

Minutes of the RADWG meeting held on 3 March 2010

Present: Yves Thurel, Andreas Herty, Chiara Bracco, Reiner Denz, Georges Burdet, Ketil Roed, Evangelia Gousiou, Gonzalo Penacoba, Giovanni Spiezia, Eric Van der Bij, Alfredo Ferrari, Pierre Dahlen, Alain Gharib, Daniel Kramer

Matters arising – (Daniel Kramer):

- Date for the next meeting was fixed for 25 march 2010
 - Agenda opened for suggestions
- A.Herty presented the list of components present in the motor driver rack for the triplets (UJ56, UJ16 and in the bypass in point 2 and 8)
 - Members of the WG were asked if they have experience with some of the components from the list in order to evaluate whether it is needed to relocate the crate or if it is worth assessing the radiation tolerance of individual components
 - The members were asked to send by mail their eventual remarks to the list
 - i.e. TRACO power supplies were tested by several groups but it is not clear which types
 - Update from 22/3/2010 – no answers were received
- The electronics is ON during the operation, but the motors are OFF and mechanically blocked
- The rack was never tested in radiation and was not designed with radiation as a constraint
- The preparation of the radiation tests in **UJ22** with the early LHC beam were announced
 - Aim was to obtain a rough cross section of the generally most sensitive equipment before the R2E workshop planned for late May / early June.
 - The tests were **CANCELLED** due to technical reasons and all the equipment will be tested in **CNGS** directly

Repair of the irradiated Cu-Cu Repeater from CNGS (Julien Palluel):

- One Cu-Cu WorldFip repeater tested in CNGS failed after 165Gy / $1.1 \times 10^{12} \text{cm}^{-2}$ 1MeV n eq.
 - Loss of communication after the failure (data errors followed by the loss of comm.)
 - Return channel remained silent even after 2 power cycles
- In the lab, 2 problems were identified
 - Frames correct at the input to the Actel Antifuse FPGA
 - Reset pulse regularly issued through the monostable 74HC4538, when this device was exchanged for a fresh one, no more resets were observed. Nevertheless still no response from the FipDiag
 - Frames correct on the output of the FPGA but not correctly synchronized
 - Voltage regulator L4931CD25 found at 1.8V instead of 2.5V
 - Regulator exchanged by a new one
 - Repeater working without problems after the exchange of the 2 components
- 2nd repeater was tested in CNGS in 2009
 - Test terminated after 250Gy(Si)

- No problems observed
- The FPGA, FieldDrive (new batch), FieldTR worked without problems during the tests!
- C.Pignard proposed to replace the two failing components with the more resistant ones (monostable HTC123 and voltage regulator LM317) in order to extend the lifetime of the repeater

CNGS electronics test facility draft planning for 2010 (D.Kramer):

The rough planning for the returning users was presented together with the list of users expected to perform tests in CNGS in 2010.

Slot #	End in week	Approx. date	miniSUBD 2.5MHz	SUBD 31.25kHz	SUBD 1MHz	miniSUBD 1MHz
			TSG45-1	TSG45-2	TSG46-3	TSG46-4
1	23	31 May		CRYO		
2	27	28 Jun		CRYO		
3	31	26 Jul	TE/EPC	CRYO		
4	36	30 Aug	TE/EPC			QPS
5	42	11 Oct	TE/EPC			QPS
6	48	28 Nov				QPS

The remaining devices are supposedly the most sensitive systems installed in the most exposed areas like UJ14/16/76/56. The PLC systems are generally known for very low TID tolerance and very high SEE cross section, but numbers are required in order to assess the risks during the operation.

The evolution of total dose in Gy(Si) is presented in the table below.

Slot #	End in week	Beam time [weeks]	Total duration	Approx. date	TSG45 floor	TSG45 corner	TSG46 floor	TSG46 corner
1	23	4.5	4.5	31-May	128	6	15	1.0
2	27	3.5	8	28-Jun	227	11	26	1.8
3	31	3.5	11.5	26-Jul	327	16	38	2.6
4	36	4.5	16	30-Aug	454	22	52	3.6
5	42	5.5	21.5	11-Oct	611	30	70	4.9
6	47	5.5	27	21-Nov	767	37	88	6.2

The preferred location for most of the tested new devices will be behind the corner of TSG46, as the dose rate should be rather low (i.e. below $1e7\text{cm}^{-2}/\text{h}$ for hadrons $>20\text{MeV}$) to avoid too frequent resets.

The list of the devices from the alcoves to be tested follows:

- **Fire detectors (2 modes of connection)**
 - ASD 516 – 2 DUTs
 - ASD 535 – 2 DUTs
 - Cables provided by the group
- **Collimator control rack**
 - Required cables
 - 2x Ethernet
- **Remote reset/ Timing crate with a PLC**
 - Timing crate
 - Remote reset crate
 - Required cables
 - 1x NE48?
 - 1x Ethernet
 - 2x VH4 timing cable
- **Ethernet switch**
 - 3 devices will be tested
- **WIC PLCs**
 - US85 crate
 - SIEMENS PLC 315F 2DP
 - ET 200M
 - Fast Boolean processor FM 352-5
 - Required cables
 - 1x Ethernet
- **CV PLC modules**
 - USV Simens Sitop 24VDC 10A (UPS)
 - Batterie 24VDC/7Ah (Pb!, acid)
 - Power supply 220VAC/24VDC Siemens Sitop 10A
 - - Siemens S7-315-2DP CPU with (local) Profibus to connect:
 - - S7-200 with Profibus module - ET200M with
 - - 1xDI, 1xDO, 1xAI, 1xAO
 - - Wago Remote IO with
 - - 1xDI, 1xDO, 1xAI, 1xAO
 - - pressure transmitter
 - - temperature transmitter
 - - Power supply 220VAC/24VDC Schneider 10A ABL7
 - - Schneider CP57453 CPU with (local) FipIO bus to connect:
 - - PSY 5520 24VDC power supply
 - - 1xDI, 1xDO, 1xAI, 1xAO

Official start of CNGS is April 28 (10 days sooner than in the previous planning). The first beam should come already on 18 April due to the beam line commissioning. All the works have to be finished before Easter as the area has to close in advance.

Requirements for the future temporary procedure for handling electronics irradiated in CNGS in 2010:

DGS/RP requests to be informed before the installation of the devices in CNGS about the expected tests to be performed after the end of irradiation. The following information has to be submitted at least 2 weeks before the installation:

- Description of actions to be performed (i.e. scope measurements, exchange of a subsystem, exchange of irradiated components by new ones etc...)
 - Destructive actions to be listed separately (soldering)
- Name of the lab where non-destructive tests should be carried out
 - Destructive tests would have to be performed most likely in 530
- Responsible person for the tests
- Justification (importance for the LHC)

The procedure will have to be approved by the DGS/RP group leader, the RSO and the responsible of the lab

Users were also reminded to fill the [form](#) **CNGS electronics test irradiation log** before the start of the tests.

Update (17 March 2010): Only BE/CO (Julien Palluel) wants to profit from the temporary procedure for the tests of the repeaters. Everybody else tests commercial components and no further development is needed or possible. The QPS team has enough remote readout.

The preferred location is the lab in 530 also for the non-destructive tests.