



## ALICE

### Minutes of the 12th RESOURCES REVIEW BOARD Meeting

(Held at CERN on 24<sup>th</sup> April 2002)

**Present:**

*Europe:*

G. Paic (Ministry of Science and Technology, Zagreb);  
F. Suransky (Ministry of Industry and Trade, Praha), M. Sumbera;  
O. Hansen (NSRC, København), H. Bøggild;  
M. Sainio (University of Helsinki, Helsinki), J. Aysto;  
M. Spiro (CEA-Saclay, Gif sur Yvette), F. Staley;  
G. Wormser (IN2P3, Paris), J.Y. Gossiorc;  
J. Richter (BMBF, Bonn), D. Muller, R. Santo (Universität Muenster);  
G. Vesztergombi (KFKI-RMKI, Budapest);  
F. Cervelli (INFN, Roma);  
J. Engelen (NIKHEF, Amsterdam), A.J. Van Rijn;  
S. Irgens-Jensen (Research Council, Oslo);  
J. Królikowski (State Committee for Scientific Research, Warsaw);  
E. Popa (Institute of Atomic Physics, Bucharest);  
F. Grishaev, V.I. Savrin (Ministry of Science and Technologies, Moscow);  
A.N. Sissakian (Dubna), A.S. Vodopianov;  
D. Valachovic (Ministry of Education of the Slovak Republic, Bratislava),  
A. Sitarova, L. Sandor;  
L. Gidefeldt (Natural Science Research Council, Stockholm);  
B. Grynyov (Ministry for Science and Technology, Kiev), G. Zinoviev;  
R. Wade (PPARC, Swindon), J. Kinson.

*Asia:*

Yongtao Zhang (National Natural Science Foundation of China, Beijing), P. Ji, M. Pu;  
S. Bhawe (Department of Atomic Energy, Mumbai).

**CERN:**

R.J. Cashmore (chairman), E.M. Rimmer (secretary),  
P. Geeraert, K.H. Kissler, A.J. Naudi, D. Schinzel, E. Tsismelis.

**ALICE:**

J. Schukraft, C. Fabjan, P. Giubellino, J. de Groot, H.H. Gutbrod.

**12th Meeting of the ALICE Resource Review Board RRB, 24th April 2002**

Documents **CERN-RRB-2002-nnn** can be found at <http://web.cern.ch/Committees/LHCRRB/ALICE/>

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**1. & 2. Introduction & Approval of the minutes of the last meeting**

*R.J. Cashmore  
 Director for Collider Programmes*

The Chairman, R.J. Cashmore, welcomed delegates. He singled out as important business items Maintenance & Operation M&O, the M&O Memorandum of Understanding, Commissioning & Integration C&I costs, and Costs to Completion.

The Minutes of the last meeting were **approved** without changes. There were no matters arising.

**3. Status of the experiment**

*Spokesperson J. Schukraft*

*Paper CERN-RRB-2002-038      Presentation CERN-RRB-2002-065*

• *Collaboration*

Y. Schutz (Nantes) will be Deputy Spokesperson from 1.9.2002 for 1 year and, as ALICE enters the construction phase, a new constitution has been approved and is included in the M&O MoU.

New institutes since the last RRB are Cape Town University, representing a new country in ALICE, (interested in the muon arm) and Ohio Super-Computing Centre (offline and GRID computing); applications have been received from 3 additional Mexican groups, Puebla University, Michoacana University and Cinvestav (cosmics trigger) and an increased CORE contribution from Mexico is being considered; participation is under discussion with ISS (RO), Kaiserslautern (DE) and Jagellonian University (PL). Concerning US participation, a proposal was submitted to DOE in March (> 60 FTE scientists, 5.5 M\$ CORE contribution, interested in PHOS, a new e.m.calorimeter and computing); progress will be reported in October. Japanese moves towards participation are going well; the groups, currently at RHIC, are interested to work on the second half of the TRD; a full proposal is expected ~ end 2002. There is still a potential for significant growth; financial problems, at the few % level, are essentially manageable.

