



ILC Project Management Status

Nick Walker ILC@DESY Project Meeting 30.11.2007

Engineering Design Phase Project Management Plan (PMP)



ILC Project Management Plan for the Engineering Design (ED) Phase

International Linear Collider Project Management Team Marc Ross, Nicholas Walker, Akira Yamamoto, Project Managers

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- Formally released this meeting
 - Earlier draft submitted to ILCSC in August
- Working document
 - Periodically reviewed, updated and released
 - Next release possible at Sendai
- Explains organisation, roles and top-level ED phase management process

url: http://ilcdoc.linearcollider.org/record/11980



- 3 Project Managers: ۲
 - Marc Ross (CFS, chair)
 - Akira Yamamoto (SRF)
 - Nick Walker (AS)
- 6 Assistant PMs
 - Shidara, Kirby, Bialowons, _ Carwardine, Lehner, Urakawa
- 15 Technical Area Groups ۲
 - Each with 10-15 Work _ **Packages**
 - Lilje (Cavity Processing)
- **Project Management Office** ۲
 - **Paterson (Integration)**
 - **Toge (Eng. Management)**
 - EDMS (Hagge) ٠
 - Change Control •
 - Garbincius (Cost & _ Planning)
 - Elsen (EDR Planning)
 - Weise (XFEL Liasion)
- **Project Management Plan**

url: http://ilcdoc.linearcollider.org/reco

Global D

Akira Yamamoto Project Manager SCRF Tech.

> Lutz Lilje (DES) Cavity Processin

Hitoshi Hayano (K

Cavity Production

Norihito Ohuchi (K

Harry Carter (FN/ Co-Leader

Shigeki Fukuda (K

Tom Peterson (FN Cryogenics

Chris Adolphse

(SLAC) Main Linac Integra

Integration

Leader

Cryomodule

HLRF

Tetsuo Shidara (KEK)

	Barry B GDE Di					DESY	
	Marc F Project Mana CFS & C	ager (chair)		Nick W Project M ccelerator			
	n Bialowons DESY)	John Carwardine (ANL)	Frank Leh (DESY		Junji Urak (KEK)		
') John Osborne Civil Engin					rachmann (SLA ectron Source	AC)	
EK) Vic Kuchler Conventional					Clarke (STFC) sitron Source		
EK) AL) Margaret Votav Contro		Project Managemen Ewan Paterson (SLA Integration		(Coc	Andy Wolski okcroft Institute) amping Ring)	
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AL)		Lars Hagge (E	DESY)	And	re Seryi (SLAC) BDS		
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		Peter Garbincius (FN	ent				
		Cost & Planning					
ord/11980		Eckhard Elsen (DES EDR Planning	·")				
esign Effo	rt L	Hans Weise (DESY XFEL Liaison)				



- demonstrate through the ILC R&D program that all major accelerator components can be engineered to meet the required ILC performance specifications;
- provide an overall design such that machine construction could start within two to three years if the project is approved and funded;
- mitigate technical risks by providing viable documented fallback solutions with estimates of their costs;
- contain a detailed project execution plan including an achievable project schedule and plan for competitive industrialization of high-volume components across the regions;
- limit options and focus R&D and industrialization efforts on those issues where technical decisions are not yet final;
- design the conventional construction and site-specific infrastructure in enough detail to provide the information needed to allow potential host regions to estimate the technical and financial risks of hosting the machine, including local impact, required host infrastructure, and surface and underground footprints;
- provide a complete value cost estimate for the machine, except for the details not yet completed in the site-specific designs, which includes a funding profile consistent with the project schedule proposed;
- begin the transition to a project management model suitable for an ILC construction project.





