IDT-WG2 report

Shin MICHIZONO (KEK/IDT-WG2)

(Nov.03, 2020)

IDT-WG2 organization

Bi-weekly *Tuesday* meeting: Sep.22, Oct. 6, 20,…

IDT WG2
Shin Michizono (Chair)
Benno List (Deputy)

https://agenda.linearcollider.org/category/256/

Charges of Sub-groups

- Discuss and coordinate the topics for
  - technical preparation (remaining topics) at Pre-lab
  - preparation for mass production at Pre-lab
  - possible schedule at Pre-lab
  - international sharing candidates of these activities
- Report to the IDT-WG2

All members belong to some sub-group(s).

SRF

Bi-weekly Tuesday Oct.13,27,…

Yasuchika Yamamoto	***KEK***
Nuria Catalan	CERN
Dimitri Delikaris	CERN
Rongli Geng	JLAB
Hitoshi Hayano	KEK
Bob Laxdal	Triumf
Matthias Liepe	Cornell
Peter McIntosh	STFC
Olivier Napoly	CEA
Sam Posen	FNAL
Robert Rimmer	JLAB
Marc C. Ross	SLAC
Akira Yamamoto	KEK

DR/BDS/Dump

Bi-weekly Tuesday Oct.13,27,…

Toshiyuki Okugi	***KEK***
Karsten Buesser	DESY
Philip Burrows	U. Oxford
Angeles Faus-Golfe	LAL
Jenny List	DESY
Thomas Markiewicz	SLAC
Brett Parker	BNL
David L. Rubin	Cornell
Nikolay Solyak	FANL
Luis Garcia Tabares	CIEMAT
Nobuhiro Terunuma	KEK
Glen White	SLAC
Kaoru Yokoya	KEK

Sources

Bi-weekly Monday Oct.12,26,..

Kaoru Yokoya	***KEK***
Jim Clarke	STFC
Steffen Doebert	CERN
Joe Grames	JLAB
Hitoshi Hayano	KEK
Masao Kuriki	U. Hiroshima
Benno List	DESY
Gudrid Moortgat-Pick	U. Hamburg

Civil engineering

Nobuhiro Terunuma	***KEK***
John Andrew Osborne	CERN
Tomoyuki Sanuki	U. Tohoku

Note: Summer to Winter time transition will be specially considered at next sub-group meeting.

1pm (->2pm) UTC (6am US Pacific, 8am US Central, 2pm U.K., 3pm Geneva, 10pm (->11pm) Japan)

Accelerator activities at ILC Pre-lab phase

Technical preparations /performance & cost R&D [shared across regions]

- SRF performance R&D, quality testing of a large number of cavities (~100), fabrication and shipping of cryomodules from North America and Europe (for validating shipping)
- Positron source final design and verification
- Nanobeams (ATF3 and related): Interaction region: beam focus, control; and Damping ring: fast kicker, feedback
- Beam dump: system design, beam window, cooling water circulation
- Other technical developments considered performance critical

Technical preparation

Final technical design and documentation [central project office in Japan and possibly regional project offices]

- Engineering design and documentation, WBS
- Cost confirmation/estimates, tender and purchase preparation, transport planning, mass-production planning and QA plans, schedule follow up and construction schedule preparation
- Site planning including environmental studies, CE, safety and infrastructure (see below for details)
- Review office
- Resource follow up and planning (including human resources)

Engineering Design Report (EDR)

Preparation and planning of deliverables [distributed across regions, liaising with the central project office and/or its satellites]

- Prototyping and qualification in local industries and laboratories, from SRF production lines to individual WBS items
- Local infrastructure development including preparation for the construction phase (including Hub.Lab)
- Financial follow up, planning and strategies for these activities

Planning and preparation of Hub lab.

Civil engineering, local infrastructure and site [host country assisted by selected partners]

- Engineering design including cost confirmation/estimate
- Environmental impact assessment and land access
- Specification update of the underground areas including the experimental hall
- Specification update for the surface building for technical scientific and administrative needs

Civil engineering

Assumed Pre-lab timeline

For Engineering design

1st year: Work on TDR-based cost-estimate confirmation, started by an international team centered on the Pre-lab.

