

Procurement Readiness Review (PRR) for WP02 – LLRF

*Minutes from the PRR presentations
26 November 2013*

Attendee List:

Stefan Choroba (WP01), Julien Branlard [**JB**] (WP02), Hans Weise, Sven Mohr (WP36), Dariusz Makowski [**DM**] (WP02), Wojciech Wierba [**WW**] (WP02), Dirk Noelle (WP17), Klaus Floettmann (WP14), Herbert Kapitza (WP39), Kay Jensch (WP03), Olaf Hensler (WP28), Tim Wilksen, (WP28), Lutz Lilje (WP07, WP08, WP19), Denis Zotkin, Serena Barbanotti (WP03), Guenter Moeller (WP02), Sergej Ruzin, Uros Mavric [**UM**] (WP18), Frank Ludwig [**FL**] (WP02), Torsten Grevsmuehl (WP01), Karsten Machau (WP01), Torsten Limberg (MLC), Winfried Decking (MLC, WP16), Chrsitain Schmid (WP02), Matthias Hoffmann [**MH**] (WP02), Mariusz Grecki (WP02), Elmar Vogel (MO, WP46), Petr Vetrov, Frantisek Krivan, Holger Schlarb [**HS**] (WP02).

Summary

All presentations can be found on the indico page:

<https://indico.desy.de/conferenceDisplay.py?confId=9147>

Opening remarks:

HS defined the scope of this PRR and presented the dates for the remaining PRR for WP02.

LLRF system presentation:

JB presented an overview of the LLRF system and the components covered in this PRR.

Questions: Will orders be made with other work packages (for example crate).

Answer: Yes, this is the plan, when possible. But, LLRF crates have a specific AMC backplane, some applications require different power supply, etc... This should be treated on a case-specific basis.

MTCA.4 framework:

UM presented the MTCA.4 crates, power supply (uPM), microTCA controller hub (MCH) and CPU.

Question: Are all power supply companies qualified for WP02 requirements?

Answer: No, currently only Wiener fully qualifies. Telkoo is expected to qualify as well. Call for tender will then be restricted to these 2 pre-qualified vendors.

Recommendations: write up list of open points to finish qualifying a company; include all procedures in time plan; involve procurement at DESY early on to expedite the call for tender process.

Clarifications about Electro Magnetic Interference (EMI) were given.

uDWC-uADC:

FL presented the MTCA.4 pair: down-converter and digitizer.

Questions: can these boards be ordered today to fulfill the XFEL WP02 specifications

Answer: yes.

Recommendation: a clear decision has to be made to stop (optimization) development and proceed with procurement.

Clarifications about the MMC1.0 and ADC limitations were given.

uTC-uVM:

DM presented the MTCA.4 pair: main LLRF controller and vector modulator.

Questions: 1. what is the latency between digitizer and main controller. 2. What is the closed-loop latency?

Answer: 1. less than 200 nsec. 2. between 1.5 and 2 usec

Clarifications about the resources of the FPGA and about future firmware development were given.

LOGM-PSM:

MH presented the local oscillator and clock generation module (LOGM) and power supply module (PSM).

CPIM:

JB presented the coupler processing interlock module (CPIM)

LLRF infrastructure:

WW presented the infrastructure tasks related to XFEL LLRF installation. This includes 3D model, racks shielding, cooling, occupation, cabling and assembly.

Question: who takes care of splitting the toroid signal? Only 1 signal is provided to the LLRF where some stations expect 3.

Answer: this point was overlooked. WPO2 will take the responsibility to split the toroid signal. Space in the MTCA.4 crate is limited. A discussion in a smaller group to find a solution is required.

Software:

CS presented an overview of the various tasks and different level of software development involved in the XFEL LLRF system.

Question: Which part of the software (if any) will be procured?

Answer: Although not directly related to the procurement, the software development was presented to justify the need for spare hardware resources. Furthermore, possible software procurement could involve external companies to help with certain developments (making the LLRF software real-time ready for example.)

Question: is hardware ready for all software wishes?

Answer: yes. Only possible bottleneck could be the CPU (current CPU usage is 50%). This would be addressed by switching from dual to quad core. This solution is currently under investigation.

Question: does the LLRF system described in this PRR meet the WPO2 specifications

Answer: Yes. The RF distribution and synchronization is the last open point, mostly due to the difficulty of getting accelerator-size field experience. However, this is not part of this PRR and will be addressed in the following WPO2 PRR.

Procurement:

JB presented the different rack occupation for the various linacs of the XFEL, including injector (gun, and third harmonic structure). Security aspects, inventory and quality management considerations were presented. The total hardware count, production and installation schedules were presented.

Question: how is WPO2 handling any unexpected delays with hardware production

Answer: production times in the MSPE have been schedule conservatively, hopefully absorbing any manufacturer delay. Furthermore, WPO2 components are ordered in relatively small quantities (300 or less), which is usually not an issue for board producers.

Recommendation: the LLRF should be formally included in a safety analysis.

Question: is WP02 in-line with its budget planning?

Answer: relatively well. Some components are significantly cheaper than foreseen. For others, the expected price discount due to technology evolution has not happened (FPGA for example). WP02 order is not large enough to influence the sell price. These 2 effects balance out.

Closing remarks:

Although not mandatory, such a presentation is considered useful to get a good overview of the system status and readiness for procurement.

The versioning of boards and system development history is not relevant and should be avoided in the next PRR.

In fine, all involved experts agreed that WP02 was ready to proceed with procurement of the components presented in this PRR.