IDT activities towards ILC

Cornell, 11 October 2023

Tatsuya NAKADA (EPFL, Lausanne Switzerland)

Chair of the IDT Executive Board

The International Development Team (IDT)

The IDT was established by the ICFA in August 2020 **to support the Japanese HEP community effort to host the ILC as a global project (since 2012)**, by paving a way for the preparatory phase of the ILC, i.e. completing engineering design for the construction. It also supports the physics community. IDT is hosted at KEK, but work has been done remotely.

Executive Board

Andrew Lankford (UC Irvine): Americas Liaison
Shinichiro Michizono (KEK): Working group 2 Chair
Jenny List (DESY): Working group 3 Chair
Tatsuya Nakada (EPFL): Executive Board Chair and Working group 1 Chair
Yasuhiro Okada (KEK): KEK Liaison
Steinar Stapnes (CERN): Europe Liaison
Geoffrey Taylor (U. Melbourne): Asia-Pacific Liaison

Working group 1 Pre-lab set-up	Working group 2 Accelerator	Working group 3 Physics & Detectors

Initial IDT strategy towards ILC

- Starting “preparatory laboratory” (Pre-lab), as a global network of laboratories with a headquarters in Japan, to prepare site and machine engineering design for the construction.
  - ⇒ Pre-lab proposal in June 2021describing the workplan and resource requirement for material (57.5 MILCU, 70% for main linac and SFR) and human resources (364 FTE-year, ~ 80% for main linac and SFR) excluding the necessary laboratory infrastructure.
- Starting preparation of the experiments under the guidance of the Pre-lab.
  - ⇒ ILC physics and detector workshop in October 2021 “ILC Workshop on Potential Experiments”
- Starting intergovernmental negotiation to agree on the governance model, organisation and share of the cost and responsibilities.
  - ⇒ Hoping an initiative by the Japanese government.

Reaction in Japan (see also Okada-san's talk)

The MEXT reaction has not been positive toward the Pre-lab Proposal

Prospect for the international funding for the ILC itself is necessary for the Pre-lab to starts.

→ *intergovernmental dialog would be needed to resolve the difference in understanding on the decision process.*

The MEXT Advisory Panel for the ILC reached its conclusions in February 2022

- Transition to Pre-lab with the proposed scale and coupled to the Japanese government indicating its interest in hosting the ILC, is premature.
- Recommend to continue accelerator R&D and re-evaluate the roadmap of the ILC with consideration of the global situation.

→ *accelerator technology collaboration can be launched, which might mitigate some of the delay in the construction timescale*

After the Pre-lab proposal became dormant, IDT strategy now

Situation considered:

- HEP needs to converge soon for a solution of the next HEP machine, i.e. a Higgs factory.
- Several studies are now ongoing, in particular large circular machines, i.e. FCCee by CERN and CECP by IHEP-Beijing.
- A linear collider will be less expensive and make smaller environmental impact, given the smaller footprint, and provide an energy upgrade path toward multi-TeV (or even beyond) if physics requires.
- ILC is still technically the most mature.
- ILC, conceived as a global project, should remain as a global project from the Japanese government.

1. ILC should remain technically at the forefront among the Higgs factory candidates.
   ⇒ IDT must ensure the accelerator work beyond the TDR, i.e. preparation of engineering work in some of the key areas, to continue.
2. Discussion among various government agencies needs to start to develop a common understanding how to initiate a global project
   ⇒ IDT must facilitate various occasions for discussion with government agencies

IDT work progress so far (I): Continue making technical progress

Launching the ILC Technology Network

- Making further advances in the development of ILC related technologies in view of providing more solid bases for the ILC engineering design and opportunities for other accelerator applications.
- The work programme derived from the work packages in the ILC Pre-lab proposal by selecting technically most critical items and those that require long time to develop.
- Based on collaboration agreements between KEK and interested laboratories worldwide.
- resource estimate for the total work: ~14 MILCU material cost and ~120 FTE-year

Progress is made such as

- Japanese government approved 2023 funding for the activity.
- Work packages for the ILC Technology Network identified by the IDT Working Group 2
- Discussion on the participation in different work packages with different laboratories is in progress.
- CERN joined the ITN acting as the European-hub laboratory (CERN-KEK agreement)
- Holding ITN Information Meeting at CERN on 16-17 October.

ITN Information Meeting

Mon 16/10

15:00
- **Welcome** — *Dr Masanori Yamauchi*
  31/3-004 - IT Amphitheatre, CERN 15:00 - 15:05
- **Introduction to ITN and goal of the meeting** — *Shinichiro Michizono*
  31/3-004 - IT Amphitheatre, CERN 15:05 - 15:30
- **Introduction to Work Area SRF** — *Yasuchika Yamamoto*
  31/3-004 - IT Amphitheatre, CERN 15:35 - 15:55

16:00
- **Introduction to Work area Sources** — *Dr yoshinori enomoto*
  31/3-004 - IT Amphitheatre, CERN 16:00 - 16:20
- **Coffee break**
  31/3-009 - IT Amphitheatre Coffee Area, CERN 16:25 - 16:45
- **Introduction to Work Area Nano-beam** — *Angeles Faus-Golfe*
  31/3-004 - IT Amphitheatre, CERN 16:45 - 17:05

