

Shin MICHIZONO (KEK/IDT-WG2)

(Jan.18, 2021)

- Technical preparation document
- Proposal of Pre-lab timeline
- ILC Steering Panel (in JAHEP) and news

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 (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 (18 WPs)
(Technical_preparation_Ver2B.docx)

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)
(EDR_Ver2.docx)

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

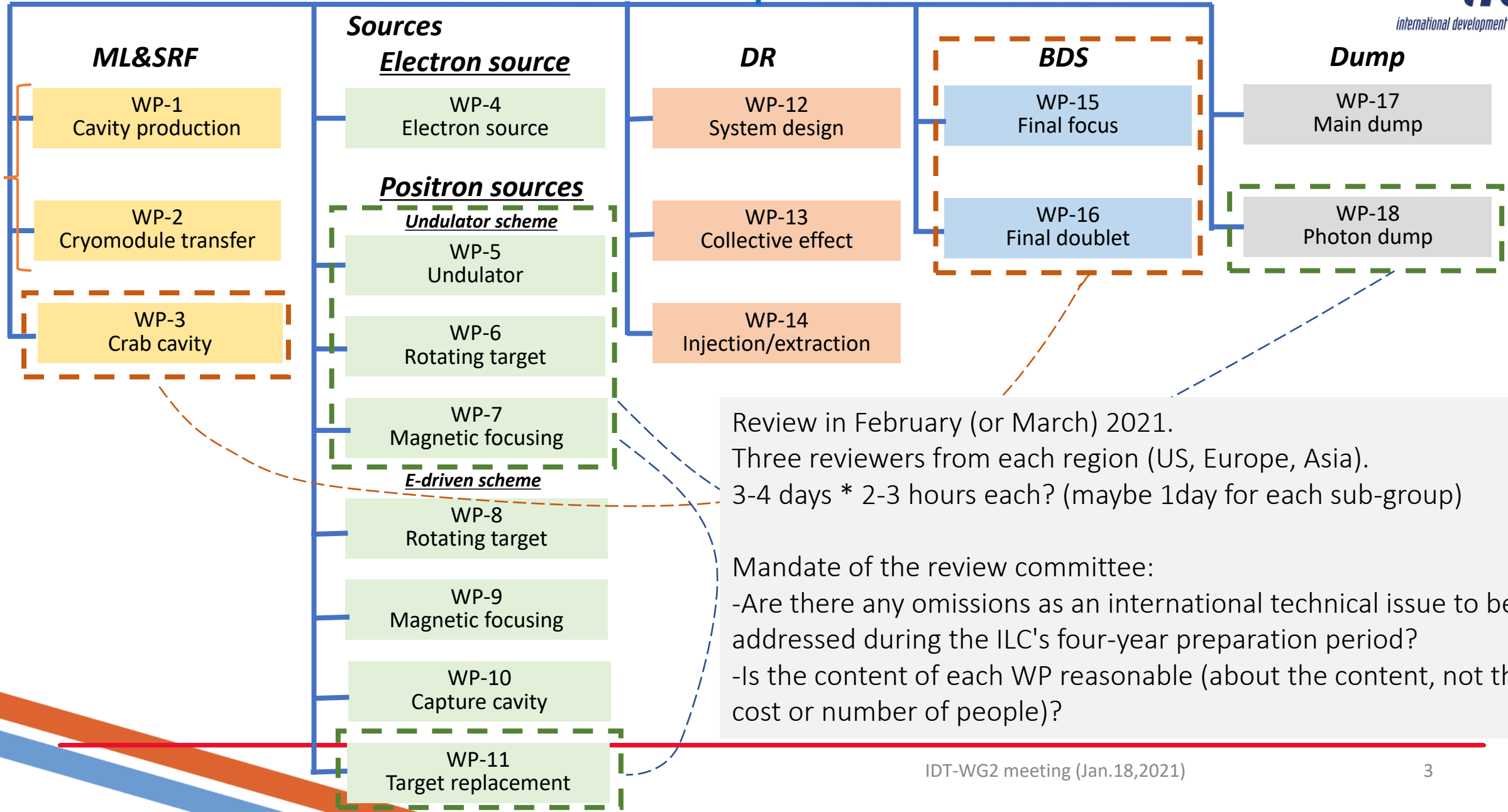
- Prototyping and qualification in local industries and laboratories, from SRF production lines to individual WBS items
- Local infrastructure development including preparation for the construction phase (including Hub.Lab)
- Financial follow up, planning and strategies for these activities

