

Submitted to the 12<sup>th</sup> Meeting of the OECD Global Science Forum

**Workshop on Management Practices  
for Establishing Large International  
Scientific Research Projects**

**at the  
Fermi National Accelerator Laboratory  
Chicago, Illinois  
October 5-7, 2004**

**Chairman's  
Report**

**November 15, 2004**

# INTRODUCTION

## Purpose

The Workshop on Management Practices for Establishing Large International Scientific Research Facilities was proposed by the Delegation of the United States and approved by Global Science Forum (GSF) at its Ninth Meeting in June 2003. GSF delegates agreed that the workshop would be an appropriate mechanism to promote sharing of information about national approaches to formulating, organizing, and funding of large international scientific research projects.

The workshop allowed working-level government representatives and other invited project management practitioners to meet face-to-face and to present key management requirements that influence their participation in large international scientific research projects. The workshop built on previous meetings sponsored by the GSF in the area of management of projects for high-energy physics, condensed matter research, high-intensity lasers, accelerators, neutron sources, and telescopes, as well as February 2003 workshop on best practices in international scientific cooperation.

## Synopsis

The workshop was a first-of-its-kind gathering of national project management practitioners. The participants indicated the forum was informative, useful, and timely. The workshop offered a focused environment (an agenda driven by responses to common fundamental questions about national management practices; tours of accelerator, light source, and neutrino projects and experiments that reinforced the workshop context; and a meeting space free of distractions) that stimulated an open and frank exchange of information about national project management practices. This exchange led to deeper conversations about differences in national management approaches and some of the reasons underpinning those differences.

The topics that were discussed included: lessons learned from completed projects; issues arising from newly planned projects; implications of evolving national scientific research infrastructures; and the need to consider influence of fiscal, regulatory, and socioeconomic factors in establishing future project organizations.

Differences in national project management approaches with respect to cost estimating were highlighted by an interactive, collaborative exercise using a standard matrix to define fundamental elements contained in national project cost estimates. The differences among the national entries in this matrix stimulated discussion and sharing of national practices for project definition, establishing project baselines, managing available project funding and national funding cycles, addressing project risk, and defining cost estimate inclusions and exclusions.

In a concluding roundtable discussion, the participants identified the development of management best practices, characterization of the range of possible project legal entities, and influence of national funding organizations on projects as common interests that were discussed at the workshop and were potential topics for a continued dialogue.

## **Attendees**

The workshop was attended by 30 participants from 11 countries, including representatives from the European Commission. The mixture of participating countries represented a broad cross-section of member nations in terms of size, experience with completed and ongoing international projects and governmental forms. A listing of attendees is shown as Attachment A.

## **Agenda**

Over two-and-a-half days, the attendees received presentations from managers of completed projects, proponents of proposed international projects, and government representatives. The workshop was intended to be informal with a flexible agenda to encourage free and open exchange of views and opinions. Tours of high energy physics projects and experience at the host laboratory, Fermi National Accelerator Laboratory, and nearby Argonne National Laboratory were intended to reinforce the workshop context. The final workshop agenda is shown as Attachment B.

## **Presentations**

The presentations were very high quality and evoked significant discussion among workshop participants. The presenters were guided by a common set of questions provided in advance of the workshop. The overall format encouraged flexibility in order for additional topics of interest to emerge.

### **Questions to Guide Development of Workshop Presentations**

1. What are the key governmental organizations involved in the formulation, planning, design and initiation of large international scientific research projects?
2. What are the fundamental governmental processes and decisions that influence participation in large international scientific research projects?
3. What is the governmental process for authorizing and allocating associated project funds?
4. Is there a consistently, defined government-required project management process for construction of or contributions to large international research projects? What provisions are made in this process for project definition; design reviews; development of complete and accurate cost and schedule estimates; project oversight project risk assessment and management?
5. What are the key project decisions in the project management process and who is involved in these decisions?

