2009 Linear Collider Workshop of the Americas: 'LCWA09'

- **Meeting Goals:**
  - R & D,
  - Engineering Design,
  - Accelerator Design and Integration
- **Parallel Sessions**
- **After the workshop:**
  - R & D milestones for LCWS10, Beijing
  - AD & I: preparing the 'SB2009' Proposal
  - Updating the 'Risk Register'
- **R & D – SCRF**
  - Cavity, Cryomodule, Linac System (S0, S1, S2)

Workshop Goals – R & D:

- **Progress on risk mitigating R&D,**
  - primarily the global high-gradient SCRF programme;
  - electron cloud suppression and ultra-small emittance generation in the damping rings (CESR-TA, ATF, DAΦNE, etc.);
  - ATF2 programme for demonstration of the final focus optics and beam stabilisation.
  - Review of TTF/FLASH 9mA experimental run.

Workshop Goals - Engineering:

- **Technical progress on engineering design work,**
  - specifically the SCRF linac (cryomodules) and
  - development of „plug compatibility“ interface specifications.
  - Global 31.5 MV/m cryomodule test (“Global S1”);
  - development of world-wide infrastructure and SCRF test facilities;
  - development of cost effective high-level RF power sources (including HLRF solutions associated with a single-tunnel option).
- **Machine Detector Interface**
  - (jointly with ALCPG), including CFS for collider hall and IR design.

Workshop Goals - Design:

- **Accelerator Design & Integration (AD&I):**
  - review of the "Straw-man Baseline 2009" (SB2009) elements,
  - including reports on on-going studies and plans towards a baseline proposal.
  - Assessment of associated cost increments and risk (via the development of the Risk Register).
  - This workshop will also provide an open forum for discussion of the proposed design modifications with the physics and detector community.
    - Tuesday 16:45 – 17:45
    - (summary in Saturday Joint session 10:30)

ALCPG09 GDE agenda

	Tuesday	Wednesday	Thursday	Friday	Saturday
8.30 – 10.00	Joint Plenary	GDE Plenary Accelerator Design & Integration	WG's parallel Peter G - sources	WG's parallel Peter G – Main Linac	GDE Plenary WG summaries
10.00 – 10.30	Break	Break	Break	Break	Break
10.30 – 12.00	Joint Plenary	WG's parallel	WG's parallel EC Gov & PIP	WG's parallel EC Gov & PIP	Joint Plenary GDE, ALCPG summary
12.00 – 13.30	EC lunch	EC lunch	EC lunch	EC lunch	
13.30 – 15.00	GDE plenary CLIC, SRF, AAP etc…	WG's parallel Peter G – damping ring	WG's parallel Peter G - BDS	WG's parallel Peter G - CFS	
15.30 – 16.00	Break	Break	Break	Break	
16.00 – 17.30	GDE Plenary PM goals, Special Det. Session – machine parameters	WG's parallel Panel discussion (in early evening)	WG's parallel	GDE Plenary Accelerator Design & Integration	

WG's: Sources, Damping Rings, Main Linac, BDS , Beam Dynamics, CFS

September 30 Parallel sessions

	September 30, 2009						
Session Times	WG1 - Sources	WG2 - DR	WG3 - ML	WG4 - BDS	WG5 - Beam Dynamics	WG6 - CFS	Cost Management
08:30 - 10:00	AD&I w/ E. Paterson						
10:00 - 10:30	Break						
10:30 - 12:00		with CMG	Cavity Production	ATF2 commissioning		AD&I CFS w/ Area System Representatives	with DR
12:00 - 13:30	Lunch						
13:30 - 15:30	e-	DR design and Kicker R & D	Cryomodule	with IR		with CMG	with CFS
15:30 - 16:00	Break						
16:00 - 17:30	undulator and OMD		Cryomodule	ATF2 SC Final Doublet		Heat Loads and Thermal Stability	CLIC

October 1 Parallel sessions

	October 1, 2009						
Session Times	WG1 - Sources	WG2 - DR	WG3 - ML	WG4 - BDS	WG5 - Beam Dynamics	WG6 - CFS	Cost Management
08:30 - 10:00	with CMG	e cloud and fast ion	Main Linac Integration with BD	ATF2	with ML / RTML	regional tunnel configs	with Sources
10:00 - 10:30	Break						
10:30 - 12:00	target	e cloud and fast ion	Main Linac Integration with BD	BDS systems	with ML / RTML	Life safety	
12:00 - 13:30	Lunch						
13:30 - 15:30	300 Hz and Compton	e cloud and fast ion	Cavity gradient	with CMG		regional tunnel costs	with BDS
15:30 - 16:00	Break						
16:00 - 17:30		SB2009 and Technical Design	Cavity gradient	with Instrumentation		2D and 3D drawing devl.	

October 2 Parallel sessions

	October 2, 2009						
Session Times	WG1 - Sources	WG2 - DR	WG3 - ML	WG4 - BDS	WG5 - Beam Dynamics	WG6 - CFS	Cost Management
08:30 - 10:00		Low Emittance Tuning	with CMG	gamma gamma		EDMS	with ML
10:00 - 10:30	Break						
10:30 - 12:00		Low Emittance Tuning	HLRF	with IR		Cost estimate	
12:00 - 13:30	Lunch						
13:30 - 15:30			with CFS	with Beam Dynamics	with BDS / IR	with ML / HLRF	with ML HLRF / CFS
15:30 - 16:00	Break						
16:00 - 17:30	AD&I w/ E. Paterson						

Workshop to Conclude with:

- **Goals for the next GDE workshop: LCWS10 Beijing, March 26-30, 2010**
  - R & D, Design, Engineering, Test Facilities
- **Plans and writing assignments for 'SB2009 Proposal' – final draft due December 2009**
  - Development of the outline and timeline
  - AD & I meeting: DESY December 2 – 3, 2009
  - A. Yamamoto, M. Ross, N. Toge, (Nick Walker)
- **Preparations for AAP Review, January 2010**

The New Baseline - Next Steps:

- **Now: ALCPG**
  - **Report/Status on AD&I Action Items**
  - **Review SB2009 Working Assumptions**
  - **First-cut cost estimate**
    - Differential, based RDR ILCU unit costs*
  - **AD&I team consensus on**
    - Proposal content
    - Proposal outline and writing assignments
  - **Additional action items for DESY Dec. AD&I meeting**
- **Dec 2-3: DESY AD&I meeting (2-3.12)**
  - **First draft proposal document**
  - **Review outstanding Action Items and issues**
  - **Final editing tasks**
- **Dec 18: Final Draft Proposal Document to EC/AAP**
- **Jan 6-8: AAP review**
- **Mar 26-30: Beijing LCWS 2010**
  - **Final proposal document, including recommendations from AAP and community input**
  - **Acceptance of new baseline for TDP-2**
  - **Change Control devised and imposed**
- **Jul 20-28: Paris ICHEP 2010**
  - **Presentation of new TDP-2 baseline**

Proposal Document

1. **Introduction (PMs)** — **2 pages**
2. **SB2009 Overview (PMs)** — **4 pages**
3. **SB2009 Proposal (TAG leaders)**
   1. **Parameters** — **2 pages**
   2. **Injectors** — **4 pages**
   3. **Bunch Compressors** — **2 pages**
   4. **Main Linac**
      1. Single Tunnel (Technical) Solution — 2 pages
      2. DRFS — 2 pages
      3. KCS — 2 pages
   5. **BDS/MDI** — **2 pages**
   6. **CFS solutions** — **4 pages**
4. **Cost Increments/differentials (PHG)** — **2 pages**
5. **Risk (PMs)** — **2 pages**

