

RD's Report on detector activity

General Overview

Project Advisory Committee
@FNAL

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Contents

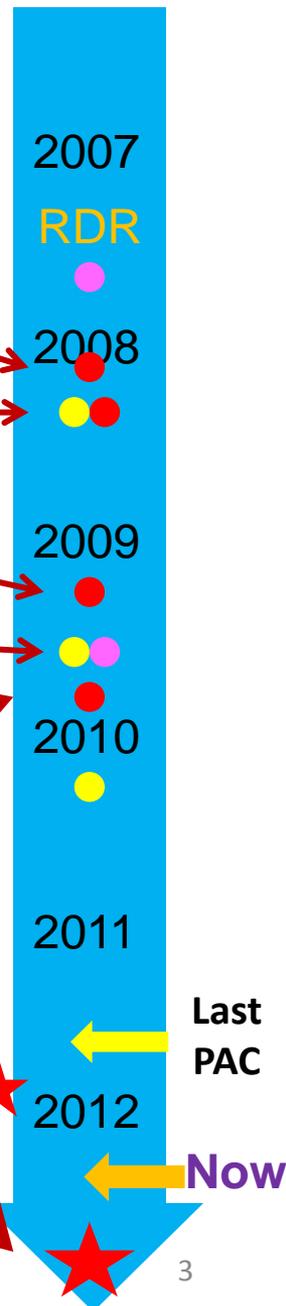
Plan and Status of DBD

- **Structure of DBD**
- **Plan**
- **IDAG** monitoring in Daegu

Post 2012 scheme for physics/detector

The time line of the LOI process

- Oct. 2007: **Call for LOIs was made by ILCSC**
appointment of RD to conduct the process
- Jan. 2008: Detector management was formed
- Mar.2008: IDAG formed, 3 LOI groups known
- Mar.2009: 3 LOIs submitted
- Summer 09: IDAG recommendation for
validation and ILCSC's approval
- Oct 2009: Work plan of the validated groups
- **End 2011: *Interim Report completed***
- **End 2012: Detailed Baseline Design Report**

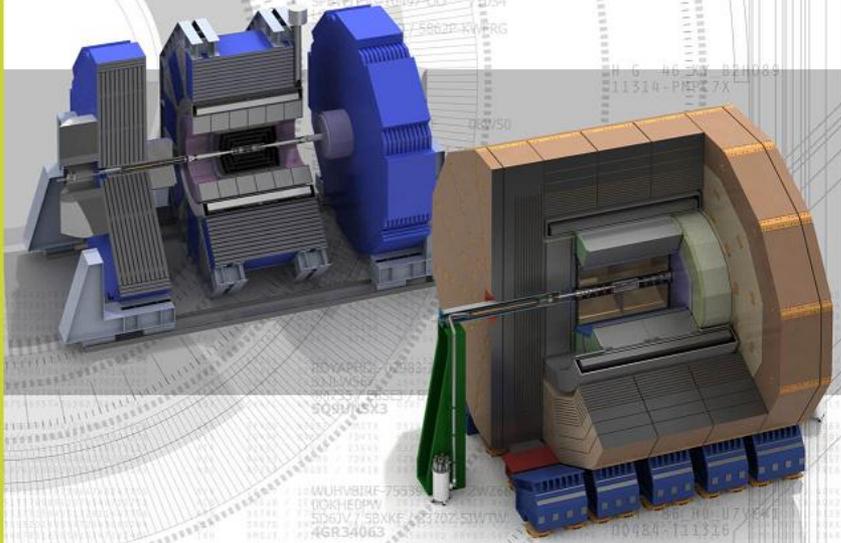
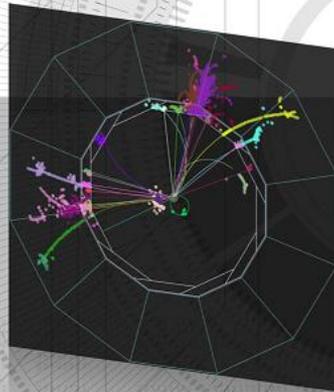
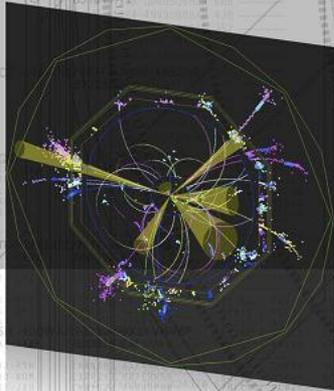


Interim Report was completed after the last PAC meeting

ISSUED BY **ilc** international linear collider

International Linear Collider Physics and Detectors

2011 STATUS REPORT



International Linear Collider Physics and Detectors 2011 STATUS REPORT
ilc-rlp01-2011-020
ilc

Lessons from Interim Report

- **Editing required big effort (of the communicators)**
(many authors, technical words, abbreviations, physics units)
- **Some items took time:**
high quality figures,
checking of author list/institution names,
additional information
(the funding agencies to acknowledge, report numbers of supporting labs, etc.)

