LHC BLM
System Readiness
Summary of YETS 22-23 Changes

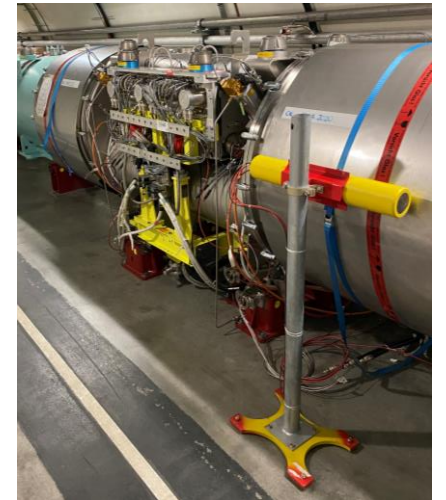Mathieu Saccani (SY-BI-BL) on behalf of the BLM team

24/03/2023

Changes during YETS 22-23

Monitors ➔ minor changes

1. Installation of 2 temporary detectors at 11L/R2 TCLD collimators: JIRA-BIBML-2560 EDMS-ECR-2859726
2. Installation of 2 detectors on the CryoBLM sCVD in SR5 and SR7 (research subject): JIRA-BIBML-2630

Hardware ➔ mostly preventive maintenance

1. Acquisition electronics: 3 replaced & 27 repaired BLECF (HV resistor, GOH, …)
2. Processing electronics: 2 replaced & 6 repaired BLETC (optical receiver, fibre clean-up)
3. Survey electronics: 1 replaced BLECS (SRAM memory)
4. Repaired of a few WorldFIP failing links (remote reset)

A11L2 new monitor

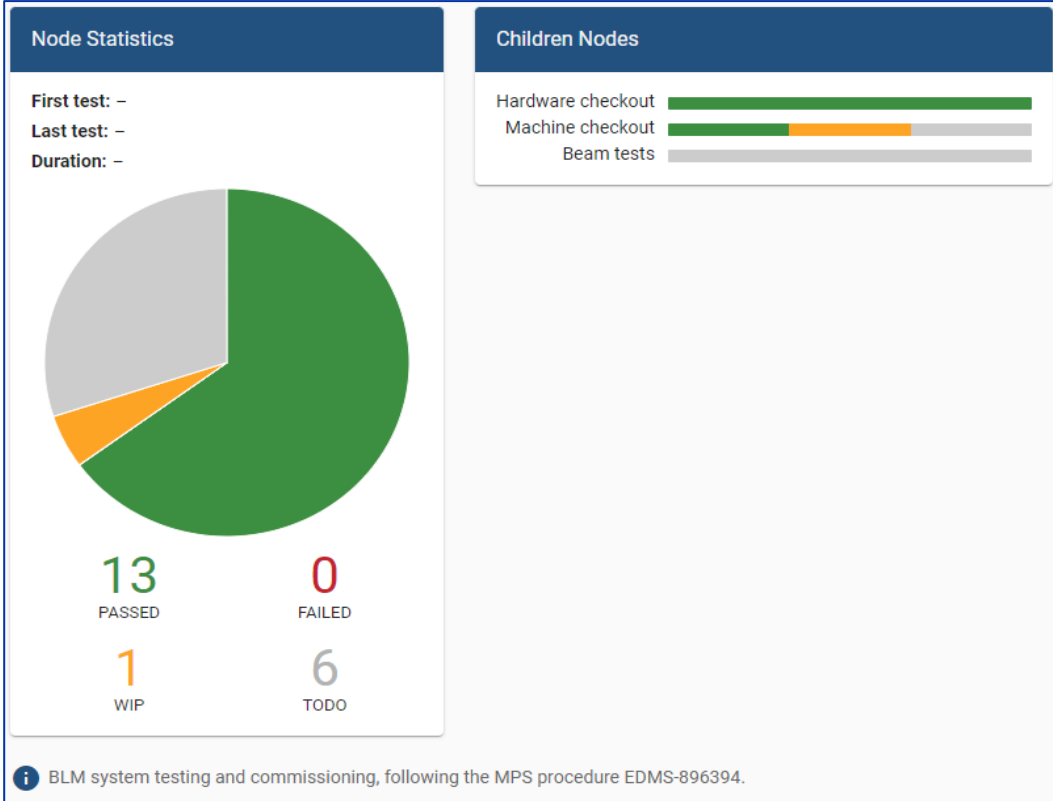# Changes during YETS 22-23 (cont'd)

Firmware ➜ major changes

1. BLETC (Threshold Comparator) firmware update to solve the RS12 Ch6/14 8MSb swap JIRA-BIBML-2548
2. BLECS (Combiner & Survey) firmware update:
    *   to solve the VME incompatibility with MEN-A25 (FPGA was responding too slowly)
    *   to improve the VME throughput and stability (block transfer added, and should solve the sanity check to randomly fail)
    *   minor processing improvements (remove offset in connectivity check, add access to all SRAMs, …)

Software and Databases ➜ major changes

1. CPU migration from MEN-A20 to A25 (advanced from LS3 to now):
    *   avoid losing CTIM events (missing XPOC/PM): JIRA-TIMING-4011 & JIRA-TIMING-4027
    *   give more processing time margin for real-time actions
2. LHC data concentrator new release: JIRA-BIBML-2507
3. Changes in FESA:
    *   Clean-up unused properties/fields
    *   Probes inserted in RT actions
    *   Remove some "VME retries" as the bus is now stable
4. Update of GUIs: BLMLHC_expert, InternalParameters, Thresholds, …

BLM LHC System readiness

BLM MPS Checklist

Node Statistics

First test: –
Last test: –
Duration: –

13 PASSED   0 FAILED

1 WIP   6 TODO

Children Nodes

Hardware checkout
Machine checkout
Beam tests

ℹ️ BLM system testing and commissioning, following the MPS procedure EDMS-896394.