Although Greece signed the MoU in January 2002, in March the 3 Greek Institutes, Athens, Demokritos and Ioannina, left ALICE for CMS (one subgroup wishes to remain and this needs clarification). The

MoU defines the formal steps needed for a Funding Agency (FA) to withdraw from a collaboration and ALICE will take this up immediately with the Agency. Greece has an outstanding debt to ALICE of 65.620 kCHF (1998 - 2002) and had signed for MoU commitments of 1500 kCHF. Assuming that the debt is paid, the 1500 kCHF shortfall can be reduced to about 200 kCHF:

| <i>Item</i>                             | <i>Commitments</i> |                     | <i>Practical measures</i>  |
|---|--------------------|---------------------|--|
|   | <i>Greek</i>       | <i>Other</i>        |  |
| CASTOR                                  | 600.2              |                     | no longer part of ALICE program  |
| FMD<br>(forward multiplicity detectors) | 499.7              | DK: 580.5, RU: 40.3 | use 300 kCHF MoU overfunding;<br>look for simplifications<br>(expected remaining shortfall ~ <b>170 kCHF</b> ) |
| T0<br>(start counters)                  | 248.8              | RU: 62.2            | FI can shift 200 kCHF from ITS to T0<br>(expected remaining shortfall ~ <b>30 kCHF</b> )                       |
| Common Fund                             | 150                |                     | find savings (~ 100 kCHF?)   |

- *Detector*

Schukraft presented some highlights of progress with the ALICE detector. He noted that the impetus is no longer to select the best detectors but to stay on time and within budget, and that ALICE is currently on track to have initial detector ready for physics at LHC start-up.

- *L3 magnet*: to improve field quality, ITEP is supplying new iron plugs to partly block up the holes left by the L3 doors. A call for tender is out for repairing the cooling circuit.

- *Si pixel detector*: ~ 30% of total number of chips needed for ALICE have been produced (together with chips for LHCb and NA60); bump-bonding is now successful and two suppliers, AMS/Italy and VTT/Finland, have produced assemblies (ladders) as well as single chips. The project is well on track and entering the system test phase (read-out, cooling, etc.).

- *Si strip detector*: the detector tender is completed and 3 companies will share the 1800 detector modules production; the new, rad-tolerant FEE chip (HAL25) prototype is working after only 1 year of development by Strasbourg, however systematic yield problems still need to be understood; if solved, an engineering run can go ahead first half 2002. Test/assembly procedures are now starting to be tuned, partly in-house in France, Italy, NIKHEF and Finland, and partly in industry. For the next step, it is very encouraging that a full ladder has been assembled for the STAR detector in a similar technology to that used in ALICE.

- *Forward detectors*: these small detectors (PMD, FMD, T0 and V0) are delicate to integrate into ALICE; the final layout is now defined and prototyping has started.

- *ITS/FWD installation*: a full-scale mock-up of the inner/forward detectors have been built to study arrangements for cabling in this congested region and a full-scale model is being used in Torino to test installation rails, insertion, removal and integration of the ITS with the FMD, TPC and beampipe.

- *TPC*: at ~ 5mx5m, the world's largest; production of the field cage FC started in September 2001 after re-tendering to reduce costs and the inner FC arrived at CERN in March. Work progresses well on the outer parts, flanges and endplates, requiring highly specialised technology. Over 50% of the inner Read-Out chambers are finished; production of the outer RO Chambers started in spring 2002. In 1998 the read-out electronics was based a 1-channel chip; by 2001 this had developed into **ALiceTPCReadOut** chip, an impressive and versatile 16-channel chip with integrated ADCs and digital filter. ALTRO, now in the CERN Technology Transfer Database, is attracting lively interest from both industry and research labs and the option of selling the chip to some commercial manufacturers is under discussion.

- *HMPID RICH*: R&D on the RICH is finished; it is now in production and stringent QC procedures measure e.g. the optical flatness etc., of the quartz plates that transmit uv-light from the radiator into the chamber. The quantum efficiency of the CsI photo-cathode has been much improved by optimizing the CsI evaporation parameters.

- *Dimuon spectrometer*: production of the magnet yoke and coil have started; final prototype trigger chambers have been tested; the PRR for the tracking chambers was passed end 2001 and detector

production will start during 2002. Design of the 100 ton absorber, a complex object which houses the vacuum chamber, is being revised to reduce costs.

– *Muon dipole magnet*: coil production is progress in France, yoke production in Dubna using 'local' iron.

– *Transition Radiation Detector*: the TDR, for this last baseline detector, was submitted in October 2001 and approved in February 2002. For cost reasons, a reduced acceptance (3 out of 5 azimuthal rings ) was proposed to the LHCC and accepted. For the read-out a highly sophisticated track processor has been developed which does pattern recognition and momentum calculation in real-time.

