

## **LHC EXPERIMENT-ACCELERATOR DATA EXCHANGE WORKING GROUP (LEADE)**

### **Minutes of the 19th Meeting held on August 02, 2004**

Present: S. Baron, R. Billen, M. Clayton, D. Evans, Ph. Farthouat, Ch. Ilgner,  
Ch. Parkman, Th. Pauly, J. Serrano, J. Troska, E. Tsismelis, Th. Wengler

#### **1. MATTERS ARISING**

##### Approval of the Minutes

The minutes of the 18<sup>th</sup> LEADE meeting were approved with the following modification: in point 2 (Report on Beam-Loss Monitors), the first sentence in the third paragraph should be replaced with `During proton running for ALICE, 1/1000 of the luminosity is expected`.

#### **2. THE LHC LOGGING SYSTEM “TIMBER” (R. BILLEN)**

Ronny Billen from AB-CO-DM reported on the LHC Logging System “Timber”, a project launched in September 2001 to analyze, design and procure logging facilities for the future LHC Controls System. It will provide information management for LHC performance improvement, meet the INB requirements for recording beam history and make available long term statistics for management. Another issue is to avoid duplicating logging efforts.

Timber is meant to comply with the needs of data providers, such as LHC equipment, the alarm systems and the so-called post-mortem system and the needs of data users (operators, detector and accelerator experts, “ad-hoc” users and the CERN management). The data will be stored correctly “as is” in its raw form.

Data will be UTC time-stamped, the database accepts a rate up to the ns level. A set of graphical tools will be implemented. In- and output can be done via a web interface, writing to an Oracle database, including meta data, such as channel names and units. The data format will be defined by the data provider and then approved by the LHC Logging System team. The output can be formatted to comply with standard applications.

Every user will have access to the whole database, since its mandate is to monitor the LHC performance.

The interface is currently deployed at <http://abofs1:7780/LoggingGUI/>. The URL of the LHC Logging System homepage is <http://lhc-logging.web.cern.ch/lhc-logging/>.

Timber was first used for the TT40 extraction tests for a successful shot-by-shot logging at SPS cycle rate (September/October 2003). The first permanent client is the SPS vacuum system that was connected in June 2004. It provides data on 1500 channels every 3 min.

Christoph Ilgner suggested that beam-dump requests and their time sequence could be logged this way, which of course is possible. In this context it was mentioned that there will be a handshake between the LHC Logging System and the respective client system, in this case the Beam Condition Monitor, that allows safe clearance of the client system memory after proper reception of the data, to prevent data loss. Timber can cope with requests for short latency time, in the order of magnitude that can be expected from a web application.

### **3. REPORT ON THE TTC SYSTEM (S. BARON)**

Sophie Baron gave an update on the status of the TTC system:

Procurement and testing of the hardware are done by Sophie Baron and Markus Joos (PH-ESS), together with Per-Gunnar Gallno and Patrick Donnat-Bouillud from PH-ATE. The timing signals will be provided to the PCR by AB-RF, while PH-ESS will take care of the encoders, transmitters and receivers in view of the signal quality at the experiment inputs. Beyond this limit, i.e. within the experiments, the TTC signal distribution will be under the responsibility of the experiment collaborations.

A TTC operation group, consisting of one responsible from each experiment, members of AB and PH-ESS (Sophie Baron and Markus Joos for the latter) will report to LEADE on the setup and performance of the TTC system.

The status of the already existing hardware is as follows:

A system-stability test was performed on the TTCrq. As a result, stability and yield need to be improved. One-third of the failure rate might be due to bad soldering (Qpll). A new batch of 2000 pieces will arrive in September 2004. In any case, for the next 25 ns run (Oct. 05-08, 2004), the old modules will still be used. For this run, Sophie will be available for coordination purposes. The experiments are expected to do the diagnostics, but a check-list will be provided.

For the TTCex, a test setup is currently being installed. It has already been understood that, in view of the TTCrq/TTCex compatibility, some modifications need to be done (ex. current TTCex stand-alone frequency (40.084 5 MHz) is outside the Qpll locking range).

The 25 ns run in June 2004 showed that the availability of diagnostic tools and coordination needs to be improved, since a rupture of the fibres in BA81 could only be discovered after a major delay.

For the PCR, the crate connectivity is well worked-out, a map of the overall optical connections will soon be established. For jitter measurements, a new oscilloscope (LeCroy Wavepro 7100) is available.

Concerning the overall system, the BST and TTC system were compared, they are in principle two parallel systems, both satisfying different needs in terms of jitter. For BST an upgrade is in progress, Sophie thus suggested a collaboration of BST and TTC groups.

For a future TTC upgrade, Sophie suggested to start a discussion already now (remote diagnostics, maintenance & support, spares).

Jan mentioned that CMS will have a designated electronics commissioning place. Whether the TTC could be included in the tests, what certainly would be an advantage, needs to be decided considering the additional costs arising.

#### 4. OPTICAL SPLITTER FOR TTC DISTRIBUTION

Jan Troska presented new developments on the TTC splitters.

Since the last market survey, single-mode optical splitters have dramatically dropped in price. CMS thus has chosen them for the optical distribution tree. The original design for the TTC system housed the optical component and the fibre in a 19'' rack enclosure. In order to avoid disadvantages related to the conception (the module does not offer a very high packing density, it is an obstacle to the cooling-air flow inside the rack), and since the optical component is small, an alternative would be to house it in a 6U VME card size module. Since a change in vendor is necessary anyway, this is a good opportunity to change the physical implementation (for example smaller optical connectors).

Jan showed some 16-channel modules from a company in China (ex.: delivery time 1 month), together with lab-test results (Insertion-Loss and Return-Loss data), which are in reasonable agreement with the measurements published by that company. Changes can be made after consultation with the manufacturer in view of 1x32 versions and/or a change in connector configuration.

Jan cannot take on the distribution of modules for other experiments (especially multimode modules), for this a solution needs to be found. Also, a radiation-hardness test needs to be carried out.

#### 5. A.O.B.

The Working Group took note of the message from Wesley Smith concerning observations of the beam time structure during the June 2004 LHC-type structured beam at the SPS. Lev Uvarov of the CMS End-Cap Muon Group observed that the SPS Beam Crossing 0 signal or 'orbit signal' varied from its supposedly regular period of 924 bunches per orbit. The consequences of such a variation would be catastrophic to the operations of the LHC experiments. Sophie Baron has agreed to look into the issue and report to LEADE at its next meeting.

**Action: Sophie Baron**

Ch. Ilgner

Provisional dates for 2004 meetings:

6 September

18 October

13 December