Minutes PSB Upgrade WG Meeting 29th January 2015

Participants: J. Abelleira, D. Aguglia, E. Benedetto, A. Findlay, V. Forte, R. Froeschl, J. Hansen, I. Kobzeka, M. Kowalska, A. Newborough, M. Paoluzzi, S. Pittet, J. Tan, G.P. Di Giovanni, B. Jones, B. Mikulec, K. Hanke.

Agenda (https://indico.cern.ch/event/367898/):

- 1. Approval of Minutes
- 2. Communications
- 3. Follow-up of Open Actions
- 4. Review of the BI Equipment Installed for the LIU-PSB Upgrade
- 5. AOB

1. Approval of Minutes

- The minutes of the last LIU-PSB WG meeting #140, available here, were approved.

2. Communications

- **2015 Budget:**
  - Malika got all information but is awaiting data for the IONS.
- **Cost and Scheduling Review:**
  - The review is getting organized and it is scheduled for March 2015.
  - B. Mikulec will present on behalf of the LIU-PSB project
- **Energy consumption report:**
  - M. Meddahi will circulate a table to the project team about the Energy Consumption Report.
- **TDR:**
  - The TDR for the PROTONS is being printed.
  - The TDR for the IONS is getting prepared.
- **Miscellania:**
  - W. Weterings would like to clear out the building where the mock-up of the H^- injection will be assembled.
  - The money requested are of the order of 20 kCHF. K. Hanke has advised him to use the money in his own budget codes first.
- **Cabling:**
  - After a presentation in the MSWG about the new turn-by-turn trajectory system on the new PSB orbit, L. Jensen directly contacted EN-EL to sort out issues about cabling.
  - S. Baird is now organizing a meeting.
  - B. Mikulec added that the first reply received seems to indicate that it will not be possible to pull cables until a complete clean-up is done.
  - M. Meddahi is trying to get an EN-EL representative for the whole LIU project.
- **Kicker Rise Time:**
  - A meeting is getting organized by the PS expert for this upcoming Friday, 30th January 2015.
  - A document summarizing the latest measurement results will be circulated.

3. Follow-up of Open Actions

- J. Tan on "Find a place in the PSB rings for the new wire scanners" and "Present a review of the BI equipment installed in the PSB in the frame of the LIU-PSB Upgrade." → Actions Closed, see presentation below.
- D. Aguglia on "Approve document with the functional specifications of the rack space for both the LIU-PSB and the Half-Sector test in Linac4." → The deadline is for the end of January 2015. D. Aguglia asked to extend the deadline. The work should require couple of additional weeks.
- J.M. Lacroix on "Complete integration of PSB-PS transfer line" → J.M. Lacroix was not at the meeting, but G.P. Di Giovanni reported that J. Abelleira sent him the optics for the new BT-BTM-BTP line and asked J.M. Lacroix for feedback. K. Hanke will contact J.M. Lacroix as a follow up.

4. Review of the BI Equipment Installed for the LIU-PSB Upgrade

After the meeting, J. Tan was requested to modify the presentation by updating the planning of the items needed for Linac4 connection, the deadline of which is set to end 2016. The updated presentation is the baseline for the beam instrumentation (BI) group and it is available here.

- J. Tan presented a review of the beam instrumentation (BI) equipment to be installed in the frame of the LIU-PSB upgrade, see here.

Main Issues to Follow-Up:

- **Cabling with EN-EL for the beam loss monitors (BLM) and beam trajectory measurement system (BTMS).**
- **Revisit the deadline (currently end 2016) for the BI equipment in the injection region and its readiness for a possible Linac4 connection during EYETS.**
- **Wire scanner project is on a critical path.**
- **Make sure the space is reserved for the different BI equipments.** → **Open Actions**.

Assigned to	Due date	Description
J.Tan	2015-12-03	L4 Connection: Make sure that the SRR or ECR to reserve space for SEM Grids for turn-by-turn measurements in ring 3 are submitted.

Assigned to	Due date	Description
J.Tan	2015-12-03	Make sure that the ECR to reserve space for the wire scanner is submitted.