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



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Assumed Pre-lab timeline (current version)

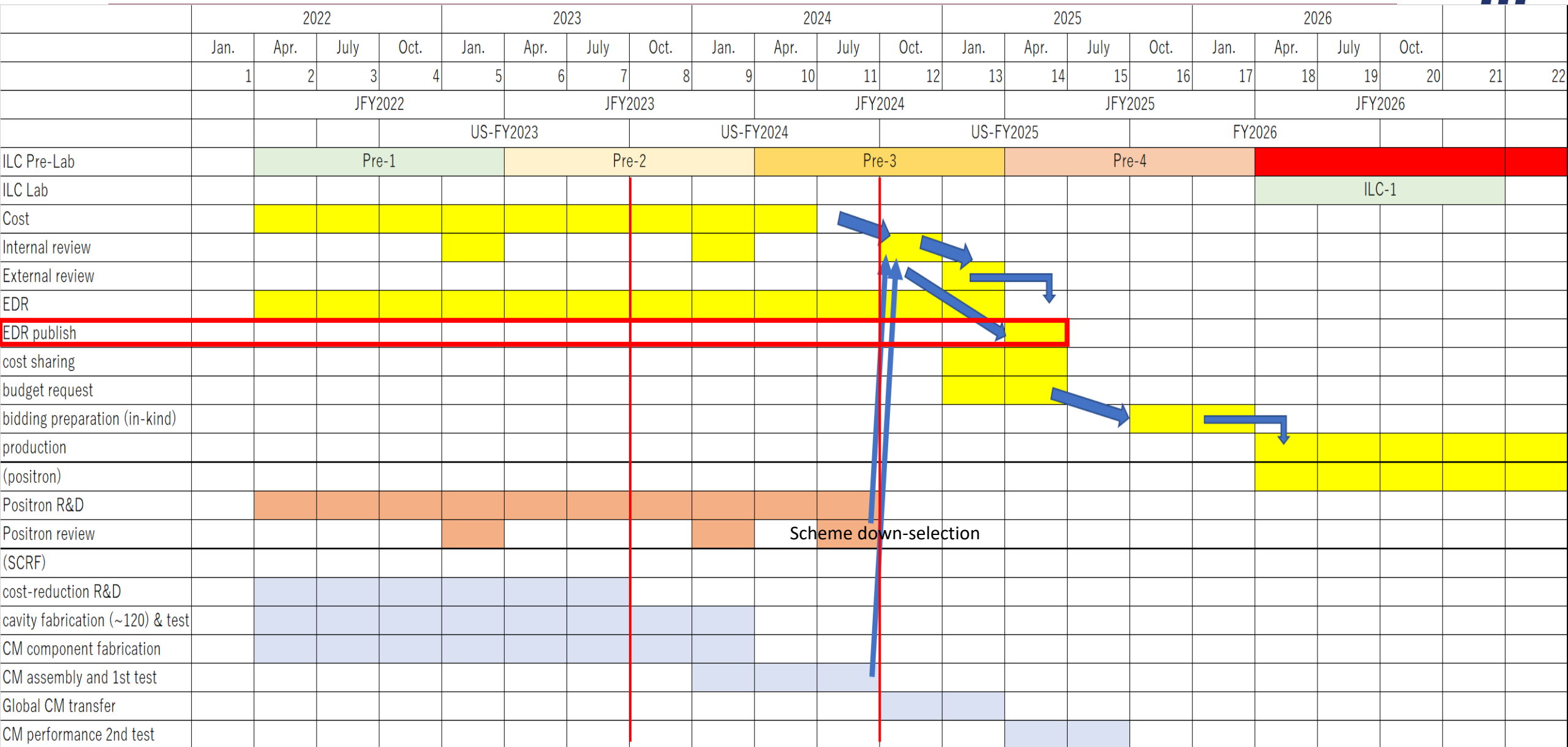
For Engineering design

- 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 SRF and positron)

- 1st year:** Extend SRF cost reduction R&D, Start a pre-series SRF cavities production preparing for industrialization
Continue positron survey
- 2nd year:** Complete SRF cost-reduction R&D, and extend the work to assemble the cavities with cryomodule (CM),
Select positron scheme
- 3rd year:** Demonstrate “Cryomodule Global 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 after CM shipment, and prepare for Hub Lab. functioning
Progress prototyping of critical items (such as positron target)

	2022				2023				2024				2025				2026					
	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	JFY2022				JFY2023				JFY2024				JFY2025				JFY2026					
					FY2023				FY2024				FY2025				FY2026					
ILC Pre-Lab		Pre-1			Pre-2				Pre-3				Pre-4									
ILC Lab																	ILC-1					
Cost																						
Internal review																						
External review																						
EDR																						
EDR publish																						
cost sharing																						
budget request																						
bidding preparation (in-kind)																						
production																						
(positron)																						
Positron R&D																						
Positron review																						
(SCRF)																						
cost-reduction R&D																						
cavity fabrication (~100)																						
CM assembly																						
Global CM transfer																						
CM performance test																						



TDR experience/ advantages

- Nov., 2012 Internal Cost Review (FNAL)
- Dec., 2012 Program Advisory Committee (TDR review)
- Feb., 2013 External Cost Review (Windsor, UK)
- June, 2013 TDR publishing

- Moved positron decision from 2nd year to mid 3rd year
- Moved Cost's Internal Review from the end of the second year to the middle of the third year
- External Review 3 months late
- EDR publishing remains unchanged at the beginning of the fourth year

