WG AC-5 Summary: AD & I

There were 6 talks :

1)	EDMS Summary and Plans	B. List
2)	Timing / Survey Constraints	E. Paterson
3)	ITER Integration	A. Yamamoto
4)	Draft Schedule (ILC-Asia)	M. Gastal
5)	Site Investigation Report	M. Miyahara
6)	Beam/Service Tunnel config.	A. Enomoto

1) EDMS (Benno List)

EDMS – ***TDD*** is the primary deliverable in support of the TDR:

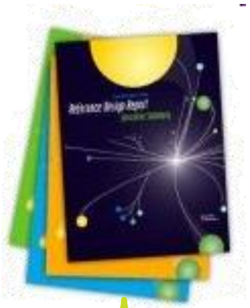
- Design and policy documents; parameter tables
- Cost estimate
- CAD models

What is our EDMS 'score'?

- How much intended content is properly in EDMS?

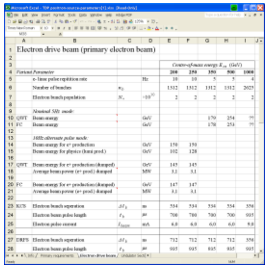
What is planned to consolidate etc?

TDD, TDR and ILC-EDMS



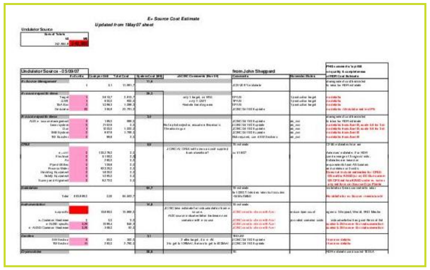
Technical Design Report (TDR) summarizes TDD for publication

Technical Design Documentation (TDD) captures entire design efforts, results & rationale

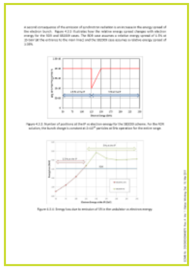


Parameters

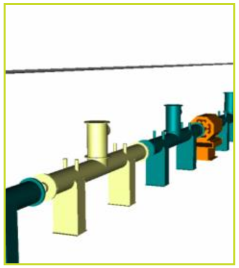
Specifications



Cost Estimation



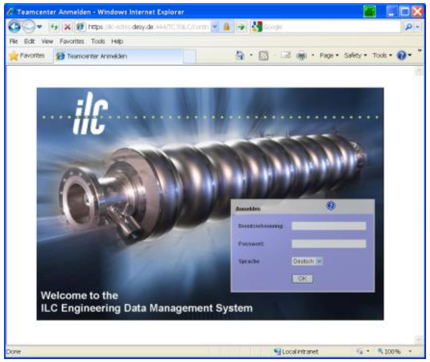
Calculations



CAD Models

Design Summary

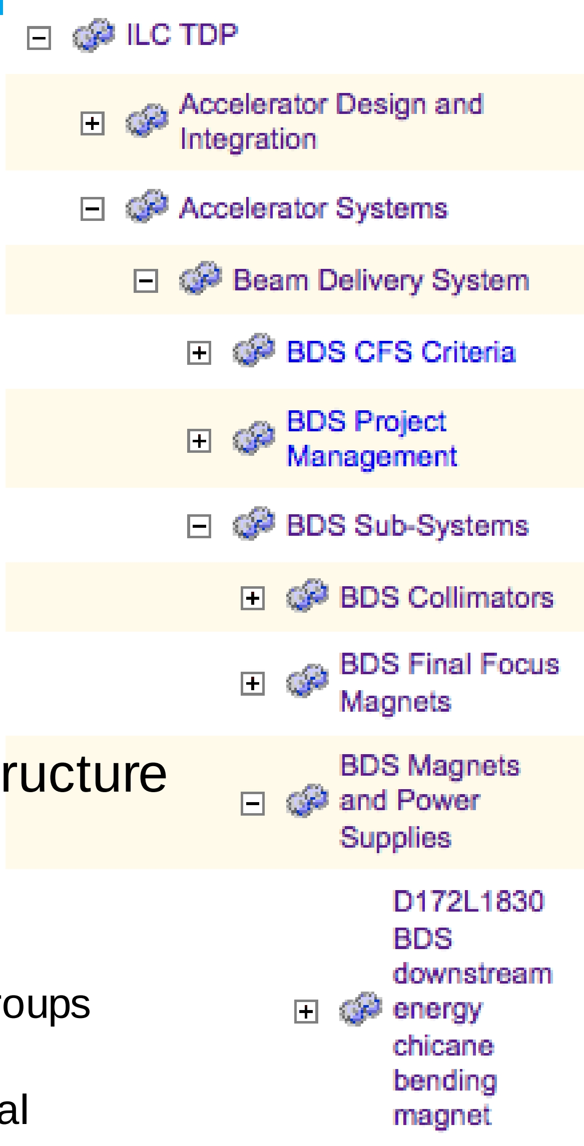
...