17:00
- **Overall discussion on Work Areas**
  31/3-004 - IT Amphitheatre, CERN 17:10 - 17:30
- **Presentation by Laboratories I**
  31/3-004 - IT Amphitheatre, CERN 17:30 - 18:00

18:00

19:00
- **Reception: aperitif followed by dinner (Glass Box @CERN Restaurant 1)**
  NOVAE,Restaurant 1, Glassbox, CERN 18:30 - 20:30

20:00

Tue 17/10

15:00
- **Presentation by Laboratories II**
  30/7-018 - TE Auditorium, CERN 15:00 - 16:15

16:00
- **Coffee break**
  30/7-018 - TE Auditorium, CERN 16:15 - 16:35

17:00
- **Discussion toward harnessing ITN**
  30/7-018 - TE Auditorium, CERN 16:35 - 17:45
- **Conclusions and future plan** — *Tatsuya Nakada*
  30/7-018 - TE Auditorium, CERN 17:45 - 18:00

18:00

IDT work progress so far (II): Towards an intergovernmental dialog

International Expert Panel discussion ongoing

- Made analysis of the difference between an "international" project like HERA (a DESY project with international participation) and LHC (a CERN project with international participation), and a "global" project (started and evolved as a common project among the partner countries) like ITER (an example of top down) and SKA (an example of bottom up).
- An observation was made that in a global project there has been an intergovernmental group that followed the evolution of the project from an early stage of the project, with some countries leading the discussion.
- Recognised that ILC started as a "global" project and Japanese government still thinks in that way, while "we" have moved to think it more like an "international" project, i.e. asking Japan to declare its interest to host, in order to move further.
- Another observation was made that technical work for the ILC has already made an advancement to a post-TDR stage, while there have been little progress in the intergovernmental discussion due to the reason mentioned above.

Now try to communicate those analyses with government authorities.

IDT International Expert Panel members

Panel members

Ursula Bassler	(FR)
Philip Burrows	(GB)
Beate Heinemann	(DE)
Stuart Henderson	(US, ICFA Chair)
Karl Jacobs	(DE, EFCA Chair)
Andrew Lankford	(US, IDT-EB Americas)
Nadia Pastrone	(IT)
Antonio Pich	(ES)
Steinar Stapnes	(CERN, IDT-EB Europe)
Nigel Smith	(CA)
Geoffrey Taylor	(AU, IDT-EB Asia-Pacific)
Katsuo Tokushuku	(JP)

Core Group

- Andrew Lankford
- Steinar Stapnes
- Geoffrey Taylor

Chair

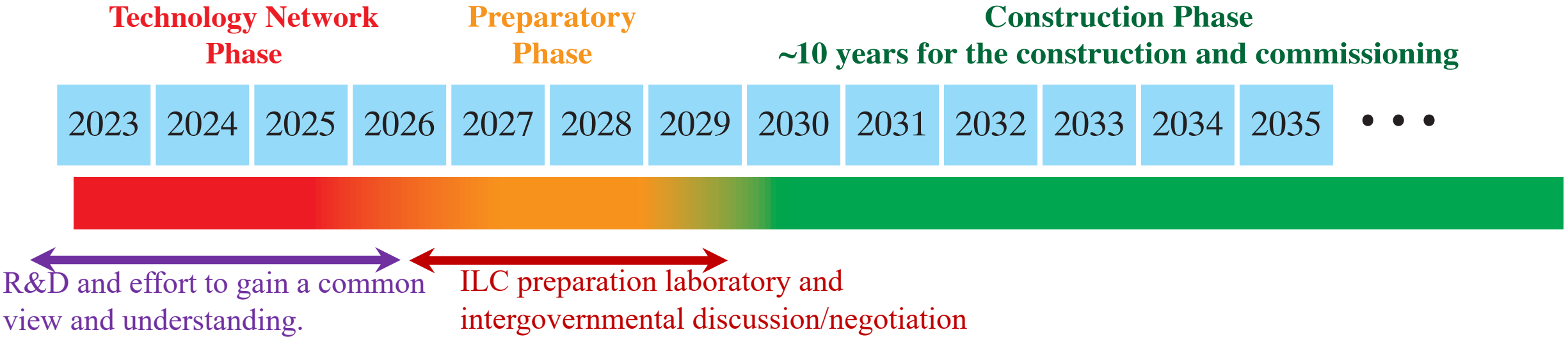
- Tatsuya Nakada (IDT-EB Chair)

Scientific Secretary

- Wataru Ootani (IDT EB Scientific Secretary)

Overall timeframe

-success oriented and asuming no major incident-



- Technology Network Phase responds to the recommendations by the MEXT Expert Panel.
- During the Technology network Phase, interested government authorities must brought into a discussion on the global project.
- MEXT funding programme for ILC-accelerator R&D is planned for five years, i.e. covers the Network phase
- Preparatory phase needs something like Pre-lab to be established.
- In the Preparatory Phase, all the interested government authorities must be ready to discuss the ILC implementation matter.
- P5 discussion in the U.S. and FCC Feasibility Study at CERN will impact the timeline.