– *Trigger*: prompted by LHCC Comprehensive Review in January 2001, the trigger has undergone important design changes that have increased functionality and performance with a simplified architecture. This has resulted in a greatly improved ALICE trigger but at the cost of a year's delay.

– *Computing*: the 'amount' of ALICE computing is ~ same as in ATLAS or CMS; for offline the move to C++ is complete, the ROOT framework has been adopted. ALICE is participating in the Data Challenge program; each Pb-Pb event requires one day for simulation plus a further half day to prepare the simulated data for analysis. In a real-life demonstration of existing GRID functionality, distributed production started in November 2001; 5800 jobs were run on 13 clusters at 9 ALICE sites during 5 weeks, with up to 300 jobs running in parallel for a total of 10\*\*5 CPU-hours and 5 TB of data; 18 sites are now ready.

### Discussion

M. Spiro (FR): new collaborators should firstly contribute to CORE projects rather than bringing in new projects, such as the US e.m.calorimeter. Why consider upgrades while the baseline detector is not fully covered?

JS: US wish to join in the PHOS; in addition, delicate discussions are underway because they have RHIC and must consider whether they can join a second facility in parallel with a RHIC upgrade; the US community feels this is only possible by concentrating on probes which RHIC cannot accommodate to make any LHC activity unique and complementary; they think that this could be jets at high-energy. On the Japanese side it is more clearer; they want like to build the second half of the TRD.

RJC: this discussion is premature and not for the RRB; anything like this will have to go to the LHCC and the RB, and their decisions will be reported here. Spiro's comment should be borne in mind as it will clearly be raised in any such discussions with the LHCC.

J. Engelen (NL): does a delay in the LHCC send more physicists to RHIC?

JS: very much so, especially the young scientists; physics is already 6 years way.

Cashmore then addressed the Greek withdrawal from ALICE and noted that the collaboration is trying hard to reduce the financial gap this has created; Greece should at least pay its outstanding debt.

G. Wormser (FR): without the gap the savings could have been used elsewhere.

J. Engelen : this must be taken seriously; it is a point of principle and the damage is effectively > 200 kCHF.

A. Naudi (CERN) : the Greeks should pay their 2002 bills as invoices were issued before their withdrawal.

JS : an 18-month notice period is defined in the MoU.

RJC : the 18-month notice period is being honoured by a member that is currently leaving another collaboration, and this should be followed up with Greece.

The RRB **instructed Cashmore and Schukraft to follow up with Greece** its debt repayments and the need to close the commitments gap.

**4. Report from the LHCC** *LHCC Scientific Secretary E. Tsesmelis*  
*Paper CERN-RRB-2002-012*

Since the last RRB the LHCC held ALICE sessions in November 2001, January 2002 and a Comprehensive Review in March 2002. The concerns of the LHCC at the first Comprehensive Review in 2001 have been addressed satisfactorily and ALICE has made very significant progress in the past year. The collaboration is advancing in its management and technical coordination structure and in integration and scheduling issues, and has adopted measures to contain the cost-to-completion.

- *Dipole Magnet*: the LHCC Magnet Advisory Group has no major concerns.
- *Inner Tracking (SPD, SDD, SSD)*: good progress reported for all detectors with some remaining concerns over the timely development and completion of the HAL25 front-end chip for the SSD.
- *Particle Identification (HMPID, TRD, TOF)*: there was progress on all PI detectors, however, the LHCC will continue monitoring the new position of the HMPID and the development of the front-end TOF electronics; an Addendum to the TOF TDR is to be submitted by May 2002.
- *Transition Radiation Detector*: the LHCC recommended approval of the TRD Technical Design Report TDR, but the Committee noted that available funds correspond to only about 58% of the detector surface area with no contingency. *The LHCC recommended construction of the 'Short Asymmetric' version with 3 out of 5 azimuthal rings.* The Research Board approved the '3-out-of-5' TDR in February 2002.
- *Time Projection Chamber (TPC)*: good progress noted with no major concerns.
- *Calorimeters (PHOS, ZDC, PMD)*: good overall progress but the LHCC is concerned about the level of available funding for the PHOS and changes to the PMD for which the Committee has requested documented details.
- *Dimuon Forward Spectrometer*: good technical progress but there are concerns regarding cost increases and the delay due to the re-design of the muon absorber.
- *Forward Detectors (FMD, T0, V0)*: these are becoming better defined but details need to be finalised and the LHCC has asked for TDRs for these detectors. *The Greek group building the CASTOR forward calorimeter has withdrawn from ALICE and thus CASTOR is no longer an ALICE activity.*
- *Trigger/HLT/DAQ/Offline*: considerable progress but the Committee finds the list of milestones incomplete. There appears to be a lack of a coordination structure for the High-Level Trigger whereas the offline software is advancing well and has a sound organisation. The LHCC noted the necessity to ensure that adequate manpower is available to provide support for the general software tools.
- *Test Beams*: the LHCC took note of the well-organised structure and the test beam plans for the coming years.
- *Physics*: the LHCC is satisfied with progress on physics issues following a series of Workshops, and the Committee awaits the Physics Performance Report at the end of 2002.

