PM report for the August 2008

With this issue of the Technical Design Phase Monthly Report, you will find summary notes for the Group's monthly meetings (Main Linac Technology – SuperConducting RF, Conventional Facilities and Siting, and Accelerator Systems), and a report from the Cost and Schedule Group (Peter Garbincius). These meeting notes show progress made and plans for upcoming meetings and work.

This monthly report complements the weekly ILC Newsline. Please see the 'Director's Corner' for important planning and policy communication.

The Project Managers' attention is now focused on how to organize the R&D activities during the Technical Design Phase 1, taking into account the available resources. HLRF distribution "RF Clustering" proposal, Plug Compatibility, Single/Shallow tunnel and Minimum Machine are the main issues, and these will be discussed also in the coming Chicago GDE meeting.

Akira Yamamoto, for Project Managers; Nick Walker and Marc Ross
August 2008

Draft: Minutes of ML-SCRF Technology Meeting (080903)

Date & Time:
13:00-14:21 GMT, September 3, 2008, using WebEx.

Participants:
H. Hayano, N. Ohuchi, T. Peterson, S. Fukuda, C. Adolphsen, A. Yamamoto, M. Ross, W. Bialowons, J. Carwardine, J. Kerby, E. Paterson, N. Toge, H. Padamsee, C. Pagani, P. Pierini, S. Barbanotti, Bob Kephart, S. Prat, Bob Rimmer, S. Mishra, S. Michizono, B. Chase, T. Matsumoto, T. Shidara

Presentation files are available at the following Indico site;
http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=2983

1) General announcement (A. Yamamoto)

- EC meeting at KEK (September 4 – 6)

The following items will be discussed; S0 R&D status, a new RF distribution system, CESR-TR, Plug-compatibility, Project Implementation Plan, Minimum Machine Design and preparation for PAC/AAP reviews and LCWS-08 (Chicago).

- JLab visit (September 11, 12)

Director (Barry Barish) and PMs (Marc Ross, Akira Yamamoto, Jim Kerby) will visit JLab to discuss its activities for ILC together with Mark Champion and Mike Harrison.

- LINAC-08, Asian Workshop (September 29 -)
- PAC (October 19 and 20)

2) TAG leaders' status report

- Cavity integration (H. Hayano)

- The 3rd cool-down test for the STF cryomodule (4 TESLA-style cavities) is scheduled from September 8 till November 28. High Power Test of 4 cavities (20, 20, 29, 20 MV/m) will be performed by connecting them to a tree-distribution and linear-distribution WG systems.
- Discussions on STF phase-2 has started. The application procedure to meet High Pressure Vessel Code has been already consulted. Schedule and design details are under discussion; a new project "Compton X-ray experiment" might divide the STF phase-2 schedule and it is necessary to pay attention to the plug-compatibility, design for cavity package (especially tuner) and available resources.
- Deeply EP-ed (100μm removal) TESLA-shape cavities (#5, #6) were inspected using the Kyoto-camera. The EBW seam part of cavity- #6 was also inspected beforehand.

- Cryomodule (N. Ohuchi)

The S1-Global cryomodule design is under way and 90% of the general design (3D-Modeling) has been completed. The details are discussed between INFN, FNAL and KEK. Module C locates closer to 2K-cold box and FNAL cavities are in the upper stream of this Module. The input-coupler directions for KEK and FNAL/DESY cavities are opposite with respect to beam axis. In the vacuum vessel, input couplers are assembled in the same direction to the KEK-BL cavities. The installation of the S1-Global cryomodule into the tunnel is presently scheduled in the Spring of 2010.

3) A new proposal for RF power distribution

- Clustered Surface RF Production Scheme (C. Adolphsen)

A new RF-power distribution scheme was proposed. It comprises clusters of 70 10-MW klystrons (housed with modulators in a single building on the surface), two ~0.5 m diameter evacuated circular waveguides feeding 350 MW into the accelerator tunnel (one upstream, the other downstream and totally to combined 64 RF units, or ~2.5 km of linac), and periodic tap-offs which feed 10 MW to a local PDS for a RF unit (3 cryomodule, 26 cavity). An appreciable amount of cost reduction will be expected since the service tunnel is eliminated and underground heat load will be greatly reduced. To test the feasibility of this scheme, in terms of power handling, we could build a resonant waveguide and build up the stored energy until it represents traveling waves on the order of 300 MW.

- KEK's Discussion about RF Cluster (S. Fukuda)

Pros and Cons for a new RF-power distribution scheme were discussed in KEK. Although the final conclusion has not yet been obtained, possible contributions from KEK were tabulated.