~30 pages

Probably end up with 50-60

- **Appendices**
  1. **Report from Availability Task Force**
  2. **Report(s) on Tunnel Safety Concepts**
  3. **…**

SB2009 Development at ALCPG:

- **System description**
  - Check the summary descriptions and confirm within the group, and with other groups. Identify open issues
- **Layout description**
  - Check the outline drawings and confirm within the group, and with other groups, in particular, CF/S. Identify open issues
- **Cost implications**
  - Check the preliminary component counts and unit costs for new components. Check within the group, and communicate with Costing G. Identify open issues.
- **TDP2 activities**
  - Check the table for key technical issues. Confirm within the group, and with other groups. Identify open issues
- **By the end of ALCPG**
  - Report the outcome of discussion. Sort out the established agreement and/or outstanding issues.
  - Assign the responsible chief author for each section.
  - Update the outline for the Proposal Document. Fill in a few sentences for each of these bullets if possible. Create a list of open issues as part of it. Share. This is our v.0.1 draft.

Action Item list – for LCWA09

Summary report of the first meeting on Accelerator Design & Integration 28-29th May, DESY

17th June, 2009

Editors: Ewan Paterson (SLAC)
Marc Ross (FNAL)
Nick Walker (DESY)
Akira Yamamoto (KEK)

ILC-EDMS ID: D*879845

DESY SB2009 Action Item List (1)

Summary of Action Items (now until ALCPG meeting)

Area	item	Action Item	Lead responsibility	Comments
General	0	Prepare spreadsheets (WBS-like) with approximate modified components counts and CFS requirements for cost evaluation (see #3 and #4)	All TAG leaders	
Cavity Yield	1	Consolidate global legacy test data into a single database	Ginsburg	
	2	Clearly define 'acceptance criteria' and 'yield' to be applied to the data in #1	Geng	
CFS	3	Schedule WebEx meetings with responsible area contacts	Kuchler	done
	4	Prepare feedback questions for TAG group meetings (requirements)	Kuchler	
	5	Evaluate SB2009 requirements and generate cost differentials	Kucher, Garbincius	2008 Klystron cluster used as model
	6	Evaluate impact of both HLRF solutions on all three sample sites	Kuchler, Osborne, Enomoto	
	7	Compile/review safety solutions for single-tunnel	Kuchler, Osborne, Enomoto	
HLRF/CFS	8	Update DRFS single tunnel integration models to include utilities, services and other (non-RF) hardware	Enomoto, Fukuda	
	9	Consider possible DRFS tunnel solution with cryomodules supported from the floor	Enomoto, Fukuda	
	10	Identify/maximise common design features between both HLRF solutions	CFS + Fukuda, Adolphsen	
E source	11	Evaluate integration in central region tunnel (incl. spin rotation issue)	Brachmann, Paterson	
	12	Consider options for independent source housing / DR integration	Brachmann, Paterson	

DESY SB2009 Action Item List (2)

P source	13	Explore parameter options for end-of-linac operation (as a function of energy) for the following scenarios: yield of 2 at 250GeV; yield of 1.5 at 150 GeV; QWT and Flux Concentrator and/or Li lens options.	Clarke	
	14	Produce comprehensive target shielding curves (rate vs concrete shielding thickness) for above schemes	Clarke	
	15	Supply envelope dimensions ("box") for target and capture station	Clarke	
	16	Compile review of existing beam dynamics simulations (emittance preservation)	Clarke	
	17	Compile available documentation on target engineering solution	Clarke	
	18	300 Hz source - prepare exact comparison charts for planned R&D tests	Omori, Urakawa	Planned R&D at ATF
	19	300 Hz source - Identify scope and resources required for integrated design work	Clarke, Omori	Begin planning for a more integrated source design.
DR	20	For 3.2km ring, what are the estimated limits on bunch charge and number?	Guiducci	Best estimate based on current understanding of e-cloud limits and thresholds.
RTML	21	Review and re-evaluate stray-field tolerances in long return line	Solyak	
	22	Review and re-evaluate phase and amplitude stability requirements for single stage compressor	Solyak	
BDS/MDI	23	Supply presented lattice with TME dogleg to Walker for CAD3D integration (see slide 6 in BDS/MDI presentation)	Angal-Kalinin	
	24	Attempt to quantify scaling for L* on FF length, impact on collimation etc.	Seryi	Is L* an FF cost driver?
CRI	25	Proposal for overall lattice geometry solution including IR asymmetry	Paterson, Walker	cut and paste existing lattices and look for first-order solution

DESY SB2009 Action Item List (3)

Management	26	Form availability task force and define plans/studies	PMs	
	27	Top-down re-evaluation and update of RDR risk register	PMs, Paterson	Will require iteration with TAG leaders and review of definition of risk quantification (including cost impact)

- **Availability Task Force**
  - **to be reported in Wednesday 08:30 – 10:00 GDE Accelerator Design and Integration Session**
- **Top – down re-evaluation and update of the RDR risk register →**
  - **The current (RDR) risk register can be found in ILC-EDMS (ID D*872285)**

Re-evaluation and update of the RDR risk register.

- **in addition to simple updates**
- **to be made uniform through the application of common criteria across each subsystem's risk listing.**
- **Standard matrix - scoring approach:**

Risk is defined as the probability of failure:

- **6 kinds of failure:**
  - **basic technology,**
  - **engineering,**
  - **{production yield,**
  - **product reliability,**
  - **existence of a viable backup, and**
  - **schedule. }**
- **we should consider only the first 2 out of the list above: basic technology and engineering.**

Risk Register Decision Point 'times':

- **The project can respond to perceived risk at any time,**
- **generally accepted that the penalty for doing so increases with time**
- **For the TDP-1 evaluation of risk we should adopt our reference point to be the end of TDP-2 (Ewan's time T_1).**
  - **(to be completed and submitted as part of the SB2009 Proposal Document in mid-December 2009)**
- **This is justified because we have a comprehensive R & D Plan which includes resource estimates and technical milestones.**

Risk Register shows impact

- **The perception of risk is derived from a series of simple questions based on present status and plans.**
- **The anticipated penalty is based on how the project would respond and apply a mitigation strategy once failure is evident or the risk becomes too great.**
- **Both the risk (probability) and penalty (cost of responding to failure) must be considered in order to gauge the impact.**
- **It is the 'impact' which is recorded, discussed, and summarized in the register.**

Risk Register update process

- **53 elements**
- **score each element:**
  - **based on what has been achieved to date and**
  - **where we expect to be following TDP-2 using the following questions.**
- **Asking the AS Technical Area Leaders to apply.**
- **Akira Yamamoto will lead the SRF discussion.**

Scoring: Basic Technology

- **Within the state of the art? 0**
- **One year advancement with minimal resources 1-2**
  - **(no Beam Test Facility experiments required)**
- **Two to three years advancement - moderate resources 3-5**
  - **(BTF experiments may be required)**
- **More than 3 years advancement -substantial resources 6-8**
  - **(BTF experiments definitely required)**
- **New technology required; development cycle unknown 9-10**