2nd year: Complete the cost-estimate confirmation, and an internal review in the latter half of the 2nd year.
The review also reports on the progress of technical issues during the preparation period.

3rd year: Conduct an external review and completed scrutiny of costs and risks.
Complete the draft of Engineering Design Report (EDR).

4th year: Publish EDR (in first half yr), report progress on technical issues,and prepare each large bid.

For technical preparation (example of SCRF and positron)

1st year: Extend SCRF cost reduction R&D, Start a pre-series SCRF cavities production preparing for industrialization
Continue positron survey

2nd year: Complete SCRF cost-reduction R&D, and extend the work to assemble the cavities with cryomodule (CM),
Select positron scheme

3rd year: Demonstrate "Global CM transfer, aiming at HPG legal-process, shipment, and SRF QA test after transport
Mature Lab. planning and preparation
Prototyping of critical items (such as positron target)

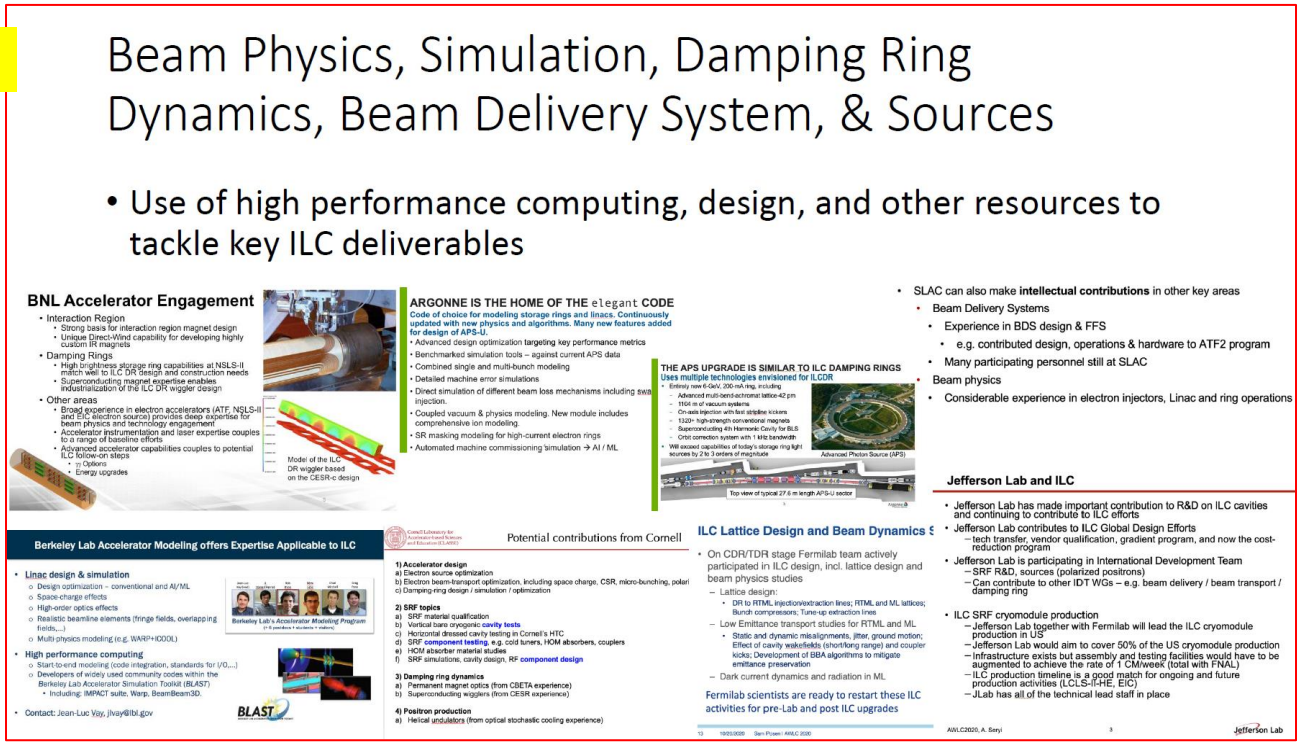
4th year: Evaluate CM performance based on CM shipment, and prepare for Hub Lab. functioning
Progress prototyping of critical items (such as positron target)

