

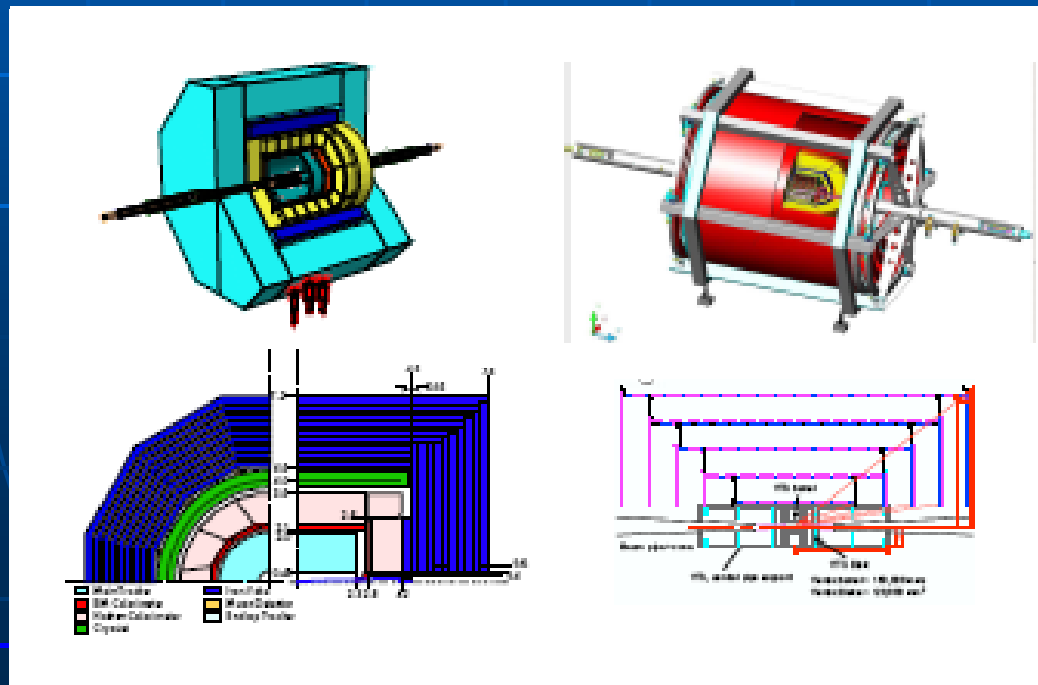


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The WWS Roadmap for ILC Detectors

by F. Richard LAL/Orsay



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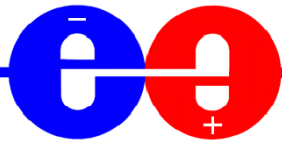
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Introductory remarks

- The WWS on physics and detectors has been up to now a self-organized ensemble operating in constant consultation with the community
- This is the so-called bottom-up approach which, we think, has worked successfully in accomplishing our various missions:
 - coordinating R&D efforts through frequent WS and, from now, with regular reviewing
 - interfacing with the machine experts on key questions for the detectors
 - developing the phenomenology in preparation of the physics program
 - preparing the software tools to evaluate the physics and the detectors

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After the DCR

- This effort has culminated with the production of the DCR (Detector Concept Report) which results from the combined effort developed for the 4 concepts as described in detailed documents called the DOD (Detector Outline Document)
- After the DCR, the WWS is facing a new challenge set by our colleagues of the GDE:
- To prepare EDR documents for the 2 “contrasting complementary detectors” of ILC by 2010, by the time of significant LHC results
- To work out a scenario of construction of these detectors assembled on surface, two years after the construction of ILC begins with detectors ready to go down into the pit less than five years after

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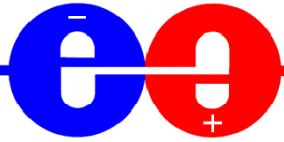
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1st Discussions

