CERN RESEARCH BOARD

MINUTES OF THE 182nd MEETING OF THE RESEARCH BOARD
HELD ON WEDNESDAY 28 NOVEMBER 2007

Present
R. Aymar (Chairman), J.J. Blaising, P. Ciriani, P. Collier (replacing S. Myers), J. Dainton, J. Engelen, M. Ferro-Luzzi, R. Forty (Secretary), E. Heijne, F. Hemmer (replacing W. von Rüden), A. Herlert, M. Huyse, P. Lebrun, C. Rembser, E. Perez, T. Wyatt

Invited
J. Carr, J. Panman (for Item 2)

Apologies
S. Myers, W. von Rüden

Items

1. Procedure
2. Review of Recognized Experiment ANTARES (RE6)
3. Report from the SPSC meeting of 4-5 October 2007
5. Any other business
1. **PROCEDURE**

1.1 R. Aymar welcomed Terry Wyatt, who was attending for the first time as chairperson of the LHCC, Alexander Herlert, the new ISOLDE Physics Coordinator, and Emmanuelle Perez, who was attending as the future SPS/PS Coordinator. He also warmly thanked Christoph Rembser, the outgoing SPS/PS Coordinator, for all of his conscientious work.

1.2 The **minutes** of the Research Board held on 10 September 2007 [1] were approved with one modification: in point 3.3 “heavy ion running for NA61 in subsequent years can only be considered if it is coherent with the programme of heavy ion physics at the LHC”, the phrase “can only be considered” should be replaced by “may only be possible”.

1.3 There was one **matter arising** from the minutes: P. Collier presented the prospects for Heavy Ion running in 2009 [2], on behalf of S. Myers who could not attend. Providing lead ions for fixed target operation at the same time as for the LHC would require commissioning a different beam control in the SPS, which could be possible but would require additional resources. Running with lead ions in the LHC and a different ion species for fixed target operation, as requested for NA61, is excluded for 2009. J. Engelen stated that he would discuss the situation with the proponents from NA61, as it looks unlikely that Heavy Ion running with the lighter species that they are interested in will be possible in the next few years.

2. **REVIEW OF RECOGNIZED EXPERIMENT ANTARES (RE6)**

2.1 J. Carr presented a status report on behalf of the ANTARES experiment, the neutrino telescope in the Mediterranean Sea sited 40 km offshore from La-Seyne-sur-Mer, France. Since January this year the experiment has had 5 lines of photodetectors successfully installed at a depth of 2400 m, out of a planned total of 12 lines, and signals from upward-going neutrinos have been observed.

2.2 J. Panman then presented his report as CERN rapporteur. The use that ANTARES is making of CERN include the use of facilities for meetings once or twice a year and tools for archiving documents; use of a CERN account for the collaboration common fund; and minor use of computing resources and office space. R. Aymar congratulated the experiment on their recent success, and **the Research Board approved the continuation of their Recognized Experiment status for a further three years**.
3. REPORT FROM THE SPSC MEETING OF 4-5 OCTOBER 2007

3.1 J. Dainton presented the report from the latest SPSC meeting, including the annual reviews of NA49, NA60 and HARP [2]. He also discussed the first observation of neutrino events from CNGS in OPERA, results from CALICE concerning calorimeter R&D for the ILC, and the proposal for an experiment at the AD facility to study the gravitational interaction of antimatter, AEGIS, which will be evaluated by the SPSC. J. Dainton stated that 2007 had been a good year for the delivery of beam to the users, and thanked those responsible for running and maintaining the accelerator complex.

3.2 Concerning HARP, the Research Board takes note of the ongoing disagreement within the collaboration concerning the analysis of the large-angle data in their TPC, and endorses the procedure being followed by the SPSC to reach a conclusion on this issue.


4.1 T. Wyatt presented the report from the recent meetings of the LHCC [2], including discussion of the status of the LHC experiments, and a Comprehensive Review of the LCG [3]. World-wide computing using the Grid is now a reality, both for production and analysis. However, there is still a lot of work to be done to be ready for the first colliding beams, improving the reliability of the services. For this, the Combined Computing Readiness Challenge, planned for early in 2008, will play an important role. The Research Board took note.

4.2 Continuation of the R&D projects RD39 (cryogenic tracking detectors) and RD50 (development of radiation hard semiconductor devices) for a further year was recommended by the LHCC, and endorsed by the Research Board.

4.3 In addition to the existing R&D projects, other R&D is underway within the LHC experiments towards their eventual upgrades. Effort should be made to coordinate the work between collaborations. In accordance with the CERN management, the LHCC plans to review such R&D activity.
5. **ANY OTHER BUSINESS**

5.1 C. Rembser reviewed the 2007 run of the SPS/PS accelerator complex, and presented the draft accelerator schedule of 2008 for approval. The priority in 2008 will be providing beam for the LHC, which is planned to start on 21 May, followed by a fast start-up of physics beam for PS, SPS and CNGS experiments. The fixed-target physics run would stop in mid-November, to allow a cool down of the injectors for shutdown maintenance, but LHC injection could continue up to the end-of-year stop. 

*The schedule was approved by the Research Board.*

5.2 The **next meeting** of the Research Board will be held on Wednesday, 27 February 2008 starting at 9:00.

**ENCLOSURES**

1. Minutes of the 90th LHCC meeting held on 25 September 2007 (LHCC-2007-027 LHCC-90)
2. Draft Minutes of the 91st LHCC meeting held on 21-22 November 2007 (LHCC-2007-030 LHCC-91)
3. Minutes of the 83rd SPSC meeting held on 4-5 October 2007 (SPSC-2007-034/SPSC-083)

**REFERENCES**


[2] Copies of the transparencies are available directly at: [http://indico.cern.ch/conferenceDisplay.py?confId=23264](http://indico.cern.ch/conferenceDisplay.py?confId=23264)

OPEN SESSION

1. LHC Status Report: Lyn Evans
2. ATLAS Status Report: Peter Jenni
3. LCG Status Report: Jamie Shiers

CLOSED SESSION:


Apologies: M. Gonin, S. Dalla Torre, R. Yoshida

1. PROCEDURE
The Committee welcomed Terry Wyatt, who has been appointed new LHCC Chairman as of November 2007 and thanked the outgoing member, Paul Dauncey, for the excellent work as a member of the LHCC.

The minutes of the eighty-ninth LHCC meeting (LHCC 2007-022 / LHCC 89) and the report from the CMS Comprehensive Review (LHCC 2007-023 / LHCC-G-135) were approved.

2. REPORT FROM THE CHIEF SCIENTIFIC OFFICER
The Chief Scientific Officer (CSO) reported on the status of the LHC machine and on deliberations at CERN Council in September 2007.

He reported on the status of the LHC machine. The RF fingers of the Plug in Modules (PiMs), that provide the electrical continuity through an interconnection module, have in some instances deformed following the warm up of Sector 7-8 to the point that they protrude into the beam aperture. The extent of the problem is being investigated using various methods. All PiMs not yet installed have been controlled and the RF fingers that are out of tolerance are being systematically corrected. In parallel, the consolidation of machine sectors which exhibit non-conformities, such as vacuum leak and faulty magnets, is well underway.

