

RD's Report on detector activity

General Overview

**Project Advisory Committee
@Taipei**

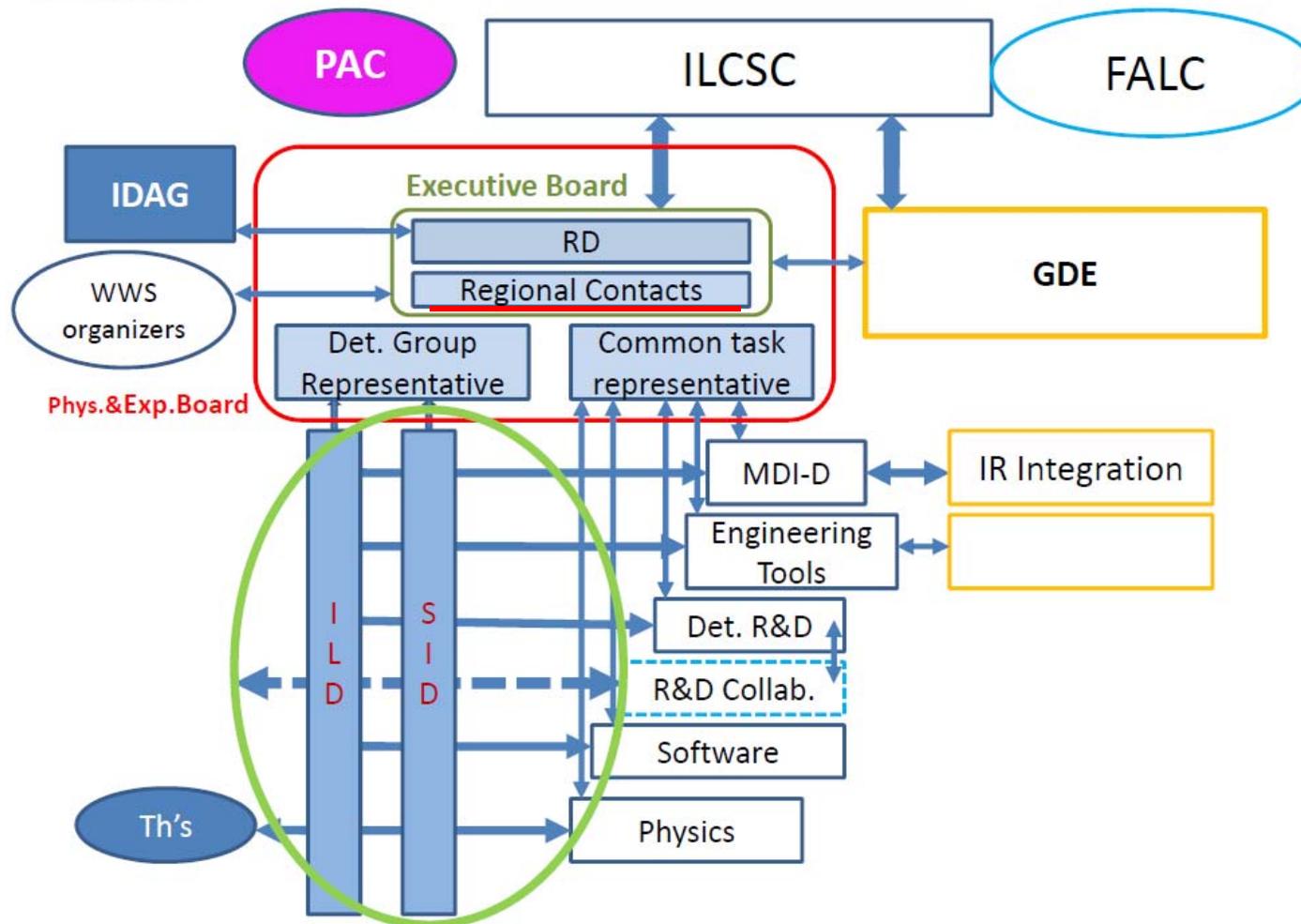
**Sakue Yamada
May 19, 2011**

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- Change in the management
- **Brief overview & update of the detector groups**
- **IDAG meeting in Eugene**
- **Common task groups, SB2009WG**
- *(Detector groups, MDI , CLIC-ILC cooperation and SB2009WG are presented separately in details.)*
- **Interim report**
- **on Post 2012 program**