- demonstrate through the ILC R&D demonstrate components program that all major accelerator specifications
- provide an ove to three years
- components can be **engineered** to mitigate techni estimates of the meet the required ILC performance
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plan including an achievable project schedule and plan for competitive industrialization of high-volume components across the regions;

Fundamental difference to RDR





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Kick-Off Meetings



Technical Group	Day, (Place)	Chaired / Supported by
Controls	8/20 ~ (ANL)	J. Carwardine (ANL)
CFS-US	8/22 ~ (FNAL)	V. Kuchler (FNAL)
RTML	8/27 ~ (FNAL)	P. Tenenbaum (SLAC)
CFS-EU	J. Baldy / J. Osborne (CERN)	
CFS-AS 9/10 ~ (KEK) A. Er		A. Enomoto (KEK)
Cryomodulde & Cryogenics	9/12 ~ (KEK)	H. Hayano, N. Ohuchi (KEK) T. Peterson (FNAL)
Cavities	9/19~ (DESY)	L. Lilje (DESY), H. Hayano (KEK)
E-source 9/24 ~ (SLAC) A		A. Brachmann (SLAC)
		C. Adolphsen / T. Shidara (SLAC)
HLRF	10/1~ (SLAC)	R. Larsen (SLAC), S. Fukuda (KEK)
E+source	10/8 ~ (Cockroft Inst)	J. Clarke (CCRC), J. Urakawa (KEK)
Beam Del. Sys.	Beam Del. Sys. 10/11~ (SLAC) A. Seryi (SLAC)	
Damping Ring	11/5~ (Cockroft Inst)	A. Wolski (LBNL)







- CFS
 - Review and check requirements
 - Close-loop with AS/MLI
 - Value Engineering
 - Alternative site designs
 - ED phase WP
- SCRF
 - R&D plans, Test Facilities,...
 - Status of 'ACD'
 - ED Phase WP

Important concept of Plug Compatibility

- Accelerator Systems
 - Maturity of RDR design
 - Completeness of Cost Estimate
 - Status of ACD
 - ED Phase WP

Cryomodule Plug Compatibility



- Design parameters to be verified:
 - Parameters lists of each component,
 - Interface between components
- Plug-compatible concept critically important to allow:
 - Improvement of base-line design during EDR,
 - ACD with keeping plug-compatible interface,
- Complimentary R&D important
 - Learn most effective industrialization experience from XFEL
 - Further advanced/basic R&D to be complementary carried out
 - For upgrade of the BCD design based on the previous industrialization experience (with less additional demonstration)

Example Technical Findings from KOMs

Technical Group	Day	Finding (technical topics)
Controls & LLRF	8/20 ~	High availability control and redundancy
CFS-US	8/22 ~	ACD development
RTML	8/27 ~	Common housing/integration, beam dynamics (emit. Preservation)
CFS-EU	9/03 ~	Experience at LHC, Safety, IR Hall structure, exp. from Olympic
CFS-AS	9/10 ~	Time scale required to reach construction, exp. from ITER
Cryomodule & Cryogenics	9/12 ~	Important plug-compatible interface definition, Thermal balance optimization b/w cryomodule and cryogenics, exp. at LHC.
Cavities (process, and production)	9/19~	< E> 30 toward 35 MV/m, Process, Shape, compatibility, Industrialization (XFEL exp.+ ,,) & further improvement (BCD/ACD)
E-source	9/24 ~	Cathode demonstration and vacuum R&D crutical
Main Linac Int.	9/27 ~	Beam dynamics (HP/HOM), Quad. alignment, dE/E acceptable?
HLRF	10/1~	Marx Gen. (ACD) encouraging, Effic. RF distributor, Min. remote cntl
E+source	10/8 ~	Target survivability, undulator, flux concentrater,
Beam Del. Sys.	10/11~	Crab and IR geometry, extendable to 1 TeV
Damping Ring	11/5~	Beam dynamics (many important ED phase planning concepts!)







- Four phases:
 - Planning
 - Execution

- almost finished this phase just beginning this phase
- Report Preparation
- Completion
- Formal transition form Phase 1 to 2 is official Tohoku University GDE meeting (3-6th March 2008)



ED Phase Plan





- Second PM Document
 - PMP was first
- R&D Plan outlines in some detail "Global R&D Plan for the ED Phase"
 - Rationale
 - Primary goals
 - Tech. Milestones
 - Key tech. deliverables
 - Global resource base
- Both **PMP** and **R&D Plan** will be working documents
 - Periodically reviewed and updated (new release)

R&D Plan: Who is if for?

