

Minutes of the phone meeting of WG-A conveners (Overall detector design, assembly, detector moving, shielding) in preparation to IRENG07 (ILC Interaction Region Engineering Design Workshop), July 5, 2007.

Present:

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The following text does not follow the flow of discussion, but rather grouped into topics.

We started from discussion of the general goal of preparatory meetings and the workshop itself. It is stressed that we need to determine the list of questions that can be answered between now and the workshop; focus on their development and come to the workshop with new results – with schemes, conceptual design solutions, etc. In the beginning of the workshop, it is important to have an introduction talk that explains the reasons for push pull solution (and of the on-surface assembly), and stress that it is the solution which ILC is focused on, and that it will be the focus of the workshop. Also need to have talks from detector concepts, which should tell what design changes were implemented to accommodate for the surface assembly and for the push-pull. For other talks in the introductory plenary sessions, experience from other machines, we need to ask the speakers to report about the experience from other detectors which would be relevant to ILC tasks.

We discussed that part of the savings that ILC is getting for single IR, should be directed to build a good push-pull system. The time allowable for push-pull (e.g. several days) is a very important parameter, which would define the phase space of possible technical solutions. One of the solutions to be discussed is the support platform, on which the detectors would move. There would be two platforms, one for each detector, and they can be of different size to adjust for differences in detector dimensions or weight, yet with common interfaces. The detectors would be assembled on the platforms in garage positions. The platforms would help to minimize distortions of the detectors. The platforms can be moved either by air-pads or rollers; this is already a secondary detailed question. CERN colleagues are working on sketches for such a solution. There is also some discussion of a solution that does not involve the platform. This is one of the clear differences which need to be discussed and settled very soon. We agreed to discuss it on the next meeting (see below for proposed tentative agenda).

Differences in the overall detector design, in particular the way how the doors are splitting or opening, need to be discussed, understood (whether some features are purely historical) and if possibly unified. We agreed to discuss this at the next phone meeting.

Clear definitions of responsibilities are needed – who is responsible for design (and consequently for operation) of certain systems. Responsibilities for certain push-pull operation need to be clearly divided between the machine group, who would probably be responsible for push-pull move of detector in and out of beamline, and the collaboration, who could be responsible for example for opening and closing the detector on beamline

for short maintenance or when it is in the garage position. The detailed interface document need to be further discussed and developed.

We also discussed some of detailed design questions that need to be addressed. In particular, the amount of power for internal detector electronics need to be catalogued and realistic estimations of the needed cables and corresponding openings in the detector structure need to be estimated (one also need to evaluate what future advances in the development of pulsed electronics people are relying upon in their design, and whether such predictions are reasonable). The openings for the cables talk to the radiation protection physics. The layout of masks and other inner IR hardware need to be augmented with information about masses, forces, torque, magnetic field effects, etc. The FD support and its alignment system need to be worked out in more details – this would be topic of not the next, but one of the nearest phone meetings (which should be held perhaps jointly with WG-B). The question of magnetic coupling and requirements was mentioned – we need to review requirements on the field outside the detector, as it talks to detector iron thickness and its cost. The double solenoids were discussed, both the one insider IR magnets, and the main solenoid in the fourth concept. It was also mentioned that the double solenoid solution was envisaged for one large SSC detector, but it was abandoned as too complicated. The double solenoid of the 4th concept was evaluated by GLD colleagues and it was found that the stored magnetic energy is 2.7GJ in comparison with 1.6GJ for the normal solenoid of GLD. The absence of yoke and non-self shielding character of the fourth concept is another clear design difference.

We also touched briefly on the alignment requirements for the internal part of the detector, recognizing that there should be internal alignment systems in the detector, which take care of measuring the position of components, and that the final doublets need a special alignment system as well. It was mentioned that there are two directions of thoughts now – in one approach, after moving the detector, the energy is set to Z and detector components are realigned with 1E7 or so tracks, and in another approach the physics run starts right away, and alignment data are provided with event tracks in the course of getting physics data. While the second way seemed clearly beneficial, we may need further discussion and design study to converge on this unifying assumption.

Nest WG-A meeting is suggested for July 12, 6AM SLAC time.

Tentative agenda:

1) General design of detector, opening and door splitting and why a particular design approach was chosen.

GLD – Y.Sugimoto

LDC – N. Meyners

SiD – M. Breidenbach

4th – A. Mikhailichenko

2) Concept of the supporting platform or solution without a platform.

Concept of the platform – Hubert Gerwig, Alain Herve

Update on calculation of platform rigidity – John Amann

Can this be done without a platform – Marty Breidenbach

Very near term actions:

Push a more realistic FD support design, to be discussed on one of the next meetings (with WG-B).

Get masses and other parameters of all components in forward IR.

Arrange discussion of magnetic field interference and specifications.