



# Strategy

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25.10.2017



# Report from the IA



- Marc initiated a vote on the extension of the mandate of the management:
  - Approval for extension until the end of 2018 (48 yes votes, no no votes)
  - Decision to launch re-election of management until May 2018, to maximise overlap
- IA is asked to approve the following things:
  - Iwate University as a new member
  - Ryo Yonamine as new top convener
  - Tomohiko Tanabe as new BSM convener
  - Final approval of the ILD logo

Since no quorum was reached in the meeting, exlectronic vote will be launched soon.

(27 members were present, quorum would be 36)

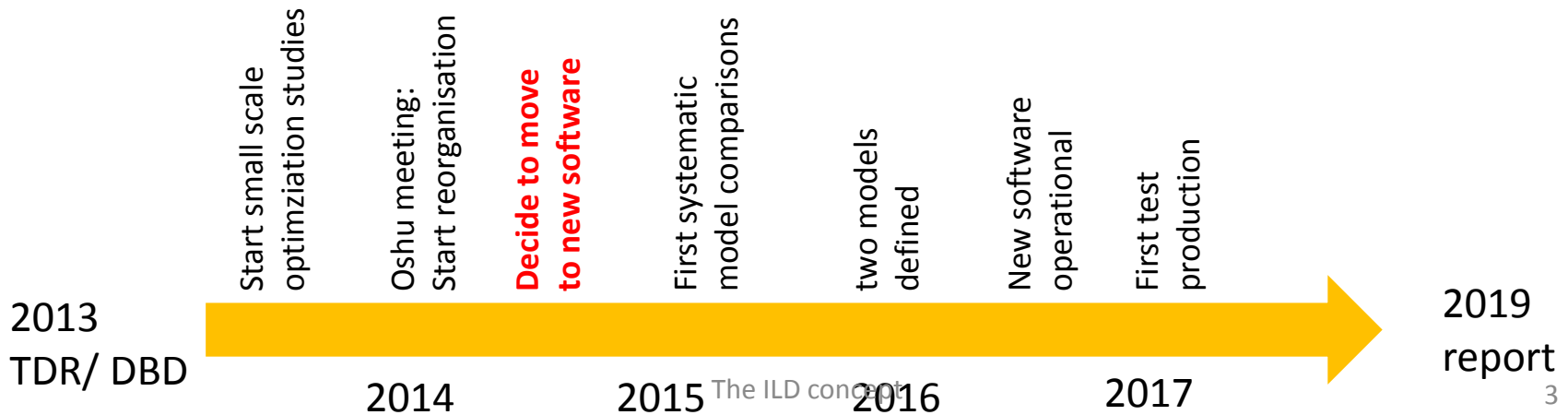
# ILD since 2013



Re-optimize ILD for optimal performance and cost/ performance ratio

Prepare the group to quickly move to a real collaboration once the start is given.

Provide a basis for realistic physics studies to make and improve the science case for the ILC. Most recently, strong push to make 250 GeV case



