TE-MPE LS1 Review

View from TE/ABT

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Outline

- Local BIS loops
- BIS client checks
- Diagnostics on the optical links
- CIBDS
- BIS frequencies at Beam Dump
- AccTesting
- Post Mortem (XPOC)
- Conclusions

Local BIS loops

- The local BIS loop around the LBDS in point 6 (LBDS and CIBG) allows to realistically test the LBDS without having the full BIS loop
  - Fundamental for testing and reliability runs of the LBDS
  - Tests went very smoothly
  - Moment to switch to global BIS loop dynamically adapted: went very well
- Second period of global BIS loop without any other clients was also very useful
  - Used to test and validate the CIBDS operation
  - To be kept for the future
- In the future could we foresee a switch back to the local loop during YETS for a couple of days of reliability running?

Re-commissioning of BIS clients

- Originally tested and accepted 2002 – 2004
- Not conform any more in 2014
  - To ABT the evolution of the specification was not clear
  - Modifications should have been (more clearly) requested *before* LS1
  - 2014 was too late to make any changes on our side as ABT commissioning was (about) finished….
- Fundamental problem as some of the BIS re-commissioning tests are not compatible with safety PLCs

Fibre optic links

- The sector test in 2015 was performed without redundant injection BIS link for B2
  - Missing one BIS frequency in P8, Fast Inhibit Board bypassed.
- Diagnostic was difficult as incoherent results
  - Missing BIS frequency detected by the Fast Inhibit Board
  - BIS sees frequencies and systems OK…BUT finally were not !
- Space for improving diagnostics

CIBDS

- New redundant link between BIS and LBDS which omits the Trigger Synchronisation Unit

- Good collaboration at the start for specifications and reliability calculations. Low level integration went OK.

- Missed details for high level integration (Arming seq.)
  - CIBDS will send pulse if CIBG arming is not successful
  - Missed out on either side (MPE and ABT)
  - Biggest omission, only diccovered during commissioning period

- Local / remote state not seen by CIBDS (commissioning)
  - Hardware problems on CIBDS side
  - No spare available ….

- For the next version ABT is not really involved ….

- Do we need to do reliability tests if changes at the CIBDS level ? (local BIS loop, see above)

