PM Report for January 2008

1) During January we, (Nick, Akira and I), worked to develop the 'post - December - 2007' roadmap. As Barry indicated in his message to the GDE, this has resulted in a recommendation for a two-stage 'Technical Design Phase' ending in 2012. Our top priorities - gradient and CFS -related cost reduction - have not changed. We will issue an updated R & D Plan, which we are calling v.2, in time for discussion by the ILCSC at their meeting February 11. Unfortunately, v.1 was never properly distributed to the GDE due to concerns that it no longer reflected an effective plan following changes in funding profiles announced in December. This version will be, and we expect to review and present it at the upcoming GDE meeting TILC08 in early March. It is important to note that it will include our emerging plan to develop a ‘plug-compatible’ cryomodule design.

2) Due to reduced research support in the US and UK, we expect the upcoming GDE meeting ‘TILC08’ attendance to be somewhat smaller than past meetings. For the same reason, however, we expect this meeting to be quite important and anticipate useful discussions about our re-planning effort now underway. Based on expected attendance (admittedly a bit difficult to gauge), we don’t think that the traditional format, which involves a large-ish number of parallel working groups, will be optimal and would like to propose a smaller number of such groups. These would be more focused, we hope, and may make it easier to achieve specific planning goals. Tentatively, we suggest working groups on 1) cost reduction studies, 2) SRF – with a focus on the cryomodule design effort, 3) BDS / MDI – to take advantage of the proximity of the detector community and 4) DR – with a focus on planning e-cloud experimental program. It is important to note that our next meeting, to be hosted by JINR / Dubna in early June, will have a CFS theme and that it will not include the detector / HE physicist groups.

3) There will be a meeting February 8 at CERN for the purpose of identifying and collecting CLIC / ILC development efforts that have common features. The culmination of the meeting, we hope, will be an agreed-upon plan that exploits the commonality and defines tasks (including a description of what, why, when, who, how) upon which we can build a strong relationship between the two collaborative efforts. The agenda is posted: http://indico.cern.ch/conferenceDisplay.py?confId=27435. The core of the agenda is the parallel session made up of 6 working groups (4 technical and 2 management) chosen to get the job started. It is important to note that future activities are not limited to these 6 groups and several others will be created shortly. We (PM) are pleased with and encouraged by this process and look forward to developing our interaction with the CERN-based CLIC effort.

4) The US funding agencies, DoE and NSF, recently launched their peer-review advisory process, in part due to our delivery of the RDR - which allowed them to begin to focus on a ‘realistic’ US-consistent schedule for ILC. The process itself generally follows what has been done in the past and is intended to cover all aspects of the US High Energy Physics program. See the advisory panel website: http://hepwww.physics.yale.edu/P5/ . The first meeting of the panel was held January 31 - February 2 at Fermilab and the slides (public) are available through the web address above. Of special note are our presentations, which describe in some detail how we are considering responding to the funding agency guidance provided in the last 2 months, (especially US and UK). Also, please note the Fermilab Project X presentations, especially Steve Holmes presentation. The ILC and Project X presentations are basically consistent, in keeping with our goal that in-kind R&D contributions benefit both the ILC and our supporting institutions.

5) The US FY09 President's budget request was released Monday, Feb 4. It includes support for ongoing ILC R & D, at a level about 25% less than US FY07. We should all recognize that the US budget process will be a bit unpredictable, especially this year, but should also recognize that this is an important, and somewhat positive, first step.

Monthly Report (21dec07-31jan08) for monthly_report_31jan08.doc
Project Management Office – Cost and Scheduling (C&S) and International Costing Group (ICG)
reported by Peter H. Garbincius – 31jan08

With the adverse budget situation in the US, pretty much all of my ILC activities stopped during this month. I was reassigned to a high-priority, short-term Fermilab task.

For the web-based documentation of the RDR estimate, I added a separate link to the CFS backup materials. The main estimate webpage has links only to the CDF summary and to a (different) password protected page for the CFS details. This streamlines the main estimates webpage and allows CFS members independent access to their own materials, while I only have to maintain a single set of files.

We started planning for the CLIC-ILC meeting on February 8 with John Carwardine, Tetsuo Shidara, Sylvain Weisz, and Hans Braun. Due to my other Fermilab commitments, I will only be able to participate via WEBEX.

The Fermilab MIS group has completed its accessibility tests for the proposed Loadspring remote host for Primavera. Primavera P6 (the latest version that ILC has purchased) has 4 user access levels. The highest level L4 = super user will require a PC for complete access. However, the lower levels L3 = myPrimavera and below can access either by PC or directly via a MacIntosh. The only complication is that Loadspring requires a password change every 60 days and this password must be changed via PC or by having the MacIntosh interface to a PC, for example, through the Fermilab terminal server. So we are now able to decide on the Loadspring host, and if/when funding is available, can proceed with a contract with them.