Scoring: Engineering Development

- **Fully tested, completed production - units on hand? 0**
- **Prototype exists and has been tested 1-2**
- **Hardware and software development needed 3-5**
- **Detailed design underway, 6-8**
  - **development task effort not 'scoped'**
- **Concept defined, detailed design effort not 'scoped' 9-10**

Updating the RR - Step by step:

1. **Record and justify the scores with a few sentences including a reference to presented or published material.**
2. **Develop a practical mitigation strategy for each of the delineated project stages for each of the failures. What would the project do if progress was deemed unsatisfactory until the end of TDP-2?**
3. **Estimate the cost for the mitigation effort, using costing guidelines similar to those used for the RDR**
4. **Roll the resulting scoring and mitigation costs up to create a summary 'risk assessment' to be entered at the top level of the register as a kind of executive summary.**
5. **Review the most serious register elements in detail to ensure the scoring, mitigation strategy and costing have been done consistently according to basic guidelines. (Perform top-down management review.)**
6. **Identify new register elements that have emerged since 2007 or that were missed in the initial draft.**

ML-SCRF R & D Report

1) Cavity Field Gradient
2) S1-Global Progress and Test Plan
3) S2 Program – 2009 FLASH Operation
4) R&D for Industrialization

Reported by A. Yamamoto for ALCW09 Plenary

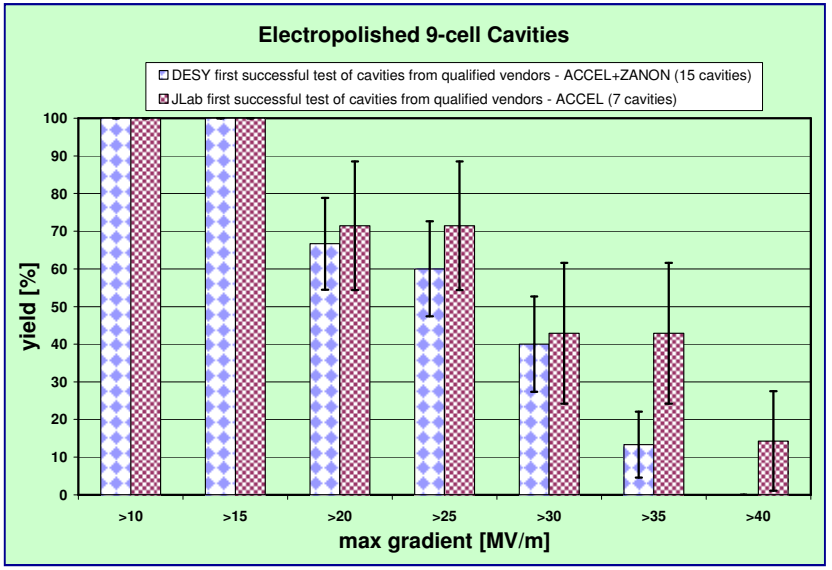
Sept. 29, 2009

Global Plan for SCRF R&D

Year	07	2008	2009	2010	2011	2012
Phase	TDP-1				TDP-2	
Cavity Gradient in v. test to reach 35 MV/m	>> Yield 50%				>> Yield 90%	
Cavity-string to reach 31.5 MV/m, with one-cryomodule		Global effort for plug-compatible string (DESY, FNAL, INFN, KEK)				
System Test with beam acceleration		FLASH (DESY)			NML (FNAL)	
					STF2 (KEK)	
Preparation for Industrialization				Mass Production Technology R&D		

Example New Yield Plot from the 1st Successful Vertical RF Test

- **Vertical axis:** fraction of cavities satisfying criteria where:
  - **Denominator (logical and of the following):**
    - Fabricated by ACCEL or ZANON
    - Delivered to labs within last 2-3 years
    - 2nd, Electro-polished at DESY and JLab
    - Fine-grain material
  - **Numerator (logical and of the following):**
    - Accepted by the lab after incoming inspection
    - 1st successful vertical RF test,
      - excluding any test with system failure, has max gradient > (horizontal axis bin) MV/m;
      - ignore Q-disease and field emission (to be implemented in future)
- **Horizontal axis:** max gradient MV/m
- Exclude cavities: which are work-in-progress, i.e., before rejection or 1st successful RF test



Note: These are results from the vertical CW test at DESY and JLab

Progress and Next steps

Fermilab

- **Plots**
  - ✓ Improve the example/preliminary plot to include only production-style EP'd cavities and include error bars
  - ✓ Add more plots

After SRF2009

- **Spreadsheet**
  - Add DESY Production 4
  - Few entries to be completed and minor errors to be fixed (don't affect plots)
- **Database itself**
  - Develop with DESY colleagues the precise tools for database uploading
  - Add a limited number of new stored quantities

→ *More Report by C. Ginsburg in ML Session (Oct. 1)*

Cavity Gradient Study - Summary

- **Yield at 35 MV/m (w/ experienced cavity vendors)**
  - **22 % at 1st pass (statistics 22)**
  - **33 % at 2nd pass (statistics 21, as of 2009-07))**
  - **DESY prod-#4 to be added, (10 more statistics)**
- **New yield statistics (w/ potential vendors)**
  - **AES: to be counted from #5 (to be confirmed)**
  - **MHI: to be counted from #5 (to be confirmed)**
- **Selected statistics needed for 'Prod. Yield'**
  - **to evaluate readiness of production-stage/industrialization and cost-saving**

Note: *'Numbers of Cavities for High-Gradient research': necessary to be separately counted/allocated.*

Progress and Prospect of Cavity Gradient Yield Statistics

	PAC-09 Last/Best 2009-05	FALC 1st Pass 2009-07	ALCPG 2nd Pass 2009-10	To be added (2009-11)	Coming Prod. Y. (2010-06)	Further, Research cavities
DESY	9 (AC) 16 (ZA)	8 (AC) 7 (ZA)	14 (AC/ZA)	10 (Prod-4)	5	8 (large G.)
JLAB FNAL/ANL/Cornell	8 (AC) 4 (AE) 1 (KE-LL5) 1 (JL-2)	7 (AC)	7 (AC)	~ 5 (AE)	24-x	x (including large-G)
KEK/IHEP				5 (MH)	2 (MH)	1 (LL) 1 (IHEP)
Sum	39	22	21		32 - x	**10 + x**
G-Sum				**40**	**72 - x**	

We may need to have separate statistics for 'production' and for 'research'