Moreover, he reported on the deliberations at CERN Council in September 2007. The official LHC schedule remains unchanged and foresees first beam injection into the LHC in May 2008 with the aim of reaching top energy as soon as possible thereafter. This LHC schedule has been presented to the LHC experiments and to CERN Council in September 2007. In addition, Finance Committee recommended for approval in December the CERN budget for 2008, including the provisions under the White Paper and also approved the additional suppliers of helium for the LHC accelerator.
3. REPORT FROM THE ALICE REFEREES

The LHCC heard a report from the ALICE referees, concentrating on the status of the sub-systems and on the installation and commissioning of the experiment.

The referees reported on the status of the sub-detectors. Good progress was reported on the installation and commissioning of the Inner Tracking System (ITS). Connections to services are proceeding well and thorough inspections and tests are in progress. The Time Projection Chamber (TPC) will be moved imminently to its final position around the interaction point from its current temporary location in the UX25 cavern. A repair of the TPC copper bus-bars, which distribute the low voltages to the TPC Front End Cards (FECs), is needed due to the large resistance of contact between the bus-bars and the connectors. The repair consists of replacing the connectors with monolithic brass pieces, which requires also the replacement of the distribution. In order to perform these operations the bus-bars have to be dismounted from the TPC and be re-worked in the appropriate workshops. The LHCC considers that the repair schedule is reasonable and will allow for a global TPC commissioning starting in January 2008. Good progress was reported on the Photon Spectrometer (PHOS), and the detector is expected to be ready for installation in ALICE in mid-November 2007, assuming that the cooling plant can be delivered to CERN on time. Production and testing of modules for the Photon Multiplicity Detector (PMD) is advancing well, but concerns remain on the detector being ready to meet its installation milestone. A test of the ALICE magnets is scheduled for the end of 2007 and details of the programme need to be optimised. The central DAQ system is well-advanced and ready to integrate the various sub-detectors and an ALICE global commissioning run is on schedule for the two months starting in January 2008.

4. REPORT FROM THE ATLAS REFEREES

The LHCC heard a report from the ATLAS referees, concentrating on the general status, an update of the Inner Detector (ID) installation and a report on the Full Dress Rehearsal.

The referees reported on the status of the various ATLAS sub-systems. The second End-cap Toroid (ECT-C) has been lowered successfully into the ATLAS cavern and the cool-down of both ECT-A and ECT-C is scheduled to start in November 2007. A full test of the ATLAS toroid magnet system, barrel and end-cap, has been pushed back to March 2008 in order to gain more flexibility for work on the ID and calorimeters. All Big Wheels of the Muon System have been installed and work on the Small Wheels and Muon End Wall Monitored Drift Tube (MDT) stations is proceeding well. The delivery of CAEN high voltage power supplies for the Muon System remains a critical item as their availability for the full commissioning detector is tight. Retro-fitting of the LAr low voltage power supplies is advancing well and the repair of the Tile Calorimeter electronics drawers is on-going in order to cure the observed instabilities. Good progress was reported on the installation of the experimental beam pipe.

The Committee heard a report on the status of the heaters of the ID evaporative cooling system. Much progress was reported on understanding the failures of the heaters and a reasonable plan is being implemented to address the problem. ATLAS is approaching the issue from various sides, including preparing a new and improved heater design, strengthening the quality control and quality assurance and improving access to the heaters in case of future failure. The ID installation schedule has been re-organised in order to minimize the impact on the overall ID plan. The LHCC will continue monitoring progress on the heater failures in its future sessions.

Preparations for the ATLAS Full Dress Rehearsal (FDR) are well underway. The FDR will make use of the overall ATLAS chain from the DAQ to the data analysis using large sets of simulated data. The LHCC considers it important that a large section of the ATLAS Collaboration will participate in the FDR data analysis. It was, however, noted that during the early part of 2008, ATLAS will be involved in several data challenges, including the FDR, the monthly cosmic challenges, and the global World-wide LHC Computing Grid (WLCG)
challenge, and although this will all serve as a valuable experience, it is nonetheless important to ensure that this effort does not interfere with the general commissioning work of the detector.

5. REPORT FROM THE CMS REFEREES
The Committee heard a report from the CMS referees, concentrating on the status of the detector construction, installation and commissioning and on preparations for the Computing, Software and Analysis 2007 (CSA 07).
The LHCC heard a report on progress since the previous meeting of the Committee. Commissioning of the CMS Tracker on the surface is complete and the detector is now ready for installation in CMS. The Tracker installation has been pushed back to the end of October 2007 in order to allow installation of the YB0 services to advance further. Installation and testing of the Electromagnetic Barrel Calorimeter (EB) in CMS is also complete. Production of crystals for the Electromagnetic End-cap Calorimeter (EE) is advancing smoothly and integration of the first EE Dee is proceeding well. Excellent progress was reported on the installation of the services on the YB0 central barrel yoke of the CMS magnet. Stringent quality control and quality assurance measures are being followed and risks are being minimized during installation. Some new operations, such as the installation of services for the Hadronic Barrel Calorimeter (HB) and for the EB, have taken longer to complete, resulting in the completion of the work for the YB0 services remaining off the CMS critical path. Tests on demonstrating that regeneration of gas by filters is made without developing dark currents in the Resistive Plate Chambers (RPCs) have continued and the LHCC will review the status at its future sessions.

The referees also reported on the status of the Pixel Detector and the Beam Radiation Monitoring (BRM) project. Good progress was reported on both the Forward and Barrel Pixel Detectors and it is expected that they will meet their installation milestones in early 2008. Good progress was also reported on all aspects of the BRM. The LHCC considers it reasonable to expect that CMS will have installed a fully-operational set of BRM detectors for the start of LHC operations, but much work remains to be done in the meantime. The LHCC noted that the CMS Tracker Group will need to play a leading role in the effort to understand the performance of the LHC accelerator and to define the day-to-day operation of the BRM.

Good progress was reported on the computing and software. Preparations for Computing, Software and Analysis 2007 (CSA 07) are well underway and the exercise will focus on the transfer of data to the Tier-1 and Tier-2 centres, the development of the High-Level Trigger and on physics studies. The status of the CMS computing and results from the CSA07 will be the main focus of the November 2007 meeting of the LHCC with CMS.

6. REPORT FROM THE LHCb REFEREES
The LHCC heard a report from the LHCb referees, concentrating on the general status of the experiment and the status of the Outer Tracker.

The referees reported on the status of the LHCb experiment. The major infrastructure works are approaching completion, with the installation of the front radiation shielding wall scheduled to be fully in place by the end of 2007. Preparations for the next round of tests of the LHCb dipole magnet are on track for the exercise planned for October 2007. The realization of the Online System is advancing well, but the available manpower remains critical. Good progress was reported on the status of the LHCb sub-detectors and the commissioning of all LHCb sub-detectors is in progress and is expected to be completed by March 2008. RICH-2 is the first detector to have completed its individual system commissioning and is now ready for the LHCb global commissioning phase. Global commissioning of the LHCb experiment is about to commence and several sub-systems will be tested concurrently. The LHCC expects that LHCb will have an experiment ready to exploit the initial LHC run in 2008.
The LHCC also heard a report on the ageing problems of the Outer Tracker (OT). The cause of the ageing problems has been identified to be the glue used in the fabrication of the modules. Tests have shown that heat treatment of the chambers in situ reduces the ageing and a full set of heating blankets have been ordered and will be tested at LHCb after the test period of the LHCb magnet. A corresponding monitoring system is being put in place to be operated in situ. The Committee considers that the ageing problem continues to be a concern for the long-term performance of the OT and encourages LHCb to continue exploring detector replacement options.

