Minutes of the Technical Board Meeting February 20, 2018

Present: Vincent Andrieux, Jens Barth, Franco Bradamante, Oleg Denisov, Nori Doshita, Jan Friedrich, Gerhard Mallot, Christophe Pires, Stephane Platchkov, Caroline Riedl, Fulvio Tessarotto, Annika Vauth.

Remotely connected: Maxim Alexeev, Vladimir Anosov, Artem Ivanov, Bernhard Ketzer, Igor Konorov, Stefano Levorato, Alexander Nagaytsev, Daniele Panzieri, Sebastian Uhl, Marcin Ziembicki.

Communications.  It is decided to move the September TB meeting from Sept 4 to Sept 3 (Monday) in order to avoid overlap with the Analysis Meeting.

Gerhard Mallot communicates that Didier Cotte might be no longer with COMPASS after March 30, 2018. This is unexpected since the follow-up appointment of Didier with the external consortium seemed to be progressing well; very recently the CERN purchase department intervened. An update is expected soon.

Not only because of this potentially new situation, but in general, it is desirable to train and authorize at least one more COMPASS person (ideally someone who is permanently stationed at CERN) to use the small crane in 888 as backup during Didier’s absence (e.g. vacation). Currently only Didier is allowed to use the small crane. CERN offers monthly overhead crane courses.

Vladimir Frolov will coordinate the 2018 DAQ. The RichWall was re-installed in the week of February 5-9, 2018. No repair had been performed. Instead it is planned to modify the gas system to allow a better flux in the critical tubes. The full intervention has been postponed into LS2. The removal of CAMERA from building 888 is being discussed with Saclay and CERN-HE. Upon request of EN-EA, the detector has to be moved from its current position close to gate 1 because of the necessity to access beam elements after the beginning of LS2, and because RP intends to install a radio protection buffer zone in the space currently occupied by CAMERA.

News from the EATM (Annika Vauth).  The SM2 electronics card was installed and validated in December. The North Area cooling tower consolidation is ongoing and on schedule for 23rd February, after which date cooling water will be available (for COMPASS essential to proceed with the magnet cooling).

On 7th March, AUG tests with power cuts in 888 are scheduled. On 26th/27th March, DSO tests without access to the area for ~half day). SPS: The shortening of the MD supercycle (by 3.6s) was decided, which will deliver 10% more protons to COMPASS.
CERN will replace all analogue phones with IP phones. The start of this campaign has been delayed towards the end of 2018. The replacement of the phones also affects the experimental hall including the barracks. It will be advantageous for us to collect requests of phone locations (in particular in regions with bad or no mobile phone coverage). Annika and Caroline are collecting the requests. (Mentioned at the meeting: target barrack; trigger barrack; ...)

The following North Area consolidation activities concern us: further extensive refurbishment of the cooling tower (CV expects cooling water back for the summer of 2020); crane refurbishment (6+2 weeks, our preferred period: June 2019 - Dec 2019, tbd with EN-HE); upgrade of gas detection system (2019), also flow measurements and alarms. Throughout LS2 (also 2019), nitrogen will be available.

**Overall 2018 schedule (Caroline Riedl).** The target schedule is well on track. This is with respect to the unavoidable delayed schedule with four minus one weeks of delay due to the cooling tower consolidation. One week was gained on our side by skipping the empty-target TE calibration. This will mean that the online polarization values will be underestimated, as in 2015. The empty-target calibration will be carried out after the end of the 2018 run. The delay in the target schedule would be two weeks longer if CERN TE-CRG had not been available to deliver a mobile dewar with 500 liters of liquid helium (LHe), which allowed us to start the pre-cooling of the magnet with liquid nitrogen (LN2) down to 80 K with simultaneous cooling of the dilution refrigerator with LHe on the day of this TB meeting - February 20.

