

Collaboratory Issues in the Context of the Linear Collider Efforts

F. Willeke, DESY

EuroTeV Open Meeting

at CERN, September 13, 2004

The GAN Proposal

ICFA working Groups

Activities on the Far Remote Collaboration-Operation Issues

ILC Activities

F.Willeke, GAN & LC, EuroTeV
Meeting, 13.9.04

Prologue

General Consensus:

- Particle physics has no broad and comfortable avenue into the future: the spectacular progress of the 60ies,70ies and 80ies have slowed down
- The accelerator facilities required to make further progress are very large and costly
- Particle Physicists are not very successful to explain society why we need to make further progress in our field
- ➔ IF we want to make progress, we need to combine the world-wide resources for future accelerator projects

How to proceed:

There are two extreme positions of how to proceed:

- Combine all available resources and expertise in one location(Super-CERN)
Advantage: Strong organization and streamlined management possible in order to carry out efficiently large scale projects
- Global Collaboration of the Accelerator Laboratories by contributions to a common project
- Advantage: Preserve the existing laboratories with the broad base of grown expertise which can regenerate from a large scientific base, necessary to keep the field dynamic and healthy

Conclusion

Not knowing what the path the field will eventually take, we need to understand the implications of these options:

For Global Collaboration this means we need to study where the real issues are, we need to start collaborations on a small scale, find out what procedures, tools are needed

➔ This is the motivation for all GAN-Related Studies

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6 May 19



International Committee for Future Accelerators
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International Collaboration in the Construction of Future Large Accelerator Projects

The International Committee for Future Accelerators (ICFA) has considered international collaboration in the construction of future large accelerator projects. In this context, large refers to a facility which is unique in its scientific potential, which is open to international exploitation of its physics, and at most only one will be built in the world.

ICFA's conclusions are as follows:

1. Future large accelerator projects should be planned, designed, and when appropriate, also built in international collaboration.
2. All future large accelerator facilities should be open to scientists and research teams from all countries, following the ICFA guidelines.
3. It is strongly encouraged that research and development work on future large accelerators be carried out in international collaboration before a project is defined. This kind of collaboration should also be open to institutions or countries which would not, or not yet, intend to participate later in the construction of the project.
4. To establish an international collaboration, appropriate coordinating and advisory committees must be set up in an early phase, and the government of countries expected to participate should be kept informed. It should, however, be the aim of the scientific community to formulate a rather concrete proposal, including a realistic cost estimate and site-criteria, before the governments are approached in a formal way.

The GAN Proposal

In August 1999, DESY Director Albrecht Wagner proposed at the ICFA
(International Committee on Future Accelerators) Meeting at Fermilab:

A global collaboration between the large accelerator
laboratories to build a linear collider in close
collaboration.

This Collaboration was to be referred as

Global Accelerator Network or

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Accelerators to span the globe

International collaboration has always played a major role in particle physics experiments. Could this also be applied to the accelerators themselves? Here, *Albrecht Wagner*, chairman of the directorate of the DESY Laboratory, Hamburg, looks at an innovative scheme for accelerator task sharing.



[Albrecht Wagner](#)

During the past 50 years, high-energy accelerators have not only become major research tools for nuclear and particle physics, but also influenced many other fields of science and industry by providing a powerful source of synchrotron radiation and other beams. New accelerator concepts have been the key to both an increased understanding of nature via fundamental research and the growing application of accelerators and accelerator techniques in other fields. It is therefore important to continue to develop new accelerators and to maintain accelerator expertise worldwide.

However, the size and cost of future large accelerators will most likely outstrip the resources of a single region, and building them will require a new approach. One way is via the framework of an international collaboration. A collaboration for a major accelerator facility must meet the following challenges:

- * maintain and nurture the scientific culture of the participating laboratories;
- * maintain the visibility and vitality of each partner.

Furthermore, all participating countries must be willing to invest and to commit themselves through long-term agreements. The proposed solution is a Global Accelerator Network (GAN).

The need for Far Remote Operating

If the contribution to the project from remote collaborators is exceeding a certain level, the commitment of the collaborating institutions **beyond the construction** phase in **commissioning**, and **operation** is mandatory, because of the host laboratory will not be able to handle the whole facility with its own staff.

On the other hand, this commitment cannot be made by relocating the technical staff on the site of the accelerator

- ➔ Far remote operating (operating in the widest sense, that is including running the accelerator, performing maintenance, trouble shooting and repairs, tuning-up the hardware systems, maintaining and managing spare inventory, pushing performance,) is required

The implication, the procedures, the technical support of this mode of operation of a large facility must be studied (also experimentally!!) and must be well understood.

- ➔ This is why we need the “GAN” projects to prepare for the linear collider

Far Remote Operating Initiative

In May 1999, consultations between DESY and SLAC started to explore

close collaboration between SLAC and DESY on controls in the context of a future linear collider to be built in collaboration between the large laboratories and to be possibly operated from far away by off-site collaborators

This resulted in a memorandum to (Nanette Phinney, SLAC, F. Willeke, DESY) addressed to ICFA and the request that ICFA takes actions to pursue this issue

ICFA Taskforce

In February 2000, ICFA set up a taskforce on issues of a Global collaboration to build a linear collider :

Subgroup I General Considerations and Implementation

(chaired by Allen Astbury, Triumpf)

Taskforce Members:

A. Astbury, Triumpf, DJ. Colas, ATLAS, Y. Kimura, KEK, E. Paterson, SLAC, D. Trines, DESY, L. Evans CERN,

Subgroup II Technical Aspects of a Global Collaboration to build a linear Collider, (chaired by F. Willeke, DESY)

Taskforce Members:

Vladimir Balakin, INP Paul Czarapata, FNAL; Don Harthill, Cornell; Steve Myers, CERN; Stephen Peggs, BNL; Nan Phinney, SLAC; Mario Serio, INFN; Nobu Toge, KEK; Ferdinand Willeke, DESY; Chuan Zhang, IHEP Beijing

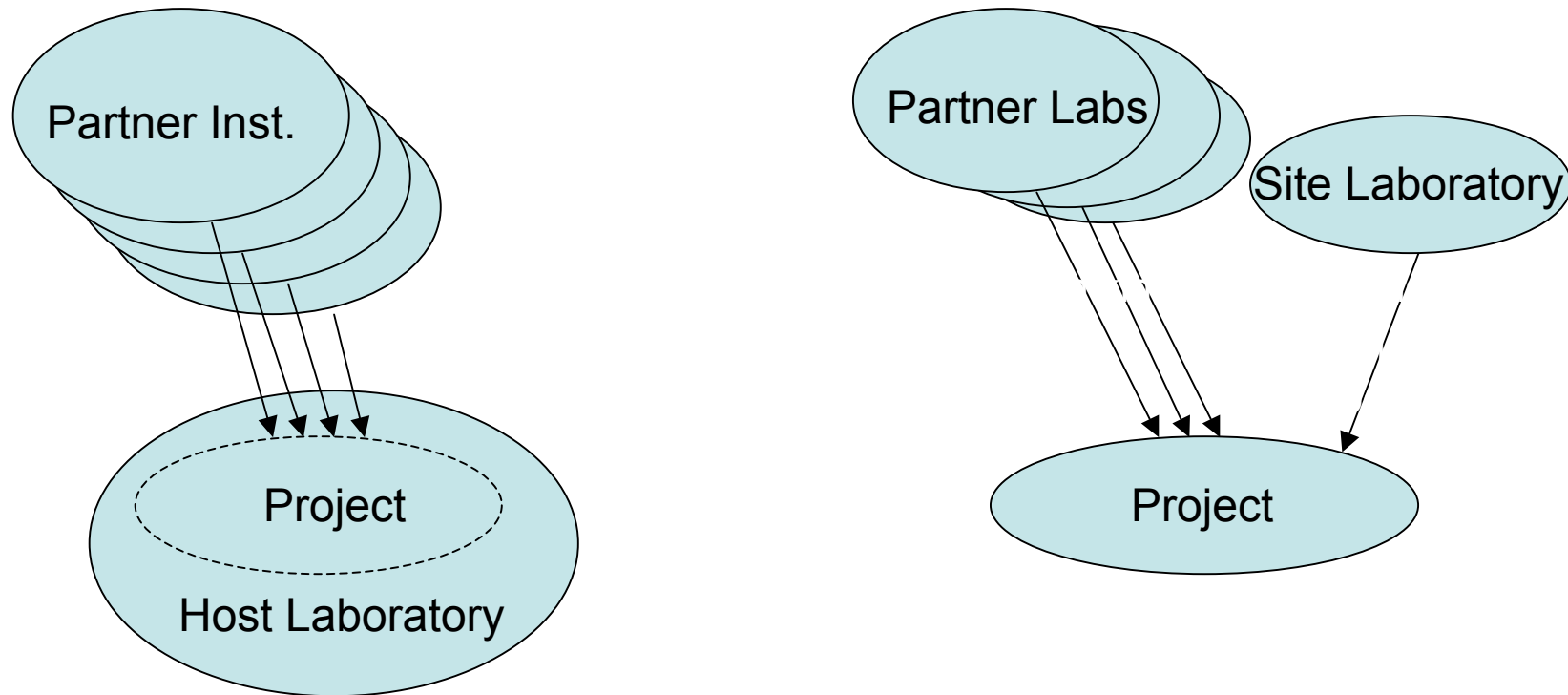
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ICFA Taskforce Subgroup 1 Conclusions

