YETS 2018

PIC / WIC / FMCM YETS Activities & Re-commissioning Plans

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PIC

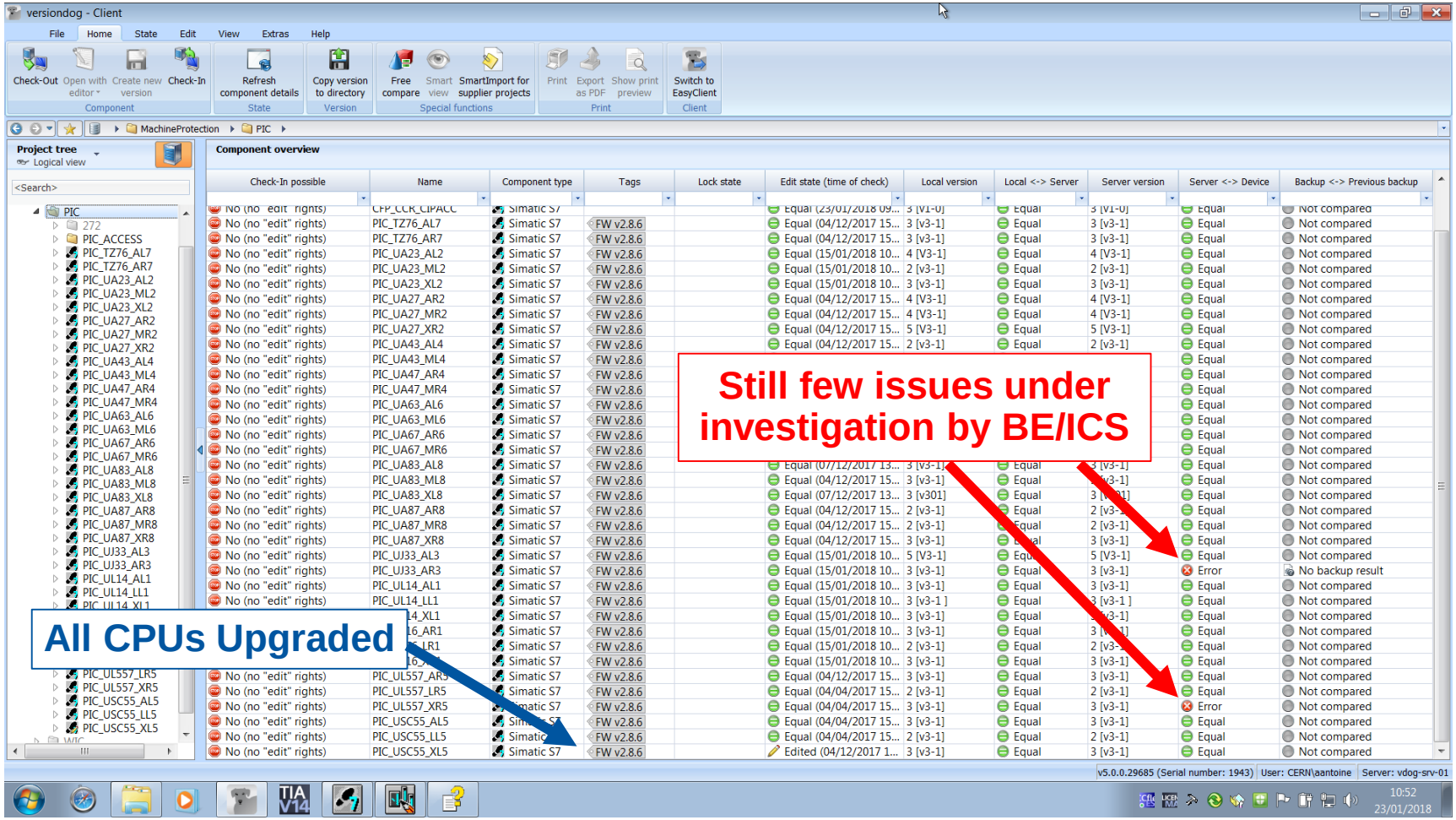
Power Interlock Controller

Summary of Activities

Description	Status	Comments
PLC Firmware upgrade (36x) from V2.8.3 to V2.8.6.	**DONE**	Triggered by CIP.AL14 failure in August
Exchange of the power supply crate (CIPS) of CIP. AL4.	**DONE**	One redundant +5V Power Supply in failure
Maintenance of the Supervision (WinCC OA).	**DONE**	General maintenance
Spare cable for RQ10.L8	**DONE**	EPC/PIC connection
Powering Test (AccTesting)	**W10/11/12**	
Cryo. Communication test.	**W12**	
General services connection test.	**W12**	
PP60A Permit test.	**W12**	
PIC – BIC Connection test.	**W12**	

