

# Tailoring the ILC

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What's the best way to dig a 72 km-long tunnel complex and install it with 2,000 cryomodules, over 13,000 magnets and approximately 540 high-level radio frequency stations? Such is the monumental question the Conventional Facilities and Siting Group (CFS) for the International Linear Collider (ILC) seeks to answer. The Americas division of this global team includes members from SLAC and Fermilab, who work closely with their Asian and European counterparts.

Although the eventual location of the ILC has not been determined, the CFS groups are tailoring the ILC to accommodate the characteristics of a set of "sample sites"—one for each region. The primary concerns for selecting the sample site were geological stability, mechanical vibrations due to seismic activity, industrial noise from construction work and traffic, issues of sealing the tunnels from ground water and having a minimal impact on the environment.



An artist's impression of a map of the Quantum Universe, highlighting the discovery scenarios of the ILC. (Image courtesy of Form One)

"These are very stringent requirements," said Fred Asiri, the SLAC Group Leader for ILC CFS efforts. "We need to work closely with experts in many fields to try to find the best, most cost-effective way to accommodate the environment."

The sample site for the Americas group is in the vicinity of Fermilab, allowing maximal use of the existing infrastructure. By using this as a sample site, they can understand a number of key issues involved in siting, such as the scope of the conventional facilities and the estimated costs. "This won't necessarily be the final location," Asiri noted, "but we need a credible sample site to assess the costs and engineering solutions. We don't want to make any vague assumptions based on a generic location."

The SLAC group, together with their CFS colleagues from around the world, devoted a major effort to producing a complete and comprehensive cost model for the Reference Design Report. This report, published in August 2007, provides a technical description of the project, including 3D visualization drawings and designs for safe, cost-effective underground facilities.

The report also allows the ILC effort to identify priorities for the project's engineering phase, as well as for developing a worldwide R&D program that will lead to further cost reduction. "There's a lot of give and take," Asiri commented. "We're constantly developing alternative ways to minimize cost and adjusting our criteria."

The next step is to establish the advantages and disadvantages for each region independent of civil cost. "We need to figure out things like how long it will take to build in each sample site, and government issues like the process of getting permits," Asiri said. "And the civil cost is only about 30% of the total, so there are other costs to consider. We're making good progress, but there's a long road ahead."

Source: by Elizabeth Buchen, SLAC Today

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