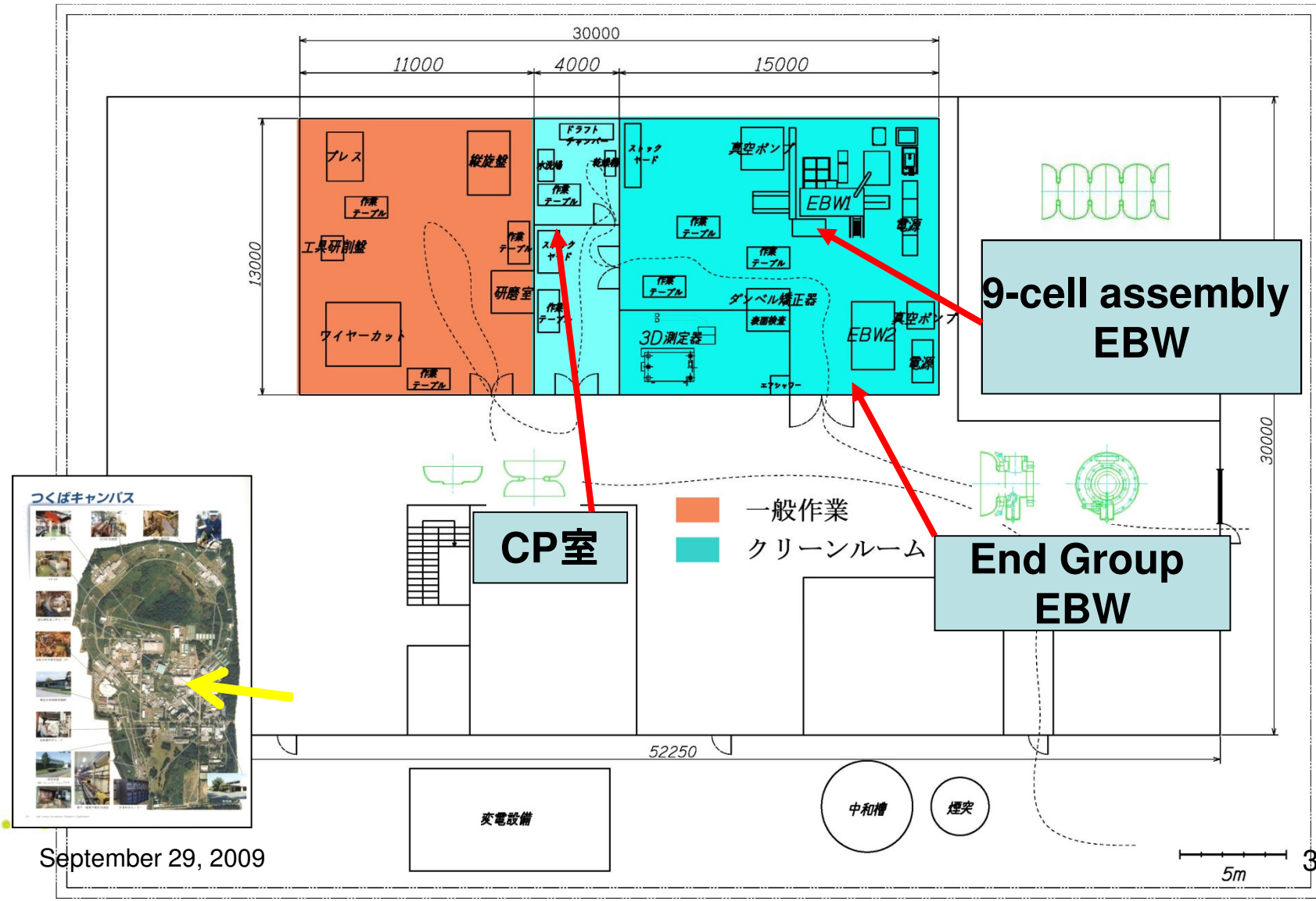
Global Plan for SCRF R&D

Year	07	2008	2009	2010	2011	2012
Phase	TDP-1				TDP-2	
Cavity Gradient in v. test to reach 35 MV/m	>> Yield 50%				>> Yield 90%	
Cavity-string to reach 31.5 MV/m, with one-cryomodule		Global effort for plug-compatible string (DESY, FNAL, INFN, KEK)				
System Test with beam acceleration		FLASH (DESY)			NML (FNAL)	
					STF2 (KEK)	
Preparation for Industrialization			Mass Production Technology R&D			

Industrialization and Cost-Effective Production and Quality Control

- Re-visit previous effort, and update the cost-estimate for production
  - Review the RDR cost estimate (based on TESLA)
  - Include recent R&D experience (industry/lab)
- Encourage R&D Facilities for industrialization
  - Important to host these in laboratories for open information and technology development,
  - Develop cost-effective manufacturing, quality control and cost-reduction in cooperation with industry
  - In progress → development of a Pilot Facility/Plant at KEK to collaborate with industries
- Reflect the R&D progress for cost-reduction...

Plan for a Pilot Facility at KEK for SCRF Cavity Production R&D



Possible EBW Facility for efficient 'batch' weld processing

Vertical
Electron beam gun

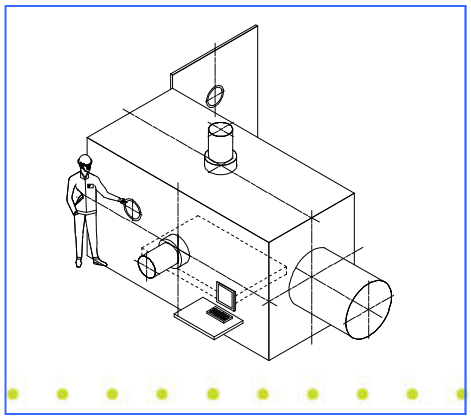
Extension chamber
φ800X1000

Extension
chamber

Table
X=800 Y=600,
Z=**900**

Horizontal
Electron beam gun

±200



1600

3800

1500

Announcement
A Satellite Meeting at IPAC-2010

Subject: Industrialization of SCRF Cavities

Date : May 23, 2010, a full-day, prior to IPAC-2009
Place: Int. Conf. Center, Kyoto, Japan

Objectives:

To discuss and exchange information on preparation for the 'ILC SCRF Cavity' industrialization between industries and laboratories,

Agenda:

Industrialization plan to be reported by laboratories,
Comments and/or advices given by industries,

Organized by:

ILC-GDE Project Managers,
(c/o Akira Yamamoto: akira.yamamoto@kek.jp)

Announcement sent to major cavity venders, RI, Zanon, AES, Niowave, PAVAC, MHI, and other industired and ILC-SCRF collaborators,
Announcement also made during SRF-09 Workshop Industial Session

Summary

- S0 Cavity Gradient R&D
  - 35 MV/m with the 2nd pass yield of ~ 30 %, with leading vendors and DESY/JLab process and tests (with statistics of 21),
  - Additional statistics of ~ 20, including the DESY Production-4 (10). Further statistics of ~ 20 or more by next summer, 2010.
  - Re-baseline - accepting a gradient distribution of = 20 %
- S1 Global - in preparation
  - for assembly starting at KEK in early 2010
- S2 Program in progress → DESY Beam Tests
  - High pressure code application may be simplified at least for the cavity production,
  -
- Preparation for Industrialization
  - Start Planning for Pilot Plant/facility hosted by laboratories, and particularly at KEK

Cavity Gradient 'Yield' to be re-evaluated

- **Original S0 concept assumed:**
  - **Surface can be reset according to the EP process, and**
  - **Multiple processes may be integrated for statistics.**
- **Several years of experience shows**
  - **Repeat processing may cause degradation**
- **Processing and Test recipe has been updated**
  - **Complete the process and test only with the first cycle**
    - no further processing if the results are acceptable
- **Revision of the definition of 'yield' is required**
  - **Process (R&D) and Production definitions are different**
  - **A common means for collection and evaluation of the data is required**
- **New effort started by the Global Database Team**
  - **Try a new approach to be more appropriate**
    - Production yield with the first/second pass RF test

Creation of a Global Database Team

- Global Data Base Team formed, May 2009:
  - **Camille Ginsburg (Fermilab) – Team Leader & Data Coordination**
  - **Zack Conway (Cornell University)**
  - **Sebastian Aderhold (DESY)**
  - **Yasuchika Yamamoto (KEK)**
  - **Rongli Geng (JLab) – GDE-SCRF Cavity TA Group Leader**

