

CERN-Korea Committee

Minutes of the 1st Meeting held at CERN on Monday, 23 April 2007

PRESENT: CERN T. Camporesi (co-chairman), J-P. Delahaye, D. Jacobs
 Korea N-J. Cho/MoST (co-chairman) (for C-I. Eom), Y-I. Choi/CMS,
 D-W. Kim/ALICE

Observers
 Invited F. Antinori/ALICE, S. Kim/KISTI (for S. Hwang),
 J. Schukraft/ALICE, T. Virdee/CMS

Apologies: C-I. Eom/Kicos, S. Hwang/KISTI

1. Introduction

T. Camporesi welcomes those present, recalling that the CERN-Korea Protocol, presently being drafted, calls for the creation of a CERN-Korea Committee (CKC) to coordinate and review the scientific and technical activities being carried out in the context of the Protocol and to oversee the spending of funds made available by the Korean Government and its agencies under the Protocol. Emphasis will be put on collaborations in particle physics theory, the LHC experiments (especially ALICE and CMS), IT in the context of the LHC programme (particularly LCG) and the participation of Korean students and young researchers in CERN's training programmes and schools.

J-P. Delahaye gets confirmation from T. Camporesi that it is also intended to include collaboration on CERN's accelerators. D. Jacobs points out that, as presently drafted, the Protocol is very unbalanced (towards experiments) in this respect. T. Camporesi proposes scheduling a presentation on accelerator work at the next meeting of the Committee.

Continuing, T. Camporesi points out that the CKC should also appoint a CERN-Korea Team Co-ordinator to ensure liaison amongst the various parties and to be in charge of operational matters such as preparation of CKC meetings, assessment of scientific and technical proposals and budget matters.

For the present meeting, he proposes setting a number of goals:

- Definition of the policy on resource allocation.
- Production of a roadmap towards signature of the Protocol, which could be signed at (e.g.) the autumn RRB session at CERN or at the Lepton-Photon Conference in Korea in August.
- Discussion of proposals for the role of Co-ordinator.
- Identification of areas of common interest.
- Identification of agenda items for the next meeting.

It is so agreed.

2. Recent activities and Korean plans for this year in CMS

Y-I. Choi introduces himself as the Korea-CMS representative, a position to which he was appointed two months ago, having worked on CMS since 2000. At present Korea-CMS is selecting detailed projects in which to participate. There are 13 member institutes, and a

further three are interested in joining and have applied for funding in 2007. The presently active effort comprises 16 professors, 20 researchers and 21 full-time graduate students from six of the member institutes and the three that are not yet members. The present 2007 funding amounts to ~1 MCHF for uses such as subsistence, travel and computing for long-term visitors.

He outlines the research plan for 2007 and notes that for now the number of member institutes has actually decreased to 12, since one professor has retired.

Discussions are under way about the establishment of a CMS Tier-2 computing centre in Korea. MoST is not able to provide funds for hardware - only for operations manpower. The three locations considered as possible sites (Kyungpook, Seoul and KISTI) must therefore decide what they can do themselves. This matter will be settled by the time of the next RRB meeting in October. It is felt to be difficult to set up a federated Tier-2 in the country (rather than a single site) due to difficulties with network routing.

Commenting on the last point, J. Schukraft notes that ALICE has a Tier-2 at KISTI. He underlines the advantage for operational aspects of locating such a centre at a large, established institute. T. Camporesi agrees that there could be advantages of synergy in co-siting the two centres.

T. Virdee confirms to J. Schukraft that the research plan shown is being discussed in the CMS working group on physics proposals. T. Camporesi adds that 16-18 proposals were received for evaluation. He had described the evaluation criteria in a cover note and had asked T. Virdee to review the ranking. Feedback was sent to the office of Prof. Eom.

3. Recent activities and Korean plans for this year in ALICE

D-W. Kim, the Korea-ALICE representative, first recalls that two Korean institutes are members of ALICE - the Universities of Kangnung and Sejong.