| <i>Status of ALICE TDRs:</i>  | <i>Submission to LHCC</i> | <i>Research Board Deliberation</i> |
|-------------------------------|---------------------------|------------------------------------|
| RICH HMPID                    | August 1998               | November 1998                      |
| Photon Spectrometer           | March 1999                | June 1999                          |
| Zero Degree Calorimeter       | March 1999                | June 1999                          |
| Inner Tracking System         | June 1999                 | September 1999                     |
| Muon Arm                      | August 1999               | November 1999                      |
| Addendum to Muon Arm TDR      | December 2000             | June 2001                          |
| Photon Multiplicity Detector  | September 1999            | February 2000                      |
| Time Projection Chamber       | January 2000              | April 2000                         |
| Time-of-Flight                | February 2000             | June 2000                          |
| Addendum to TOF TDR           | <i>May 2002</i>           |                                    |
| Transition Radiation Detector | October 2001              | February 2002                      |
| Computing TP                  | <i>July 2002</i>          |                                    |
| Physics Performance Report    | <i>End 2002</i>           |                                    |
| Trigger / DAQ                 | <i>March 2003</i>         |                                    |
| Forward Detectors             | <i>To be defined</i>      |                                    |

### *LHC COMPUTING GRID PROJECT*

The LHCC has recommended that it should treat the LHC Computing Grid Project in the same way as the experiments. This means that the Grid Project will submit documents and reports for review by the LHCC, including the project's TDRs. The Committee is now analysing the relation between detector parameters and computing requirements, particularly the trigger rates and associated physics performance.

### *TEST BEAMS*

The LHCC has reviewed requests for test beams in 2003 - 2006. It considers that all 4 experiments need beams in 2003 - 2004 to calibrate calorimeters, validate front-end read-out electronics and DAQ chains, monitor detector construction quality and test alignment procedures. In 2005, ALICE, ATLAS and LHCb have no compelling test requirements, while CMS's needs in 2004 - 2006 are driven primarily by ECAL calibration. Therefore, the experiments have been asked to proceed without SPS test beams in 2005. However, the LHCC recommends that PS test beams operate throughout 2003 - 2006.

### *Discussion*

M. Spiro (FR): the LHCC is monitoring milestones; where are they?  
JS: in the written report *CERN-RRB-2002-03*; they need to be adapted to the new LHC schedule.  
RJC: ALICE are a little behind on their milestones but not seriously so. They are moving ahead well in many respects, as the LHCC noted in the Comprehensive Review. Concerns are being addressed and ALICE is trying hard to keep costs under control. The ALICE trigger is crucial for p-p as well as heavy ion collisions. Pruning the TRD to ~ 60% to match available funds has given ALICE a funded and approved detector which is regarded by the LHCC as a good detector for ALICE physics. All four LHC experiments will have to cope without SPS test beams in 2005. Finally, noting that it takes a day to simulate an ALICE event, the sooner the heavy ion collider works, the better.

## **5. Financial matters** *CERN Finance Division Leader A.J. Naudi*

### **• Collaboration accounts**

*Paper CERN-RRB-2002-003*

Updating the distributed document, Naudi announced that an additional 95 kCHF of membership fees have been received and there has been a further 101 kCHF of expenditure on the L3 magnet, infrastructure and the vacuum chamber. He strongly urged FAs with outstanding contributions to pay as soon as possible; they will receive written reminders after this RRB. Spiro pointed out that CERN is one of the FAs with an outstanding contribution.

### **• Market Surveys & Invitations to Tender**

*Paper CERN-RRB-2002-004*

Naudi reported minor changes to the distributed document:

Funding for MS-3071/EP will be ALICE Common Fund T710100 and for MS-3072/EP and MS-3073/EP funding will be ALICE Common Fund T710600.

For IT-2957/EP, the contract F454/EP was signed on March 27th 2002.