7. REPORT FROM THE LCG REFEREES
The LHCC heard a report from the LCG referees, concentrating on the status of the services, the Full Dress Rehearsals (FDRs) and the Common Computing Readiness Challenge (CCRC). Significant progress was reported on the reliability and availability of the services. Implementation of the Storage Resource Management (SRM) Version 2.2 is complete and has been extensively tested at some sites. However, testing of SRM Version 2.2 by the experiments has been delayed and while the roll-out plan has been defined, further problems may appear in the future, which is particularly worrisome as the deployment is being carried out in the midst of the FDRs. Moreover, the Work-load Management System WMS 3.1 is not yet available on Scientific Linux 4 and the site migration plans remain unclear.

The Committee considers that the upcoming FDRs, scheduled to run for all experiments between September 2007 and May 2008, and Common Computing Readiness Challenge (CCRC) 2008 are essential exercises, will allow for the extended testing of the LHC computing system and will foster closer links between the experiments and the World-wide LHC Computing Grid (WLCG). Preparations by the experiments for the analysis of LHC data is advancing well.

The next LCG Comprehensive Review will be held on 19-20 November 2007.

8. TEST BEAMS
The SPS and PS Co-ordinator reported on the 2007 accelerator schedule and test beams and gave an outlook on the accelerator schedule for 2008. He reported that the accelerator chain has been providing excellent beam conditions to the users in 2007 and the complex is scheduled to continue running until 12 November. Version 2.0 of the Accelerator Schedule for 2008 was presented. Physics is scheduled to start on 19 May at the PS and on 29 May at the SPS, running in both cases until 10 November. The fixed target physics programmes at the PS and SPS are progressing successfully. The CMS Collaboration has made a new request for the provision of a single shift with a fast extraction beam in order to simulate an accidental LHC beam dump. The LHCC asked the SPS and PS Co-ordinator to continue investigations on how best to accommodate this request either into this year’s or next year’s accelerator run.

9. DISCUSSION ON LHCC PROCEEDINGS FOR 2008 AND BEYOND
Given that the emphasis of the LHCC deliberations would be shifting in the coming months to providing an increasing importance on issues related to a) full experiment systems rather than individual sub-systems, b) the running in of the experiments with first beam, c) the interaction between the experiments and between the experiments and the LHC Machine, d) the large scale data processing and distribution and the data physics analysis, and e) the detector upgrades for a higher LHC luminosity, the Committee members held a first discussion on what form the LHCC deliberations should take in the future. Following further consultations with the CERN Management and the LHC experiments, another round of discussions will be held in an upcoming LHCC meeting to decide on the form of the LHCC reviews for the future.
10. REFEREES
The LHCC referee teams are as follows:
ALICE: P. Dauncey, M. Gonin, J. Haba (Co-ordinator)
ATLAS: F. Forti, V. Kekelidze (Co-ordinator), R. Mankel, P. Mato
CMS: S. de Jong, M. Martinez-Perez, S. Smith (Co-ordinator), R. Yoshida
LHCb: S. Dalla Torre, C. Niebuhr, B. Peyaud (Co-ordinator)
TOTEM: S. Dalla Torre
MOEDAL: B. Peyaud
LHCf: M. Mangano, C. Niebuhr
RD39: S. de Jong
RD42: V. Kekelidze
RD50: R. Yoshida
LCG: P. Dauncey, F. Forti (Co-ordinator), R. Mankel, M. Martinez-Perez

11. The LHCC received the following documents:

Minutes of the eighty-ninth meeting held on Wednesday, 4 July 2007
- CERN/LHCC-2007-022/LHCC 89
- CERN/LHCC 2007-023/LHCC-G-135*

*Restricted circulation

12. DATES FOR LHCC MEETINGS
Provisional Dates for 2007:
21 – 22 November

Provisional Dates for 2008:
20-21 February
7-8 May
2-3 July
24-25 September
19-20 November

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OPEN SESSION

4. Report from the Topical Workshop on Electronics for Particle Physics: François Vasey
5. LHCb Status Report: Roger Forty
6. RD39 Status Report: Jaakko Haerkoenen
7. RD50 Status Report: Michael Moll

CLOSED SESSION:


* part-time
** for item 11

Apologies: J. Haba

3. PROCEDURE
The minutes of the ninetieth LHCC meeting (LHCC 2007-027 / LHCC 90) were approved.

4. REPORT FROM THE CHIEF SCIENTIFIC OFFICER
The Chief Scientific Officer (CSO) reported on the status of the LHC machine. He reported good progress on the LHC machine installation and commissioning. All interconnections in the LHC tunnel have been completed and commissioning of the various LHC systems is well underway. TI2, the second of the SPS-to-LHC transfer lines to be tested and that will carry beams into the LHC in the clock-wise direction has been commissioned to nominal beam intensity at the first attempt at the end of October 2007. Sector 4-5 is currently been cooled down and several additional sectors are being prepared for cool down.

3. REPORT FROM THE ALICE REFEREES
The LHCC heard a report from the ALICE referees, concentrating on the status of the sub-systems and on the installation and commissioning of the experiment.
The referees reported on the status of the ALICE sub-detectors. Installation of the sub-detectors is proceeding essentially according to schedule. The repair of the bus bars of the Time Projection Chamber (TPC), following a voltage drop due to a bad connection between the bus bars and the front-ends, is on track and is expected to be completed by early
December 2007 in time for the full commissioning of the detector in February 2008. Installation of the support structure for the Electromagnetic Calorimeter (EMCAL) is complete. Good progress was reported on the installation and commissioning of the Muon System and the higher-than-expected noise levels in Tracking Stations 3, 4 and 5 are under investigation. Installation of modules of the Time-of-Flight (TOF) and Transition Radiation Detectors (TRD) is advancing well. Commissioning of the High Momentum Particle Identification Detectors (HMPID) is advancing well, and the reported loss in acceptance due to trips of the high voltage does not deteriorate significantly the performance of the detector. The Photon Spectrometer (PHOS) has encountered problems with the stability of the read-out electronics and the detector’s installation is delayed to March 2008. The Trigger and DAQ is currently being used in stand-alone mode for individual sub-detectors and a combined Trigger/DAQ test is scheduled for December 2007.

The LHCC took note of the ALICE schedule. The initial working ALICE detector is expected to be in place by March 2008 and a series of three cosmic runs, in December 2007 and in February and April 2008, will allow ALICE to exercise the complete Trigger/DAQ system.

4. REPORT FROM THE ATLAS REFEREES

The LHCC heard a report from the ATLAS referees, concentrating on the general status, an update of the Inner Detector (ID) and a report on the commissioning of the experiment. The Committee took note that two new institutes – Universidad Antonio Nariño from Colombia and a joint team from Chile, formed by members of Pontificia Universidad Católica de Chile and Universidad Técnica Federico Santa María – have been admitted to the ATLAS Collaboration.

