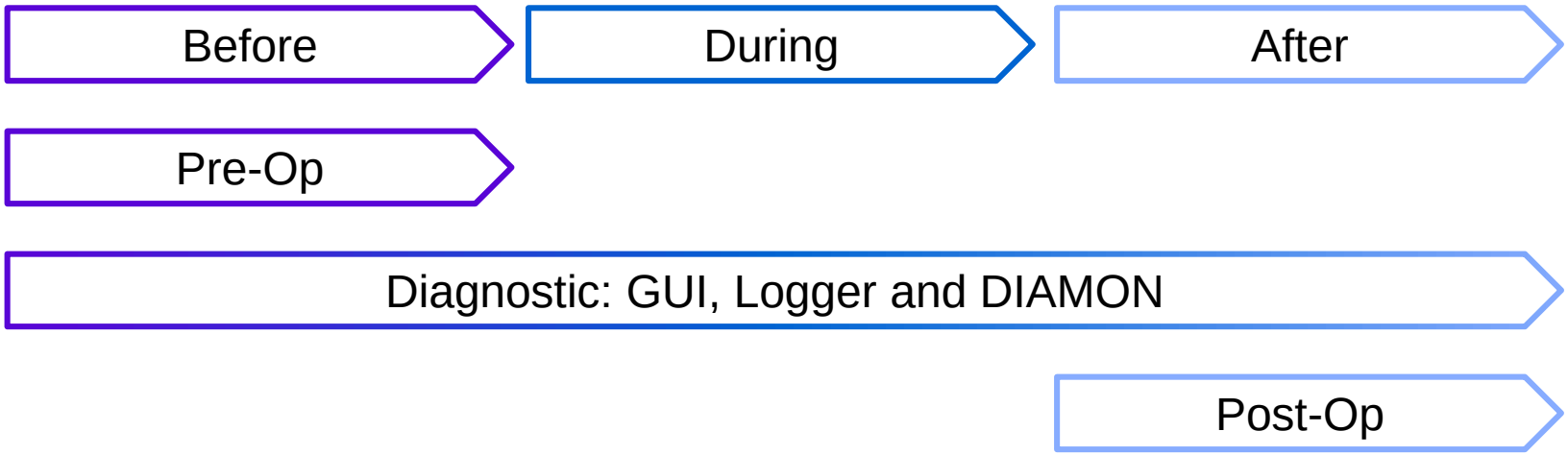
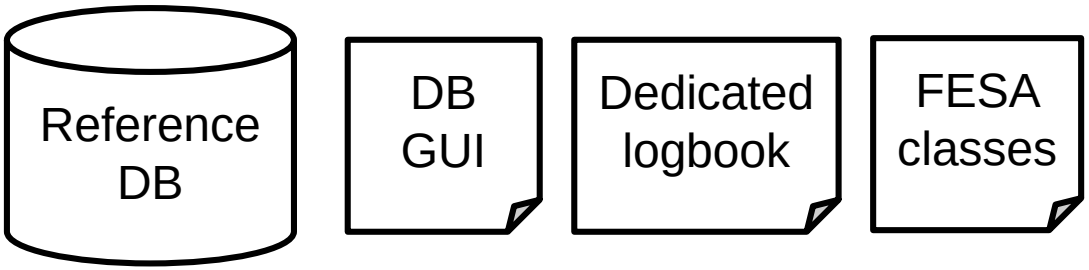
SMP : DIAGNOSTICS AND PRE-POST OPERATIONAL CHECKS

JEAN-CHRISTOPHE GARNIER ON BEHALF OF SMP SOFTWARE TEAM

OVERVIEW


Before
During
After
Pre-Op
Diagnostic: GUI, Logger and DIAMON
Post-Op


Reference DB
DB GUI
Dedicated logbook
FESA classes

PRE-OP

Features

- Comparison of the SMP configuration with a Reference model from database (DB)
  - Firmware versions
  - Interconnections
  - Thresholds
  - etc …
- Functional checks
  - LHC SMP connected to the Software Interlock System
  - Energy read from the SPS SMP correct for LHC injection
  - And much more …
- Prevent operation in case of major problem

Java sequencer tasks for LHC and SPS

- Both in the LHC sequencer
- Executed before beam injection

PRE-OP

Results of the task

- 4 different severities – none < note < warning < error
- 4 notifications
  - Message in the LHC OP logbook
  - Notes written in TE-MPE logbook (id 333)
  - Warnings sent to the bis-smp-experts egroup
  - Errors interlock the SIS