Preparation for DBD

DBD is important !

Our 5 years efforts will be summarized, and will be the jumping board for the next step.

Together with GDE's TDR, DBD will make a part of the project proposal when a consensus is reached that ILC is the LC to be built.

We prepare to keep *the target date, end of this year.*

DBD will have 2 volumes

Physics volume (80-100 pages)

describes physics case for ILC

Detector and simulation volume

(~350 pages)

*describes the feasibility of the detectors
for solving the aimed physics questions.*

It has

introductory chapter +

common issue chapter (~50 pages)

2 detector chapters (150 pages for each).

Expected Readers

- **Physicists in HEP and related field**

Detailed and precise information will be given to convince experts.

- **For non-experts in the wider community,**
we will participate in making
the **Executive Summary volume of TDR/DBD**
and an outreach document.

Author groups to make DBD

Physics volume:

a group of physicists convened by Michael Peskin
(The base is the Physics CTG but invites wider contribution. The group started early last year.)

**The group is studying the LHC results
and waits for new ones with better statistics.**

The first version will be made this Summer (after ICHEP12)
and will be updated, if needed, toward the DBD completion.

Detector and Simulation Volume:

The two detector groups write their detector chapters.

The introductory/common issue chapters will be written by
the management and the common task groups.

General guidelines for the detector volume

- **The detector chapters can be regarded as the advanced update of the LOI contents.**
- **Each group will write**
its detector concept, design, R&D of the components, simulation for benchmarks, cost estimation, and so on.
- **The chapters need to be convincing for addressing the physics aims.**
- **The groups are free about where to put emphasis.**
- **The common items for the both detectors will be described in the introduction and common chapters.**

DBD Format WG

This group coordinates the format and contents of the detector volume.

- **Members:**

(ILD) T. Behnke, Y. Sugimoto

(SiD) P. Burrows*, M. Stanitzki

(Management)

J. Brau, J. Fuster, H. Yamamoto, S. Yamada

(P. Burrows will be the contact to the TDR'S editors.)*

This group will work also as the editing team.

The minutes of this WG can be accessed through our web page.

Some of the discussions of the Format WG

- Due dates of the mile stones

Outlines: End March (finished)

IDAG monitoring during KILC12, in April

First draft: Sept. 21

IDAG monitoring during LCWS12 in October.

Final draft: Dec. 21

(We plan to submit sub-final draft to PAC before the next meeting, December 13/14.)

- LaTeX is to be used for drafting. (the same format as TDR)

- We collect the signatories again.

Where to place the author list is not fixed yet.

(E.g. RDR had all the authors repeated in each volume.)

IDAG monitoring in Daegu

- The outlines of the introductory chapter and the two detector chapters were discussed.
SiD and ILD prepared detailed documents of contents of about 50 pages in advance.
- IDAG met **with the management, the two groups (SiD/ILD), the software CTG members and Physics CTG convener.**
- IDAG gave us several suggestions on the organization of the contents, and on the schedule and production procedure.

IDAG recommendations include

- **Moving more common items from the individual detector chapters to the introductory chapters.**
- **Writing the introduction chapter and the common issues chapter very soon so that the detector authors know what are covered there.**
- **Bringing a list of future R&D for improvement in the common chapter not in each detector chapter.**
(The detector chapters are better emphasize that using today's technology excellent detectors can be built.)
- **For each detector part, detailed page allocation needs to be made soon.**

IDAG recommendations (cont'ed)

- Regarding the new benchmark simulation, to compare the new results of the two groups in advance, e.g. before the LCWS12,
- Summarizing the simulations at 500 GeV, which were made for LOIs, first before presenting the new 1 TeV benchmarks.

(The primary focus of the DBD will be achieving a robust design for 500 GeV Physics.)

What will be covered in the introduction

- **Physics reach (This is a very brief summary of the physics volume).**
- **General requirements on detector performance at ILC**
- **Machine BG and beam instrumentation**
- **Benchmark processes**
- **The necessity and the contrast of the two detectors**
- **Description of the physics/detector activity during this LOI period; mile stones, organization, IDAG,....**

Items covered in the common issue chapter

- E.g. MDI matters and interfacing matters with the accelerator, push-pull in general
- Beam instrumentation
- Det. R&D activity, common technologies for the both detectors, spin-off cases
- Engineering tools,
- Common simulation and software tools
- Cost estimation methodology

(The details were organized by J. Fuster and will be discussed in the Format WG.)

