R2E Internal Meeting – 24.10.2013

Follow-ups

- QPS has an interest in outsourcing the components test
  (TRAD and other companies to be checked again)
- Fraunhofer tests to be re-launched
- EN/STI testing option to be investigated
- QPS team will do a rescan of components -> to be transmitted by Jens to us
- Collaboration with Montpellier to be followed
- Batch-purchase provisions to be taken (tracking batches, keeping spares and foreseeing tests after installation (CHARM)

Insertion Region parts

- Production launched (IPQ/IPD) -> will be applied to all LHC systems
- Planned for LS1
- Assembly part was problematic for RadMons (QPS expects <5%)
- No pending tests
- Batch components -> what could be critical?
- ADC critical MAXIM 1162 (Bi-CMOS process) -> certain batch to be kept for batch testing
  - 2009 test: TID limit in the order of up to 80Gy (placed only in the RR)
  - SEE risk
- Flash memories (same producer - ATMEL - now ADESTO)
  - Memories will be tested at PSI in November/December
- CHARM tests to be foreseen (resources needed)
  - To be seen what can be done with universities/companies

600A

- Development is on hold
- Base algorithm is running
- ADC 1281 is back into game (due to revised detection threshold settings)
  -> tests foreseen for November
- SRAM -> the one from EPC can be used
- Flash memory required during operation (custom TMR foreseen)
- ACTEL 3000 should be ok
- OPA2227 -> already tested by EPC
- PhotoMOS -> to be tested
- Real problem is not R2E related -> difficult to get the full program running
  (so far no full prototype with 600A running)
- Timeline seems to be very critical

Power

- Traco (regulator) issue with possible failure impacting downstream. It is installed in the 600A crate. The current consumption is 0.5A.
- Change of the Traco with linear regulator is possible, but currently no man-power
- LDO (linear regulator) solution also brings other advantages: less noise, less impact on the grid, etc.
- Could be done after the current crash campaign

nanoFIP

- Big impact on QPS (major constraint for design)
- The use of the FPGA ProAsic3 as NanoFip is not straight forward for QPS. Alternative plan

    - Taking the IPcore
    - To be implemented in a ProASIC (bigger version than 400)
    - Implement also the microcontroller part of the card on the FPGA. →own communication chip to be developed
- ADUC is now used as microcontroller with the Microfip. Recently the ADUC was tested by the survey group at CNRAD (Matheusz Sosin's talk on the RADWG 12 September)
    - Tested only indirectly and concerns the more vulnerable ADuC834, QPS fieldbus couplers use ADuC831 (nQPS detectors use however ADuC834)
- Now QPS uses only the microcontroller functionality (8051). The ADC part no longer required for the latest version of MB protection systems -> this would make the ADUC less prone to radiations
- Intermediate solution before the NanoFip: automatic recovery (8051 detects that WorldFIP communication is not working anymore)
    - Has been tested in CNRAD with satisfying results
    - To be tested in the tunnel (LS1 deployment)
    - Will be deployed for the main dipole protection systems
    - Maybe for the add-on on the Quadrupole
    - If it works, it saves you an access
- General: The FIP is only used for Diagnostic
- General Question for the FIP bus remains; we have the slave (NANOFIP) but we have also to care about the FullFIP(on the master side) -> PCI express today, but future?

Other

- **PhotoMos question -> is it sensitive to SEEs?**
- IGLOO2 tests, etc. -> 100 versus 40krad
    - Internal structure should be more complex than the ProAsic
    - the IGLOO does have Maths blocks and DSP block but it has a simpler structure than the SMARTFusion2
    - Test of IGLOO can be more challenging than the ProAsic3
    - Could be tested (partly) with an external company -> **student/fellow project**

AC/DCs

- Big impact on QPS (major constraint for design)
- Development will be done after LS1
- Not very complex, basic design is known
- Integration is difficult, crates have to be redesigned
- Components: LDO regulators, etc. -> expected not to be a testing r2e issue. Plan to reuse the LT1084, now tested at Fraunhofer
- Supervision might be required/envisaged (not on the box itself)

Post LS2 operation

- Better/updated radiation estimates required (RRs, DS/ARC)
- Few other things to be checked
    - impact on SCLs

Man-Power/Planning:

- Can/should we profit from the MoU with Montpellier (how) -> work package description
- Test requirements to be summarized -> important for Giovanni's LMC talk