

Subject: SiD LOI planning

Date: August 28, 2008

To: Subsystem/Subgroup Leaders

From: LOI editors (Hiro Aihara, Phil Burrows, Mark Oreglia)

Contents: 1. LOI schedule, 2. LOI outline, 3. Subsystem issues,
4. Request for presentations at Boulder workshop,
5. Writing/Editing LOI, 6. Internal Review of LOI Draft

Here is our plan to prepare a successful LOI for SiD on time.

1. LOI (tentative) schedule

September 17-19, 2008, Boulder Workshop: Presentations

The following proposed dates are NOT fixed. This schedule could be too aggressive. We will discuss this and fix the schedule at Boulder.

- October 31, 2008: Deadline for subsystem/subgroups to provide reports (see below), and addressing the list of issues below.
- LCWS08 (Nov. 16-20, 2008): Presentation of physics benchmarking results. Editors to have given feedback on subsystem sections.
- December 15, 2008: Deadline for first pass of physics benchmarking chapter, and revised subsystem sections that meet LoI length requirements. Editors will then work on combining material coherently.
- January 15, 2009: Complete draft LOI available for collaboration review.
- February 15, 2009: Final draft ready.
- March 2009: Submission of LOI to the Research Director.

2. LOI outline

The guideline issued by the Research Director (dated October 3, 2007) and its amendment are attached at the end of this memo (see also on the web page: <http://www.linearcollider.org/cms/?pid=1000472>).

We also include here the preliminary list of additional questions from IDAG.

Additional Questions from IDAG (Draft) June 22, 2008

IDAG wishes the proponents of the 3 LOI's to address the following points in their LOI document:

- (1) Sensitivity of different detector components to machine background as characterized in the MDI panel.
- (2) Calibration and alignment schemes.
- (3) Status of an engineering model describing the support structures and the dead zones in the detector simulation
- (4) Plans for getting the necessary R&D results to transform the design concept into a well-defined detector proposal.
- (5) Push-pull ability with respect to technical aspects (assembly areas needed, detector transport and connections) and maintaining the detector performance for a stable and time-efficient operation.
- (6) A short statement about the energy coverage, identifying the deterioration of the performances when going to energies higher than 500 GeV and the considered possible detector upgrades.
- (7) How was the detector optimized: for example the identification of the major parameters which drive the total detector cost and its sensitivity to variations of these parameters.

Based on the information listed above, we tentatively propose the LOI outline as follows:

In roughly logical order – details to be discussed; page estimates not to be taken too seriously, but note should be around 100 pages total!

I Introduction (5)

- ILC physics (brief)
- SiD philosophy and rationale; emphasize strengths, uniqueness ...

- Outline of SiD design, and optimization process
- Pointer to cost and future R&D issues (later)
- SiD organization

II Global issues (10)

- The machine-detector interface: rationale, engineering drawings ...
- IR hall, assembly, access ...
- Push-pull issues, to include: strategy, time estimate, alignment, calibration...
- Backgrounds

III Subsystems: for each, to include:

- Performance requirements, pointers to physics benchmarks
- Design outline, including engineering details, drawings etc
- Technology options
- Baseline choice(s)
- Front-end electronics
- Performance: spatial resolution, efficiencies, energy/momentum resolution ...

Tracking system (10+)

EM calorimeter (10+)

HCAL (10+)

Forward systems (5?)

Magnet (5 or less)

Muon system (5)

DAQ (1)

Simulation tools + infrastructure, PFA ... (5)

IV Benchmarking results (25?)

V Cost estimate (5)

VI R&D (3) to include:

- Needs for further R&D
- Plans, goals, benchmarks, timescales

Summary (1)

Total pages: 100+

3. Subsystems issues

In order for us to collect the most updated information and share it with the collaboration at large, we would like to ask the subsystem groups to provide its description *roughly* organized in the following manner.