Tests that interlock the SIS

- CISV did not receive the LHC flags from the GMT media
- Critical firmware version is incorrect on SMP boards
- SMP generator boards are not producing LHC parameters
- CISC is in test mode
- The SMP CIBUs are in test mode or cabling is incorrect
- RS485 connectivity is incorrect

DIAMON

Standard tool from BE/CO

Current monitoring

- Crate status
- Correct configuration of the SMP system
  - Device connections
- Correct behaviour
  - Parameter reception

Work in progress

- Comparison with reference model from DB
- Preparation of DIAMON2 with CO

SMP GUI

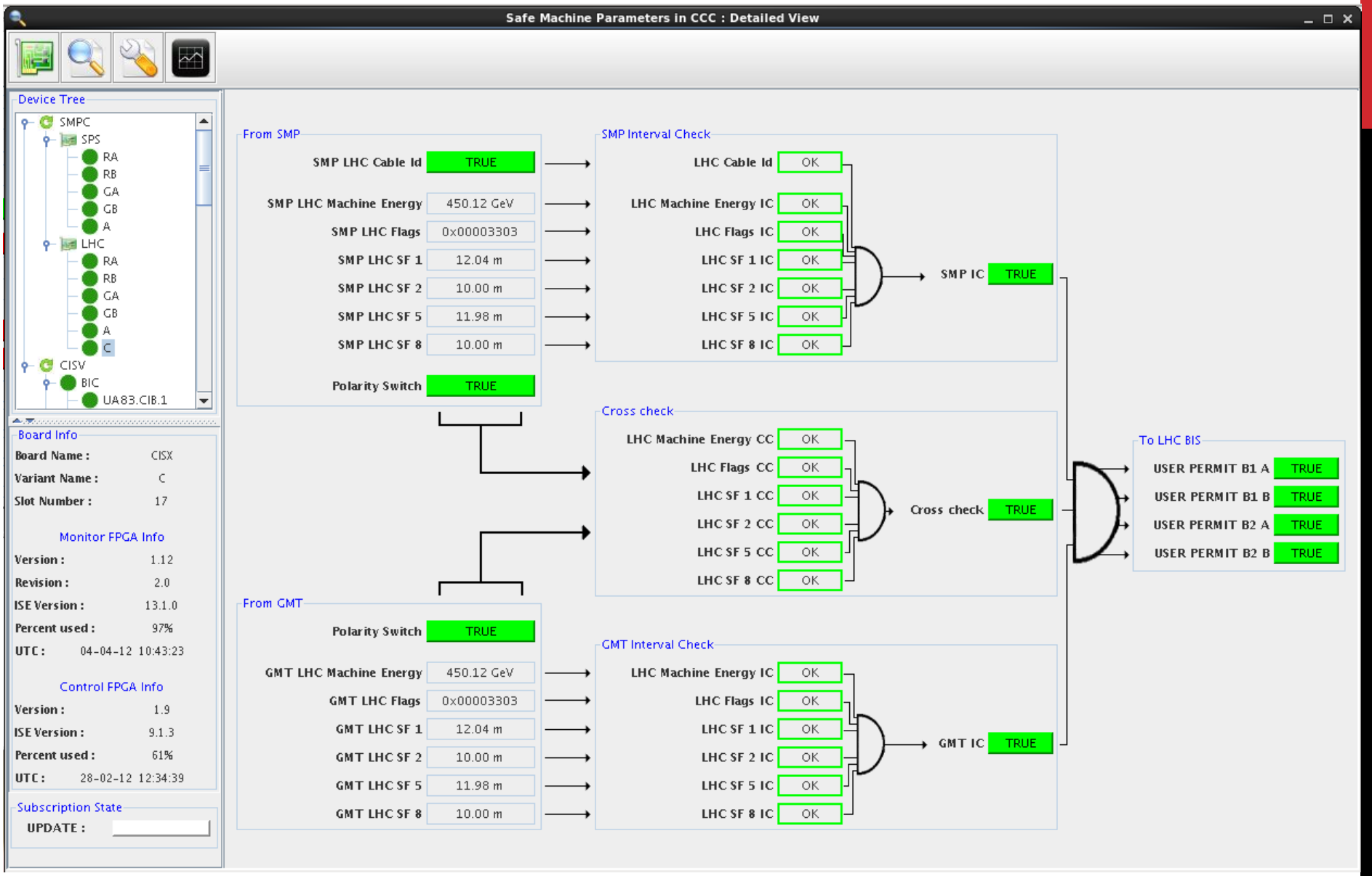
Features

- Decode and display all information from the SMP system
- Retrieve history buffers from any interval range

