ILD MDI Webex Meeting

17. November 2011

Present: K. Buesser, K. Sinram, Y. Sugimoto, T. Sanuki, T. Behnke, R. Settles, H. Videau, C. Clerc, D. Moya, T. Tauchi, U. Schneekloth, J. Timmermans

Minutes

I. Status of discussions on civil facilities (K. Buesser)

The engineering design of the IR region including the underground and surface conventional facilities is being studied in collaboration with SiD and the GDE CFS and BDS groups. The focus is on cost drivers that are the push-pull system and the layout and dimension of the underground halls. GDE-CFS has hired an external contractor, ARUP, to work on an engineering design for the platform and its movement system as well as on a study of the underground geology for the CLIC site. The final results of these studies are expected for the end of the year. In addition, CFS, SiD and ILD work on the layout and dimension of the underground hall and the vertical access shafts (for the non-mountain sites). A general design of the hall has been agreed upon at LCWS in Granada, the dimensions will be finalised by the MDI/Engineering pre-meeting to the SiD workshop on December 12-13 at SLAC.

As ILD is bigger and heavier than SiD, the ILD numbers have been taken as benchmarks for all of these studies. If the ILD outer dimensions or mass would change due to modifications of the solenoid or the yoke, this would therefore have a visible impact on the conventional facilities. As the GDE plans to finalise all layouts and the associated cost before spring of 2012, the SLAC meeting will be the last chance to communicate any significant changes to the ILD design.

II. Status of civil facilities for mountain sites (Y. Sugimoto)

The two candidate sites in Japan are in mountainous regions where access to the IR hall would not be provided via vertical shafts, but via horizontal access tunnels. A series of meetings with the CFS group, experts from the candidate sites (scientists, civil contractors, local governments) and with experts from J-Power has led to an updated design of the underground area. The planned access tunnel needs to accommodate the solenoid coil as the biggest single piece and therefore needs to have an diameter of ~11m. Modifications to the detector assembly scheme concern mainly the assembly of the yoke, that would be assembled from ~200t heavy segments in the underground hall. The hall has to provide sufficient crane capacities and enough space for the assembly and the tooling. Emphasis is being put on studies of the safety issues like ventilation and emergency egress.

A 3d CAD model of the new hall design will be made available next week. The CFS/MDI workshop at SLAC will be used to define the basic design of the facilities. The design will be finalised before the CFS Technical Baseline Review in March 2012

III. Status of solenoid (H. Videau)

An updated design of the solenoid coil without the correction coils exists now at Saclay. Simulations show that the stored energy in the coil could be reduced from 2.7 GJ to 1.76 GJ. The total integrated field is still a bit lower than in the original design (16.10 Tm instead of 17.34 Tm), an optimisation of the coil configuration is proceeding. The stray fields of this new configuration are basically unchanged with respect to the LoI design, so the amount of iron in the yoke cannot be reduced. A concern are the forces on the field shaping plate FSP that could lead to larger bending. This is important as the endcap calorimeter mounting would be affected.
The technical realisation and the resulting field-map of the anti-DID are under study at Saclay as well.
The CLIC solution with the reduced iron in the yoke endcaps that is replaced by active endcap coils is still an interesting solution and should be looked into as well for ILD at ILC.
The design of the vacuum tank should not be affected by the current design changes to the coil.
The costing is discussed jointly with SiD and the Research Director. A good first approximation of the cost should be available in spring 2012. A similar WBS to be used by ILD and SID is under discussion. The experience from CLIC with costing tools might help.

IV. Status of detector integration (C. Clerc)

The list of detector integration tasks comprises:

- Modification of the coil: possible changes to the FSP (c.f. III)
- Decision on the design of the yoke endcap (radial vs. horizontal)
- Design of QD0 pillar and yoke endcap trench
- Study on consequences of tilt of AHCAL on ECAL endcaps
- Alignment systems for all inner and forward detectors; consequences on the hardware
- ETD: overall dimensions and number of layers (XY or XUV), mounting system and services
- SET: not yet in CAD model, fixation studies on TPC
- TPC: fixing system, endcaps, free space for patch panels (inner det. plus TPC)
- SIT/FTD1+2: input for cable needs, all in cryostat?
- Inner detector: support tube structure, service and cable paths, patch panel positions

Especially the material budget increase due to the cables in the inner region needs to be understood. Changes of the material (Cu or Al) and studies on optimised (w.r.t thickness, insulation, shape) low-voltage cables could help to mitigate the problem. A joint meeting with the software group is urgent to understand better what needs to be decided for the software baseline detector.

V. Outcome of the meeting

The masses and dimensions of ILD that are the basis for the CFS and push-pull studies remain unchanged.

DESY will try to re-do the simulations of the field and forces on the yoke endcap and the FSP.

A regular meeting schedule for ILD MDI and integration issues should be re-established. The Wednesday afternoon time slots (Europe) should be used about bi-weekly for phone meetings. A meeting together with the software group on the question of cables in the inner detector should be organised as soon as possible