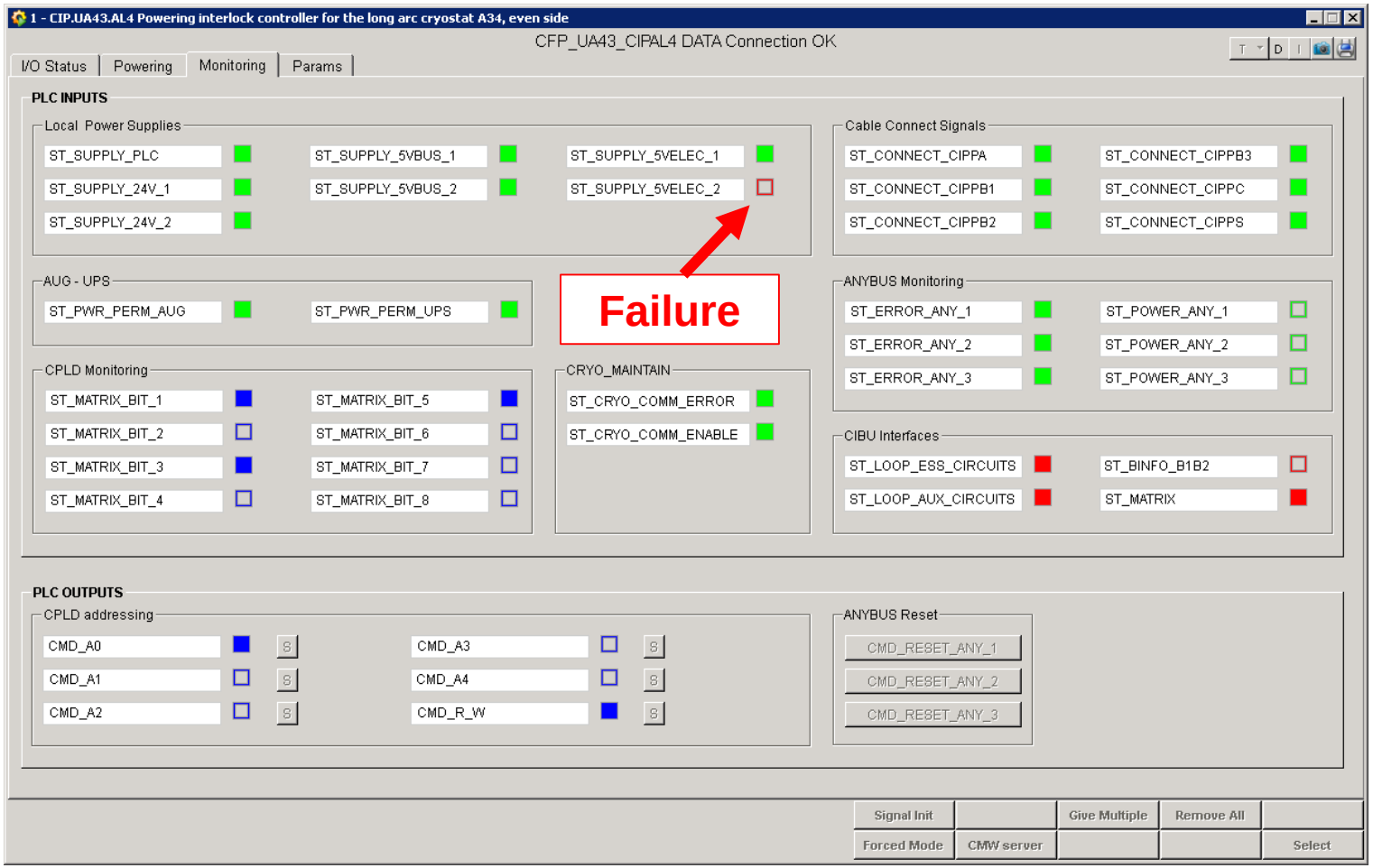
Summary of Activities

VersionDog [Data Management for automotive]



Summary of Activities

CIP.AL4 Faulty Power Supply



Summary of Activities

WinCC OA

- General maintenance:
  - Performance improvements.
  - QPS_OK Flickering (2nd trial).
  - **History buffer (PIC, WIC, QPS)** (https://its.cern.ch/jira/browse/ENS-20347):

Time range changes after a query.	To be deployed
Page up/down bug.	To be deployed
Entity filter issue.	To be deployed
Export to excel CSV and print on user AFS folder.	Pending
Extend filter to multiple choice.	Pending

Commissioning after EYETS

- Commissioning without beam
  - Individual System tests for all PIC devices.
  - PIC – BIS Interface test.
- Commissioning during Machine Checkout
  - Beam Dump triggered by:
    - AUG
    - UPS
    - CRYO
    - POWERING_FAILURE
- Commissioning with beam
  - No need to perform any tests.
- Reference:
  - EDMS 896390 - LHC-OP-MPS-0005 (MPS Aspects of the Powering Interlock System Commissioning).