## THEMES

### **Scientific Research and Infrastructure Roadmaps**

A number of participants described the development and use of national or regional scientific roadmaps to illustrate medium- to long-term scientific research planning and exploitation schemes. Roadmaps provide a comprehensive characterization of scientific research needs and opportunities to leverage ongoing and newly proposed scientific facilities to address those needs. The roadmaps create a framework for organizing grass-roots (bottom-up) and strategic (top-down) scientific research initiatives. In a context of increasing internationalization, the roadmaps provide a basis for evaluating the potential to achieve national or regional science goals by leveraging investment in collaborative international ventures.

### **International Project Organization Structures**

Observations by several speakers evoked discussion about the significance and impact of the form of international project organizations established to plan, construct, and operate international scientific facilities. Organizational issues underscored by participants' historical and current experience included uncertainty in mitigating possible legal liabilities, status of national employees as members of international project workforces, consideration for intellectual property rights of industry participants, issues related to centralized vs. distributed project authorities, and seeking involvement of appropriate type and level of governmental entities in initial and implementing international agreements.

### **Mechanisms for Approving International Participation**

National mechanisms for establishing the manner and degree of participation in large international projects range from ad hoc, case-by-case practices, to well defined processes that actively engage a comprehensive and diverse set of stakeholders. Many nations rely heavily on independent advice from science community organizations to objectively assess value and risks of investments in international projects. Collaboration among a diverse set of domestic agencies is viewed by national authorities as a powerful signal that helps to validate the science-case for participation in an international project.

### **International Project Funding Mechanisms**

Participation in international projects is made possible by different forms of funding mechanisms (direct project funds, grants, public-private partnerships, cash vs. in-kind, etc.). These funding mechanisms have associated with them many requirements and constraints. These influences significantly affect the ability of national agencies and international project organizations to optimize project activities with respect to cost or science objectives.

### **Project Management Practices**

The inclusion of contingency and escalation in project cost estimates generated a great deal of interest and discussion. Some countries always include contingency and escalation in estimates as a routine element required by standard cost estimating

practices. Some countries do not include contingency because its use implies an unacceptable project design quality. Some countries rely steadfastly on their vendor's providing materials, components, or assemblies for agreed upon fixed prices, which is viewed as obviating the need for contingency. Some countries have funding agencies that do not allow use of contingency or escalation.

## RECOMMENDATION

The workshop participants supported a recommendation similar to one contained in the recent (September 2004) report from the OECD Global Science Forum Workshops on Future Large-Scale Projects and Programmes in Astronomy and Astrophysics.

*The Global Science Forum should undertake to compile an annotated compendium of the possible legal/managerial/organizational arrangements for implementing large scientific projects, and to make the results publicly available via the internet.*

**Appendix A**  
**Workshop on Management Practices for**  
**Establishing Large International Scientific Research Facilities**

**Participant List**

**Australia**

Dr. Robert Robinson  
Australian Nuclear S&T Organization

**Belgium**

Mr. Johan van Helleputte  
Vice President of Strategic Development  
IMEC

**Canada**

Dr. Kate Wilson  
Manager  
Subatomic Physics and Space Sciences  
NSERC

**European Commission**

Dr. David Campbell  
Research Directorate General  
European Commission

Dr. Gerburg Larsen  
Scientific Officer  
European Commission

Dr. Serge Paidassi  
Principal Scientific Officer  
European Commission

**Finland**

Dr. Eeva Ikonen  
Academy of Finland  
(Research Councils in Finland)

**France**

Dr. Gerard Bonneaud  
Research Director  
CNRS

Dr. Joel Feltesse  
Physicist  
CEA/Saclay

Dr. Yves Petroff  
Direceur Adjoint  
Ministry of Research

**Germany**

Dr. Anneliese Bohn  
Division Deputy Head  
BMBF

Professor Albrecht Wagner  
Chairman, Board of Directors  
DESY

**Korea**

Professor In-Soo Ko  
Director  
Pohang Accelerator Laboratory

**Japan**

Dr. Hideo Ohno  
Senior Executive Director  
JASRI (Spring-8)