BIS frequencies at Beam Dump

- **Loss of BIS frequencies to dump the beam not very neat**
  - ☐ Several ways / types at which this can happen
  - ☐ Present detection works, however could possible improve and minimise reaction time
  - ☐ Studies for the future ….Adapt the detection system if necessary
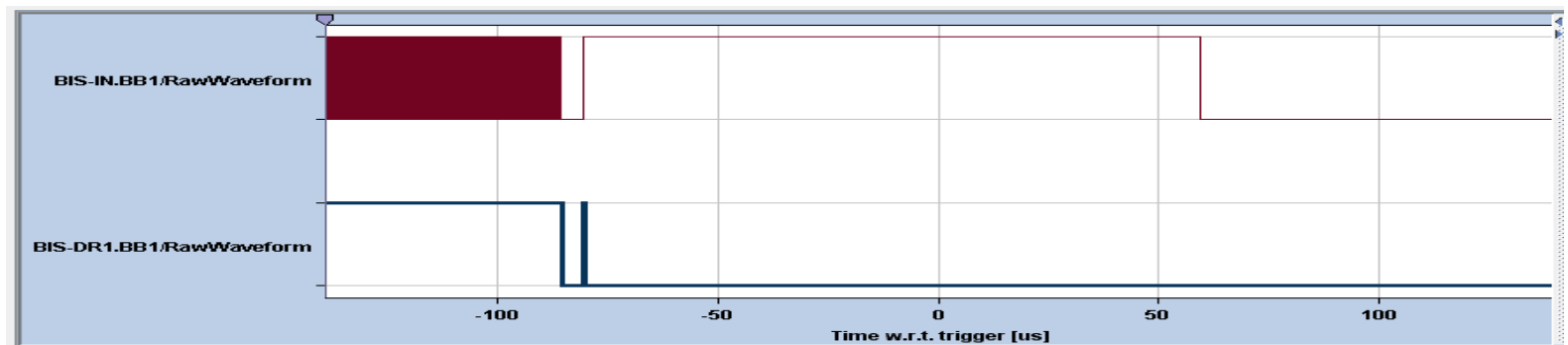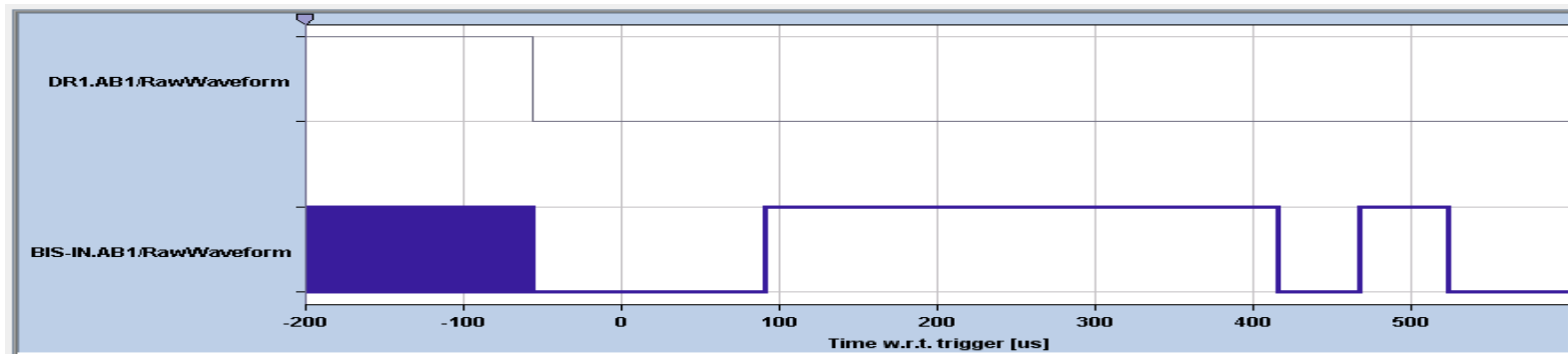
AccTesting

- The Plan about 1 year ago:
  - ☐ To be used for Machine Protection checklist
  - ☐ To be used for exchange of beam dumping system generator
- Started development of some required features, with Technical Student 'borrowed' to AccTesting team
- Components successfully developed but no final product which could be used by ABT group
  - ☐ Work could not be finished on time due to different priorities
  - ☐ No strong push from the ABT team once we were in the heat of injector and LHC commissioning
- Lack of follow-up and definition of priorities from both sides

Post Mortem (XPOC)

- **Integration problems with BE/CO (RDA3 / FESA3)**
  - ☐ Many releases of CMW / PM / FESA3 necessary
  - ☐ First working version came very late (just before first injections)
- **XPOC not available during sector tests and first injections.**
  - ☐ Almost all XPOC analysis sessions failed because of missing data
- **XPOC not available during MKD and MKB waveform scan with beam.**
  - ☐ We could not rely on PM (XPOC) to save the data and reload/analyse afterward, so measurements based on screenshots

Conclusions

- MPE – ABT collaboration during LS1 was good
- Some space for improvement / development:
    - Local BIS loops for YETS ?
    - Update of BIS client specifications
    - Test procedure incompatible with safety PLCs
    - Diagnostics for fibre optics links
    - New CIBDS version
        - What's new ? What's needed for testing ?
    - Different modes of loosing the BIS frequency seen by TSU
    - AccTesting lacking follow-up and prioritisation from both sides
        - We should pick it up 'now'
    - Post-Mortem needs better integration with BE/CO
- Looking forward to the future