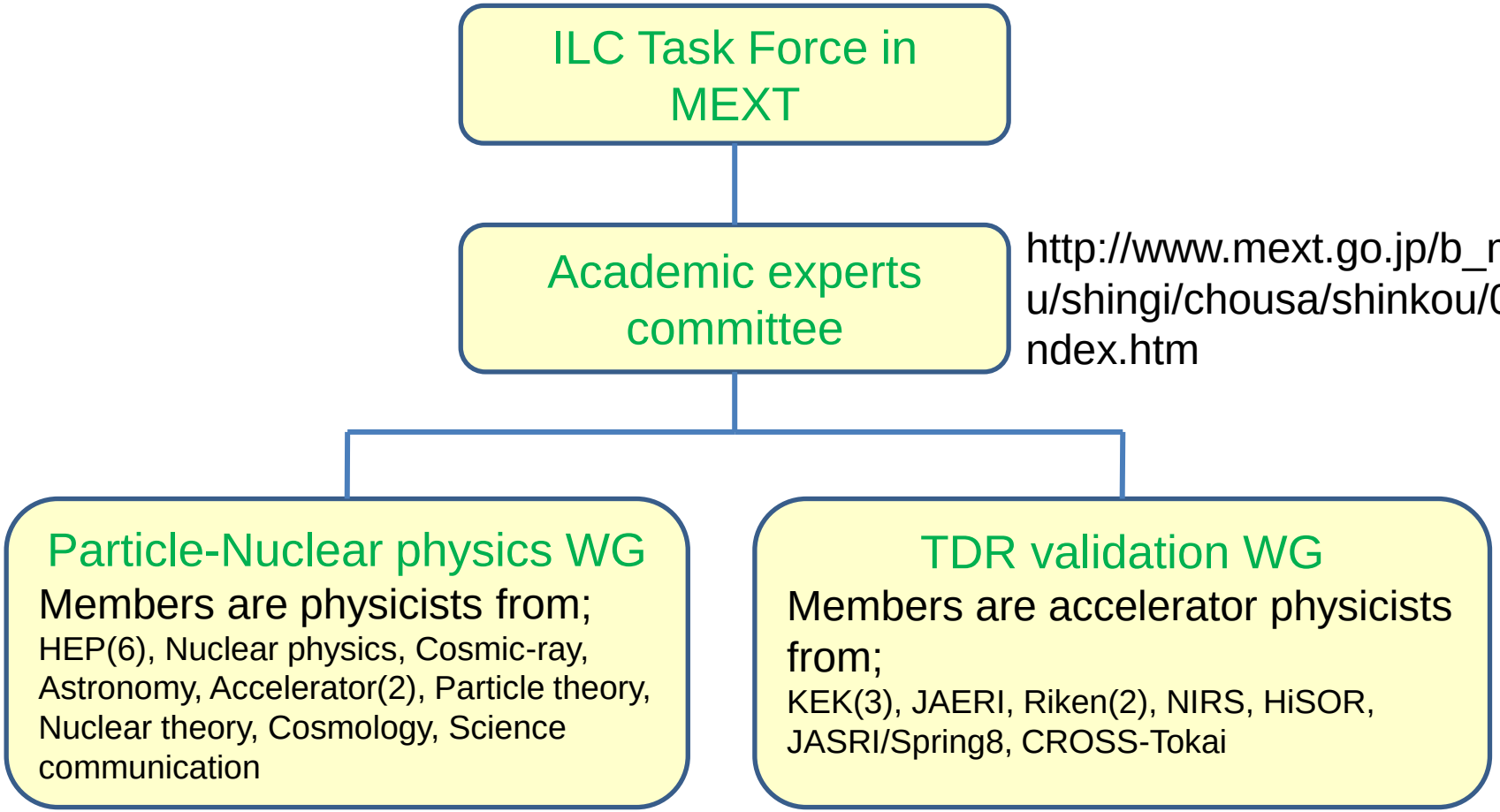
ILD Resource Survey

2014/9/9

Y. Sugimoto

Committee under MEXT



We need information from detector groups

TDR validation WG

- Discussion points (example) – from MEXT web page
  - Cost
    - Items to calculate the total cost (including items which are not included in the official documents)
    - Validity of the cost which is published
    - Cost increasing factors
    - Possibility of cost reduction (alternatives)
  - Human resource
    - Estimation of human resource during construction and operation (amount, level and field of expertise)
    - Cost of human resource (except for what is included in M&S)
  - Technology
    - What part is achievable with present technology? What part requires further R&D?
    - Feasibility, necessary time, and additional cost of the R&D
    - Possibility of alternative technology