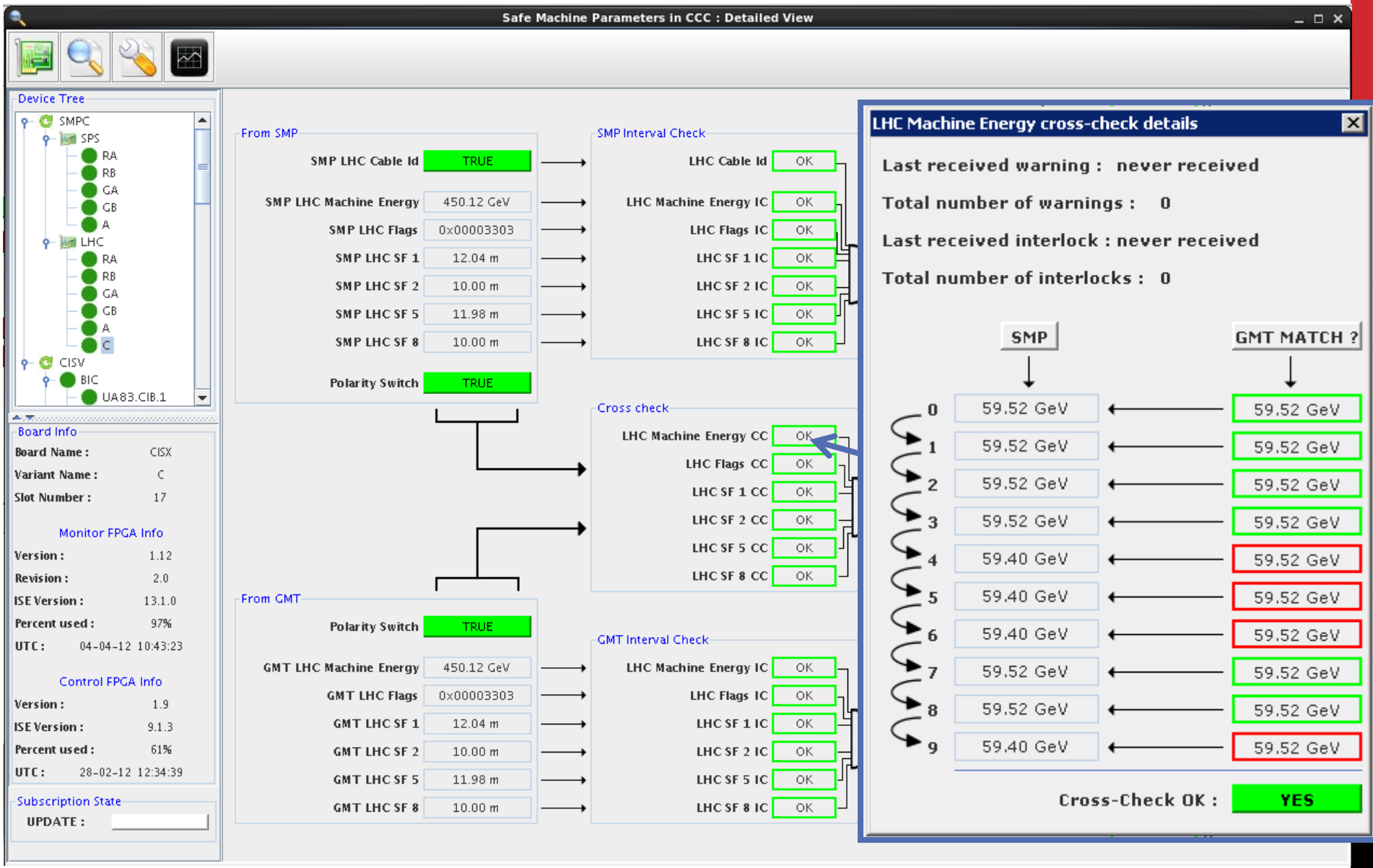
Java application

- For experts and for operators
- http://abwww.cern.ch/ap/dist/smp/smp-gui/NEXT/SMPGUI.jnlp?arg0=CCC