- GAN model new for building accelerators in contrast to experiments
Carry over Procedure for building large detectors:
Experiments: consensus & peer pressure \leftrightarrow Accelerator hierarchy structure
- Laboratory needs on-site activities to maintain culture and vitality
- Site Laboratory: special task of providing infra structure (no green field site)
- In order to get collaboration going need one nation to move ahead by contributing ~50% of the project
- Important to involve partners in the design stage

Collaboration Models



Conclusions Taskforce 2

Question: Can we build, commission and operate a large accelerator facility with the contributing labs remaining committed to their part of the project, without any major relocation of staff, thus by mean of remote operating in the most general sense?

- Extrapolation of present large accelerators to GAN like environment looks encouraging
- Experience on far-remote operation of telescope is an existence proof that there are no unsolvable technical problems
- Networking and controls technology at today's level is already sufficient for needs of remote operations
- Diagnostics in hardware must be sufficiently increased, this must be taken into account in the early stage of a design (obvious), major challenge of hardware design is reliability, which is independent of GAN
- Challenge lies in organization of operations maintenance, communication, need formalize procedures, need dictionaries and formal use of language, development of communication tools

Experience from the SLC, LEP HERA: the LC is expected to be in a state of continuous commissioning and improvement

How to assure commitment beyond the construction and first commissioning of the parts contributed by the various laboratories?



Need to keep the off-site designers and experts involved and interested

→ They need to be part of the team, which operates, trouble shoots, improves and pushes performance of the accelerator

→ Collaboration beyond design and construction phase via

Far Remote Operating

Recent LC Initiatives

2002 International LC effort moved forward with the ILCSC initiative

March 2003 GLC Roadmap submitted March 2003,
the planned organization of the 3 regional design groups

Nov 2003: set up of ITRP,

OECD Statement on LC as the next important project in fundamental physics

2003 TRC report

September 2003 LC parameters defined by ICFA

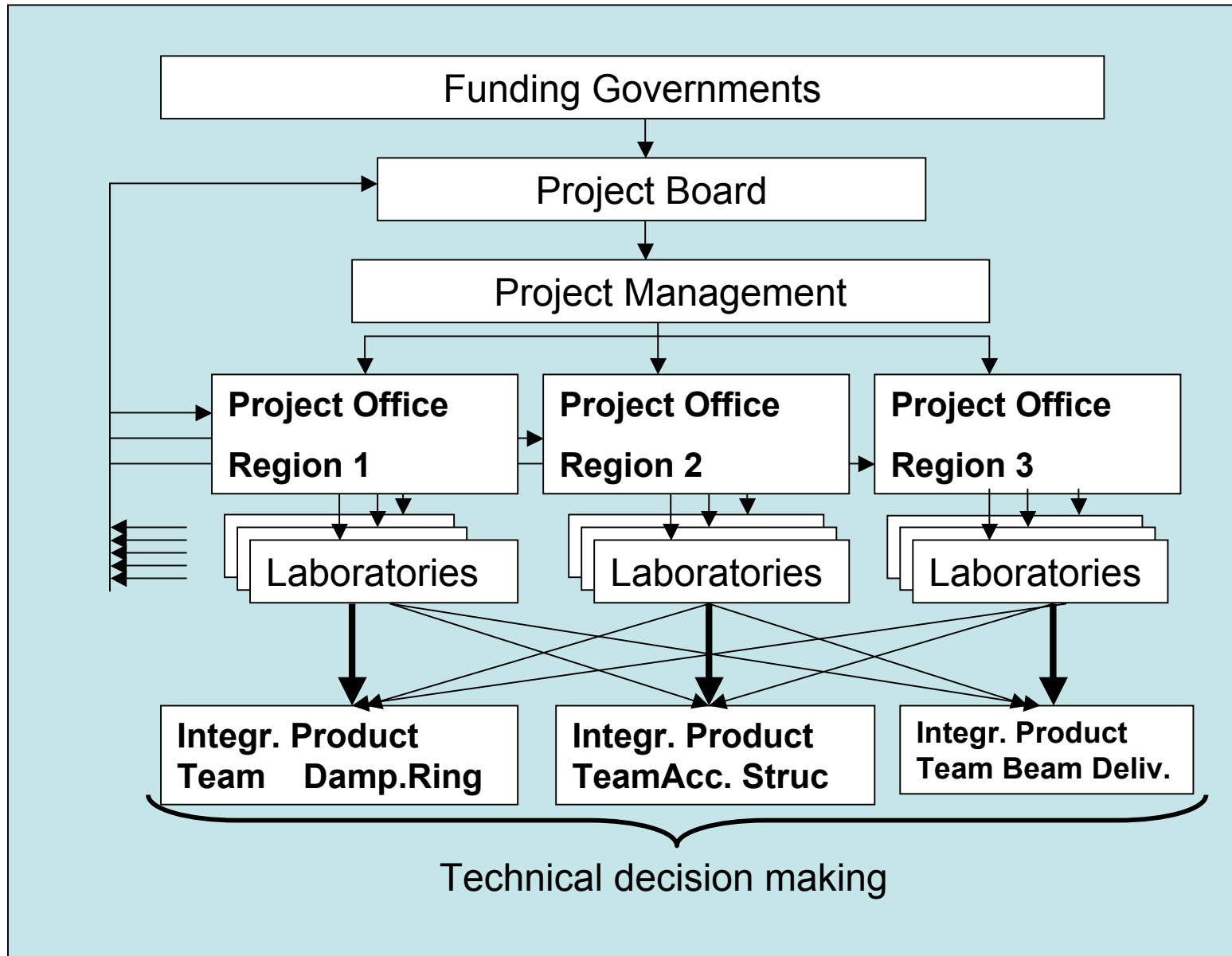
March 2004 ILCSC Taskforce on the establishment of a Global Design
Effort GDI (Report March 2004)

August 2004 ITRP decision

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November 2004, ILC Workshop
open meeting , 13.9.04