Involvement of LCC

- Accelerator and CFS
  - Akira Yamamoto consults with LCC members
- Detector
  - LCC P&D Associate Director (Hitoshi Yamamoto) set up following working groups
    - Physics WG (Convener: K.Fujii, C.Grojean, M.Peskin)
    - ILC Infrastructure & planning WG (Convener: S.Yamada)
  - Physics WG prepares materials for Particle-Nuclear Physics WG
  - ILC Infrastructure & Planning WG prepares materials for TDR validation WG

ILC I&P WG

- Members
  - Convener: Sakue Yamada
  - ILD: Karsten Busser, Frank Simon (, Mary-Cruz Fouz)
  - SiD: Marty Breidenbach, Marcel Stanitzki
  - Local: Kiyotomo Kawagoe, Yasuhiro Sugimoto
- Mandate
  - Study of the human and budgetary resource needs during construction and operation
  - The time profile of the resources and their reality to quire
  - The organizational structure to interact with the ILC laboratory (Not relevant to MEXT review)

Resource survey in ILD

- Very premature study has been done and presented at ILD session of AWLC2014
- There are several comments
  - Manpower needed is overestimated
  - FTE*year might be more appropriate than FTE
- We need more information from sub-detector groups
- Human resource needs for operation period also has to be clarified

- Excel file (and Word file for instruction) has been sent to sub-system contacts to survey manpower needed for construction and operation period
- Rough estimate of time profile of budget is also asked
- Newly proposed detector hall scheme (Hybrid-A') and CMS style detector assembly is assumed for the schedule
- Detector construction period of 8 years is assumed to cope with possible early start with 250GeV CMS energy

Resource survey in ILD

- Timeline
  - Time line was drawn based on the schedule in TDR (Figure 14.10. in Vol.3-II) and recent CFS study
  - Assembly hall is assumed to be built in 2 years from ground breaking
  - Duration of “Assembly on site” can be modified by sub-system groups

ILD assembly timeline for Hybrid option (CMS style assembly))

Sub-detector	Y-3	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4
Detector Hall				Excavation/Utilities									
Assembly Hall				Construction					Extention				
VTX				TDR	Construction off site					Assembly on site	Ins	Detector commissioning	Accelerator commissioning
SIT				TDR	Construction off site					Assembly on site	Ins		
FTD				TDR	Construction off site					Assembly on site	Ins		
TPC		TDR			Construction off site					Assembly on site	Ins		
FCAL		TDR			Construction off site					Assembly on site	Ins		
ECAL (Barrel)		TDR		Construction off site				Ass. On site	Install		Detector lowering		
ECAL (End cap)		TDR		Construction off site			Ass. On site	Install					
HCAL (Barrel)		TDR		Construction off site				Ass. On site	Install				
HCAL (End cap)		TDR		Construction off site			Ass. On site	Install					
Coil		TDR	Bid	Modules construction off site	Modules const. off site/assembly on site			Ins		FM			
Iron Yoke		TDR	Bid	Modules construction off site	Modules construction off site/ring assembly on site								
Muon det		TDR		Construction off site			Ass. On site	Install					
DAQ				TDR	Construction off site			Assembly on site		Commissioning		Operation	
Computing					TDR		Bid	Delivery on site		Operation			
Physics/software	Simulation				TDR		Simulation						Analysis

