Present
L. Alvarez-Gaume (replacing G. Altarelli), R. Aymar (Chairman),
A.E. Ball (for item 2), G. Bossen, M. Calvetti, P. Ciriani, J. Dainton, J.
Engelen, L. Evans, R. Forty (Secretary), P. Geeraert, M. Hauschild,
H. Hoffmann, P. Lebrun, S. Myers, A. Naudi, W.-D. Schlatter, W. von
Rüden, W. Zapf

Apologies
G. Altarelli, J. Äystö

Items
1. Procedure
2. Status report from NESTOR and decision on renewal as RE9
3. Reports and matters arising from the LHCC meetings of 26-27 November 2003
   and 28-29 January 2004
4. Reports and matters arising from the SPSC meeting of 3 February 2004
5. Any other business
1. **PROCEDURE**

1.1 R. Aymar welcomed the members of the Research Board to this first meeting during his tenure as Director General, and explained the changes to the mode of operation of the board. The meetings will take place four times a year, combined with meetings of the Executive Board. The membership is composed of the Executive Board members along with the chairpersons of the scientific committees (the INTC, SPSC and LHCC), a representative from the Theory Unit and from the Staff Association, and the scientific secretary. Other experts, such as the scientific coordinators of ISOLDE or the SPS/PS, may be invited as required.

1.2 The **minutes** of the previous Research Board held on 13 November 2003 [1] were approved with one change: in the SPSC report the phrase concerning COMPASS: “They should complete their muon data taking in 2004” should be replaced by “Their aim is to complete a substantial program of polarization physics by the end of 2004.”

2. **STATUS REPORT FROM NESTOR**

2.1 A. Ball presented a status report from NESTOR, the deep-sea neutrino telescope sited off the coast of Greece. The proposed structure of the detector is in the form of towers attached to the sea bed, ~ 400 m tall, equipped with optical modules each containing a phototube. These collect the Cherenkov light emitted by muons in the sea water, and by measuring the time of arrival of the light the direction of the muon can be reconstructed. This can be used to study neutrinos from astrophysical sources, which can traverse the earth and produce upward-going muons through their charged-current interaction. The towers are composed of “floors” of star shaped metal structures holding the optical modules. The current status is that one such floor, with 12 optical modules, was deployed at a depth of 4000 m in March 2003, and has been sending back data to the shore station. In 2004 it is planned to recover that floor, and deploy four full floors. Then further floors will be deployed to form a full tower by 2006. The longer term goal is to reach a neutrino telescope with a km$^3$ instrumented volume, and here the collaboration has been working with the other proponents of a Mediterranean neutrino telescope, ANTARES and NEMO, on a joint proposal for funding of an R&D project within the 6th framework programme of the European Union.

2.2 It was clarified that CERN is not a member of the NESTOR collaboration, and that A. Ball participates in the experiment on an individual basis. It was pointed out in the discussion that the Recognized Experiment programme is a way for CERN to support experiments in
related fields with member state participation, but should not involve significant resources from CERN; the rules for recognizing experiments have not changed [2]. J. Engelen commented that the coordination of experiments of this type should be helped by the Astroparticle Physics European Coordination (APPEC), and that the effort being made to converge on a km$^3$ detector is an important development. The continuation of the Recognized Experiment status of NESTOR was granted for a further three years, as RE9.


3.1 M. Calvetti began his report on the two LHCC meetings with a discussion of the status of R&D projects. RD39, RD42 and RD50 all aim to improve the radiation resistance of solid-state detectors: RD39 through the use of silicon at low temperature [3], RD42 by the use of diamond [4], and RD50 by the study of material structures in semiconductors [5]. All three are making good progress, and have been recommended for continuation by the LHCC. In the discussion it was suggested that the projects should focus on the needs for the potential upgrade of the LHC to higher luminosity. M. Calvetti felt that a new R&D committee was not required to oversee their work, as the LHCC plays that role. On the other hand it would be advantageous to stimulate parallel developments in the read-out electronics, and a workshop will be organized to this end. It was commented that the collaborations were not requesting increased support from CERN, but that anyway the support should be maintained at its current level. The continuation of RD39, RD42 and RD50 was approved by the Research Board.

3.2 Next M. Calvetti discussed three Technical Design Reports and an addendum to a TDR that had been recommended for approval by the LHCC. The ATLAS high-level trigger, data acquisition and controls TDR [6] describes how the collaboration intend to reduce the 40 MHz bunch crossing rate to $O(100)$ Hz for output to mass storage. They will use a hardware first-level trigger to reduce the event rate to about 75 kHz, and two distinct higher levels that run in commodity PCs: the second level uses regions of interest defined in the first level, while the final level studies the full event. The LHCb trigger TDR [7] describes how the collaboration intends to select b-hadron decays of interest, again using a multi-level architecture, with a hardware first level selecting high $p_T$ leptons and hadrons, followed by a software trigger level that selects tracks with high impact parameter and $p_T$, before the final level of full reconstruction. The LHCb reoptimized detector design and performance TDR [8] describes changes that have been made to the experiment’s spectrometer, to reduce the material seen by tracks, and to allow the $p_T$ of tracks to be
measured early on in the trigger. The **ALICE photon multiplicity detector** is designed to measure the multiplicity and spatial distribution of photons on an event-by-event basis, in order to study event shapes and fluctuations in the forward region. The addendum to its TDR [9] describes how the detector has been moved closer to the interaction point, to reduce the material in front of it. The **Research Board approved the TDR’s, with the understanding that the projects that they describe will conform to the resources as indicated in the TDR’s and also as reviewed by the LHCC; furthermore, it is understood that these resources are consistent with the allocations as agreed by the appropriate Resources Review Board.**