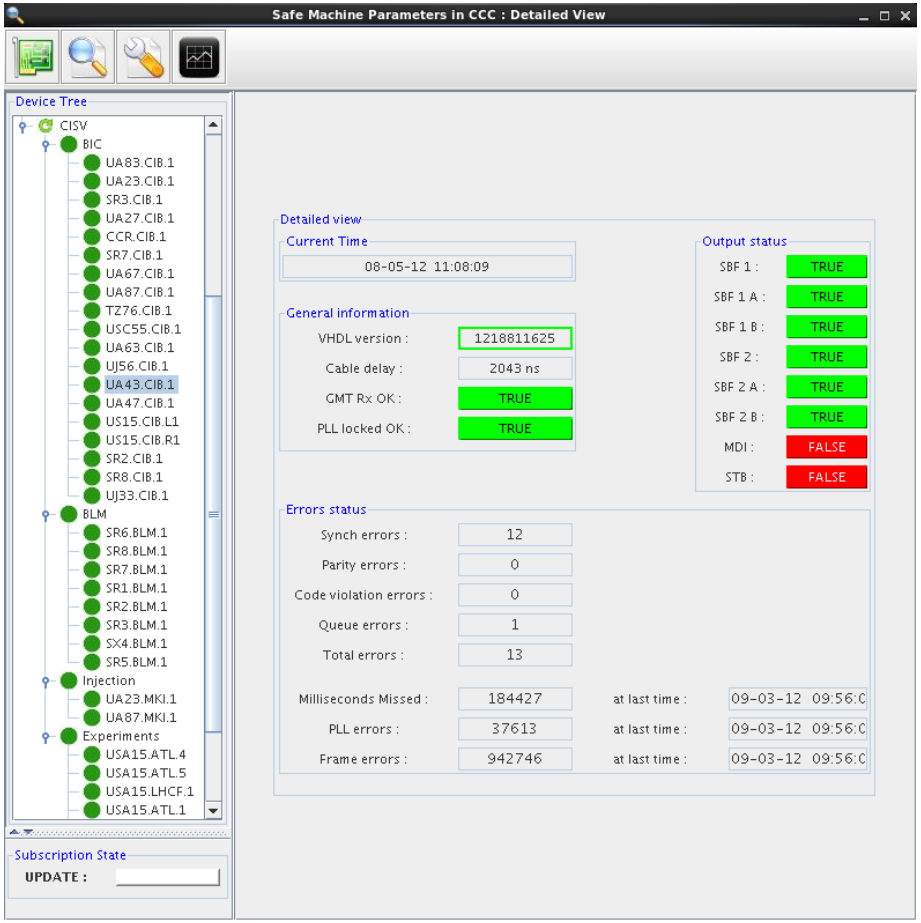
SMP GUI – CISC PANEL



SMP GUI – CISC PANEL



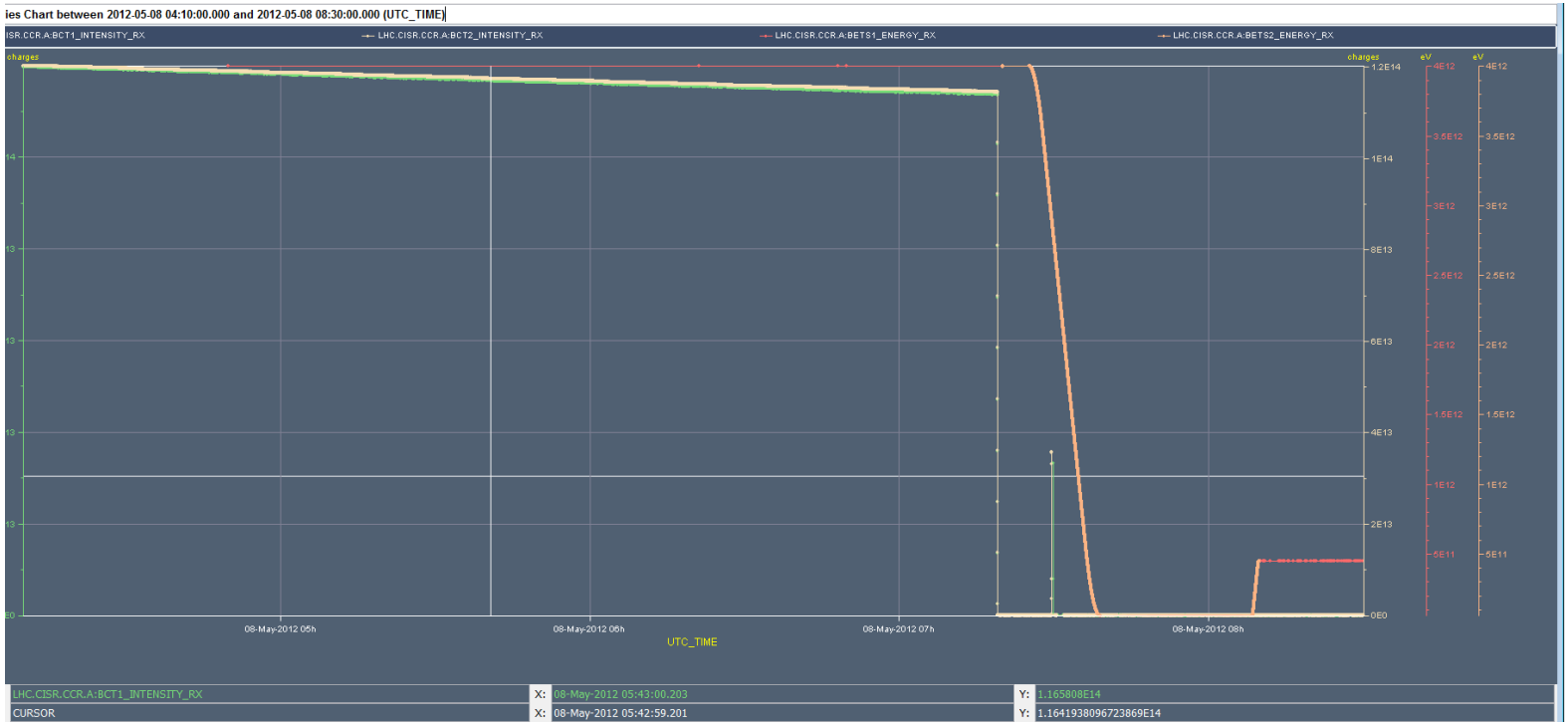