ILC-EDMS organizes the Technical Design Documentation, providing **structure**, **traceability**, **version & configuration mgt.**, and **change control**

Plans: Reconciling Document & Cost Structure (WBS)

- Work Breakdown Structure is a central tool in modern project management for
  - Scope management: What does the project entail? What is in, what is out?
  - Cost management
  - Project scheduling
  - Progress monitoring (reporting, cost control / Earnend Value Management)
- We currently use WBS's for
  - Structuring of the documentation
  - Structuring of costs
- The Goal: unify the cost and the documentation structure
- Benefits:
  - Better tracking of cost impact of design changes
  - Better correspondence between cost items and people / groups working on them
  - Better correspondence between cost estimate and technical documentation



Next Steps: Consolidation / Expansion of the WBS

- Consolidate: Define what the WBS elements entail (WBS dictionary)
- Expand: Identify the deliverables and work needed to complete the project (1-2 levels down from accelerator systems / technical areas)
- Keep flexible to adjust to project structure as it emerges

Benefits:

- Solid foundation for costing and scheduling
- Foundation for risk analysis -> risk management: identify and react to
  - Threats, e.g. by dedicated R&D or early prototyping
  - Opportunities, e.g. larger gradient (-> provide enough RF to utilize that)

Plans and Interests at DESY

- **Support for ILC EDMS will continue!**
- Consolidation of existing design documentation has high priority
- This includes support for uploading and cross-linking the final cost estimation documents
- Work on design integration will continue

Medium / Longer Term Interests:

- Continue our support for the project into the Engineering Phase
- Develop / provide supporting tools (integration, documentation, cost estimation / control) and services for the TB / Project Management

Send us you wishlist!

2) ILC Path-Length Constraints / Suggestions

E. Paterson and D. Rubin

The TDR positron 'circuit' length requires trimming

- Considered a detail during the TDR
- To be reviewed and reset as part of staging scheme (and specific site)

There are 3 different scales to this E+/- path difference problem!

≈ 100 m Static in design for a given site layout.

Needs final site and design layout and is required before construction starts.

≈ 1 m Static but unknown until full operation.

Originates in Survey and Alignment above and below ground and used during design, construction, installation and commissioning. Will need some adjustment during commissioning due to limits in survey and installation accuracy. Needs an adjustment system??? DIFFICULT CHICANE!

≈ 1 mm, daily,monthly

Need some fine path length adjustment system?

Required during final commissioning and operation. Used daily and might use slow feed forward?

Change DR Circumference instead of RTML and Linac

Example of technique

• Promising results

Cornell Laboratory for Accelerator-based Sciences and Education (CLASSE)

Procedure for $\Delta P = 0.5m$

Consider 10 Hz mode as that is the more challenging since the circulation time is shorter

1. Fill damping ring with hot bunches and extract cold beam (first 100 turns)
2. Circulate for ~1 damping time (1500 turns)
3. Unlock DR RF of one ring for ~ 5000 turns with $\Delta f_{RF} \sim \pm 20Hz \Rightarrow \Delta C = \pm 0.1mm$, $(\Delta C = (-\Delta f/f)C)$
4. Relock RF ($\Delta f=0$)
5. Circulate for additional 2 ½ damping times (3000 turns)
6. Extract, having accumulated $\Delta P \approx \pm 0.5m$

- Looks feasible to introduce ~ 1-2 m path difference between electrons and positrons by varying damping ring RF frequency
- Negligible effect on emittance, partition numbers, bunch length
- Effect on dynamic aperture is asymmetric
  - DA relatively insensitive to increases in path length (reduced RF frequency)
  - DA shrinks rapidly with decreasing path length (increased RF frequency)