- Since the Vancouver WS (July 2006), the WWSOC has been thinking along these lines in conjunction with ILCSC and the GDE
- A roadmap scenario was first presented to the community in Beijing (February 2007) which became aware of these challenges
- Many reservations were expressed by the community in Beijing which, rightly, felt worried by the new burden added to the R&D commitments, without clear prospects of extra resources and without official recognition of the ILC project
- Many also expressed the worry that too early decisions might compromise several promising ongoing detector R&D and prevent new groups, active e.g. at Tevatron, B-factories or building LHC to join at a later stage

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ILCSC

- ILCSC during the Beijing meeting took notice of the proposed roadmap and of the reactions from the community and gave to the WWS co-chairs the mission to define a scenario acceptable to the community but avoiding any gap with the machine plans for the preparation of ILC construction

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The mission

- The realization of the International Linear Collider has taken major steps forward in recent years. This could not have happened without the leadership taken coherently by the particle physics community, within the framework of ICFA. Unprecedented collaborative steps have been necessary, and the community has adapted successfully to what, in some regions, required major redirections of traditional accelerator R&D effort.
- Two major milestones, the selection of the main-linac RF technology and the GDE's announcement of the RDR budget and associated design choices, keep the GDE on pace to complete a construction-ready engineering design for the ILC accelerator-complex by 2010.
- **Maintaining this momentum requires also that the equivalent strategic decisions and the level of technical maturity for the two ILC detector proposals keep pace with the accelerator schedule. Major progress in this regard is ongoing under the auspices of WWS. In addition, a definite plan together with milestones is needed to have detector designs of a maturity similar to that of the accelerator by 2010. This needs an enhanced effort by the community. ILCSC will support the formation of an International Detector Advisory Group to assist this effort. ICFA looks forward to receiving such a plan from WWS at the June 1, 2007 ILCSC meeting at DESY.**

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How did we proceed?

- A working group was set up immediately after Beijing, comprising 2 representatives/concept, Chris as representing the R&D program and the 3 co-chairs
- The outcome of 5 phone meetings, in consultation with the WWSOC and the GDE EC is the following:
 - An inter-concept WG on jet energy reconstruction, in particular to identify the various challenges and set up the priorities
 - A roadmap proposal
 - A web Forum to prepare the present discussion

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Key elements

The key elements of the roadmap proposal are:

- A call for LOIs by ILCSC due for summer 2008
- These LOI can be based on an simple extension of the DOD documents
- They will be reviewed by IDAG, an International Detector Advisory Group of experts chosen by ILCSC
- IDAG should get acquainted with the R&D aspects of the detectors
- IDAG will interact with the LOI proponents and produce recommendations to ILCSC
- The result of this process should be two proto-collaborations operating beginning of 2009 to produce an EDR document by end 2010

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The issues

Details of this proposal were of course thoroughly discussed:

- What is an LOI?
- What is the content of an EDR?
- How many EDRs can there be?
- Which resources are needed, how can they be committed?
- Can one produce this EDR while most sub-detectors are still under R&D?
- What is the charge of IDAG?
- How to make sure that we get everyone on board?

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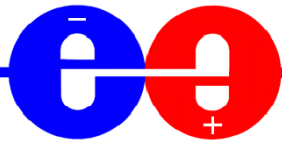
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A Research Director

- Several of these essential details are not yet settled and need careful implementation
- The WWSOC thinks that IDAG alone cannot accomplish the executive tasks which are needed to make this process active and viable
- We need a **Research Director** for detectors to provide the necessary inputs for IDAG
- Ideally one would need this RD to be nominated early enough by ILCSC to initiate the LOI procedure in collaboration with the IDAG
- An 'umbrella organization' is needed ASAP to coordinate the detector and machine activities until a world lab is constituted

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What is an EDR?

- It should be, in 2010, a 'ready for approval' documented engineering design
- It should aim at mitigating cost and risks (value engineering process)
- It cannot be, as for the machine EDR, a 'ready for construction' engineering document
- It should study the integration of the various sub-detectors and give a realistic material distribution (input for performance evaluation)
- It should be flexible to permit late choices, even beyond 2010, of sub-detectors still under R&D
- It should encourage new comers

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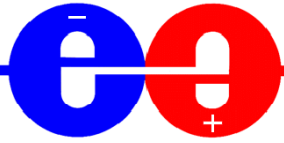


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What is a LOI?