Consistent with TDR
schedule

Merit:

- Americas/Europe are interested in positrons, but the FY2023 budget will not be enough.
- It will be possible to make contributions on FY2024.
- It is also possible to include the results of the yield of superconducting cavities.

Demerit:

- Internal Review is delayed by 6 months. (Moved from the end of the second year to the middle of the third year)

Engineering design schedule

For Engineering design

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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.

(revised)

For Engineering design

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

2nd year: **Conduct internal Program Advisory Panel on the progress in technical and cost-confirmation issues.**

3rd year: Complete the cost-estimate confirmation.

Conduct internal and external Cost-confirmation Reviews 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.

Technical preparation schedule

For technical preparation (example of SRF and positron)

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- (revised)

For technical preparation (example of SRF and positron)

- 1st year:** Extend SRF cost reduction R&D, Start a pre-series SRF cavities production preparing for industrialization
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- 2nd year:** Complete SRF cost-reduction R&D, and extend the work to assemble the cavities with cryomodule (CM),
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- 3rd year:** Demonstrate “Cryomodule Global transfer, aiming at HPG legal-process, shipment, and SRF QA test after transport
Mature Lab. planning and preparation
Establish positron scheme down-select, prototyping of critical items (such as positron target)
- 4th year:** Evaluate CM performance after CM shipment, and prepare for Hub Lab. functioning
Progress prototyping of critical items (such as positron target)

Civil Engineering Design for Positron Source

Since civil engineering (CE) work will start immediately after the preparation period, a lot of detailed design work is expected during the preparation period, so the CFS Group will proceed with the basic design of the CE for the positron source in advance.