Should be checked with

- Misalignments
- Multipoles
- Full wiggler nonlinearities

- RF manipulation appears workable

3) ITER Integration - A. Yamamoto

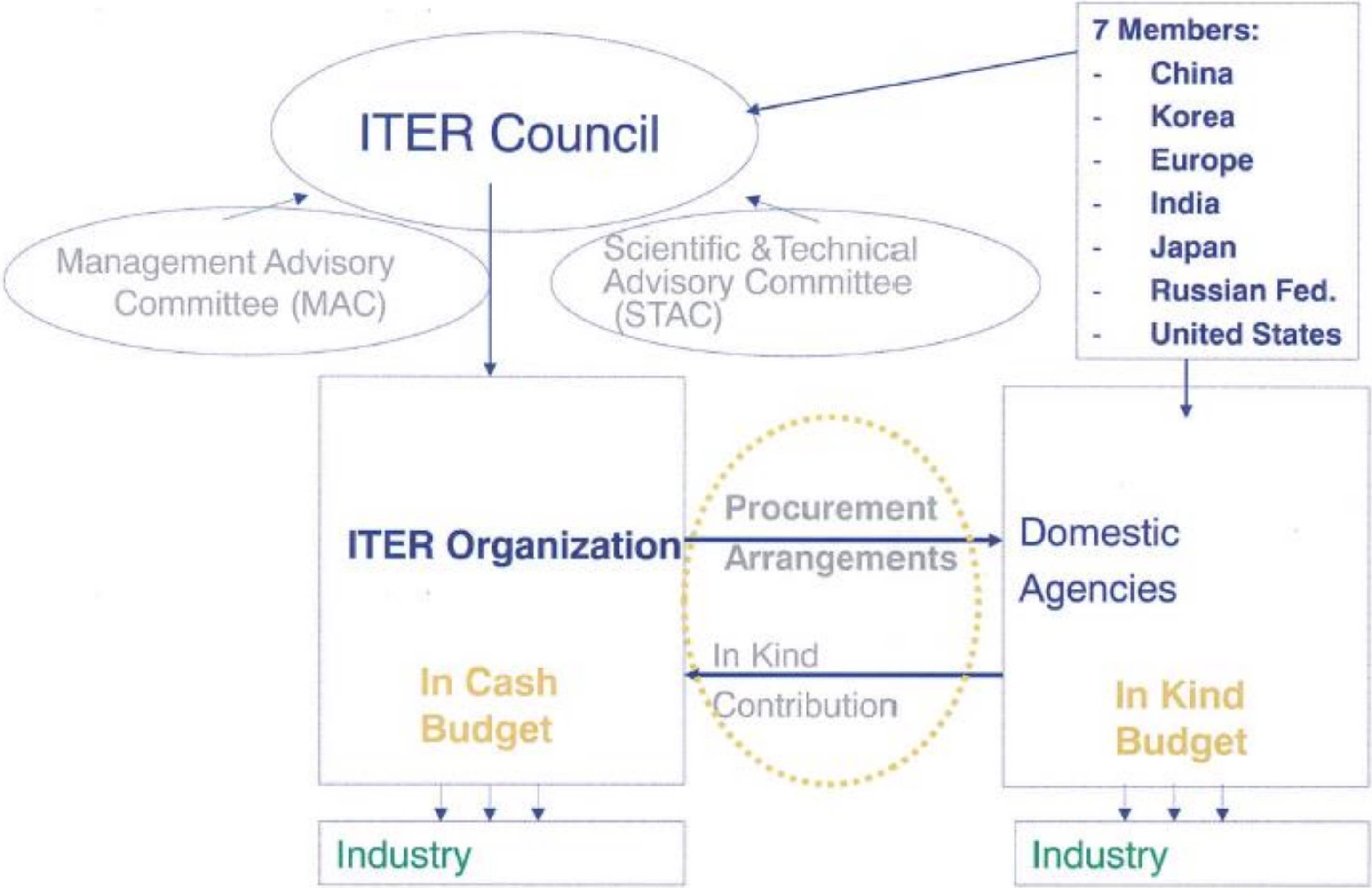
Cost Review (02.2013) identified 'other project costs' for further study:

esp. cost of managing in-kind contributions

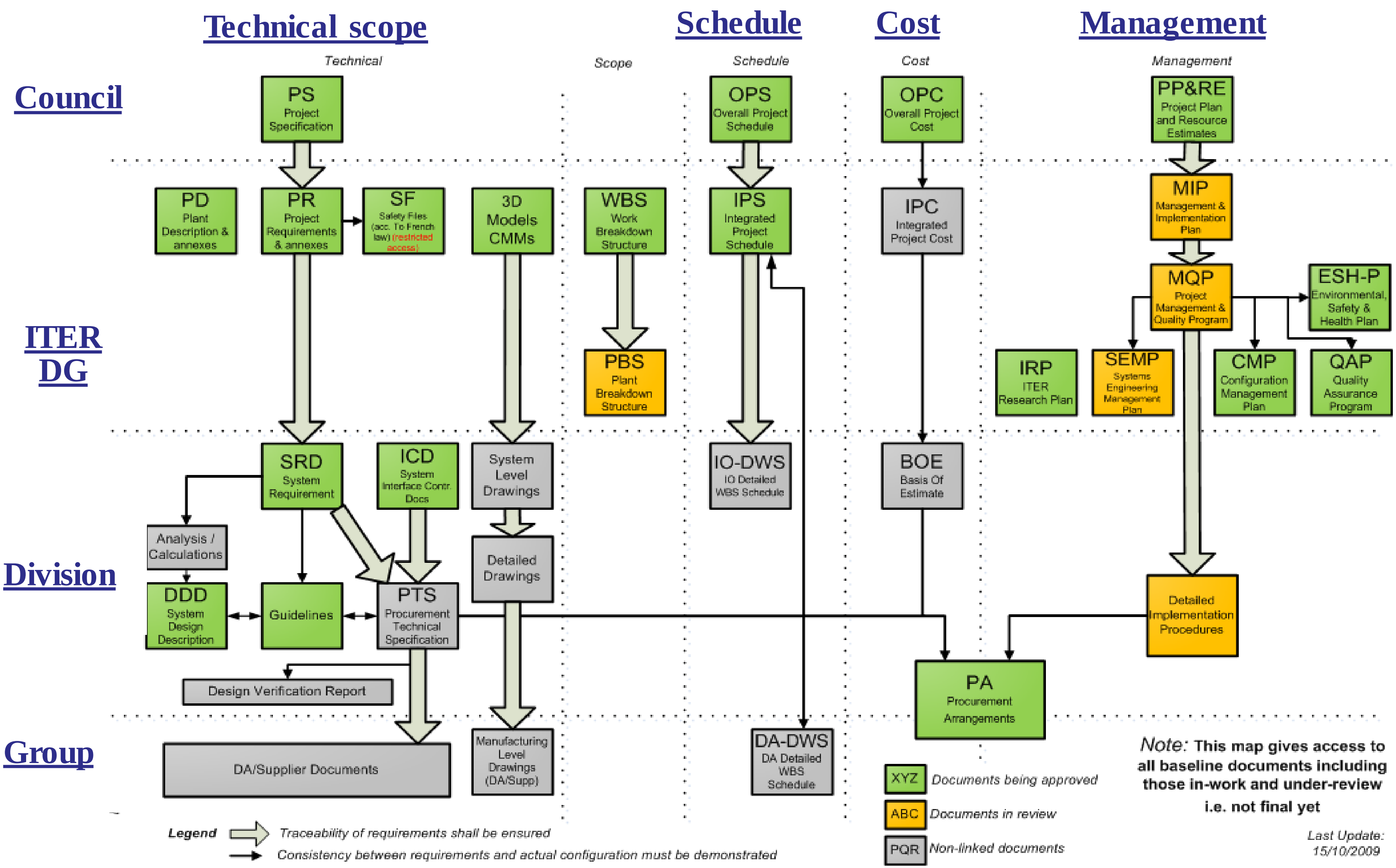
A very important aspect of ITER and EU-XFEL construction projects

E. Tada (Japan ITER Domestic Agency) provided overview of ITER in-kind management

The management of ITER



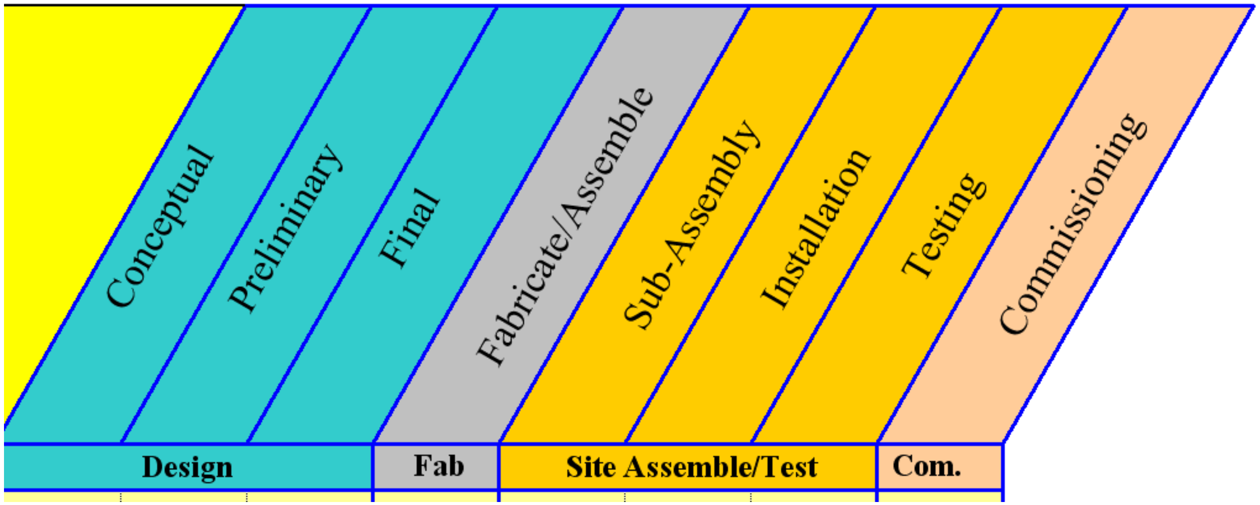
ITER Baseline Structure



Sharing of Work between IO and DA

Work sharing defined by frame chart

- Construction：IO/DAs depending on the type of specifications
- Transportation：IO to coordinate a global transportation
- On-site installation/testing：IO in support of DAs
- Project management & integration: IO



