General Notes

The National Science Foundation (NSF) sponsors a series of surveys to collect information about the financial and human resources devoted to research and development (R&D). In this report, NSF survey data on various sectors of the U.S. economy—industry, government, and academia—and on selected nonprofit organizations are aggregated so that the components of the overall R&D effort are placed in a national context. Information presented in this report and other *National Patterns* reports includes the following:

- Level of R&D expenditures
- Sources of R&D funds
- Sector or organization performing R&D
- Character of work undertaken (i.e., whether it is basic research, applied research, or development)
- States in which R&D is undertaken in the United States
- International R&D comparisons

The national totals reported here incorporate data available from several NSF Division of Science Resources Statistics (SRS) surveys as of October 2003 as well as projections to cover the entire year.[1] This report, including the appendix tables, is available on the Internet at http://www.nsf.gov/statistics/natlpatterns/.

These notes introduce the main concepts used in the report. Important changes and revisions from previous *National Patterns* reports also are highlighted. More technical information as to how the various surveys' data are combined to produce national R&D estimates is presented in appendix A and in the forthcoming *National Patterns of Research and Development Resources: Methodology Report.*

Performer-Reporting Basis

SRS annually surveys Federal Government agencies, industry, and academia. Respondents in each sector indicate the amounts they spend on R&D in their own sector and the sources of these funds. National historical totals are based on data reported by performers because they are in the best position to (1) indicate how much they spent in the actual conduct of R&D in a given year, (2) classify their R&D by character of work, and (3) identify the sector of the economy in which their financing originated. The consistent use of performer reporting reduces the possibility of double-counting R&D expenditures and conforms to international standards and guidance.

There are exceptions to the use of performer-reported data. The last complete survey of the nonprofit sector was conducted in 1999 for activity undertaken in 1996 and 1997. Estimates of R&D performance by nonprofit organizations reported here are generally based on (1) Federal agency reporting of Federal funding of the nonprofit sector and (2) R&D performance trends in the other non-Federal sectors. Between 1973 and 1999, large R&D-performing nonprofit organizations were contacted periodically to inform NSF's estimation procedures.

In addition, NSF sponsors only occasional surveys of state government agencies; the last two surveys covered fiscal year (FY) 1987–88 and FY 1995–96. Consequently, the national R&D time-series totals exclude estimates of state agencies' intramural R&D performance. State funds for R&D performed and reported by other sectors of the economy, however, are included in the respective R&D performance totals.

One byproduct of the decision to use performer-reported data is that the federally funded R&D performance totals presented in *National Patterns* reports differ from the Federal R&D funding totals reported by the Federal agencies that provide the funds. One reason for these differences is that performers of R&D often expend Federal funds in a year other than the one in which the Federal Government provides *authorization*, *obligations*, or *outlays* (for definitions of these terms, see sidebar "Definitions of R&D" and appendix A). Differences between Federal R&D funding reported by performers and by funding agencies are documented in the sidebar "Tracking R&D: Gap Between Performer- and Source-Reported Expenditures."

Projections

Although respondents are continually given the opportunity to revise prior data, the R&D totals for 2001 reported here are considered actual expenditures. Data reported for 2002 and 2003 are preliminary, in the sense

[1]Data sources for this report are detailed in appendix A.

that 2002 data are based on preliminary reporting of information, and 2003 data are projections based on information available when this report was written.

For Federal agencies, preliminary estimates of obligations for R&D are available for FY 2002 and FY 2003, and budgetary data for FY 2004 are available in the Bush administration's 2004 budget proposal. These various sources of data are used to estimate Federal R&D performance for calendar years 2002 and 2003.

R&D performance estimates for 2002 and 2003 for the other sectors of the economy are derived on the basis of three types of information: (1) survey information submitted early by some of the responding institutions, allowing for a preliminary estimate of what the aggregate results will be once all survey responses are received; (2) responses by performers to questions about their future plans; and (3) statistical regression and time-series modeling techniques based on observed patterns of R&D expenditures by performers. The precise methodologies used for estimation are explained in the forthcoming *National Patterns of Research and Development Resources: Methodology Report*.

Calendar-Year Basis for All Data

Unless otherwise noted, this report presents all data, regardless of sector, in terms of calendar years. *National Patterns* reports before 1998 provided a combination of fiscal-year expenditures for governmental and academic R&D and calendar-year expenditures for industrial R&D and R&D performed by other nonprofit organizations. Aggregates of these amounts were then taken, reflecting neither precise fiscal-year nor calendar-year definitions but a general combination of both. Therefore, for greater consistency and clarity in measurement, and for ease of calculation (especially in adjustments for inflation), all R&D levels for all performers have since been converted to calendar years. However, detailed data for Federal agencies, federally funded research and development centers, and academic institutions refer to fiscal years, as do data on the budget authority of the Federal Government. The use of fiscal-year data is noted in the text.