■ Have the CE design to **include the undulator scheme in any scenarios.**

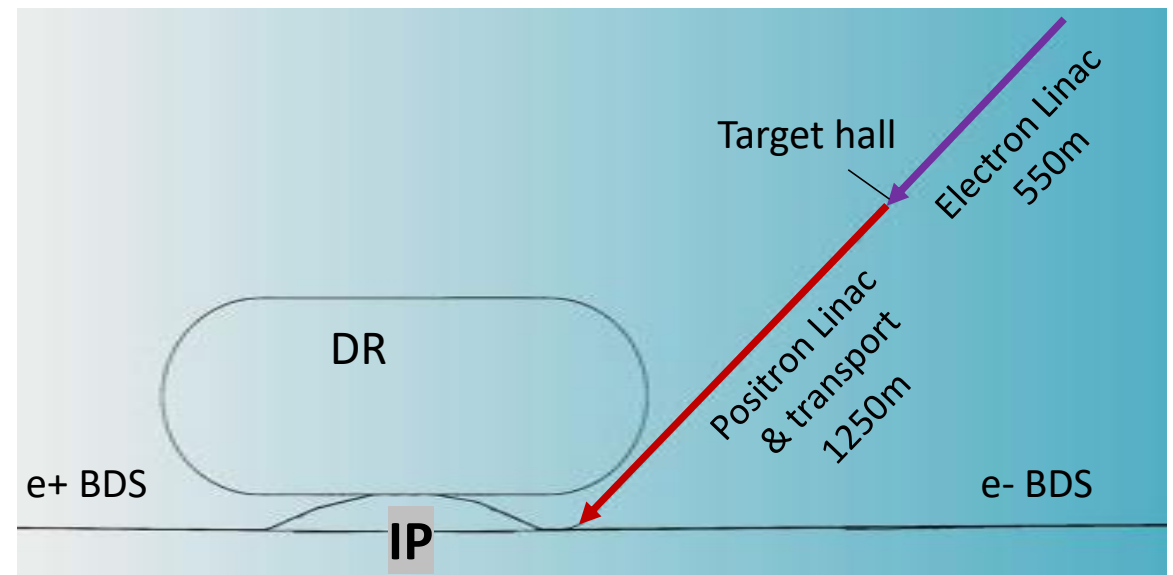
- TDR based layout
- and have **Photon dump line** in the BDS tunnel

■ **E-driven source will be in separated dedicated tunnel.**

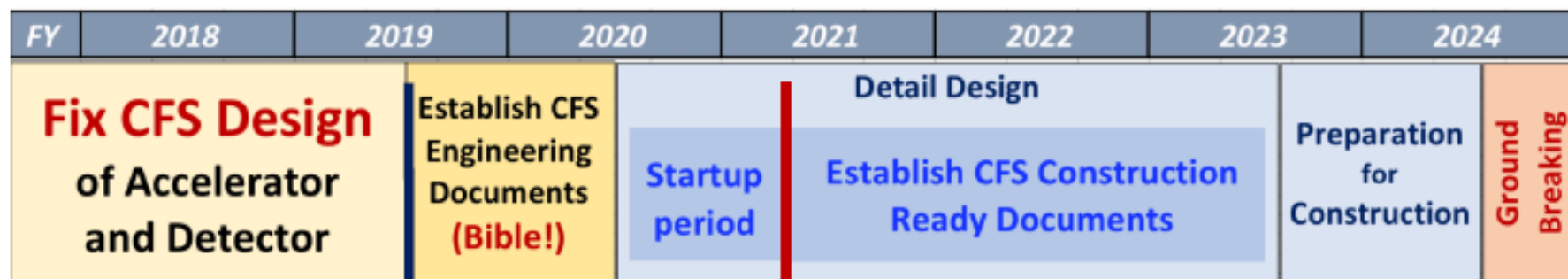
- **add on to the TDR based design**
- From the CE view, sharing of BDS tunnel is not realistic.
- e-driven study group is developing this design.
- Access tunnel should be considered.