3.3 M. Calvetti then discussed other issues that were raised during the LHCC meetings. The TOTEM collaboration has requested a beam test in the SPS of their Roman Pot in 2004 [10], to study issues concerning its operation, the use of edgeless silicon sensors, the first-level trigger, and RF pickup. This will be discussed below under items 4.1 and 5.1.

3.4 The LHC Computing Grid project has been reviewed [11]. The project was created in September 2001 with the aim of prototyping and deploying the computing environment for the LHC experiments, and the review concluded that significant progress has been made towards the realization of the computing requirements in time for LHC operation in 2007. The issue of a Computing Memorandum of Understanding is becoming urgent, and J. Engelen commented that work was underway on this.

3.5 A Comprehensive Review has also been made of the LHCb experiment [12], and concluded that the reoptimization of the detector has led to a more elegant experiment with the same physics performance as specified in the Technical Proposal, and that it is realistic to expect LHCb to have a working detector installed in time for the beginning of LHC operation.

3.6 Finally, a proposal had been received for the measurement of photons and neutral pions in the very forward region of the LHC [13], which will be considered at a future meeting.

4. **REPORTS AND MATTERS ARISING FROM THE SPSC MEETING OF 3 FEBRUARY 2004**

4.1 J. Dainton presented a report on the recent SPSC meeting. Concerning the SPS schedule for 2004, there has been a request for extension of the SPS vacuum scrubbing run by three days, and two periods of eight hours each for the TOTEM Roman Pot test. The SPSC accepted these requests, and has reduced the running time available to COMPASS, NA48/2 and NA60 accordingly. The situation will be reviewed in July to take into account the progress of the run, before finalizing the sharing of beam time between NA48/2 and NA60.
4.2 The progress was reviewed of experiments at the AD: ATHENA/AD-1, ATRAP/AD-2 and ASACUSA/AD-3. They were encouraged to maintain spectroscopy as their top priority. ACE/AD-4 [14], which studies the biological effect of antiprotons, was recommended by the SPSC for approval to continue data taking in 2004. Approval was granted by the Research Board, but conditional on the commercial aspects being first investigated by the new CERN management.

4.3 ICARUS/CNGS2 has proposed a muon spectrometer [15] to complement its liquid-argon TPC for the study of neutrino oscillations using the CNGS beam. The Research Board noted that approval has been given by the LNGS and endorsed that decision.

4.4 Next J. Dainton discussed the preparation for the Villars meeting, at which present and future activities and opportunities in fixed-target physics will be reviewed. The date of the meeting has been set for 22–28 September 2004. R. Aymar stressed the importance of this meeting, to help focus on interesting options for any future fixed-target programme at CERN.

4.5 The SPSC has received an expression of interest for a new programme of heavy ion physics using the NA49 experiment [16]. The Research Board accepted the recommendation that the NA49 set-up should be retained in situ whilst a proposal is prepared for the Villars meeting.

5. ANY OTHER BUSINESS

5.1 M. Hauschild presented the latest schedule of the PS and SPS machines for 2004 [17], including the modifications made to accommodate the extension of the SPS scrubbing run and the TOTEM Roman Pot test. The Research Board endorsed the machine schedule.

5.2 L. Evans mentioned that delays have been suffered in the installation of the cryogenic lines for the LHC. However, the management has decided that priority must be given to maintaining the approved schedule, and this will be achieved by increasing the number of teams performing the installation in the tunnel. As a result there should be no delay to the completion of the machine installation.

5.3 The dates of future Research Board meetings in 2004 were confirmed to be the following: 27 May, 22 July and 2 December.
REFERENCES

[10] Proposal for a measurement with a Roman Pot in the SPS (LHCC 2003-061/G-062)
[15] ICARUS: A second-Generation Proton Decay Experiment with Nuclei and Proton Beams at the CERN SPS (SPSC 2003-030/P323/Add. 1)
[16] Expression of Interest of NA49: A New Experimental Programme with Nuclei and Proton Beams at the CERN SPS (SPSC 2003-038/EOI-01)
[17] SPS/PS Schedule for 2004 (enclosed)

ENCLOSURES

3. Minutes of the 66th SPSC meeting held on 3 February 2004 (LHCC 2004-006/SPSC 66)
4. SPS/PS Schedule for 2004