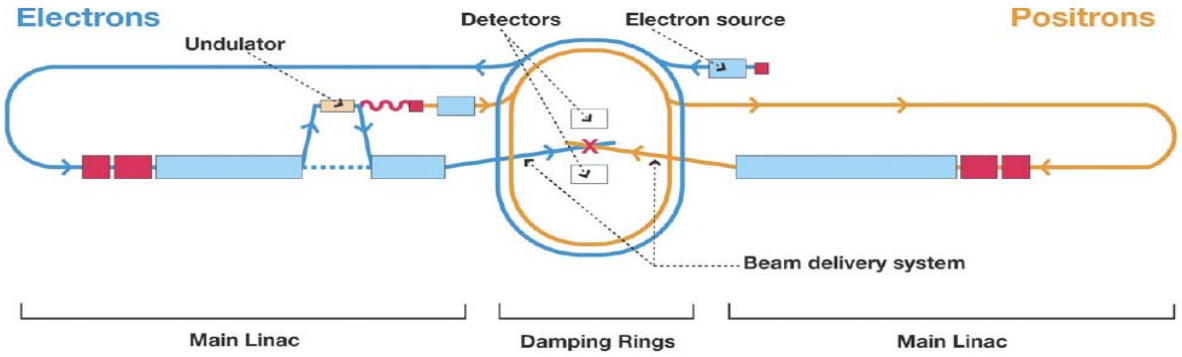
GDE Status and Plans

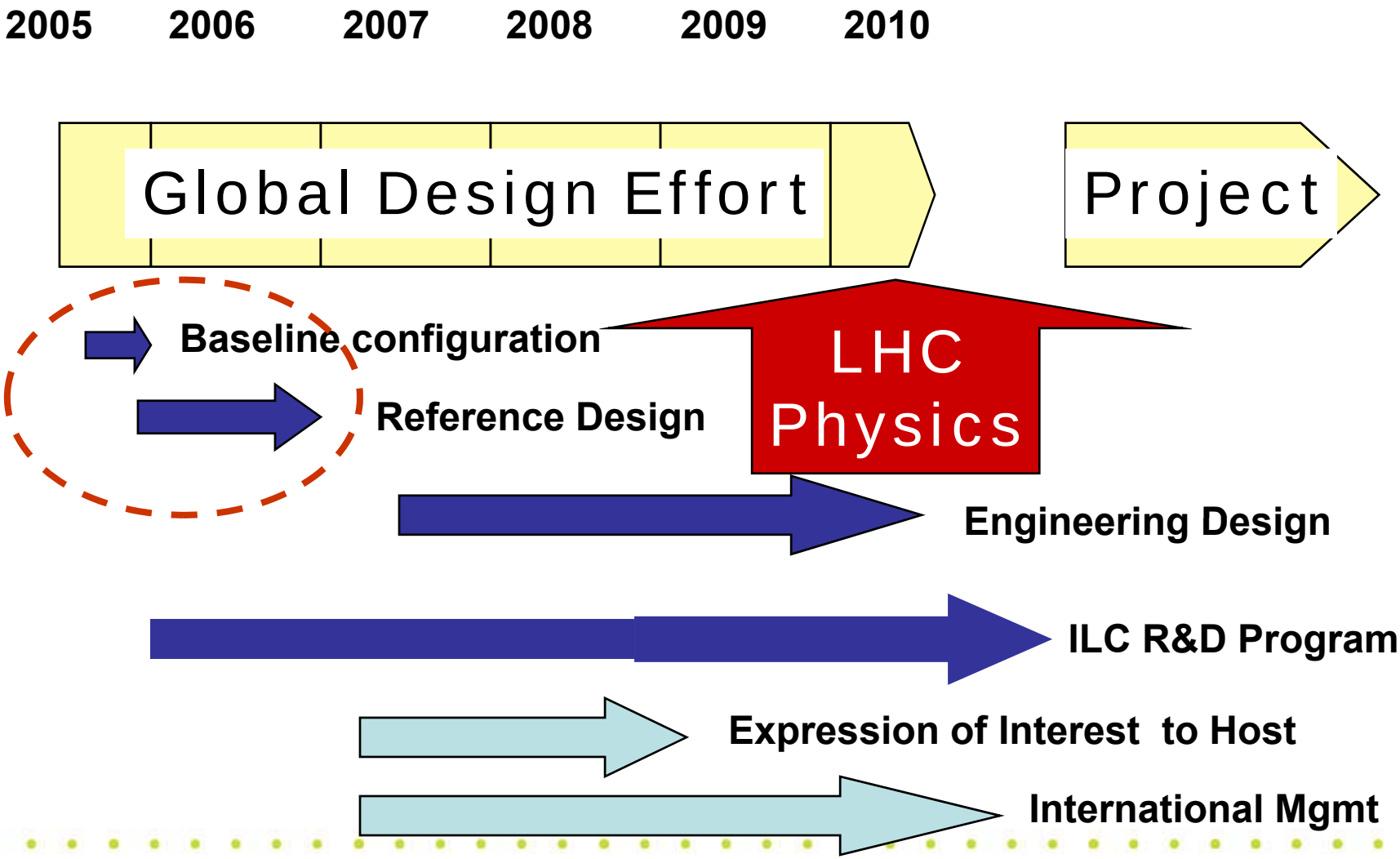


Barry Barish

Caltech / GDE

22-Oct-07

The GDE Plan and Schedule



Our Status

RDR

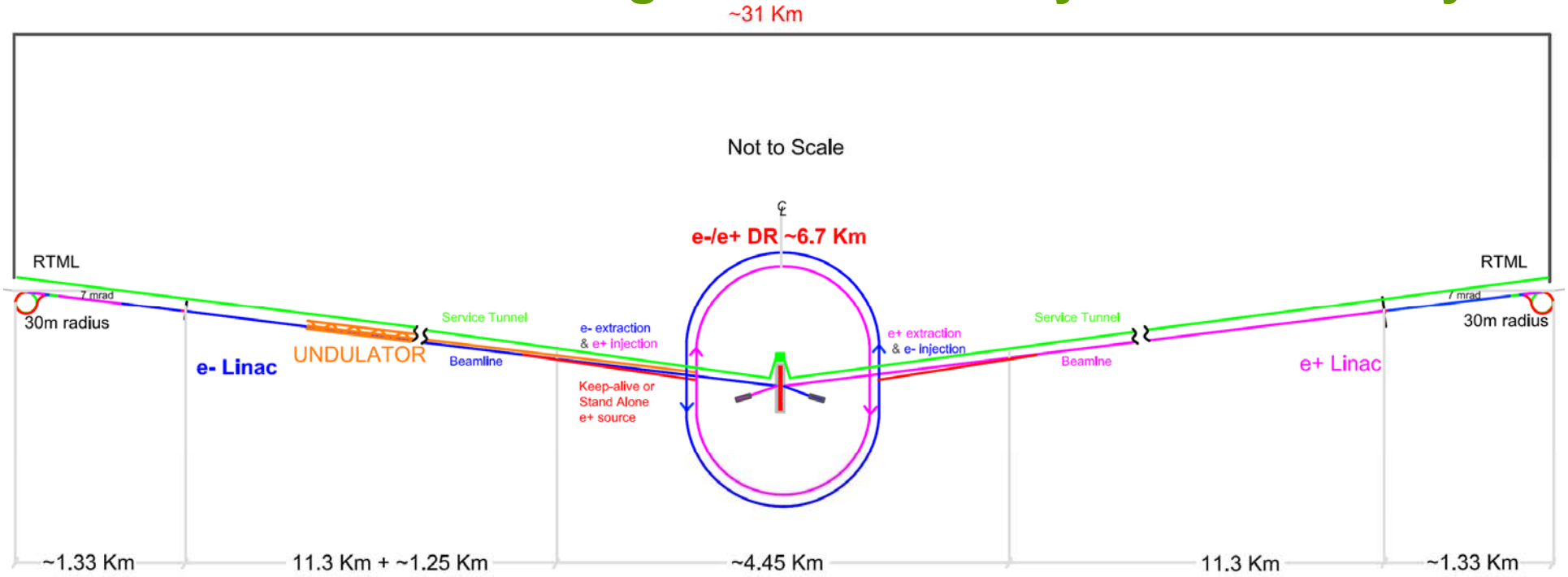
Parameters for the ILC

- E_{cm} adjustable from 200 – 500 GeV
- Luminosity → $\int L dt$ = 500 fb^{-1} in 4 years
- Ability to scan between 200 and 500 GeV
- Energy stability and precision below 0.1%
- Electron polarization of at least 80%

- The machine must be upgradeable to 1 TeV

RDR ILC Schematic

- 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



RDR Design Parameters

Max. Center-of-mass energy	500	GeV
Peak Luminosity	~$2x10^{34}$	$1/cm^2s$
Beam Current	9.0	mA
Repetition rate	5	Hz
Average accelerating gradient	31.5	MV/m
Beam pulse length	0.95	ms
Total Site Length	31	km
Total AC Power Consumption	~230	MW

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 extensively

- 3 day "internal review" in Dec
- ILCSC MAC review in Jan
- International cost review in Spring