More report and discussion to be held at GDE ML Session: 16:00

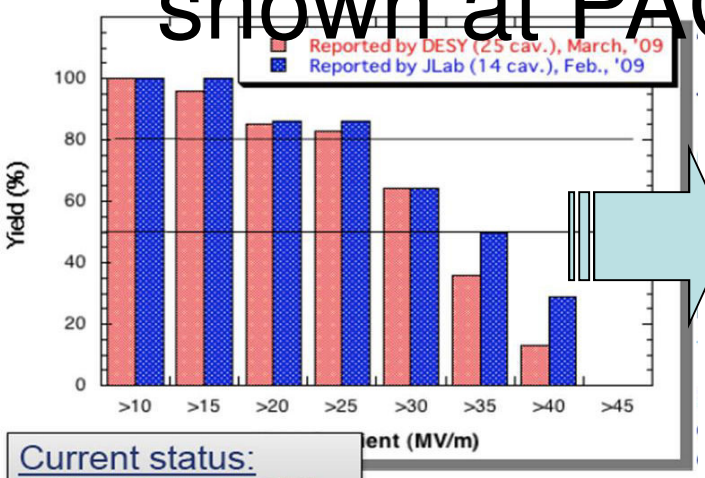
First Effort:

Check of DESY/JLab data in old yield plot

- The gradients for DESY data were off by +2MV/m
- Not 08/09: large component of 2007, and very small component of 2009
- Not 1st or 2nd test: instead, last (DESY) or best (JLab)
- Included cavities fabricated by ACCEL, ZANON, AES, JLab-2, KEK-Ichiro

This is not the ideal data selection from which to infer a production yield

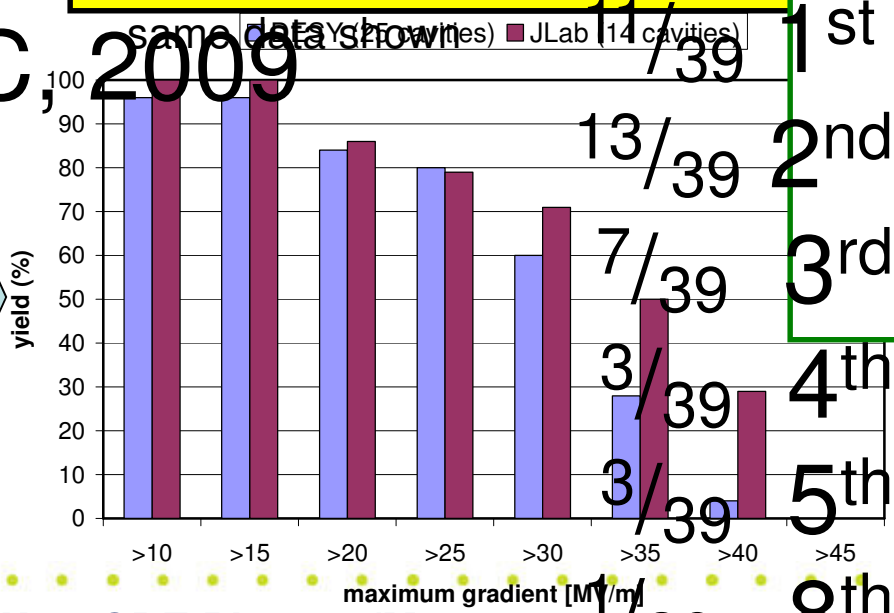
Old version, shown at PAC, 2009



Current status:
50% yield at ~ 33 MV/m;
(80% >25MV/m)

Revised version (corrected only fo

same data shown



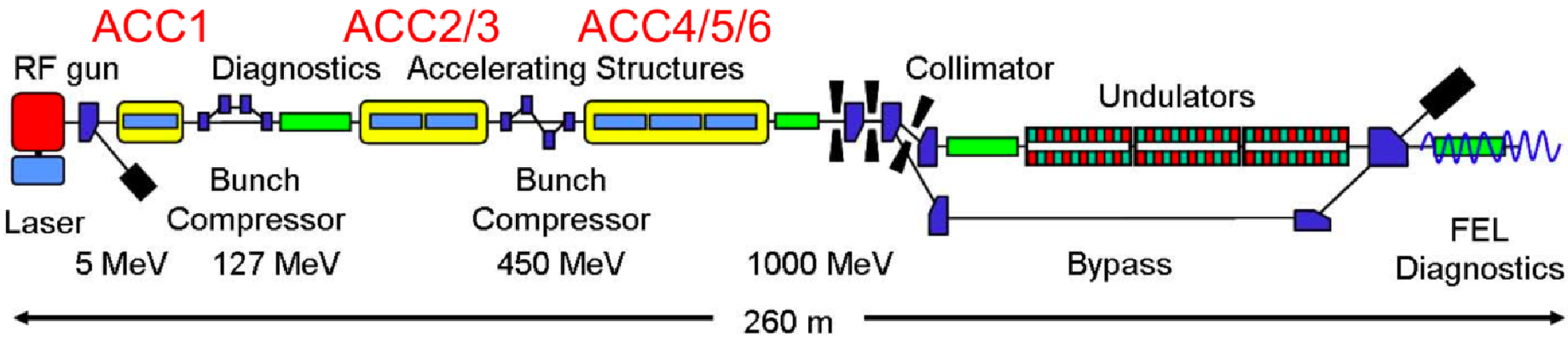
1st test
2nd test
3rd test
4th test
5th test
8th test

Standard Process Selected for Further Yield Plot

	Standard Cavity Recipe
Fabrication	Nb-sheet (Fine Grain)
	Component preparation
	Cavity assembly w/ EBW (w/ experienced venders)
Process	1st Electro-polishing (~150um)
	Ultrasonic degreasing with detergent, or ethanol rinse
	High-pressure pure-water rinsing
	Hydrogen degassing at > 600 C
	Field flatness tuning
	2nd Electro-polishing (~20um)
	Ultrasonic degreasing or ethanol
	High-pressure pure-water rinsing
	Antenna Assembly
	Baking at 120 C
Cold Test (vert. test)	Performance Test with temperature and mode measurement (1st / 2nd successful RF Test)

TTF/FLASH 9mA Experiment

Full beam-loading long pulse operation → "S2"



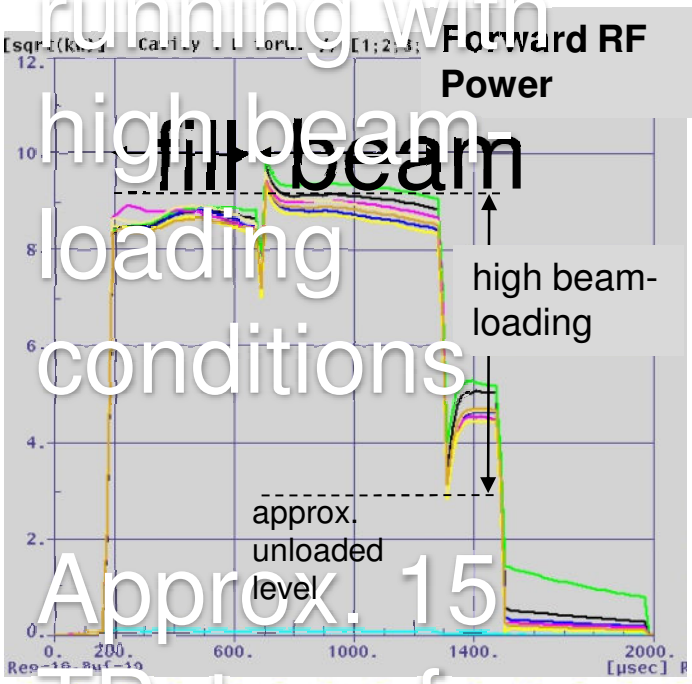
		XFEL	ILC	FLASH design	9mA studies
Bunch charge	nC	1	3.2	1	3
# bunches		3250	2625	7200*	2400
Pulse length	μs	650	970	800	800
Current	mA	5	9	9	9

