-010/RES-EVR-201	PBI-ICBLM10:Ctrl-EVR-101	Spk-100RFC:RFS-EVR-201
⑦ HBL-090RFC:RFS-EVR-101	MEBT-010/RFS-EVR-301	PBI-ICBLM11:Ctrl-EVR-101	Spk-110RFC:RFS-EVR-101
⑦ HBL-090RFC:RFS-EVR-201	PBI-APTM01:04I-EVR-101	PBI-ICBLM12:CM-EVR-101	Spk-110RFC:RFS-EVR-201
WHEL-090RFC:RFS-EVR-301	PBI-APTM02.Ctd-EVR-101	PBI-ICBLM13:Ctrl-EVR-101	Spk-120RFC:RFS-EVR-101
OPERATION OF CONTRACT OF CONTRACT.	 Ø PBI-APTM03.Ctrl-EVR-101 	PBI-ICBLM14:Ctrl-EVR-101	Spk-120RFC:RFS-EVR-201
WHEL-100RFC:RFS-EVR-101	OPBI-APTM04.Ctil-EVR-101	PBI-ICBLM15:Ctrl-EVR-101	Spk-130RFC:RFS-EVR-101
OPERATION CONTRACTOR CONTRACTO	 PBI-BCMT1;Ctrl-EVR-101 	PBI-ICBLM16:Ctrl-EVR-101	 Spk-130RFC:RFS-EVR-201
Participation (Control of the control of the con	PBI-BOM01CbI-EVR-101	PBI-IMG01:Ctrl-EVR-201	
(7) HRL-100REC-RES-EVR-401	PBI-BCM01Cttl-EVR-201	PBI-IMG01:Ctrl-EVR-301	⑦ TS4-ISrc:Ctrl-EVR-001



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)

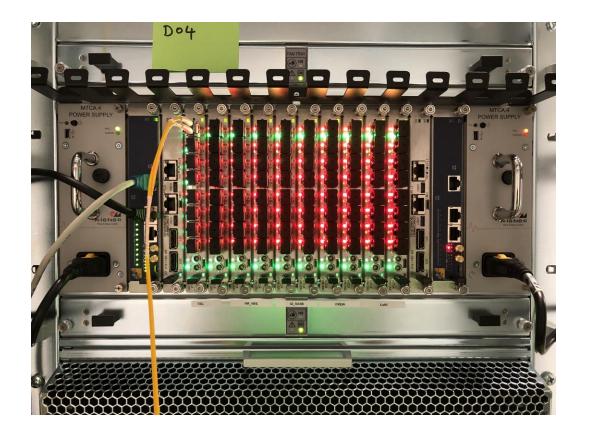
Slow migration from CentOS 7 to Yocto based OS

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 interventation 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



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 Łódž 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?