4) Comments from LLRF (S. Michizono, B. Chase and S. Simrock)

- Field regulation

Field regulation will be worse but may be still OK. Higher stability of subsystems will be required. Robust performance against perturbations or parameter changes will be significantly reduced. Field/current limits at operation will be lower and feed forward might be difficult due to the time delay between RF and beam (especially upstream RF distribution). Fast klystron loops should be used to reduce HLRF errors.

- Availability

Exception detection and handling may be limited and hot spare concept cannot be implemented

- Operational

We can not simply turn on-off individual RF station for commissioning, operational or diagnostic purposes. Setting up of linac cannot be done by incremental adding or controlling RF stations. Operation margin (for cavity quench, field emission and klystron saturation) will be reduced.

5) Plug-compatible definition (A. Yamamoto)

The plug-compatibility document intends to provide basic guide-line for SCRF cavity package and cryomodule designs aiming for an effective and efficient R&D in the Technical Design Phase (TDP). The document will be discussed at the EC meeting and will be presented at the PAC and AAP reviews. Quick comments and revisions from SCRF experts are highly requested.

- Basic Guide-line

- Cavity package to be plug-compatible and replaceable with any other cavity packages
- Flexible R&D and improvement can be made within the envelope
- Cavity package envelope will include (Cavity, beam-pipe, LHe vessel, Tuner, Input coupler).
- Cryomodule unit to be plug-compatible and replaceable with any other cryomodule packages
- Cyomodule unit include (Vacuum vessel, cold-mass support, pipes, (5K shield), 80 K shield, etc)

- Boundary conditions

The following boundary conditions are assumed;

- Three regions need to share tasks in production/construction to share in a fare balance
- R&D works are still required to improve the field gradient
- Multiple sources/productions may be necessary and important to prepare for redundant production capability with holding “insurance”

6) SCRF meeting schedule

- Post-TTC SCRF meeting: It became difficult to organize the Post-TTC SCRF meeting on October 23, because of various schedule conflict. We are seeking for a new schedule; either in the week of October 28 or November 3.
- Next SCRF WebEx meeting: October 1.
- LCWS-08, GDE meeting (November 17 - 21): Need to prepare for Plug-compatibility (overall definition) and a new RF distribution system.
- GDE meeting and AAP (interim) review will be held at Tsukuba in April (20 – 24), 2009.

CFS & Global Systems Webex Meeting
20th August, 2008

Agenda

PM Report (M Ross)
CFS Report (V. Kuchler, J Osborne, A. Enomoto)
LLRF Report (J. Carwardine)

Meeting Summary

PM Report

The ILC Project Advisory Committee review will be held in October. This review will be a high level review, largely focused on ILC management, R&D plans, resources, and project implementation. The meeting is open, but Technical Group Leaders are not required to attend.

The Accelerator Advisory Panel (AAP) review at KEK in April 2009 will have a strong technical focus. Technical Group Leaders will have significant involvement in the preparation and planning for this review. This is in effect an interim review of the ILC Technical Design Phase 1, and will be broadly based on the published ILC R&D Plan and specifically in presenting plans for meeting the goal of an updated ILC baseline design by the end of TDP-1 in July 2010.

ILC08 in November will be used largely to prepare for the AAP review, and will have both plenary and parallel working group sessions. Guidance will shortly be sent to the working group session leaders.

The FALC meeting in July was the first since the formation of the PM team. Three topics of particular interest were GDE plans to develop a project implementation plan, the R&D Plan and associated resources, and a presentation on CLIC.

CLIC will host their annual workshop in October. There is a strong desire to have consistent reporting of both CLIC and ILC groups at both this meeting and at ILC08 in November. There will be a short "update only" webex meeting of the ILC/CLIC collaboration on September 19th.

SLAC has proposed a new scheme for distributing high level RF power that promises cost savings through the elimination of the main linac service tunnel. It also promises substantial flexibility in the ILC design because it could make single deep-tunnel and shallow enclosure systems practically equal. The EC will consider the proposal at their meeting at KEK in early September.

Plug compatibility continues to have high priority, and it will play a significant role in the development of an ILC Project Implementation Plan. A document is being drafted for distribution later in 2008.

There will be a face-to-face meeting of the Executive Committee meeting in early September at KEK. Major topics include CFS and main linac integration, minimum machine definition, and development of a project implementation plan.

CFS Report

The ILC/CLIC collaboration on CFS is now having monthly teleconference meetings. Topics discussed to date include civil works, material handling & transport, and HVAC and air handling.

Initial points of contact for the ILC/XFEL collaboration are Thomas Hott and Vic Kuchler. The focus of the first meeting will be to understand the respective ILC and XFEL costing structures.