To do over the next month(s): - if Fermilab continues to work on ILC

Complete documenting RDR cost estimate as far as possible, including links to AS/GS/TS group presentations to be used as "basis of estimate" documentation (suggested by John Carwardine).
Finalize contracts for external hosting of Primavera & sign contract for project management consulting.
Define and start implementing Project Management tools, procedures, and training
Complete the Business Model for ILC

Peter

EDR Monthly Report (January 2008)
Cryomodule, SCRF Technology
Norihito Ohuchi

The following activities have been performed and scheduled:

1. Interface definition for the plug-compatible cryomodule design

On January, 18, the SCRF technology meeting in DESY was held after the TTC meeting. In this meeting, the interface components of the two types of cavities in KEK were described. This presentation was done in order to understand the interface components and the required definition for the plug compatible cryomodule design. In the following local meeting at January 29, the dimension table of these components was shown by the KEK group and this EXCEL table was distributed to the DESY and FNAL groups for completing the interface definition of the cryomodule design. This table will be completed until the Tohoku-GDE meeting, and the interface of the cryomodules will be defined at this meeting.

2. Cryomodule design work without 5K thermal shield

The thermal calculations of the cryomodule without the 5 K shield have started with INFN-Milano and KEK groups. INFN-Milano will calculate this problem with the TTF-III cryomodule, and KEK will calculate it with the STF cryomodule. As the first step, two groups will start the static thermal calculations with and without 5 K shield related to the thermal radiation. The two data will be compared, and they will be compared with the present heat load for the ILC cryomodule, too. The calculation study will be extended to the thermal calculation of the heat-conduction problem, especially for the input-coupler.

The meeting of the cryomodule design without 5K shield at CERN is scheduled at February 7.

3. Common coordinate system of the cryomodule and cavity

At the January-18 meeting, the common coordinate system was discussed following the proposal by Camille Ginsburg at the TTC meeting, using the common coordinate system in the data base for the cavity test. The coordinate system of the accelerator, cryomodule and cavity are not clear and not consistent between individual working groups. For the cryomodule, the coordinate system was defined for construction of 3D-CAD design by the Type-4 cryomodule design group. The KEK group proposed the coordinate system for cavity and cryomodule, however, the systems will be discussed from the ILC-overall point of view, with being led by the PMs.

4. Alignment of the quadrupole

The alignment strategy of the quadrupole in the cryomodule was discussed at the January-18 meeting at DESY. The proposed alignment method was confined to the super-ferric magnet which located under the center post of the cryomodule. For this strategy of assembly and alignment of the quadrupole, the magnetic center should be transferred to the fiducials on the helium jacket by the field measurement before assembling it in cavity string in the clean room. The method itself is the same as the alignment of the conventional magnet. The alignment tolerance is expected to be the same level of the conventional magnet. The requirement of the mechanical mover for the quadrupole will be discussed including the cost while the quadrupole package will have correctors which can work as the magnetic mover.

5. Helium vessel design pressure

The design pressure of helium vessels for KEK-STF cavities is 0.3 bar, and this pressure is much less than the pressure for the TESLA cavity vessel, 2.0 bar. This pressure strongly influences the design of the cooling scheme and the pipe size in the cryomodule. At present, the design pressure at 2.0 bar is well accepted by the present cryogenic and cryomodule design. In the January-18 meeting at DESY, it was confirmed among the DESY, FNAL and KEK groups that the design pressure for the cavity vessel was 2.0 bar, and the KEK group would try to find the solution in the mechanical design of the cavity and the vessel.

ILC Damping Rings Monthly Report

January 2008

Part I: General and Organisational

A picture is emerging of the impact of the recent funding decisions in the US and the UK, though the overall situation is still not completely clear. In the UK it may be possible to continue studies on damping rings, if such studies may be regarded as largely "generic". In the US, there are very positive signs that the work planned for CesrTA over the next two years will go ahead: this will address critical areas including low-emittance tuning and suppression of electron cloud. It is hoped that SLAC will be able to provide (as planned) materials for the test vacuum chambers for CesrTA; however, since LBNL will not be able to complete the fabrication of the chambers as intended, it is hoped that this fabrication can now be undertaken by KEK. Although much of the rest of the work planned in the US will now be severely curtailed or stopped altogether (at least for the remainder of this fiscal year) it may be possible to continue some studies, supported by the baseline programs of individual laboratories.