Design study for e-driven positron source

- Figure shows the length of the linac, taking into account the size and placement of devices.
- Positron injection into the DR uses RTL.
- Joint angle to the BDS tunnel will be optimized for local conditions.



CFS timeline on “Pre- and Preparation Phase”



(A) Basic Design linked to CFS should be fixed.

- Accelerator layout
 - beamline
 - power supplies
- Requirement of Utilities
 - specification and route

(B) Selection of Positron Source Scheme

Note:

This timeline has been discussed and reached a consensus by the KEK LC-CFS members.

- M. Miyahara,
- H. Hayano,
- N. Terunuma,
- S. Michizono,
- K. Yokoya

Exception: Positron Source

- Prepare designs for all possible schemes by (A)
- Scheme choice should be done by (B)?

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JAHEP ILC Steering Panel

Established by Japan High Energy Physics Committee, 28th October, 2020

<http://jahep-ilc.org/en/>

Members of JAHEP ILC Steering Panel (as of 28th October, 2020):

- Shoji Asai (University of Tokyo)
- Kazunori Hanagaki (KEK)
- Toru Iijima (Nagoya University)
- Kiyotomo Kawagoe (Kyushu University)
- Sachio Komamiya (Waseda University)
- Shinichiro Michizono (KEK)
- Toshinori Mori (University of Tokyo)
- Hitoshi Murayama (UC Berkeley/Kavli IPMU, University of Tokyo)
- Yutaka Ushiroda (KEK)
- Hitoshi Yamamoto (Tohoku University/IFIC Valencia)
- Satoru Yamashita (University of Tokyo) – Chair

Documents

2021.01.16	Recent Progress Towards the Realization of the ILC in Japan: Cooperative Efforts by Academia, Industry, and Local Region
2020.10.28	JAHEP ILC Steering Panel
2020.08.31	Snowmass2021 Letter of Interest "Update of the Japanese Strategy for Particle Physics"
2019.12.13	Recent Progress Towards the Realization of the ILC in Japan: Cooperative Efforts by Academia, Industry, and Local Region
2019.11.06	HEPC Chair's letter to express general opinions of the HEP community in Japan in response to an inquiry from European Strategy Group Secretariat (CERN/ESG/05b, private)
2018.12	A submission to the 2020 update of the European Strategy for Particle Physics "Japan's Updated Strategy for Future Projects in Elementary Particle Physics" Addendum
2017.09.06	Final report of the committee on Future Projects in High Energy Physics
2017.07.22	Scientific Significance of ILC and Proposal of its Early Realization in light of the Outcomes of LHC Run 2
2017.07.22	Report by the Committee on the Scientific Case of the ILC Operating at 250 GeV as a Higgs Factor
2013.08.17	Report by the ILC site evaluation committee of Japan
2013.08.17	Report by the ILC site evaluation committee of Japan
2012.10.18	A Proposal for a Phased Execution of the International Linear Collider Project
2012.02.11	The Final Report of the Subcommittee on Future Projects of High Energy Physics

1

Recent Progress Towards the Realization of the ILC in Japan:
Cooperative Efforts by Academia, Industry, and Local Region

January 16, 2021

JAHEP ILC Steering Panel¹

Introduction

1. The International Linear Collider (ILC) is a large-scale project that requires global cooperation. In Japan, people not only from the academic sector, but also from the political, industrial, business sectors and local communities of the candidate site for construction and its surrounding areas, are now working together to promote the ILC in Japan and are considering the various preparations needed for the realization of the ILC.