- A document (<100 pages) signed by laboratories, research groups forming a proto-collaboration able to prepare an EDR for the construction of an ILC detector
- It should therefore define:
 - The content and the goals of the EDR
 - The sharing of responsibilities
 - The resources needed for the EDR (until 2010)
- It should rely on a comprehensive description of the detector concept(s), which they propose to build, in a document like the existing **DDDS**



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What do we expect from this discussion?

- After the web Forum discussion a face to face with the community including our oversight bodies and the GDE
- You are encouraged to ask questions and make suggestions
- What is the issue ?
- -> Get the detector community better organized, confident in its future and consistently structured in its various activities

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COMPLEMENTARY SLIDES

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Machine EDR

- From Barry to ILCSC
- Our plan is to have by the time of significant LHC results a documented engineering design (EDR), a plan for industrialization in the different regions and countries, and a proposed scheme for cost sharing and sharing of responsibilities and resources for construction of the ILC
- In conjunction, we will be carrying out an ongoing R&D program to demonstrate our baseline technologies and to optimize the design for both performance and cost
- As proposed to you (ICFA, ILCSC and FALC), our plan is to coordinate the development of the engineering design through a project management office, having an empowered project manager

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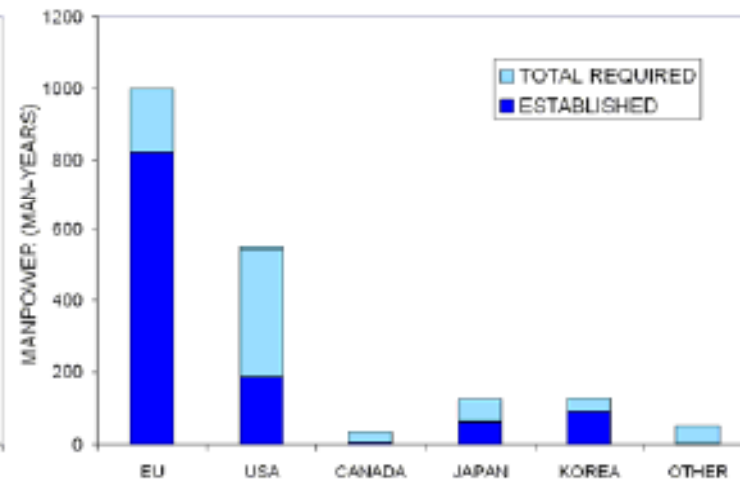
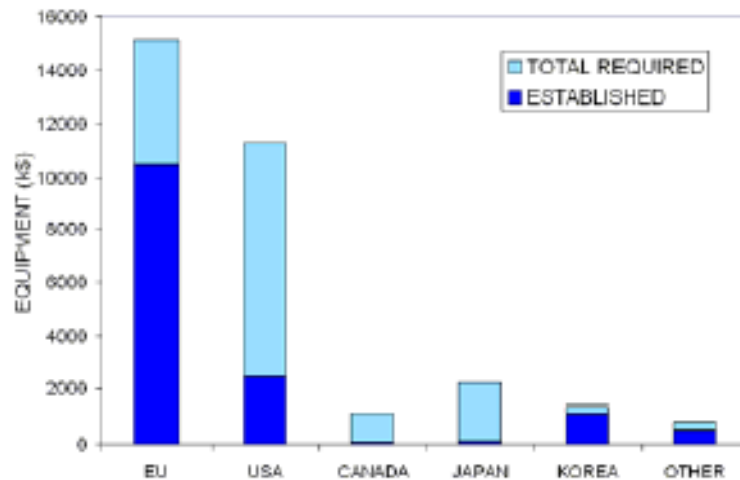
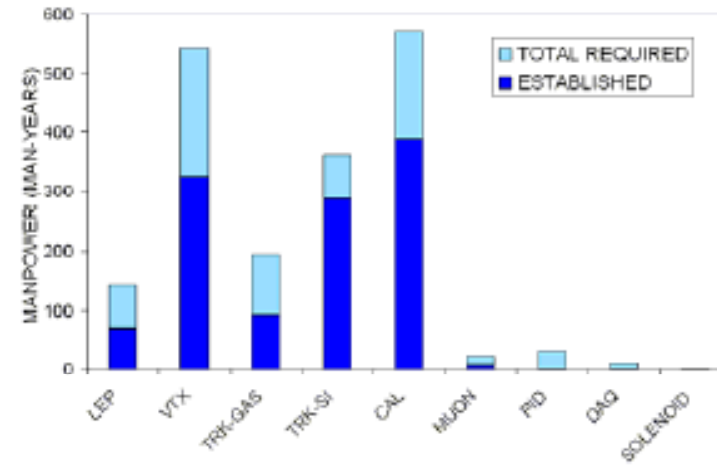
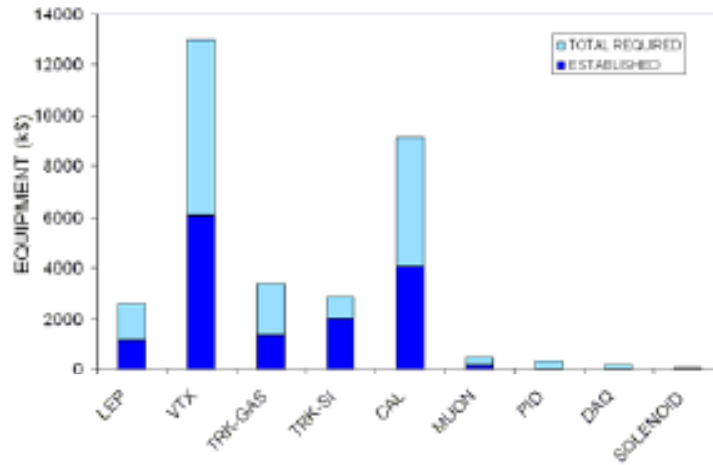


