

5th meeting of SRF subgroup in IDT/WG2

- ✓ New members of SRF subgroup
- ✓ Reconfirmation/determination of task list
 - ✓ Update of # of cavity/cryomodule in technical preparation period
 - ✓ Plug-compatibility
 - ✓ Global CM transfer
- ✓ Preparation for draft of budget request
- ✓ Discussions on high pressure gas, cost down R&D, etc.
- ✓ Others (if any)

Attendees: A. Yamamoto, S. Michizono, H. Hayano, N. C. Lasheras, S. Posen, R. Rimmer, R. Geng, M. Liepe, P. McIntosh, B. List, B. Laxdal, E. Cenni, L. Monaco, L.G. Tabares, O. Napoly, N. Solyak, Kirk

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

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/>

SRF **Bi-weekly Tuesday**
 Oct.13,27,...

DR/BDS/Dump **Bi-weekly Tuesday**
 Oct.13,27,...

Yasuchika Yamamoto	KEK
Nuria Catalan	CERN
Enrico Cenni	CEA
Dimitri Delikaris	CERN
Rongli Geng	JLAB
Hitoshi Hayano	KEK
Bob Laxdal	Triumpf
Matthias Liepe	Cornell
Peter McIntosh	STFC
Laura Monaco	INFN Milano
Olivier Napoly	CEA
Sam Posen	FNAL
Robert Rimmer	JLAB
Marc C. Ross	SLAC
Luis Garcia Tabares	CIEMAT
Hans Weise	DESY
Akira Yamamoto	KEK

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
Nobuhiro Terunuma	KEK
Glen White	SLAC
Kaoru Yokoya	KEK
Mikhail Zobov	INFN LNF

Ivan Podadera ivan.podadera@ciemat.es

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).

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

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

Peter Sievers Peter.Sievers@cern.ch

Sabine Riemann<sabine.riemann@desy.de>

Civil engineering

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

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

Main tasks in technical preparation period based on “Recommendations on ILC Project Implementation”

- ◆ Cavity and cryomodule production
 - ◆ 100 cavities produced in preparation for mass production
 - ◆ ~1% of full production
 - ◆ Japan: 50 cavities, other regions/countries: 50 cavities
 - ◆ By new cost-effective production method
 - ◆ Plug-compatibility re-confirmed/re-established
 - ◆ Surface preparation recipe baseline/guideline to be re-established
 - ◆ To be checked RF performance/success yield
 - ◆ High pressure gas regulation in Japan (cavity/cryomodule production)
 - ◆ Coupler/Tuner improved/produced/assembled/tested
 - ◆ Superconducting magnet (quad.+dipole combined) in CM to sustain under dark current irradiation from high-gradient SRF linac
 - ◆ Cryomodule (CM) production/test
- ◆ Cryomodule transport (“Global Cryomodule transfer”)
 - ◆ Shipment/transport incl. inspection
 - ◆ RF performance rechecked after transport

