

SRF sub-group meeting of IDT/WG2

- ✓ Introduction of myself
- ✓ Mission of SRF group, and schedule
- ✓ Discussion on additional members
- ✓ others

- ✓ Introduction of myself
- ✓ Mission of SRF group, and schedule
- ✓ Discussion on additional members
- ✓ others

At its 86th meeting held on August 2, 2020, ICFA approved the formation of the International Linear Collider International Development Team (ILC-IDT, referred to here as the Team) with a mandate to make preparations for the ILC Pre-Lab in Japan, which is the next step in the ILC project.

The Team has commenced its work and is expected to complete its mandate by the end of 2021.

Structure and function of the ILC-IDT

The Team is hosted by KEK and consists of the Executive Board (EB) and three Working Groups (WG1, WG2 and WG3).

The EB comprises:

- a Chair;
- a member from each of the three regions contributing to the ILC effort (Americas, Asia-Pacific and Europe); and
- three ex-officio members (KEK liaison officer and Chairs of WG2 and WG3, whereas WG1 is chaired by the EB Chair).

The EB members are appointed by ICFA. The EB has the overall responsibility for the Pre-Lab preparation.

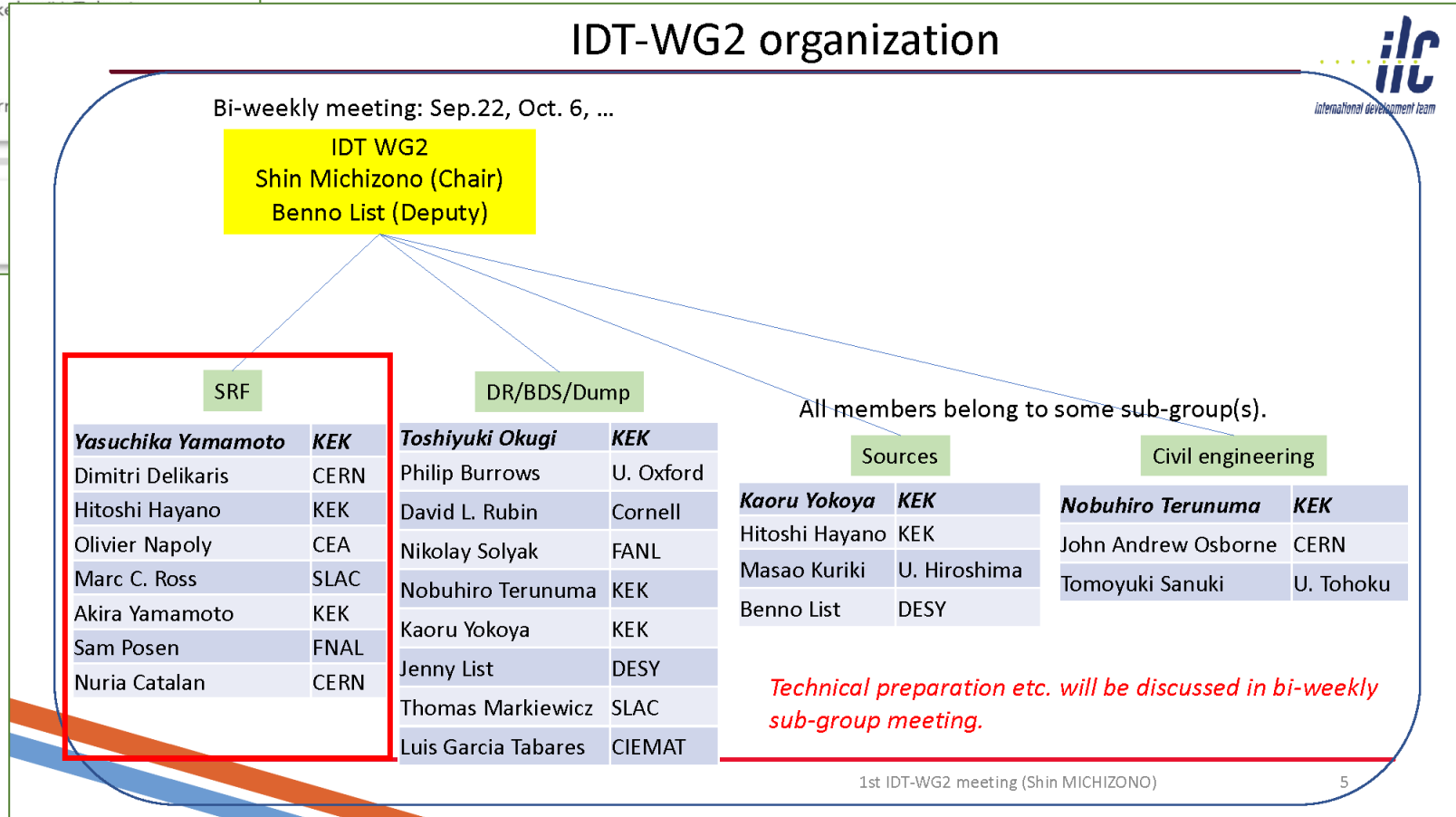
The EB and WG1 will carry out the key tasks of developing the function and organisational structure for the Pre-Lab. They will support the preparation of Memoranda of Understanding among the national laboratories and other interested parties for the operation of the Pre-Lab and will support discussions at the national authority level.