The referees reported on the status of the various ATLAS sub-systems. The three toroid magnets – Barrel and the two End-caps – are being tested separately and a joint magnet test is scheduled for spring 2008 following the closure of the ATLAS detector. Modifications to the heaters of the evaporative cooling system of the ID are complete but a further problem has arisen in regard to faulty solder joints of the heat exchangers. The repair is in progress in the CERN workshops but the problem has resulted in a 5-week delay and the schedule to complete the ID is tight. Operation of about 30% of the Transition Radiation Tracker (TRT) is in progress and the commissioning is limited by the availability of the Read Out Drivers (RODs). The observed noise in the TRT is under investigation. All three cryostats for the LAr calorimeters have been filled with LAr, are cold and are being operated since spring 2007. All of the low voltage power supplies for the LAr calorimeters have been retro-fitted and the repair of the front-end boards as a precautionary measure is well underway following the observation of errors in April 2007 which would reduce the boards’ lifetime. The Tile Calorimeter has been in operation for several months. All its low voltage power supplies have been refurbished and are operational while the refurbishment of the electronics drawers is well underway. Installation of the Forward Muon Spectrometer Big Wheels is essentially complete and the Small Wheels are scheduled to be installed in the next two months, but their installation is on the critical path. Delivery of the CAEN power supplies for the Muon System is due to be completed in mid-May 2008.

Commissioning of the ATLAS experiment is continuing with cosmics. These runs achieve many aims, including exercising the trigger, DAQ, calibration and alignment systems and help in improving the experimental operational stability, training of members of the Collaboration and in the development of procedures. The upcoming Full Dress Rehearsal will make use of the overall ATLAS read-out chain and the LHCC considers it essential that a large section of the ATLAS Collaboration will participate in this event. ATLAS has taken the decision to base the data-handling model on inclusive streaming, whereby inclusive raw physics streams will be used at the output of the online.
5. REPORT FROM THE CMS REFEREES

The Committee heard a report from the CMS referees, concentrating on the status of the detector construction, installation and commissioning and on the proposal for a spare Electromagnetic Calorimeter Supermodule.

The referees reported on the status of the various CMS sub-systems. Commissioning of the Inner Tracker is complete on the surface and the detector will be transported to Point 5 in December 2007, following which the connections to the services check-out and commissioning is scheduled for the first two months of 2008. Installation of the Pixel Detector is scheduled for March 2008 and is being integrated together with the installation of the CMS experimental beam pipe. Installation of the Barrel Electromagnetic Calorimeter (EB) is complete. The prototype for the Electromagnetic Calorimeter trigger concentration cards has been delivered and CMS aims to place the order for the series production in December 2007, with the full delivery scheduled for June 2008 as expected. All barrel yoke elements (YBs) have been lowered into the CMS experiment cavern and the installation of services on the central YB module (YB0) has been completed, albeit after taking much longer than expected due to the elevated complexity of the task. Mounting of the End-cap Electromagnetic Calorimeter (EE) Dee1 is complete and the mounting of Dee2 is expected in December 2007. The first EE is expected to be ready for installation in March 2008 and the second EE in May 2008. The LHCC took note that the recent CMS Engineering Design Report for the CASTOR calorimeter provided conditional approval within the CMS Collaboration to proceed with the construction of the detector and endorsed the purchase and preparation of materials. Progress will be reviewed in early 2008.

The Committee took note of the proposal from CMS for the construction of a spare EB Supermodule. Such a Supermodule was originally foreseen and would serve as a fast replacement in case one of the installed Supermodules is malfunctioning and could also be used as a control element in test beams. The LHCC asked CMS to make further considerations regarding this proposal, including the likely failure scenarios of an installed Supermodule, the benefits of beam test arguments and the funding mechanism.

The LHCC heard a report on the CMS schedule. The main aim is to close CMS by April 2008 and to run through a cosmic run with the nominal magnetic field in the solenoid. The schedule includes an overall contingency of about one month prior to first LHC beams in May 2008.

6. REPORT FROM THE LHCb REFEREES

The LHCC heard a report from the LHCb referees, concentrating on the general status of the experiment, the status of the Outer Tracker and the funding situation for the LHCb experiment.

The referees reported on the status of the LHCb experiment. Installation of the major mechanical structures in the LHCb experiment cavern is essentially complete. Good progress was reported on the installation and commissioning of the various LHCb sub-detectors. The Vertex Locator (VELO) is installed, cabled and is being commissioned, the installation of the Trigger Tracker and Inner Tracker is expected to be complete by the end of 2007, the RICH-2 is complete while RICH-1 is approaching completion, the full Calorimeter system is installed and cabled and the installation of the Muon Stations 2-5 is complete. The LHCC noted that the Muon Station 1 may not be ready for 2008, but as the station is mainly used to improve the $p_T$ resolution in the Level-1 trigger, it is not essential for the 2008 run.

The LHCC also heard a report on the Outer Tracker gain loss. The Araldite glue used in the construction of the chambers has been identified as the cause of the gain loss and LHCb plans to use a heater system warming the chambers to 40 °C together with flushing to mitigate the gain loss problem. The LHCC reiterated its request for LHCb to consider a replacement detector, including costs, resources and schedule, in order to avoid any limitations to the LHCb trigger.

The Committee took note that the LHCb experiment is now fully funded with the recent contributions from Brazil, Spain, the United Kingdom and the United States. However, additional expenditure is foreseen for replacing the third beryllium experimental beam pipe section and the VELO RF boxes.
The LHCC expressed its appreciation for the work of T. Nakada, whose term as Spokesperson of the LHCb Collaboration is coming to an end in April 2008.

7. REPORT FROM THE TOTEM REFEREE
The LHCC heard a report from the TOTEM referee. All Roman Pots have been installed in the LHC tunnel around Point 5. One of the silicon detector sensors is being assembled in its final configuration and will be tested with cosmics. The radiation hardness of the edgeless silicon detectors has been shown to be good in an irradiation campaign and the detectors have been shown to function up to $10^{14} \text{ p cm}^{-2}$, which corresponds to an integrated luminosity of around 1 fb$^{-1}$. This detector will be installed in a Roman Pot and will be used for commissioning of the cooling and read-out systems. Production of the Gas Electron Multiplier (GEM) detectors for the T2 Telescope is complete and their testing is well underway. Chamber production for the Cathode Strip Chambers (CSCs) of the T1 Telescope is in progress but their assembly into the first arm by March 2008 is tight. Installation of the T1 Telescope within the CMS detector volume will be discussed in a common meeting in January 2008. Most of the components for the detector read-out electronics are either in the prototype or test phase and the work is distributed through-out the Collaboration. The timely completion of the read-out electronics remains on the experiment critical path.

8. REPORT FROM THE LHCf REFEREES
The LHCC heard a report from the LHCf referees. The beam test campaigns at the SPS have been very successful and show that the energy and position resolutions of the detector arms are adequate for the LHCf physics needs. The LHCf installation schedule in the TAN absorbers at Point 1 has been worked out with the machine groups and the detectors are planned to be installed in early 2008. The study of the co-habitation of the various detectors (LHCf detectors, ATLAS Zero Degree Calorimeters and the BRAN LHC collision rate monitors) in the TAN absorbers show that the detector configuration in the TAN absorbers will be changing repeatedly and that a remote-handling system is required to install and remove the detectors during the LHC exploitation period in order to overcome radiation-safety restrictions coming from the activated material.