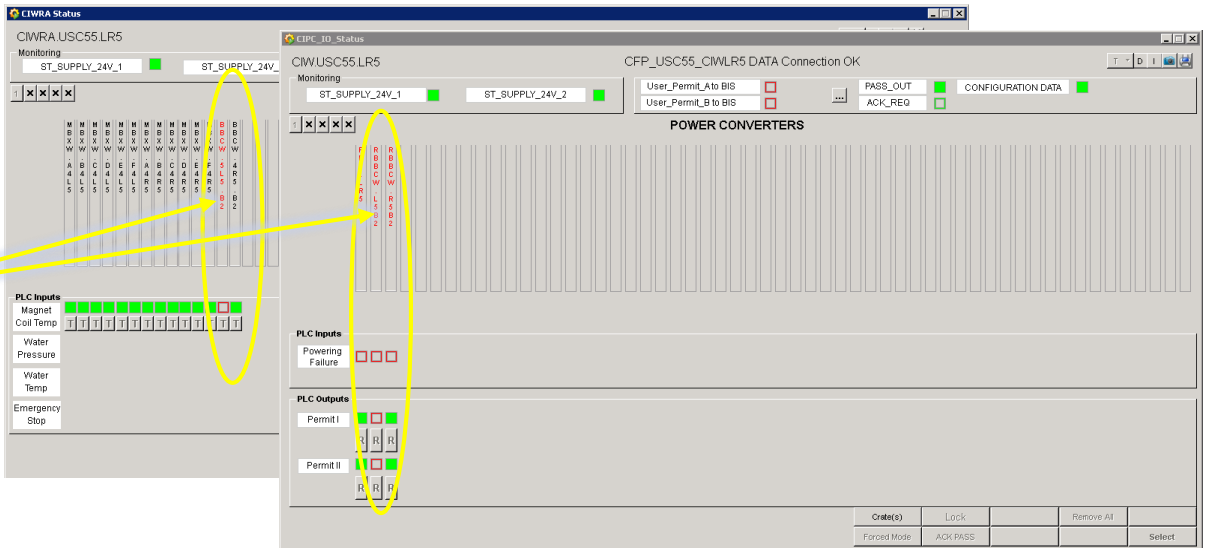
WIC

Warm Interlock Controller

Summary of Activities

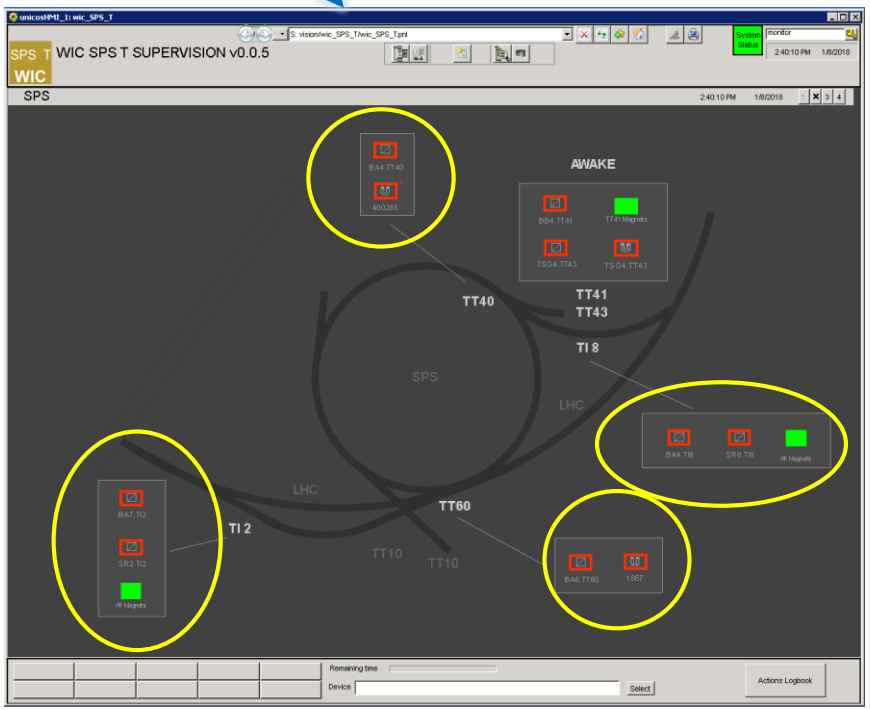
- LHC Point 1:
  - Add 2 input signals for the Beam-Beam Compensator Wires in L1 & R1 + 2 power converters (No changes on the “User_Permit_to_BIS” definition).
    - => Involves HW & SW modifications.
  - Same work as done in P5 during EYETS 16-17.
  - Full re-commissioning scheduled:
    - L1: Week 8.
    - R1: Week 10.