SMP GUI – CISV PANEL



LOGGER

Automatic Java process

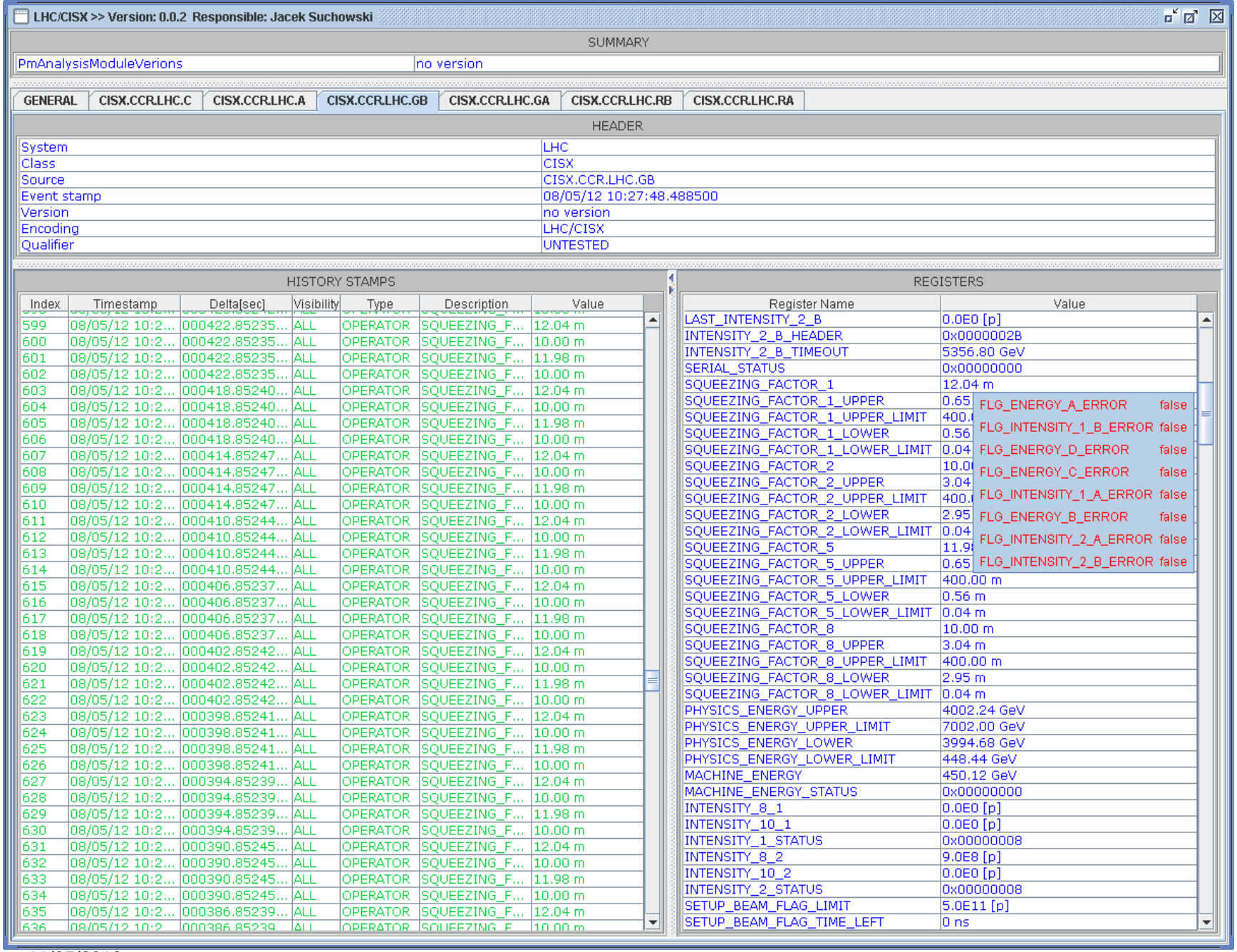
- History buffer conversion to workable format



