



2010 (and beyond) Plans & Milestones

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2010 – A Year of Transition

- **Phase 1 ends – Phase 2 begins**
 - This is our last meeting in Phase 1
- **Seamless transition**
 - No major re-structuring etc.
- **Adiabatic “shift in emphasis” needed**
 - Beginning plan for producing TDR (end 2012)
 - Consolidation (results) of risk mitigating R&D
 - Collider design work → updated cost estimate
 - Documentation!

A good opportunity to
take stock and review
where we are



TD Phase Goals – A Reminder

- **TDR deliverables:**

- Results from Risk Mitigating R&D
- Updated Reference Design
- Updated VALUE estimate
- Project Implementation Plan

- **General Goals**

- Risk Mitigating R&D
 - Main Linac SCRF [gradient, cavity yield, mass-production and industrialisation]
 - Beam Test Facilities [ATF/ATF2, CESR/TA, TTF/FLASH, DAPHNE...]
 - Sources...
- Accelerator Design & Integration
 - Integrated, robust and simplified design
 - Cost containment



Where do we stand?

- **Published milestones in R&D Plan**
 - Pay attention!
- **Part of Workshop Charge: Review these milestones & goals**
 - Expect status report as part of WG summaries
- **PM are planning major update for Release 5**
 - Due June 2010
 - Your input will be required