Funding for IT-3071/EP will be ALICE Common Fund T710100, and for IT-3072/EP/ALICE and -3073-EP/ALICE funding will be ALICE Common Fund T710600.

The results of the external audit of CERN's 2001 accounts will be reported at the next RRB.

*At this point, the order in which the remaining agenda items were taken was slightly altered.*

## 7. M&O

- **Scrutiny Group Report**                      *Scrutiny Group Chair, D.Schinzel*  
    *Paper CERN-RRB-2002-036*                      *Presentation CERN-RRB-2002-80*

Cashmore introduced this item by thanking all of those who have worked hard, especially Scrutiny Group members, to produce a clear picture of the expected M&O costs of the experiments.

Current members of the M&O Scrutiny Group are:

|  |                                 |
|--|---------------------------------|
| Atul Gurtu   | Tata Institute                  |
| Bernard Aubert   | IN2P3, Annecy                   |
| Brigitte Bloch-Devaux  | CEA, DAPNIA                     |
| Franco Cervelli, Paolo Giubellino  | INFN                            |
| Guy Lujckx   | NIKHEF                          |
| Jim Yeck   | DOE                             |
| Kai Koenigsmann  | University of Freiburg          |
| Peter Chochula   | Comenius University, Bratislava |
| Steinar Stapnes  | University of Oslo              |
| Sven-Olof Holmgren   | University of Stockholm         |
| T. Camporesi, D. Plane, D. Schinzel (Chair) and E.M. Rimmer (Secretary) CERN |                                 |

Given M&O estimates for 2002 – 2007, the Group was asked to:

- flag items linked to Construction, Commissioning and Integration
- flag items for which costs are intrinsically unreliable or likely to vary with time
- flag items for which a change in strategy might produce economies
- identify items related to shut-down activities
- identify cost drivers

In addition, the Group decided to:

- standardize the data presentation formats to facilitate comparison between Collaborations
- review and analyze the spending profile

M&O 'A' costs, to be paid in common across the experiment, were identified and the estimates checked. They include running the collaboration, support linked operation of test beams, workshops, storage areas, various installations, moving equipment, lifting gear, etc. Between August 2001 and April 2002 the Group scrutinised all Category A items for the years 2002-2007. The original spending profile remained valid but for each year a slight cost reduction was achieved, mainly by defining uniform accounting for manpower and moving some items from Category A to Category C to be paid by CERN.

ALICE does not have any sub-system-specific M&O B costs before 2004 and so Schinzel did not present B costs at the RRB meeting (they are in the presentation file *CERN-RRB-2002-80*).

The Group unanimously considered that the C costs were incomplete as presented and that CERN's support for LHC experiments is substantially more than given by the existing template. If needed, CERN should provide a complete list with Cost Estimates.

The Group concluded that ALICE M&O A cost estimates for 2002 and 2003 are sound and ready for endorsement. The 2003 costs will be further examined before presentation for approval at the October RRB. Although costs are relatively modest for 2002 (~ 450 kCHF), looking ahead it is expected that the main cost driver will be manpower.

For on-line computing, a common strategy is needed for charging for raw data storage and common guidelines are needed for equipment replacement cycles. There is a wide discrepancy between the experiments at present in projected on-line costs, however this has little impact in 2002 and 2003. Cashmore said that these questions are being taken up with experts from the Computer Centre.

*Discussion*

- G. Wormser: Category B costs are zero now, and later are much smaller than for ATLAS and CMS; why?  
DS: there is no detector here at CERN at the moment needing M&O and 2004/2005 are 'far away' for ALICE.
- J. De Groot (ALICE): ALICE is later in development than ATLAS and CMS and for the moment we have concentrated on A-type costs; the B costs are very preliminary and have to be refined.
- P. Giubellino: the A/B ratio will probably always be different for ALICE because several items defined as B-type in the other experiments are A-type in ALICE, e.g. management of test-beams and paying for gas systems.
- R. Wade (UK): has any RRB actually asked for a list of C costs?  
DS: the Scrutiny Group feels that either you are content that CERN is providing a safe and wholesome working environment or the entire list must be generated, scrutinised etc., and this is a lot of work which should be avoided if possible.
- RJC: C costs originated from the needs to make the caverns etc., safe. The complete operation costs of the sites have not been included and it would, as the Scrutiny Group has noted, generate a lot of extra work to do so. The RRB could view C costs as an internal CERN issue unless and until there are problems.
- R. Wade: that is acceptable.