R&D for multi-gap RPC's has been carried out since 1998, very good results being obtained that year from the first prototypes. At the same time, the size of the team grew and a larger chamber was built, which also gave satisfactory results in tests. As a result, the multi-gap RPC was considered to be a suitable technology for large-area modules. By reducing the gap width (to 0.22 mm) it was possible to obtain 90 ps time resolution - fully satisfying the requirements for the ALICE Time-Of-Flight (TOF) application. In spring 2000 INFN Bologna joined ALICE and took responsibility for the TOF, in collaboration with both Korea and ITEP Moscow. Valuable financial support for Korean participation was received from the World Lab. The collaboration thus started, still with no Korean funding. Travel funds were, however, granted by MoST and subsistence by INFN, allowing Korea to continue to contribute to the R&D effort. The World Lab. continued to support Fellows. The resultant effort has led to some publications in common and also served to train young researchers. In 2003 an agreement was reached between Italy and Korea on support for R&D and Korean students, as well as one World Lab. Fellow.

In 2004 Korea joined the ALICE offline computing team, thanks to the efforts of Y. Schutz and F. Gagliardi. This aspect of Korean participation in ALICE was subsequently grouped under the CKSC label (Chonnam, Kangnung and Sejong Universities). A Korean software engineer has been at CERN participating in a number of activities and Sejong has participated with capacity in the ALICE Data Challenges.

It was not until 2006, however, that formal support was obtained from the Korean government for participation in ALICE and the Construction MoU was signed by means of an Addendum (No. 8). Out of the ~1 MEUR granted in 2007 by MoST under the 2006 CERN-Korea Cooperation Agreement, about 200 kEUR are for ALICE.

D-W. Kim lists the Korea-ALICE collaborators from Kangnung and Sejong Universities and the activities planned for 2007.

The total ALICE construction funding foreseen by MoST is 300 kCHF, of which it is hoped to receive 250 kCHF in 2007. This will be insufficient to cover the foreseen expenditure of 125 kCHF at CERN and 175 kCHF in Korea (of the latter, 55 kCHF can be found from other sources). The 2008 deficit is expected to exceed 50 kCHF. Kangnung and Sejong are each making one-time Common Fund contributions (one this year and one next).

J. Schukraft notes that it must be decided how to present the budgets.

4. Status and plan for the future in CMS

T. Virdee, the CMS spokesperson, welcomes the initiative of setting up the CKC. It is very good that, after the large effort on construction, the experiments are now moving into the exploitation phase, with all of its academic interest. Korean interest in CMS started as long ago as 1992-3. The Construction MoU was defined in 1998, with Korea taking responsibility for the end-cap RPC's at the level of 7 MCHF. This amount was subsequently reduced, however, first to 2.6 MCHF and then even more.

CMS is presently being commissioned both on the surface and in the cavern. RPC's are located both in the end-caps (where Korea is involved) and in the Barrel (Bulgaria and Italy). The installation of the off-detector electronics is under way. It is very good that Korean scientists are involved in this commissioning phase. Showing the overall schedule of the commissioning activities, T. Virdee draws attention to the global readout test foreseen for end-May. Preparations are actively under way for work on the first physics. In the first year of LHC physics running (2008) it is expected to reach an integrated luminosity of 1 fb^{-1} , as much as CDF will have collected in its entire lifetime to end-2007. Having chosen the topics for the papers that are expected to be published in 2008, detailed consideration is being given to what will be necessary for each of them and the tools are being prepared for the various analysis topics. A start is also being made with writing a few papers in 2007 to exercise the authoring procedure, pursuing it all of the way to publication. The overall CMS schedule covers not only hardware completion and commissioning but also software, computing and physics analysis. In the second category, Korea has shown interest in work on the High-Level Trigger. Analysis is considered to be a task for the Tier-2 centres. With CSA07 it is planned to exercise the full chain all of the way through to analysis and it is hoped that the Korean centre can join-in.

Korean participation in CMS so far totals 815 kCHF for Common Projects and 500 kCHF for the manufacture of the gaps of the Forward RPC's (RE). A further 500 kCHF is still being discussed for DAC hardware (PC's and monitors). Historically, it was planned in the original Construction MoU that Korea would build a full RE system but this project was later descope due to lack of funding, and finally China and Pakistan also joined in the construction of the descope RE system. Nevertheless, Korea has successfully manufactured all of the RE gaps, a vital contribution, and is also starting to contribute to the DAQ system. It will be necessary to restore the RE system to full scope before the LHC reaches its design luminosity in 2010-11 so that the muon trigger continues to work well.