To make up for the schedule delay as much as possible, the beam telescope will be installed in two stages: A) setup for preliminary trigger between April 9 and 13 with only FI01 and VI01, and B) setup with full beam telescope including FI04 in its new position after April 28. In between A) and B), the target will be loaded and TE-calibrated, and veto up/down, FI15, FI04, FI03, VI02 will be installed.

From April 13 to April 28, there will either be no FI01 and VI01 installed (due to the presence of the target loading platform), and/or no beam due to target activities. It might be difficult to gain some more days with preliminary trigger setup between April 25 and 28. Starting from April 29, COMPASS is expected to start commissioning of detectors and target. First physics DY data is expected for May 14. *The week after the TB meeting we were informed that the cooling water delivery is delayed by 1 week due to the cold weather. The cryo compressor will start delivering liquid helium at around March 14, at which point in time the magnet cooling to 4 K can be started.*

**Target (Nori Doshita.)** The preparations of the 3He and 4He lines of the dilution refrigerator (DR) are well progressing; some leaks have been fixed and the 4He lines have been purged 3 times. All NMR coils have been installed on the target cell.
Target cell and holder were connected and a test insertion at room temperature into the magnet was performed on February 16. The new power convertor rack for the magnet was installed on January 31 and commissioned in February (EP-DT) at full current (short cut circuit). At the time of the TB meeting, the MSS signal test was still ongoing. The magnet was leak-checked and prepared for pre-cooling including the installation of the LN2 line and 4 purging cycles.

The mobile dewar with liquid was delivered on February 15 and was connected to the DR on February 20. Pre-cooling of the magnet (with LN2) and of the DR (with LHe) started on February 20 with about 1 K/hour drop of temperature. A second dewar was ordered to ensure that the 80 K, once reached, can be preserved until the day that the cryo compressor will provide liquid helium.

**Elastic mu-p scattering: preparations 2018 (Sebastian Uhl).** The high-pressure TPC will be delivered to CERN on March 21. It is requested by the TB to determine a responsible scientist to be present during this period, in particular since it will be during the Bonn workshop and since the colleagues transporting the TPC have not been at CERN before. This coordinator is later identified to be Christian Dreisbach. The TPC is self-triggering and the 2 DAQs (COMPASS / TPC) will be synced at the beginning of each spill. Bernhard proposes to have part of the events beam triggered. The setup on the concrete platform in 888 is progressing well including the silicon preparations. Bernhard raised the question whether larger size detectors (i.e. $10 \times 10$ cm$^2$ instead of the $5 \times 7$ cm$^2$ covered by the SIs) albeit with worse spatial resolution would be advantageous.

**Test of NA64 Straw detector with 2018 M6 muon beam (Igor Konorov).** A 20 cm × 20 cm large, 6 mm-diameter NA64 Straw prototype with iFTDC readout will be placed into COMPASS for about 1 week during initial muon beam (before physics). It will be integrated into the COMPASS DAQ. A dedicated technician will be sent to install the detector in late March. This plan has been shared with the DY analysis group after this TB meeting. The Straw test will not interfere with the DY physics data taking.

**Beyond 2020: recoil detector with polarized target (Alexander Nagaytsev).** The hardware upgrade is shortly summarized; detailed talks had been given at the Prague workshop in November 2017. It is suggested that a more detailed presentation be given at one of the next future meetings organized by Vincent Andrieux, followed by a presentation at the CM and then return with an update to the TB. It is also suggested to appoint dedicated referee(s) of the TB to follow up on the project.
CEDAR upgrade 2018 (Marcin Ziembicki). While the CERN part of the project is on track, the WUT part is delayed. This is due to sickness of some of the main actors but also because the two PMTs tested at WUT behave differently than written in the Hamamatsu specs: the signal amplitude is not uniform over the area of the PMT. The good news is that it is a gain non-uniformity and not a bad quantum efficiency or collection efficiency. Therefore the plan is to proceed with the 18 PMTs received from Hamamatsu. The FEE will be delivered beginning of April. The installations will be done in the last 3 weeks of April (including 1 week spare) during dedicated non-beam periods. The PMT installation will require 4-5 days, the FEE installation 7-10 days. The planning will be updated by Marcin in the nearest future.