***ILC Research and Development Plan
for the Technical Design Phase***

Release 4

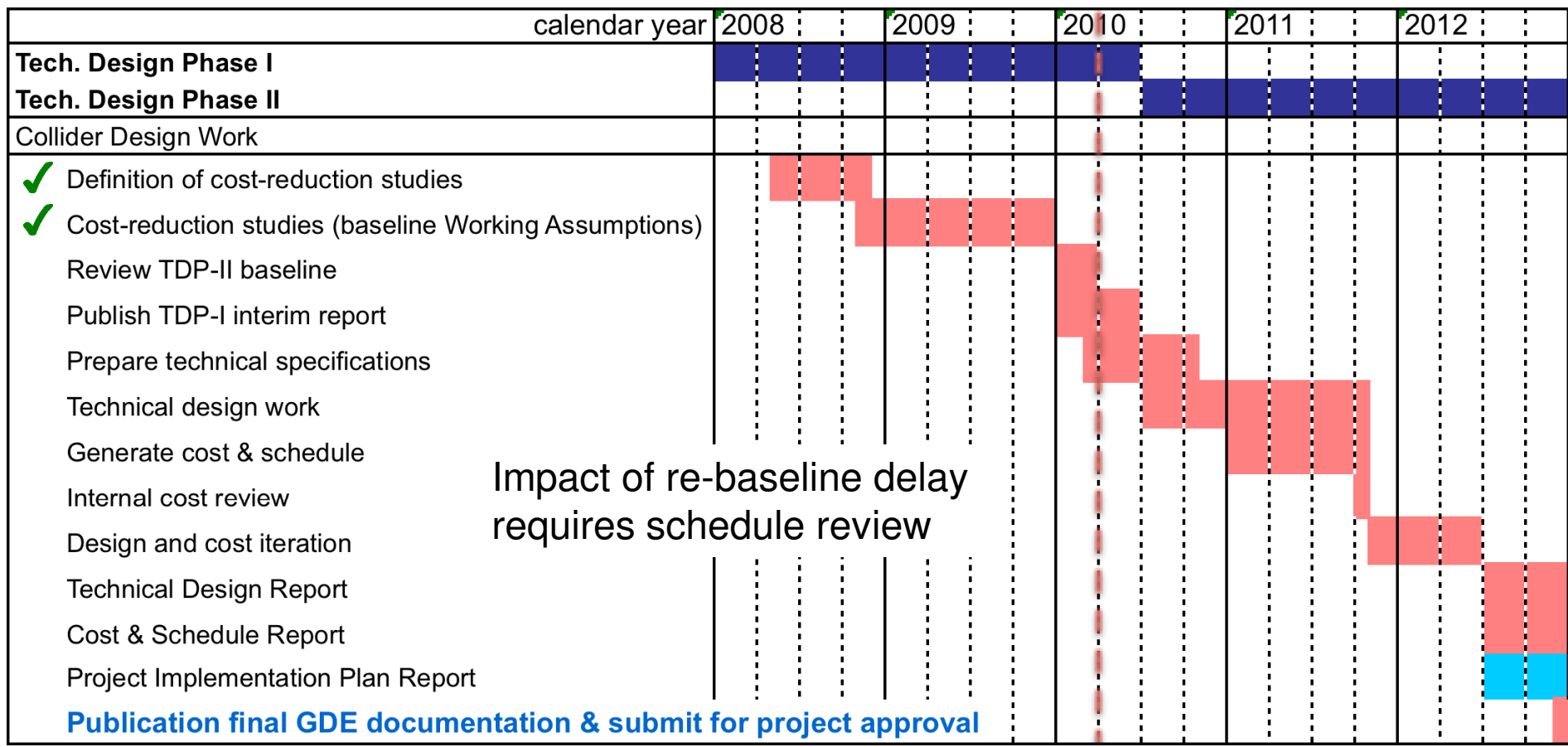