• ***Update on 2002 M&O Expenses and Estimates for 2003 M&O Expenses***

*Resource Co-ordinator, J. De Groot*

*Paper CERN-RRB-2002-041*

*Presentation CERN-RRB-2002-068*

Since October, the total M&O Category A costs for 2002 have been reduced from 493 kCHF to 446 kCHF, the differences mainly being in general services and power. As agreed at the last RRB, 30% of the October estimates were invoiced to the FAs in February according an 'author list' of 547 members; about half of these payments have been received. As stated earlier ALICE has no M&O Category B costs in 2002 and 2003.

The RRB **agreed to the 2002 total M&O Category A costs as presented** and that the **remaining '70%' invoices could be issued** after adjustment for the reduced costs and for CERN's part-payment of power costs, as defined in the MoU.

For 2003, preliminary estimates for Category A costs amount to 1,019 kCHF. The RRB **took note** of these **2003 preliminary M&O Category A cost estimates** and instructed the **Scrutiny Group to further inspect them** ready for presentation for approval at the October RRB.

*Discussion*

- S. Bhave (IN): is the author list updated annually?  
RJC: yes, each October the updated list will be presented with the budget for the following year.
- A. Naudi: as from the next RRB, we will present the position of the M&O accounts as well as the Common Funds.
- G. Wormser: can power costs be presented separately, as some fraction of them will be paid by CERN?  
RJC: yes; it is our intention to present invoicing information in as transparent a way as possible.

Cashmore reminded the RRB that, according to the MoU, Scrutiny Group members serve for 2 years, half of them being replaced each year, and its composition agreed each April. He proposed that the present launch group be retained for the remainder of the 2002 exercise and that RRB delegates provide him with **names of candidates for the 2003 Scrutiny Group before the October meetings**. After further discussions, 50% of the present group can then be renewed next April. This was accepted.

- **Memorandum of Understanding** *J. De Groot*  
*Paper CERN-RRB-2002-034* *Presentation CERN-RRB-2002-73*

De Groot recalled that the main text of the MoU, defining rules and procedures for handling M&O expenses, is the same for the four LHC experiments. Since the last RRB there has been a change in the treatment of energy costs and the experiments have completed the collaboration-specific Annexes. In the case of the ALICE MoU: the current composition of collaboration (Institutes and Funding Agencies;) is given in Annexes 1 and 2, the up-to-date management structure and roles, recently approved by Collaboration Board, are in Annex 5, the breakdown of the detector and responsibilities, essentially unchanged since construction MoU, are in Annexes 4, 6, 7 and 8, and the list of authors (PhD scientists or equivalent) fixed on Jan 1, 2002 and to be reviewed each September, is in Annex 13. The 2002 list that is being used for Category A cost sharing this year comprises 486 physicists and 61 engineers. The level and sharing of Category B costs (zero until 2004) will be determined by the sub-detector collaborations and reported to the RRB. In Annex 8 there is a version of the deliverables money matrix presented in terms of the %age responsibility of each FA in the various sub-systems.

*Discussion*

- S. Bhawe: has the rebate, as discussed last time, been reduced?  
 RJC: the concept of a 'rebate' led to a lot of confusion and so has been replaced by the more direct target of repayment of the energy costs, fully for Member States, partially for non-Member States that have contributed to building the LHC machine; the level will be very similar to that in the original proposal which was intended to cover the energy costs of the Member States.  
 G. Wormser: can Annex 13 contain the number of authors per FA and not just the list?  
 JDG: yes, we will do that.

The RRB then **agreed that the ALICE MoU for M&O could be circulated for signature** after any final **updates and error corrections** in the ALICE-specific Annexes; these should be sent to J. De Groot by **May 10th 2002**.. Cashmore thanked the Board for taking this extremely important step which is of great value to the collaboration.

**6. Budget issues** *Resource Co-ordinator J. De Groot*

- **Report on 2001 CORE Expenses & Update on 2002 CORE Expenses**  
*Paper CERN-RRB-2002-039* *Presentation CERN-RRB-2002-066*

Details of these budgets by FA and by sub-system can be found in the documents presented.

| <i>2001 CORE budget in kCHF</i> | <i>Approved Oct. 2000</i> | <i>Book closing April 2002</i> |
|---------------------------------|---------------------------|--------------------------------|
| commitments                     | 18,605                    | 15,464                         |
| payments                        | 14,152                    | 6,554                          |