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)

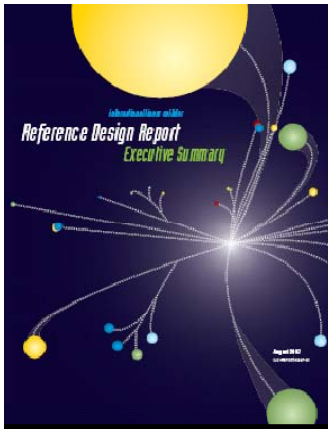
1 ILC Unit = $ 1 (2007)

Assessing the RDR

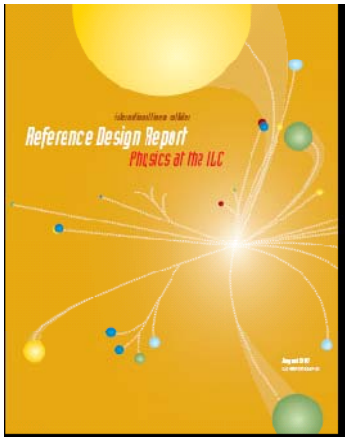
- **Reviews (5 major international reviews + regional)**
  - **The Design:** "The MAC applauds that considerable evolution of the design was achieved … the performance driven baseline configuration was successfully converted into a cost conscious design."
  - **The R&D Plan:** "The committee endorses the approach of collecting R&D items as proposed by the collaborators, categorizing them, prioritizing them, and seeking contact with funding agencies to provide guidelines for funding.
  - **International Cost Review (Orsay):** Supported the costing methodology; considered the costing conservative in that they identify opportunities for cost savings; etc.
- **RDR Deliverables**
  - The final versions of four volume Reference Design Report were submitted to FALC (July), and to ILCSC and ICFA (August).
  - Companion Document released last week. Available today!