International discussions among governments, and politics-industry-government-academia sectors are also ongoing. Among such international activities, clear support for the ILC sited in Japan shown by the US government since the fall of 2019 has become a great driving force for the realization of the ILC.
2. This report summarizes the latest status of such efforts towards the realization of the ILC in various sectors of Japan. We will continue to report the status in future. We hope that this report will be widely shared by the research communities around the world as useful input information for international discussions.
3. On March 7, 2019, at the Linear Collider Board (LCB) meeting held in Tokyo, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) announced the view of the Japanese government regarding the ILC project. Following this, at the LCB meeting held at SLAC in the United States on February 22, 2020, MEXT and the Federation of Diet Members for the ILC reported on the progress of the project, and the Director of the Office of Science of the U.S. Department of Energy gave a speech on the views from U.S. Based on these presentations, the International Committee for Future Accelerators (ICFA) decided to advance the ILC project to the next phase by establishing the ILC International Development Team (IDT) in August 2020, whose mandate is to make preparations to establish the ILC Pre-Laboratory (Pre-Lab)².
4. With the establishment of the IDT, the ILC project has entered the transitional phase towards the ILC Pre-Lab. In order to support and facilitate this transition, the Japan High Energy Physics Committee (HEPC) that represents the Japan Association of High Energy Physicists (JAHEP) established the ILC Steering Panel in October 2020.

The mandate of the Panel is to lead the high energy physics community to advance the ILC project towards its timely realization, including:

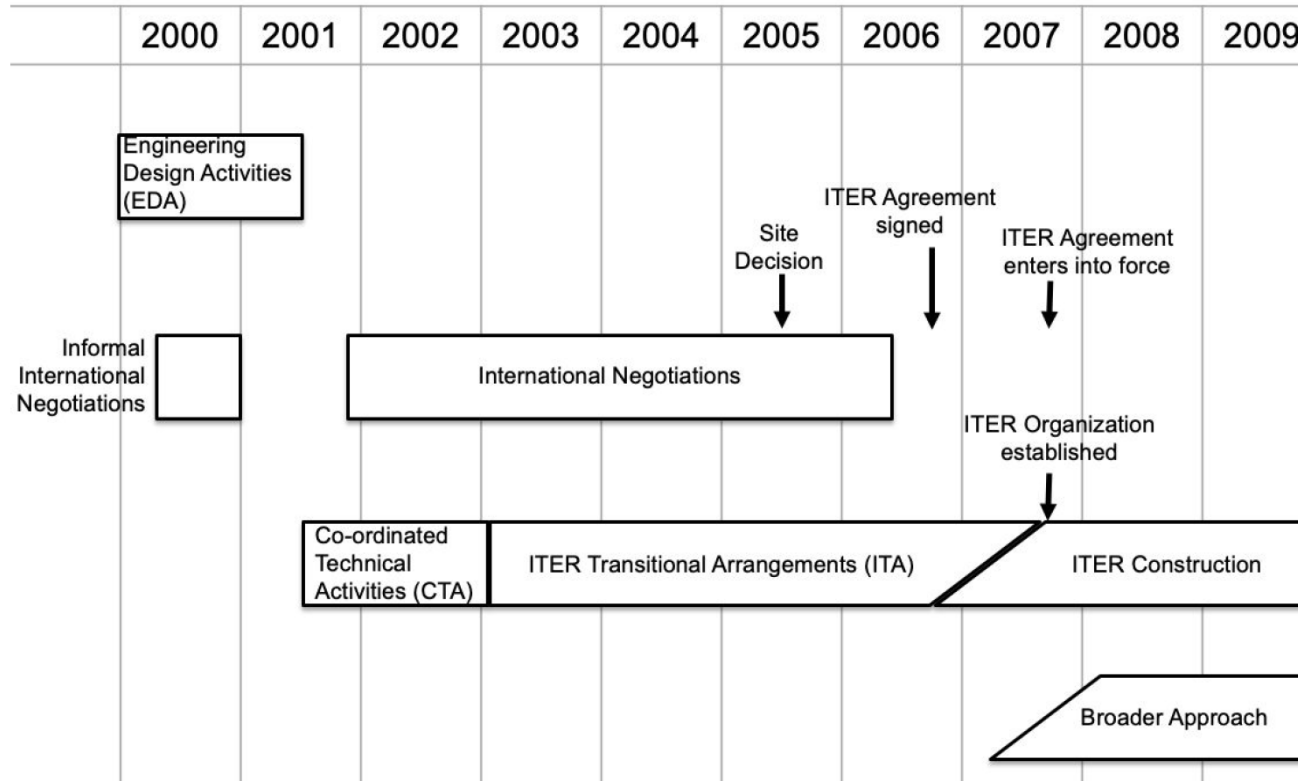
- *developing coherent promotion strategies and putting them into action,*
- *in promotion of the ILC project, cooperating with other scientific communities, governmental authorities, legislators, corporate leaders, regional governments, media, as well as international communities and authorities,*
- *cooperating closely with the IDT and KEK.*

