

MSWG Meeting 26-Nov-2013

Present:

D Manglunki, M Bodendorfer, G Kruk, K Hanke, Q King, A Radeva Poncet, A Guerrero, H Damerau, O Hans, G Metral, M Barnes, S Gilardoni, K Cornelis, G Bellodi, A Findlay, V Montabonnet, B Mikulec, JL Sanchez Alvarez, E Benedetto, G Sterbini, L Soby, JP Burnet, R Steerenberg, W Bartmann

Agenda:

- Approval of minutes
- Main presentations:
 - FGC Integration in OASIS and Trigger Synchronisation, Anastasiya Radeva Poncet
 - FGC integration - feedback from OP, Jose-Luis Sanchez Alvarez
 - FGC integration – INCA, Grzegorz Kruk
 - FGC integration - comments from EPC, Quentin King
- AOB

The MSWG minutes of the last meeting were approved.

FGC Integration in OASIS and Trigger Synchronisation, Anastasiya Radeva Poncet

Anastasiya introduced the FGC integration in OASIS with adjustments of time base, delays, software zoom and scrolling mode. The present diagnostics information of type, specialist, device and equipment group class behind will be extended with a copy/paste functionality into the terminal to see e.g. if data was published for a certain cycle. The runtime management of operational equipment will come in Q1/2014; not critical for the start up.

Presently the analogue signal correlation in OASIS for the PS complex uses centrally generated triggers which results in different delays due to the cable distribution. The FGC data sources are published with absolute timestamp. The analogue signals will be treated as so far, the digital signals will be plotted with reference to the LTIM trigger stamp.

As a solution for the trigger synchronisation in the PS and SPS complex a dedicated White Rabbit network is foreseen; for non WR compatible digitizers extra HW is needed for timestamp extraction. This requires modification of all existing FE installations and eradication of all legacy VXI HP digitizers and crates. The project will be launched in 2014 for 3 years; it is dependent on the HW consolidation between 2014 and 2016.

Discussion:

L Soby asked why the FGC data sources won't be used for the BI BCTs – it will be used, ongoing work.

S Gilardoni commented that LEIR is not included in the list of machines for the HW consolidation - to be included.

R Steerenberg asked how it was tested that the triggering is not jittering and that the signal is not drifting – the analogue signals will be visualised as for today; the FGC data sources have a precise UTC timestamp. Q King commented that there is no compensation for cable delays which can go up to a few us; the jitter is in the order of a few tens of ns.

JP Burnet commented that the migration of the OASIS HW will be a waste of investment after the FGC upgrades in LS2 and if it made sense to upgrade OASIS for just two years. R Steerenberg answered that these upgrades need to be synchronised but most importantly a solid prove is needed that the data sources will work in the future. The worry is the correlation of data sources with non-data source signals.

Concerning the available tools in OASIS – all tools as so far will be included (e.g. for Labview).

G Metral asked how the PSB and PS data can be correlated - with the timestamps of data source it is possible to synchronise. In case of analogue signals, can the old one be kept - both signals are kept for the length of one cycle.

[FGC integration - feedback from OP](#), Jose-Luis Sanchez Alvarez

For the FGC2 integration in the PS signal through OASIS would be beneficial. Presently specialist application needed to unlock after fault.

In the PSB FGC3 was integrated with digitalized data source and absolute timestamps. In parallel 8 independent OASIS channels are used for cross checking the FGC3 acquisitions, synchronisation issues with other machine signals to be solved.

FGC3 integration for Linac4 is in progress.

Discussion:

G Metral commented that there won't be the possibility to cross-check the digital data source with the OASIS signal in the future. Q King answered that FGC3 is tested in the lab; OASIS and data sources are compared. Also this parallelism shall be kept for some time for a subsystem. In LHC there is only one system because it is very stable. The problem with a data block after a trip shall be improved with the migration from FGC2 to FGC3 due to the limited memory in FGC2 when dumping data into post mortem.

The software to detect better the polarity state of power converters with a polarity switch will come in 2014.

FGC integration – INCA, Grzegorz Kruk

Amplitude and delay parameters will be implemented in new INCA and can be erased from FGC.

Configuration of dis- and reconnected FGC: after disconnection parameters and settings will be deleted from InCA and automatically reconfigured after connection.

InCA to FGC subscription issues to be tested.

Dry runs with participation of FGC experts and OP required in Feb/March 2014.

Discussion:

Can FGC devices be proved – yes, lab systems which can run in simulation are available to debug the software.

S Gilardoni was asking whether there could be showstoppers – There are some problems to be solved like end of cycle policy, but no showstoppers to be expected.

FGC integration - comments from EPC, Quentin King

Different software classes are used for continuously regulated (porting FGC2 POPS controller) or capacitor discharge power converters (being written now for Linac4).

In the PSB all 104 corrector circuits have been tested – 37 to be inverted. During LS1 145 multipole correctors have been replaced by 82 new ACAPULCO converters.

An FGC device has been defined per circuit.

In the PS 4 FGC3 systems will be installed during LS1 for resonance compensation. Ultimately (LS2 or LS3) also the existing FGC2 (only the ones running the new POPS) will be migrated to FGC3. This shall increase network bandwidth (one point per millisecond) and logging memory.

One of the important SW changes includes the state machine with three new states added (blocking, direct, economy) and a simplified scheme with OFF, BLOCKIN, ON.

The regulation algorithm was improved with better filtering which is not a problem if DCCTs are used but with noisy sources like hall probes.

Also in development for 2014 is the pre-function policy property, where the rms current can be minimised. A reference pulse has to be chosen to control also the capacitor discharge converters. The combination of ppm and non-cycling devices poses problems for the FGC software. Not too critical in PSB and PS but the SPS has non ppm users as well.

ALL USERS and NO USER are not separable in InCA; OP needs to be aware; it is difficult to diagnose if problems occur.

Discussion:

S Gilardoni was asking whether the regulation algorithm SW was common for different machines – yes, it is compatible with 10 kHz iteration rate.

R Steerenberg was asking how the pre-function regulation works if different capacitor discharges are used for the same ramp rate as done for the injection bump for instance. Now it is regulated by adjusting the timings and delays - this will be a new challenge for the regulation board.

What happens to settings in case of a gateway re-boot – no change to settings, only if the FGC is changed. In case of HW replacement, InCa provides an application that has to be run by the EPC piquet.

JP Burnet commented that the complexity of the WS led to a manpower problem and he hopes that the present situation is ok for 2014; from 2015 on any new device will have an FGC.

AOB:

Status of POPS: low risk of short-circuit and explosion but degrading of capacitors needs to be understood. Measurements in January on a dummy load. A rapid cycling test system is being developed, a better understanding is expected in April 2014. First restart is planned with the MPS.

Next meeting: 2014