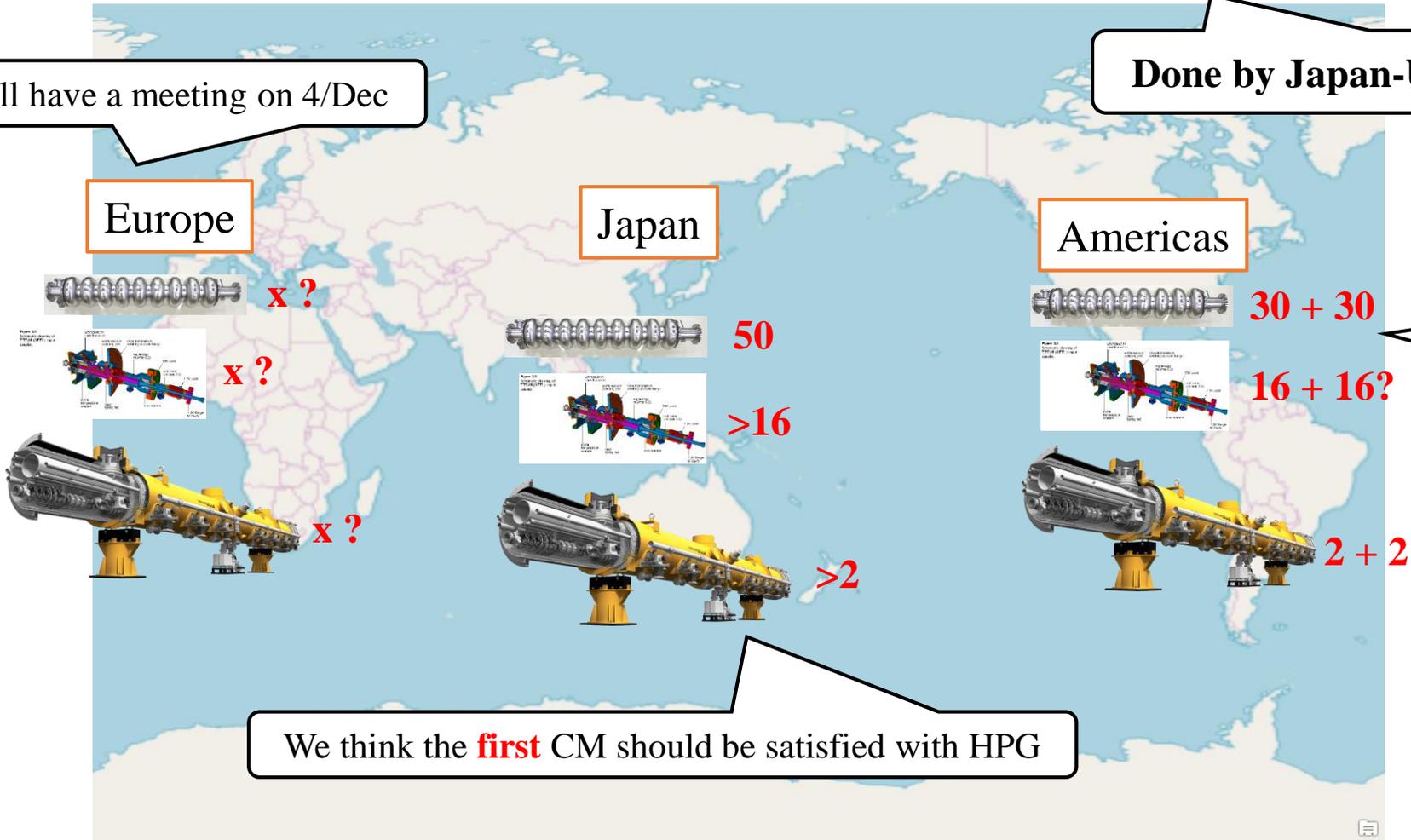
Crab cavity is listed additionally **as third issue**

Update of # of cavity/cryomodule produced in technical preparation period

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

European people will have a meeting on 4/Dec

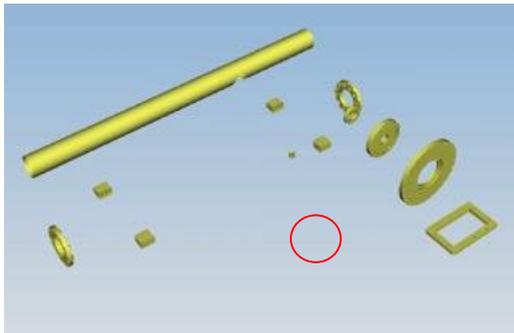
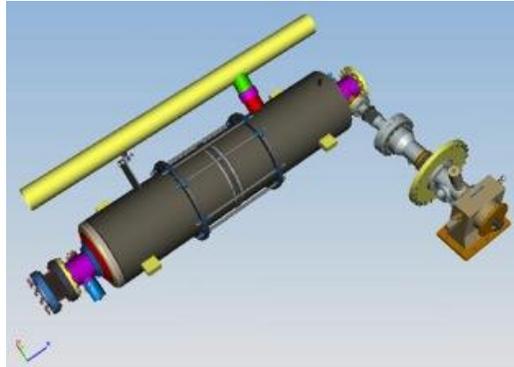
Done by Japan-U.S. collaboration



We think the **first** CM should be satisfied with HPG

In the both plans of Japan and Americas, upgrade of infrastructure as function of hub-laboratory is also included!