Mr. Minoru Yonekura  
Director  
Basic Research Division  
MEXT

## **Netherlands**

Dr. Richard Schilizzi  
International Project Director  
Square Kilometre Array Project

## **United Kingdom**

Dr. Gavin Costigan  
Department of Trade and Industry

Dr. Peter Fletcher  
Particle Physics and Astronomy  
Research Council

## **United States**

Dr. Michael Holland  
Senior Policy Analyst  
Office of Science and Technology Policy

Mr. Daniel Lehman  
Director, Major Systems Assessment  
U.S. Department of Energy

Dr. Robin Staffin  
Associate Director  
Office of High Energy Physics  
U.S. Department of Energy

Dr. Michael Turner  
Assistant Director, MPS/OAD  
National Science Foundation

## **OECD**

Dr. Stefan Michalowski  
Executive Secretary  
Global Science Forum

## **Other Speakers**

Dr. Walter Henning  
Science Manager  
GSI Darmstadt

Dr. James Yeck  
Director, IceCube Project  
University of Wisconsin

Dr. Hideaki Yokomizo  
Deputy Director General  
JAERI

## **Observers**

Ms. Casey Clark  
U.S. Department of Energy

Dr. Harold Jaffe  
U.S. Department of Energy

Mr. Ronald Lutha  
Fermi Site Office  
U.S. Department of Energy

Mr. Stephen Meador  
U.S. Department of Energy

**Appendix B**  
**Workshop on Management Practices for**  
**Establishing Large International Scientific Research Facilities**

**DRAFT AGENDA**

**Tuesday, October 5, 2004—Wilson Hall, Fermilab, Batavia, Illinois**

- 7:45 a.m. Depart Lisle Hilton Lobby via Fermilab Shuttle Bus
- 8:30 a.m. Welcoming Remarks  
Director of Fermilab..... Mike Witherell  
Office of Science..... Robin Staffin  
Workshop Overview ..... Dan Lehman
- Introductions
- 9:00 a.m. Presentations by Invited Speakers  
U.S. Large Hadron Collider Projects (U.S. LHC)..... Jim Yeck  
Joint European Torus (JET)..... David Campbell
- 10:00 a.m. BREAK
- 10:15 a.m. Presentations by Invited Speakers  
Japan Proton Accelerator Research Complex (J-PARC)..... Hideaki Yokomizo  
International Facility for Antiproton and Ion Research (FAIR) . Walter Henning  
Square Kilometer Array (SKA) ..... Richard Schilizzi
- 12:00 p.m. Lunch
- 1:00 p.m. Presentations by OECD member representatives on  
national management practices that influence participation  
in large, international scientific research facilities .....U.S./Belgium
- 2:30 p.m. BREAK
- 2:45 p.m. Presentations by OECD member representatives... Canada/European Commission
- 4:00 p.m. Tour of Fermilab
- 7:00 p.m. Dinner Hosted by Fermilab
- 8:30 p.m. Return to Lisle Hilton via Fermilab Shuttle Bus

**Wednesday, October 6, 2004**

- 8:00 a.m. Depart Lisle Hilton via Fermilab Shuttle Bus
- 8:30 a.m. Presentations by OECD member representatives..... Finland/France
- 10:00 a.m. BREAK
- 10:15 a.m. Presentations by OECD member representatives.....Germany/Japan
- 12:00 p.m. Lunch
- 1:00 p.m. Presentations by OECD member representatives.....Korea/U.K./Australia
- 2:30 p.m. BREAK
- 2:45 p.m. European Free Electron Laser (XFEL)..... Albrecht Wagner
- 3:30 p.m. Tour of Argonne National Laboratory
- 6:30 p.m. Return to Lisle Hilton via Fermilab Shuttle Bus

**Thursday, October 7, 2004**

- 8:00 a.m. Depart Lisle Hilton via Fermilab Shuttle Bus
- 8:30 a.m. Completed presentations; Roundtable Discussion
- 12:00 p.m. Adjourn/ Return to Lisle Hilton via Fermilab Shuttle Bus