Building the Superconducting Super Collider, 1989 – 1993:*  
The Problem of Project Management  
Michael Riordan  
*UC Santa Cruz & Stanford University  
*Research supported by NSF Award No. 823296.
**Major Projects in High-Energy Physics**

**Stanford Linear Accelerator Center**
- constructed 1961–1966
- $114 million (~$600 million 1990$)
- Wolfgang Panofsky, SLAC Director

**Fermi National Accelerator Laboratory**
- constructed 1968–1972
- $243 million (~$800 million 1990$)
- Robert Wilson, Fermilab Director

**CERN Large Electron Positron Collider**
- constructed 1983–1989
- 910 million Swiss francs* (budgeted)
- Herwig Schopper, CERN Director
- Emilio Picasso, Project Manager

*external costs of equipment only, as projected, in 1983 Swiss francs. Later cost overruns — tunneling under Jura
SSC Cost Growth, 1986–1993

From Daniel Lehman, “Lessons Learned from the SSC,” 1994
Figures given in projected “as-spent” dollars, including expected inflation
Which one is the Project Manager?
Which one is the **Project Manager**?
And who is the **Chief Scientist** reporting to him?
The Proposed SSC Management Team*

Universities Research Association, Inc.
- non-profit corp. of ~ 80 universities
- Fermilab M&O contractor since 1968

Sverdrup Corporation, St. Louis
- construction management firm
- Trident Submarine Base, Georgia
- Baltimore Harbor Tunnel

EG&G, Inc., Boston
- operations management firm
- Idaho Engineering Laboratory
- Nevada Test Facility

* from URA SSC Management and Operations Proposal, November 1988
Proposed SSC Leadership, November 1988

Figure 3.5-1. URA-SSC Laboratory organization.
DIRECTORATE
LABORATORY DIRECTOR
R. Schwitters
DEPUTY
M. Tigner

QUALITY ASSURANCE
INTERNAL AUDITS
LEGAL COUNSEL
ESSH
ORTA
PLANNING
USER'S OFFICE
INTERNATIONAL COORDINATION

PROJECT MANAGER

PLANS AND REPORTS
INTEGRATION

MAGNET SYSTEMS
ACCELERATOR SYSTEMS
H. Edwards
CONVENTIONAL CONSTRUCTION
R. Robbins

INDUSTRIAL CONTRACTORS
COLLIDER
INJECTOR
INSTRUMENTATION AND CONTROLS
ACCELERATOR PHYSICS

LABORATORY SUPPORT SERVICES
SHOPS
MATERIALS HANDLING
PLANT ENGINEERING/MAINTENANCE
ENGINEERING SUPPORT

LABORATORY ADMIN. SERVICES
B. Chrisman

PHYSICS RESEARCH
THEORY
EXPERIMENTAL FACILITIES
COMPUTATION AND DATA ANALYSIS

• KEY PERSONNEL FROM RFP/DRAFT CONTRACT
SSC Lab Director Roy Schwitters
The SSC Project Manager Parade:

• N. Douglas Pewitt (acting), March to October 1989
  — former high government official in OMB, DOE and OSTP
• Richard L. Briggs, October 1989 to March 1990*
  — project manager on LLNL induction accelerator (~$100M project)
• N. Douglas Pewitt (acting), March to May 1990
• Theodore Kozman (acting), May to September 1990
  — LLNL/LBL mechanical engineer, head of SSC Accelerator Systems Div.
• Paul Reardon, October 1990 to December 1991*
  — former Fermilab Business Manager, Brookhaven Associate Director

* DOE held up both Project Manager candidates put forth by URA.
DOE’s Candidate: Edward Siskin

• B.S. degree, Electrical Engineering, Univ. Pennsylvania, 1963
• Naval Reactors Division, Atomic Energy Commission, 1970-84
  — reported to Admiral Hyman G. Rickover, head of the “Nuclear Navy”
  — knew DOE Secretary Admiral James Watkins from Navy experience
• Executive Vice President, Stone & Webster Corp.*, 1984-89
  — was responsible for S&W operations in southeastern United States
  — included all S&W nuclear work and chemical plant safety work
• Registered Professional Engineer in Electrical, Mechanical, Chemical, Civil and Nuclear Engineering

* Stone & Webster was construction manager for Oak Ridge lab in WWII.
SSC Project Manager Parade, Continued:

- N. Douglas Pewitt (acting), March to October 1989
  — former high government official in OMB, DOE and OSTP
- Richard L. Briggs, October 1989 to March 1990
  — project manager on LLNL induction accelerator (~ $100 M project)
- N. Douglas Pewitt (acting), March to May 1990
- Theodore Kozman (acting), May to September 1990
  — LLNL/LBL mechanical engineer, head of SSC Accelerator Systems Div.
- Paul Reardon, September 1990 to December 1991
  — former Fermilab Business Manager, Brookhaven Associate Director
- John Rees, January 1992 to October 1993
  — project manager on SLAC PEP and SLC colliders (~ $100 M projects)
SSC Cost Growth, 1986–1993

From Daniel Lehman, “Lessons Learned from the SSC,” 1994

- 1993 figures include impact of the “Clinton Stretch-Out”
Observations and Opinions

• It was a big mistake to build the SSC at a new, green-field site.
• The DOE was justified to insist that URA have someone with large-project management experience in a top management position, but it did so in a counter-productive manner.
• Nobody in high-energy physics had such experience in 1989.
• A good part of the cost overruns experienced on the SSC can be attributed to the absence of a strong project manager.
• While Siskin and Rees were beginning to bring the SSC project under control at the end, it was too little and (much) too late.
Tunnel Visions: The Rise and Fall of the Superconducting Super Collider

by Michael Riordan, Lillian Hoddeson and Adrienne Kolb