Type or specifications
- Functional: DA for preliminary design based on conceptual design by IO
- Detailed: DA for final design based on preliminary design by IO
- Build-to-print: DA for manufacturing design based on final design by IO

4) Draft Schedule (M. Region) - M. Gastal

Comprehensive look at schedule

(CFS, Technical, Detector, Staging)

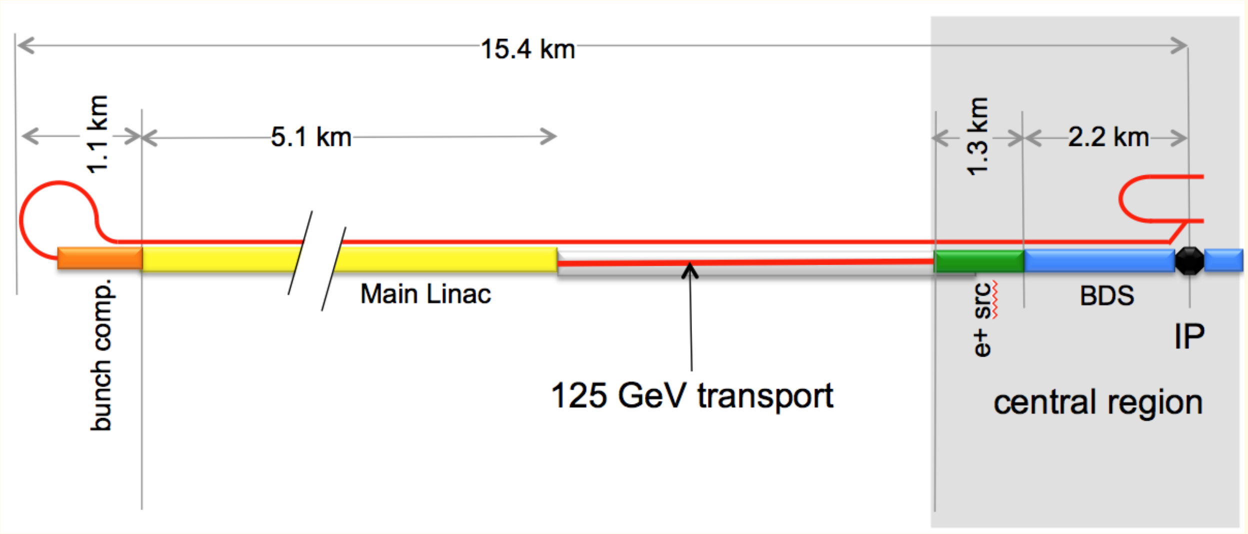
How much time do we save with staging?

Commissioning & Staged options

- → The Asian site schedule is labor intensive
- → Building the shielding wall takes an entire year of the schedule
- → The installation of infrastructure is fast thanks to the deployment of many teams and great tolerance to coactivity
- → For the installation of machine components, 4 teams are deployed
- → Milestone: BDS and ML up to AH1 ready for early commissioning
  - → Y8 Q2… but what about DR and RTML?
- → Milestone: Ready for Full commissioning (whole accelerator available)
  - → Y9 Q4
- → Milestone: ILC ready for beam
  - → Y10 Q4 (commissioning program to be fine tuned)
- → Commissioning programs still under study…
- → What would be the impact on the construction schedule to choose a staged approach?

Staged Scenario 2

→ Scenario 2:
250 GeV



15 tunnelling crews

→ Costs and benefits of Option 2

- → 2a. Install all the final common facilities in the 125GeV transport tunnel section
  - → 9 months could be save by redeploying the machine installation crews
  - → The installation of the final common facilities hardly comes on the critical path
  - → 6 months could be dedicated to the installation of the 125GeV transport line
- → 2b. Install only minimum required services for 125GeV transport line
  - → 1 year could be saved by redeploying the CF and machine installation crews
  - → 2.8 years could be dedicated to the installation of the “temporary” CF and the 125GeV transport line