Meetings

- AWLC “Discussion of potential US accelerator contributions”

https://agenda.linearcollider.org/event/8622/timetable/#20201020

FNAL	Sam Posen
Jefferson Lab	Andrei Seryi
Oak Ridge National Lab	Marc Doleans
Cornell University	Georg Hoffstaetter
SLAC	Glen White
Argonne National Laboratory	John Byrd
Brookhaven National Lab	Mark Palmer
Lawrence Berkeley National Laboratory	Thomas Schenkel
Facility for Radioactive Isotope beams	Ting Xu
Session summary	Sam Posen



- DoE meeting was held on Oct.27 organized by Andy Lankford.
  - I explained mainly “technical preparation” at Pre-lab phase.
  - Around 35 people (DoE, Lab. Representatives, IDT-WG2 in Americas, IDT-WG2 in KEK (S. Michizono, A. Yamamoto, K. Yokoya, N. Terunuma, Y. Yamamoto) joined this meeting.

First-day, plenary
T.Nakada

Intended IDT goals for this year

- Try to establish
  - a preliminary list of Pre-lab tasks and deliverables and national/regional laboratories which might be interested in contributing to those
  - Pre-lab resource needs for the regional activities and central office (a few % of the ILC cost)
  - a preliminary proposal for the Pre-lab organisation and governance by the end of this year.

    ⟹ Needed for the Pre-lab Japanese funding request preparation by KEK in 2021 to obtain funding in 2022: a similar requirement for the other countries expected.

(for details, see S. Stapnes and A. Lankford's talk)

First-day, plenary
T.Nakada

Rough timeline of the ILC under discussion

ILC IDT (~1.5 years)

- Prepare the work and deliverables of the ILC Pre-laboratory and workout with national and regional laboratories a scenario for their contributions
- Prepare a proposal for the organisation and governance of the ILC Pre-laboratory

ILC Pre-laboratory (~4 years)

- Complete all the technical preparation necessary to start the ILC project (infrastructure, environmental impact and accelerator facility)
- Prepare scenarios for the regional contributions to and organisation for the ILC.

ILC laboratory

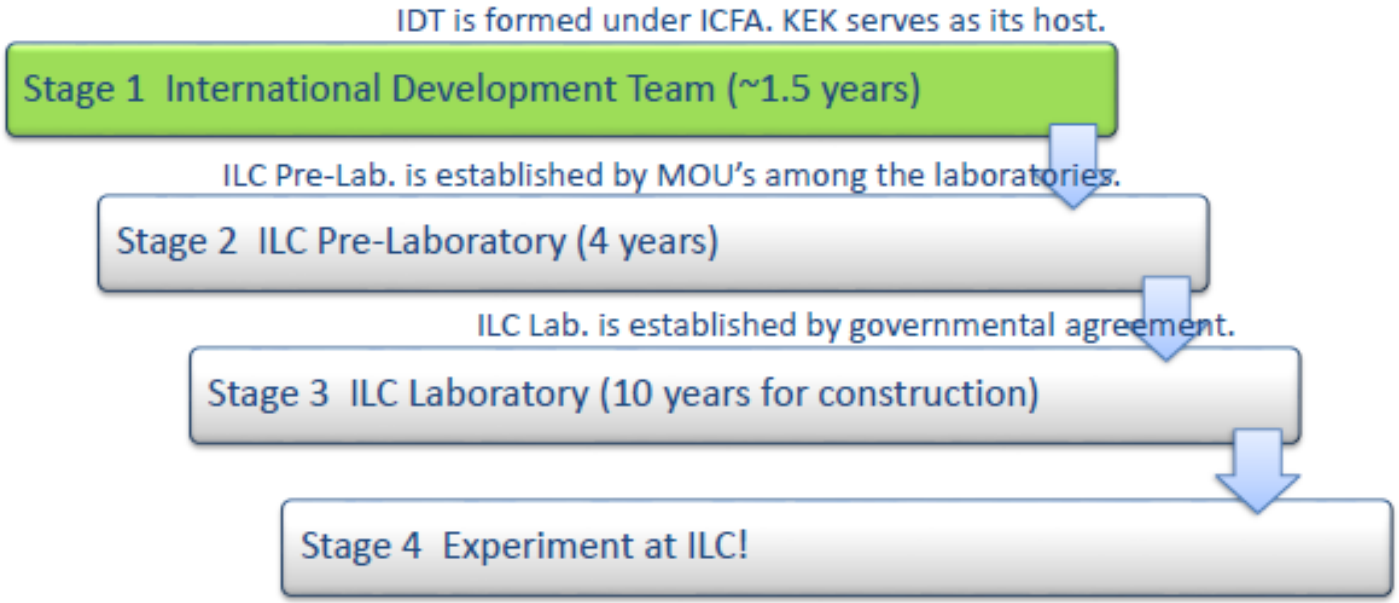
- Construction and commissioning of the ILC (~10 years)