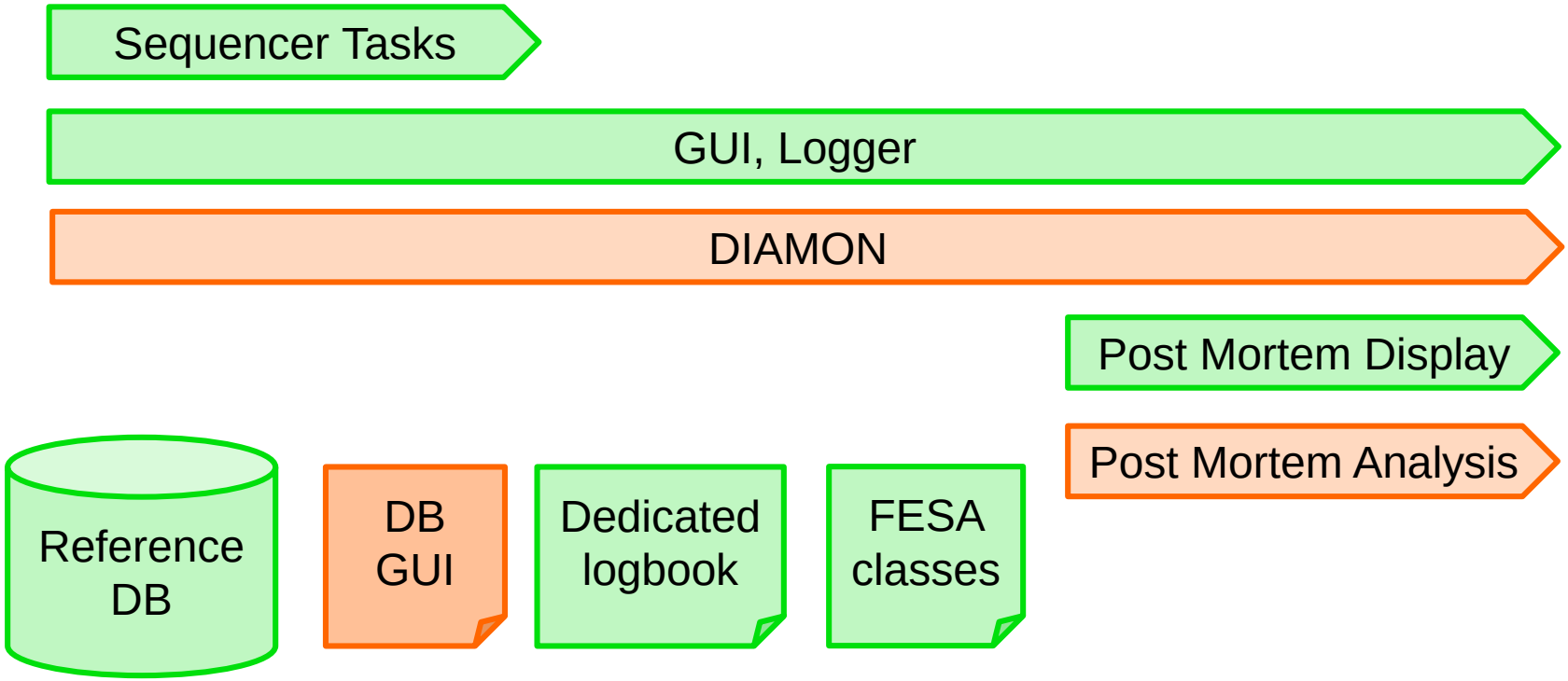
POST-OP

Tools in post mortem analysis framework

- History buffer and register decoder
  - Convenient display of all registers and history buffers from all devices
- SMP status analyser (work in progress)
  - Comparison of data from SMP and GMT in the cross-checker
  - Check that the cross-checker did not interlock the BIS
  - Non blocking for further operations
    - SMP itself will be interlocking the BIS