Assigned to	Due date	Description
J.Tan/C.Zamantzas	2015-12-03	L4 Connection: Make sure that the SRR or ECR for BLM for the PSB and transfer lines is submitted. The SRR or ECR should include FLAT ionization chambers and ionization chambers to replace ACEMs.

Assigned to	Due date	Description
J.Tan/J.Belleman	2015-05-21	L4 Connection: Make sure that the DIC, SRR and ECR to reserve space for the wide band BPM in the BTP line are submitted.

SUMMARY:

- The total budget requested for BI is 3635 kCHF:
  - Divided into 5 budget codes with almost 80% of the budget is allocated for 4 projects:
    - Wire Scanners: 970 kCHF.
    - Booster Trajectory Measurement System: 750 kCHF.
    - Upgrade for Linac4 (L4): 648 kCHF.
    - BLMs: 532 kCHF.
  - **K. Hanke asked about the discrepancy between the budget reported in APT (3674 kCHF) and the one mentioned in the slides:**
    - J. Tan said the budget foreseen is indeed 3635 kCHF.
    - J. Tan and G.P. Di Giovanni already discussed about the issue and it is likely due to the fact that several work-units were not updated with the real spending, but had still the planned spending.
    - These discrepancies will be synchronized at the next re-baselining process.

- The table below summarizes the status of the BI projects for the PSB and injection/extraction transfer lines:

Beam Instrument	Goal	Baseline	Status
BCT in 8L1	Measurement of injection efficiency with L4. Acquire the first 100 turns and compare the intensity with BI.BCT20 and trigger the watchdog if needed.	LS2	On time. One BCT is currently available in laboratory.

BCTDC in section 9	Quantify total intensity transmission during PSB cycle.	End 2017	On time. Current milestones are: - Acquisition chain upgraded. - Front-end electronics assembled. - Front-end electronics housing manufacturing launched.
Position measurement plates in BI.SMV	Measure the beam position for the 4 rings in the new injection septum for the 160 MeV beams	End 2016. J. Tan asked if the deadline is still valid or if it could be anticipated. B. Mikulec said the deadline has to be aligned with the work done by the ABT group.	On time. Specification being discussed with B. Mikulec. The design will start in April/May 2015. The plates should be ready to be installed in BI.SMV in October 2015.
SEM Grids for turn-by-turn measurements in ring 3 for both planes.	Measure the beam profile turn-by-turn on half-turn PSB beam for beam injection with L4.	LS2	Conceptual design started. Mechanic design not started. The space in 4L1 has to be still reserved (ECR). K. Hanke stress that space reservation is an urgent issue: There is no much space available in the PSB.
Wire Scanner (WS).	Measure the beam profile in the PSB.	LS2	Two prototypes available in SPS and laboratory. Design proposal for 11L1. BI group would prefer to split the WS in two separate section to allow measuring both planes at the same time. The additional section to be reserved would be 16L1. K. Hanke remarked that the WS should be separated vacuum-wise from kicker, septa, etc, in order to make a WS change as easy as possible. B. Mikulec added that actually 16L1 is not a good location

			because of the presence of the extraction septum. On a critical path. The space reservation has to be done (ECR).
New housing for BI.BTV30, BT.BTV10 and BT.BTV30.	Measure beam profile.	LS2	On time. The tank for BT.BTV10 is installed. The design for BT.BTV10/30 is in progress. J. Tan mentioned that the deadline could be anticipated. B. Mikulec proposed to install the tanks during the EYETS, if the work is ahead of time.
BLM for the PSB and transfer lines.	Monitor the beam losses.	End 2016	On time. Cable pulling completed in L2 sections. All systems should be ready for the 2017 start-up, if cabling is granted in L3 sections and transfer lines.. The ECR has to be prepared.
Turn-by-turn BPM in the PSB.	Turn-by-turn trajectory measurement over the whole cycle.	Originally LS2. New request from OP for project completion is start-up in 2017. Feasible for 2017 if the cables are pulled in BOR. K. Hanke mentioned that this could be done during the EYETS.	One full ring can be acquired, multiplexed. Design target resolution of 0.2 mm, but the interference on analogue signals is a real nuisance. Still using the old front-end electronics, without VGAs. B. Mikulec pointed out that the resolution is not so small right now, when connecting multiple pick-ups even at high intensity. The issue has to be followed up closely. Software: FESA interface, with hooks for YASP and the Sampler + Expert GUI. E. Benedetto mentioned that

