ML-SCRF: Monthly WebEx Meeting
April 4, 2012

1. **Reports from PMs** (20 min.)
   - GDE activity and meeting plan
   - Summary document of SCRF-Baseline Technical Review (A.Y.)
   - Report from CFS-Baseline Technical Review (M. Ross)
   - KILC: SCRF parallel session, general plan: (A. Yamamoto)

2. **Topical Reports from TA Group Leaders** (if any?)
   - Cavity, Cavity Integration, Cryomodule, Cryogenics, HLRF, ML

3. **Special Discussions on**
   - KILC ML-SCRF Each Parallel Session Agenda (H. Hayano)
   - Draft preparation of TDR (by each convener)
     - Outline with tables and figures

ML & SCRF Action/Meeting Plan (2012)

Month	Day	Place	Meeting
April	4 23-26	WebEx Korea	ML-SCRF Monthly meeting (Check homework) ACFA-LCWG S1-Global report (draft) TDR drafts and cost-study reports, required
May	15-16 21-25	Fermilab New Orleans	ILC-PAC IPAC
Sept.	10-14	Telaviv	Linac-2012
Oct.	22-26 29-30	Texas Annaheim	ALCPG-LCWS IEEE-NS (LC event)
Nov.	5-6	JLab	TTC

Summary of ML and SCRF BTR

(being uploaded to SCRF meeting Indico Agenda)

Summary of Decisions from Main-Linac and SCRF Baseline Technical Review (BTR)

held at KEK, January 18 – 19, 2012
Reported by GDE Project Managers (PMs):
Akira Yamamoto, Marc Ross, and Nick Walker

Attendance:
C. Adolphsen, M. Akemoto, B. Barish, J. Carwardine, G. Dugan, E. Elsen, A. Enomoto, B. Foster, S. Fukuda, R. Geng, H. Hayano, M. Hronek, E. Kako, S. Kato, J. Kerby, N. Kobayashi, R. Kriske, K. Kubo, V. Kuchler, M. Kumada, T. Lackowski, B. List, T. Matsumoto, S. Michizono, M. Miyahara, K. Nagai, C. Nantista, E. Paterson, P. Pierini (webex), T. Peterson (webex), M. Ross, T. Saeki, M. Satoh, T. Shidara, T. Shirakata, T. Tajima, R. Takahashi, T. Tauchi, N. Toge, K. Ueno, N. Walker, S. Yamaguchi, A. Yamamoto, M. Yamanaka, K. Yokoya

Decision Summary:

The Main-Linac and SCRF Baseline Technical Review (BTR) was organized to discuss baseline design and technology for the Technical Design Report (TDR) and its associated cost-estimate.

Homework by KILC

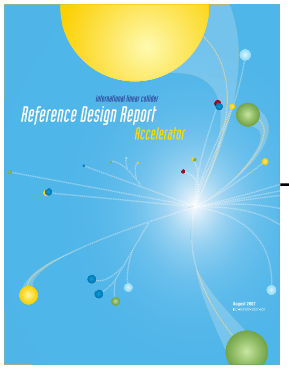
ML Integration	- Provide a complete ML lattice with 9+4Q4+9 cryomodule unit, - Confirm requirement of energy overhead (1.4%) w/ additional ML length for operational availability (provide rationale) - Fix total numbers of CM including ML, RTML, e-source (# add. CMs to be fixed) - Q + corrector +BPM package design (w/ energy dependent design?) - Plan for full power upgrade at 500 GeV, and scenario up to 1 TeV (→ such as quad. configuration, FDFD up to 500 GeV, and FFDD at 1 TeV?
HLRF	- Required RF power overhead, more detail (in KCS and RDR) - Cost saving of PDS, Klystron, Marx Generator etc - Catalogue local power distribution variants and conceptual designs - Estimate waveguide losses and heat loads
CM and Cryogenics	- Confirm CM slot length to be fixed: 12,652 mm in RDR, and it need to be reflected to the current ILC-CM drawing which has currently 12,644 mm (11794+850) in FNAL-CM4. - Asses the need for accessibility and maintenance of active components (tuner motors) - Cryo-string length, additional length of Cold-box for phase-separation, to adapt new RDR-like RF unit and/or tilting tunnel and effect on add. Total main linac length.
Cavity Integration	- Cavity-slot length to be well established (to be 1326.7 mm) - Feasibility of magnetic shield inside LHe tank at central region and outside at inter-connect.
Cavity Gradient	- Update fabrication process and recipe; re-definition of production yield (documentation)
Coupler processing	- Determine specifications for peak power processing - Evaluate solution for tunnel in-situ processing

TDR Technical Volumes

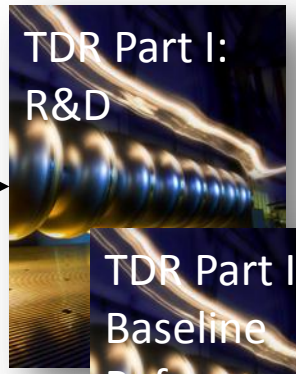
2007 2011 2013*

ILC Technical Progress Report (“*interim report*”)

AD&I



Reference Design Report



~250 pages
Deliverable 2

~300 pages
Deliverables
1,3 and 4

Technical Design Report

More discussed by J. Carwardine
On Jan. 20, tomorrow

* end of 2012 – formal publication early 2013

Logistics

Ch	Sect	Heading	Pages	Primary
		PART I: ILC R&D in the Technical Design Phase	**280**	
1		Introduction	10	Walker
2		Evolution of the ILC design in the Technical Design Pha	10	Walker
3		Superconducting RF technology	95	Yamomoto
4		Beam Test Facilities	70	*[Editor]*
5		Accelerator Systems R&D	70	*[Editor]*
6		Conventional Facilities and Siting Studies	10	Kuckler
7		Post-TDR R&D	10	Ross
8		Summary	5	Walker
		Part II: The ILC Baseline Reference	**338**	
1		Introduction and overview	5	Paterson
2		General parameters and layout	15	*[Editor]*
3		SCRF Main Linacs	50	Yamomoto
4		Electron source	10	Sheppard
5		Positron source	20	Gai
6		Damping Rings	25	Guiducci
7		RTML	20	Solyak
8		Beam Delivery System and MDI	25	Seryi
9		Global Technical Systems	26	
10		Commissioning, Operations, and Availability	15	Ross
11		Conventional Facilities and Siting	42	Kuchler
12		Upgrade options	20	*[Editor]*
13		Scope of post-TDR engineeting (tech. risk assessment)	20	Ross
14		Project Implementation Planning	20	Harrison
15		Cost and Schedule	20	Dugan
16		Summary	5	Walker

There are too many chapters to spend 3hrs on each, so we will need to prioritize

Which authors are going to the meeting?

TDR Part I: R&D - Outline

1. Introduction — 5 pages
2. Superconducting RF Technology — 75 pages
3. Beam Test Facilities — 75 pages

2.1 Overview	(Yamamoto, Ross)
2.2 Development of world-wide SCRF R&D infrastructure	(Kerby, Elsen, Hayano)
2.3 High-gradient SCRF cavity R&D and the yield evaluation	(Geng, Gisburg)
2.4 Cavity Integration	(Hayano)
2.5 The S1-Global experiment	(Hayano, Kerby, Moeller)
2.6 Cryomodule, cryogenics thermal balance, and Quad. R&D	(Pierini, Peterson, Kashkin)
2.7 RF power generation and distribution	(Fukuda, Nantista)
2.8 R&D toward mass-production	(Kerby, Elsen, Saeki)

3.1 Over View	(Ross, Walker)
3.2 FLASH 9 mA experiment	(Carwardine, Walker)
3.3 Cesr TA and electron-could R&D	(Palmer)
3.4 ATF2 final focus experiment	(Tauchi, Burrows)
3.5 Fermilab-NML	(Nagaitsev)
3.6 Quantum Beam at KEK	(Urakawa, Hayano)

4. Accelerat
5. Post-TDR
6. Conclusi

TDR Part II: ILC Baseline Reference

1. Introduction and overview — 5 pages
2. General parameters and layout — 15 pages
3. SCRF Main Linacs — 60 pages
4.
5.
6.
7.
8.
9.
10. .. *see later*

3.1 Main linac layout and parameters	(Adolphsen)
3.2 Cavity performance and production specification	(Yamamoto, Kerby)
3.3 Cavity integration, coupler, tuners,…	(Hayano)
3.4 Cryomodule design including quad	(Pierini)
3.5 Cryogenics systems	(Peterson)
3.6 RF power and distribution systems	(Fukuda, Nantista)
3.7 Low-level RF control	(Carwardine, Michizono)

Detailed section outline available here

KILC SCRF Parallel Sessions

updated, April 4

-	4/23	4/24	4/25	4/26C
AM-1	Plenary	Homework-b	TDR-2 >> 1	Costing-c
AM-2	Plenary	Homework-c	TDR-2	Costing-d
PM-1	Plenary	TDR-P1	(TDR-2?) Costing –a	Plenary
PM-2	Homework-a	Panel Discussions	Costing-b	Plenary

Example: Outline for Cavity Performance and Specification

- Summarize requirements on ILC SCRF cavity fabrication and chemical process,
  - based on the Part-I R&D outcome (R. Geng et al.)
- Describe the cavity acceptance criteria with "plug compatibility"
- Describe recovery/ plan against fabrication failure
- Share of responsibility including cold tests.

Example: Tables and Figures for

- Tables:
  - Cavity technical requirements and counts
  - Summary of Baseline cavity specification
  - Standard process, and acceptance criteria and test
  - Units of cavity string and cryomodule string, RF system
- Figures:
  - Cross section of ILC baseline-cavity
  - Cross section of ILC baseline-cryomodule

Example: ML Parameters

(based on KEK BTR, Jan. 2012)

	Main Linacs		Kamaboko		Upgrade (and KCS)	
	Required energy gain	GeV	235		235	
	Cavities / LPDS		39		26	
	Cavity					
	RF voltage	MV	32.70		32.70	
	phase	deg	5		5	
	loss factor (beam loading)	MV	0.04384		0.04384	
	dE/cavity	MV	32.53		32.53	
	DE per LPDS unit	GeV	1.27		0.85	
e+	# LPDS units		186		279	
	Energy gain	GeV	235.96		235.96	
e-	Required OH for e+ src	GeV	2.6		2.6	
	Total e- energy gain	GeV	237.6		237.6	
	# LPDS units (rounded)		188		282	
	Energy gain	GeV	238.50		238.50	
	Overhead (LPDS units)		2		3	
	Electron linac LPDS units		190		285	
	Positron linac LPDS units		188		282	
	Total LPDS units		378		567	
	Max. e- energy (IP)		253.44	1.4%	253.44	1.4%
	Max. e+ energy (IP)		253.50	1.4%	253.50	1.4%

Cryomodule & cavity counts

	CM9	CM8Q	cavities	quad pkg
e-	570	285	7410	285
e+	564	282	7332	282
totals	1134	567	14742	567

9 cm overhead

original RDR RF units (26 cavities)

Kamaboko RF units (39 cavities)

Example: ILC Cryomodule Counts

ILC Cryomodule count

EDMS document D*972665

standard

	C6Q6	C8Q2	C9	C8Q1	Cavities	QPKG
Electron source						
5GeV booster			8	16	200	16
E compressor			1		9	0
Positron source						
5GeV booster	4	8		12	184	52
E compressor			1		9	0
RTML (electron)						
1st stage compressor				3	24	3
2nd stage			32	16	416	16
RTML (positon)						
1st stage compressor				3	24	3
2nd stage			32	16	416	16
Main linacs						
Positron			564	282	7332	282
Electron			570	285	7410	285
Totals	**4**	**8**	**1208**	**633**	**16024**	**673**

From Marc's email to conveners

The ACFA-sponsored GDE plenary meeting, to be held in Korea in April 2012, has two main goals:

1. ***Collect and assemble both draft Technical Design Report text and cost estimate information for the TDR***
2. ***Make preparations for the transition to the post-TDR Linear Collider organization.***

The meeting agenda will be structured to give priority especially to the former, 1) above, and will therefore provide adequate time for TDR authors and editors to meet and for Group Leaders to meet with the Cost Engineer team

TEB context

- KILC is a declared formal milestone in the TDR production
  - ***First draft to be ready by KILC***

- Realistically, we can expect to receive some fraction
  - **Hopefully plenty enough to start the editing process**

- The basic objectives
  - **Make progress with TDR production over the course of the four days. This means using time at the meeting to actually generate content**
  - **Launch the editing process, and address any immediate issues / barriers**

What to do during these working sessions

- In reality, every case will be different, depending on the chapter, individuals involved, and progress to date

- In essence, the goal is to make real progress
  - **Where it exists, review face-to-face with the authors**
  - **Where it doesn’t exist, make progress developing text**
  - **Generate a list of figures and diagrams (with captions)**
  - **Identify any open issues, develop schedules for authors to deliver their respective sections**
  - **Identify any overlapping scope or missing elements**
  - **Go through the corresponding RDR text with the authors and identify what stays and what will be new**

- Editors should discuss with authors and decide how best to use divide up and use the available time