LHC/CISX >> Version: 0.0.2 Responsible: Jacek Suchowski
SUMMARY
PmAnalysisModuleVerions
no version
GENERAL
CISX.CCR.LHC.C
CISX.CCR.LHC.A
CISX.CCR.LHC.GB
CISX.CCR.LHC.GA
CISX.CCR.LHC.RB
CISX.CCR.LHC.RA
HEADER
System LHC
Class CISX
Source CISX.CCR.LHC.GB
Event stamp 08/05/12 10:27:48.488500
Version no version
Encoding LHC/CISX
Qualifier UNTESTED
HISTORY STAMPS
Index Timestamp Delta[sec] Visibility Type Description Value
599 08/05/12 10:2... 000422.85235... ALL OPERATOR SQUEEZING_F... 12.04 m
600 08/05/12 10:2... 000422.85235... ALL OPERATOR SQUEEZING_F... 10.00 m
601 08/05/12 10:2... 000422.85235... ALL OPERATOR SQUEEZING_F... 11.98 m
602 08/05/12 10:2... 000422.85235... ALL OPERATOR SQUEEZING_F... 10.00 m
603 08/05/12 10:2... 000418.85240... ALL OPERATOR SQUEEZING_F... 12.04 m
604 08/05/12 10:2... 000418.85240... ALL OPERATOR SQUEEZING_F... 10.00 m
605 08/05/12 10:2... 000418.85240... ALL OPERATOR SQUEEZING_F... 11.98 m
606 08/05/12 10:2... 000418.85240... ALL OPERATOR SQUEEZING_F... 10.00 m
607 08/05/12 10:2... 000414.85247... ALL OPERATOR SQUEEZING_F... 12.04 m
608 08/05/12 10:2... 000414.85247... ALL OPERATOR SQUEEZING_F... 10.00 m
609 08/05/12 10:2... 000414.85247... ALL OPERATOR SQUEEZING_F... 11.98 m
610 08/05/12 10:2... 000414.85247... ALL OPERATOR SQUEEZING_F... 10.00 m
611 08/05/12 10:2... 000410.85244... ALL OPERATOR SQUEEZING_F... 12.04 m
612 08/05/12 10:2... 000410.85244... ALL OPERATOR SQUEEZING_F... 10.00 m
613 08/05/12 10:2... 000410.85244... ALL OPERATOR SQUEEZING_F... 11.98 m
614 08/05/12 10:2... 000410.85244... ALL OPERATOR SQUEEZING_F... 10.00 m
615 08/05/12 10:2... 000406.85237... ALL OPERATOR SQUEEZING_F... 12.04 m
616 08/05/12 10:2... 000406.85237... ALL OPERATOR SQUEEZING_F... 10.00 m
617 08/05/12 10:2... 000406.85237... ALL OPERATOR SQUEEZING_F... 11.98 m
618 08/05/12 10:2... 000406.85237... ALL OPERATOR SQUEEZING_F... 10.00 m
619 08/05/12 10:2... 000402.85242... ALL OPERATOR SQUEEZING_F... 12.04 m
620 08/05/12 10:2... 000402.85242... ALL OPERATOR SQUEEZING_F... 10.00 m
621 08/05/12 10:2... 000402.85242... ALL OPERATOR SQUEEZING_F... 11.98 m
622 08/05/12 10:2... 000402.85242... ALL OPERATOR SQUEEZING_F... 10.00 m
623 08/05/12 10:2... 000398.85241... ALL OPERATOR SQUEEZING_F... 12.04 m
624 08/05/12 10:2... 000398.85241... ALL OPERATOR SQUEEZING_F... 10.00 m
625 08/05/12 10:2... 000398.85241... ALL OPERATOR SQUEEZING_F... 11.98 m
