The Challenge of Going Global

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- Science is a global activity
- The Web and now the Grid are accelerating this process
- Global communication is taken for granted
- The facilities required are becoming larger, more complex, with particle physics in the lead
- But other fields are following not far behind

- Particle Physics has a ‘Road Map’ which extends for 20+ years
- This foresees major new facilities starting with the electron-positron LINEAR COLLIDER
- Which should be build ‘as soon as possible’ so that it complements the CERN LHC (operational 2007)
- The likely cost is comparable to that of the LHC and hence of other major facilities in physics

- Previous accelerators were ‘regional’ or ‘national’
- The detectors were ‘international’
- As was the science
- Examples: LEP, Tevatron, PEP-2, ...
- LHC machine marked a change: regional but with very major contributions from rest of world
- Next machine likely to take a further step and be planned and built as a global collaboration

- What are the issues?

and

- How could we proceed?

OECD GSF
HEP Consultative Group

Final Report June 2002

HEP Consultative Group formed to:

- Exchange views between government delegations on future direction of HEP
- Examine rationale behind programme priorities and strategies
- Discuss generic issues
- Identify and examine organisational and managerial issues

All from point of view of governments or funding agencies

Participants in Group

A wide representation of interested bodies is essential for true consultation.

- OECD member nominees
- Non-OECD member delegates
- Representatives of scientific communities

There were four meetings marked by free & open discussion with full participation by all present.

- Input from communities was invaluable in enabling Group to understand significance of ‘Standard Model’ & its limitations
- Group was impressed by range and depth of studies by world-wide HEP communities, and care with which the arguments were marshalled
- Group was impressed by consensus on the way forward
- And found the arguments compelling

"The Consultative Group concurs with the world-wide consensus of the scientific community that a high-energy electron-positron linear collider should be the next facility."

"There should be a significant period of concurrent running of the LHC and the LC, requiring the LC to start operating before 2015. Given the long lead times for decision-making and for construction, the process of consultation among interested countries should begin at a suitably-chosen time in the near future."

"To ensure the long-term vitality of particle physics as described by the Road Map, a diverse accelerator R&D programme should be maintained. Innovative accelerator concepts should be explored well before they may be needed, since the lead times for large, complex new projects span decades, and the unpredictable course of discovery in physics may shift the currently foreseen priorities of the facilities on the Road Map."

Given the consensus on what is needed, and the strength of the arguments behind that consensus, what needs to be addressed?

- The Group looked at a range of areas where more governmental and intergovernmental work is needed
  - Legal
  - Financial
  - Managerial
  - Oversight, reporting, accountability