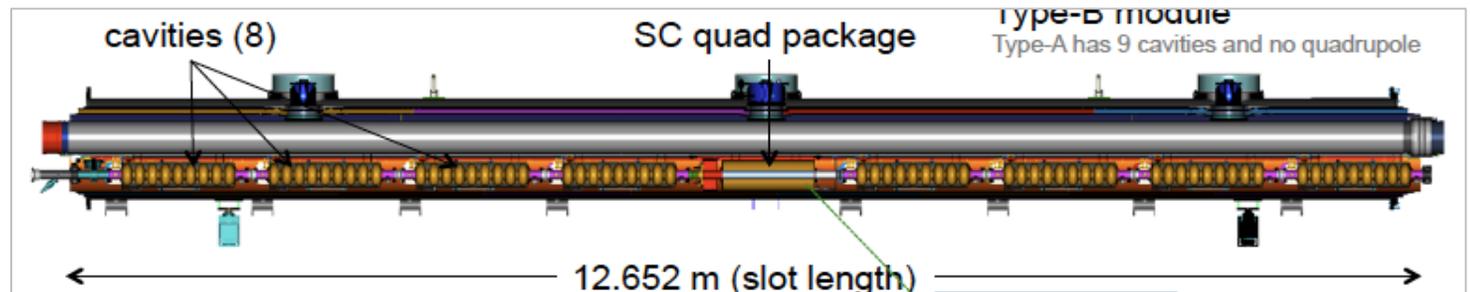
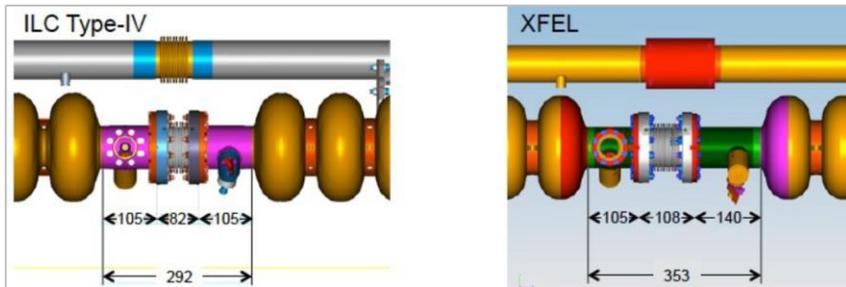
Interface and Process established, in TDR, 2013