5) Site Investigation Report – M. Miyahara

Focus of attention for LC2013

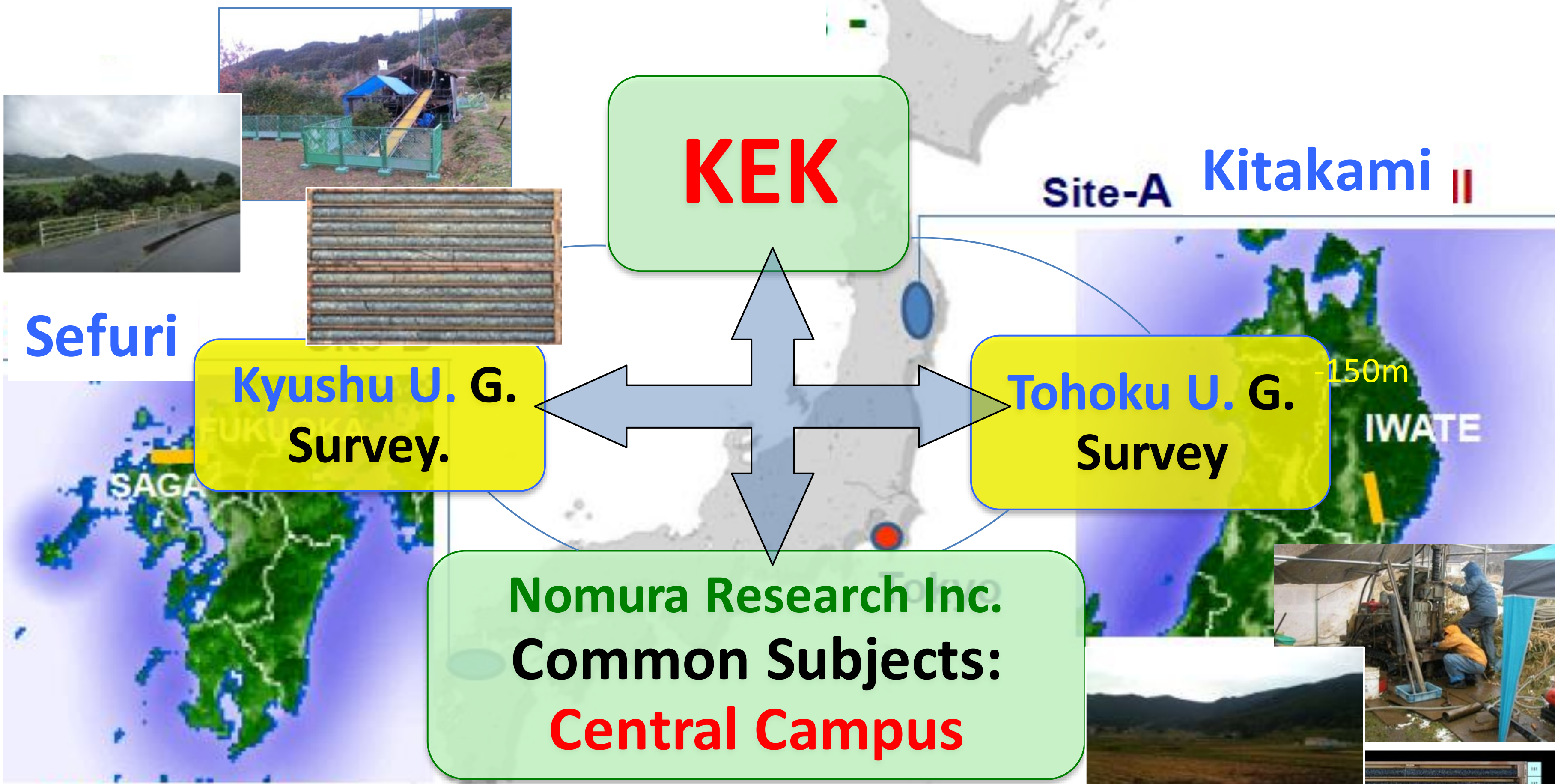
Multi-year study **(led by KEK) now nearing completion**

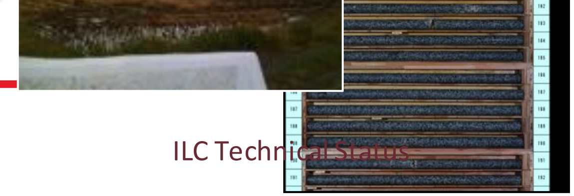
→ Critical for Japanese (internal) site recommendation

→ 07.2013

Culmination of a major effort

Geological Survey and Common-Subject Study progressed in japan





Reports to be available in July, 2013

Evaluation of Possible ILC Sites: Background

1. Initial site-study promoted by local organizations (~ 2011)

- Reports given in 2012 (50 ~ 100 pages)
  - Science Frontier Plans in Kyushu, and in Tohoku

2. Study with neutrality through KEK based on the Government requests (in 2011 ~ 2012)

- Including geo-technical studies and city/campus planning
- In cooperation with consultants/excerpts: Nomura Research Inc (NRI).