Legal

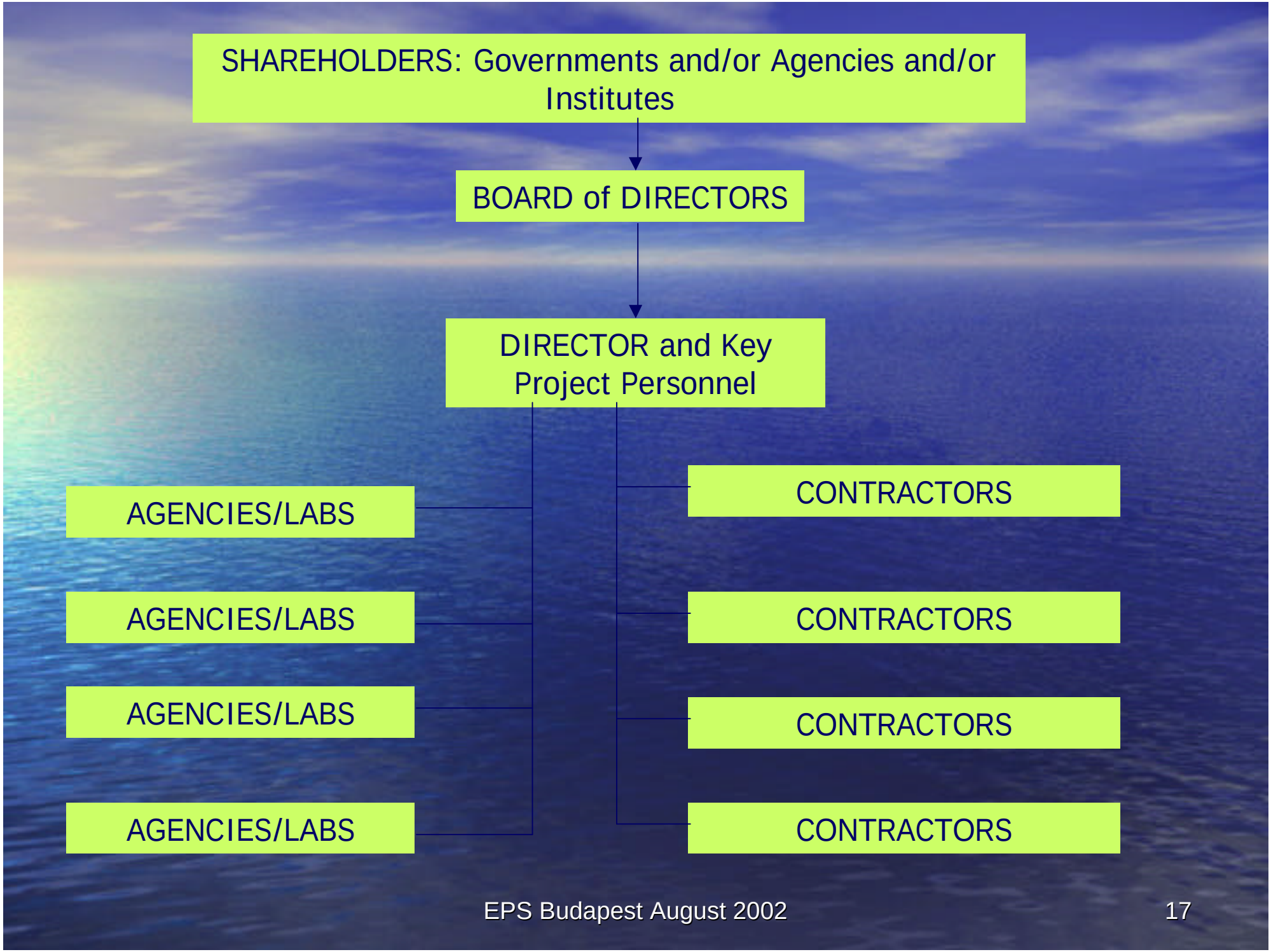
- New legal entity or built on existing entity or entities?
- Owned by Host State or Shareholder company?
- Intergovernmental or interagency agreement(s)?
- Voting rights?
- Own or lease site?
- Employ staff or staff seconded?
- Receive funds and place contracts, or co-ordinate ‘in-kind’ contributions?
- Ownership (and liabilities)?
- Guarantees (‘lender of last resort’)?

Financial

- Cash or kind or both (‘common fund’)?
- Budget control
- Contingency
- Accountability
- Currency fluctuations
- Contracts and procurement rules
- Liability
- Insurance
- Payroll issues

Managerial

- Centralised structure – Director & Key Personnel
- Reporting to what?
- Controlling what?
- With what authority?
- Employment of staff?
- Administrative support?


SHAREHOLDERS: Governments and/or Agencies and/or Institutes
BOARD of DIRECTORS
DIRECTOR and Key Project Personnel
AGENCIES/LABS
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How to decide the technology and the site, given the competing possibilities?

Two (simplified) generic routes:

- Regions or countries compete – each with own technology – for local funding; first to reach critical level seeks partners,