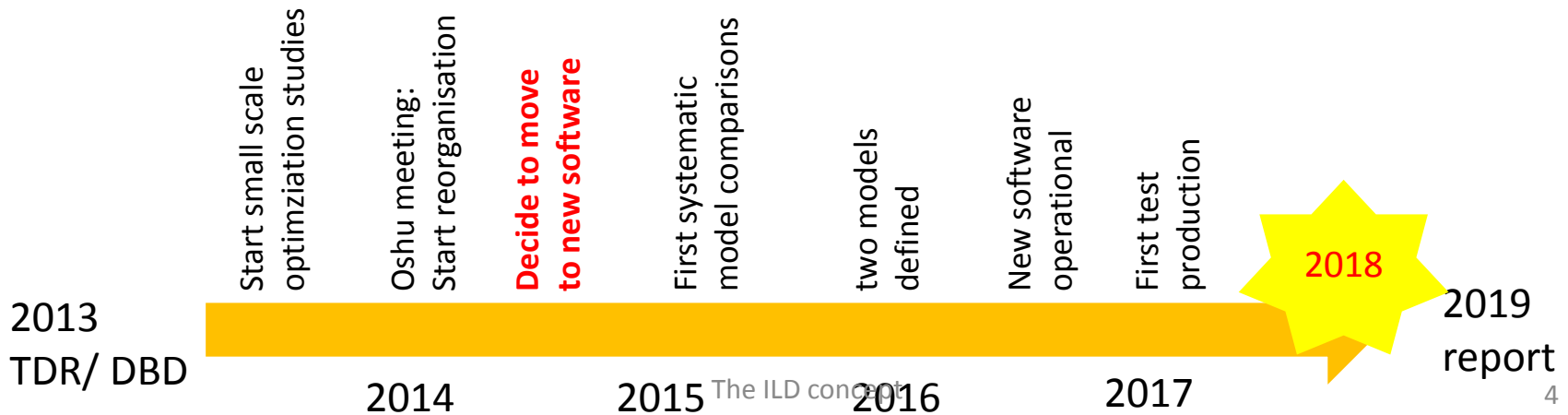
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# Our Goal



1. Make the science case for ILC as strong as possible
2. Define a performance/ cost optimized ILD detector
3. Demonstrate the performance of the ILD concept
4. Develop a realistic implementation of the ILD detector
5. Document the
  1. Design
  2. Engineering
  3. Performanceof the ILD detector model

# Making the physics case



- Demonstrate the scientific capabilities
  - Deliver key results for key analyses
  - Do this in a well tested and as realistic as possible detector model
  - Do it now!
- 
- Most important goals:
    - Firm up the 250 GeV physics case
    - Connect to latest developments (example EFT for higgs couplings)
    - Show the complementarity to the LHC and other projects

# Deliverables physics case



## Together with the LCC physics groups

- Publish the physics case for the ILC
  - Recent papers on Higgs physics
  - Paper on ILC discovery potential
  - Paper on 250 GeV running of the ILC
  - ...

ILD makes important contributions, in many cases is driving the work.

Studies and publications done in the LCC context, not primarily in the ILD context.

## For ILD

- Show the potential of the ILD detector
- Demonstrate the validity of the optimized detector model

We want to show that ILD is the right detector to do the physics, and that we can do an excellent job on the physics.

This can only be done fully once we have agreed on an optimized ILD detector.

# Optimize the ILD detector



## Single particle Studies

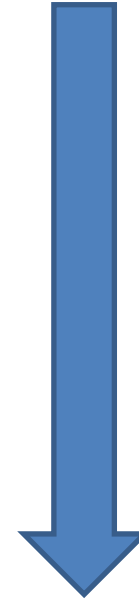
- Response studies focussed on one sub-detector
- “easy”, low resource needs, fast

## High Level performance studies

- Tracking, vertexing, particle flow
- Based on dedicated, maybe even unphysical samples
- Based on multiple subdetectors

## Physics Performance

- Selected physics channels to study performance for key measurements
- Need full samples, including backgrounds



Increasing complexity  
Increasing demands on samples

Goal: define a cost/ performance optimized detector baseline.



# Costing



- We need to restart a costing group
- We need to critically look at the work which was done 6 years ago and reestablish our costing baseline