By the end of 2001 ~ 10% of the CORE cost of ALICE had been spent. The payments profile for 1997-2001 in kCHF has been:

| <i>1997</i> | <i>1998</i> | <i>1999</i> | <i>2000</i> | <i>2001</i> | $\Sigma$ |
|-------------|-------------|-------------|-------------|-------------|----------|
| 427         | 360         | 2,017       | 2,579       | 6,554       | 11,937   |

As a reminder for 2002, with no changes to report as yet:

| <i>2002 CORE budget in kCHF</i> | <i>Approved Oct. 2001</i> |
|---------------------------------|---------------------------|
| commitments                     | 20,381                    |
| payments                        | 19,193                    |

*Discussion*

J. Królikowski the expected commitment and payment for the PHOS in 2001 were each 500 kCHF (150 kCHF each (PL): from Poland), but the actual commitment and payment were 161 kCHF (and Polish payments were not made). When will the money be spent? Apparently not in 2002.  
 JDG: at some time in the future but I cannot say now; it depends on the schedule of the PHOS community.  
 J. Schukraft: PHOS production is going slower than expected as reported last time.

• **Estimates for 2003 CORE Expenses**

*Paper CERN-RRB-2002-040*

*Presentation CERN-RRB-2002-067*

De Groot noted that by 2003 all detector sub-systems will be in full production. Preliminary estimates of payments/commitments for 2003 are 18,826 kCHF. The numbers constitute an 'early warning' and will be refined before presentation for approval in October. Some 2003 payments will be for commitments already made.

• **Costs to Completion**

*Paper CERN-RRB-2002-042*

*J. Schukraft*

*Presentation CERN-RRB-2002-069*

The evolution of the ALICE Cost-to-Completion CtC since the last RRB has been:

| <i>In MCHF</i>                                     |   | <i>October 2001</i>          | <i>Totals in April 2002</i> |
|--|---|------------------------------|-----------------------------|
| Sub-detectors                                      | <i>MoU under-funding of Si-strips</i>     | <i>0.7</i>                   |                             |
|  | <i>Additional costs for sub-detectors</i> | <i>1.1 – 1.4</i>             |                             |
|  | <i>Additional costs for muon absorber</i> | <i>1.5 – 1.8</i>             |                             |
| $\Sigma$ sub-detectors                             |   | <i>3.3 – 3.9</i>             | <i>3.7</i>                  |
| Common costs for services,<br>installation and C&I |   | <i>~ 3 (possibly 5)</i>      | <i>3.2</i>                  |
| <b>GRAND <math>\Sigma</math></b>                   |   | <b><i>6.3 - 6.9 MCHF</i></b> | <b><i>6.9 MCHF</i></b>      |

The October totals assumed that there would be no further surprises in 'grey area' of the machine/detector interface and that 2 MCHF of savings would be achieved for the common costs, mainly by using fewer Industrial Services and more institute manpower. Since then the numbers have been revised and cost saving have been sought everywhere. CERN will pay 20% of the revised CtC.

Changes to the common costs in MCHF have been:

- 1.1 for manpower, smaller control room, etc.)
- 0.9 by attributing racks to individual detectors as in the other experiments
- + 0.2 for FMD/T0, previously a Greek responsibility

changes to the costs the sub-detectors in MCHF have been:

- 1.1 for pixel, muon absorber
- + 0.9 by attributing racks to individual detectors

and the components of the 3.7 MCHF sub-detector CtC are now:

|                                   |     |
|-----------------------------------|-----|
| MoU underfunding                  | 0.8 |
| muon absorber (missing funds)     | 1.1 |
| racks (upgrades and extra needs)  | 0.9 |
| cost increase and forgotten items | 0.9 |

Full details of how these totals have been reached can be found in the presented documents. Schukraft emphasised that the ALICE CtC includes C&I and that there is no additional C&I funding request. ALICE has prepared a proposal for sharing the CtC:

| <i>Item</i>  | <i>Comment</i>               | <i>Proposed sharing</i>  |
|--|------------------------------|--|
| <i>Sub-detector</i>  |                              |  |
| (i) MoU underfunding 0.8 MCHF (inner tracking pixels and strips) | not responsibility of any FA | cover from CERN share of CtC (20% of total)  |
| (ii) Missing funds, etc. 2.9 MCHF                                |                              | distributed according to MoU responsibility in detector projects   |
| Common items 3.2 MCHF  | includes C&I                 | ~ 10% (300 kCHF) by extending yearly fee (5kCHF/Institute) to 2006; the rest according to MoU contribution, except for CERN's extra CF contribution of 550 kCHF and using a level of 6.5 MCHF for Russia rather than the nominal value of 13 MCHF. |