3. **Further evaluation and plan**

- *Opinion Survey in ILC community to be proceeded after site selection in 2013*

Conceptual Study of the ILC Central Campus Design (reported: AC-5, AD&I, May 30)

Survey/Study proceeded with visiting:

- CERN
- ITER,
- CEA/Saclay,
- OIST (Okinawa),
- Universities,
- KEK/JAEA,

A Plan for Opinion-Survey / Enquete to solicit inputs from ILC community: (to be done in 2013)

- **Objectives:**
  - *To solicit your inputs to the conceptual design of the ILC laboratory/campus and environment :*
- **Questions such as:**
  - *Number of researchers 'on-site' (or nearby)*
  - *Stay/visit - Duration*
  - *Space and infrastructure requirements*
  - *Specific requests, advices and or concerns*

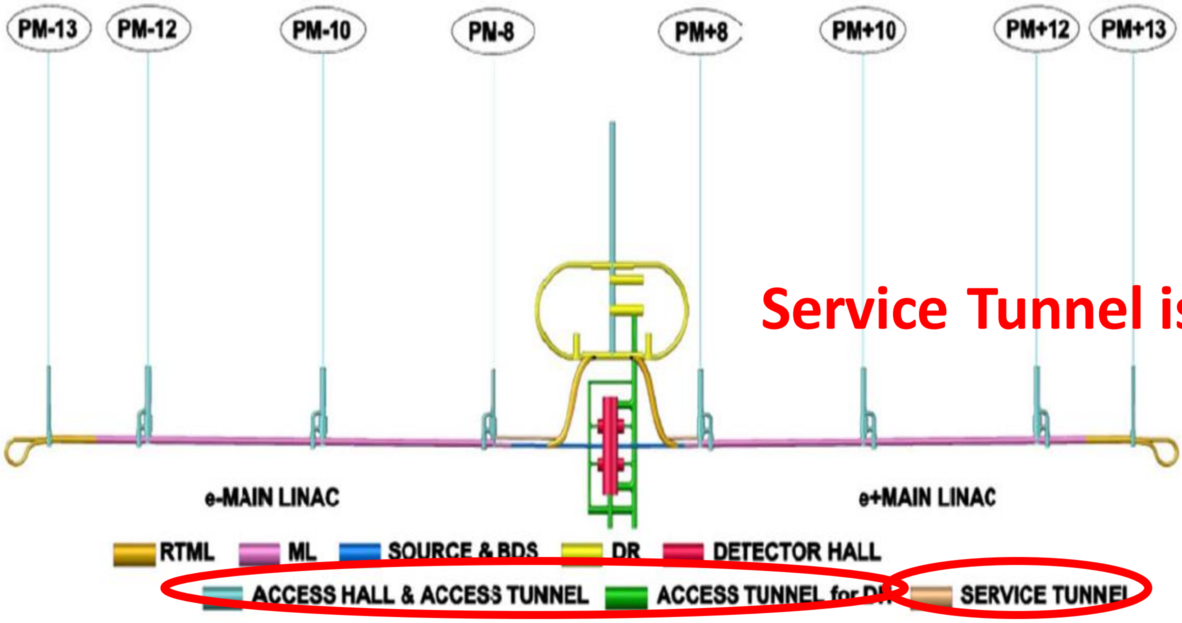
6) Beam/Service Tunnel Config. A. Enomoto

Adapting and ***checking*** the TDR configuration in preparation for a real site

Reconciliation of technical component / civil layouts

Beam/Service Tunnel Direction

Service tunnel is located on the opposite side of beam dumps.

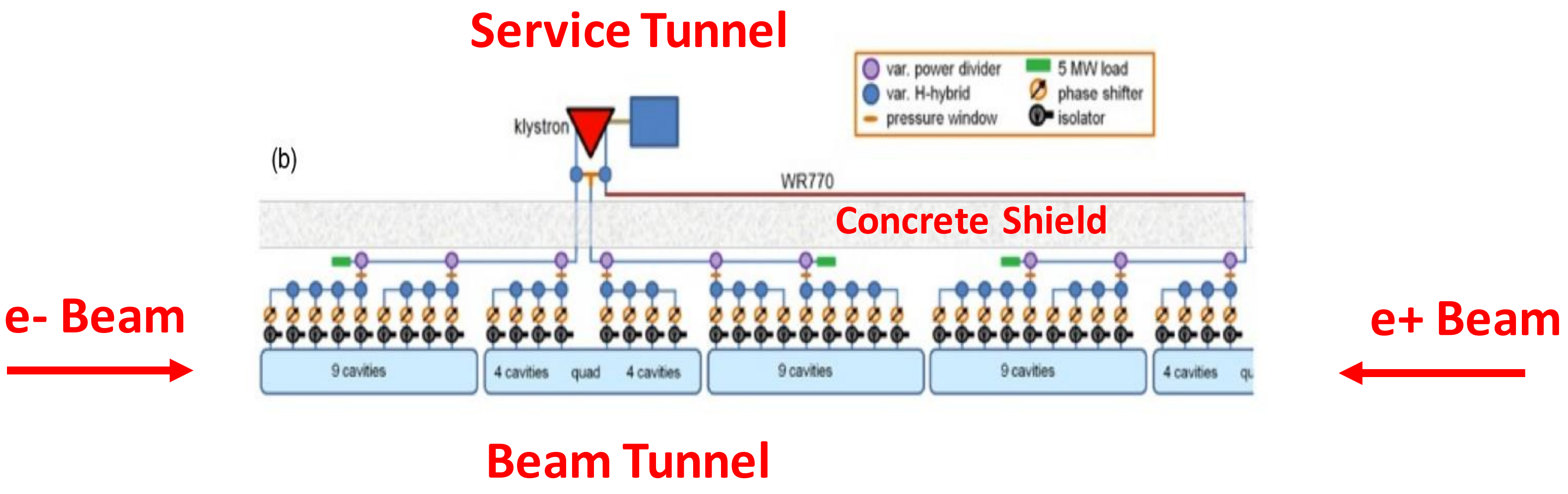


Service Tunnel is on this side.