			the software is not ready yet in CCC and the data access is currently possible only with expert software.
Wide Band BPM in the BTP line.	Beam position measurement in the BTP line to spot transverse instabilities during beam transfer between PSB and PS.	End 2016	Not yet started. Doable because it is based on existing PS design. Design and production will start in 2015. Space reservation in BTP and ECR to be done.
Inductive BPMs in the extraction lines.	Beam position measurement.	LS1	8 monitors + 2 spares completed in LS1. Front-end electronics compatible with L4 beams. Some interference noise with beam being investigated.

- H^- injection system and Half Sector Test (HST)

Beam Instrument	Goal	Baseline	Status
Ionization chambers.	Beam loss monitoring.	Q1 2016	BLM support design and integration done. The system is to be commissioned in 2016. The cabling should be completed during EYETS.
Diamond detectors.	Measure fast losses and foil degradation.	Q1 2016	BLM support design and integration done. The system is to be commissioned in 2016. The cabling should be completed during EYETS.
H^0/H^- current monitor.	Measure stripping efficiency and provide interlock for dump protection.	Q1 2016	Mechanical design completed. The production could be launched, but BI would like to review/approve the production drawings. Electronics design ongoing.
H^0/H^- stripping foil current.	Monitor current on the stripping foil.	Q1 2016	Electronics design on going. The system will be ready for HST.
BTV for the	Optimization of the injection process and inspection of	Q1 2016	Design, integration and production are completed.

stripping foil.	the stripping foil.		What is left is a qualification of the system and a validation of the interlock. B. Jones asked about the expected lifetime of the BTV. In his experience because of the radiation level they do not last very long. J. Tan said he currently does not have any figure for that. For the PSB the installation is foreseen in LS2. K. Hanke mentioned that the deadline for the installation of BI equipment in the injection region is currently end 2016 and this deadline for the PSB is not compliant with it.

- **Conclusions:**
  - Two WUs completed during LS1.
  - HST: on time part 1 (Q3 2015) and part 2 (Q1 2016).
  - BLMs and BTMS will require a large cabling effort during the EYETS in 2016-2017.
  - H^- injection is on time for Linac4 connection:
    - K. Hanke asked what if Linac4 could be connected during EYETS and not in LS2, because of a time extension of EYETS.
    - In fact for the time being the end-2016 deadline for all the hardware needed for Linac4 connection is still valid.
    - J. Tan replied that it is not obvious that all the BI equipment will be ready.
    - B. Mikulec remarked that for instance also the watchdog for the BCT in 8L1 should be ready for the L4 connection, while the deadline reported is LS2.
  - Wire-scanner is the only project currently on a critical path.
  - The other BI work-units do not seem to currently face any showstopper.
    - B. Mikulec expressed her concerns about the readiness of the electronics for the H^- monitors for the HST.
  - BI group would like to get a wish-list of monitors which might be installed before LS2:
    - **B. Mikulec said that every monitor needed for the L4 connection should get higher priority to be ready for the EYETS.**
  - K. Hanke added that space reservation will have to be sorted out quickly → **Open Actions**

5. AOB

- The next meeting is tentatively scheduled for the 12th February 2015.
- B. Jones mentioned there is an interesting paper on stripping foil efficiencies from J-Parc available at http://www.sciencedirect.com/science/article/pii/S0168900214015241.
- M. Paoluzzi reported that there will be a RF review in September 2015, but he is still waiting for answers from the reviewers to finalize the program.
- **A. Findlay mentioned that it would be good to clean the machine from unused pickups**:
  - B. Mikulec said the procedure is to write and ECR with the removal proposal and send it to T. Birtwistle.

- E. Benedetto mentioned that it is important to get an estimate about the maximum intensity of Isolde:
    - G. Rumolo is collecting information about all the parameters.

Assigned to	Due date	Description
A.Findlay	2015-12-03	Make sure that the ECR to clean-up the PSB from the unused pick-ups for is submitted.