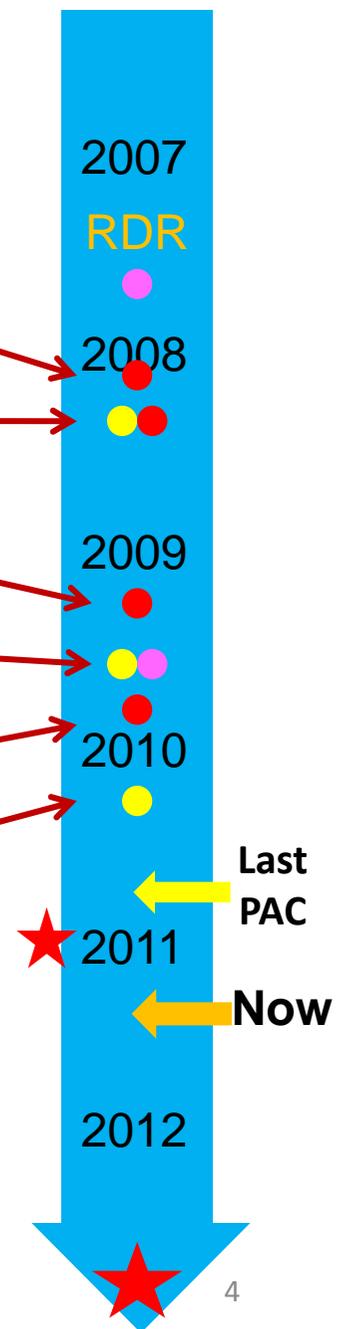
The European regional contact changed end January 2011 from F. Richard (LAL) to Juan Fuster (Valencia) .

Oct. 03, 2009

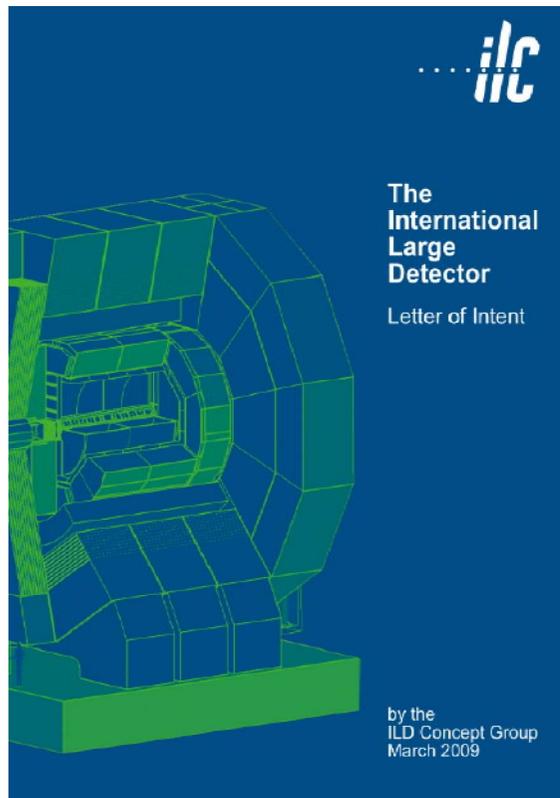


The time line of the LOI process

- 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
- Mar:2009: IDAG began monitoring the progress
- **End 2010: Interim report to be produced**
- ***It is under the final polishing.***
- **End 2012: Detailed Baseline Design Report
including physics case for ILC**



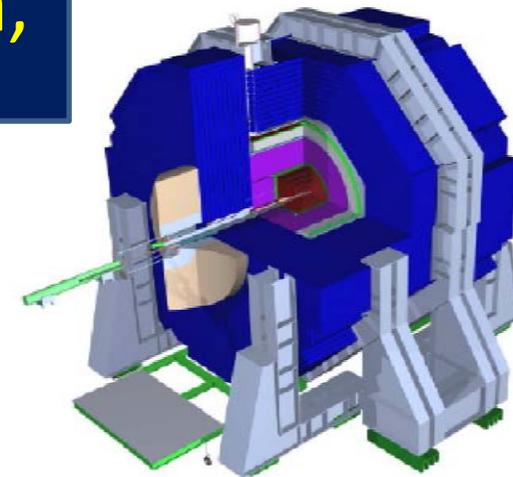
Overview and updates of the activities of the detector groups



Securing resources
Component R&D,
Integration,
Physics simulation,

SiD Letter of Intent

31 March 2009



Resource acquisition

- Since many universities are participating in the activity, the acquisition of resources is an important part of their activity.
- **Some big labs provide supports.**
- **A large fraction is obtained by the participating groups. For doing R&D and/or simulation, they have to obtain resources for these works.**
- **Funding scheme varies widely depending on the region or country.**

Issues

- The environment is becoming more difficult and obtained resources are reducing.
- It takes much time of physicists in preparing for application or reviews.