WG1 membership is established by the EB, includes the EB members and is chaired by the EB Chair.

WG2 conducts the ILC accelerator and facility work.

WG3 carries out the ILC physics and detector activities.

The members of WG2 and WG3 will be appointed by the EB.



IDT-WG2
 Chair: Shin Michizono
 Deputy: Benno List

Sub-Group: SRF
 Leader: Yasuchika (Kirk) Yamamoto

Sub-Group Meeting (alternately)
 Sept. 29,
 Oct. ?? (to be discussed)
 ...

IDT WG2 timeline



Example (towards Pre-lab)

- 2022 April: Pre-Lab starts
- 2021 Dec.: IDT ends
- 2021 Feb.: First draft of budget request (each region/lab.)
- 2020 Dec.: Draft of sharing remaining technical preparation/pre-lab preparation (each region/lab.)
- 2020 Oct.: AWLC
- 2020 Oct.: Information sharing about **technical preparation and updating the list**
- 2020 Sep.: List of Pre-lab acc. activities/ **Human resources/ budget/** schedule

**2021, Submission of budget request in each region/lab,
(2021, early Summer: Submission of budget request to MEXT, in case of Japan)**

Materials for Pre-lab human resources, budget, technical preparation

- KEK ILC action plan (Jan. 2018, KEK)

https://www.kek.jp/en/newsroom/KEK-ILC_ActionPlan_Addendum-EN%20%281%29.pdf

- “Recommendations on ILC Project Implementation” (Oct. 2019, KEK)

<https://www.kek.jp/en/newsroom/2019/10/02/1000/>

* Both materials are based on KEK estimate.

IDT-WG2 organization

Bi-weekly meeting: Sep.22, Oct. 6, ...

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

Charges of Sub-groups

- Discuss the topics, and work/progress 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

SRF

DR/BDS/Dump

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

Sources

Civil engineering

Yasuchika Yamamoto	KEK	Toshiyuki Okugi	KEK
Dimitri Delikaris	CERN	Philip Burrows	U. Oxford
Hitoshi Hayano	KEK	David L. Rubin	Cornell
Olivier Napoly	CEA	Nikolay Solyak	FANL
Marc C. Ross	SLAC	Nobuhiro Terunuma	KEK
Akira Yamamoto	KEK	Kaoru Yokoya	KEK
Sam Posen	FNAL	Jenny List	DESY
Nuria Catalan	CERN	Thomas Markiewicz	SLAC
		Luis Garcia Tabares	CIEMAT

Kaoru Yokoya	KEK
Hitoshi Hayano	KEK
Masao Kuriki	U. Hiroshima
Benno List	DESY

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

Technical preparation etc. will be discussed in bi-weekly sub-group meeting.

