DRAFT

March 28, 2003

MEMORANDUM

TO: Warren Washington
Robert Richardson

FROM: James Duderstadt

SUBJECT: Federal Science and Technology Budget

The National Academies seeks wider adoption of the federal science and technology (FS&T) budget as a mechanism for tracking, analyzing, and projecting federal spending on programs that create new knowledge and technologies. The National Science Foundation and the National Science Board can facilitate and benefit from the FS&T budget concept through revisions to NSF data collection activities and NSF and NSB analysis of resources for science and engineering.

FS&T Budget Concept

In 1995, the National Academies issued a report entitled *Allocating Federal Funds for Science and Technology* that recommended tracking federal investments in programs creating new knowledge and technologies—what the report referred to as the federal science and technology budget. The Academies have since issued five reports in an annual series that describe the FS&T budget concept and analyze the President's proposed FS&T budget, commenting on its potential impacts on our ability to meet short- and long-term national goals in science and technology.

The U.S. Office of Management and Budget (OMB) has developed an FS&T budget tabulation consistent with the National Academies FS&T budget concept that is presented in the President's annual budget proposal and tracked by OMB through the Congressional appropriations process. OMB first published this tabulation in the Administration's FY 1998 budget proposal as the Research Fund for America. OMB revised this tabulation and presented it as the 21st Century Research Fund for FYs 1999 and 2000. With the FY 2002 budget proposal, OMB formally referred to this budget cross-cut as the Federal Science and Technology Budget, acknowledging the National Academies concept as the underlying motivation for the tabulation.

The National Academies endorsed the OMB FS&T budget tabulation because it:

- focuses on basic and applied research in the largest S&T programs;
- includes all costs associated with those programs, including staff salaries;
- includes key science and engineering education programs at the NSF which are not classified as R&D but do represent key S&T investments; and
- is composed of identifiable budget line items which obviates the need for agency estimates and permits easy tracking through the Congressional appropriations process

The National Academies utilized OMB's tabulation as its basis for tracking and analyzing the FS&T budget in its last two annual reports (for FYs 2002 and 2003).

National Science Foundation: Data Collection

The NSF collects R&D trend data through seven surveys carried out by the Division of Science Resources Statistics (SRS). These data are widely used by those seeking to analyze key trends in funding resources for science, engineering, and innovation. The National Academies have argued that FS&T provides a better measure of federal resources for national science and engineering programs than R&D does. The National Science Foundation could facilitate the promotion of the FS&T budget concept and the analysis of FS&T investments by revising SRS data collection activities to begin collecting and analyzing funding data for FS&T as well as R&D.

The place to start, among the seven R&D surveys carried out by SRS, would be the Survey of Federal Funds for Research and Development. Federal agencies are the respondents to this survey, which provides data on federal funding for basic research, applied research, and development, by agency, field, performer, and location. It could also include data on FS&T funding by agency, field, performer, and location. We recognize that revising a survey to include collection of additional data requires effort and an increased burden on agency respondents. However, the collection of FS&T budget data—especially trend data—would greatly facilitate the ability to analyze developments and projections in areas of critical national need.

The NSF has contracted with the National Academies to review and make recommendations about NSF's portfolio of R&D surveys. The NRC's Board on Science, Technology and Economic Policy (STEP) is participating in this effort by holding an April 7 workshop on R&D data needs. The Committee on National Statistics (CNSTAT) will draw on this workshop and other sources to provide a consensus study with recommendations for the SRS R&D portfolio going forward. The CNSTAT committee has been briefed on the FS&T concept and will consider it as findings and recommendations are developed.

National Science Board: Analysis

Similarly, the NSB provides an important biennial picture of our nation's science and engineering enterprise through the publication of *Science and Engineering Indicators*. This volume and its data tables are widely used by those seeking to understand the availability and impact of funding and human resources for science and engineering in the U.S. With regard to funding, the NSB currently focuses primarily—almost exclusively—on R&D rather than FS&T funding trends. The latest volume of *Science and Engineering Indicators* provides a short description of the FS&T budget concept (a text box covering part of page 4-13), which is a small acknowledgement, but does not provide any analysis of FS&T budget trends. This short text box is embedded in a lengthy chapter that otherwise focuses on R&D trends. Of course, R&D has been the traditional means for examining financial resources and the data sources (such as those in SRS) focus on R&D trends. However, as FS&T focuses more closely on the federal investments that matter the most in advancing our nation's science and technology goals than does the more general R&D concept, the NSB would provide a more insightful analysis if it focused on FS&T trends.

A first step toward expanding the NSB analysis of FS&T would be to present a table showing FS&T by agency. This table is readily available in the President's annual budget proposal and is updated by the American Association for the Advancement of Science (AAAS) at the conclusion of the Congressional appropriations cycle. Text could be included in the R&D chapter that augments the existing description of FS&T to include an analysis of trends by agencies over several years as data allow.

A longer-term goal would be for the NSB to ask for and utilize the kinds of data that would come from revising the NSF/SRS Survey of Federal Funds for Research and Development as described above.