T. Virdee welcomes the creation of the CERN-Korea fund with the stated uses. He points out that, in CMS, as in other HEP experiments, the basic attitude taken by institutes and countries is that the builders of particular detector elements also commission, maintain and operate them. This approach applies also to the RPC's. The physics exploitation is also usually closely linked to the use of the hardware built. It is thus natural that the Korean groups take on these tasks for the RE and DAQ systems, following through with work on the HLT and physics using muons. CMS will do its best to help them in this direction.

The restoration of the RE system has been presented in detail to the last RRB meeting and all agencies were asked to contribute. Korea is not being asked for more money, just for the manufacture of the gaps, the RE1, 2 and 3/1 chambers and the associated trigger

electronics. It has also expressed an interest in assembly work. The financial aspects are still being discussed. A conclusion can hopefully be reached at the next RRB meeting.

T. Virdee concludes that CMS is progressing well towards completion of the low-luminosity detector. The coming period of LHC operation will be pivotal for HEP and perhaps for Science in general. The experiments, including CMS, are likely to answer some of the most fundamental questions about Nature. Korea is a full partner in CMS. CMS welcomes the establishment of the Korea Fund along with the CKC and recommends that Korean contribution to CMS be formalised in an Annex to the Protocol. This would include the use of the Korea Fund and, upon agreement, the Korean contribution to completion of the Design Luminosity Detector.

J. Schukraft confirms that such an Annex would also be appropriate for ALICE. T. Virdee agrees that such Annexes provide stability in a way that the experiment MoU's do not.

N-J. Cho comments that MoST has no funds available now for additional RPC construction. A position can only be taken after discussion in Korea with all parties concerned. Such an increase in scope is not presently under consideration but MoST is open to proposals.

T. Virdee raises two more issues:

- The proposals sent from Korea mention a large number of PhD-level scientists. The Korean side must bear in mind that the amount of the M&O Category A contributions is normally linked to PhD count.
- He believes that MoST will take on responsibility for payments from 2005-6 onwards but further discussions are needed with the universities regarding the ~240 kCHF owed from before that time.

Y-I. Choi confirms that the correct PhD count for 2007 is 12.

5. Status and plan for the future in ALICE

J. Schukraft, the ALICE spokesperson, emphasises that ALICE has very different physics goals from those of CMS. It will use heavy ions (HI) to study the state of the early universe. The ion collision energy is distributed over their volume and so heats the matter to $\sim 10^{12}$ K, the kind of temperature at which a Quark-Gluon Plasma (QGP) is expected to form. ALICE is the one detector at LHC specially built to probe what happens in such heavy ion collisions, although ATLAS and CMS will also take data with heavy ions.

The ALICE Collaboration comprises ~1000 members at ~100 institutes in ~30 countries, Korea being amongst them. All of the individual baseline detectors have been essentially completed and are being installed. Two further detectors, for which funding only became available more recently, will be installed later: the TRD by 2009 and the PHOS by 2010. An additional detector, an electromagnetic calorimeter (EMCAL), is currently under consideration for funding by US, France and Italy, and could be ready by 2010/11. ALICE expects to run for about 10 years overall.

Korea has several active, internationally recognised groups in HI physics. One group participated in the now completed NA49 experiment at CERN, seven more at RHIC in STAR and Phenix, and now two in ALICE. There is also a significant theory community at several institutes. In the short term it is hoped to gradually increase the Korean participation in ALICE, with 1-2 more groups focused on analysis and Grid computing know-how. The financial implications would be a one-time contribution to the Common Fund of about 50 kCHF and increased M&O Cat. A payments (~13 kCHF/year per PhD). J. Schukraft would like to know if such a gradual increase is in line with MoST plans for support and, if so, how it can be implemented and on which time scale. N-J. Cho responds that any new institutes wishing to join ALICE should firstly contact the Korean CKC members and only then open discussions in CERN. J. Schukraft agrees to this procedure.

6. LHC computing at KISTI

S. Kim apologises for the absence of S. Hwang. Although there was no formal Korea-CERN collaboration before 2006, there were earlier interactions with ALICE and the EGEE project leading to a decision to apply for a research grant, a move that subsequently led to the formation of the CKSC (Chonnam-Kangnung-Sejong) Collaboration. The interests of Kangnung and Sejong were in HEP, whereas that of Chonnam was in bioinformatics. The activities included participation in the EGEE NA4 activity (Application Identification and Support), with one computer engineer stationed at CERN and a grid test-bed contribution to ALICE. This absorbed the available funding and so a real question was posed by the proposal in 2006 to site an ALICE Tier-2 centre in Korea. It was recognised that a big effort in operation would be needed in addition to the hardware contribution. This was felt to be beyond the capabilities of Sejong University and so KISTI was asked to host the centre. Although KISTI is a natural location for such a centre, the institute has no HEP physicists. It was thus natural that they should join EGEE-II, as they did, since their interests lie in grid operations etc. rather than physics.