ALICE believes that this CtC of 6.9 MCHF, ~6% of the cost of the MoU detector, is accurate and complete. ALICE will continue to strive to contain costs, as has been done in the past, e.g. for the PHOS and the TRD where reduced performance has been adopted in the face of potential cost increases. ALICE has managed to save ~ 2 MCHF of the original CtC estimate by taking a very aggressive approach which has left some members of the collaboration somewhat uneasy. However, any further 'foreseeable' variations should be a small fraction of the current CtC and ALICE should be able to absorb it within available resources. ALICE is starting consultations with the Funding Agencies on how to address the CtC. Some FAs have already indicated their willingness to help within the limits of their possibilities. ALICE will pursue these contacts and discussions and will report to the RRB in October 2002.

### *Discussion*

- J. Engelen: for clarification; is your approach to detector-specific CtC the same as ATLAS and CMS; as long as deliverables arrive the collaboration need not be concerned with cost increases as such.
- JS and RJC: one could argue that a very small fraction of the 2.9 MCHF is covered by deliverable responsibilities but it would be very small.
- J. Królikowski: ATLAS & CMS CtC are ~ 17% of the total, ALICE CtC is ~6%.
- JS and RJC: ALICE started with a magnet and a pit and is smaller than the other 2 experiments; the underestimation of installation complexity has been similar in all 3 experiments but ALICE, coming later, has been able to learn from the other 2 and so has smaller errors; constraints to stay on budget have been tighter for ALICE (and LHCb) and we are seeing the results of that; when present CtC issues have been dealt with, ALICE will have to design to budget.
- G. Wormser: have the C&I costs been scrutinised? There should be a common view for all C&I estimates.
- RJC: the C&I costs have not been scrutinised but they should be and will be.
- F. Cervelli (IT): would the new e.m.calorimeter add an overcost?
- JS: the cost estimates for the TRD and TOF are very recent; we have learned how to make them and are now very careful.
- RJC: any new additions to ALICE must be completely funded.
- L. Gidefeldt (SE): what about staging and/or deferrals?
- JS: that will be part of the process of resolving the funding shortfall during the next 6 months.
- G. Wormser: new collaborators could bring ~ 2 MCHF and they should fit into gaps.
- RJC: that is a good point, also raised earlier by Spiro; it should be a requirement that new collaborators help fill the gaps.
- JS: it also depends on the time-scales on which new members might join.
- M. Spiro: the proposed sharing algorithm is not the same as in ATLAS.
- JS: I think that ATLAS also has a detector-specific part and a common, C&I part; we will obviously discuss the sharing guidelines with the FAs; some items are simple and clear, e.g. the electronic racks needed by each detector.

Cashmore pointed out that ALICE is about 6 months behind ATLAS and CMS and should now catch up. For the October RRB, ALICE should make a plan to completion after discussions with the FAs as to what firm and less firm money can be found. This plan should show how the collaboration will cope if the 6.9 MCHF are not forthcoming. It should include a funding profile which shows up any cash flow problems so that CERN can work out how to help. As stated earlier, CERN intends to cover 20% of the CtC. The FAs present were not asked to indicate their likely contributions as the necessary discussions had not taken place in most cases.

**8. & 9. Summary, future activities, date of next meeting & A.O.B.**

*R. Cashmore*

Cashmore closed by noting that ALICE is well into building. They are facing and solving many problems and have had a very positive review from the LHCC. The RRB has taken a very important step in agreeing to the circulation of the M&O MoU and accepting to cover the 2002 M&O expenses. ALICE's approach to CtC is healthy and the RRB can feel that the money is being well spent. At the October meeting we should know what amount of extra funds are likely to be found and have a view of how ALICE will finish their detector with the funds actually available. The FAs should send **written indications of amounts and profiles for additional funds to ALICE by end June** so that this plan can be presented to the RRB in October.

Cashmore raised the topic of the LHC ion program. In August, CERN Director for Accelerators C. Wyss will organise a Technical Review of the LHC heavy ion injectors. This should lead to a schedule for the evolution of heavy ion physics at the LHC and so will be very important for ALICE and the heavy ion community. As part of the preparation, Cashmore will conduct a review of the physics needs within the next few months (ion types, energies, etc.), following up on the series of workshops that have been held during the past year.

Next meetings: October 21st - 23rd, with ALICE on the afternoon of Wednesday 23rd.