9. REPORT FROM THE RD39 REFEREE
The LHCC heard a report from the RD39 referee on the collaboration’s programme concerning the operation of solid-state detectors at low temperatures and in a high radiation environment. The referee summarised the experimental results that RD39 has achieved on the development of such detectors and also described the proposed programme for future work. The Committee took note of the good progress in the study of such cryogenic devices for applications in future high energy physics experiments. The plan of work for 2007 has been to a large part met or well underway. The studies on Charge Injection Devices (CIDs) and edgeless sensors are well focused and the CID techniques could offer a possible solution for the SLHC. The LHCC considers that the proposed work-plan for 2008, concentrating on the further development of CIDs, its implementation to edgeless detectors and the production of cryogenic modules is reasonable.

In view of the above and given the modest request for resources for further work, the referee recommends that the R&D project be continued in 2008. A status report is expected to be submitted to the LHCC in one year’s time. The Committee reiterates that it is imperative that the RD39 Collaboration focuses on working towards applying the developed technology to the LHC experiment upgrade programme. The Committee agrees to the continuation of the project on this basis.
10. REPORT FROM THE RD50 REFEREE
The LHCC heard a report from the RD50 referee on the collaboration’s programme concerning the development of radiation hard semiconductor devices for very high luminosity colliders. The referee summarised the experimental results that RD50 has achieved on the development of such detectors and also described the proposed programme for future work. The Committee took note of the good progress in the study of such devices for applications in future high energy physics experiments, such as those at an upgraded LHC. Although there was no significant breakthroughs on new material in the past year, RD50 has made steady progress in understanding, characterizing and bringing to practical use radiation-hard silicon sensors, and in particular n-in-p silicon could be a very promising technology for the SLHC. The Collaboration has also demonstrated the viability of industrial production of some of its materials. RD50 and the LHC experiments are working closely in many areas and the former also serves as forum where the LHC experiments can meet and exchange experiences. The LHCC considers that the proposed work plan for 2008, which concentrates on developing full detector systems for the LHC experiments, to be reasonable. In view of the above and given the modest request for resources for further work, the referee recommends that the R&D project be continued in 2008. A status report is expected to be submitted to the LHCC in one year’s time. The Committee agrees to the continuation of the project on this basis.

11. LHCC DELIBERATIONS ON LHC EXPERIMENT UPGRADES
The LHCC discussed the plan for future reviews of the LHC experiment upgrades. L. Linssen, S. Stapnes and the LHC experiment spokespersons were invited to participate in this discussion. A considerable R&D effort is currently underway within several projects (RD39, RD42, RD50, SLPH-PP and various work in the CERN PH Department), and within the ATLAS and CMS Collaborations. ALICE and LHCb are also in the process of planning for the longer-term future. The general consensus is that the LHCC is the natural body which should review all such activities in the future. The Committee is considering organizing presentations on the LHC machine upgrade scenarios and the physics motivation at one of its upcoming sessions.

12. TEST BEAMS
The SPS and PS Co-ordinator, C. Rembser, reported on the 2007 test beams and gave an outlook on the accelerator schedule for 2008. He reported that the accelerators of the PS Complex and the SPS, which will also serve as injectors to the LHC, operated reliably and stably in 2007. Version 2.2 of the LHC Injector Accelerator Schedule for 2008 was also presented. Physics is scheduled to start on 19 May at the PS and on 29 May at the SPS, running in both cases until 10 November. This schedule will be presented to the November session of the Research Board for approval. Requests for beam tests at the PS Complex and at the SPS have been received and the draft user schedule for 2008 is being drawn-up. The Co-ordinator underlined that such beam tests remain important for the LHC experiments and include requests for LHC-upgrade-related studies. He also outlined the plans for an upgraded Gamma Irradiation Facility (GIF) to succeed the present facility. The Chairman thanked C. Rembser for his work as SPS and PS Physics Coordinator from which he retires at the end of 2007. His efforts have been essential for the successful definition and operation of the LHC test beam activities. He will be succeeded by E. Perez as of 1 January 2008.
13. REPORT FROM THE LHC PROGRAMME CO-ORDINATOR
The LHCC heard a first report from the LHC Programme Co-ordinator (LPC), M. Ferro-Luzzi. The role of the LPC is to provide the co-ordination between those responsible for running the LHC machine and those responsible for running the LHC experiments with the overall aim of optimizing the efficiency of data collection for the LHC physics programme. This will be done by taking into account the status of the LHC machine and the LHC experiments and the priorities in the physics programme. Monthly meetings have started between representatives from the LHC machine and experiments with the current deliberations concentrating on the LHC commissioning period and the period of first data taking.

14. DISCUSSION ON LHCC PROCEEDINGS FOR 2008 AND BEYOND
Given that the emphasis of the LHCC deliberations would be shifting in the coming months to an increasing emphasis on issues related to a) full experiment systems rather than individual sub-systems, b) the running in of the experiments with first beam, c) the interaction between the experiments and between the experiments and the LHC Machine, d) the large scale data processing and distribution and the data physics analysis, and e) the detector upgrades for a higher LHC luminosity, the Committee members continued their discussions on what form the LHCC deliberations should take in the future. Following consultation with the CERN Management and with the LHC experiment spokespersons, a broad consensus was reached whereby mini-reviews over one day to be held twice per year for each experiment will be introduced to replace the Comprehensive Review starting from February 2008. The format will remain flexible to respond to changes in the LHC schedule and will likely evolve during the time leading up to steady data taking. The Open and Closed session formats will be modified to reflect this new format.

15. LCG COMPREHENSIVE REVIEW
The fifth annual LHCC Comprehensive Review of the LHC Computing Grid (LCG) Project took place on 19-20 November 2007. The LHCC referees addressed the following areas: Management, Resources and Collaboration; Mass Storage and Networking; Distributed Fabric; Middleware Development and Deployment; Applications Area and Distributed Databases; and the issues of Services and Experiment Readiness. The LHCC acknowledges the considerable amount of work that has gone into the preparation of the LCG Project Comprehensive Review.

The LCG Project was created by the CERN Council in September 2001 with the aim of prototyping and deploying the computing environment for the LHC experiments. The formal launch of the project was at a workshop held in March 2002. Since that time, the LCG has demonstrated progress towards the realisation of the computing requirements of the experiments in time for LHC operation in 2008.

The LCG Project is a collaboration of the LHC experiments, the Regional Computing Centres, CERN and the physics institutes with the aim of preparing and deploying the computing environment that will be used by the LHC experiments to analyse the LHC data. The project includes support for applications and the development and operation of a computing service. The LCG Project is divided into two phases. Phase I (2002-2005) had the objective of building a service prototype, based on existing Grid middleware, of running a production Grid service and of producing the Technical Design Report for the final system. Phase II (2006-2008) is building and commissioning the initial LHC computing environment. The LCG is not a Grid development project and it relies on other Grid projects for the middleware development and support.

