AAP Review – SCRF

Introduction

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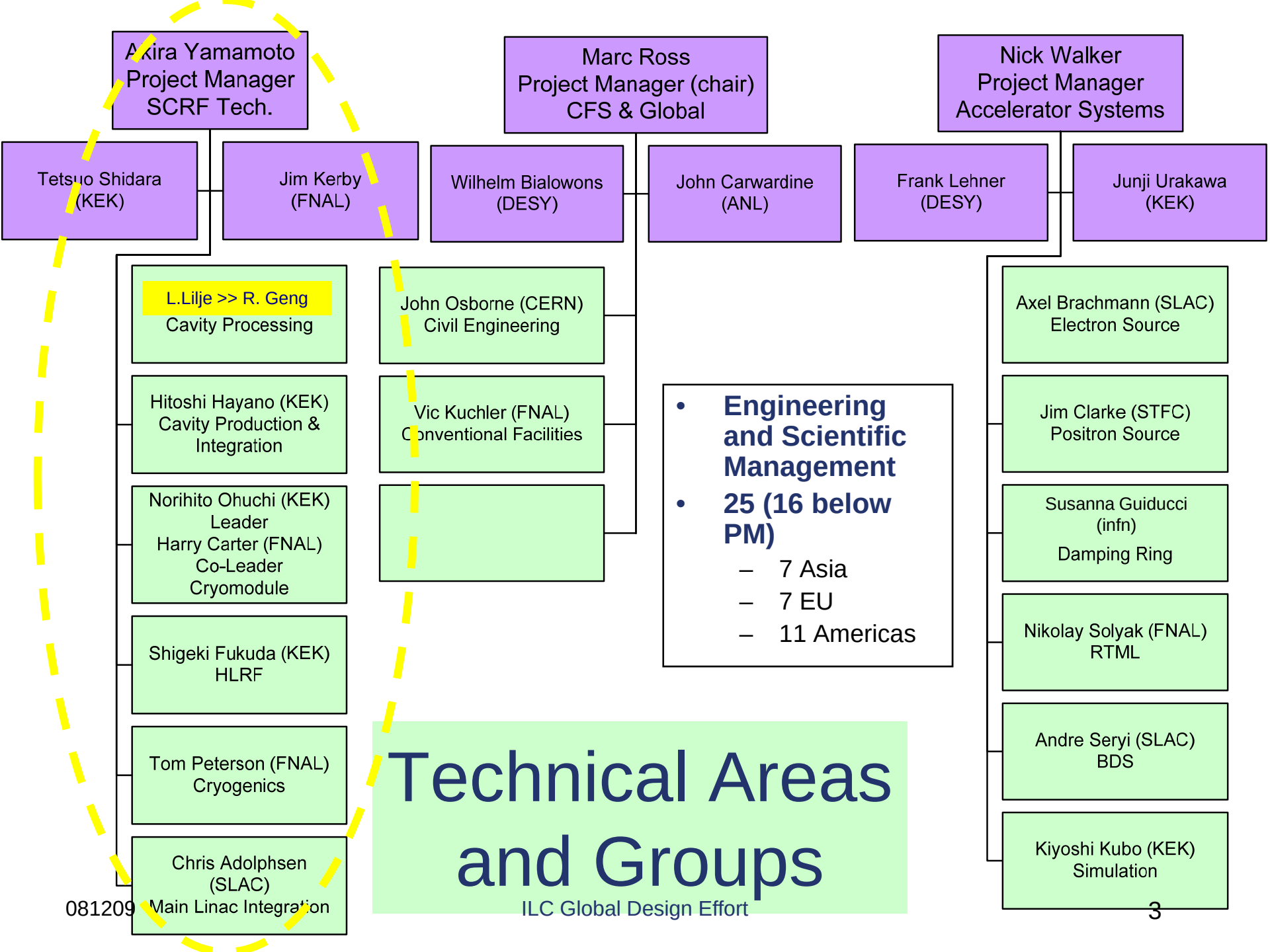
To be presented, April 19, 2009

SCRF Cavity Major Goals

High-gradient cavity performance at 35 MV/m according to the specified chemical process with a yield of 50% in TDP1, and with a production yield of 90% in TDP2	2010 2012
Nominal Cryomodule design to be optimized: - plug-compatible design including tune-ability and maintainability - thermal balance and cryogenics operation - beam dynamics (addressing issues such as orientation and alignment)	2009
Cavity-string performance in one cryomodule with the average gradient 31.5 MV based on a global effort (S1 and S1-global)	2010
An ILC accelerator unit, consisting of three cryomodules powered by one RF unit, with achieving the average gradient 31.5 MV/m (S2)	2012


Akira Yamamoto
Project Manager
SCRF Tech.
Marc Ross
Project Manager (chair)
CFS & Global
Nick Walker
Project Manager
Accelerator Systems
Tetsuo Shidara (KEK)
Jim Kerby (FNAL)
Wilhelm Bialowons (DESY)
John Carwardine (ANL)
Frank Lehner (DESY)
Junji Urakawa (KEK)
L.Lilje >> R. Geng
Cavity Processing
Hitoshi Hayano (KEK)
Cavity Production & Integration
Norihito Ohuchi (KEK)
Leader
Harry Carter (FNAL)
Co-Leader
Cryomodule
Shigeki Fukuda (KEK)
HLRF
Tom Peterson (FNAL)
Cryogenics
Chris Adolphsen (SLAC)
Main Linac Integration
John Osborne (CERN)
Civil Engineering
Vic Kuchler (FNAL)
Conventional Facilities
Axel Brachmann (SLAC)
Electron Source
Jim Clarke (STFC)
Positron Source
Susanna Guiducci (infn)
Damping Ring
Nikolay Solyak (FNAL)
RTML
Andre Seryi (SLAC)
BDS
Kiyoshi Kubo (KEK)
Simulation
• Engineering and Scientific Management
• 25 (16 below PM)
– 7 Asia
– 7 EU
– 11 Americas
Technical Areas and Groups
ILC Global Design Effort