RDR Reports

- **Reference Design Report (4 volumes)**

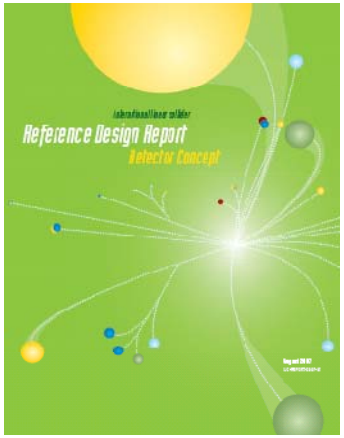


Executive Summary



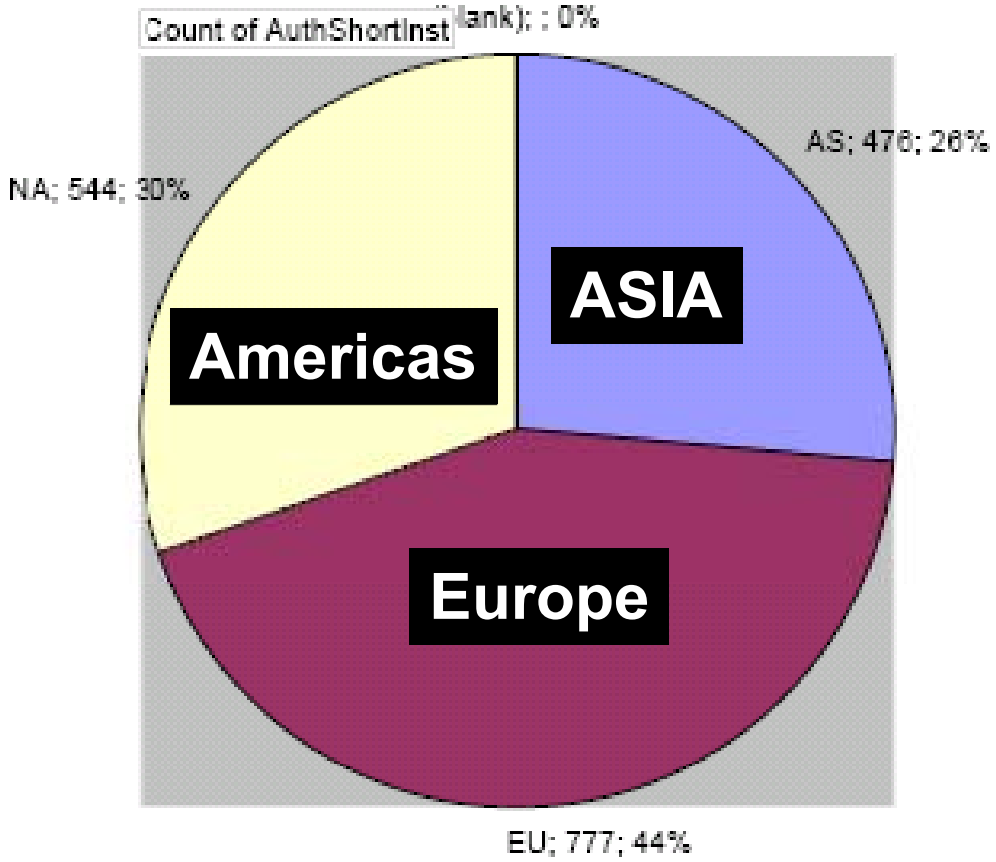
Physics at the ILC

Accelerator



Detectors

RDR Author List



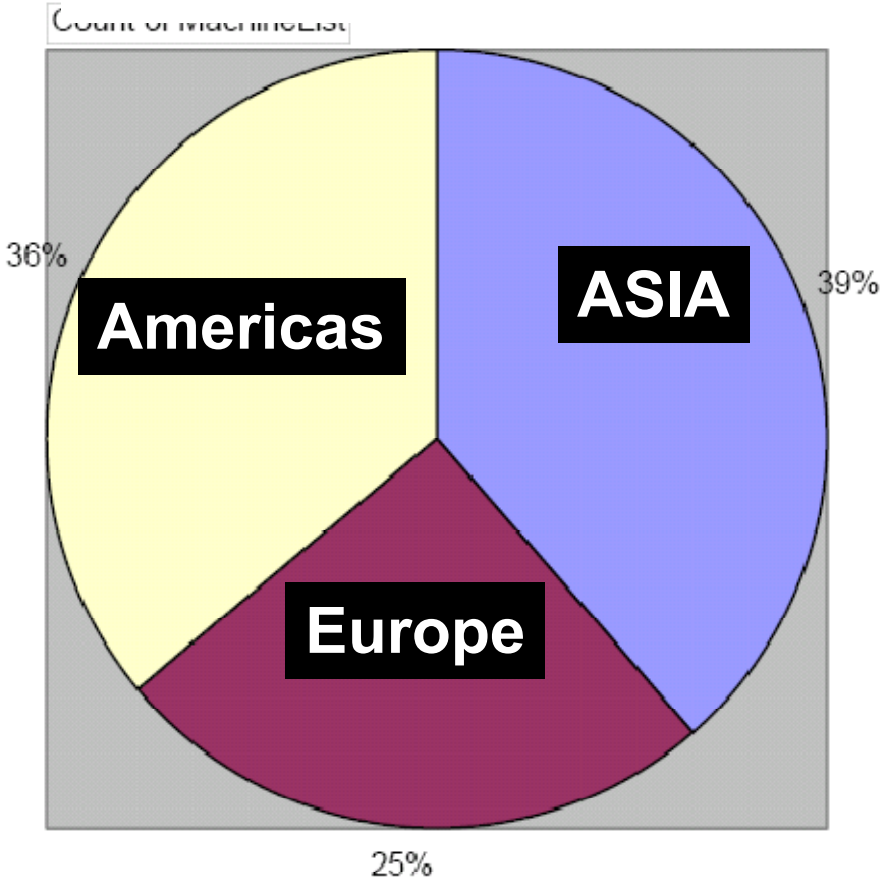
- Asia 476
- Americas 544
- Europe 777

- TOTAL 1797

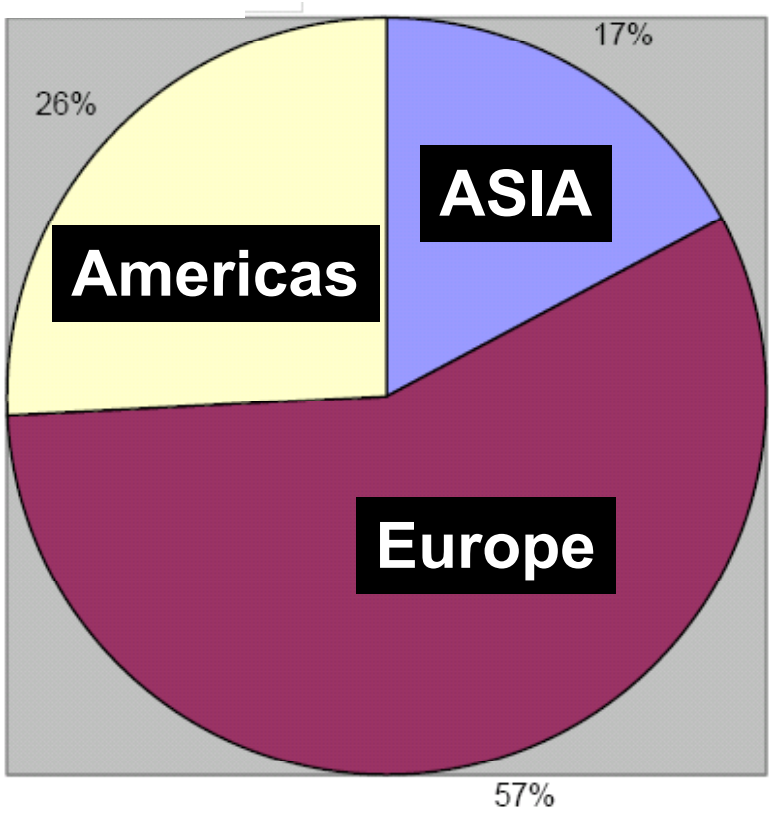
Ties Behnke

RDR Author List

Accelerator



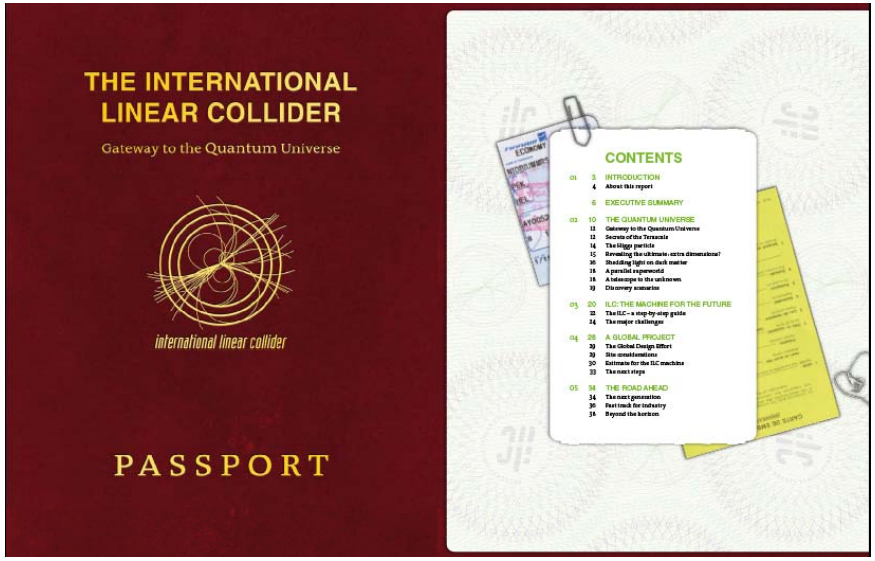
Detector

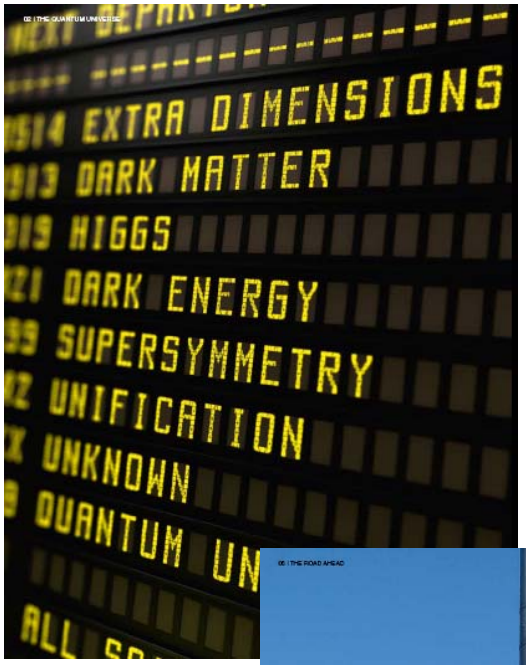


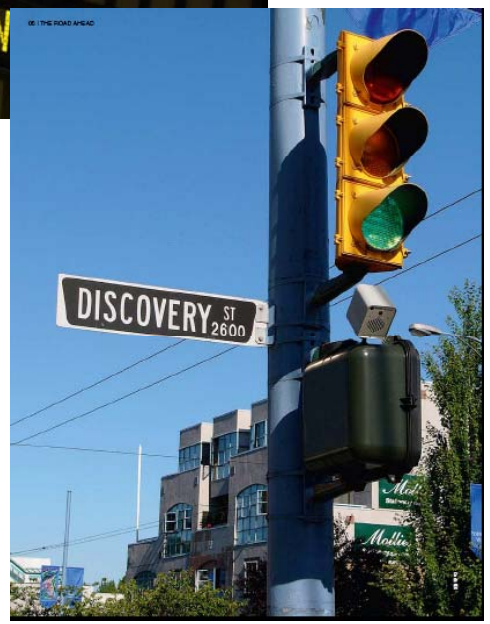
Ties Behnke

The RDR is Complete

Last piece: Companion Document for broad circulation, including translations to eight languages over the coming year.







http://www.linearcollider.org/gateway/

Our Plans

Prepare in technical and non technical areas, such that we are ready to successfully propose the ILC to our governments, whenever LHC results justify

Communicating our Story

ILC Communicators: Perrine, Barbara, Elizabeth and Rika

- Communications challenges for the EDR phase
  - **We must convince our scientific colleagues in related fields of the ILC**
  - **We must prepare our governments for our proposal for a globally based ILC**
  - **We must inform and educate the public**

ILC *NewsLineQ*

translate locally

NewsLine Q is quarterly printed communication for policy makers and interested public

ILC NewsLine

NewsLine

PDFs For Printing • Archive • Search • ILC Home • Subscribe • Contact 11 October 2007

Around the World

On the way to the forum

Got a question, problem, solution? Post them on the forum!