The Panel will regularly report its activities to the HEPC. Important decision items will be discussed by the HEPC and shared within the high energy physics community in Japan.

Aspects of the ITER project relevant for the ILC preparatory phase

November 26, 2020

Wataru Ootani, Tohru Takeshita, Tomohiko Tanabe, Tamaki Yoshioka



ITER's schedule is similar to the ILC250.

- International discussion
- Technical preparation

Document is uploaded to IDT-WG2 indico site.

Figure 1: ITER timeline. Adapted from a presentation at the Working Group on Organization and Management of the ILC Advisory Panel, Ministry of Education, Culture, Sports, Science and Technology.

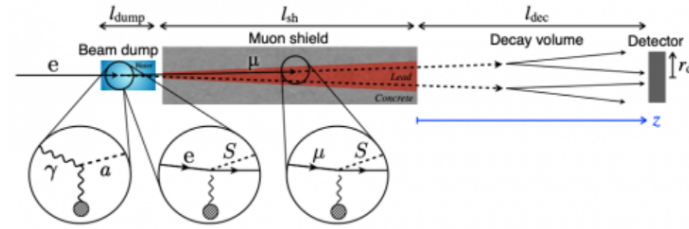
DIRECTOR'S CORNER

ILC++: an opportunity for all kinds of experiments

by Hitoshi Murayama

<http://newsline.linearcollider.org/>

Fixed target proposal from physics



The ILC as it is planned today will offer a host of possible physics studies, writes Hitoshi Murayama, Director for Physics and Detectors in the International Development Team for the ILC. He asks: But why stop there? What else, however fancy it may seem now, can you see the ILC doing – fixed-target experiments, experiments at the beam dump or near the interaction point? Now is the time to propose them!

ANNOUNCEMENTS

Two workshops 2021 – Please mark your calendars

by Tatsuya Nakada, Hitoshi Murayama and Steinar Stapnes

The **2021 International Workshop on Linear Colliders (LCWS 2021)** will be arranged by Europe/CERN as a remote meeting from 15 to 19 March next year. Similar to the past meetings, it will cover the physics, detector, and accelerator studies of ILC and CLIC. The meeting will be at a timely moment since the European Strategy for Particle Physics Update has been published and its implementation started. Also, the ILC International Development Team and its working groups have been set up and detailed plans for the ILC Pre-lab are being made. In parallel, the Snowmass process is on-going. This workshop will be followed by individual more specialized ones for ILC and CLIC in the autumn 2021. We are looking forward to “seeing” you all in March.

The ILC International Development Team (IDT) will hold a workshop, **Towards ILC Expressions of Interest**, in October 2021 in Tsukuba, Japan, with focus on the experimental programme of the ILC. The main meeting will take place from 26 to 29 October with an optional tour to the ILC candidate site in the Tohoku region of Japan, as well as satellite meetings before and after the main meeting. The discussion will be centred around the steps toward the Expressions of Interest for the experiments at the ILC. It will also include discussions of recent developments in detector technology and provide updated information about the Pre-lab planning and the general status of the ILC project. Further details will follow soon.

LCWS2021: Mar.15-19 (arranged by Europe/CERN)