The test facilities, including CesrTA and ATF/ATF2, are a high priority in the revised GDE plans for the next few years. The operation of these facilities will allow us to address critical concerns including: suppression of electron cloud, development of fast injection/extraction kickers, tuning for ultra-low vertical emittance, and control of fast ion instability. Damping rings R&D will focus on achieving the necessary results and demonstrations at the test facilities.

Design studies for the damping rings will continue as resources permit. A stable lattice design is needed to underpin such studies, but the selection of the baseline lattice was deferred from the end of last year, until options with lower momentum compaction could be investigated. Such options are motivated by recent studies indicating that impedance effects will likely be less severe than initially expected. A lower momentum compaction would allow operation with a reasonable rf system at 6 mm natural bunch length, and would have significant technical and cost benefits for the damping rings and some downstream systems (notably, the bunch compressors). There has been some progress in the past month with lattice designs allowing flexible operation with momentum compaction in the newly-specified range; it is hoped that a baseline lattice selection can be made during or before the GDE meeting at Sendai in March.

Part II: Technical

Instrumentation and Diagnostics (Work Package 4: Manfred Wendt)

Despite lack of funds for GDE/ILC instrumentation activities, Fermilab are continuing to investigate the problems observed during ATF beam studies, regarding measurements made using the Echotek BPMs in turn-by-turn mode. Two important technical issues have been uncovered in the signal processing, which have to be corrected. One issue is a consequence of the rather short revolution time of the ATF damping ring, and can be addressed using a carefully designed impulse response of the filter section. Since these efforts do not need M&S funds at the moment, some work can continue.

Electron Cloud (Work Package 7: Mauro Pivi)

Electron cloud mitigation tests are ongoing at SLAC, KEK, Cornell and CERN. Despite ILC work at SLAC generally being on hold for the remainder of FY08, the installation of a 4-magnet chicane in the PEP-II positron ring has been completed, to allow studies of the electron cloud effect in magnetic

field regions. The dipoles have the same magnetic field strength as the ILC damping ring dipoles. Aluminum vacuum chambers and chambers coated with titanium nitride have been instrumented with special diagnostics to study the electron cloud distribution (as a function of horizontal position and energy). We expect to collect data during February before PEP-II shutdown. A chamber with triangular grooves has been fabricated; however, because of the funding situation, this chamber has not been completed, and it could not be installed in time for the final PEP-II run. Instead, it will be used for tests at KEK or CesrTA.

At KEK, vacuum chambers have been installed in the KEKB positron ring to study the electron cloud suppression in wiggler field regions by means of clearing electrodes. The clearing electrode chambers have been instrumented with special diagnostics to study the electron cloud distribution as a function of horizontal position and energy. To run preliminary power load tests, the chambers have first been installed in a field-free region close to the wigglers. After the power load tests, the chambers will be moved to the wiggler region. To enable studies of various mitigation techniques, the chambers have been built with a special that allows exchange between clearing electrodes, grooves and coating.

As mentioned above, the work planned for CesrTA over the next two years will go ahead.

Power Systems (Work Package 8: Paul Bellomo)

SLAC have been in contact with IHEP (Dr Yun-Long Chi) to explain the situation in the US, concerning budgets for the ILC, HEP and SLAC. The initial discussions will be followed up with an exchange of information on the present specifications for damping rings magnets and power supplies. It is expected that progress in the US on this topic will be slow.

Fast Kicker Development (Work Package 14: Susanna Guiducci)

KEK-ATF: Work at ATF for testing various 10 kV pulsers is on-going. These pulsers will be used to drive strip-lines in the ATF damping ring; combined with a 5mm slow orbit bump it will be possible to perform extraction of individual bunches from trains stored in the damping ring. The 5 mm orbit bump has now been tested with beam. Some modifications of pulsers provided by FID GmbH have been requested, to improve performance.

INFN-LNF: At LNF, new fast pulsers are being prepared to drive the kickers installed in the DAΦNE positron ring. The system will allow fast exchange between old and new pulsers. First tests will start in mid February.

SLAC: There has been little activity in January: everything has been on hold, pending the re-evaluation of the FY08 budget. That has now been resolved and a plan for the remainder of the year has been developed. Work on a second generation FET/driver hybrid will be completed, probably by the end of March; this will comprise all the additional work this year related to the development of the inductive adder technology. Some funding is available to continue the DSRD program; although this will not be sufficient to develop a modulator for ATF2 during FY08, work will continue towards that goal. DSRDs will be purchased from Ioffe, and work will be carried out to characterize those devices and optimize the topology for the modulator. This should allow construction of a modulator for ATF2 modulator during FY09, if the anticipated funding is received.