W. Bialowons is the point of contact for the JINR effort. EU is working to supplement funding to the JINR effort. Contracts with GSPI are in the process of being finalized.

Near-term priorities for the CFS group are layed out in the GDE R&D Plan. Limited resources require the group to focus on the cooling water cost reduction activities and on alternate tunnel configurations. A goal of ILC08 is to come to a resolution on the process cooling water design.

In the longer term, a strong CFS program must be presented at the AAP review in April 09. Focus for the remainder of TDP-1 continue to be value engineering and cost reduction, and review of the minimum machine design.

Controls & LLRF Report

ILC-specific Controls activities remain largely stalled due to lack of funding. Some limited activities may resume in US FY09.

Ray Larsen, Claude Sauders, and Margaret Votava are organizing a 2-day ATCA workshop at the Nuclear Science Symposium in Dresden.

LLRF activities are currently focused on the TTF/ILC 9mA beam studies program at FLASH. Several collaborators from

Fermilab, SLAC, and KEK will participate with the studies in September. Studies on RF overhead and high gradient operation are slated for January and May of 2009.

10. Accelerator Systems WebEx Conference
22 August 2008, 13:00 GMT
(http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=3043)

Minutes (v1.0)

Attending: W. Bialowons, J. Carwardine, M. Kuriki, F. Lehner (minutes), O. Napoly, E. Paterson, M. Ross, A. Seryi, T. Shidara, N. Solyak, N. Toge, J. Urakawa, N. Walker, A. Wolski, A. Yamamoto

1. General Announcements
Nick welcomed the attendees and started the meeting by mentioning that the primary focus of the meeting is to pin down the minimum machine requirements. According to the planning it was supposed to sign-off the concept of the minimum machine at this meeting, but that given progress over the holiday season, this would now be delayed.

There were no further announcements.

2. Short status report by TAGLs

2.1 Damping Ring – A. Wolski
Andy reported on some progress to reinstate the DR regular meeting beginning in mid September with monthly schedules. Announcements were sent out. The meetings are coordinated with CESR-TA & CLIC meetings.

2.2 Beam Delivery Systems – A. Seryi
Andrei mentioned the plans to restore BDS meetings. There will be a phone meeting in October together with ATF meeting. A half-day workshop on BDS status and planning will take place in December at KEK.

Nick added that all dates of meetings should be posted at central place through Maxine.

2.3 RTML – N.Solyak – *slides attached*
Nikolay presented simulation results of RF kicks due to asymmetric couplers and wakefields in ML and BC1, BC2 for “old”, “new” and “alternate” configurations. There is an unacceptable emittance growth in BC1 and BC2 due to RF-kicks in the new configuration. While the old configuration performs best for BC1 and BC2 the emittance growth in the ML for the alternate design is smallest.

Nikolay further reported on work done to re-evaluate costs of the RTML return line vacuum system using tapered beam lines with increased pipe diameters.

However, presently nobody is re-evaluating the tight vacuum requirements of 20 nTorr.

Nikolay further emphasized the RTML planning for September, which includes design work on the single stage bunch compressor, the study of effects of the tapered beam pipes in the return line and the conceptual design of RTML in the context of the minimum machine.

3. Study of low power parameter sets – E. Paterson (Slides attached)
Ewan presented a preliminary study of possible low power parameters sets for consideration in a minimum machine. Ewan pointed out that low power parameters look interesting if one makes maximum use of lower power in beam in all systems from beginning to end. Ewan presented four new low P parameter sets and showed simulation results that were carried out by Andrei. All four new low P parameter sets exploit the idea of a "travelling focus", a scheme that shifts the focal point during collisions by introducing head/tail energy shifts which has to be applied if the bunch length is larger than β*. In case of travelling focus a higher disruption parameter for bunches is needed to keep them focusing together. At the same time the sensitivity to offsets of the beams is higher.

It was suggested to write up the presented ideas and publish them as a note.

4. Minimum Machine; next steps – Nick (Slides attached)
Nick revisited the basic philosophy of the minimum machine concept, which should represent reduced cost alternatives with respect to the RDR. The goal is to define the minimum machine concept at the end of the ILC08 workshop with identified and prioritized studies to be done for 2009. Nick further presented the minimum machine report outline and invited all TAG leaders to make comments and suggestions to him and Ewan.

5. PM report – Marc (Slides attached)
Marc presented the PM report by giving extensive information on the two future major reviews (PAC 19/20 October 2008 and AAP 17-21 April 2009). He also reported about preparation work towards the upcoming ILC 08 workshop and CLIC meeting. The outcome of the recent FALC meeting held on 14 July 2008 was shortly reviewed. Moreover, Marc presented the ideas of the SLAC high level RF distribution proposal to the cryomodules that would abandon the service tunnel.