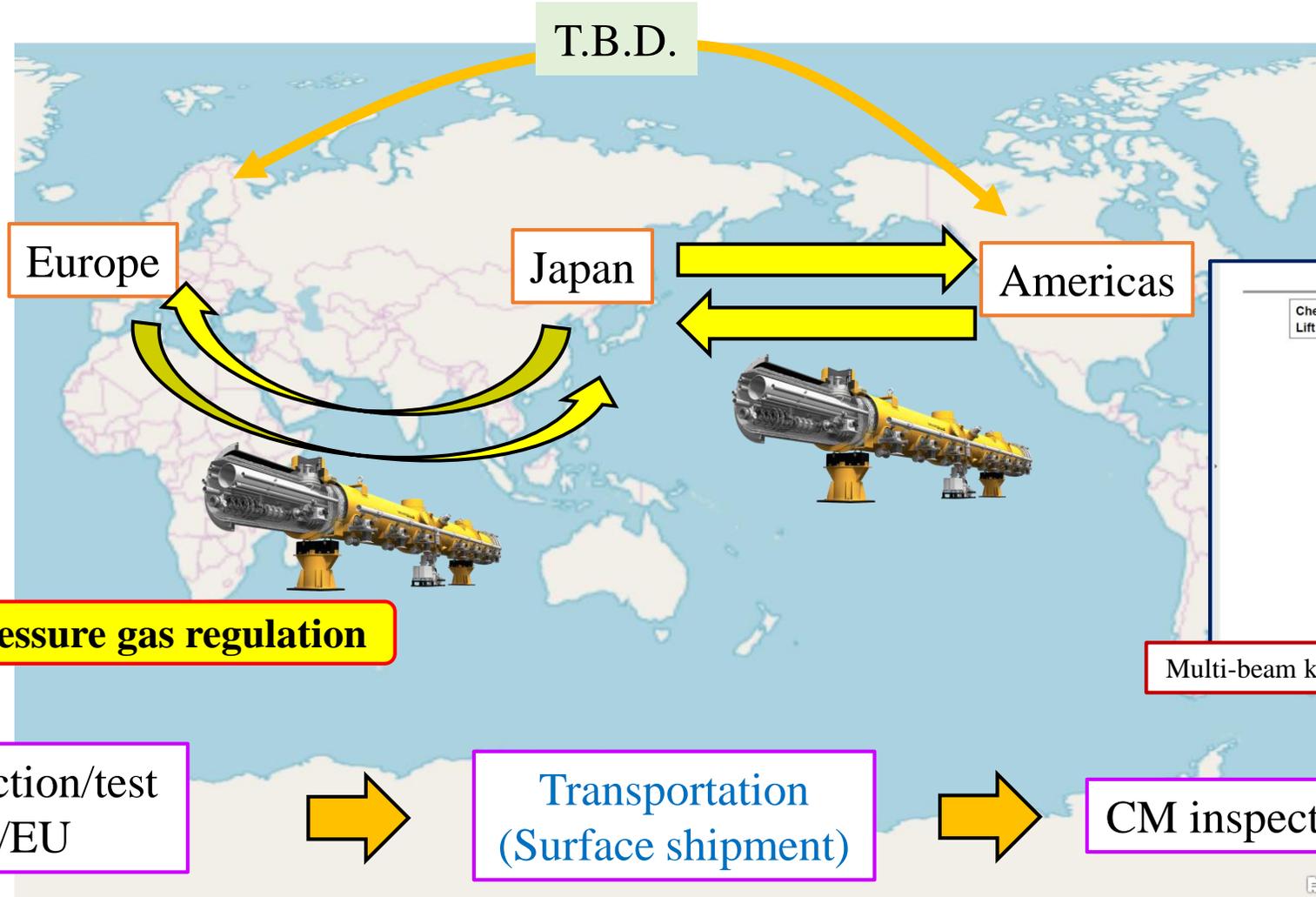
Item	TDR Baseline
Cavity shape	TESLA
Length	Fixed, L = 1,247 mm (61 mm shorter than XFEL)
Beam pipe flange	Fixed
Suspension pitch	Fixed
Tuner	Blade
Coupler flange (cold end)	40 mm
Coupler pitch	Fixed
He -in-line joint	Fixed

	Standard Fabrication/Process
Fabrication	Nb-sheet purchasing
	Component Fabrication
	Cavity manufacturing with EBW
Process	EP-1 (~150um)
	Ultrasonic degreasing with detergent, or ethanol rinse
	High-pressure pure-water rinsing
	Hydrogen degassing at > 600 C
	Field flatness tuning
	EP-2 (~20um)
	Ultrasonic degreasing or ethanol (or EP 5 um with fresh acid)
	High-pressure pure-water rinsing (HPR)
	Antenna Assembly
	Baking at 120 C
Cold Test (vertical test)	Performance Test with temperature and mode measurement

12/05/14 KEK-LC-Meeting



Global cryomodule transfer in technical preparation period



Preparation for task list/budget request

Michizono-san and Kirk are preparing for document and task list including budget request for the technical preparation period. We will submit the preliminary version to EB early December. Then, the SRF subgroup has to fix the task list until the end of this month.

Table 4.3: Accelerator-related technical preparation tasks and possible partners for international collaboration as envisioned by KEK.

Component	Issue	Summary of tasks	Candidates for collaboration
SCRF Cavity	Mass production incl. automation	Performance statistics, mass production technology	France, Germany, US
	Cryomodule transport	Performance assurance after transport	France, Germany, US
Rotating target	Design	Exchanging target, design	CERN, France, Germany, US + industry-academia effort
	Design	Design	France, Germany, Russia
Ring	Design	Design	CERN, Germany
	Feedback	Test at SuperKEKB	Italy
Interaction	Beam	Long-term stability, design	CERN, Italy
	Beam	Test at SuperKEKB	CERN, UK
Beam Dump	Beam window, cooling water circulation	Durability, exchangeability, earthquake-resistance	CERN, US + industry-academia efforts

Budget request will be added

Name of laboratories will be added

Crab cavity is listed additionally **as third issue**

If you don't have any other input, we can fix these two (plus one) tasks as the list of SRF

Schedule of SRF subgroup meeting in IDT/WG2

Meeting #	Date	Contents
1	29/Sep/2020	introduction, member list, schedule/work items in technical preparation, discussions
2	13/Oct/2020	New member, discussions on how many cavities/CMs to be produced, AWLC2020
	19~22/Oct/2020	AWLC2020 on virtual
3	27/Oct/2020	Brief report of KEK-DOE mtg and AWLC, discussions on main items in technical preparation
4	10/Nov/2020	Reports from US labs., introduction to Michizono-san's report, discussions on cost down R&D, crab cavity, high pressure gas, etc.
5	24/Nov/2020	To be fixed task list in technical preparation period
6	8/Dec/2020	To be checked draft for budget request
7	22/Dec/2020	Are you convenient (Christmas holiday)? Draft of sharing work items in technical preparation period
?	12/Jan/2021?	
?	19/Jan/2021	
	19~21/Jan/2021	TTC meeting 2021 on virtual
?	26/Jan/2021	
	Feb/2021	First draft of budget request in each region/lab., Submission to WG1/EB
		Preparation for MOU between/among laboratories
	Jun~Jul/2021	Submission of budget request to MEXT, in case of Japan

Questions/Discussions/Comments (memorandum) @5th meeting

Translation by Kirk

- Plug-compatibility
 - One design should be selected. More than two types, we need two jigs, and will experience complicated situation.
 - We can decide only flanges of cavity and CM, it dose not mean two types are used
- Relation between surface treatment and cost increase
 - We think selection of surface treatment is flexible, but we also need to think about the cost increase related to the selected method
- The words of “mass production” may be misunderstood, it’s much better to use the other ones
- SCQ is included in CM production?
 - Yes, Spain is added as the new contributor
- Steiner will organize the meeting in Europe to discuss cavity/CM production and test, how shared, how proceeding
 - Crab cavity is unknown to discuss
- Budget request
 - Local or global to be submitted?
 - How much precise is the draft?
 - In Japanese case, we need to submit by August of the previous fiscal year. We need to complete the draft by the end of this year, discuss it with EB, and go to each lab. for consultation.
 - In Americas and Europe, it will be a different process. At least, the process will be slower than in Japan.
 - In Europe, we need to hold a meeting because we have to discuss the proposal first
 - The SRF budget request does not include the cost of infrastructure as function of hub-lab, but FNAL and J-LAB plan to construct new experimental facilities. If it is built during the technical preparation period, the new experimental facility will be available only around the final fiscal year, and there will not be enough time to demonstrate its function as a facility.
 - There are various approaches in each lab and each region, and it is difficult to unify all of them. Of course, it may be behind the expected plan, so you don't have to think so seriously.
- The SRF subgroup concluded that there are three main tasks (cavity/CM production, global CM transfer, crab cavity) during the technical preparation period
 - If there is more input from Europe and Americas, we think it can be added later
- How about the SRF subgroup meeting on 22/Dec?
 - CERN and Spain are on Christmas holidays
 - Americas has no problem

Announcements

- Two meetings related to crab cavity have been done on 24, 30/Nov
 - Issues on installation space, beam dynamics, timing confirmed/discussed
 - Presentations from UK, US, CERN
 - Task list in technical preparation period
- European meeting related to SRF technology will be held on 4/Dec