

90th Meeting of the LHC Collimation Working Group, December 10th, 2007

Present: Oliver Aberle, Ralph Assmann (chairman), Giulia Bellodi, Chiara Bracco, Markus Brugger, Francesco Cerutti, Yacine Kadi, Michel Jonker, Mike Lamont, Luisella Lari, Roberto Losito, Marco Mauri, Valentina Previtali, Stefano Redaelli (scientific secretary), Stefan Roesler, Lucia Sarchiapone, George Smirnov, Thomas Weiler.

Comments to the minutes and follow-up of actions

No comments to the minutes of the previous meetings.

Open issues about the layout of the **passive absorbers** were solved after the meeting of July 12th, 2008. The 2008 layout has been frozen.

Agenda of this meeting

- Status of collimator production and installation (R. Assmann)
- Status of collimator controls (M. Jonker)
- Brainstorming on commissioning (round table)

List of actions from this meeting

Action	People	Deadline
Follow-up the procurement an the earlier availability of the PC gateways for the collimator FESA servers	M. Jonker R. Assmann	Jan. 2008
Final proposal for the design of the collimator FESA classes after agreement with the parties involved	M. Jonker	Jan. 21st
Investigate the feasibility of collimator beam tests at the SPS in 2008 after manpower evaluation (ATB mechanics and control teams, installation, ...)	R. Assmann	Early 2008

List of recent open actions

(Complete list at <http://lhc-collimation.web.cern.ch/lhc-collimation/action.htm>)

Date	Action	People	Deadline
12.07.2007	Laboratory measurements of collimator low-frequency impedance	B. Salvant F. Roncarolo	Update on Feb. 4th
12.07.2007	Collimator and material procurement for impedance measurements	R. Assmann	Done

The next meeting will be **Thursday, December 13th, 2007.**

Minutes of the meeting

1 General discussion

R. Assmann stated that we will now resume the LHC collimation working group meetings on a regular base Meetings will be held every two weeks (even in case of limited attendance) in order to follow up promptly the remaining issues to be addressed before the 2008 beam operation. The working group will now mainly focus on commissioning and controls issues in preparation for the LHC beam operation.

R. Assmann also commented that in addition to the collimation working group, a **dedicated meeting on Phase II studies** is going to start at the beginning of 2008. It will be focused on the system design specification. TS will also set-up a meeting to follow-up the Phase II collimator design.

2 Status of collimator production and installation (R. Assmann)

R. Assmann gave a update on the status of collimator production and installation. Ralph browsed through the slides of his recent presentation at the LHC Machine Advisory Committee (the full agenda of 22th MAC meeting held on Dec. 6-8, 2007, can be consulted at <http://mgt-lhc-machine-advisory-committee.web.cern.ch> collimator production is now fully on track, even slightly ahead of installation schedule. The system layout to achieve a luminosity of $10^{33} \text{ cm}^{-2}\text{s}^{-1}$ was finalized after the 450 GeV run was officially cancelled. About 70% of this system is installed in the LHC tunnel as of today and by **April 2008** we should have **110 collimators** installed.

Ralph's talk at the MAC also covered various other topics such as the status of the 2-in-1 collimators and of the passive absorbers, the performance of the collimator position survey, planning for the collimator hardware commissioning and cold-checkout and strategy for the beam commissioning. These topics were not discussed in detail in this meeting and Ralph suggested the interested people to consult his slides.

3 Status of collimator controls (M. Jonker)

Michel Jonker gave an overview of the status of the collimator controls. Controls aspects were followed up in the COCOST meeting:

<http://controls-wiki.web.cern.ch/controls-wiki/collimators/Main/COCOSTMeetings>

Michel commented that it has been difficult to follow up the relevant issues and take decisions at the COCOST due to the limited attendance of people during 2007. Even though detailed technical discussion will take place off-line, from now on the critical decisions will be discussed in this meeting.

M. Jonker presented a list with the status of the various sub-systems. The **PXI system** installation was **completed** this morning according to the latest information provided by Roberto Losito. A few drivers for the stepping motors and some power supplies are still missing but they will be delivered by mid-January.

On the other hand, we are on a critical path for the procurement of the **PC gateways** (these are the middle-level gateways that run the FESA servers and that contain the timing card for the collimator synchronization). Fourteen gateways are needed but for the moment only 7 are available (three of which are being used for the collimator control at TI8, SPS and in the collimator workshop at Bld. 252). Michel commented that for the procurement of these units we are competing with bigger ongoing installation campaigns and we cannot get more units before the beginning of 2008. The orders are managed by CO. The company were PC

gateway will be bought will be selected by mid-February and the new gateways should be available by **March 2008**.