Ins: Install

FM: Field mapping

Resource survey in ILD

- Numbers to be specified by each sub-system group

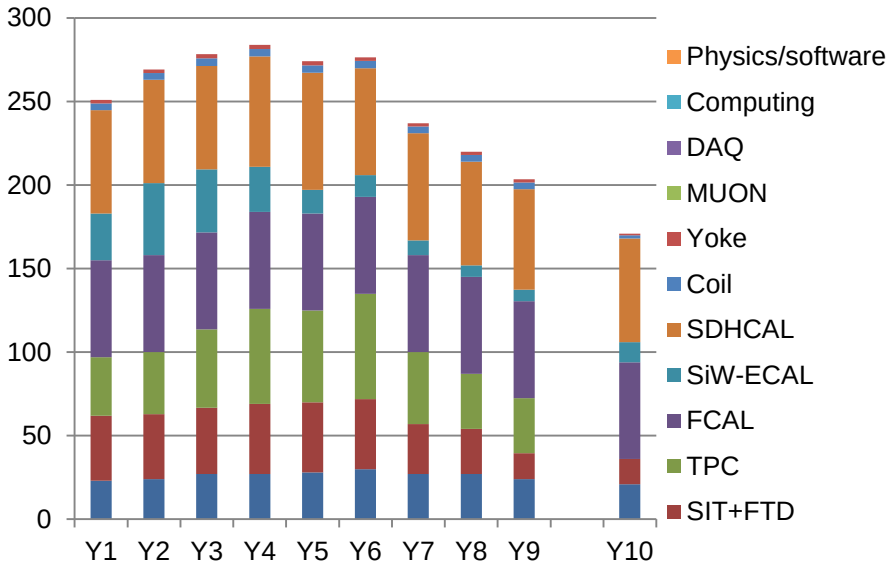
VTX	Now	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total in construction phase	TDR value
		Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4	Q1 Q2 Q3 Q4			
Timeline	R&D	TDR	Construction off site					Assembly on site	Ins		Physics Run		
Budget													
Annual budget (MILCU)			0.34	0.68	0.68	0.68	0.68	0.17	0.17		0.1	3.4	3.4
FTE from external labs/univ													
Item													
Sensor	1.5	3	3	2	2	2	2	1	1	1	1	17	
Electronics	1.5	3	3	5	5	5	5	3	3	3	3	35	
Ladder	1.5	2	2	3	3	3	3	2	2	1	1	21	
Mechanical support	1.5	3	3	3	3	3	3	2	2	2	2	24	
Cooling	0.5	2	2	2	2	2	2	2	2	2	2	18	
Assembly/alignment		1	2	2	2	2	2	2	2	1	1	16	
Flexible cable/connectors		1	1	2	2	2	2	2	2	2	1	16	
DAQ	1	3	3	3	3	3	5	5	5	5	3	35	
Beam pipe/Inner suppoty tube		1	1	1	1	2	2	2	2	1	1	13	
Software	0.5	3	3	3	3	3	3	5	5	5	5	33	
Management	0.5	1	1	1	1	1	1	1	1	1	1	9	
Total	**8.5**	**23**	**24**	**27**	**27**	**28**	**30**	**27**	**27**	**24**	**21**	**237**	
FTE from ILC labo													
Item													
Cooling							0.2	0.2	0.2	0.2	0.2	0.8	
Total		**0**	**0**	**0**	**0**	**0**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.8**	
FTE on site													
Item													
Sensor							0.5	0.5	0.5	0.5	0.5		
Electronics							1	2	2	1	0.5		
Ladder							1	2	2	2	0.5		
Mechanical support							1	2	2	2	1		
Cooling							1	1	1	1	0.2		
Assembly/alignment							1	2	2	2	0.3		
Flexible cable/connectors							1	1	1	1	1		
DAQ							1	2	2	2	1		
Beam pipe/Inner suppoty tube							1	1	1	1	0.5		
Software							1	2	5	3	2		
Management							1	1	1	1	1		
ILC labo staff		0	0	0	0	0	0.2	0.2	0.2	0.2	0.2		
Total		**0**	**0**	**0**	**0**	**0**	**10.7**	**16.7**	**19.7**	**16.7**	**8.7**		