Beam Tunnel is on this side.

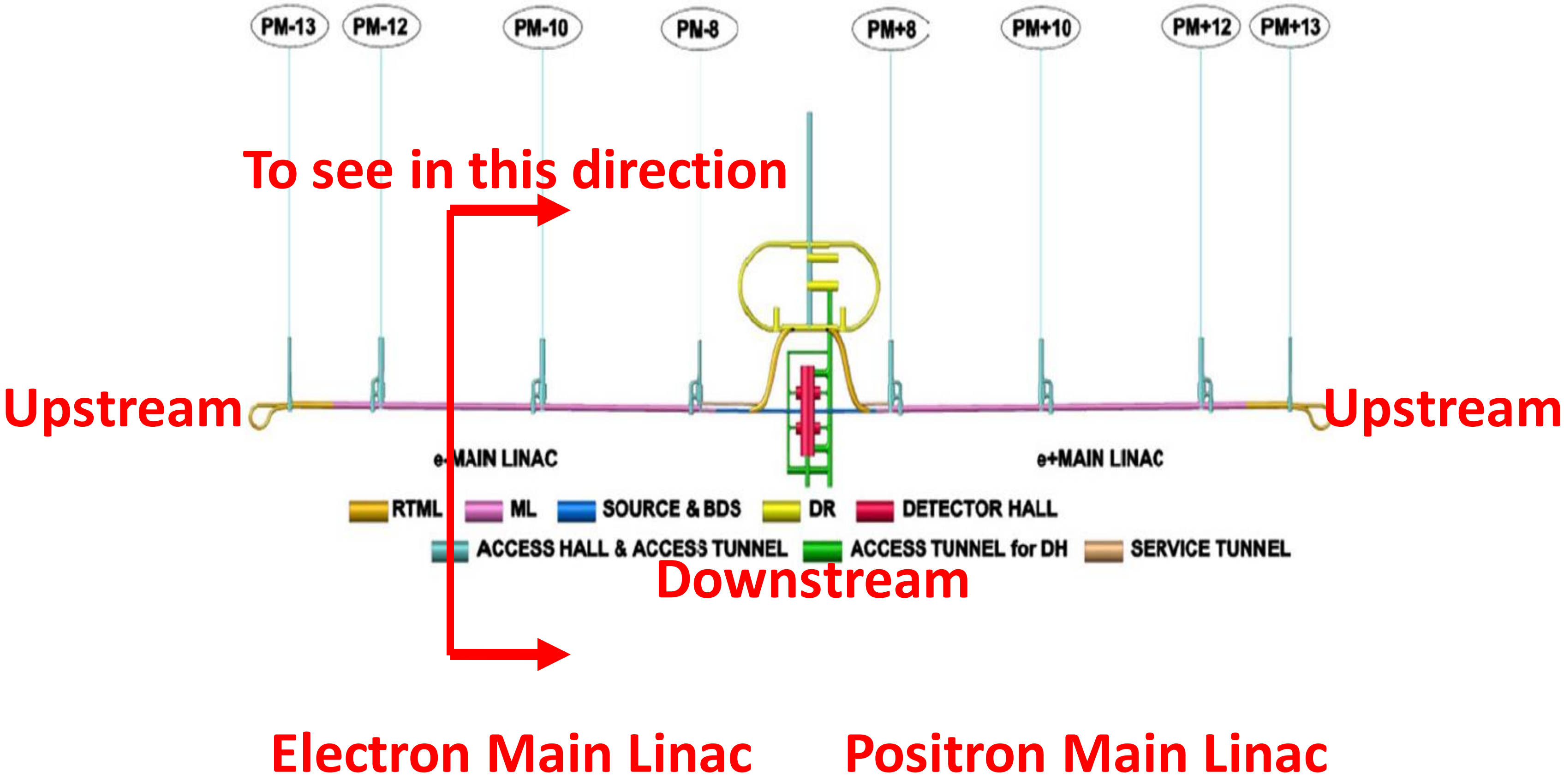
Acceleration Direction in Main Linac

Cryomodules are installed in the same way for both e+/e- linacs;
The directions of acceleration differ from each other.



Proposal for Direction To See Main Linac Section

Direction to see ML cross section should be kept always from upstream to downstream in the electron main linac.



Then – this view is correct: