

Delhi Symposium on Linear Collider
Nov. 10 - 12, 2003

The International Linear Collider
A Great Opportunity
and
A Great Challenge

Vision for the Linear Collider

A Global Undertaking with shared conception, design, construction, operation and scientific harvest; distributed centers of excellence based on existing Labs and University particle physics infrastructures for the concept development, detailed design, construction, operation and particle physics program.

Some History

- First mention of LC in 1965, sic, beginning of serious work in 80's, in Asia, Europe and US, intensifying in the 90's
- ACFA endorses LC in 1997 (<http://ccwww.kek.jp/acfa/>)
- Similar conclusions from ECFA 2001
<http://committees.web.cern.ch/Committees/ECFA/wghep/wgreport213.pdf>
- and HEPAP 2002 (http://doe-hep.hep.net/lrp_panel/index.html)
Recommendation: We recommend that the highest priority of the U.S. program be a high energy, high luminosity, electron-positron linear collider, wherever it is built in the world. This facility is the next major step in the field and should be designed, built and operated as a fully international effort.
- Global Science Forum 2002 - Consultative Group on High-Energy Physics : recognizes the global nature of agreements on LC and

plots a course for realization. Final statement in the executive summary: While the work leading to this report was carried out under the aegis of the OECD, participation in a global high energy physics facility such as the linear collider should be open to any government with an interest and capability to participate. www.oecd.org/pdf/M00032000/M00032800.pdf They emphasized the great importance of completing the LC in time for significant overlap with the LHC for exploiting their synergies.

Technical Status

- In 2001, ICFA (International Committee of Future Accelerators - created by IUPAP in 1975) commissions an International Linear Collider Technical Review Committee, a.k.a. TRC, to review the technical status of the various technologies being put forward. Their report was delivered early this year and will

be one of the principal bases for an internationally carried out choice of the technology to go forward with.

<http://www.slac.stanford.edu/xorg/ilc-trc/2002/2002/report/03rep.htm>

- Consensus is that a linear collider capable of 500 GeV CM, expandable to ~ 1 TeV is needed for the science that needs to be done. The practical result -keeping in mind the important time frame set by LHC - is that the candidate technologies to be considered now for realization of the LC are normal conducting technology at X-band (11 GHz) and superconducting technology at L-band (1.3 GHz)

Current Organizational Status of LC Work - Worldwide (sample)

- For the accelerator itself, two rather broad consortia have self organized: **normal conducting development centers around a combination of KEK/SLAC with other Labs such as FNAL, BINP, LAL and many universities participating in the R&D ;**

superconducting development centers around DESY with other Labs such as Saclay, Orsay, INFN Milano, INFN Frascati, Jefferson Lab, FNAL and many universities participating as well.

- Since the early '90s there have been workshops every two years, rotating among the regions, in which all of the accelerator developers come together to discuss status and compare notes about R/D progress
- For the physics studies and detector R/D there are regional groups sponsored by ECFA and ACFA and a self organized effort in N. America (ALCPG). <http://blueox.uoregon.edu/~lc/alcpg>
- Similarly to the accelerator world wide meetings, there is a World Wide Study of Physics and Detectors organized by the global physics community with leaders from Asia, Europe and America. Last meeting was at Jeju Island, Korea in Aug. 2002

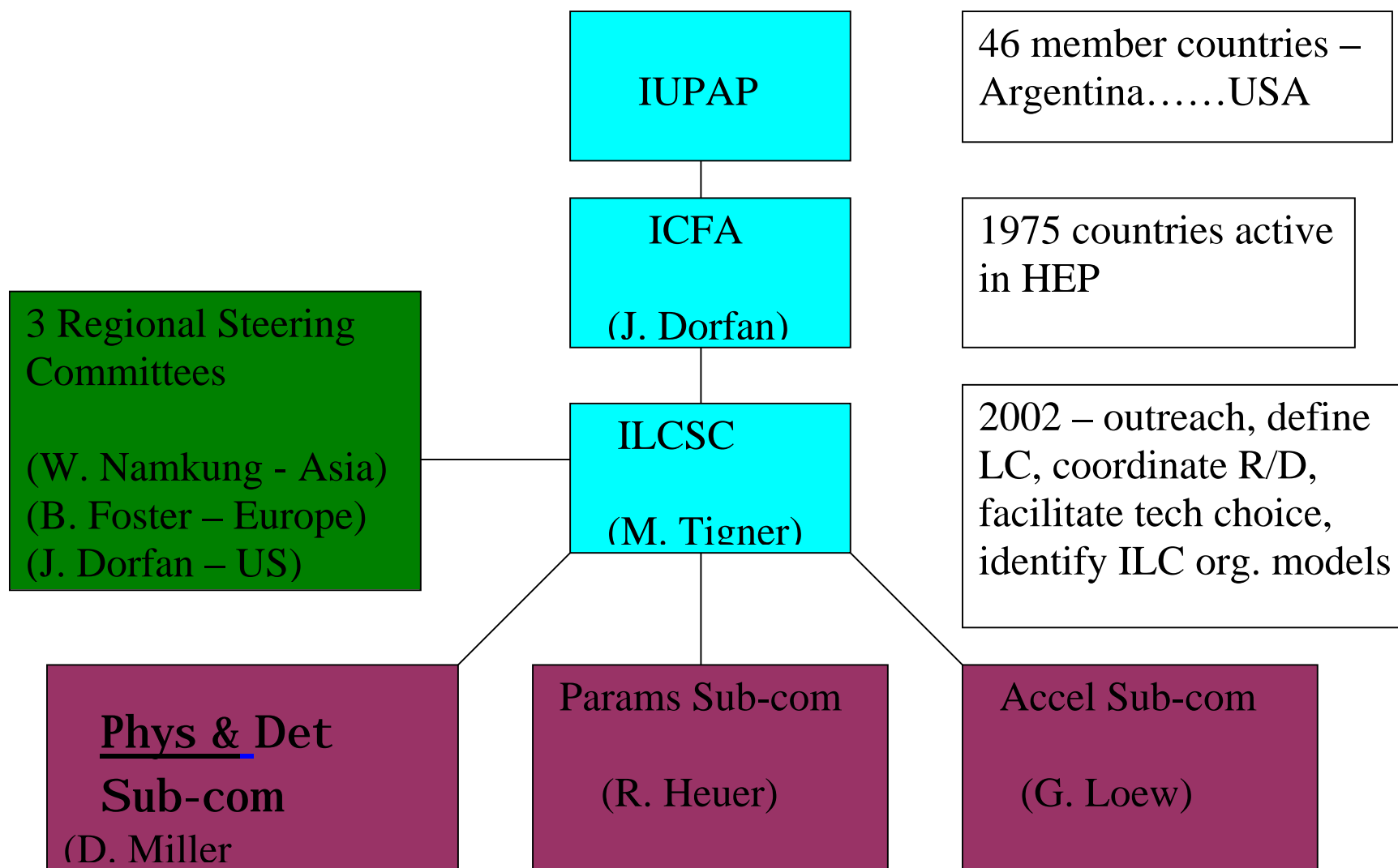
- University participation is very important. In the US alone there are 44 universities engaged in 71 projects in accelerator and detector R/D . the numbers are bound to grow.

http://www.hep.uiuc.edu/LCRD/html_files/proposal.html

Time for Consolidation

- There is a broad consensus among those currently involved in LC matters that the time is ripe to choose among the two technical approaches and pool our resources globally and move forward to realization together.
- ICFA has taken the lead, based on this broad and strong consensus. (Note that this is still largely a “grass roots” effort although we keep our governments aware of progress and receive some mild guidance and encouragement from them. All are aware that governments must ultimately be involved globally and together - a great challenge)

Progress Towards Globalization



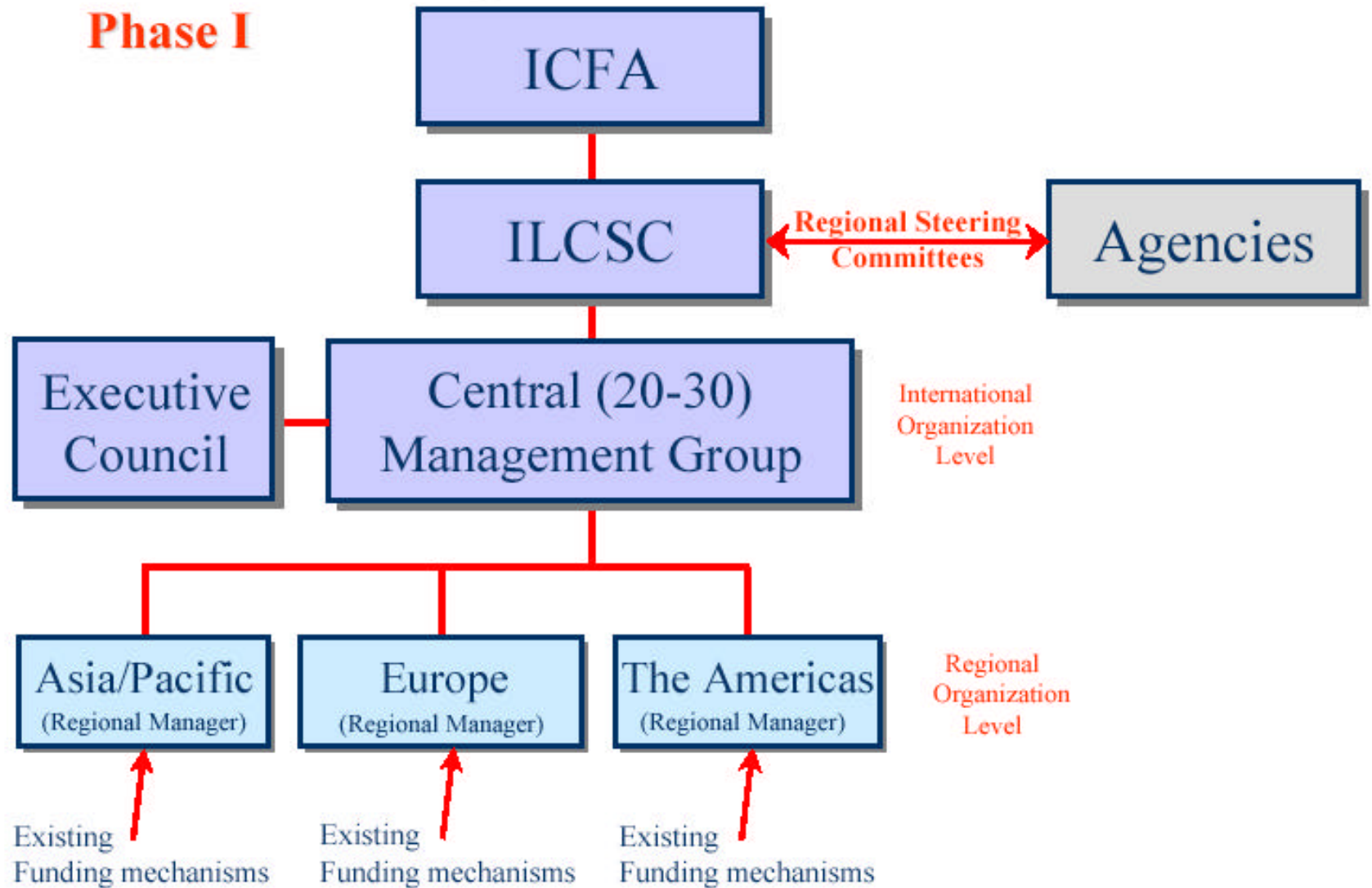
- Primary assignments for the ILCSC are to facilitate the technology choice and look into possible mechanisms for an international project management which fulfills needs for accountability and efficient project realization.
- Accordingly, the ILCSC in consultation with ICFA and the regional steering groups has put together an International Technology Recommendation Committee, ITRC with 4 delegates from each of the three regions. Nominees have been submitted and recruitment of a Chair is now under way. The ITRC will assemble all relevant material, visit the principal technology sites and hear from proponents about the two technologies. It is hoped to have a recommendation well before the end of 2004.
- As currently envisioned, the recommendation will be followed by establishment of a temporary organization to produce a Concept Design based on the recommendation and the extensive design work already accomplished. In addition this temporary organization will produce a plan, including budget, for completing R/D and engineering studies for a

Technical Design Report, TDR. The TDR needs to be complete as consistent with the hoped for begin of construction in 2009.

- It is understood that the temporary organization will have no new resources at its disposal at its beginning. Thus it must be supported and peopled by laboratories and universities now involved for some period of time until an internationally accountable mechanism can be put in place.
- Preliminary discussions among the current participants and government agencies suggest that the LC might profitably emulate two recent international projects, i.e. ITER (www.iter.org) and ALMA (<http://www.alma.nrao.edu/>)
 - » Based on a Council representing governments, a directorate appointed by the Council with the actual work being carried out in the participating regions through existing institutions where possible.