There are competitions with other programs in particle physics and even in wider physics field.

Very often apparent physics outputs are required in such competition.

ILC detector activity is for R&D and is a long term program (much longer than the duration of the most funding programs).

We wish PAC be informed of this difficulty.

- New efforts are necessary under this situation:
- Wide cooperation with other programs is sought where synergies can be expected.
- The spin-off of ILC originating R&D is being surveyed to be published. There are ample cases which need to be known. (Spin-off cases may help for support, but are not the main purpose of the activity.)

Divergence of interest ?

Defocusing of efforts on ILC ?

Under this situation, to keep the community interested in ILC is crucial and can be critical.

Component R&D

- **They are on-going. Details will be covered by the presentation of each group.**

- **Please note:**

Many of the component studies are made by horizontal (and independent) R&D collaborations.

Due to the differences between the ILD and SiD designs, the R&D for the detectors is a mix of cooperation on R&D for both, and work that is more specific, such as the LCTPC for ILD and SiD silicon R&D.

- **These horizontal R&D collaborations have budget. Often their interest is wider than ILC.**

Integration

A: Detector components into a system

Our experience tells:

Dead material/area increases as integration study proceeds, and they deteriorate the performance.

(support structure, cables, cooling etc.)

We need detector systems of unprecedentedly high performance.

Thorough study is required to be sure

that the designed performance is maintained after full integration.

Integration (continued)

B: Integration with the accelerator

Here push-pull is a key item to be studied.

Vibration, relocation of the components (acc. & det.), switching period, shielding etc.

The MDI common task group is working on this, together with the BDS/CFS teams of the GDE.

There will be a report by T. Tauchi.

Progress: the two detector groups made efforts to come to a common solution, i.e. platform solution.

Issue of the integration study:

Engineering support is lacking.

We made a request at ILCSC for more support.

For MDI a common request was made with GDE.

The request was repeated at the last ILCSC in Beijing.

Recently there was a step forward from CERN.

The push-pull study team for CLIC will join the ILC push-pull study.

We hope this, together with the additional new support at KEK, will stimulate more engineering support from other labs.

Physics Simulation

- The physics CTG made a new list for simulations towards DBD last year.
- IDAG monitored them and suggested that it is not necessary to add many new reactions.

LOIs already cover a lot and the detector groups are short of resources.

- In order to make a realistic list, a new benchmark taskforce was formed with representatives of **ILD- and SiD-groups, Software and physics CTGs, convened by Michael Peskin.**
- **The taskforce made a report last January.**

Conclusion of the task force

The two groups and the CTGs agreed:

- **Three new process to be studied:**
 $e+e- \rightarrow \nu\bar{\nu}H, W+W-, t\bar{t}H$ @ 1 TeV
- **Each group repeats one of the LOI processes @500 GeV with the final detector configuration,**
and with the same event sample
- Beam polarization taken into account
- All relevant physics back grounds to be included
- How to produce machine background

Preparation started.

- Various software tools are being prepared by the software CTG.
Barklow, Berggren, Miyamoto (of the Software CTG) will generate common sample of physics events and BG events.
- **Hope:** when the detector baselines are fixed, simulation can be started with these tools.

IDAG monitoring

- IDAG keeps monitoring the activities of detector groups and CTGs **twice a year.**
- **IDAG met during ALCPG11 in Eugene last March.**
 1. discussed with the management on current status of the detector activity,
 2. made interviews with the detector groups and Engineering tool CTG,
 3. examined the planning of the detector groups towards DBD.
(This was the major aim of the Eugene meeting.)
 4. **gave a suggestion on the costing methods of the two groups.**

IDAG Monitoring(continued)

- **ILD and SiD presented detailed plans for BDB.**
- **ILD described its plan and policy not to exclude possible options while they will fix the baseline detector design for physics simulation by Summer 2011.**
- **SID described presently planned contents of the DBD in details. It commented which items have resource shortage. (The consequence of the shortage is still being worked out.)**

Difficulty about resources

- **Both groups stated that human resources are limited.**

(SiD showed a list of human resources in each year.)

