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PROJECT ORGANIZATIONS AND SCHEDULES

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Abstract

The Superconducting Super Collider Laboratory (SSCL) faces the challenge of simultaneously carrying out a large-scale construction project with demanding cost, schedule, and performance goals; and creating a scientific laboratory capable of exploiting this unique scientific instrument. This paper describes the status of the laboratory organization developed to achieve these goals, and the major near-term schedule objectives of the project.

Organization

The SSCL has grown rapidly during the first year of its existence. The laboratory staff started with a core group of less than 100 employees located in the Central Design Group in Berkeley, California, and grew to over 600 employees located in the temporary quarters in Dallas, Texas. The challenge faced by the laboratory is how to combine the execution of a large scale construction project—with demanding cost, schedule and performance goals—with the creation of a laboratory infrastructure that will support and promote creative science activities and its associated educational benefits. Models of other scientifically oriented megaprojects, such as those in NASA, combined with the successful approaches used in the past in high energy physics projects provide guidance, but it is clear that new ground is being broken by the SSC.

The most recent organization chart is shown in Figure 1. The roles and responsibilities of the key leadership positions are as follows. The Director establishes the goals and policies for the laboratory, and he develops the strategic plan for the project and the laboratory in the context of the world high energy physics program. The Project Manager reports to the Director, and he is responsible for the execution of the construction project, consisting of the accelerator technical systems and the conventional facilities. The development and acquisition of the superconducting magnets, because

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Figure 1. Organizational Chart

of the magnitude of this accelerator component task, is the responsibility of a separate division (Magnet Systems). All other technical systems in the accelerator complex are the responsibility of the Accelerator Systems Division. The Conventional Construction Division is responsible for the conventional facilities, including the underground tunnels and the surface facilities.

A new feature of the present organization is the addition of a Technical Director supporting the Project Manager, as shown in more detail in Figure 2. The Technical Director, supported by system integration group leaders for the major portions of the accelerator, leads the physics design of the accelerator and has responsibility for all the technical requirements and interface definitions.

The Technical Services and Administrative Services Divisions provide support to the construction project, and they are also part of the laboratory infrastructure supporting scientific research. These scientific activities will, of course, become the mainstream of the laboratory when the construction is completed and the operating phase begins.

The Physics Research Division reports to the Director, separate from the construction project organization. The Physics Research Division is responsible for the detectors, and these components are designed and constructed by scientific collaborations involving many universities and other research organizations. The management and coordination of these collaborations is of a different character from the rest of the construction project, which is a more traditional project activity under the direct line authority of the SSCL project manager.

Schedules

The near-term priorities of the SSC project are:

1. Baseline cost/schedule/performance validation.
2. Development of industrial capability to produce large numbers of superconducting magnets.
3. System tests of a prototype collider segment by September 1992.

The development of the near-term schedule is driven by these priority items, which are critical to establish the readiness of the SSC project to move forward. The current definition of the baseline design of the SSC complex has been documented in a preliminary draft of the Site-Specific Conceptual Design, and a final version reflecting major design decisions is being prepared. Other papers at this symposium provide details of this design. The cost and schedule is also being finalized, and it will be subjected to a major review in early Summer 1990.

One major change from the earlier designs is the choice of aperture in the collider dipole magnets (CDM)—namely, 50 mm rather than 40 mm. This change led to restructuring of the superconducting magnet development. Strong support from Fermilab, Brookhaven, and Lawrence Berkeley Laboratories will continue (Figure 3), with the industrial contractor working in partnership with the laboratories after the selection has been made (Figure 4). Assembly of about a dozen collider dipole magnets by the industrial contractor at Fermilab is part of the technology transfer plan. These magnets, assembled by the industrial team, will be used to form a segment of the collider system for system testing by September 1992 (item 3 on the above list).

The first part of this "string test" will take place at a surface facility where five superconducting dipole magnets will be connected together. The major goals of the string test are:

Figure 2. Technical Director Organization

Figure 4. Industrial Contractor Selection Criteria

- The installation of the magnets to test the design of the magnet interconnects: electrical, cryogenic, and vacuum connections.
- The operation and integrity of the vacuum system.
- The ability to cool the string to liquid helium temperatures, verifying operation and control of the refrigerator system.
- The demonstration of the power supply, quench protection and controls systems, as well as the superconducting magnets, by ramping the string under conditions similar to those expected in operation.

These tests involve the first implementation of the major systems necessary to operate the collider and are the next important step in the SSCL program following successful tests of individual magnets. Following the surface facility tests, a similar test will be made below ground in a tunnel segment to test the operation of the support systems (cryogenics, electrical, and vacuum) in a realistic environment. The schedule of tasks involved in these system tests is shown in Figure 5. Results from these system tests are essential before the preproduction collider dipole manufacturing begins, and the production design of interconnections and spool pieces is finalized.

The top-level milestones over the full duration of the SSC construction project are shown in Figure 6. These milestones are preliminary versions; finalization of the baseline schedule will occur in late-Summer 1990 according to our present plan.

Figure 5. Schedule of Tasks

<u>MAJOR MILESTONES FOR SSC</u>	<u>PRELIMINARY DATE</u>
AE/CM Award	May 90
Baseline Validation Complete	July 90
Collider Dipole Magnet (CDM) Contract Award	Aug. 90
SEIS Record of Decision	Nov. 90
CDM Preliminary Design Review	July 92
Collider String Test	Sept. 92
First Collider Sector - Start Installation of Major Components	Jan. 94
Start CDM Production	April 94
Linac - Start Commissioning	Sept. 94
MEB - Start Commissioning	Oct. 95
HEB - Start Installation	Jan. 96
MEB - Test Beams Available	April 96
HEB - Start Commissioning	Oct. 97
SSC - Start Commissioning	April 98
SSC - Beam to Experiments	Oct. 98

Figure 6. Top-Level Milestone Chart

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