1. Definition of subsystem/subgroup

1.1 Name of the subsystem

1.2 Contact person(s) for LOI writing (!very important !)

1.3 Geometrical definition: Where it is located. Dimensions

1.4 Function

1.5 Requirements/specifications

Typical physics benchmark(s) that your system is most relevant.

2. Description of the subsystem

2.1 Concept

2.2 Baseline design

2.3 Expected performance

2.4 Illustrations/Drawings that you *definitely* want to include in LOI

2.5 Options

3. R&D roadmap

3.1 Issues

3.2 Milestones (Before 2012, and after 2012)

3.3 Resources needed

4. Cost estimation

5. Q&A : anticipated questions from IDAG and answers to them.

6. Organization of the subsystem group

6.1. Institutions involved

4. Request for presentations at Boulder Workshop (September 17-19, 2008)

We would like to ask your representatives to address the above subsystem/subgroup issues as much as possible in their talks. We also appreciate if they can specifically point out what has changed since DOD, so we can clearly identify the progress that each subsystem group has made.

5. Writing/Editing LOI

The LOI will be written in LaTeX (not in MS-Word) !

The DOD will be used as a starting draft and updated appropriately.

We ask each subsystem group to submit a report, prepared using LaTeX and eps figures, no later than October 31, 2008 (tentative as mentioned above).

There are no page limits and each subsystem/group should prepare this report with all relevant material necessary to document the subsystem/group. These are reports by the subgroups that describe their status and will have more detail than the LOI document, but they are used as the basis for the LOI document.

This report can be an update of DOD, but must include the information listed in the above "Subsystems issues."

LOI editors, then, with the help from subsystem contact persons, condense this information into LOI that meets RD/IDAG requirements by December 15, 2008.

6. Internal Review of LOI draft

We envision the extensive internal review/referee process will take place between mid January and February 2009.

October 3, 2007

Guideline for the definition of a Letter of Intent to express an interest to design and engineer a detector at the International Linear Collider

The purpose of this draft document is to define more precisely the letters of intent (LOIs) for detectors at the ILC.

With the LOI a group expresses its interest to develop a design for a detector at the ILC. LOIs will form the basis on which two groups will be invited to further develop and detail their plans and eventually submit an engineering design report, EDR.

The LOI should contain information on the proposed detector, its overall philosophy, its sub-detectors and alternatives, and how these will work in concert to address the ILC physics questions. The evaluation of the detector performance should be based on physics benchmarks, some of which will be the same for all LOIs based upon an agreed upon list and some which may be chosen to emphasize the particular strengths of the proposed detector. It should contain a discussion of integration issues with the machine. It should be developed enough to allow a first preliminary assessment of civil engineering issues like interaction hall, support halls etc. It should enable the reader to judge the potential of the detector concept and to identify the state of technological developments for the different components. Alternative technological options should be elaborated. Where needed, areas of further research and development should be identified, together with timelines and milestones. The group submitting the LOI should define its position and role in the ongoing international research and development for a detector at the ILC. The LOI should include a preliminary cost estimate for the detector. The overall length of the LOI should not exceed 100 pages.

The LOI can, but need not, refer to other documents where more technical details are given. If so these documents should be submitted together with the LOI.

In addition to a concise technical description of the proposed detector the LOI should present the structure of the group which is proposing the detector. The resource needs and their evolution in time should be presented. The LOI will not represent any formal commitment of the groups signing it to the project or the proposed detector. It should however enable the reader to judge the capacity and the seriousness of the groups to carry out the work until the EDR.

The ILCSC had called earlier for these Letters of Intent to develop designs of ILC detectors. Subsequent to the [ILCSC call](#) in October, 2007, three changes were implemented:

- the due date for the Lols was extended to March 31, 2009;
- the foreseen design efforts were reduced to technical designs;
- the selection of two was dropped in favor of validating each of the submissions.

Recommendations on validation will be made to the Research Director by the [International Detector Advisory Group \(IDAG\)](#).