CHAPTER ONE

INTRODUCTION

"Science and technology have never been more essential to the defense of our nation and the health of our economy." President George W. Bush (March 2001)

In the 21st century, advances in science and engineering (S&E) will to a large measure determine economic growth, quality of life, and the health and security of our planet. The conduct, communication, and use of science, all intrinsically global, have become increasingly important in addressing many critical global issues. Awareness of the necessity of investing in S&E research and education has grown throughout the world, and many countries have taken steps to expand such investments. As a result, high-quality science and engineering research are no longer the domain of only a small group of countries. The ability of science and engineering to contribute to societal goals, address global problems, and make useful contributions to foreign policy relies to a high degree on global communication and cooperation in science and engineering. Such collaboration is also critical to creating an environment that is conducive to enhancing communications among diverse people and building on the values of cooperation, open-mindedness, and tolerance.

International S&E collaboration encompasses a complex network of activities, with numerous participants and stakeholders, including industry, universities, professional societies, international organizations, private foundations, and governments. In the context of the United States, the Federal Government has played a significant role over the years in promoting international S&E activities through the work of its agencies with S&E missions, and by supporting research with international dimensions by scientists and engineers at U.S. universities. Science and engineering have also been important components of major foreign policy issues, such as arms control and global climate change. The role of the Federal Government will continue to be critical in supporting communication and collaboration in science and engineering. How to improve the effectiveness of the Federal role in international science and engineering is the subject of this report.

The National Science Board (NSB)[5] has periodically assessed the role and needs of science and engineering in the international arena. Given the growing importance of science and engineering in the global setting, the Board decided that it was time for a fresh look at this topic. It established the NSB Task Force on International Issues in Science and Engineering in February 1999 and

[5] The National Science Board serves as the governing board of the National Science Foundation and provides advice to the President and the Congress on matters of national science and engineering policy.

charged it with meeting two objectives. The first was to develop recommendations for strengthening the Federal framework of policies and agency relations supporting fundamental research and education in an international setting. The second was to develop recommendations for an effective leadership role for the National Science Foundation (NSF) in international science and engineering in the 21st century. (See Appendix A for the task force charge.)

In its first year, the task force focused on gathering information. Given the limited number of serious policy evaluations of international S&E issues during the previous decade, the task force felt it important not only to conduct a comprehensive literature review, but also to hold discussions with a broad array of stakeholders.

The following key themes emerged during this information-gathering exercise:

- The need for more effective coordination of the U.S. Government's international S&E and S&E-related activities and greater consistency in meeting its international commitments;
- The importance of increased international cooperation in fundamental research and education, particularly with developing countries and by younger scientists and engineers and;
- The need to improve the use of S&E information in foreign policy deliberations and in dealing with global issues and problems.

The Board concluded that serious re-examination of the United States Government's role in international S&E research and education and the contribution of these activities to foreign policy is essential. Retaining the status quo would jeopardize future U.S. economic and scientific leadership and diminish both the Nation's security and its ability to address important global problems. New approaches to the management and coordination of U.S. international S&E activities are needed if the United States is to maintain the long-term vitality of the U.S. economy and its science and engineering enterprise. The Board therefore urges implementation of seven specific actions and makes the following overarching recommendation.

KEYSTONE RECOMMENDATION

The U.S. Government should move expeditiously to ensure the development of a more effective, coordinated framework for its international S&E research and education activities. This framework should integrate science and engineering more explicitly into deliberations on broader global issues and should support cooperative strategies that will ensure our access to worldwide talent, ideas, information, S&E infrastructure, and partnerships.

Process for Developing the Task Force Report

- Planned and held hearings with invited speakers representing a wide range of perspectives;
- Convened an international symposium on models for S&T budget coordination and priority setting, cosponsored with the NSB Committee on Strategic Science & Engineering Policy Issues;
- Received briefings from key representatives of Federal agencies, including OSTP, DOD, DOE, DOS, EPA, NASA, NIH, NSF and NOAA;
- Arranged a comprehensive literature search to identify and review key documents;
- Prepared a guidance report for the NSF Director—"Toward a More Effective NSF Role in International Science and Engineering"—containing the Board's recommendations for an effective leadership role for NSF in international science and engineering in the 21st century[6]; and
- Prepared a transition paper for the new Administration forming the basis for this report which is a more comprehensive report on international science and engineering responding to the first task force objective of strengthening the Federal role in international S&E research and education.

[6] The report is available on the NSB web site at—http://www.nsf.gov/nsb/documents/2000/nsb00217/nsb00217.htm.