KISTI has good international connectivity to Europe via GLORIAD but in practice the best route is via the US. There is a 1 Gbps link to Sejong. Despite the fast main links, however, the actual end-to-end network performance achieved has been disappointing and many aspects must be improved before KISTI can function as a proper Tier-2. Nevertheless, the centre has been running as an EGEE-certified production site since January.

Concerning the collaboration with ALICE (and so with WLCG), KISTI was approved as an ALICE-LCG site in February and it is aimed to sign the WLCG MoU in October with capacity pledges rising to 150 kSI2K of cpu and 50 Tbytes of disk by 2009. Funding sufficient operations personnel to run a Tier-2 service remains a concern.

The situation regarding possible computing for CMS is not clear due to a lack of operations personnel.

Concluding, S. Kim points out that there will be just one more year of EGEE funding and it is urgent to consider how the activity can be continued. N-J. Cho gives assurance that MoST will provide operations funding after the WLCG MoU is signed. It has promised to sign the MoU, pledging an ALICE Tier-2 centre, and foresees support for four people.

T. Camporesi recalls that Kyungpook University has aspirations to host a CMS Tier-2 but he fears they would need to build up much infrastructure to make this possible. T. Virdee adds that the capacity numbers for a CMS Tier-2 are four times larger than those shown for ALICE at KISTI. He agrees, however, that the major cost will be for operations staff.

S. Kim emphasises that KISTI is starting with relatively small capacity to "test the water". If the centre is shown to work then capacity can be increased. They will be associated with the Lyon Tier-1 centre.

T. Virdee points out that a reasonable amount of cpu capacity is needed do simulations and disk capacity is also necessary to do analysis. He advocates considering the balance capacity/people in order to get the maximum useful output.

7. Discussion on the draft Protocol to the 2006 CERN-Korea Co-Operation Agreement and planning of the next meeting

T. Camporesi observes that there are few clearly defined issues to discuss in a closed session. The invited persons are thus encouraged to remain for this item. One aspect linked to the Protocol is obviously to plan the agenda of the next meeting.

He inquires about the MoST budget calendar. N-J. Cho replies that MoST needs to receive in April the proposals for the following year. Although the 2008 budget has not yet been submitted, its content is already decided and so new proposals cannot be made at this

stage. The budget will now pass through a 2-month review process before being submitted to Congress, for finalisation by the end of the year.

T. Camporesi notes that there are two budget issues: 1) the ongoing operational budget for collaboration, taking into account the numbers of physicists involved; 2) requests for further investments, such as the completion request from CMS. It is necessary to discuss to what extent Korea will contribute to these in-kind or in-cash. He also sees an interest in new collaborations, which would also have an impact on the situation in 2008. There is a definite interest for the CMS community in having an established computing facility in Korea and he hopes that the CKC can help to move this forward. N-J. Cho responds that the available budget is limited and it is hard to decide on the profile of the problem.

T. Camporesi suggests that it should be decided before the next CKC meeting which aspects of the points raised it is wished to discuss. N-J. Cho feels that the situation for ALICE is clear but there is a need for discussion concerning CMS.

T. Camporesi proposes that a representative of Pohang University should be invited to the next meeting to discuss accelerator matters. N-J. Cho responds that he has no knowledge of contacts with MoST regarding collaboration on accelerator matters. J-P. Delahaye explains that, while there have been contacts with Pohang University for many years, this has not yet resulted in any collaborative work. It must be seen if there are any subjects of common benefit. T. Camporesi repeats his suggestion of a presentation on accelerator matters at the next meeting, adding that it would also be possible to meet representatives of Pohang over the summer. Y-I. Choi re-emphasises the point made by N-J. Cho that funds are in short supply, making it very hard to add any new projects. Groups in Korea wishing to undertake new projects must contact MoST, which will consider their plans. He considers that a presentation on accelerator matters at the next meeting would be premature. Meanwhile CERN should encourage the Pohang group to contact MoST. N-J. Cho recognises, however, that there could be benefits on both sides and so stresses that MoST is willing to consider the request. T. Camporesi concludes that he will leave it to C-I. Eom and N-J. Cho to propose such a point for the next meeting, if desired.

