Status Report of the LCC Detector R&D task force

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Charge

The detector R&D liaison ensures productive communication between the LCC Physics and Detectors Executive Board and detector R&D groups. The liaison is a member of the Executive Board and communicates relevant information from the Executive Board to detector R&D groups and vice versa.

The liaison is in contact with all detector R&D groups relevant to linear colliders to keep track of the overall detector R&D efforts conducted or planned for linear colliders and to periodically compile summaries of the efforts.
The ILC Detectors

Purpose:
● Precision measurements of Higgs properties
● Discovery potential for (and precision measurements of) new phenomena

Requirements:
● Precision instruments that are optimized for the ILC beam structure
● Choice of PFA paradigm requires an integrated concept. All parts play together to achieve the best performance.
Fields of detector R&D

In spite of tight budgets, Linear Collider R&D is still an active field.

Marcel Demarteau showed many beautiful results this morning.
The Plan

Get an overview over the linear collider detector R&D efforts.

Purpose:
• Publicise the technology. Make areas of overlap obvious without pointing them out.
• Provide a showcase for the technology, not individual institutes. Manpower and effort is explicitly not mentioned in the report.
• Provide an entry point for new groups.
Technical Details

Contributions come in many formats:
  o LaTeX, Word, PDF, emailed text, …
  o With varying quality of references

Report is being written in LaTeX. Currently 60+ pages + 7 pages references. Goal was <70 pages. We might get there. All references are verified and hyperlinked.
Collaborations

- RPC DHCAL
- Scintillator ECAL
- CMOS MAPS
- Silicon ECAL
- Silicon ECAL (SiD)
- LCTPC
- DEPFET
- SDHCAL
- GEM DHCAL
- FCAL
- CLICPix
- ChronoPixel
- TPAC
- Calice
- KPIX
- VIP
- RPC Muon
- Dual Readout
- FPCCD
- Scintillator HCAL

NB: incomplete list. For illustration purposes only.
Feedback

> 30 individuals contacted
→ overlap in technologies, ensure maximum coverage of all technologies

covering 20 Technologies

Responses ranged from pointers to 100+ page documents, over inline text and bullet points to 18+ dedicated pages.
Five Questions

1. **Introduction**
   Brief overview over the technology

2. **Recent Milestones (Since DBD / CDR)**
   To avoid receiving historical data and get an idea of the activity of the group

3. **Engineering challenges**
   for putting the technology into a real-world LC detector

4. **Future Plans**

5. **Applications Outside of LC**
Overview over the responses

List of responses was rather variable. From text inline with an email to 17 page document

Some chapters are not in good shape.
We need some additional help if we are to meet our goal of \(~70\) pages. If your chapter is not shown in green, please talk to us.

- All is good. Response received within time and expected scope
- More work needed. Supplementary material requested or additional editing needed from your side.
- Contribution has not been received within time or with the requested scope.
## HCal Technologies

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## Tracking Technologies

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# Vertex Pixel Technologies

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Current Status

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Preliminary
Suggestion to the Community

The current layout makes it still difficult to get a quick overview.

We are working on a summary table listing collaborating institutions, milestones, future plans. This will become the main part of an executive summary for each section (not each technology).

Should this be expanded with pointers to areas of possible contributions by newcomers (provided by the groups, not by us?)
Software

Suggestion at the SiD meeting to add software.

This can have a huge benefit: Oftentimes managers don’t know the status of the software world and are convinced by their engineers that they must start an effort from scratch. Documenting the capabilities we have developed properly might increase adoption. Your input is welcome.
Software examples

We have pioneered some very useful technology:
LCIO
SLIC
DD4HEP
LCFIPlus
PandoraPFA

Would be useful outside of the ILC world.
_summary

- Compiling an overview of the field of detector R&D is a lot of work and cannot happen without the help of the community.
- If your contribution was not shown in green, we would like to talk to you.
- The overview document has been mentioned several times in the ICHEP Detector R&D talk. This is an indication that it’s seen as useful from outside the LC world.
- Thank you for your help with this effort so far. We will continue to work hard to provide a first draft around the time of LCWS.