626 08/05/12 10:2... 000398.85241... ALL OPERATOR SQUEEZING_F... 10.00 m
627 08/05/12 10:2... 000394.85239... ALL OPERATOR SQUEEZING_F... 12.04 m
628 08/05/12 10:2... 000394.85239... ALL OPERATOR SQUEEZING_F... 10.00 m
629 08/05/12 10:2... 000394.85239... ALL OPERATOR SQUEEZING_F... 11.98 m
630 08/05/12 10:2... 000394.85239... ALL OPERATOR SQUEEZING_F... 10.00 m
631 08/05/12 10:2... 000390.85245... ALL OPERATOR SQUEEZING_F... 12.04 m
632 08/05/12 10:2... 000390.85245... ALL OPERATOR SQUEEZING_F... 10.00 m
633 08/05/12 10:2... 000390.85245... ALL OPERATOR SQUEEZING_F... 11.98 m
634 08/05/12 10:2... 000390.85245... ALL OPERATOR SQUEEZING_F... 10.00 m
635 08/05/12 10:2... 000386.85239... ALL OPERATOR SQUEEZING_F... 12.04 m
REGISTERS
Register Name Value
LAST_INTENSITY_2_B 0.0E0 [p]
INTENSITY_2_B_HEADER 0x0000002B
INTENSITY_2_B_TIMEOUT 5356.80 GeV
SERIAL_STATUS 0x00000000
SQUEEZING_FACTOR_1 12.04 m
SQUEEZING_FACTOR_1_UPPER 0.65
SQUEEZING_FACTOR_1_UPPER_LIMIT 400.
SQUEEZING_FACTOR_1_LOWER 0.56
SQUEEZING_FACTOR_1_LOWER_LIMIT 0.04
SQUEEZING_FACTOR_2 10.0
SQUEEZING_FACTOR_2_UPPER 3.04
SQUEEZING_FACTOR_2_UPPER_LIMIT 400.
SQUEEZING_FACTOR_2_LOWER 2.95
SQUEEZING_FACTOR_2_LOWER_LIMIT 0.04
SQUEEZING_FACTOR_5 11.9
SQUEEZING_FACTOR_5_UPPER 0.65
FLG_ENERGY_A_ERROR false
FLG_INTENSITY_1_B_ERROR false
FLG_ENERGY_D_ERROR false
FLG_ENERGY_C_ERROR false
FLG_INTENSITY_1_A_ERROR false
FLG_ENERGY_B_ERROR false
FLG_INTENSITY_2_A_ERROR false
FLG_INTENSITY_2_B_ERROR false
SQUEEZING_FACTOR_5_UPPER_LIMIT 400.00 m
SQUEEZING_FACTOR_5_LOWER 0.56 m
SQUEEZING_FACTOR_5_LOWER_LIMIT 0.04 m
SQUEEZING_FACTOR_8 10.00 m
SQUEEZING_FACTOR_8_UPPER 3.04 m
SQUEEZING_FACTOR_8_UPPER_LIMIT 400.00 m
SQUEEZING_FACTOR_8_LOWER 2.95 m
SQUEEZING_FACTOR_8_LOWER_LIMIT 0.04 m
PHYSICS_ENERGY_UPPER 4002.24 GeV
PHYSICS_ENERGY_UPPER_LIMIT 7002.00 GeV
PHYSICS_ENERGY_LOWER 3994.68 GeV
PHYSICS_ENERGY_LOWER_LIMIT 448.44 GeV
MACHINE_ENERGY 450.12 GeV
MACHINE_ENERGY_STATUS 0x00000000
INTENSITY_8_1 0.0E0 [p]
INTENSITY_10_1 0.0E0 [p]
INTENSITY_1_STATUS 0x00000008
INTENSITY_8_2 9.0E8 [p]
INTENSITY_10_2 0.0E0 [p]
INTENSITY_2_STATUS 0x00000008
SETUP_BEAM_FLAG_LIMIT 5.0E11 [p]
SETUP_BEAM_FLAG_TIME_LEFT 0 ns

CONCLUSION



CISV software cross-checker?

THANK YOU FOR YOUR ATTENTION

QUESTIONS

BACK-UP SLIDES

Diagram:	SMP E_R Model
Author:	zmakonne
Created on:	2012-04-26 08:41:27 CEST
Modified on:	2012-04-26 08:55:22 CEST
Changed by:	zmakonne
Design:	Untitled_1
Model:	SMP E_R Model