Technical preparation of SRF (only 4 years!)

ILC spec. should be satisfied!

- ❑ Mass production
 - ❑ Cavity production by cost effective method
 - ❑ Japan: 50 cavities, Others: 50 cavities
 - ❑ Ancillaries production (power coupler, tuner, HOM antenna, etc.)
 - ❑ Cryomodule production (Prototype, Type A, Type B)
- ❑ CM transportation
 - ❑ After marine transportation, CM test is done in Japan (maybe in others)
 - ❑ After CM test, CM may return to home country

In case of Japan;

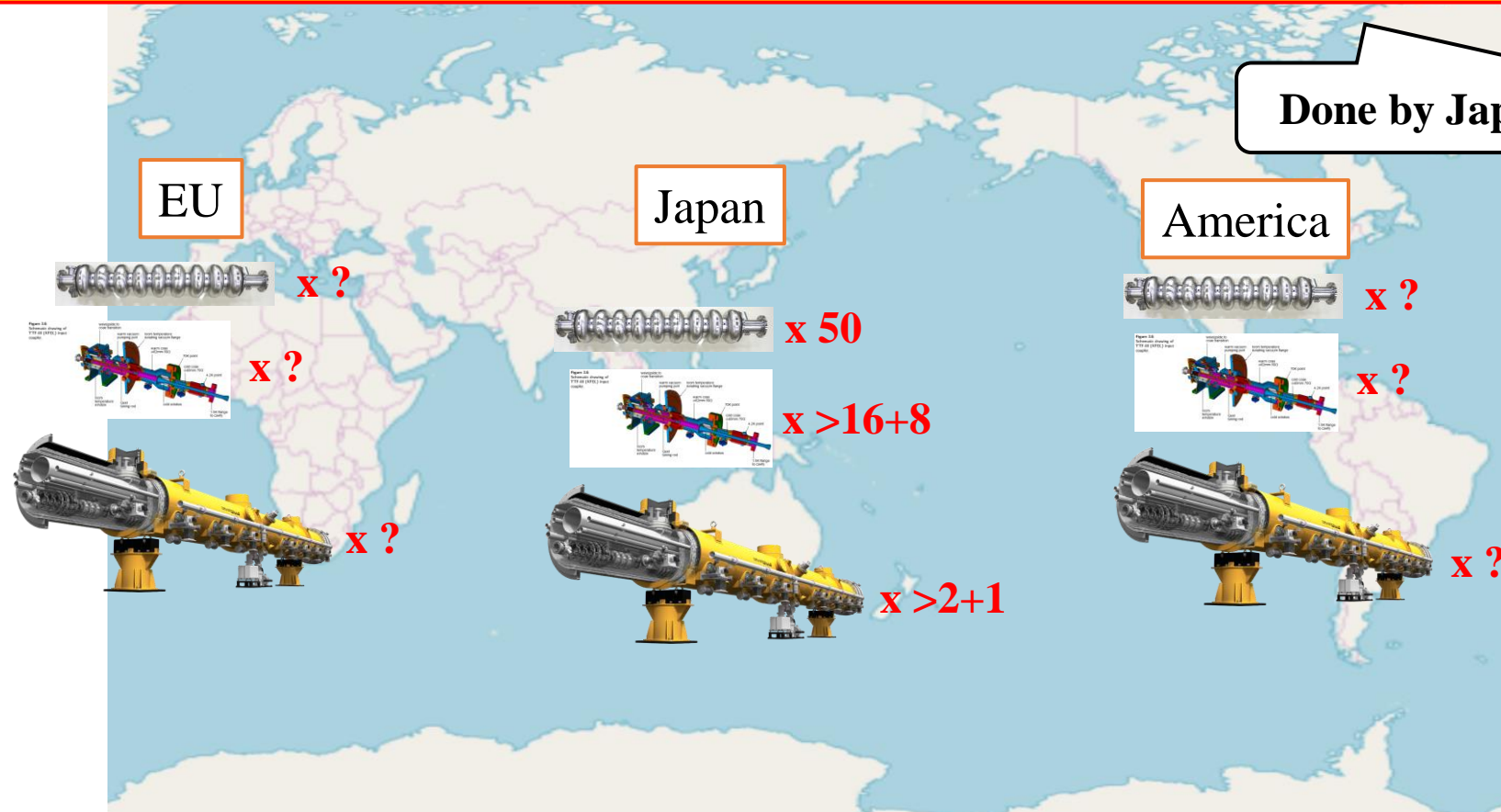
- ❑ **Construction of hub-laboratory for mass production**
- ❑ **Demonstration of beam acceleration satisfied with ILC spec.**