Fast Ion Instability (Work Package 15: Junji Urakawa)

Studies of fast ion instability at KEK-ATF are continuing. Further work is needed to achieve low vertical emittance (< 10 pm): several quads in two straight sections have been replaced, and beam-based alignment is now needed to determine the optimum orbit and allow effective tuning.

From: Seryi, Andrei
Date: 2/5/2008

Very short summary, focusing mostly on areas where progress was not stalled:

The November-December 2007 run at ATF was one of the largest in terms of number of participants and experimental studies that were performed.
The run focused on studies needed for preparation for ATF2, e.g. measurements and minimization of emittance extracted from the ring. One of significant achievements by UK team was the measurement, using the laser wire, of a beam size of approximately 4 microns in the extraction line.
The ATF2 project meeting, held at the end of December, focused on discussion of readiness for ATF2 commissioning. The ATF2 construction is proceeding. All beamline quadrupole magnets were installed in ATF2 beamline in January. The final doublets and sextupoles are being finished at SLAC and prepared for shipment to France, LAPP, where final integration will be made. The high availability power supplies are being assembled and prepared to be shipped to KEK. The collimation beam damage test at ATF beamline is in progress.
The work on beam dump design has resumed with S.Polepalle visiting SLAC from BARC, India. The crab cavity phase stability test with two superconducting single cell cavities is being prepared -- the cavities have been delivered to Daresbury, and will soon be installed into the vertical cryostat for testing while the control boxes and synchronization system is ready.

Andrei

From: Solyak
Date: 2/5/2008

ILC beam dynamics simulation packages, which are relevant to both CLIC and ILC projects are (shown names are currently appointed for ILC studies):

1. Information for simulation

- Lattice design - M.Woodley, A.Valishev
- Error models
  - Alignment model - K.Kubo
  - Ground motion and vibration model - P.Lebrun, D.Kruecker
  - RF (BC, ML) error model - D.Schulte
  - Magnet error model - J.Jones
  - Stray electromagnetic fields - D.Sergatskov
- Instrumentation models - G.Blair
  - BPM performance model
  - BSM(Beam size monitor) performance model -
- Wakefield simulations - R.Barlow
  - Cavity wakefield
  - Collimator wakefield
  - Other impedance

2. Beam Physics Simulations (DR-to-ML line, Bunch compressors, ML, BDS)

- Static tuning
  - Alignment strategy
  - Tuning algorithms (DFS, KMS, Ballistic, Quad Shunting, Bumps,etc)
  - Errors sensitivity studies
  - Failure analysis
- Dynamic tuning
  - Design and performances of the feed-back system
  - Alternative dynamic alignment techniques (Adaptive alignment)
- Start-to end simulations

More details in presentations on LET Bead Dynamic Workshop at SLAC Dec.12-14, 2007.
http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=2364

Nikolay

2008/2/12

To: GDE PMs
From: Nobu Toge
Subject: Monthly Activity Report – Engineering Management (Jan. 2007)

The following activities have been performed or ongoing.

1. **EDMS Category Structure:** An initial implementation of the EDMS category structure has been installed in the ILC EDMS.

2. **EDMS Strategy Discussion:** Toge visited DESY on Jan. 21 and 22 and discussed on the near-future development strategies for EDMS with Walker and Hagge. Our understanding of the mid-range EDMS goals include the following:
   - Make the document management and repository structure available for design efforts at ILC:
     - Existing RDR-related documents.
     - Forth-coming design-related documents.
   - Develop the zeroth order BOMs (Bill of Materials).
   - Make the document management and repository structure available for costing efforts at ILC:
     - Forthcoming costing-related documents.
     - Existing costing-related documents.

3. **EDMS Outstanding Issues:**
   - We need guidance from PM (and EC) as to how to initiate communication with TAGLs for EDMS user registration and team leaders including assignments of uploading privilege. This action is presently on hold, given the volatile situation of the Level 3 (and below) GDE organization. Unless this initial hurdle is cleared, it is impractical to proceed further.
   - A workshop to conduct some real, hands-on EDMS exercises is worth holding at DESY. The primary focus of this workshop is to actually start uploading existing ILC-related technical documents to EDMS, according to the EDMS category and Team/Project structures. An adequate time for this workshop is sometime soon after the Sendai GDE meeting where most of the organizational ambiguities are resolved.
   - Work is in progress to implement a config-control structure in accordance with PM's EDR Planning Document. We need more in-depth discussion on real-life operation of configuration-control aspects within EDMS.
   - The link between the EDMS and Costing Efforts needs refinement.

E N D