  or

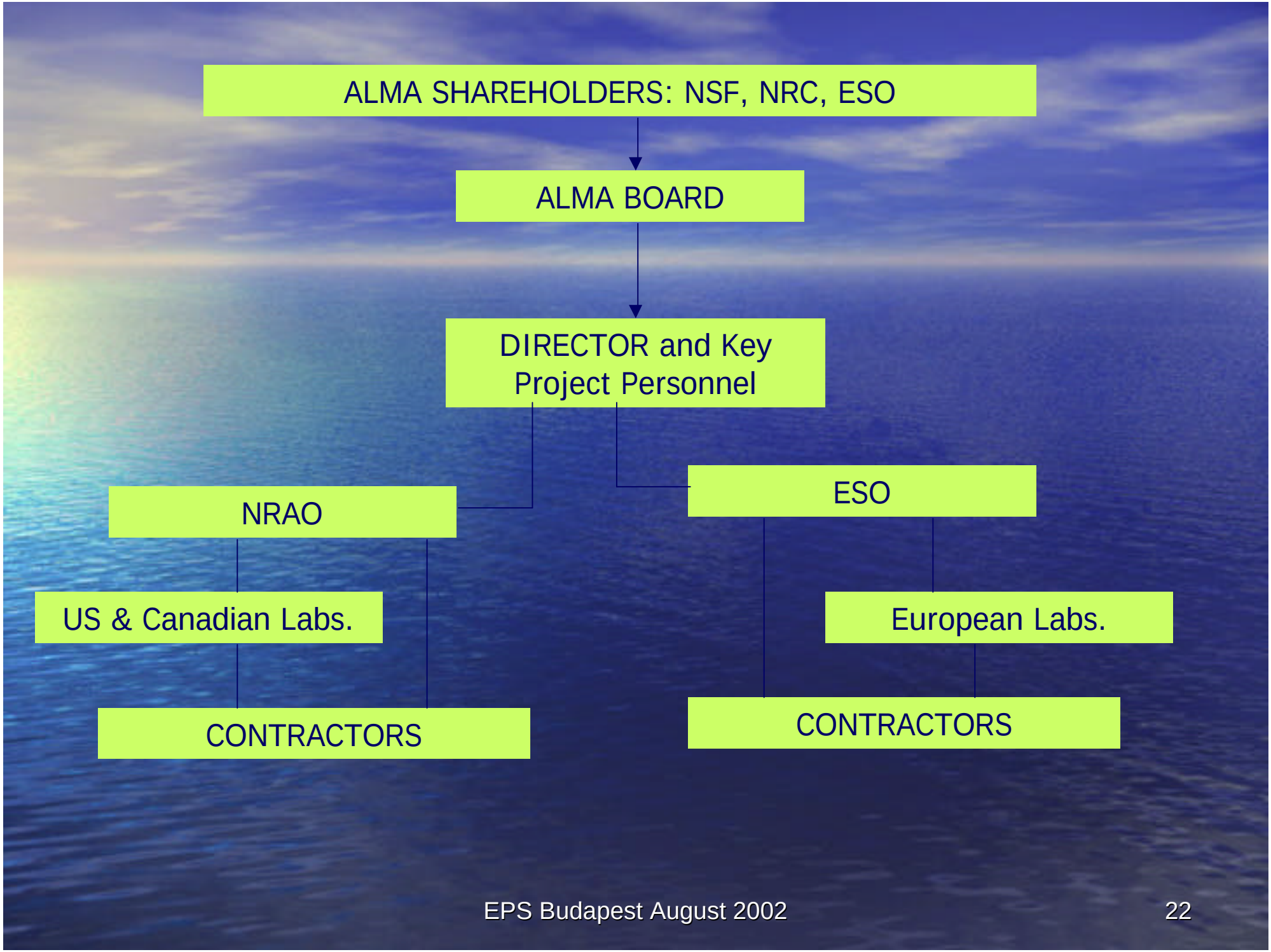
- Community decides on ‘best’ technology, seeks local funding for participation; governments or agencies ultimately decide outcome.

- Examples - with variations – of both exist in various fields of science
- Group agreed that the underlying dynamics of both had a part to play
- But ultimately it was for governments to decide how to address the question

- The current process to establish the ITER fusion project and the ALMA radio telescope array may provide valuable insights on how to proceed with a global high-energy physics facility, both with respect to the negotiating phase, and the subsequent facility construction, operation and management.

ALMA

- An example but not necessarily a solution.
- Two main collaborators: North America (USA & Canada) and Europe (ESO & Spain)
- Large radio telescope (64 12m Ø antennas) in remote area of Chile
- Bilateral ‘in-kind’ project, cost ~ 600M euros
- With central managerial control through one Joint ALMA Office
- Initial (to 2004) location of JAO not critical
- After 2004 project based in Chile
- Host nation not contributing to cost
- Japan may join later with major enhancements