The LHCC considers that the LCG Project has shown significant progress since the last Comprehensive Review in both the production and analysis phases and that the World-wide distributed LCG (WLCG) is becoming a reality. In particular, considerable progress has been
achieved in the stability, usage and interoperability of the Grid infrastructure and in the use of
the Grid by the experiments for analysis; certain of the Tier centres have installed and run
successfully the necessary hardware, while the Storage Resource Manager SRM v2.2-
compliant services are being deployed, albeit after lengthy delays; the middleware services are
in place and focus has shifted to ensuring stability of the installed features. The service level
has constantly improved and the nominal data transfer through-put rate for 2008 has been
achieved. A number of useful products have also been delivered by the Applications Areas
and significant progress has been reported on the monitoring and reporting performance for
both generic and experiment-specific issues.

However, the Committee did note some concerns. The Grid infrastructure has been only
partially exercised and the analysis models are not yet fully defined. Although site stability
and reliability have improved, they are not yet at the desired level and the required support
model, especially for 24x7 operations, is not yet fully defined. The deployment schedule for
the mass storage management and operation remains one of the most critical issues for the
WLCG and its schedule is extremely tight for the upcoming Combined Computing Readiness
Challenge CCRC08, which is an important milestone as all the services should be tested in
their complete capacity at the same time for all the experiments prior to the start of LHC
operations. Finally, it is also important that all pledged resources for 2008 are available for the
CCRC08 in order to exercise the full system. The long-term guarantee of resources, both
manpower and hardware, for the long-term also remains a concern.

The conclusions and concerns of the LHCC are given below. They will help the Committee to
follow up outstanding issues and to monitor future progress of this project in forthcoming
sessions of the LHCC.

• Considerable progress has been achieved in the stability, usage, and interoperability
  of the Grid infrastructure. The LHC experiments routinely use the Grid for
  production activities, with approximately 20% of the production done at CERN, 40%
  at the Tier-1 centres, and 40% at Tier-2 centres. Great progress has also been
  reported in using the Grid for analysis, although the system has only been partially
  exercised, and the analysis models are not fully defined.

• As part of the system commissioning, the CCRC08 has been planned for 2008, with
two windows, in February and in May. The CCRC08 is an important milestone, when
all the services should be tested at full capacity at the same time for all the
experiments.

• A certain number of the Tier centres have proven to be able to install and run the
necessary hardware. Still, the support model, especially for 24x7 operations, is not
well defined. Measures have been developed to monitor the site reliability. The
improvement is constant, but the site reliability is not yet at the required level. The
measure derived from both basic tests and experiment-specific tests should be
published to have a better understanding of the site situation. The CERN Tier-0
centre seems to be well equipped to cope with the expected data rates. Operational
issues are being addressed, but a full plan is not yet in place. Networking is in general
adequate.

• Mass storage management and operation remains one of the most critical issues for
the LCG. After many delays, the SRM v2.2-compliant services are being deployed.
The experiments have done only limited tests on the new services. The deployment
schedule is extremely tight for the CCRC08. The CASTOR2 system has at the end of
October 2007 released a new version fixing many issues, but it remains to be seen
whether this new version has the required stability and performance. Deployment at
remote sites is essential in order to reduce service difficulties. dCache v1.8
deployment has begun well, but its overall schedule remains very tight.

• Basic middleware services are in place and the focus of the past year has been more
on stability than on new features. The gLite middleware failed to deliver the
computing element software. Development of this has been stopped and replaced
with Web-based services (CREAM). The LHCC is concerned by the announced
manpower cuts of European Union funds in the area of middleware development.
The real test of the system will only happen with the first data, and it is essential that
key experts are retained until then. A continued focus on stability and production quality software is essential for the coming year.

- The Application Area is in general in very good shape. The long-awaited migration from SEAL (Shared Environment for Applications at LHC) to the ROOT interactive tool for analysis is delayed because of unforeseen although not fundamental difficulties. The manpower level is matched to the requirements, but turnover can become a problem if the overlap is not sufficient to ensure proper knowledge transfer. Once again, in the view of the Committee, retention of key experts until the system has been fully exercised with real data would be very prudent. The 3D distributed database project is well on track.

- The service level has constantly improved and the nominal data transfer throughput rate for 2008 has been achieved, although only for short periods. Sustained, stable operation still needs to be achieved. Planning for the CCRC08 requires a strong coordination among all sites, a robust data transfer and management service, and a clear definition of the criticality of the various services as well as a failure recovery mechanism.

- Resources for the WLCG are provided through a Memorandum of Understanding for which, however, some signatures are still missing. Not all the pledged resources have been deployed in time and in particular the scarce disk space has caused significant problems to the production activities. In addition, a large fraction of the Tier-1 and Tier-2 sites have not confirmed the 2008 pledges. It is important that the pledged resources for 2008 are available for the CCRC08 in order to exercise the full system prior to LHC data taking. Up to 2010, the pledged resources match reasonably well the experiments’ requirements, except for ALICE, where a 50% short-fall is still observed. The pledged resources for 2011-2012 are significantly below the experiments’ requirements.

- Communication with remote sites has improved significantly, and a system to plan and track the progress of each site (especially the Tier-1 centres) has been set up. Many level-1 milestones are not being met, including the 24x7 support, the VO boxes support, and the site reliability. Stronger coordination is required to ensure that the sites are ready for CCRC08 and for data taking.

16. REFEREES

The LHCC referee teams are as follows:
ALICE: M. Gonin, J. Haba (Co-ordinator)
ATLAS: F. Forti, V. Kekelidze (Co-ordinator), R. Mankel, P. Mato
CMS: S. de Jong, M. Martinez-Perez, S. Smith (Co-ordinator), R. Yoshida
LHCb: S. Dalla Torre, C. Niebuhr, B. Peyaud (Co-ordinator)
TOTEM: S. Dalla Torre
MOEDAL: B. Peyaud
LHCf: M. Mangano, C. Niebuhr
RD39: S. de Jong
RD42: V. Kekelidze
RD50: R. Yoshida
LCG: F. Forti (Co-ordinator), R. Mankel, M. Martinez-Perez

17. The LHCC received the following documents:
Minutes of the 90th meeting of LHCC held on Tuesday 25 September 2007
CERN/LHCC 2007-027 - LHCC90
18. **DATES FOR LHCC MEETINGS**

Dates for **2008:**

- 20-21 February
- 7-8 May
- 2-3 July
- 24-25 September
- 19-20 November

Emmanuel Tsesmelis  
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**LHCC Secretariat:** Morna Robillard (Bldg. 3-R-012) Tel. 73224  
morna.robillard@cern.ch
MINUTES of the 83rd Meeting of the SPSC
Held on Thursday and Friday 4th and 5th October 2007

OPEN SESSION:

2. Status Report on NA60  G. Usai
3. Status Report on HARP i)  A. Blondel
5. Status Report on CALICE  F. Salvatore
6. AEGIS Proposal  G. Testera

CLOSED SESSION

Present:
S. Baird, J.J. Blaising (part time), B. Bloch-Devaux, T. Carli, J.B. Dainton (Chair), M. Doser, J. Engelen (part time), A. Ereditato, J. Fuster-Verdu (part time), L. Gatignon, L. Kluberg, J. Knobloch, P. Kooijman, M. Mannelli (Secretary), P. Marage (part time), P. Newman, C. Rembser, G. Ridolfi, P. Schleper (part time), U. Wiedemann