- Stable 800 bunches, 3 nC at 1MHz (800 μs pulse) for over 15 hours (uninterrupted)

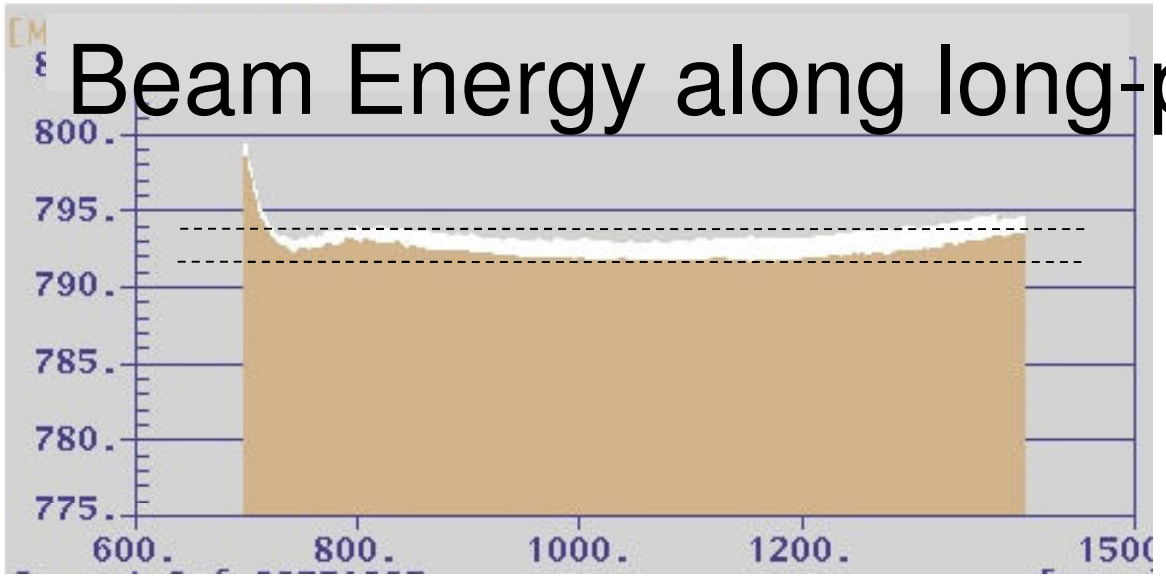
9mA Example Results

Much experience gained

running with high beam loading conditions



Approx. 15 TBytes of



Along pulse: 0.1%

RMS (0.5% pk-to-pk)