FEE status (Maxim Alexeev). Comments about CEDAR FEE, DAQ, and general spare situation. Plan is to switch on all equipment by mid-March to see if anything is broken.

MWPC readout: During the 2016 and 2017 the stability of the MWPC R/O was degrading. The main cause for the problem was identified in the Hotlink connectors on the FE side. Two projects for 2018: 1. Long-term upgrade validation: if tests in laboratory conditions in March will be successful, install prototype before the start of the 2018 run. 2. Urgent R/O stability fix: substitution of the RJ45 connector by a DB9 connector, a modification that requires the exchange of both the FE and the Hotlink cable connector. Testing of the prototype 19-23.02.2018, modify the 36 FEs and cables during the period 26.02-06.03.2018. Install the modified cards and cables on 06-09.03.2018. The status should be discussed with the TB via e-mail prior to the next TB meeting.

DAQ status (Igor Konorov). Preparations of the 2018 run: No change in DAQ software and hardware. Reduced detector setup to compare to 2017. Not included: silicon detectors, ECAL0, RICH. ECAL1 and ECAL2 will be included if data rate is tolerable and no FE errors, no stop of run in case of failure. CEDAR to be included in the DAQ. DAQ computers were running over winter shutdown. All disks will be exchanged to new ones, instead of 8x1TB will be 8x4TB = 16TB of effective space. The main change in the DAQ for the 2018 running is expected to be the introduction of the cross-switch. It will be transparent to the users and its purpose is the ease of load balancing and system redundancy to compensate for hardware failures. A test will be done in March. Onsite presence March and April: Vladimir Frolov and Ondrej Subrt, remaining onsite presence for 2018 run fully covered.

Standalone DAQ for proton radius TPC: installed in the area and ready; software for synchronization is being developed and to be tested after March 20-th.
DCS status (Christophe Pires). WinCC OA 3.11 is deprecated after the eYETS 2017. The migration to WinCC OA 3.15 was performed in January 2018 and a new patch is to be expected before the start of the run.

The DCS is being prepared for the 2018 run; in particular the polarized target is readily monitored (pressures, temperatures, ...). The reading of the SMS824 environmental radiation monitor (fence to the cow meadow on the far-Saleve side of the Prevessin area) is now monitored in DCS.

Some updates / changes for the CEDARs (PMTs, gain monitoring, readout, thermal system) are yet to be integrated. Further ongoing updates / re-integrations concern the SciFis, the hodoscopes, RICHwall, and DCS summary / beam files. Please let Christophe know if there are any further requests.

The silicons, used in 2018 for the proton radius test measurement, will also be monitored in DCS.

RICH status (Fulvio Tessarotto). 20 kg of C4F10 are being ordered from F2 Chemicals at a price of 125 GBP/kg (half of the cost is covered by LHCb RICH colleagues).

In 2018 the RICH will operate with N2 as radiator and only MAPMTs. The MAPMT system needs minor fixing of HV and CMAD problems. Intervention foreseen in March. New LV power supply bought: will serve as spare. 24 new fibers bought.

MWPCs with CsI and Hybrids: collected data in nominal conditions in 2017. Micromegas performed nicely, despite few shorted pads (25 for a total of 20k). PT corrections were essential for a constant gain.

RICH survey: Measurements performed by Pascal Sainvitu on January 23-26, 2018 with DC4, DC5, ST03 in garage position: PDs targets, vessel and large frame targets + APV boards. Measurement series will be completed when trackers are in beam position (late March). An improved alignment will solve to the RICH "Two Peak" problem?

The next TB meeting is scheduled for April 10, 2018.