The SiD chapter

Concept overview

Detector components (description, performance)

Vertex det., Si tracking, Calorimeters(EM, Had),
Muon system, Sup. cond. Magnet

Engineering, Integration, MDI, Forward system

Electronics and DAQ

Simulation and reconstruction

Detector performance, Bench marking

Cost estimation

The ILD chapter

Introduction and overview

Detector subsystem (requirement and performance)

Vertex, Si-tracking, TPC, Calorimeters(EM, Had),
Muon system, Magnet

Detector System

Integration, DAQ, software, Integration with Acc.

Performance

Simulation, benchmark reactions

Cost estimation

Post 2012 program

During the KILC12

there was a strong hope that LHC bring new physics which pushes ILC forwards.

It matches very well with the completion of TDR/DBD to proceed to the next step.

“The community appreciates the initiative of ILCSC and will be much interested in participating in the discussions.”

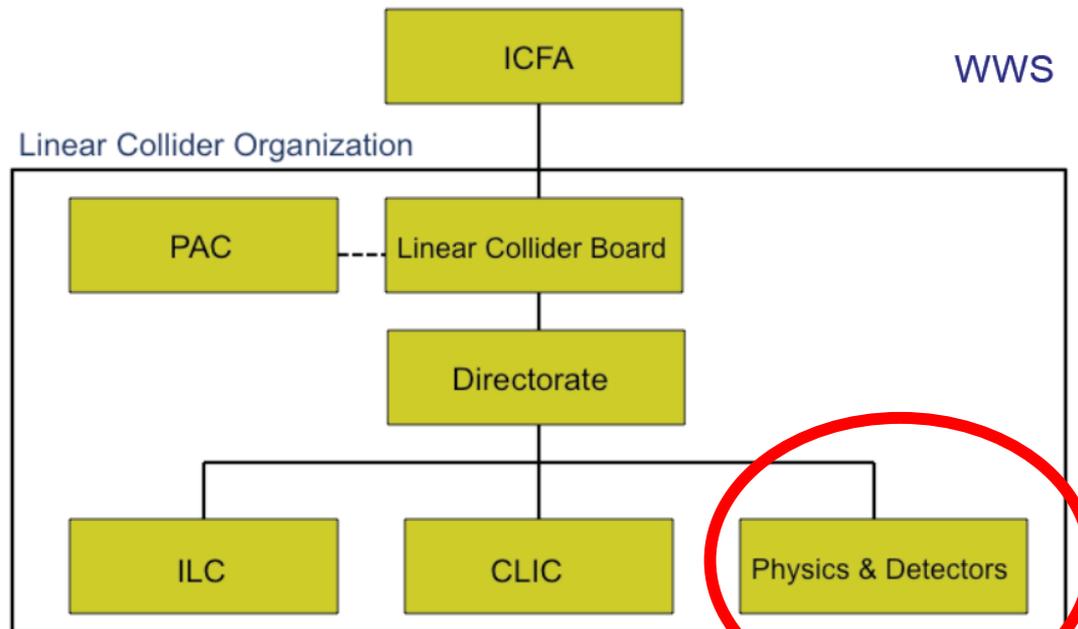
The community began thinking about its details.

Post 2012 scheme being considered by ILCSC

- In the planned scheme the detector/physics organization contains both ILC and CLIC activities.*

Jon Bagger @Granada (LCWS11)

Possible Organization



Considerations

- Some grass-root discussions have been made between the ILC people and CLIC people.
- **It does not look simple so far to design a structure which is agreeable to everybody.**

On the ground level, there are cooperation.

The same concept groups, which are autonomous & independent, are participating in both ILC and CLIC.
(Report by J. Fuster)

There are also differences, which cause difficulties.