Example in P5



Summary of Activities

- LHC-SPS Transfer lines:
  - Upgrade to the latest “non-safety” generic code.
  - CPU Firmware upgraded
  - Move to a dedicated HMI (Ti2, Ti8, TT40, TT60).
  - Done !
  - TT41 was upgraded in Oct. 17.
- Full re-commissioning:
  - Magnet part: **Done !**
  - PC part t.b.d. in the CCC **with OP.**
    - Starting from 6th of March.
  - BIS outputs tests.



Investigation on TI2 (1)

- Sporadic communication losses with some PLC deported I/O Slaves.
- Happened during a week only in 2017:
  - Short period: from 13/11 to 20/11.
  - Had an impact on LHC operation twice (13/11 and 15/11)
  - External event ?

System	Start Time	End Time	OP Duration	State	Faulty Elemer	Description	AWG	Expert	R2E Status	Parent	Child Count
Machine Interlock Systems » Other	15-11-2017 12:05:32	15-11-2017 12:39:16	33min 44s	OP Ended	RMSI.L2B1	tripped in SB (FA); WIC problem ?	Requires review	Requires review	Not R2E related		0
Machine Interlock Systems » Other	13-11-2017 22:56:32	13-11-2017 23:03:26	06min 54s	OP Ended	MSI.L2B1	tripped during Stable beams due to a WIC problem in TI2	Requires review	Requires review	Not R2E related		0

- Same behaviour already observed over the past years.

Investigation on TI2 (2)

- Analysis on TI2 & TI8 PROFIBUS-DP bus:
  - Measurements done.
  - Comparison with last year measurements analysis on-going.
- Hardware architecture similarities between TE-ABT and TE-MPE
  - Similar problems recently seen on the LBDS.
  - TE-ABT organised an audit with Siemens.
  - Waiting for the final report of the audit by end of February.
- JIRA issue: MAGINT-243

FMCM

Fast Magnet Current Monitor

Summary of Activities

- **No changes** of the FMCM firmware
- New SATURN converters installed on RD1.LR1/5 and RD34.LR3/7 during EYETS 2016/2017:
  - In 2017, **no dump** recorded for RD1.LR1/5, RD34.LR3/7 because of **electrical disturbances**.

Description	Status	Comments
Exchange of one unit with a brand new spare (if available !)	**PENDING**	TI2 or TI8 Transfer line
Inspection of all HV Box	W5	To complete missing data (divider values)

Re-commissioning

without beam

- For all FMCMs (12 in LHC and 14 in SPS-TLs): **Trigger, threshold validation (dI/I) and propagation to BIS**, as described on the MPS document - EDMS 896393.

4	S	For each FMCM, **program a current step into the powering cycle (TL devices) or create an FGC_STATE fault on the power converter (LHC) and validate the correct triggering of the FMCM with the BIS**; optimize threshold if required with increasing beam intensity/energy (Note: The threshold is not dependent on the beam intensity/energy, but may for safety reasons be further decreased for high beam intensity).	BE/OP, TE/MPE

Re-commissioning

with beam

- Trigger, threshold validation, propagation to BIS and verification of beam excursion and losses with **pilot beams at 450 GeV and 6.5 TeV** (EOF tests).

	Rep.	Action	Group(s) Responsible
1	S	For each FMCM (or a selection in case of a short winter-stop; **), program a current step into the powering cycle (or provoke an FGC_STATE fault) and validate the correct triggering of the FMCM with the BIS** **Determine the maximum beam excursion observed in the vacuum chambers of the TL/LHC and possible beam losses before the beam was dumped**. These tests can be done as an end of fill (EOF) test.	BE/OP, TE/MPE
2	N	**In case of relevant changes of optics or powering configurations** potentially affecting the protection timescales and thresholds, **the abovementioned test shall be repeated with the FMCM masked in order to establish a new reference and to confirm the beam dump to happen via BLMs in IR7.** **Determine the maximum beam excursion observed in the vacuum chambers of the TL/LHC and the reaction time of the BLM system** (which ideally should trigger in IR7). These tests can be done as an end of fill (EOF) test, the interlocked BPMs in IR6 should be masked and the monitoring factor of a selected set of primary collimators in IR7 decreased in order to trigger the BLMs with the used pilot beam.	BE/OP, TE/MPE

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