A possible Structure for LC



ILCSC Taskforces on GDI: Two phase approach

Figure 1: Schematic for the Global Design Effort: the early phase of the GDI

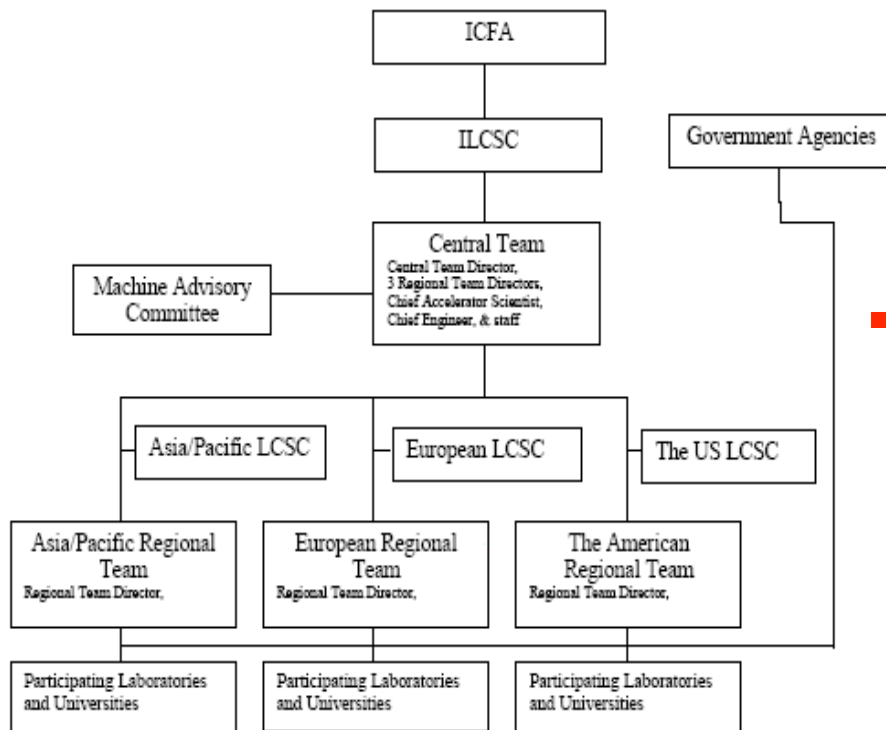
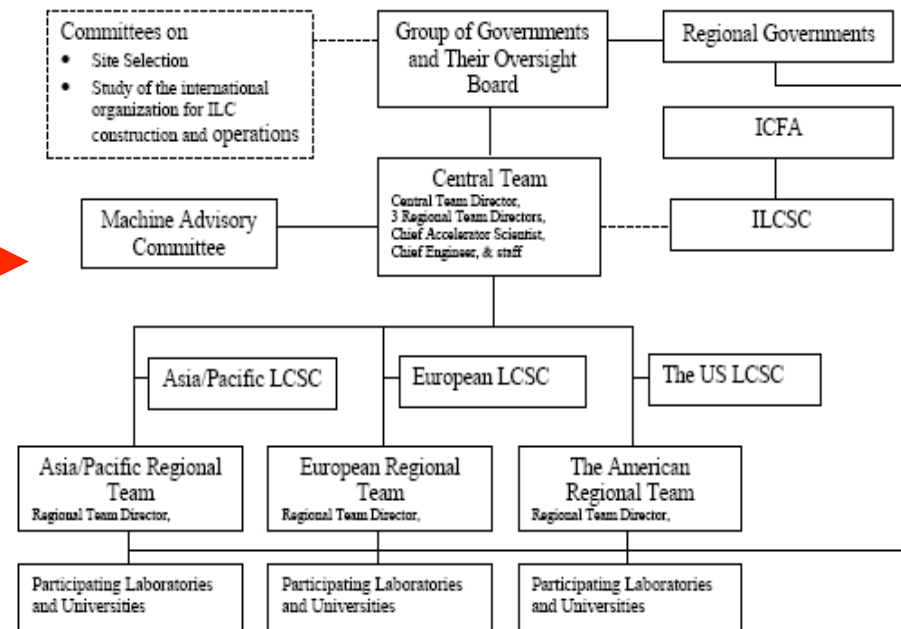


Figure 2: Schematic for the Global Design Organization: the later phase of GDI



GAN Efforts:

4 Workshops (3 international)

Cornell March 2002 : collaboratory issues

Berkely August 2003: Collaboration Tools

Shelter Island September 2002: Hardware Design
Aspects of Remote facilities (a.o.)

Trieste, October 2003: Tools for global accelerator
collaboration, MVL

GANMVL: Demand by ECFA and CARE to launch a
remote operating project and request funding in the
frame of FP6

GAN and ILC

GAN Issues are going to be on the agenda of the ILC workshop by mid-November 04

Positions towards GAN within ILCSC range from strong support over skepticism to clear opposition.

→ ILCSC is body that should discuss the virtue of GAN and GAN-related activities