(af

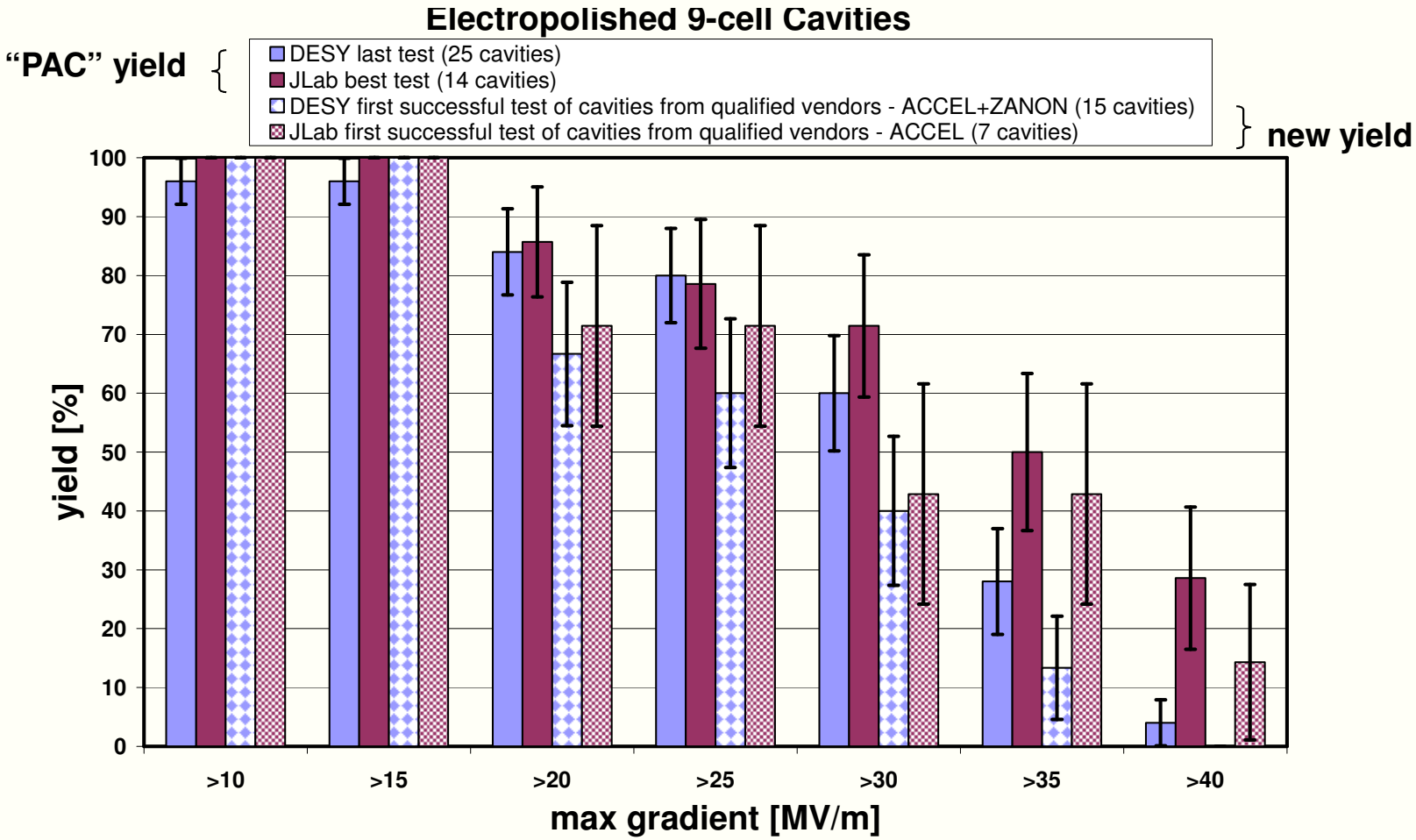
Pu

Integrated Systems Test -Understanding

trip and trip

Compare New Production Yield Plot with Old One

Fermilab

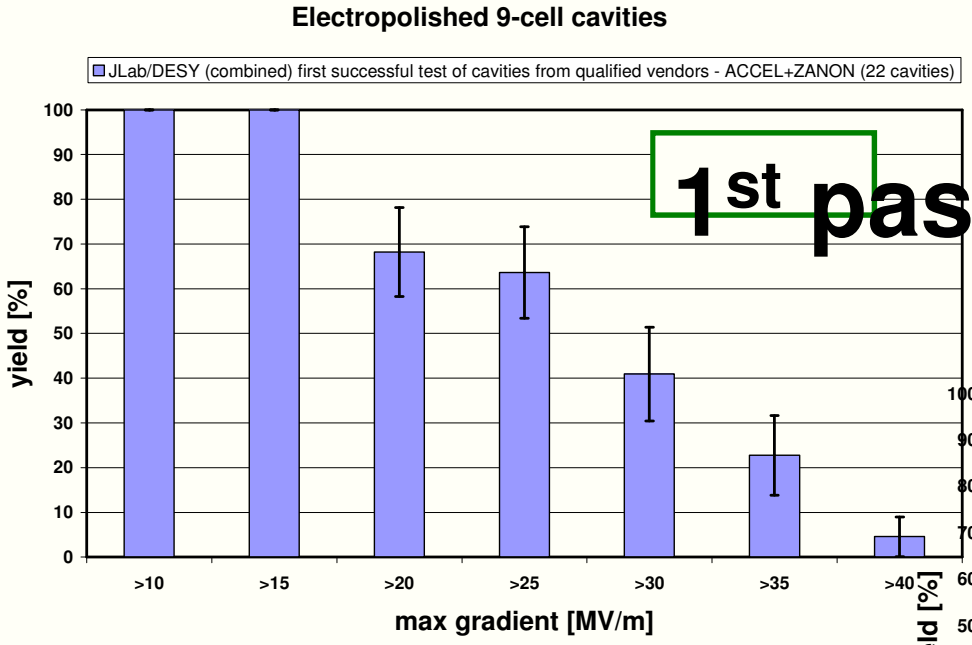


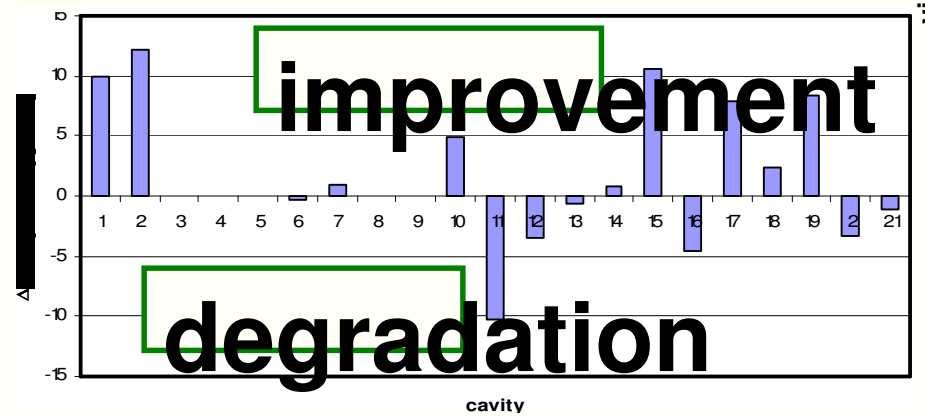
New yields from DESY & JLab are statis

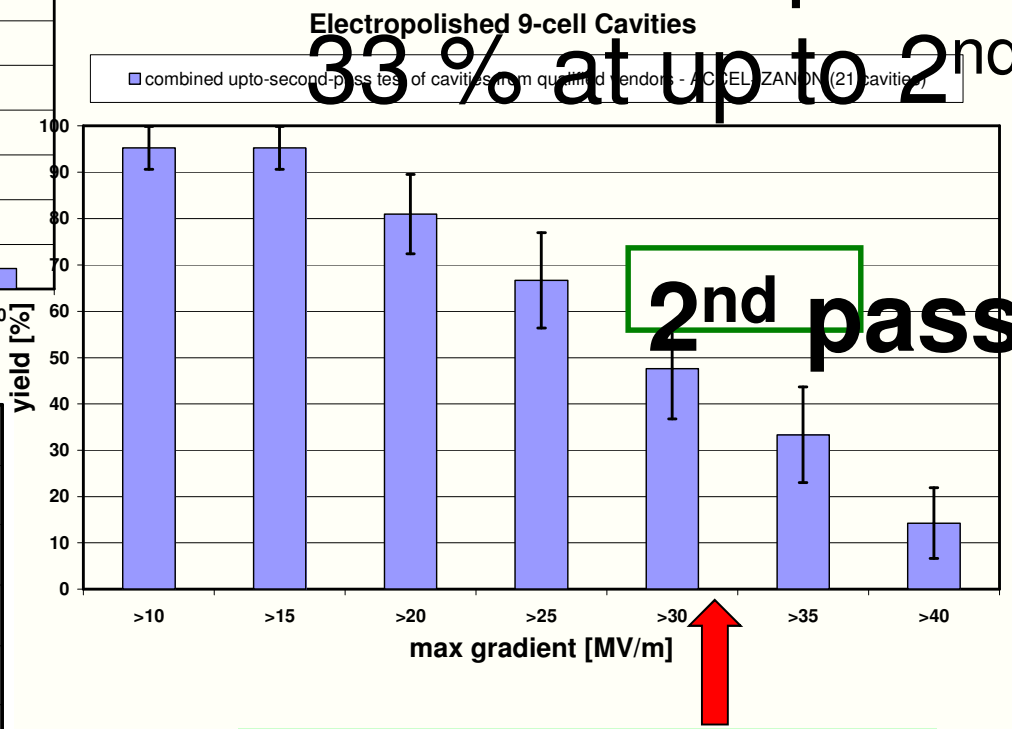
Old yields from DESY & JLab are also st

Comparison of 1st and 2nd Pass Yields

Fermilab







Yield at 35 MV/m:
22 % at 1st pass
33 % at up to 2nd

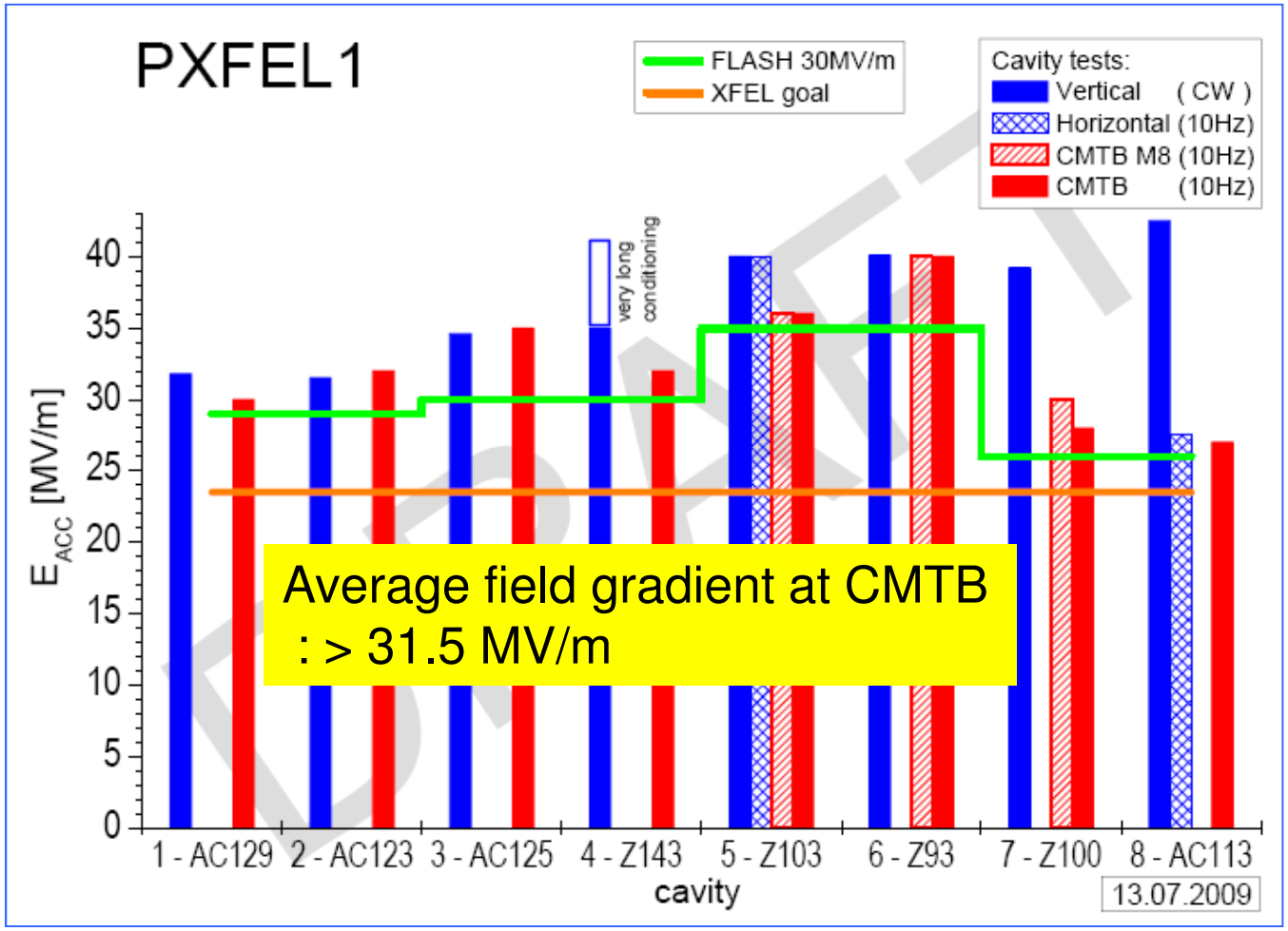
ILC Operation at <
Yield reaching ~ 4

Global Plan for SCRF R&D

Year	07	2008	2009	2010	2011	2012
Phase	TDP-1				TDP-2	
Cavity Gradient in v. test to reach 35 MV/m	>> Yield 50%				>> Yield 90%	
Cavity-string to reach 31.5 MV/m, with one-cryomodule		Global effort for plug-compatible string (DESY, FNAL, INFN, KEK)				
System Test with beam acceleration		FLASH (DESY)			NML (FNAL) / STF2 (KEK)	