5. A.o.B.

The future scheduled AS-TAGL meetings are:

- Friday, 19 September 2008 13:00 GMT
  - First draft of selected sections in minimum machine report ready for feedback/discussion

  - Lattice files migrated into EDMS
- Friday, 17 October 2008 13:00 GMT
  - Reports from AS TAG action items, iteration of existing sections

- Friday, 14 November 2008 13:00 GMT
  - Draft – ready for discussions at ILC08

- ILC08 – 17-21 November 2008

- Friday, 12 December 2008 13:00 GMT
  - Final complete draft – submission to EC

Attachements

1. **Slides** **Nikolay Solyak - RMTL Report**
2. **Slides** **Ewan Paterson – Low P Parameter Studies**
3. **Slides** **Nick Walker – Minimum Machine Philosophy**
4. **Slides** **Marc Ross – PM Report**

Monthly Report (1-31aug08) for Peter H. Garbinicus monthly_report_31aug08.doc

News:

Triad: waiting for them to get back to us in September

klyCluster/RFpipe: I got estimates for the pipe, couplers, and reduction of WR650 waveguides. This was put into a spreadsheet and given to Tomski to fill in the Amercias CF&S estimates (RDR - klyCluster) and for America's CF&S to give to Marc before he leaves for Japan.

I made NO PROGRESS on getting estimate differentials for Ewan's reconfigured central campus.

Estimate Template for Costing Tool: discussed with Carwardine, Paterson, & Himel, passed around another version, critiqued by Tom Himel. I now have specific task of adding in an example(CryoModule) of a composite part consisting of some specified number of atomic parts (for which estimates exist).

CLIC: JohnC and I met with Hans Braun of CERN. Gave him 2nd version of estimate template, discussed Beam Delivery System estimates. JohnC discussed agreement to write CLIC-ILC compatible documents on (1) common estimating methodology for room temperature magnets, and (2) tunnel safety. Hans gave us CLIC tunnel safety statement by Fabio C, PeterG sent him NFPA 520 standard. Hans also said Jean-Pierre and Barry agreed that CLIC could have and use ILC RDR estimates for Beam Delivery System. Barry verified this and I will send to CLIC Cost and Schedule people, after we decide on best format. (I also informed Andrei Seryi and cc'ed the Project Managers and Cost Engineers so they wouldn't be surprised or left out.

Leftovers from previous months:

I was not able to make much progress on my first four assignments from the Cost Management Team Meeting at DESY in early May:

1. develop up a grading system to assess the availability and traceability of the background information for the cost estimate including basis of estimate, completeness, correctness, accessibility of data or the estimators themselves, namely to find how far we can ultimately trace back, distribute this to the other CMG members so they can apply – working on a template, will be later than the assigned date of end of May08

2. apply this grading methodology to drill-down into the Conventional Facilities estimate – again, will be later that the assigned end of May 2008

3. review the grading information supplied by the other CMG members on their assigned parts of the estimate – sometime in early June 2008 – will probably be not earlier than end of June.

4. place the cost estimating data in the EDMS, which will need organization and file structure and templates – much longer term – this will depend on the manpower added to this task.

To do over the next month(s):

Get Triad involved using ILC Costing Tools Functional Requirements document and draft estimating templates as starting points for discussion. Introduce EDMS.

Decide what parametric aspects are needed for the cost estimate and how to implement them in a database format.

Document Magnetic Field, Current, and Voltage information for all magnets from the MagSys TS Group.

I've gotten the e- Source, e+ Source, and RTML technical/cost sheets from Vladimir Kashikhin.

Have cost spreadsheet from Jim Clarke on Undulator – technical description from RDR text

Have authorization (from Apollinari and Holmes) to have Tompkins provide any cost and technical backup sheets that he has for magnets for BDS (conventional & SC), SC for ML, kickers and pulsed magnets (from Mattison), and DR (from Mark Palmer e-mails – may have to ask Wolski/Guiducci for DR – Palmer hasn't responded)

After determining the appropriate format, start porting the estimate files from my personal web-page to EDMS in a confidential-secure manner. This was done only to the Project Management group area in EDMS for non-cost-confidential files. Will need decision on how confidentiality will be accomplished in EDMS.

Finalize contracts for external hosting of Primavera – defer that for a while

Define and start implementing full Project Management tools, procedures, and training - also defer

With the other Cost Engineers, complete the Business Model for ILC – part of PIP for TDR – no progress since October 2007

Peter