July 2009

ILC Global Design Effort

Director: Barry Barish

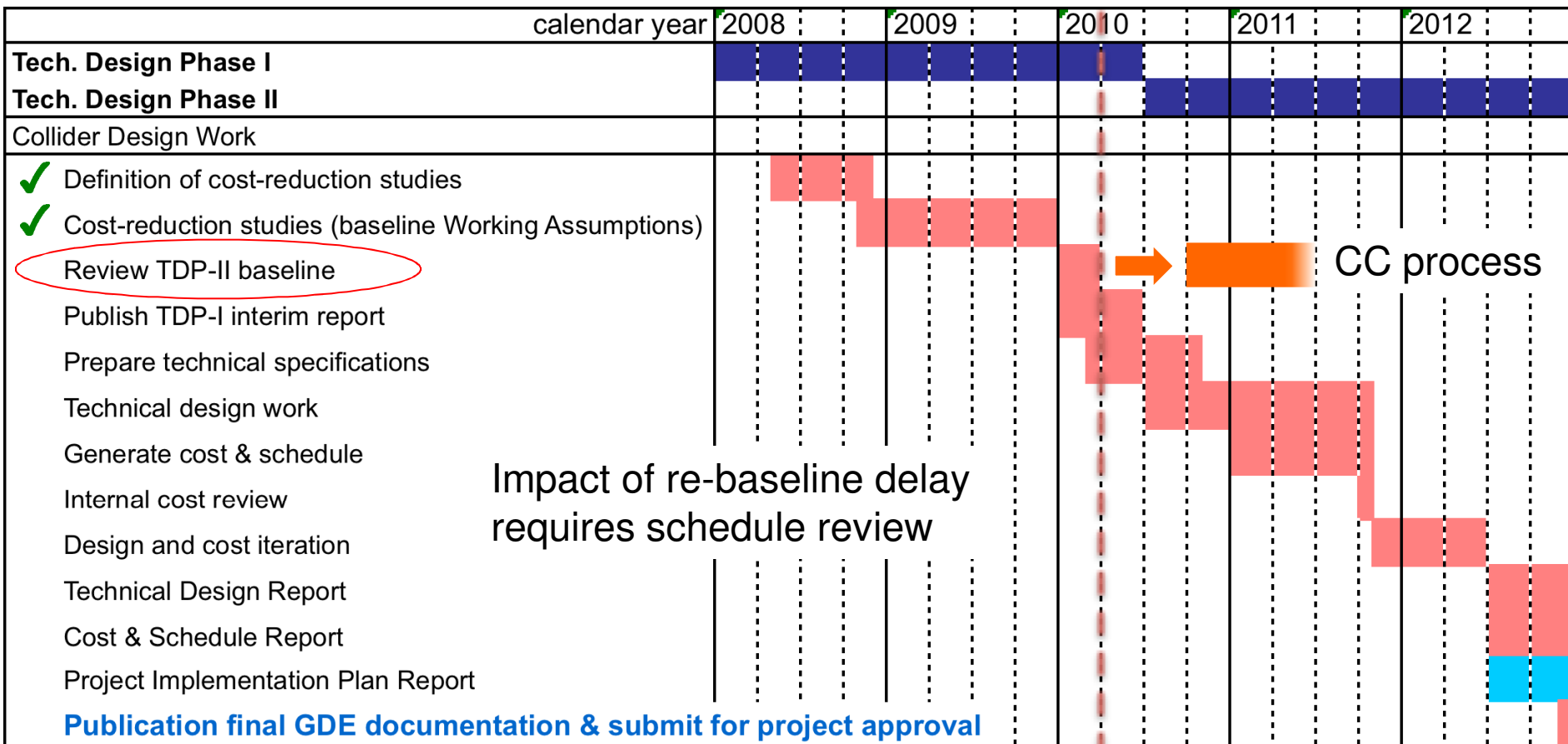


Collider Design Work (ADI)