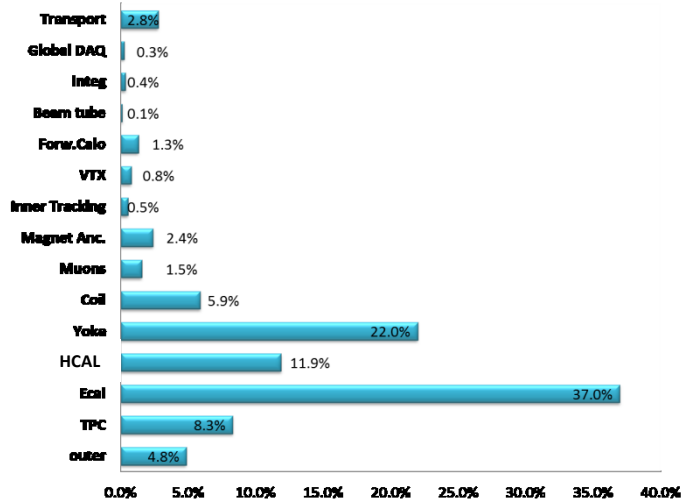


Table of relative costs taken from the DBD

Needs updates and improvements

# Benchmarking



- We need to define the benchmarks for the optimization studies
  - Need to be done in collaboration between physics group and subdetector groups
  - We need to firm up for each one the details like backgrounds, pile up, etc etc

## Acceptance

- $p_{T,min}$  (as determined by B-field,  $\theta_{min}$ ,  $R_{min}$ )
  - **tracking** → low  $p_T$  tracks (compressed spectra)
  - **flavor tagging** (material budget, angular coverage) → for low  $\theta$  tracks
  - **particle ID ( $\mu/\tau/e/\gamma$ )** → for soft/low  $\theta$  tracks
- **$\theta_{veto}$**  (missing  $p_T$ , ISR-tag) for  $e/\gamma$  → for  $\mu$ , hadron, too

## Resolution

- **momentum** (tracker):  $\Delta p/p^2$  → recoil mass
- Jet Energy Resolution (**JER/PFA**):
  - what processes are driven by JER? → single bosons
  - but many others are mostly driven by jet clustering
- **$dE/dx$ , TOF** → b(c)-jet charge ID
- **two-track, displaced vertices** (kink) → tau ID
- **non-pointing photons**
- **$\pi^0, \eta^0$  reconstruction**
- **split photon merging**

## BG tolerance

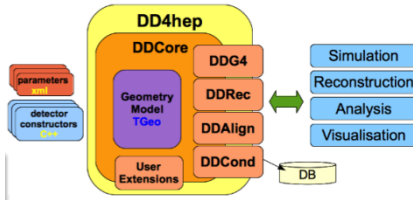
- vertex detector **occupancy**
- pileup mitigation using **time stamping** (Tracker/CAL), **vertex detection**

## Systematics control

- monitoring of machine parameters: E, luminosity, polarization  
→ need to know the **luminosity spectrum** (recoil mass,  $t\bar{t}$  threshold)
- $E_{jet}$  scale,  $p$  scale, flavor tagging, ...

- We need to start a regular discussion on optimization and benchmarking for optimization

# Software



Transition to new software framework mostly done  
Great and impressive job by the software group done with  
very limited personpower!

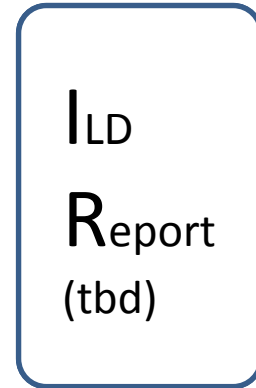
- Reconstruction development should now move as quickly as possible to the new framework, if not already done so
- Analyses should now start to use the new framework more broadly
- The only way to validate fully the new system is to actually use it!

# The Deliverable



Document the work in a comprehensive (set of ) ILD document(s)

- ILD philosophy and thinking
- ILD overall design
- ILD subdetector choices and options
- ILD engineering design
- ILD integration with ILC and into the Kitakami site
  
- ILD performance
  
- ILD physics performance



# The ILD Detector Document



- ILD detector concept, its philosophy
- ILD subdetectors, including options where applicable
- ILD detector integration
- ILD integration into the Kitakami site
  
- Describe the optimization process and results
- Describe the ILD detector performance

See presentation  
by Claude for more  
details

Goal: a coherent, “complete” description of the ILD detector and its performance

Goal: report, and concise version of this as journal paper

# The Physics Performance of ILD



- Physics with ILD at different ILC energies
- Comprehensive list of analyses
- Detailed descriptions, performance, etc
- Broad, based on the optimized ILD detector model presented in the previous part of the document.