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R&D effort (3-5y)

~33M\$/y



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ATLAS (T. Akesson)

ATLAS

- Around 1989-1990 the collaboration was formed
- 1990 DRDC was set up by CERN as its scientific committee for detector R&D proposals
R&D collaborations were formed
- 1992 LHCC was set up by CERN as its scientific committee for LHC experiments
- 1992 Letter of Intent, 100 pages
Basis for CERN to choose which of the collaborations that should proceed
From this point ATLAS was monitored by an LHCC referee team
- 1994 Technical proposal, 250 pages
Basis for the principal project approval
- 1994 Basic collaboration constitution
 - Spokesperson
 - Collaboration Board
 - Executive Board
- 1995 The Resources Review Board (funding agencies) was formed
Chaired by the CERN director of research. Meets twice a year.



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ATLAS 2

- Technical Design Reports 1-15. In total 6'000 pages
Basis for construction approval
 - 1996 Calorimeter, 1'100 pages
 - 1997 Tracker (pixel detector 1998), 1'400 pages
 - 1997 Muon spectrometer, 500 pages
 - 1997 Magnets, 650 pages
 - 1998 First level trigger, 500 pages
 - 1999 Technical coordination (infrastructure, installation and procedures), 600 pages
 - 1999 Detector and physics performance, 950 pages
 - 2003 Higher level triggers, DAQ and controls, 360 pages
 - 2005 Computing, 230 pages
- Memorandum of Understanding
 - 1996 Interim
 - 1998 Construction (distribution of responsibilities and organization)
 - 2002 Maintenance and Operation
 - 2005 addendum for core computing
- Technical coordination internal review system. During peak periods one review/week
 - Design reviews, 75 reviews during 1997-2003
 - Production readiness reviews, 77 reviews during 1997-2003
 - System overview reviews, 13 reviews during 2001-2006

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