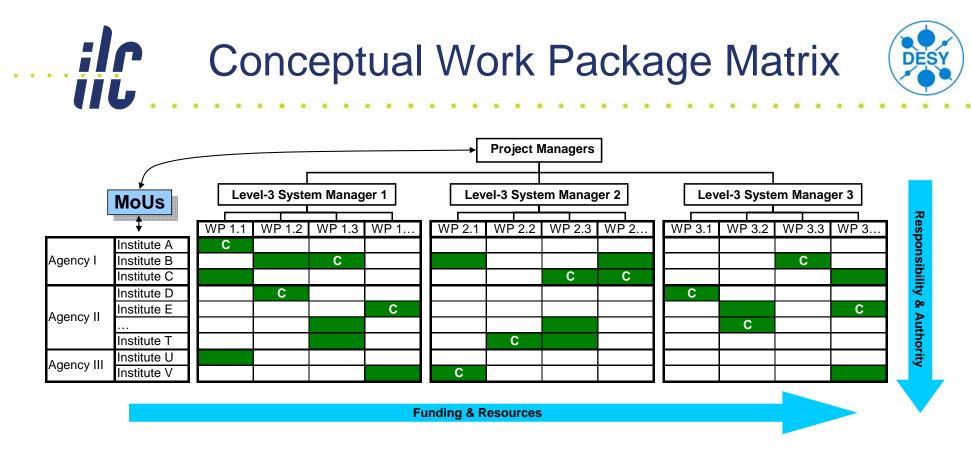


- ilc FALC Resource Board (ultimately FALC)
 - Want to see "The Matrix" (see next slide)
 - Interested in home much the EDR will cost
 - GDE has stated we have enough projected resources world-wide
 - ILCSC
 - Our bosses! Interested in the actual plans and what we expect to achieve.
 - The ILC community (GDE)
 - Understanding of top-down goals and priorities, and what people are expected to do
 - …and at some level Ray Orbach (DoE)
 - Has requested a written "Globally Coordinated R&D Plan"
 - RO needs this to defend ILC/SRF funding in the US
 - Clear indication of regionally balanced effort
 - focus: SCRF Technology

Will be released next week

Conceptual Work Package Matrix





We now have many matrices ©





Report Structure



- Two parts:
 - Main body of report (~15 pages)
 - Appendices containing comprehensive detail of
 - More details and explanation of ED phase primary focus:
 - SCRF Tech; CFS; Accelerator Test Facilities
 - all ~170 Work Packages
 - Known or expected institute participation across Work Packages (mostly bottom-up from responses to Eol and TAG leaders)
 - Top-down role up of **Resources** (FTE, M&S) for calendar year 2007 (known), and expected (hopedfor) 2008-2009 (see questions later)





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 - 5.1.1 Primary ED phase goals
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 - 5.1.3 High Gradient R & D
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 - 5.3.1 Primary ED phase goals
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 - 5.3.3 Test Facilities
- 6 Resource Base for ED Phase Research and Development
- 7 Summary of Work Package assignments and responsibilities

Global Design Effort

Section 5-7 is the focus of the body of the report.

This is the part we expect the F.A. to read.

Appendices (tech. detail)



Appendices (t	ech. detail)
 Appendix A.1 Cavity Processing Work Package Description A.1.1 Cavity Processing Work Package Organization Overview Appendix A.2 Conventional Facilities and Siting (CFS) Work Package Descriptions A.2.1 CFS Work Package Organization Overview A.2.2 Current CFS Focus A.2.3 Factors Affecting CFS Work Package Progress and Completion A.2.4 Summary Appendix A.3 Test Facilities Appendix A.4 ED Phase Work Packages A.4.1 Superconducting RF Technology A.4.1.1 TA-1.1 Cavity Processing 	More detailed info on three focus areas A.1 was supposed to be complete updated S0 plan (A.1-3: overlap with Report Body)
 A.4.1.2 TA-1.2 Cavity Production and Integration A.4.1.3 TA-1.3 Cryomodule A.4.1.4 TA-1.4 Cryogenics A.4.1.5 TA-1.5 High Level RF A.4.1.6 TA-1.6 Main Linac Integration A.4.2 Conventional Facilities & Siting and Global Systems A.4.2.1 TA-2.1 Civil Engineering and Services A.4.2.2 TA-2.2 Conventional Facilities Process Management A.4.2.3 TA-2.3 Controls A.4.3 Accelerator Systems A.4.3.1 TA-3.1 Electron Source A.4.3.2 TA-3.2 Positron Source A.4.3.3 TA-3.3 Damping Rings 	Descriptions (summary) of all Work Package scope Institute participation tables Work Package Coordination
A.4.3.4 TA-3.4 Ring to Main Linac (RTML) A.4.3.5 TA-3.5 Beam Delivery System (BDS) A.4.3.6 TA-3.6 Simulation Appendix A.5 Resource Base for ED Phase Research and Development Appendix A.6 Summaries of Activities useful for ILC EDR R & D A.6.1 Introduction A.6.2 XFEL / DESY	The bottom line

WP Summary



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	6 1.1.3	Fabrication (material selection, metho		(lation)					
	7 1.1.4	Beam dynamics (HOM-HOM_coupler-							
	8 1.1.5	Flange and seal (material & method s		Jin (600)					
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Global Resource Base



• Approximate FTEs (2007-2010)

– SCRF Tech	690
– CFS/Global	200
 Accelerator Systems 	560
– Total	1450

• ~360 FTE/year

- Expressions of Interest from ~50 institutes worldwide
- (Materials budget still needs consolidation)

The Plan (in a nut shell)



• SCRF

ilc.

- High Gradient R&D (reproducible 35 MV/m)
- Cryomodule design(s) (plug compatibility)
- SCRF tech/Infrastructure in all three regions
 - FNAL/KEK ramping up
 - DESY/Europe has XFEL (and 15 year lead!)
- CFS
 - Where we intend to reduce the \$\$\$\$!!
 - CFS-driven schedule for Accelerator Systems (see later)
 - VALUE engineering process to reduce the cost.
- Accelerator Systems
 - Cost-driven (re-)design of machine
 - Supplying necessary information to CFS





Americas	FY06 (actual)	FY07 (actual)	FY08	FY09	FY10	TOTAL ED-P	FY11	FY12
Cavity orders - qualified vendors	8	12	18	40	40	108	40	40
Total 'process and test' cycles		40	60	90	115	276	120	120
Asia	FY06 (actual)	FY07 (actual)	FY08	FY09	FY10		FY11	FY12
Cavity orders	8	7	15	25	15	59	39	39
Total 'process and test' cycles		21	45	75	45	152	117	117
Europe	2004-08 (actual)	2007 (actual)	2008	2009	2010		2011	2012
Cavity orders	60			838		898		
Total 'process and test' cycles		14	15	30	100	109	354	354
Global totals								
Global totals - cavity fabrication	76	19	33	903	55	1065	79	79
Global totals - cavity tests	0	75	120	195	260	538	591	591

Expect ~400 cavity tests before gradient decision end 2009





Functional requirements from AS

		2008												200	9							
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2.1.1.1 - Final Criteria Development and Design EDR I																						
Functional requirements template publication						ł																
Functional requirements complete - Main linac																						
Functional requirements complete -BDS and IR																						
Functional requirements complete - Sources, DR, RTML																						_
CFS - Update RDR Main Linac design	_																					
CFS - Update RDR design other areas																						_
2.2.2.1 Cost and Schedule Development - Baseline Value E	ngin	eer	ring																			
Process water value engineering - Main linac																						
Underground Space usage – Main linac																						
Air Handling – all areas																						
Underground Space usage – non-linac																						
Surface buildings									7													
Electrical – all areas									1													T
Project Schedule									/													

Engineering mini-workshops (cost)



DESY resources



- DESY is participating in *many* of the 170 WP
 - For SCRF dominated by XFEL synergy
 - But not completely! (ILC-HiGrade)
- ~30 FTE per year (2007-2010) specifically designated ILC
 - Not including detector
- XFEL "synergy" resources still being compiled - (clearly very large)
- These numbers will appear in the ED Phase R&D report