Goal: report, plus concise version of this as a journal publication.



# ILD organisation



- Monthly ILD meeting, Tuesday 14:00 Paris time
  - Continue on every first Tuesday of the month
  - Increasingly focus on optimization studies and results
- Regular software/ analysis meetings
  - Wednesday, 14:00 Paris time
- Meeting of working groups etc.
- Calendar of ILD meetings available on ILD page and on ILD confluence.



# The next ILD meeting



February 20-22,

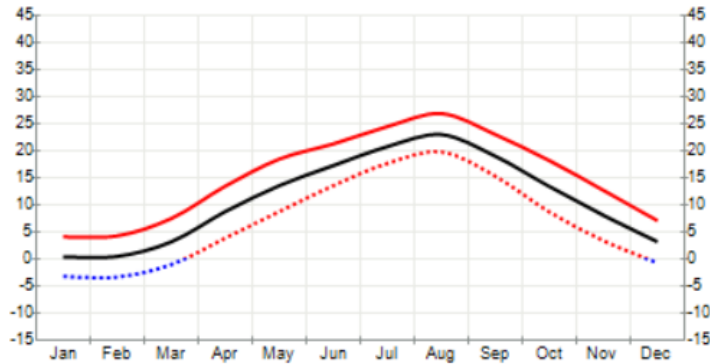
Ichinoseki, Japan

Easily reachable by Shinkansen  
from Tokyo and Sendai,  
Close to the proposed  
ILC site in Kitakami

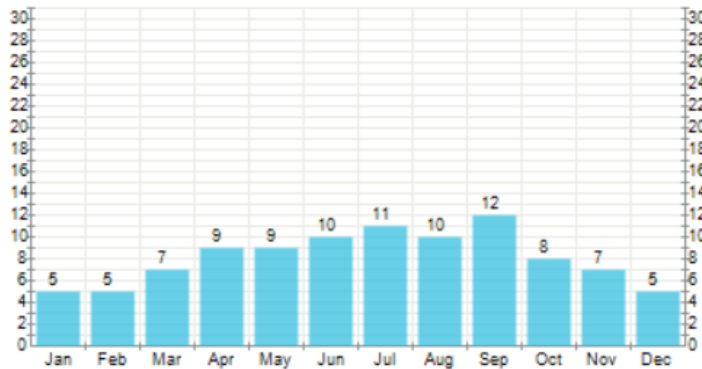
# ILD meeting location



Average temperature per month



Average days with precipitation per month



Meeting room proposed for the meeting in Ichinoseki.



# ILD meeting location



The ILD concept

# Tentative things to discuss



- Sub-detector status, R&D status, progress on R&D
- Reconstruction and Algorithms
- Status of ILD Detector integration and overall design
- Discussion of ILD costing
- ILD optimization
- ILD analyses

This meeting will be an important milestone towards our goal of documenting ILD at the end of 2018/ early 2019

# Schedule



Currently negotiating details of local organisation, support, etc.

Mid-end November: will open registration together with tentative program

We hope for a lively and interesting discussion and participation from ILD in this meeting

Please block these dates in your calendars, try to make a broad participation possible!

# Outlook



- We hope for a clear signal from Japan in 2018
- This will be needed to put ILC (and ILD) on national and international roadmaps
- In Europe, CERN Council strategy will be central element

# Outlook ILD



- Optimization comes to fruition: see results next year
- Ambitious goal to prepare comprehensive documentation towards the end of 2018
- Many thanks for the continuing support and efforts even in the face of very small funding and difficult overall situation!