Checklist - MPS - BLM

MPS_BLM_Commisisoning-EDMS-896394

Hardware Checkout

	Status
MPP/BLM - LSA	
MPP/BLM - HW1 - High voltage modulation	
MPP/BLM - HW2 - 10pA signal monitoring	
MPP/BLM - HW3 - Optical line comparison	
MPP/BLM - HW4 - 100pA signal	
MPP/BLM - HW5 - Radioactivate source	
MPP/BLM - HW6 - EMC	
MPP/BLM - HW7 - Beam energy receptiom	
MPP/BLM - HW8 - BLETC & BLECS v. DB comparison	
MPP/BLM - HW9 - Remove beam permit	
MPP/BLM - HW10 - User permit transmission (BLETCs)	
MPP/BLM - HW11 - User permit transmission (BLECs)	

Completed
20th Mar 23
Done by BI experts.

Only after LS2.
Could be greyed in the checklist.

Also verified with BIS team.
Issue in SR5 solved.

Machine Checkout ("IST")

	Status
MPP/BLM - MC1 - User permit transmission	
MPP/BLM - MC2 - Threshold values change with energy	
MPP/BLM - MC3 - Missing HV detection and propagation to the SIS	

Scheduled
3rd Apr 23
(delayed?)

To be done from the CCC.
Last year issue in SR5 is solved.

Tests with Beam

	Status
MPP/BLM - BT1 - Interlock request functionality of the BLM crates	
MPP/BLM - BT2 - Interlock request functionality of the BLETC	
MPP/BLM - BT3 - Interlock request system latency	
MPP/BLM - BT4 - Test the interface of direct BLMs with the beam dumping system	
MPP/BLM - BT5 - Injection Interlock Inhibit functionality	

Scheduled
3rd Apr 23
(delayed?)

1 block of tests in CCC

No need
No change on Direct Dump (neither on BLM nor LBDS)
Already tested after LS2.

Needed?
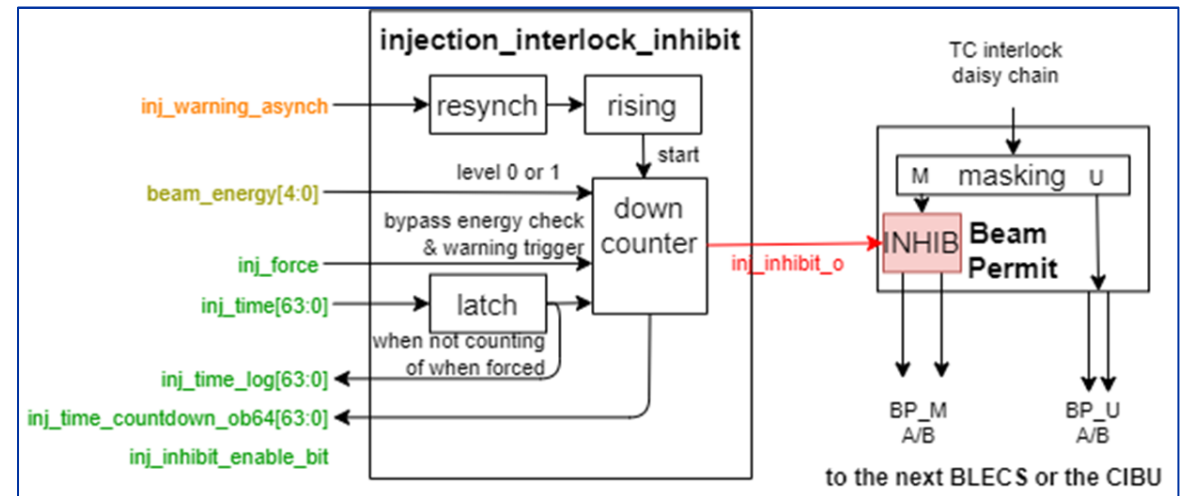Injection Inhibit test to be tested with beam by ABT & BI.

Limitations

Blindable channels inhibit at injection never tested with beam

- Feature present in all crates, not only SR2-Inj & SR8-Inj
- By default, it is disabled
- Triggered by injection warning (from BST) with programable timer per crate
- Acts only on maskable channels
- Inhibits the interlock output to BIC only (all running sums still active, and dump requests logged)
- This feature must be commissioned:
  - Dedicate ~3h to ABT+BI in the CCC
  - Test with beam
    and measure the blind time needed
  - Double-check the set of maskable
    channels to blind (+adjust monitor factors)

Injection Interlock Inhibit FW Implementation