Apologies: H. Abramowicz, M. Erdmann, D. Wark

1. MINUTES OF THE 82nd MEETING OF THE SPSC, HELD ON
   June 26th and 27th, 2007
The Minutes were approved.

2. REPORT FROM THE CHAIRMAN

The Chairman reported on the Research Board meeting, RB181. The following points were presented and, where necessary, discussed:

   i. appreciation by the SPSC of the shutdown work on the CERN accelerator complex and experimental areas, which has underpinned the timely start up in 2007 and the present good progress of data-taking in 2007,
ii. the status of the NA63 (particle tunnelling in crystalline fields) experiment and its readiness for data taking in 2007,

iii. the outcome of the COMPASS annual review by the SPSC, namely the encouragement of timely publication of new results, the anticipation of the completion of the $\mu$ program in 2007, and the expectation of a revision of hadron programme with in particular an initial emphasis on data-taking in 2008,

iv. the outcome of the OPERA annual review by the SPSC, namely that 2008 data-taking is contingent on assembly of enough target mass (brick assembly), that with the present set-up meaningful 2007 data-taking is possible, that the SPSC recommends CNGS 2007 deliver beam for up to 6 weeks for OPERA, including a period of high intensity, that there remains a funding shortfall for the full OPERA target mass of emulsions, and that the SPSC is concerned that the later-than-anticipated start of OPERA data-taking begins to jeopardise the competitiveness of the experiment on its original timescale,

v. the outcome of the ICARUS annual review by the SPSC, namely that excellent progress has been made in the installation of the experiment underground, in particular concerning the challenge of cryogenic operation, and that ICARUS looks forward to recording neutrino interactions from CNGS in 2008,

vi. the satisfactory response to questions to the SHINE (NA61) experiment, as part of the preparation of a recommendation to the Research Board (RB) for this proposal, concerning the identification and definition of resources, and the delineation of responsibilities within the collaboration, leading to an SPSC recommendation to the RB for approval of the 2008 $pA \pi A pp$ data-taking (for T2K neutrino and cosmic ray physics), and an SPSC recommendation to the RB for approval of the 2009 heavy ion data-taking, subject to the state of progress (mid-2008) on the 2007 $pC$ analysis, and to the availability of resources and expertise at CERN for a sulphur beam,

vii. an SPSC recommendation to the RB for the approval of the extension into the period 2008-2010 for data-taking with the CAST experiment,

viii. the concern of the SPSC that recent publications by HARP may include results in which a systematic bias in particle momentum may not yet be properly understood and for which clarification may be available at the annual review of the experiment at SPSC83, and

ix. an SPSC recommendation for approval of the 2007 beam request by the AD4 (ACE) experiment.

The Research Board noted the points in i. through v. and in viii. above, and confirmed the recommendations in vi., vii. and ix. above, subject as usual to the availability of resources at CERN. There was further discussion concerning the compatibility of the requests for data-taking with particular ion species and the LHC programme, for which clarification will be sought at the (next) RB182.

### 3. STATUS OF ACCELERATORS

S. Baird reported on the statistics for Physics Beam availability during the 2007 Accelerator Complex operation so far, on the main issues arising since the SPSC 82 meeting in June, and on the major activities scheduled for the next shutdown.

So far this year, availability of Physics Beam from the PS has been about 92%, over 80% from the SPS, and about 70 for the AD%.

Highlights for 2007 accelerator operations included:
• Excellent PS beam quality for DIRAC, in a newly established operational mode
• Successful full test of SPS filling for LHC
• Much improved Operational procedures: for example, SPS super-cycle changes are now routinely established in 10-20 minutes
• AD extracted a record $3.6 \times 10^7$ pbars/shot
• The PSB achieved $3.8 \times 10^{13}$ protons per pulse for the high intensity CNGS beam
• Multiple PS beams for MERIT were successfully established

A particular highlight has been the start of the CNGS run, for which the SPSC heard a separate report from E. Gschwendtner.

For what concerns commissioning of Ion beams for the I-LHC, the LINAC3, LEIR and PS “early beam” had been commissioned in 2006, and test for the “nominal” beam have started. The SPS “early” beam is planned for this autumn. Ion injection for this has proceeded as planned, but delays with RF beam control hardware mean that the ion beam has not yet been accelerated in the SPS.

This raises the question of the possible need for Pb ion beam in 2008, in order to complete the SPS commissioning for the I-LHC.

The SPSC expresses its appreciation for the continued delivery of excellent quality beams, with high operational efficiency.

There are no big changes to the foreseen program of major activities for the forthcoming shutdown, with the exception of specific additional repairs for failures incurred during Operation in 2007. These include the removal, repair and re-installation of a leaking quadrupole in the AD beam.

A full review of the main operational concerns from 2007, and their implications for the consolidation program and spare parts policy is planned for the next ATC/ABOC Days.

4. STATUS OF EXPERIMENTAL AREAS

L. Gatignon reported on the status of the East, North, CNGS and AD Experimental Areas.

EAST AREA

The EAST Area worked as expected with the new magnet for directing beam to the South and/or North Branches of the East Area.

However, the original magnet allowed for an approximately 30% higher operational efficiency, which can only be recovered by re-introducing a similar magnet, once the failure modes incurred with the original magnet are resolved. The source of these failures is now thought to be understood. However, as previously reported, further progress on this issue remains on hold pending availability of resources.

As mentioned above, the DIRAC experiment benefited from excellent quality beams, once the new PS mode of operation (5-current Pole Face Winding mode) was established.
Beam intensity for DIRAC was finally limited by the new, more stringent radiation limit requirements. This issue, which concerns the muon rate behind the dump, should be resolved by the installation of about 100 Tons of additional shielding, scheduled for mid-October.

NORTH AREA

The NORTH Area operated well, with the new CESAR control software proving itself stable and reliable.

The more stringent radiation limit requirements resulted in more radiation alarms than in previous years, in particular for the Very Low Energy beam in H2.

The COMPASS beam has operated smoothly, with $1.4 \times 10^{13}$ protons per pulse on the T6 Target, and $2.2 \times 10^8$ muons per SPS cycle delivered to COMPASS.

The changes from Longitudinal to Transverse polarisation took place on August 5’th, and the change back to Longitudinal took place on September 25’th, as planned.

The NA62 run had a smooth start-up and has been running well since. After an initial phase using simultaneous $K^+$ and $K^-$ beams, NA62 has switched to running mainly with a $K^-$ beam, and a correspondingly higher proton on target flux.

As of October 2’nd, NA62 had collected over 100’000 $K\bar{e}_2$ events.

Beam tests if the new Straw prototype chambers in the vacuum tank are starting, and preparations for tests of the RICH prototype are well under way.

Installation for NA61 has been completed, and data taking started on October 1’st. Preparations for NA63 and RD22 are also proceeding as planned.

AD

As mentioned above, the AD beam has been of excellent quality so far this year, with both close to record intensities and very good deceleration efficiencies. In addition, the AD experimental areas have benefited from a number of other improvements.

However, a number of equipment failures led to significant downtime for the AD.

The failure of a dipole magnet in the ejection line, reported at the previous meeting of the SPSC in June, required a 6.5 days stop for its replacement.

An intermittent short in a dipole magnet in the electron cooler was found to be the cause for troublesome orbit jumps. In retrospect, it appears likely that the fault in this magnet was present since the very beginning of AD operation.

This faulty magnet was finally replaced during a 10 days stop in AD operation, thus eliminating a longstanding source of problems.