ALMA SHAREHOLDERS: NSF, NRC, ESO
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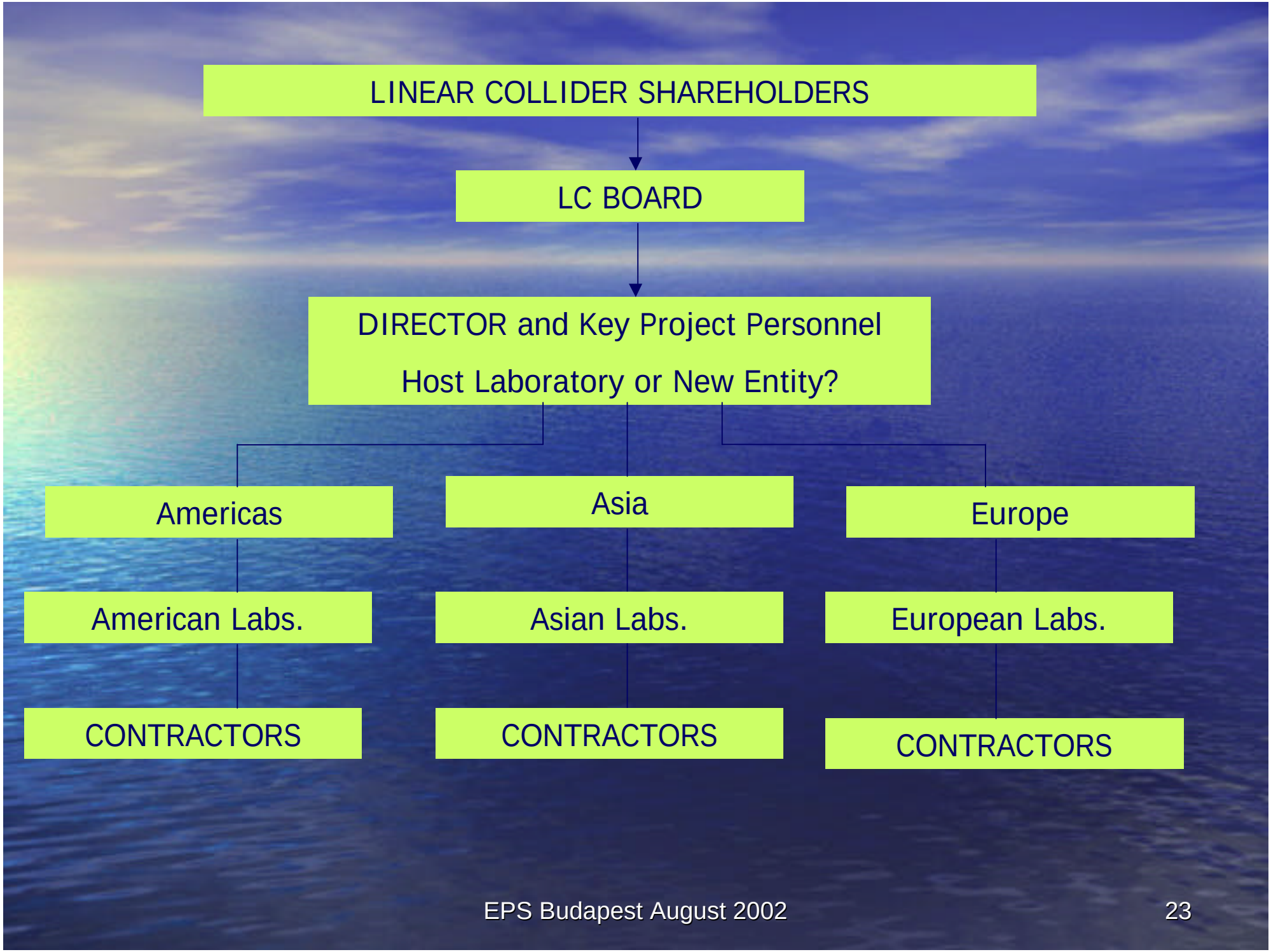
LINEAR COLLIDER SHAREHOLDERS
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Host Laboratory or New Entity?
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Asia
Europe
American Labs.
Asian Labs.
European Labs.
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FINAL QUOTATION FROM GSF HEP REPORT

- Preparing and negotiating a formal agreement (or a series of agreements) for the design, construction and operation of a facility on the scale of a linear collider is very time-consuming. ... several years may have to be devoted to consultations and negotiations that are the responsibility of governments. ..... **Therefore, it is important to allow sufficient time for inter-governmental consultations, well before any financial, manpower, timeline, or other commitments are made.**

WHAT NEXT?

- Community has established **“International Steering Group for the Promotion of Linear Colliders”**
- ICFA will discuss the main issues from community and scientific point of view at ICFA Seminar on **"Future Perspectives in High Energy Physics” October 8 - 11 CERN**
- OECD GSF will evaluate follow-up to Consultative Group