Remarks:

- Necessary cost should be considered **based on TDR.**
- Another important point is whether new technology can be (or prospectively) **reliable.**

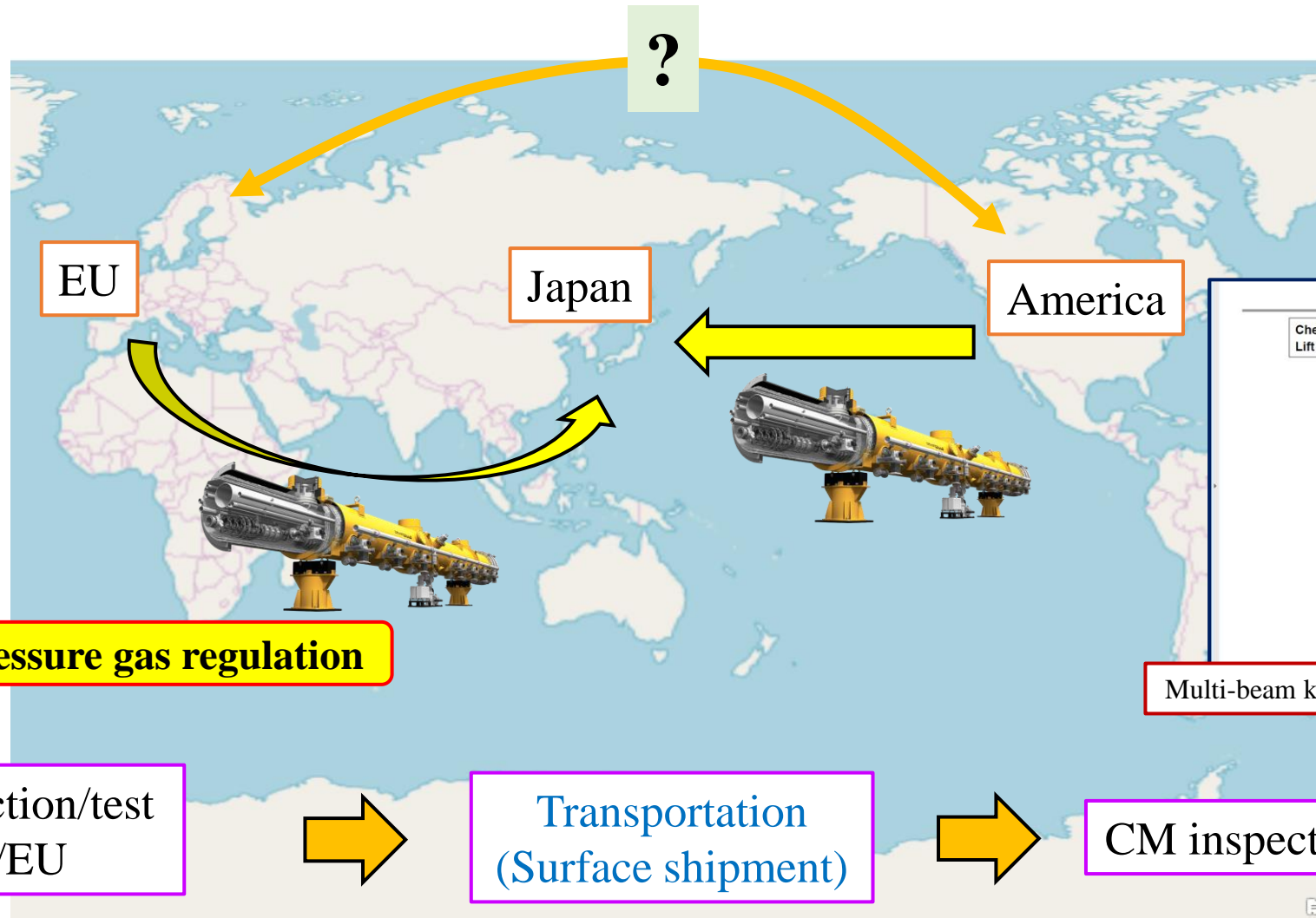
Mass production

Before mass production starts, tuner design should be fixed!!



Which lab. is responsible for cavity, power coupler, tuner, CM, etc.?
How many cavities, couplers, CMs are produced?

Cryomodule transportation from overseas



Note: Returning the CMs to Europe/Americas for redundant confirmations, to be discussed.

In case of Japan (KEK)...

STF



Demonstration of beam acceleration satisfied with ILC spec.

Infrastructure upgrade for hub-lab. is mandatory!

COI



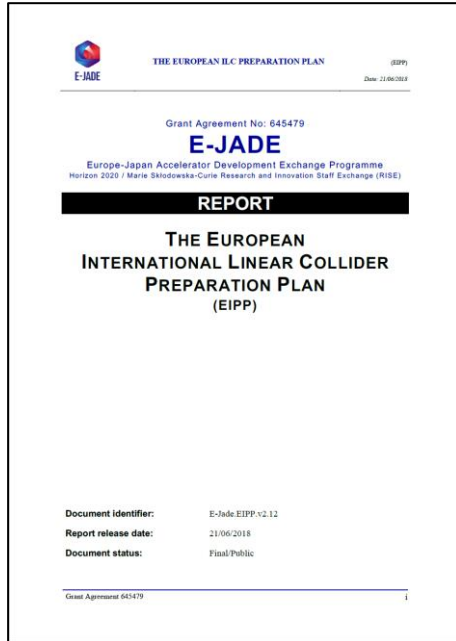
Mass production of CM

CFF



Mass production of cavity

Contribution from each lab. (case of E-JADE)



Item/topic	Brief description	CERN	France CEA	Germany DESY	Time line
SCRF	Cavity fabrication including forming and EBW technology,	✓			2017-18
	Cavity surface process: High-Q & -G with N-infusion to be demonstrated with statics, using High-G cavities available (# > 10) and fundamental surface research		✓	✓	2017-18
	Power input-coupler: plug compatible coupler with new ceramic window requiring no-coating	✓			2017-19
	Tuner: Cost-effective tuner w/ lever-arm tuner design	✓	✓		2017-19
	Cavity-string assembly: clean robotic-work for QA/QC.		✓		2017-19
Cryogenics	Design study: optimum layout, emergency/failure mode analysis, He inventory, and cryogenics safety management.	✓			2017-18
HLRF	Klystron: high-efficiency in both RF power and solenoid using HTS	✓			2017- (longer)
CFS	Civil engineering and layout optimization, including Tunnel Optimization Tool (TOT) development, and general safety management.	✓			2017-18
Beam dump	18 MW main beam dump: design study and R&D to seek for an optimum and reliable system including robotic work	✓			2017- (longer)
Positron source	Targetry simulation through undulator driven approach			✓	2017-19
Rad. safety	Radiation safety and control reflected to the tunnel/wall design	✓			2017 - (longer)

- SRF sub-groups need to make similar table for each region (Asia, America).
- Addition to these items, some new contents need to be added to the table.
 - CM transportation, automation, etc.
- And, budget, human resources...