Differences

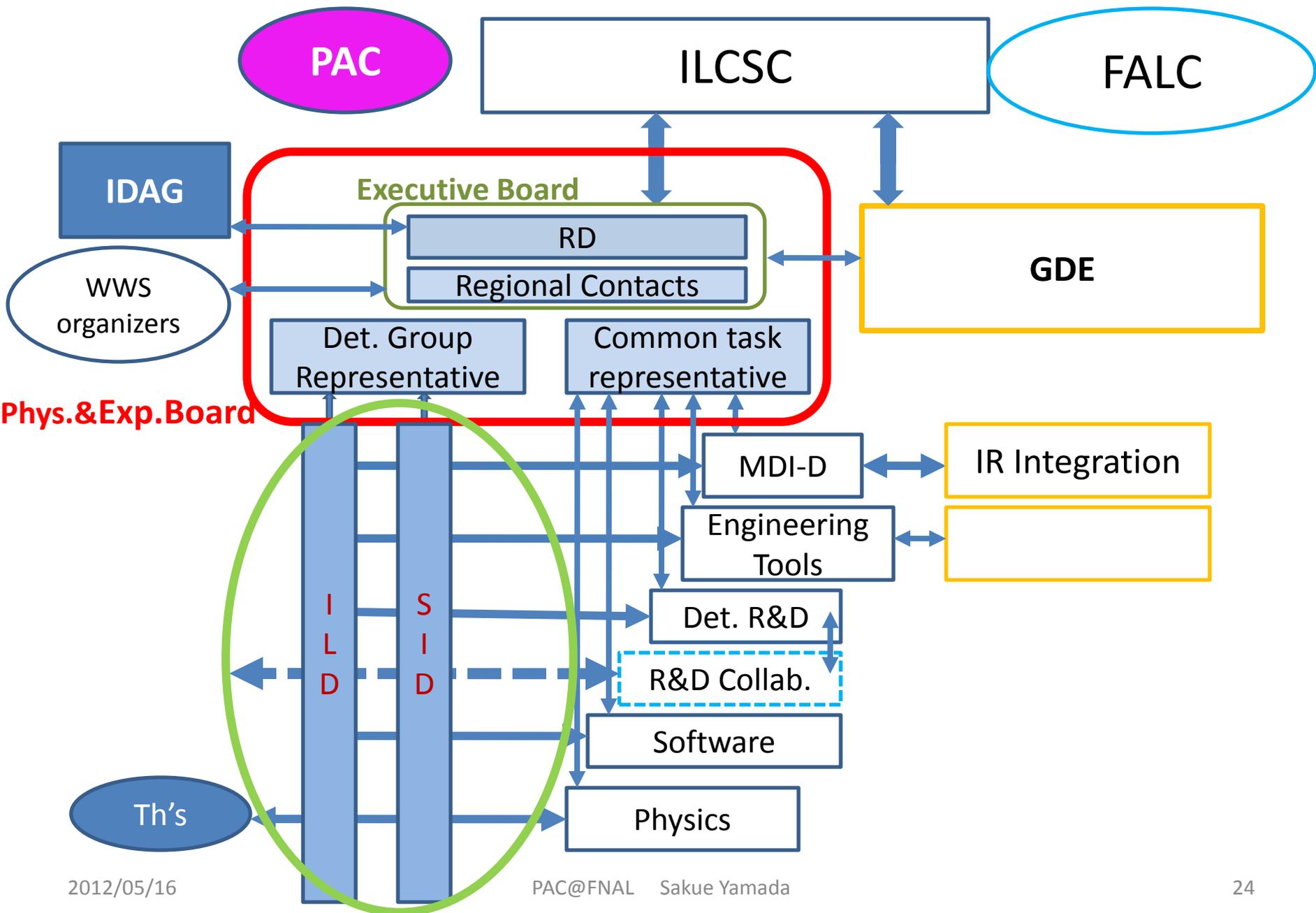
- **ILC and CLIC are different accelerators.**
Energy range (physics),
Stage of R&D, Time range

While the situation is different for CLIC, and CLIC people may think differently,

ILC people wish ILC be realized soon when it is possible. (In particular if Higgs candidate is found)

ILC detector/physics activity has been **organized fully globally and successfully under ILCSC through the LOI process.**

Since 2008



ILC detector activity

- This structure was formed by consulting ILCSC and all the regional steering bodies.
- It keeps good balance of participation regarding regions, concepts and laboratories.
- We reported regularly to ILCSC, and also were overseen by PAC.
- It has been working successfully & is coming its goal, starting from the call for LOI, through validation, Interim Report, and now towards DBD.
- Resources for R&D are secured by the participating groups.

ILC detector activity (cont'ed)

- **The management was supported by GDE's common fund, which is provided from all the regions. It is used almost fully for IDAG which validated LOI and monitors the efforts of the validated groups towards DBD.**
- **We think a similar organization is needed, and wish to strengthen its function as we approach ILC realization so that more work, including engineering, can also be supported.**
- **I.e., the management needs to be strengthened, too.**
- **The sub-director's role will be important to lead the activity further and to support the director in pushing the project.**

Remarks on designing for the 2012 scheme

- With these differences of status and intension, it looks difficult to rapidly merge the ILC and CLIC detector activity, while it will be a good and necessary direction to go.
- ILCSC says the change will be made *adiabatically*, sensing such complexity. We wish ILCSC looks into the matter further and in detail to design the new scheme.
- To compare, the accelerator part of the new scheme is in parallel for ILC and CLIC, and each party can continue without changing its internal scheme.

Summary

- The detector activity is concentrating on completion of DBD as scheduled. It is an important mile stone to summarize the ILC detector /physics activities during the LOI process and to make a starting point for the next step.
- IDAG monitored the outlines of the contents during KILC12 and will do so for the first draft in October.
- Bottom-up discussions and considerations are going about the post 2012 physics/detector scheme. There are considerable differences between the present ILC and CLIC scheme and intensions. This may necessitate certain time and effort to design a possible new scheme.