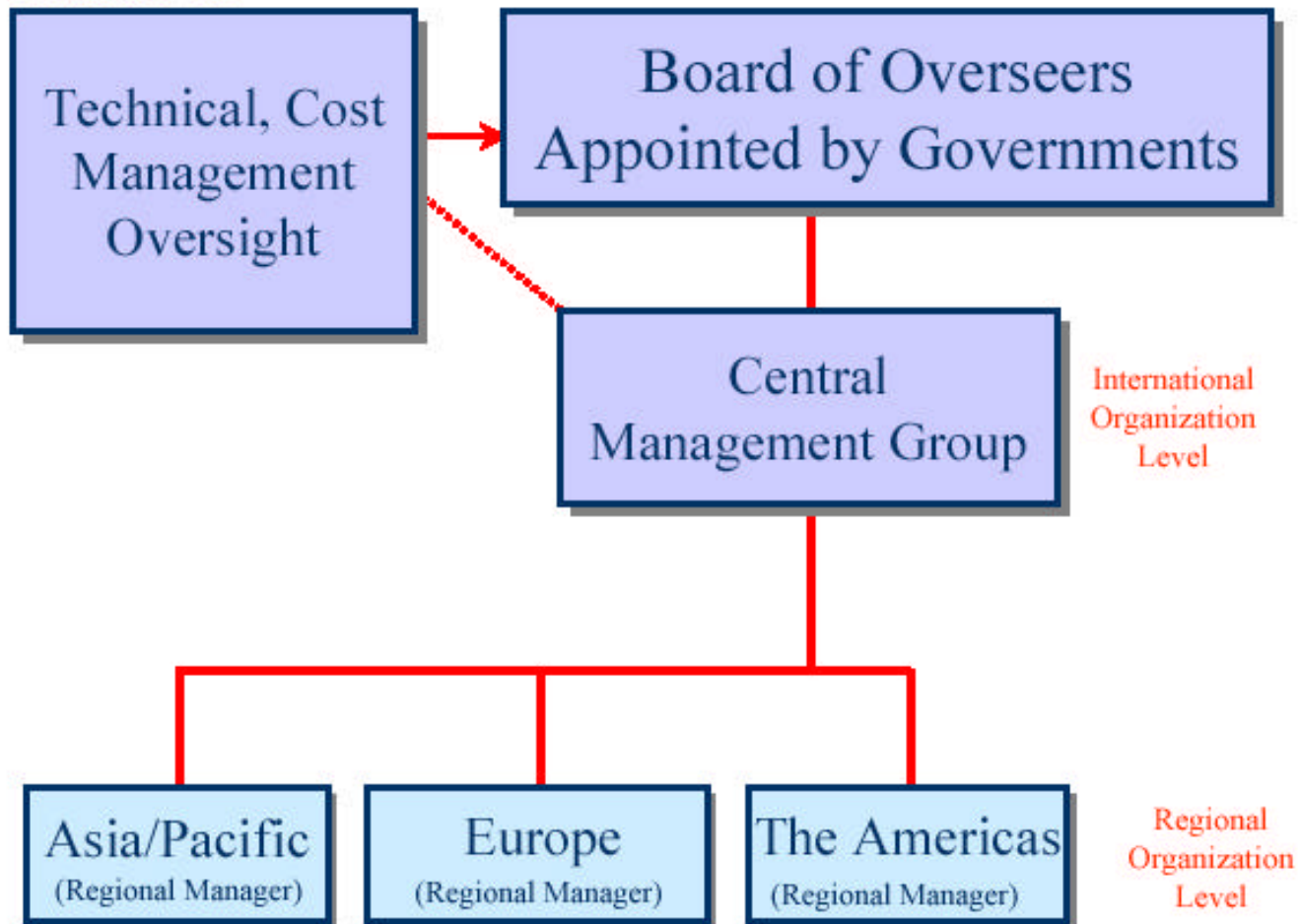
Possible First Stage

Phase I



Deliverables: Conceptual Design Report and Plan to complete a Technical Design Report

Possible Second Stage Phase II



- Deliverables:**
- a) Technical design, cost and schedule, plan for industrialization,
 - b) Construction Management Plan, Operations Management Plan

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How Can Such a Vision Possibly be Realized?

Only through the essential unity of the world particle physics community and that of our patrons, the worldwide government agencies, realizing that worldwide scientific culture is essential for world civilization.