Many scientists working on ILC detector simulation know: Mokka can give you sleepless nights. This has nothing to do with caffeine, however Mokka is a software that lets you run full simulations of events in future ILC detectors. It uses the Geant4 simulation tool, and ILC detector people around the world use it – and struggle with it sometimes. If you're one of those people and are looking for answers (or maybe you

Feature Story

ILC physicists build their dream house

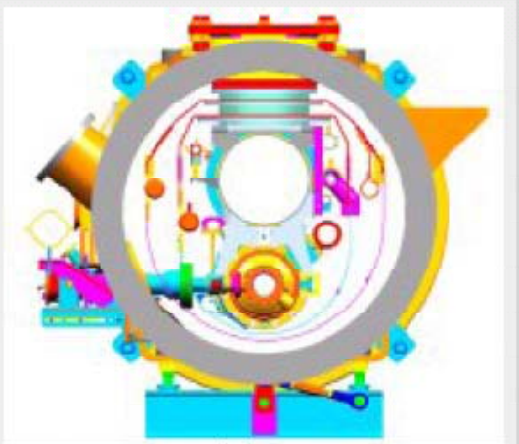
Engineers, accelerator and detector physicists initiate dialogue at IRENG07

Older detectors can still teach us new tricks as the IRENG07 participants inspected the rollers of the SLD detector at SLAC.

Be it a house renovation or even a proposed particle accelerator, anyone involved in a construction project can appreciate the 1948 classic film *Mr.*

Director's Corner

Unified versus plug compatible designs



ILC cryomodule cutaway view

We are now making the transition from completing the International Linear Collider reference design to beginning the engineering design phase by holding a set of kick-off meetings to cover the major areas of the machine. The ILC project

ILC NewsLine Survey

Who are our readers?

	Response Percent	Response Count
Administrative/Management	11.4%	43
Computing Professional	4.2%	16
ILC engineer	6.3%	24
Other engineer	8.7%	33
ILC physicist	21.6%	82
Particle physicist	**28.8%**	109
Other scientist	13.2%	50
ILC technician	0.8%	3
Other technician	2.4%	9
Administrative Support	1.3%	5
Funding Agency	1.9%	7
Journalist	1.1%	4
Student	9.0%	34
Teacher	5.0%	19
view Other (please specify)	9.0%	34
	answered question	**379**

ILC NewsLine Survey

What kind of stories do you want more or less of?

	More	Just Right	Less	Rating Average	Response Count
Stories about people	21.7% (70)	**60.7% (196)**	17.6% (57)	1.96	323
Detectors	40.5% (135)	**57.7% (192)**	1.8% (6)	1.61	333
Accelerator	44.8% (152)	**53.4% (181)**	1.8% (6)	1.57	339
Physics	**54.0% (183)**	44.0% (149)	2.1% (7)	1.48	339
ILC Management	19.6% (65)	**61.3% (203)**	19.0% (63)	1.99	331
Meetings	14.6% (48)	**74.1% (243)**	11.3% (37)	1.97	328

The EDR Phase

- **ILC Engineering Design**
  - **We have a solid design concept in the reference design, but it is immature and needs engineering designs, value engineering, supporting R&D and industrialization.**
- **GDE has been reorganized around a GDE Project Management Office to reach this goal**
  - **Marc Ross, Nick Walker and Akira Yamamoto**
  - **Central management being given the authority to set priorities and direct the work**
  - **Resources for the engineering design and associated R&D appears feasible**
  - **Investments will be made toward Industrialization and siting**
  - **Anticipate LHC results in about 2010. We plan to be ready whenever the physics motivation is in place!**

Project Management Plan

ILC Project Management Plan for the Engineering Design (ED) Phase

International Linear Collider Project Management Team
M Ross, N Walker, A Yamamoto, Project Managers

Purpose of this document

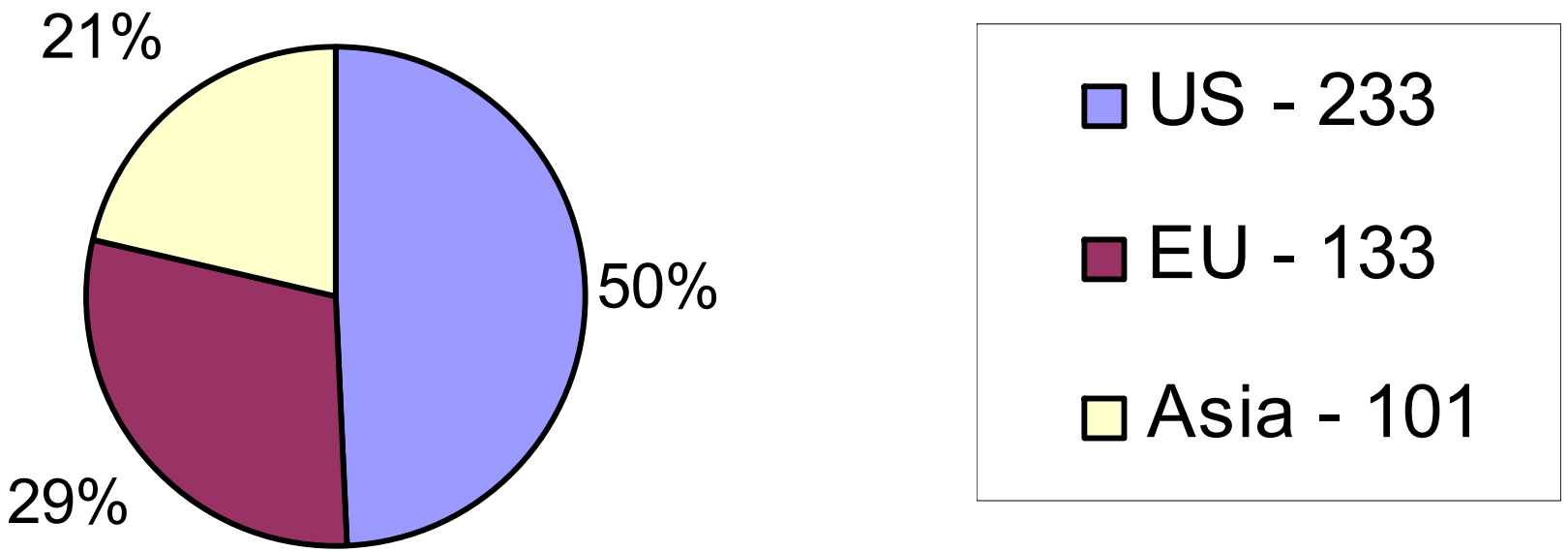
This document describes the organization and processes that will be used to complete the Engineering Design Phase of the ILC Global Design Effort.