In parallel:
Positive "signs" from the host country (Japan) government and agreements by the national/regional laboratories for providing their contributions.

In parallel:
Positive outcomes of the inter-governmental negotiation for the responsibility and cost sharing among the host (Japan) and partner countries

First-day, plenary
M.Yamauchi

Stepwise realization of ILC



First-day, plenary
A. Lankford

Planning for Pre-lab accelerator activities in U.S.

In addition to participation in WG2 and subgroup activities,
I will invite U.S. WG2 members to participate in development of a collaborative funding proposal for Pre-lab accelerator activities in the U.S.

Goal: Strong U.S. involvement in Pre-lab activities,
which will technically enable start of ILC Construction in ~4 years,
which will signal strong U.S. support for the ILC.

I anticipate that proposal will be for 4-year directed accelerator R&D project.

Role of U.S. WG2 members, with assistance from others:

- Understand the scope and nature of Pre-lab technical activities.
- Help identify tasks for which U.S. participation is critical, as well as other areas for strong U.S. participation (incl'g. design for EDR).
- Transform WG2 descriptions to level of detail required for a U.S. project.
- Estimate U.S. costs for performing prospective U.S. responsibilities.
- Help id a set of U.S. responsibilities that matches DOE budget guidance.

I expect to establish an advisory body consisting of laboratory directors (or designates) to advise on development of U.S. responsibilities and proposal.

Partnering with Canada is to be investigated.
Recall that IDT is preparing Pre-lab, not ILC construction.

First-day, plenary
S. Stapnes

Pre-lab 2022-25: Accelerator core activities

Overall:

Technical preparations /performance & cost R&D [shared across regions]
- SRF performance R&D, positron source, nanobeam (ATF3), etc

Final technical design and documentation [central project office in Japan with the help of regional project offices (satellites)]
- Engineering design and documentation, WBS, costs, schedule, review, resource planning and follow up, etc

Preparation and planning of ILC deliverables [distributed across regions, liaising with the central project office and/or its satellites]
- Prototyping and qualification in local industries and laboratories

CE, local infrastructure and site [host country assisted by selected partners]

European priorities:

Pursue R&D interests and capabilities, requires material and personnel, link to "local" strategic interests

For some countries and groups this is the easiest entry point to Pre-lab contributions

European Project Office(s) – mostly personnel

Identification and preparation of ILC deliverables – one main one is a European SFR module line, then other individual WBS items

SFR module production line requires a multinational approach, other deliverable are a good entry point for countries and groups
For deliverables:
1) R&D required at some level 2) Final specifications, technical documentation, tender documents, 3) Prototyping and qualification in (local) industry, followed by tests and verifications in industry or labs

Contributions by single person/groups with special skills