Plenary RRB

April 2021

Draft Minutes of the 52nd Plenary Session of the LHC Resources Review Boards CERN, Geneva, 26th April 2021

Documents and slides of all presentations can be found on the RRB Indico pages, accessible via the LHC-RRB home page http://cern.ch/committees/LHCRRB

The minutes of the last Plenary Session CERN-RRB-2020-125 were approved.

CERN Status and News. J. Mnich, Director for Research and Computing

J. Mnich presented the new composition of the CERN management and the CERN Research and Computing sector management.
In the last months, approximately 4000 individuals are entering the CERN sites every week-day. At CERN, ~10 COVID-19 positive cases per week have been registered, which are in line with the relative numbers of cases in Geneva, which makes the CERN management believe, that the measures, which were put in place to manage the crisis, are effective.

There were no questions following this presentation.

Status of the Accelerator Complex post LS2. M. Lamont, Director for Accelerators

M. Lamont presented a brief overview of the accelerator complex. Concerning LS2, the work on the injectors has been fully completed and the injectors are now back in the hands of the Operations since the end of last year. The same is now true for the LHC, which is hands of Operations since mid-March 2021.
During LS2 the LHC Injectors Upgrade (LIU) has been successfully deployed with excellent operational progress with beam. The goal for 2021 is to ramp up to the pre-LS2 beam parameters for protons and to the HL ones for ions. The ramping up to the full LIU specs is foreseen during Run-3.

- Linac 4: Was connected to the Booster during LS2. Now good availability, good beam current from source through Linac4 to the Booster and good beam characteristics.
- Booster-PSB: Major LIU upgrades. The connection to Linac4 now brings 160 MeV H- to the PSB, where the H- charge injection takes place. This, combined with the increase of the extraction energy to the PS to 2 GeV, should deliver the ambitious LIU target parameters in terms of beam size and protons per bunch.
- Beam commissioning of PSB and PS: For the PSB beam commissioning, excellent progress with LHC 25ns beam, the brightness is already very close to the LIU target and for the PS beam commissioning good initial progress was achieved.
- SPS: Just starting up with the beam commissioning after the significant amount of work that was done in LS2. In particular, the RF commissioning has started after major upgrades for cavities and the beam control system.

Concerning the 2021 injectors schedule, ISOLDE will start June 21 and all beams will be stopped November 15 for the Year-End-Technical-Stop to allow a restart of the complex early in 2022 for the LHC commissioning with beam.
For the overall LHC status, 7 sectors are at nominal cryogenic conditions, of which 4 sectors are in magnet training, while in the other 3 sectors powering tests are ongoing. The 8th sector S67 is cooling down after a quadrupole circuit earth fault repair. The target dates are a beam test at the end of September and the closing of the machine for full beam commissioning in February 2022. The schedule will be revisited with the experiments in June.

S. Bentvelsen asked what determines to have the beam tests end of September and what are the plans between September and mid of November 2021. M. Lamont note that the beam tests are important for LHC, and by the end of September the training should be finished. The test will be followed by a maintenance period with no beam circulating, leading to the YETS. The exact dates of the beam tests are determined by the schedules of ATLAS and LHCb.

R. Tenchini wanted to know if the machine is still on track for a baseline of 7 TeV. M. Lamont affirmed that there is still a long way to go before this can be confirmed, although the initial training results are encouraging.

Status of the Experiments, including Phase II Upgrades. J. Mnich, Director for Research and Computing

Summary:

In recent months, several physics highlights from the LHC experiments have been presented as for example the LHCb results on lepton flavour universality and on four new tetraquarks states. This adds now up to 59 hadrons which have been discovered at the LHC. ATLAS reported evidence for a new rare Higgs decay mode.

On the critical path for the beam start in February 2022 for LHCb is the installation of the Scintillating Fibre Tracker. The C-side has to be installed before the beampipe, which is required for the pilot beam end of September. CERN is assisting in facilitating travel and local arrangements for high priority projects such as this. For ATLAS, the critical path is given by the installation of the New Small Wheel, where the A-side is almost ready to be installed and the C-side will be hopefully ready well before the closure of the cavern in February 2022. The ITS inner Barrel installation of ALICE is scheduled this week and the CMS Central Beampipe installation has been successfully completed.

A lot of effort in the last year was directed to the VTRx module which is a radiation tolerant optical link designed mostly for LS2 upgrade projects. Different failure modes of those modules have been observed. The investigations are still ongoing but it seems that cooling mitigates the problem.

Overall, the schedule for the experiments has become tighter due to COVID-19 related travel restrictions and some technical problems but it is still possible. The general LHC schedule will be revisit in June. The experiments are enthusiastic about the LHC trying to reach 14 TeV. The pilot beams are considered very helpful, in particular if there could be collisions in stable-beam conditions, even at injection energy.

For Phase-II, ATLAS and CMS have planned major and challenging upgrades, ATLAS has already submitted all upgrade TDRs whereas for CMS only two are missing. For CMS, a lot of progress has been presented for MTD, the Barrel Calorimeter and the HGCAL. For ATLAS, ITK is on the critical path, where COVID-19 slows down activities in many laboratories around the world. A new potential threat is the world-wide shortage of silicon wafers. ASIC design remains in general a challenge. This is certainly not only a concern for ITK.

The Working Group for the long-term Support of the LHC experiments has presented results in December. As a follow-up of this, a technical working group is working on a proposal of the contract modalities of an "Experimental Project Associate" (PJAS) for a duration of maximal 8 years. The proposal will then go into the concertation process with the Staff Association, Comité de Concertation Permanent and Tripartite Employment Conditions Forum, to be completed in the second half of 2021. On the initiative of the CERN directorate a new Working Group on strengthening the support for Users at CERN has been established to assess the present status and to propose possible improvements, complementary to ACCU.

The WLCG services for Run-3 are operationally ready, as they never stopped during LS2, and the activity has continuously increased. For the coming year the resource needs are manageable with a flat funding. Taking into account the new detectors and the new computing models of ALICE and LHCb, maybe more resources are required in the future. Run conditions with more pile-up in the future, may increase this additional demand. For the HL-LHC computing challenge, however, aggressive investments in R&D are needed. In the view of this, the CERN Council has approved the Prévessin Computing Centre. The CERN Quantum Technology Initiative has been recently set up and the Collaborations are being established in the Member States, US and Japan. A Quantum Hub Agreement with IBM has been signed. A workshop on Quantum Technologies for HEP has been organised for June.

C. Jamieson wanted to know, how probable it will be to still meet the schedule and how will a possible delay in the schedule be communicated to the Funding Agencies. J. Mnich explained, that, although the LS2 schedule is very tight, two months ago he was more pessimistic than today. More information should be available in June. The LS3 schedule is more complicated to address now. A closer look together with the experiments is foreseen for the second half of the year. Of course, the findings will be communicated to the Funding Agencies and, if planning has to be adjusted, then this will be done in concertation with the Funding Agencies.

Summary. J. Mnich

There being no further business, the Chairperson closed the meeting. The proposed dates for the next RRB are 25-27 October 2021.

Reported by: W. Funk