EUROTeV and the ILC Global Context



Nick Walker (DESY) **EUROTeV** Annual Meeting INFN Frascati 24 January 2008

What's in Store

- EUROTeV and the ILC a historical context
- The GDE activities and accomplishments to-date
- The current resource crisis and the GDE response
- ILC-CLIC collaboration initiative important for Europe

Historical Context

- 2004 EUROTeV created (and approved!)
 - Pre-technology down-select
 - EUROTeV focused on non technology specific linear collider areas (TESLA/CLIC/NLC-JLC)
- August 2004 down-select to SRF technology
 - EUROTeV re-alignes itself with technology decision in preparation for Global Design Effort
 - CLIC remains R&D project for possible multi-TeV machine
- July 2005 Snowmass: GDE formally created
- December 2005 Frascati: ILC baseline configuration established (Reference Design)
- March 2007 Beijing: Draft RDR published
- May 2007 DESY: Engineering Design Phase launched.



EUROTeV (European) Input into GDE process



ILC Reference Design

- 11km SC linacs operating at 31.5 MV/m for 500 GeV
- Centralized injector
 - Circular damping rings for electrons and positrons
 - Undulator-based positron source
- Single IR with 14 mrad crossing angle
- Dual tunnel configuration for safety and availability



~31 Km



Schematic Layout of the 500 GeV Machine

RDR Design & "Value" Costs

The reference design was "frozen" as of 1-Dec-06 for the purpose of producing the RDR, including costs.

It is important to recognize this is a snapshot and the design will continue to evolve, due to results of the R&D, accelerator studies and value engineering

The value costs have already been reviewed twice

3 day "internal review" in Dec
ILCSC MAC review in Jan

Σ Value = 6.62 B ILC Units

Summary RDR "Value" Costs

Total Value Cost (FY07) 4.80 B ILC Units Shared + 1.82 B Units Site Specific + 14.1 K person-years ("explicit" labor = 24.0 M person-hrs 1,700 hrs/yr) 1 ILC Unit = \$ 1 (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



Technical Area: SCRF



24.01.2008

Technical Area: CFS & Global



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ED Phase Plan

ILC Research and Development Plan for the Engineering Design Phase

Release 0.9 DRAFT

International Linear Collider Project Management Team

> Marc Ross Nicholas Walker Akira Yamamoto

- 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 are working documents
 - Periodically reviewed and updated (new release)

The (Original) Plan (in a nut shell)

SCRF

- High Gradient R&D (reproducible 35 MV/m)
- Cryomodule designs) (plug compatibility)
- SCRF tech/Infrastructure in all three regions
 - FNAL/KEK ramping up
 - DESY/Europe has XFEL
- Conventional Facilities & Siting
 - Where we intend to reduce the \$\$\$\$\$!!
 - CFS-driven schedule for Accelerator Systems
 - VALUE engineering process to reduce the cost.
- Accelerator Systems
 - Cost-driven (re-)design of machine
 - Supplying necessary information to CFS
 - Test facilities (ATF, ATF-2, CESR-TA,...)

Primary EUROTeV contributions

ILC/GDE Funding Crisis (End 2007)

- UK new funding agency (STFC) published road-map and cuts support for ILC R&D activities
 - UK is a large part of EUROTeV
- US Funding "melt-down" hits basic science and in particular HEP
 - ILC funding reduced by factor of 4 for FY 2008



"both the UK and US actions are programmatic budget cuts and not rejections of the scientific goals and priorities that have motivated our work toward a linear collider."

24.01.2008



GDE Director Response:

THE SCIENCE !!!

- <u>Nothing has changed</u>. A linear collider remains the consensus choice as the highest priority long term investment for particle physics
- Global Collaboration Response
 - Strong response urging us to forge ahead and find ways to help or replace US and UK efforts.
 - Global commitment to the GDE Common Fund (*new*: Spain)
 - Offers of visiting appointments, equipment help, travel help, *etc*
- Note the value of multilateral program! Can survive problems in parts of the consortium.

ILC-Specific Resources (R&D Plan)



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ILC-Specific Resources (R&D Plan)



ILC-Specific Resources (R&D Plan)



SCRF – Still Primary GDE Priority

- R&D on SRF remains top-priority and to a large extent is funded by synergy projects in EU and US:
 - XFEL / FLASH in Europe
 - Project-X in US (under discussion)
- Asian (KEK) commitments / goals unchanged

Re-Structuring / Re-Planning

- GDE must react to reduced resource situation
 - Version 1 of R&D plan is no longer valid.
- Basic road-map now exists
 - Presented to FALC by Barish last week
- Basic "ED-phase" priorities remain the same
 - Gradient (SRF)
 - Cost reduction (CFS focus)
 - Test facilities (critical R&D)
 - (Cryomodule design not in v1 of report but will be in new version)
- Response to funding reduction
 - Keep priority R&D (risk mitigating) goals for 2010
 - Many final engineering activities delayed until 2012
 - Including complete new VALUE estimate
 - Including Project Implementation Plan

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N. Walker

New ILC-GDE Technical Phase Roadmap



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The Role of CERN (ILC-CLIC) (1)

- CERN made significant contributions to the ILC RDR
 - CFS
 - Cryogenics
 - Cost & Schedule
- Closer collaboration between CLIC (CERN) and ILC
 - areas of mutual benefit
 - increased engineering, R&D participation of CERN in ILC
 - beyond formal 1.3FTE CERN ILC participation
 - breaking down barriers

The Role of CERN (ILC-CLIC) (2)

- Initial areas identified:
 - BDS & MDI (incl. IR integration)
 - CFS (concrete, power, water...)
 - Cost & Schedule (important topic)
 - Beam Dynamics (effectively on-going)
- Meeting 8th February at CERN to begin working on detailed plans
 - contact people identified (CLIC/ILC)
 - understanding the meaning of 'mutually benefit'
 - future plans (meeting attendance etc.)
- If this works, investigate further topics:
 - cryogenics, positron source, DR (e-cloud), etc.

Goals of (initial) ILC/CLIC collaboration

- Work with CERN scientists and engineers on ILC / CLIC items; toward solving ILC design challenges
- Establishing connections and
- Mutual basis for discussion on key items
- Demonstrate a functioning collaboration through presentations to CERN / ILC communities *etc*.

CERN <u>must</u> play a more direct role in the global ILC

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In Summary

- by 2010
 - Some indication of the physics (early LHC results)
 - Primary risks resolved (gradient, e-cloud)
 - Cost reduction indication (selected systems)
 - Feasibility demonstrations of CLIC RF (CTF3 results)
- by 2012
 - The physics case will be validated (LHC results)
 - Project implementation plan (consensus)
 - Process for site selection agreed upon (but not necessarily started)
 - Ready for international project approval
- European participation is mandatory for this global project
 - Via synergy with European XFEL and FP7 initiatives
 - Via closer collaboration with CERN (and specifically CLIC)
- Despite current set-backs, we must go forward and build on the exceptional achievements that we have made