

Concept for the ILD Integration Plan

Discussion Paper

DRAFT Version 23. Nov. 07

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1 Introduction

Considerable efforts have been spent on engineering design and integration solutions for the GLD and the LDC detector concepts. Though both detectors follow similar design considerations, a merger of both concepts into ILD requests a coherent approach which needs to converge on a timescale which is given by the ILC detector LoI process initiated by the ILCSC.

2 Scope

The scope of the Integration Plan should encompass questions which need to be answered to be able to write an ILD Letter of Intent. The plan should be extended to the Engineering Design Phase afterwards.

The level of detail of the integration planning for the LoI should focus on conceptual questions like:

- General assumption about the assembly procedure
- Opening and closing strategy
- A forward region design with a strategy on how to support and supply the final focus magnets

A detailed engineering design lies beyond the scope for the LoI, but a conceptual design which shows that the proposed detector design has no show-stoppers needs to be developed.

3 Boundary conditions

3.1 Timescale

The ILD Letter of Intent needs to be submitted to *the* ILCSC before October 1st 2008. This means that any substantial technical design work on the concepts needs to be finished in summer 2008. Due to the limited manpower resources, this immediately shows the need to focus on important matters and postpone detailed questions to the engineering design phase later.

3.2 Technical boundary conditions

Due to the limited resources and the ambitious timescale, we should concentrate only on the ILC baseline parameters laid down in the Reference Design Report. Alternatives (e.g. other crossing angles) and options (e.g. gamma collider) cannot be studied in the limited time and need – if we want to study them at all - to be deferred to the engineering design phase. Where possible, show-stoppers for promising options should be avoided.

3.3 Existing work

A lot of detailed work has been performed for GLD and LDC (and the TESLA-Detector) before. We should avoid any duplication and use what has been done before.

Some work – especially in defining the boundary conditions of the underground hall – has already been done at the IRENG'07 workshop and needs to be taken into account.

4 Implementation

4.1 Define resources

We need to understand better, which resources we need for the process laying ahead. Do we have all the relevant people involved in the MDI/Integration Working Group? Do we see the need for specialists or specialised resources already now?

4.2 Working plan

4.2.1 Regular meetings

Regular meetings of the relevant technical physicists and engineers are important. A first face-to-face meeting should be planned for the first ILD workshop on January 14-16 2008 in Zeuthen, Germany. Either in a parallel session or in a satellite meeting adjacent to the main workshop, all relevant people should sit together and agree on the general detector concept as described in 4.2.2. Task forces for the urgent tasks defined at that meeting should be formed immediately after.

Regular face-to-face meetings should be planned in conjunction with the upcoming ILC physics and detector workshops in Sendai (March 2008) and Warsaw (June 2008). More meetings can be planned if necessary.

In between the live meetings, teleconferences should be held on a regular weekly or bi-weekly schedule.

4.2.2 Definition of the general detector concept

First of all the general technical detector concept of the ILD detector needs to be defined. The following questions need to be agreed upon first:

- What is the size of the detector. As some parameters depend on the outcome of the optimisation working group, some key numbers need to be parametrised
- What needs to be accessed when?
- When do we need access to where?
- What are the implication of push-pull on the general detector concept (e.g. platform or not, etc.)?
- What is the assembly procedure?
- How should the forward region look like?
- How to support and supply QD0?
- What are the general boundary conditions on the detector hall (cranes, sizes, etc.). Use agreement done at IRENG'07 as starting point.

4.2.3 Task group formation

After the general concept has been agreed upon, task groups can be formed which need to tackle the technical implications of the general concept. This then includes engineering studies on important topics, e.g. calorimeter supports, detailed design of magnet support, etc.

4.2.4 Design an ILD forward region

Detailed designs of the forward regions for GLD and LDC exist and have been studied in numerous simulations. It seems possible to derive from the experience of the involved people in GLD and LDC a common design for the ILD forward region. The relevant players in this field should come together at the Zeuthen workshop and agree on a proposal for the forward region which could be tested in full detector simulations for its background suppression performance.

4.3 Personnel

4.3.1 Technical Coordinator

A responsible technical coordinator needs to be nominated to lead the technical part of the MDI/Integration Working Group. It is of extreme importance that one person – or if none could be found a team of competent people – takes over the responsibility of the technical planning for ILD. The coordinator should plan and coordinate the technical part of the integration planning for the detector concept. He should ideally be a technical competent physicist or engineer and should be able to communicate with the relevant physics groups like the optimisation or the MDI study group and the R&D collaboration where appropriate.

4.3.2 CAD Model Librarian

It is extremely important to have only one source for technical drawings and CAD models of the ILD concept. Ideally one person takes over the responsibility of making sure that an unambiguous set of geometric models is available. In principle the technical coordinator could take over this job as well.

As a repository for CAD models, the DESY EDMS system could be used. As this is the production system for the storage and management of machine related documents, it is natural to use it for the detectors as well.

4.4 Reporting

The integration working group (i.e. the technical coordinator) reports regularly to the Joint Steering Board.