R. Losito stressed that without the required gateway it will not be possible to commission the systems. Michel replied that, as a backup solution, we could use two units originally foreseen for the transfer lines (transfer line collimators do not require gateways with timing cards). Roberto disagreed: we should perform the system commissioning with the final system. R. Assmann agreed with Roberto and stated that he will follow-up this issue. He suggested to contact directly H. Schmickler and see if it is possible to get earlier the few gateways that we need.

As far as the **synchronization signal hardware** is concerned, M. Jonker commented that all the signal conversion modules are available and can be picked up by R. Losito's team. The person to contact is Christine Gayraud. The **fibre system** was ordered and has also been received. There is a problem with the connectors of the patch panels that do not match the receiver connectors. IT will replace the connectors. Connections and system tests should be completed by the end of February.

The PLC system for the **collimator temperature survey** is on a good track. Points 2, 8 and 7 are basically completed. A first version of the control software has been deployed for the TI8 tests (more detailed tests are needed, though). The team of J. Brahy will need for each collimator some details of the collimator installation in order to configure the system. S. Redaelli commented that this information is entered in the LSA database for each collimator approved for installation and will be provided to J. Brahy. The same source is being used to configure automatically the low-level positioning controls.

Concerning the **collimator software**, the main challenge ahead of us is the test of function driven motion and limit functions. Software development is ongoing at the low-level. Michel also brought up the issue of the **two FESA servers** at the middle-level. Michel believes that in the present implementation the CSS class is redundant because it just transfers information to the low-level FESA server without playing any active role. He proposed to merge the two servers. This would require to add the timing handling to the server developed by R. Losito's team. S. Redaelli reminded that the CSS server also receives the BLM transient data and will have to be used for automatic collimator alignment. In addition, it provides more flexibility for the integration of the controls into LSA. R. Losito confirmed that at this stage of the project the flexibility of the low-level FESA class is very limited. Roberto stated that we need a clear technical proposal for the required design changes in order to assess the feasibility of Michel's proposal. It was agreed that Michel will investigate with the parties involved the details of this implementation and will come back with a technical proposal as soon as possible after the Christmas break.

R. Assmann commented that he would prefer to keep a separate unit for the CSS server. The responsibilities and the agreed work packages must be respected: CO is responsible for the implementation of automatic alignment procedures and for the collimator synchronization. M. Jonker replied that he can work together with the ATB control team and take responsibility of the agreed work packages by implementing the required features into the ATB FESA sever.

M. Jonker concluded by showing a list of pending items from previous COCOST discussions (see last page of Michel's slides). R. Assmann asked for a more detailed list of topics to follow up. S. Redaelli suggested to add to the list the definition and validation of HWC procedures. Ralph proposed that in January we should tackle the issue of the TOTEM controls. Michel agrees. TCDQ controls issues will be discussed in a dedicated collimator WG meeting this Wednesday, December 13th.

4 Brainstorming on commissioning

R. Assmann kicked off a brainstorming discussion on the requirements for the collimator commissioning with beam. What do we need in order to be ready for the commission and the operation of the system in 2008? People were encouraged to bring up outstanding issues. This meeting should be seen as a forum to discuss the various requirements. In the next months we should collect a list of topics to tackle. Discussions should also include the people from other systems related to the collimators (BLM, injection, dump, ...).

A few examples came up: fast signal beam current measurements (50-100 Hz) for the collimator setup (Ralph, based on Tevatron experience); collimator settings during commissioning and associated energy deposition studies; impact on protection performance from the TCDI tapering (Y. Kadi); update on impedance measurements (S. Redaelli); effect on impedance from the grooves between Tungsten inserts (Ralph). More topics are expected to come up at the next meetings!

In addition, S. Redaelli brought up the issue of SPS collimator beam tests for 2008 operation. We need to decide very soon if we want to perform beam tests in 2008. The main motivation would be to perform beam tests the final LHC collimator controls (hardware and software). This requires to upgrade the SPS collimator prototype (which still uses LEP stepping motors with MIDI electronics) or to install a CERCA collimator in the SPS. The BLM team would be interested to perform tests of transient BLM signals. Potentially we could gain one year of experience, in particular if in 2008 there will be no much beam time in the LHC for collimator studies. R. Assmann will follow up the various implication on the project and assess the possibility of performing SPS beam tests in 2008 (action).

The next meeting will be Thursday, December 13th, 2007.