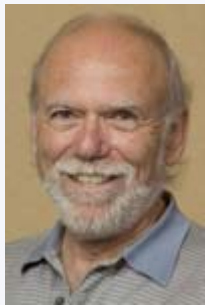


## Director's Corner

20 May 2010



Barry Barish

### International Linear Collider Steering Committee confronts ILC R&D support issues

Scientific oversight for the ILC Global Design Effort is provided by the International Linear Collider Steering Committee (ILCSC), a subcommittee of the International Committee for Future Accelerators (ICFA). The most recent meeting of the ILCSC, chaired by Jon Bagger, was held on 25 February 2010 at Brookhaven National Laboratory, a day before the meeting of ICFA. This meant that many of the major laboratory directors could take part in the ILCSC meeting, and since much of the ILC R&D programme is carried out through these laboratories, this meeting presented the opportunity to have meaningful and frank discussions of the support and resources needed to achieve the high-priority ILC R&D goals, both for the ILC accelerator and detector efforts.

The ILCSC helps to determine the main goals of the ILC R&D and design work and it guides and evaluates the actual work that we perform. To this end, at the Brookhaven meeting I presented our plans to evolve the ILC design, in order to optimise cost to performance to risk, with a special emphasis on cost containment as we move forward. I also reviewed the status of our key R&D risk mitigating demonstrations.

Our highest priority short-term milestone is to demonstrate our goal of being able to produce 35 megavolts per metre superconducting radiofrequency cavities with 50 percent yield. We are now approaching that goal! This is very encouraging, as our general approach is that if we can achieve 50 percent yield during the R&D phase, it should be possible to develop detailed procedures over the next few years for building, processing, testing and repairing cavities, such that we can approach 90 percent yield by the time we are ready to contract the project.



Group photo of the ILCSC meeting participants. Image: Brookhaven National Laboratory

Regarding the ILC design effort, our main focus is to evaluate a proposal made by our project managers to adopt a set of changes to the accelerator baseline that include adopting a single-tunnel configuration, placing the undulator-based positron source at the end of the electron linac, reducing the circumference of the damping rings to about 3.2 kilometres, and integrating the crowded central region. The total cost savings from these baseline changes will be approximately 13 percent or about one billion dollars. As I said in [last week's Director's Corner](#), we expect these savings will be needed to compensate other areas of cost growth, like material costs and the cost of manufacturing superconducting radiofrequency cavities.

A particularly important topic of discussion with the laboratory directors at ILCSC was how well the technical and engineering support from the major high-energy physics laboratories is matched to the priorities of our R&D programme. In that regard, we summarised our programme at each laboratory as one carried out through an informal process (rather than formal work packages). Nevertheless, we concluded that for the most part, this is working well, except for a few places where GDE goals are not well aligned with the priorities of the laboratories. Laboratory priorities change and these can impact our ability to reach major milestones. Detector support by labs is an area that is particularly lacking, which is limiting progress on the detector designs.

One important outcome of our discussions is that the laboratories will try to provide some additional engineering support for fleshing out the design of the push-pull system. This is a crucial problem to develop at this time, because each beam line from the main linac to the detectors costs more than an ILC detector. Therefore, we have been strongly motivated to develop a scheme where two detectors can alternately share a single beam through a push-pull system, by moving one

detector or the other onto the beamline. This is an attractive cost savings solution and for the *Reference Design Report* (RDR), we determined there were no 'show stoppers' in such a scheme. However, we did not carry out a detailed enough engineering design to understand the practicalities and challenges for implementing a push-pull interaction region.

In addition to the needs for engineering for the push-pull system, the detector groups are working to provide a prioritised list of engineering needs for developing the ILC detectors. Again, moving on from the Letters of Intent detector concepts to an assessment of the practicalities and costs for each detector requires technical and engineering support. Hopefully, the laboratories will be able to provide some of the high priority engineering support for the detector efforts.

The other very important topic briefly discussed at ILCSC is the need to develop a post-2012 strategy. By the end of 2012, the *Technical Design Report* (TDR) will have been delivered. It will take considerable time to review and validate the TDR, before actually proposing a construction project. Then obtaining approval for construction, agreeing to a scheme to finance the construction, select a site and agreeing to a governance for the project all will take considerable time, even if these tasks can be worked somewhat in parallel. The timing of a decision on an ILC construction project will also depend on when the Large Hadron Collider (LHC) provides results that can give the scientific motivation for a linear collider and determine the needed beam energy. During this interim period, resources will be needed to complete the risk mitigating R&D, perform superconducting radiofrequency systems test and to maintain the core team to begin the project. With all the unknowns, it will be a challenge to find a viable strategy for the post 2012 period.

In general, the ILCSC was pleased with our progress and was quite supportive of our plan for the TDR. The Project Advisory Committee, which is the technical subcommittee of the ILCSC, met last week in Valencia, Spain and I will report on the recommendations from that review, as soon as their report is available.

-- Barry Barish