KEK starts development of automation technique

Table 1: Current common studies between European institutions and Japan relevant for ILC.

	Germany DESY	France CEA Saclay	LAL	Italy INFN Milan	IFJ PAN	Poland WUT	NCBJ	Russia BINP	Spain CIEMAT
Linac									
Cryomodules	✓	✓		✓					
SCRF Cavities	✓			✓					
Power Couplers	✓		✓						
HOM Couplers							✓		
Frequency Tuners	✓								
Cold Vacuum	✓							✓	
Cavity String Assembly	✓	✓							
SC Magnets	✓				✓				✓
Infrastructure									
AMTF	✓				✓			✓	
Cryogenics	✓								
Sites & Buildings									
AMTF hall	✓								

	Germany DESY	France CEA	IPNO	Italy Elettra	INFN-LASA	Poland IFJ-PAN	Spain ESS Bilbao	Sweden ESS	Uppsala	UK STFC
RF systems				✓			✓	✓		
LLRF									✓	
Cryomodules		✓	✓							
SCRF Cavities		✓	✓		✓					✓
Power Couplers		✓	✓							
HOM couplers										
Frequency Tuners		✓	✓							
Cold Vacuum		✓	✓					✓		
Cavity String Assembly		✓	✓							
RF Tests (Cavities)	✓									✓
RF Tests (Cryomodules)		✓	✓			✓		✓	✓	

Table 2: Responsibility matrix for cryomodule production and testing for the European XFE

Table 3: Responsibility matrix for the cryomodule production and testing for the ESS.

- ✓ Introduction of myself
- ✓ Mission of SRF group, and schedule
- ✓ Discussion on additional members
- ✓ others

IDT-WG2 organization

Bi-weekly meeting: Sep.22, Oct. 6, ...

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

◆ possible to add new member to SRF sub-group
 (with approvals by Michizono-san and Kirk)
 Note: More formality to add new member to WG2 (with approval by EB)

SRF

DR/BDS/Dump

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

Sources

Civil engineering

Yasuchika Yamamoto	KEK	Toshiyuki Okugi	KEK
Dimitri Delikaris	CERN	Philip Burrows	U. Oxford
Hitoshi Hayano	KEK	David L. Rubin	Cornell
Olivier Napoly	CEA	Nikolay Solyak	FANL
Marc C. Ross	SLAC	Nobuhiro Terunuma	KEK
Akira Yamamoto	KEK	Kaoru Yokoya	KEK
Sam Posen	FNAL	Jenny List	DESY
Nuria Catalan	CERN	Thomas Markiewicz	SLAC
		Luis Garcia Tabares	CIEMAT

Kaoru Yokoya	KEK
Hitoshi Hayano	KEK
Masao Kuriki	U. Hiroshima
Benno List	DESY

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

Technical preparation etc. will be discussed in bi-weekly sub-group meeting.

- ✓ Introduction of myself
- ✓ Mission of SRF group, and schedule
- ✓ Discussion on additional members
- ✓ others

Tentative agenda for next meeting on 12/Oct

- ◆ Input from each region for SRF list
- ◆ SRF program in AWLC2020

Any other content?

Additional Remarks:

- **Confirmation** of the ILC Acc. Construction Cost:
 - to prepare for the Eng. Design Report (EDR) to be completed in the ILC Prelab Phase, and
 - to include partial updates for subjects not included in TDR
- **Preparation/Establishment** of the ILC preparation budget in each region:
 - to be authorized and funded in each region, prior for starting the ILC prelab phase.
 - For example: CM transportation test program need new budgets to prepare for the new CM* performance to be confirmed before and after the transportation,
 - * CM need to satisfy the High-Pressure regulation (correspond. to PED in EU).
- **AWLC**. SRF session program:
 - To be discussed in the next SRF subgroup meeting, 12 Oct.