As the project progresses, the Project Management Plan will be periodically reviewed, and subsequently revised as needed.

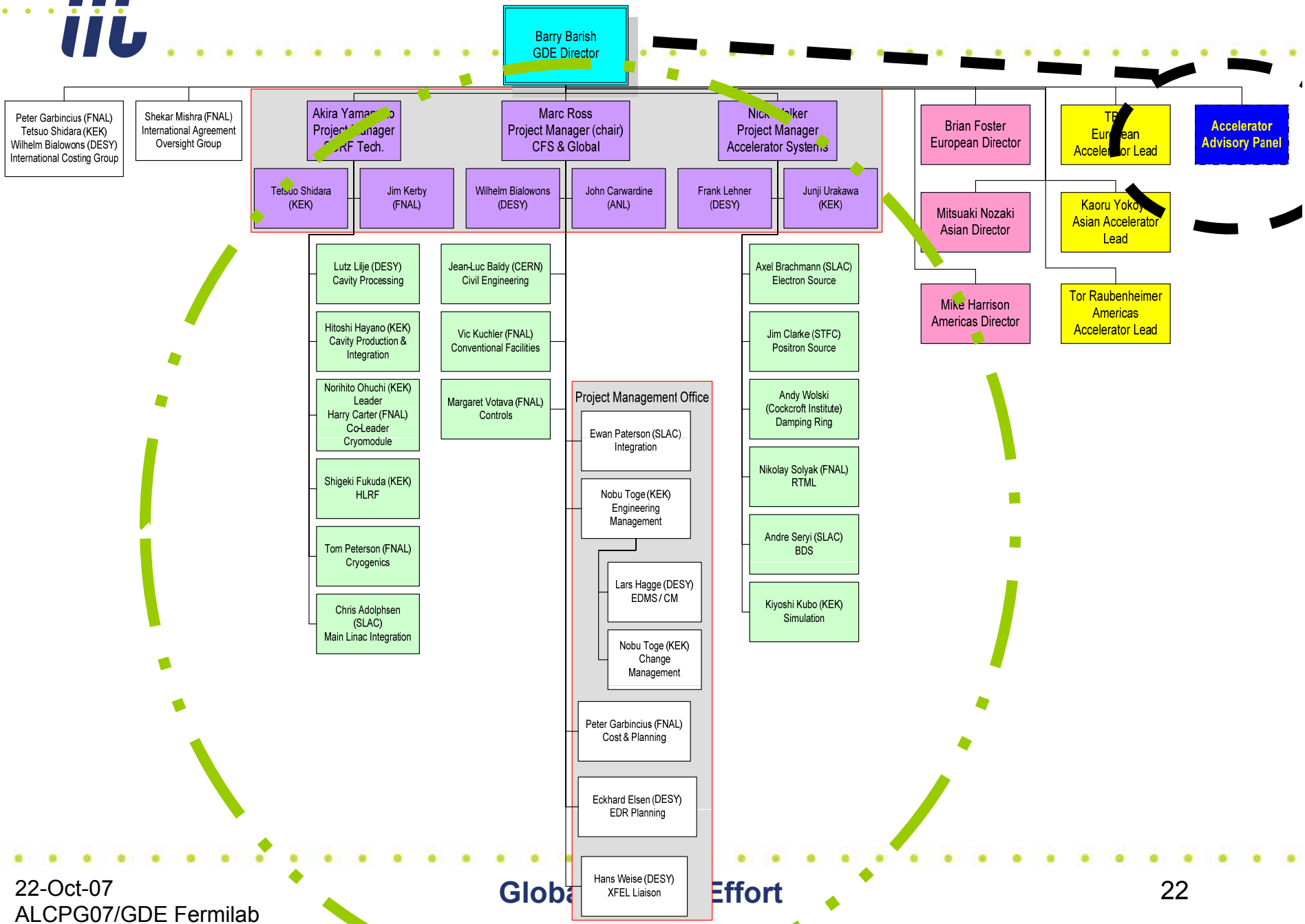
Release 2.0 dated 15 Oct 2007.