Preparation for Industrialization			Mass Production Technology R&D			

S1 Goal: Reached at DESY PXFEL1

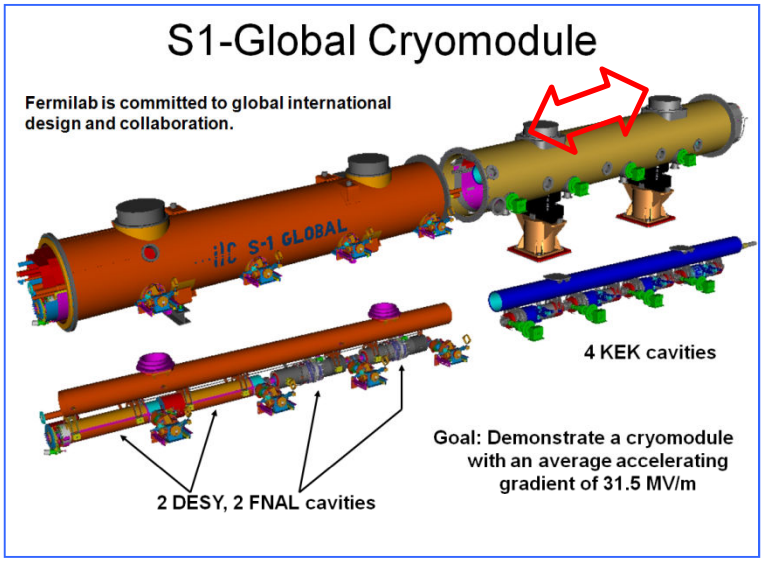
reported by H. Weise, at SRF-09



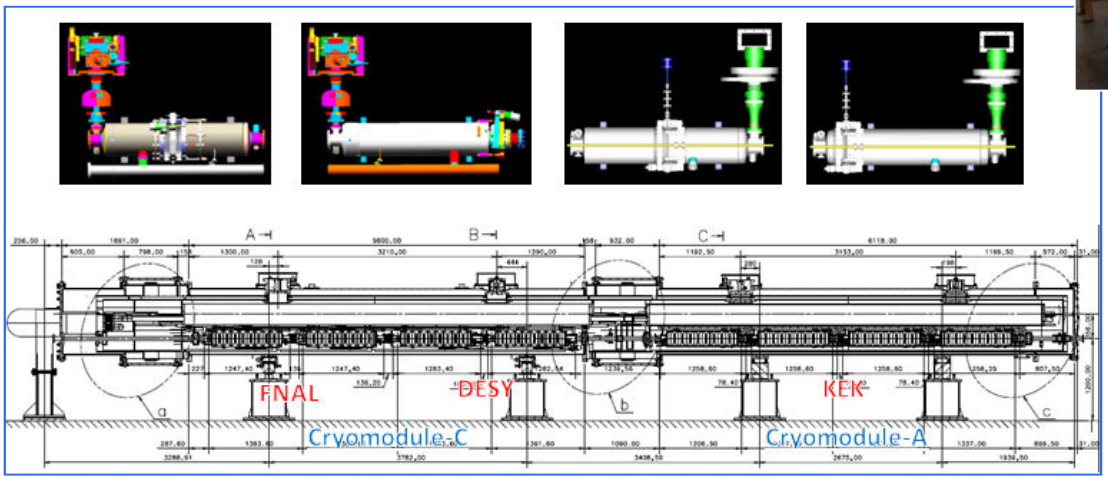
Note: DESY prepared cavities and assem

cold mass, contributed by IHEP, for XFEL

S1-Global Cryomoduleto be delivered from INFN/ZANON to KEK, Nov. 2009



Diagnostics installation In July 2009



S1- Global: Objective, Progress and Plan

- **Objectives**
  - **Exercise global collaboration**
  - **Learn necessary 'Plug-compatibility'**
  - **Demonstrate cavity field gradient of <31.5 MV/m>**
- **Progress**
  - **INFN to deliver Cryomodule by Nov. 2009,**
  - **DESY to deliver 2 cavities by Nov. 2009**
  - **FNAL to deliver 2 cavities by Dec. 2009**
  - **KEK to provide 4 cavities by Nov. 2009**
- **Scientific Program**
  - **To be discussed during ALCPG/ILC-GDE**

>> More in ML in Cryomodule parallel session on Sept. 1 (Wed.)