Finally, a quadrupole magnet has developed a slow water leak. Due to the difficulty in accessing the corresponding vacuum connection, and of the subsequent bake-out, this can
only be repaired during the next shutdown, until which time the leak will be regularly monitored.

The SPSC heard a separate report on the commissioning of the CNGS.

5. PS AND SPS SCHEDULES

C. Rembser summarised the situation for the ongoing 2007 run.

C. Rembser summarised the situation for the ongoing 2007 run, and the outlook for the 2008 Accelerator Schedule.

As reported above, the run so far this year has been successful, and the user community appreciates both the efficient operation of the Accelerators, and the excellent support and help of the Experimental Area Team.

The proposed three-week extension of for the AD run was approved at the last RB.

The Draft Schedule for 2008 presented. While the schedule is driven by the LHC, it also offers good prospects for Fixed Target physics.

Two modes of operation for Accelerator complex for LHC injection have been commissioned. During LHC set up with beam, a “Pilot” LHC cycle is added to the Fixed Target/CNGS super-cycle, such that these can operate concurrently. Only during LHC filling proper is the Accelerator complex devoted exclusively to LHC injection.

The MTE scheme for sustained high intensity CNGS operation is challenging: this is the first time such a scheme will be used in an accelerator and commissioning is expected to take a large part of the 2008 run. CNGS operation will continue with the existing extraction scheme, limited to about 2/3 of the full intensity by beam loss induced radiation in the PS, and will ramp up to full intensity once the MTE scheme is commissioned.

6. CNGS COMMISSIONING

E. Gschwendtner reported on the status of the CNGS.

The repairs to the Horn and Reflector cooling water outlet and inlet manifolds have been completed as planned.

In addition fatigue induced faults to the Reflector Strip-line Cable have been observed. Modifications have been made to the existing strip line cables, to ensure continued operation for the 2007 CNGS run, and new design for a replacement Strip-line Cable are underway to allow for replacement during the next shut-down.

Commissioning of the CNGS started as planned, in week 38. Both the beam-line and the beam profile and monitoring equipment work well, allowing for systematic progress and optimization.
On October 2’nd a new record intensity of $1.84 \times 10^{13}$ protons on target was established, and the first $\nu_\mu$ Charged Current events inside the OPERA target were reported.

The SPSC congratulates the CNGS team on the successful commissioning, and looks forward to the prospect for sustained operation of the CNGS for Physics in 2008 and beyond.

7. IMPLICATIONS OF OPERATION WITH LIGHT ION SPECIES ON THE ACCELERATOR COMPLEX

S. Maury reported on the implications of SPS heavy ions operation for fixed target, in the context of the LHC heavy ions program.

The schedule for operating the SPS with lead for fixed target, together with lead operation for the LHC in any given year, is challenging but not impossible.

Operating with different ion species for fixed target and the LHC in any given year, once this operational mode has been established, is even more challenging.

Developing the ability to run with a new light ion species for fixed target together with heavy ion operation for the LHC in any given year is problematic, and appears to be excluded before 2010. Some of the problems could be alleviated, by building an independent ion source test stand, with which to develop the required light ion capability.

Significant resources are required to establish ion beam capability in the SPS, be it for the LHC injection or the fixed target mode, for each new ion species and operating mode.

8. DISCUSSION OF THE OPEN SESSION

8.1 NA49

The SPSC notes that, since its last Annual Review, NA49 has published a significant number of final data analyses. In addition, NA49 has a number of further analyses under final review within the Collaboration.

The SPSC appreciates the continuous NA49 effort in the analysis of their proton-proton, proton-nucleus and nucleus-nucleus data, and the quality of their results.

The SPS encourages the NA49 Collaboration to proceed according to their plans for further publication of p-p, p-A and A-A results. The SPSC recommends continued support for the NA49 data analysis in order to achieve this.

8.2 NA60

The SPSC notes with satisfaction the continued publication effort by NA60 since the last Annual Review, and the quality of their results.
**The SPSC encourages** the Collaboration to proceed with their plans for analysis of the In-In and p-A data, **and recommends** continued support for the NA60 analysis program in order to achieve this.

### 8.3 HARP

The HARP Collaboration reported on progress with both the Small Angle and Large Angle data analyses.

**SMALL ANGLE DATA ANALYSIS:**

The SPSC notes the publication of results, using the forward acceptance part of the experiment, on small angle positive pion production from proton beams on Aluminum and Beryllium targets. These results are important input for the K2K and MiniBoone neutrino experiments, and are being used by these collaborations to reduce the corresponding systematic uncertainties.

Further publications are underway, for negative pion small angle production on an Aluminum target as input to MiniBoone, and charged pion small angle production on a Carbon target, as input to cosmic air shower and atmospheric flux calculations.

**LARGE ANGLE DATA ANALYSIS:**

It has long been established, that track reconstruction using the HARP TPC suffers from very large biases, both static and dynamic, which require correspondingly large corrections.

There are two independent analyses of the large angle data, each of which has taken a different approach to derive these corrections. **The SPSC takes note** of the updated results from the two analyses, which were shown in the Open Session.

In view of the very large corrections required in the TPC, in light of the report by the CERN/INFN Review Committee, and given the apparent discrepancies between the two independent analyses, **the SPSC recommends** that publication of large angle results remains on hold, until these discrepancies are understood and the validity of the results can be reliably assessed.

**The SPSC continues to strongly encourage** the HARP Collaboration to resolve these issues internally as a matter of utmost importance, and ensure convergence of the two analyses for final results.

Meanwhile, the SPSC, working with the Collaboration and at the request of the Funding Agencies, is currently engaged in a detailed comparison of the two independent analyses of the HARP large angle data. The full data sets requested have been provided for one analysis,
while only partial information has so far been provided for the other analysis, and the SPSC looks forward to receiving the remaining information in a timely fashion. This comparison will be concluded in advance of the next meeting of the SPSC in December, on the basis of the information made available by then.

8.4 CALICE

**The SPSC congratulates** CALICE for their rapid recovery from damages incurred during the transport of their apparatus, and for their efficient use of the beam time.

The results obtained can be expected to advance the understanding of, in particular, hadronic shower development in highly segmented calorimeters, and to provide important input to the choice of calorimeter technology for future Linear Collider experiments.

**The SPSC looks forward** to publication of these results.

8.5 AEGIS Proposal

**The SPSC recognizes** that the AEGIS proposal addresses a question of fundamental interest, namely the gravitational interaction of anti-matter.

The proposed ultra-cold anti-hydrogen beam is novel, challenging, and interesting in its own right, as it will significantly advance the experimental state of the art in the field.

**The SPSC considers** that the proposed method for the measurement of the gravitational force on anti-hydrogen atoms requires excellent control of systematic uncertainties, **and looks forward** to a further evaluation of these.

9. FOLLOW UP ON EXPERIMENTS AND PROPOSALS

9.1 CNGS1-OPERA

**The SPSC notes with satisfaction** that OPERA has by now installed over 50’000 bricks, and that first CC neutrino interactions in the emulsion target have already been recorded in the early part of the CNGS high intensity run.

10. DOCUMENTS RECEIVED


7. NA60 Status Report (NA60 collaboration); CERN-SPSC-2007-032/SR-026.