http://ilcdoc.linearcollider.org/record/11980

GDE Membership



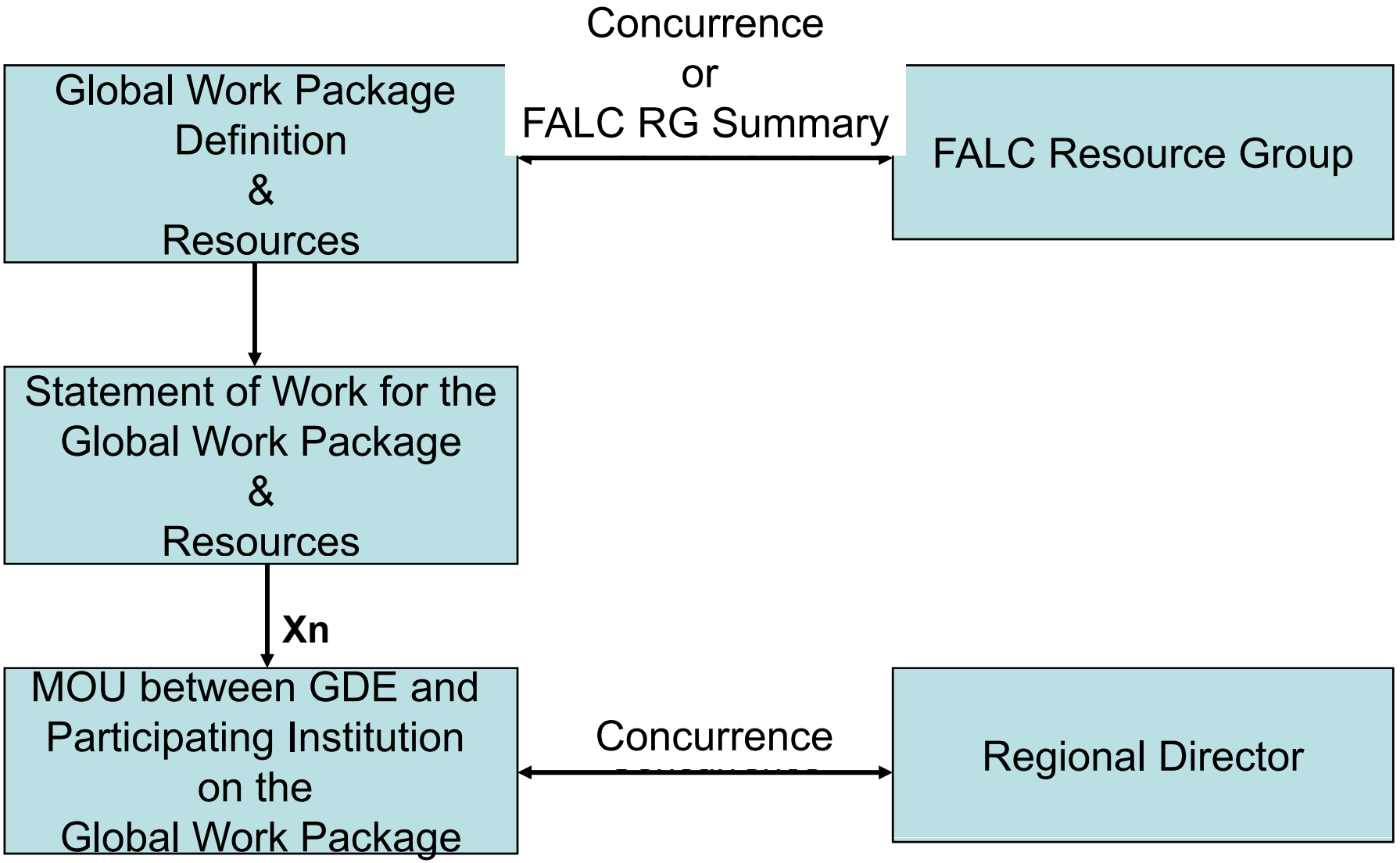
GDE ILC Engineering Design Phase Project



Oversight for the GDE

- **Funding Agencies for Large Colliders - FALC (chair Roberto Petronzio)**
  - A group of representatives from funding agencies and governments around the world, FALC provides dialogue and advice for the GDE from funding agencies for support of R&D program and plans for construction of the International Large Collider. (Co-sponsored international cost review of the RDR)
  - FALC Resource Group (chair Richard Wade) developed the common fund for the GDE to support GDE Office, website, telecommunications, EDMS group, Cost group, etc.
  - The common fund 2008 will also provide support for the new detector Research Director
  - FALC RG will review the EDR Work Package plans. We are expected provide report for 18-Dec-07 meeting

ILC Work Package Agreement



Oversight for the GDE

- **International Linear Collider Steering Committee ILCSC (chair Shin-ichi Kurokowa)**
  - The primary role of the Steering Committee is to promote the construction of an Electron-Positron Linear Collider through world-wide collaboration. In so doing the Committee will give particular attention to Outreach, Science, Technology and Organization of the LC project.
  - Established the Machine Advisory Committee (MAC) to technically review the RDR
  - Co-sponsored the International Cost Review of RDR
  - New chair: Enzo Iarocci
  - Establishing new MOU for EDR stage
  - Will form a successor to the MAC for EDR phase

The Directorate: Policy Issues

GDE Executive Committee

The GDE Director is directly supported in the day-to-day running of the project by the GDE Executive Committee.
The Executive Committee consists of the Regional Directors (see below), the Project Manager(s) and other senior GDE members appointed by the Director.
The Executive Committee meets weekly and advises the GDE Director on high-level policy decisions and management of the GDE.

The Directorate: Technical Issues

Accelerator Advisory Board (AAB)

The Accelerator Advisory Board (AAB) is a board set up by the project director to advise him and the project managers on technical issues regarding the accelerator. Research, development, engineering, design, and industrialization issues would all be addressed by the AAB.

The board serves as an advisory body and a tool for the project to address reviews and interfaces, which formally and periodically reports to the GDE Director on all technical aspects of the project. When requested by the project director or project managers for advice on a certain issue, the chair of the AAB would decide whether to assign a sub-group to gather information and advise the full board or simply to have the full board consider the issue. To keep up-to-date a few members will participate in the Project Review Meetings (9.3).

The Directorate: Technical

Accelerator Advisory Board (AAB) (continued)

The standing membership of the board will be agreed upon by the GDE Director and the chair of the AAB. For specific issues, the AAB may choose to add ad-hoc members to a sub-group or the board to complement its knowledge base. Both standing and ad-hoc members may be from inside or outside the ILC community.

The chair will designate three members of the board (one from each region) to act as members on the Change Review Board. These members will participate in the change control process, and make periodic reports back to the AAB during their meetings.