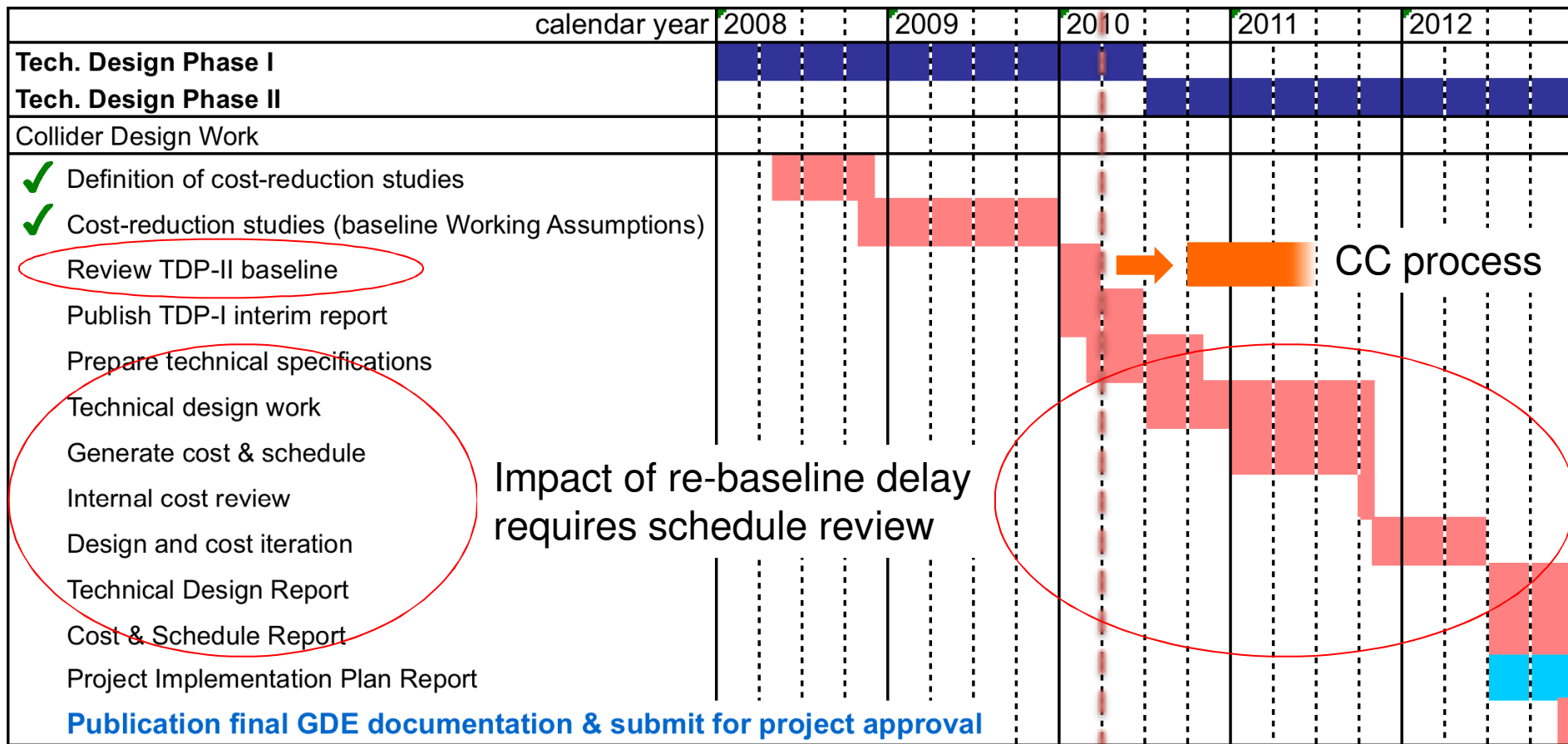


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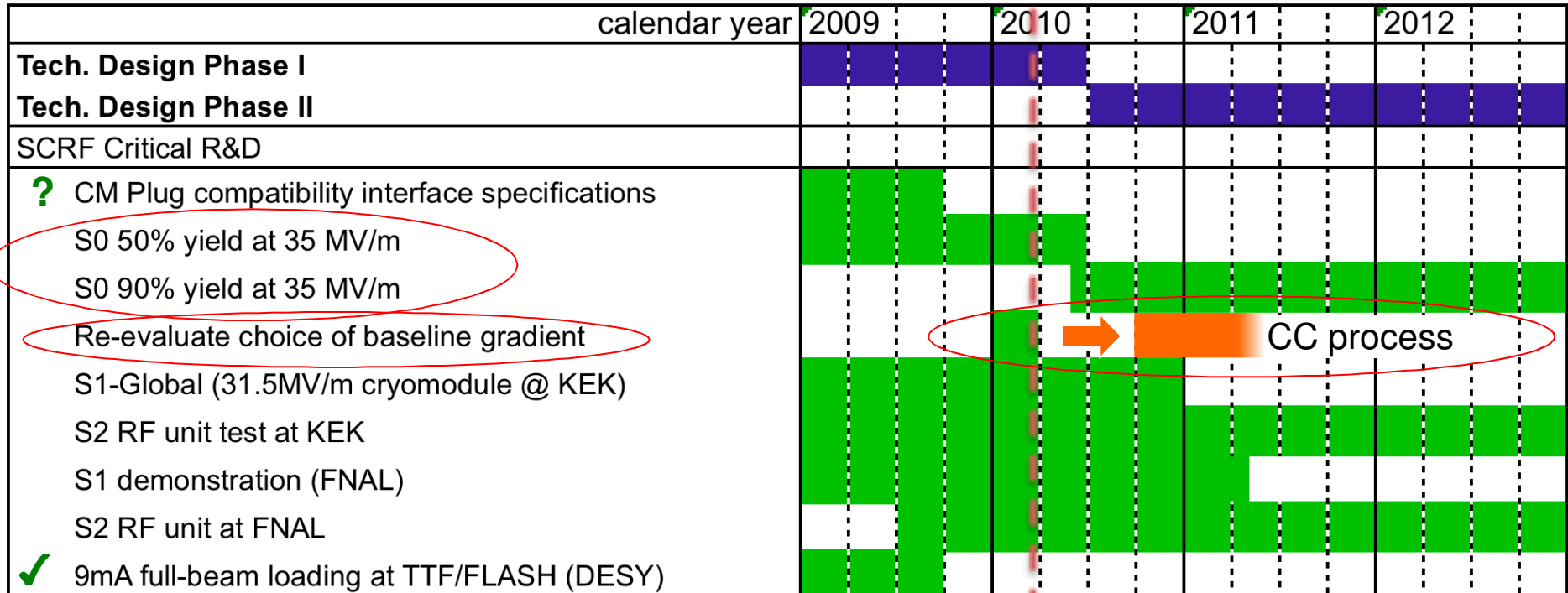


Collider Design Work (ADI)





R&D: SCRF



Required: strategy and plans for producing an updated cryomodule cost (early 2012?)



R&D: SCRF HLRF

- **Milestones for RDR Alternatives:**
 - Marx modulator development / demonstration 2010
 - Demonstration of circulator-less distribution system (with VTO) 2010
- **Klystron Cluster System (KCS)**
 - Initial high-power tests of WG components 2010
 - EM modelling of components (VTO etc) 2010
 - FMEA / operations study 2010
 - Full-power tests of WG components 2012
- **Distributed RF System (DRFS)**
 - Prototype of 700kW Mod. Anode Klystron 2010
 - Prototype of Mod. Anode Modulator 2010
 - Design for manufacture (cost!) 2012
 - MAK/MAM lifetime demonstration 2012