Status of the survey

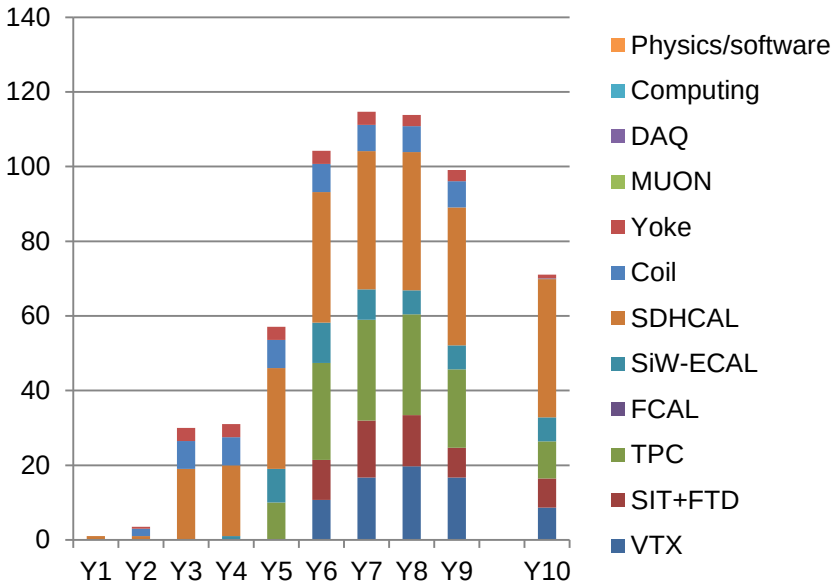
- Inputs from sub-detector contacts so far
  - Si ECAL
  - AHCAL
  - SDHCAL
  - SIT/FTD
  - VTX
  - TPC
  - Yoke
- Some discussion issues
  - ETD/SET was forgotten → Who is responsible?
  - It was suggested “Common engineering” sheet should be added: safety, detector integration and infrastructure, detector hall issues, etc.

Status of the survey

Annual budget



Total FTE needed



FTE on site

Some comments

- FTE for Physics/software is not included yet
  - It must be quite large, particularly in Y10
- Some sub-detector does not have entry in Y10
  - Running cost cannot be zero
  - Detector upgrade cost can be included
  - Some FTE must be needed for maintenance

Prospects

- MEXT TDR review for detectors would be held quite later than we expected: in Feb. 2015 (?)
  - Revise the numbers, if necessary
  - Detector running cost and budget for detector upgrade should be considered more seriously by then (Please give me the numbers of annual budget and FTE needed in Y10)
- There will be no report by Sakue at LCWS2014
- But the schedule could be changed (actually happened for CFS: Nov.→ Sep.8th)
- Sakue suggested to collect information of the budget needed by next TDR validation WG meeting

BACK UP SLIDES

Particle-Nuclear Physics WG

- Mandate
  - Review the issues listed below concerning the contents of scientific studies which ILC aims, and supplement the discussion at the Academic Experts Committee for ILC:
    - Scientific role which ILC plays in the future plan of particle and nuclear physics
    - Other related issues

- Schedule
  - This WG will last between May 2014 and March 2016 (can be extended if necessary)
  - Review meetings will be held ~1/month

    1st meeting was held on June 24

Particle-Nuclear Physics WG

- Discussion points (example)
  - What programs are suitable to tackle the challenges to be uncovered in particle physics?
  - From the programs above, what scientific outcome is expected for particle physics in future? What is the importance of the outcome?
  - Based on the expected results from upgraded LHC, what program can we expect to produce new rich results?
  - What is the expected outcome of ILC? How do you evaluate its certainty? What impact does the expected outcome give to particle physics?
  - Does ILC have scientific advantage over other future plans (FCC, CLIC, CEPC, etc.)?
  - Can you get enough discussion and wide agreement in the community of the related scientists taking other future projects into account?
  - How much human resources do you expect to gather from abroad?

TDR validation WG

- Mandate
  - Review the issues listed below concerning the cost and technical performance, and supplement the discussion at the Academic Experts Committee for ILC:
    - Validity of the cost estimation, necessary human resource, and technical feasibility described in the TDR
    - Other related issues
- Schedule
  - This WG will last between May 2014 and March 2016 (can be extended if necessary)
  - Review meetings will be held ~1/month
    - Detector will be discussed in January 2015