Context Give by AAP

- **SCRF**
  - ***What is the path to finalizing the gradient choice?*** ***Context***
    - Current experimental status
      - Established standards
    - Extrapolation of results
  - Time limitations
  - Decision process
  - Role of plug compatibility in this process
- ***What is the path towards industrialization?*** ***Context***
  - Current experimental status
    - Established standards
    - Extrapolation of results
    - Internationalization of efforts
  - Outline tendering process
  - Role of Plug compatibilty
- ***Lessons expected from systems tests*** ***Context***
  - FLASH
    - Operational limitations of ILC cavities
      - ILC like mode
        - *Long bunch*
        - *High charge*
        - *High gradient*
      - Experience and characterization of implications for ILC
  - Other facilities foreseen
    - Timelines
    - Benefits

AAP Review Context for SCRF

Context	Charge	Note
What is the path to finalizing the gradient choice? - Current Experimental status - Established standards, and Extrapolation of results - Role of “plug-compatibility”, in R&D stage - Time (limitation) and Decision Process	L. Lilje M. Champion H. Hayano R. Geng A. Yamamoto	S0
What is the path toward industrialization? - Current experimental status - Established standards, and extrapolation of results - Internationalization of efforts, - Outline tendering process - Role of Plug-compatibility, in Production Stage	N. Ohuchi P. Perini D. Mitchell H. Hayano C. Pagani J. Kerby A. Yamamoto	S1/S2
Lesson expected from system test - FLASH at DESY (operational limitation of ILC cavities) - STF at KEK, time-line and benefit - NMF at FNAL: time-line and benefit	(J. Cawardine) H. Hayano M. Champion	S2

Response from AAP for SCRF

The SRF R&D started with a well-laid out international R&D plan, which required the intricate interaction of the participating laboratories already in the phase of the Reference Design Report. Goals defined during that phase have been elaborated in an often demanding decision process. Naturally, as time went on priorities shifted and so did the R&D activities. How did and does the process affect the readiness for the decision process of the gradient? What level of confidence can be reached in the various technical areas?

It would be beneficial for the committee to have a short introductory review of the critical R&D gradient goals for TDP 1 and 2 and their timelines, with mention of targets for number of cycles/number of cavities, and number of cryomodules, as laid out in the TDP document. The status report should cover activities in both cavity and cryomodule gradients. On the continuing R&D Plan, there is a need to discuss fully how the gaps between the current status for cavity gradients and the goals for TDP phases 1 and 2 will be addressed. For example:

Specific Questions by AAP

Specific Questions	To be reponded/answered by:
•What are the sources of present limitations in gradient yields due to preparation processes?	L. Lilje
•What approaches are underway to increase the process yield?	L. Lilje
•How will sufficient number of cycles be made available?	L. Lilje/ A. Yamamoto
•What are the sources of present limitations in gradient yields from cavity to cavity?	L. Lilje
•What approaches will be pursued to increase the cavity yield/vendor yield?	L. Lilje/ A. Yamamoto
• How will sufficient number cavities/cycles be made available to 2012?	A. Yamamoto

Questions Continued;

Plug-Compatibility

Specific Questions	To be responded/answered by:
•While the topic of "Plug compatibility" relates both to R&D and industrialization phases, it would be more suitable for the review goals to focus on the role for the R&D phase. Some of the related issues that would be helpful to address are:	J. Kerby
•What are the expected cost/performance advantages of each of the options being considered (for cavities, couplers, tuners), especially relative to the XFEL choices?	(To be discussed)

SCRF Session Agenda, April 19

Time	Report	Charged by	Note
09:30	Introduction	A. Yamamoto	
	Path to finalizing cavity field gradient		S0
09:40	- R&Ds to improve the gradient	L. Lilje	
10:15	- Decision process	A. Yamamoto	
10:30	-- Coffee Break --		
11:00	Path towards industrialization		S1
11:00	- Cavity Integration	H. Hayano	
11:30	- Cryomodule	N. Ohuchi	
12:00	- Role of plugcompatibility (cavity/cryo)	J. Kerby (updated)	
12:20	- Cryogenics	T. Peterson	
12:30	-- Lunch break --		
14:00	- HLRF	S. Fukuda	
14:20	- MLI: beam dynamics and quadrupoles	C. Adolphsen	
14:40	Lesson expected from system tests		S2
14:40	- STF at KEK	H. Hayano	
15:00	- NML at FNAL	M. Champion	
15:20	Summary / Discussions	A. Yamamoto	
15:30	Adjuorn		

backup

AAP Review General Agenda

	17(Fri)	18(Sat)	19(Sun)	20(mon)	21(Yue)
9			ATF	AS	Joint Summary
10	ACFA-GDE Joint	CFS	SRF		
11					
12					
13					
14		CESRTA	SRF	MM	
15	AAP Guidance			PM summary	
16		FLASH			
17	AAP Closed Session				