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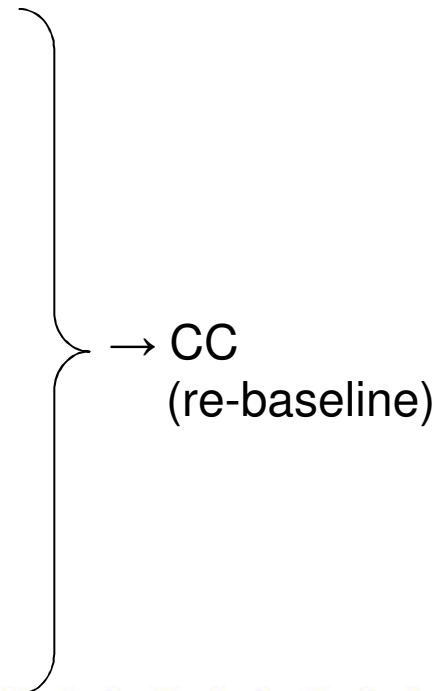
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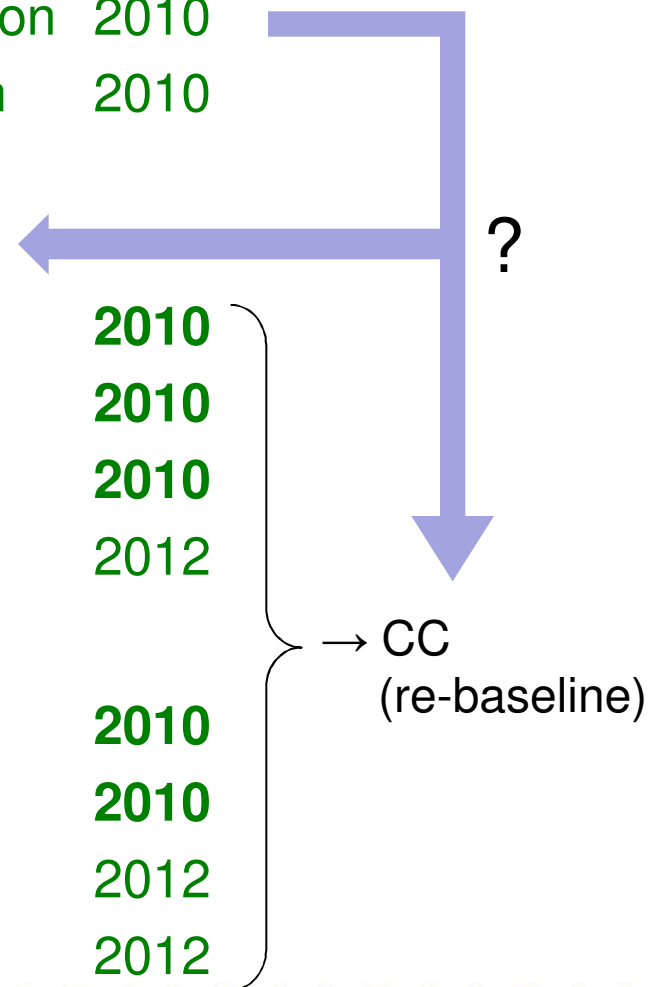
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Accelerator Systems R&D

- **Electron Source:**

- Proof of principle system 2008 (?)
- Reliable 200 kV load-locked gun prototype 2009 (?)
- Prototype laser system 2010
- Generation of beam with ILC spec. 2010
- Reliable 350 kV load-locked gun prototype 2011

Required: plans for polarised cathode fundamental
R&D



Accelerator Systems R&D

- **Positron Source:**

- SC Helical undulator prototype 2009 ✓
- Feasibility studies and design of a high-field flux concentrator 2009 (2010)
- Feasibility study and design of a lithium lens with possible beam tests 2010
- Engineering design of rotating target system with appropriate lifetime 2010
- Feasibility studies and beam tests of liquid Pb target 2010
- Feasibility studies and beam tests of a hybrid crystal target 2010

In addition: SB2009 parameters/specifications and associated ADI work → CC (re-baseline)



Accelerator Systems R&D

- **Damping Ring – ATF:**

- Demonstration of 2pm vertical emittance 2010

- **Damping Ring - DAΦNE**

- Fast kicker demonstrations 2010

- **Damping Ring – CEsrTA:**

- Reconfiguration of machine 2008 ✓

- incl. instrumentation and test sections;
First measurements of ecloud building up.

- Reduced emittance operation; 2009 ✓

- e-cloud build-up in wiggler chambers

- Characterisation of e-cloud build-up and 2010

- instability thresholds as a function of low
vertical emittance (≤ 20 pm)

Final recommendations on e+ DR configuration

(including possible 3km ring) → GC (re-baseline)



Accelerator Systems R&D

- **RTML**

- Experimental demonstration of the bunch compressor RF phase stability, and beam-loading compensation

2011
(FLASH)

- Results of beam dynamics simulation, demonstrating the required emittance tuning techniques

2010?