S. Kim observes that the Protocol also has provision for collaboration on particle physics theory and asks about the attitude to this (thinking particularly of the computing aspects and noting that theorist colleagues in Korea are interested). J. Schukraft suggests that there should be a short presentation on theory activity. T. Camporesi asks Y-I. Choi and D-W. Kim to propose a speaker, adding that he will try to ensure that J. Ellis can be present. N-J. Cho vetoes this proposal, however, insisting that any interested Korean theory group must first contact MoST, as any collaboration would clearly need funding.

T. Virdee raises the question of M&O contributions. For CMS, Category A payment on the basis of 12 PhD's (at ~11kCHF/person) amounts to 122.9 kCHF/year and is part of the 2008 budget being discussed. The Category B contribution is 32 kCHF. N-J. Cho assures him that an effort will be made to secure this budget for 2008 and 2009. More details can be given at the next meeting. He underlines that the M&O Category A contributions are in fact separate from the 2008 operational budget currently being discussed.

T. Camporesi raises the issue of the appointment of the CERN-Korea Team Co-ordinator called for in Article 6.2 of the draft Protocol. He feels that the Co-ordinator should be an interested Korean, who is able to help prepare Committee meetings and also follow-up on activities between them. **It is agreed that the Co-ordinator will be Cheon-II Eom, Director of Kicos.**

N-J. Cho proposes that the Protocol could be signed by the Korean Embassy in Geneva.

J-P. Delahaye suggests that the Protocol should include at least a paragraph on accelerators but Y-I. Choi is reluctant to agree. T. Camporesi nevertheless proposes perhaps a small

mention and adds that a statement is missing to the effect that the CKC oversees all collaboration between CERN and Korea. N-J. Cho is ready to consider such changes.

Closed Session

7. Summary and future actions

T. Camporesi notes that it was clear from the presentations that the estimates of PhD-equivalent numbers (12 for CMS, 6 for ALICE) used to calculate M&O Cat. A contributions should probably be revised at intervals. It is already clear that the numbers of proposed Korean participants exceed these values. For example, if all of the proposed physics topics in CMS were to be taken up, the number would rise to 16-20. The present number of 12 was simply arrived at on the basis of a realistic estimate of the possible M&O contribution. He feels that the CKC should decide in its meetings the actual numbers or at least recommend numbers for decision by MoST. The question therefore arises of how to assess the real numbers. He proposes an evaluation mechanism, consisting of asking the experiment coordinators to assess the work and report to the Committee. He stresses that this would only apply to future years, the 2007 figures having already been agreed. In detail, each experiment has appointed co-ordinators for the different areas of work. These co-ordinators would be asked to evaluate the human contribution of the members of the Korean teams, translate them into FTE's and put the resultant numbers, via the Committee, to MoST for consideration. The outcome would clearly influence both the M&O Cat. A contributions and the Korean operations funding. **It is so agreed.**

Summarising the meeting, T. Camporesi draws attention to the main points agreed:

- Any Korean teams wishing to join collaborative work with CERN or increase their existing collaboration should firstly seek the approval of MoST, with a view to the matter being discussed in the CKC.
- MoST is open to proposals for participation in the re-scoping of the CMS RE system.
- MoST is willing to consider requests for cooperation in accelerator matters and in particle physics theory.
- The CERN-Korea Team Co-ordinator is named to be Cheon-Il Eom, Director of Kicos.
- The CERN side will propose modifications to the draft Protocol to mention possible collaboration on accelerator matters and also to make clear that the CERN-Korea Committee oversees all CERN-Korea collaboration.
- The mechanism for assessing the FTE numbers of PhD-level Korean participation in the LHC experiments is agreed, namely evaluation by the experiment coordinators for submission, via the Committee, to MoST for its consideration.

The date of the next regular meeting of the CKC will be agreed in due course.

8. Any Other Business

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There being no other business, T. Camporesi thanks those present and closes the meeting.

David A. Jacobs

Action list

	Raised	Item	Who	For	Status
1.		Next item			