- **The yet-unknown resource situation makes precise planning difficult at present.**
- **Under such environment, the groups made their best effort for planning.**

IDAG recommendation on Costing

- Last year IDAG recommended that the two groups use a common costing method.
- A small working group on costing was formed, members from ILD, SiD, management,+ advisor.
- CLIC detectors impose another and similar boundary condition for the costing of the two detectors.
- **GDE is much advanced about how to coordinate different costing methods in different regions.**
- **We can copy successful ideas. It is also meaningful to compare with the accelerator cost.**

Agreements at present

1. what to include in the cost,
2. to list material cost and man-power separately,
3. to use FY2012 ILCU (like the accelerator cost),
4. to use the same unit costs for several materials. (CLIC-detectors do the same.)
(So far they are Si-det, W, Iron, Stainless steel.
These cover a large fraction of the cost.)

IDAG's comment on Cost

- IDAG discussed the difference of M&S costs listed in the LOIs.
- IDAG recommends to watch updated cost estimates in early stage.

The LOI costs were premature and were not fully coordinated between the groups.

Under the presently agreed method, there will be better numbers to be compared.

The difference reflects the difference of the size.

Interesting to see if this affects performance.

Quick view of the Common Task Groups

- **MDI:** They have been working on push-pull to reach a common solution between ILD and SiD.
In Eugene, the final agreement was obtained that both groups will use platforms.
(The detailed report is made by Toshiaki Tauchi.)
- **Engineering Tools:** The agreement was to use EDMS, which is used by the accelerator people.
More practical question was investigated **about how to maintain the system and was solved.**
The group met with IDAG in Eugene.

CTG continued

- **Detector R&D:**

Following the suggestion of IDAG, during its interview in Geneva, the group is working to list up spin-off of detector technologies in other experiments.

The report will be completed Summer this year.

CTG continued

- **Software:**

The group is working on the common tools for the simulation of the new benchmarks, i.e. event generation, physics background generation.

Coordination work is well-done. They suffer from the lack of manpower for actual works.

- **Physics:**

The group lead the discussion of the new benchmarks.

They will also lead in organizing the preparatory work for the physics chapter of DBD. (The will study possible physics scenarios for ILC with new findings at LHC.)

Working group to study SB2009

- The group participated in BAW2 held at SLAC January 2011. There were a number of contributions.
- **This group communicated with GDE's physics group and received all relevant information for this preparation.**

Details to be reported by Jim Brau.

Cooperation with CLIC detector

- **Juan Fuster will report more in detail.**
- The joint working group surveyed on-going and possible cooperation.
- **Many cooperation programs are seen on the grass-root level. A few more possibility for common efforts were identified.**
- We wish the cooperation turns out to be beneficial for the both sides in the long run.
- **For the moment many members participate in CLIC-CDR.**
This may defocus the effort from ILC detector activity.
- **CLIC group offered to each group a list of possible items for contribution towards DBD. Discussions are in progress.**

Interim Report

- We planned to make an interim report by spring this year.
- It will be a report to ILCSC, but will be circulated to the community and beyond, too.
- It describes **physics overview**, overview of **the LOI process**, activities of **R&D and integration, simulation** and the activity of **the common task groups and the working groups**.
- The drafts were collected but the finalization by ourselves is still being done. Hopefully we can hand them to the communicators soon for their editing.

Post 2012 program

- This is a serious concern of the groups:
“what will happen to DBD after 2012 ?”

The question is beyond our given mandate.

But we look much forward to the on-going discussions of ILCSC toward the future scheme.

First, the effort of ILCSC is very appreciated and we wish it be successful.

The community will be much interested in participating in the discussions.

Post 2012

We wish the hard work will be awarded by the realization of the project , also remaining R&D and physics studies can be continued further after 2012.

Hope: In the new scheme, difficulties can be mitigated and R&D and physics studies can be strengthened.

Otherwise, it may be difficult to stop the current tendency that young people who join the ILC detector/physics activity are decreasing.

If it continues and the community becomes very small, it affects badly to the project.