Chair of AAB: Bill Willis

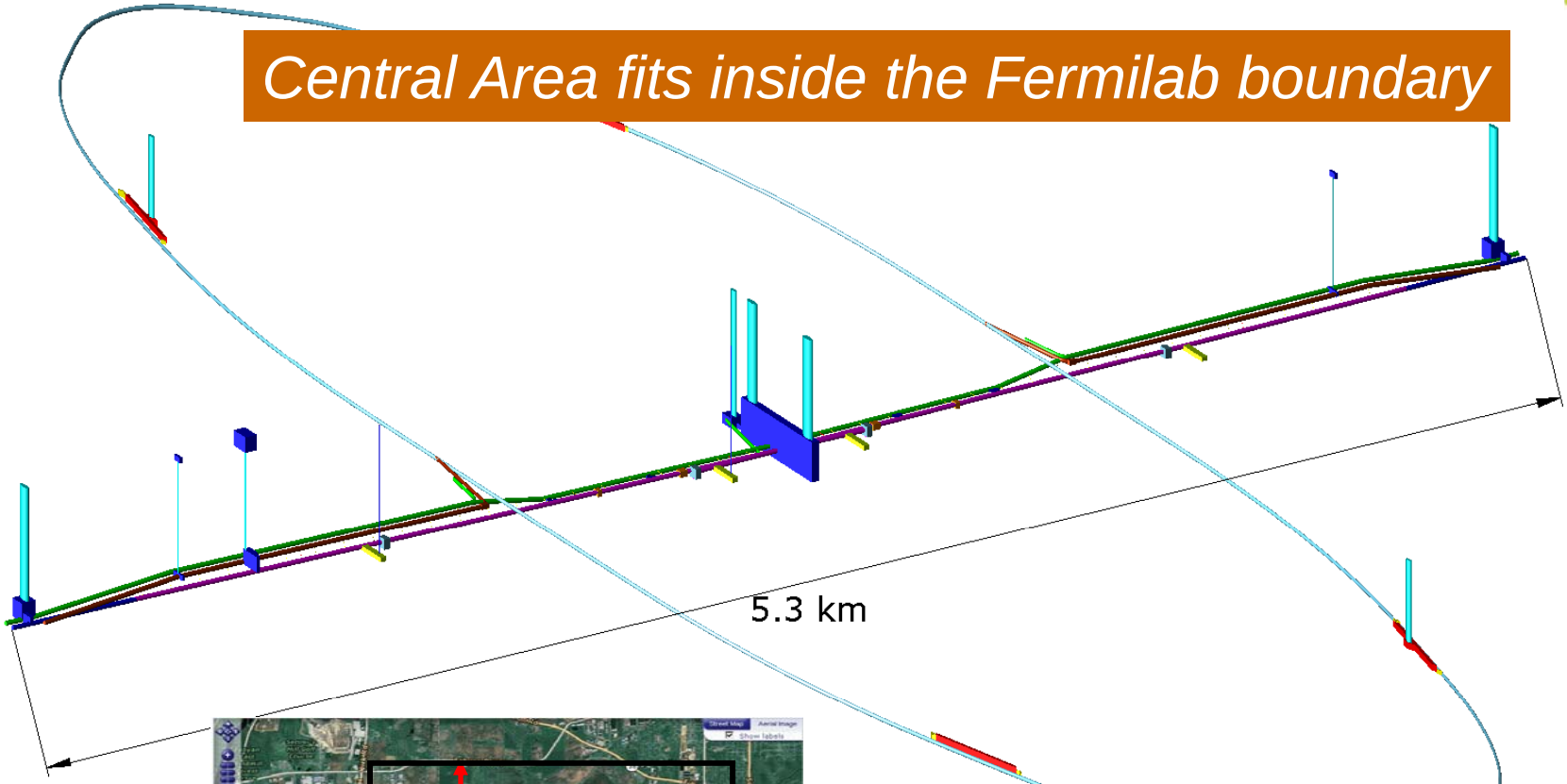
The AAB will be developed over the coming months

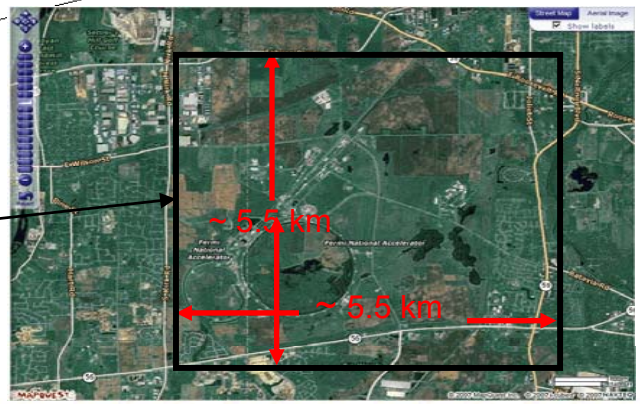
Supporting R&D & Regional Programs

- **Global R&D**
  - Organized around task forces to achieve milestones linked to EDR schedule
  - S0 task force - globally coordinated program to demonstrate gradient for EDR by 2009
  - S2 task force – RF unit test and string tests by construction
  - S3 task force – Electron Cloud tests to establish mitigation and verify one damping ring is sufficient.
- **Regional Preparations**
  - Siting preparations – prepare to bid to host
  - Developing regional expertise on SCRF
  - Regionally based infrastructure and facilities
  - Industrialization

Preconstruction Plan: Fermilab

Central Area fits inside the Fermilab boundary





~ Boundary of Fermilab

Site Characterization of the Central Area can be done

Approach to the EDR Phase

- The ILC design is proceeding toward an engineering design by July 2010. The main objectives are performance/cost optimization and risk reduction (Goal: Be ready to propose a solidly conceived construction project, whenever LHC results justify).
- Prioritized R&D program is being globally coordinated to determine gradient, electron cloud, etc with milestones that support the EDR schedule.
- R&D on design options, systems tests, industrialization, mass production, siting studies will continue though and following the EDR. The design will evolve and risks (technical and cost) will be reduced.
- A site specific engineering design will be carried out once the project is approved and a site determined.