Further studies of single-stage compressor option for SB2009 (compression limits)



Accelerator Systems R&D

- **BDS– ATF2:**
 - Demonstration of design beam size 2010
 - Demonstration of the beam stability 2012
 - Evaluation of performance of SC FD and permanent magnet FD 2012
- **BDS**
 - Demonstration of the required phase stability of the prototype crab cavity system ?

Many other ADI related studies listed in Appendix B



Accelerator Systems R&D

- **Simulation:**

- Answers to critical beam-dynamics questions arising during the TD Phase (engineering driven)
- Overall (simulated) demonstration of emittance preservation from the Damping Rings to the interaction point
- Modelling of halo generation, transport and collimation
- Software tools (simulation codes)

Specific studies resulting from SB2009 studies to be defined → CC (re-baseline)



CFS

Table 4-1: Functional Requirements and Value Engineering Milestones (stages 1 & 2)

calendar year	2008	2009	2010	2011	2012
Tech. Design Phase I	[Blue bar spanning 2008 to 2010]				
Tech. Design Phase II	[Blue bar spanning 2010 to 2012]				
CFS Design work					
Process Water and HVAC Value Engineering	[Red bar]	[Red bar]			
Main Linac Tunnel Configuration Alternative Investigation		[Red bar]	[Red bar]		
ADI CFS Design		[Red bar]	[Red bar]		
Review and Improve Surface Building Facilities Criteria			[Red bar]		
Functional Requirements template publication			[Red bar]		
Functional Requirements complete for Main Linac			[Red bar]		
Functional Requirements complete for BDS and IR			[Red bar]		
Functional Requirements complete for Sources, DR and RTML			[Red bar]		
Update Main Linac design using new Baseline			[Red bar]	[Red bar]	
Update design all other areas using TDP2 Baseline				[Red bar]	
Develop Project Schedule				[Blue bar]	[Blue bar]

Focus has been on ADI (SB2009) in 2009

Schedule needs re-work for proposed CC (re-baseline)



Planning for the TDR

	2010	2011	2012
Risk Mitigating R&D			
Re-Baseline (CC)			
AD&I			
SCRF			
CFS			
Update VALUE estimate			
Document baseline			
Write TDR report(s)			

More detail required

Definition of milestones & critical path

AD&I, SCRF and CFS are focus activities and need definition



TDR – what is it?

TDR



Glossy Reports

Documents primary TDR deliverables

Readable
6-9 months to write

- 1 Results and status of Risk Mitigating R&D
- 2 Updated Reference Design
- 3 Updated VALUE estimate
- 4 Project Implementation Plan

references



Detailed Documentation in ILC-EDMS

Reference Documentation
Structured and linked

Basic design documentation

- Parameter tables
- Requirements
- Specifications
- Design documents
- Drawings (2D)
- CAD-3D models
- ...

Cost information
Schedule

ICET

Provides traceability

Released documentation

All relevant design documentation over next two years



Two Imminent Reports

- **TD Phase Interim Report**

- To be published ~July 2010
- General status report
- Terse!
- Upbeat publication (outreach)
 - Photos
 - Results
 - ..

Considerable amount of work which will require careful planning.

- **TD Phase R&D Plan Release 5**

- To be published in June 2010
 - Resource tables update in May for FALC RG
- More detailed planning for TD Phase 2
- Major update (re-write) expected
 - Main report body – PMs
 - Appendix B sections – TAG leaders



This Workshop

- **What's expected from the WG**

- Review of the R&D status (esp. R&D Plan milestones)
- How will R&D results factor into ILC baseline?
 - And when?
- ADI activities – how mature are the current designs

- Special attention to SB2009 themes
- Catalogue outstanding decisions
- What remains to be done for the TDR?

Detailed planning (action items) for next 6 months
→ [October GDE meeting \(Geneva\)](#)

- Overall planning and milestone updates
 - R&D plan release

Top-level planning towards TDR

- **What's expected from the PMs**

- Better defined overall schedule and goals (2010+)
- Change control procedure (SB2009)
- Outline for Interim Report
- Schedule/requirements for R&D Plan Update