

3145-0100 Revised Part A

SF-83-I SUPPORTING STATEMENT

for

**Survey of Research and Development Expenditures at
Universities and Colleges**

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LIST OF ATTACHMENTS

- Attachment 1: First Federal Register Notice for the 2009 Academic R&D Survey
- Attachment 2: Bureau of Economic Analysis Letter of Support
- Attachment 3: FY 2008 Academic R&D Survey Questionnaire
- Attachment 4: FY 2009 Higher Education R&D Survey Questionnaire (Pilot test)
- Attachment 5: Kauffman Foundation Letter of Support

Survey of Research and Development Expenditures at Universities and Colleges Supporting Statement

A. JUSTIFICATION

This request is for a three-year extension of the previously approved OMB clearance for the Survey of Research and Development Expenditures at Universities and Colleges (Academic R&D Survey). The Academic R&D Survey was last conducted for FY 2008. The OMB clearance for the Academic R&D Survey will expire on May 31, 2009.

The Academic R&D Survey collects information about current fund expenditures for separately budgeted research and development (R&D) activities, by source of funds and by science and engineering (S&E) and non-S&E field. Separate data about current fund expenditures for research equipment by S&E field are also requested. Federal and state policy makers, as well as academic research administrators and researchers, frequently request survey results. The Academic R&D Survey is an annual census of the universities and colleges meeting eligibility criteria plus federally funded research and development centers--FFRDCs. The National Science Foundation (NSF) is now requesting approval to collect these data for the FY 2009-2011 survey cycles and also to conduct a pilot test of a redesigned survey instrument with a small subset of institutions.

1. Need for Data Collection and Legislative Authorization

Approval to conduct the Academic R&D Survey is being requested under The National Science Foundation (NSF) Act of 1950, as amended. Public Law 507 (42 U.S.C. subsection 1862) sections 3(a), (6), and (7) directs the Foundation:

- (6) "to provide a central clearinghouse for the collection, interpretation, and analysis of data on scientific and engineering resources and to provide a source of information for policy formulation by other agencies of the Federal Government and
- (7) to initiate and maintain a program for the determination of the total amount of money for scientific and engineering research,....."

The Academic R&D Survey provides essential data on the resources devoted to research and development in the higher education sector where over one-half of the Nation's basic research is conducted. The survey provides both summary data on R&D resources, by source and discipline, and data on individual institutions.

Results of this survey are combined with other NSF data for the federal and business sectors to arrive at national levels of R&D spending, as required by the NSF Act cited above. In 2007, the university sector accounted for approximately 13% of the total R&D performed in the United States, and FFRDCs accounted for an additional 4% of the estimated \$373 billion spent on S&E R&D. Without information from the Academic R&D Survey, NSF policymakers and planners, as well as other policymakers in the Executive Branch, Congress and the states, would have an incomplete and inaccurate understanding of the Nation's R&D activities. Furthermore, the data from this survey are used in conjunction with information from other surveys of academic science and engineering—such as the Survey of Graduate Students and Postdoctorates in Science and Engineering and the Survey of Scientific and Engineering Research Facilities—to provide the background statistics that are critical for obtaining a meaningful understanding of research activities in the academic sector.

Additionally, the population of academic institutions surveyed in the Academic R&D Survey serves as the universe for a related survey effort mandated by the United States Congress: the previously-mentioned Survey of Scientific and Engineering Research Facilities (Section 108, Public Law 99-159 [1986]).

NSF also utilizes the first question on this Academic R&D survey instrument to collect R&D performance data and the funding sources for such R&D from all FFRDCs (37 FFRDCs in FY 2008). According to responsibilities assigned to the NSF in 1990 under the Federal Acquisition Regulations as recorded in the Federal Register (vol. 55, no. 24, February 5, 1990), the NSF “maintains a list of FFRDCs... and information on each FFRDC, including sponsoring agreements, mission statements, funding data, the type of R&D being performed...” The data collected through this survey are used to inform the public on individual FFRDC R&D expenditures and to provide information on this sector's contribution to the national R&D total.

The Academic R&D Survey is one of several surveys directed to universities and colleges collected by the Division of Science Resources Statistics (SRS), the federal statistical agency with responsibility for statistics on the nation's S&E enterprise located within NSF. These data have been integrated along with survey data from the Department of Education's National Center for Education Statistics (NCES) and other data sets into an on-line integrated science and engineering resource data system, WebCASPAR. WebCASPAR provides an extensive and growing data library with multi-year statistics on the state of higher education in general and academic S&E resources specifically. WebCASPAR can be accessed via the World Wide Web at the NSF/SRS web site: <http://webcaspar.nsf.gov>. The

data in WebCASPAR provide basic information for planning and policy formulation regarding academic science and technology resources.

2. How, by Whom, and for What Purpose the Information Is to Be Used

Federal Uses

The Academic R&D Survey meets many information needs for federal policy makers. The data are used in policy formulation; implementation and evaluation; i budget analyses; congressional hearings; program planning; and annual publications mandated by Congress. The information is provided to Congress, the Office of Management and Budget, and the Office of Science and Technology Policy through published reports, briefings by the NSF Director and staff, and in special tabulations.

The National Science Board, the Director of NSF, and NSF program directors and managers use the Academic R&D Survey data for long-range planning and policy formulation. Specific uses include the following:

- (1) The NSF Office of Integrative Activities uses R&D expenditure data to help assess the need for and the impact of special NSF programs in the Office of Experimental Programs to Stimulate Competitive Research.
- (2) The NSF Office of Legislative and Public Affairs and the Budget Division use the annual R&D expenditures data to assess the support for R&D in universities and colleges. The detailed data by individual discipline are very important for these users.
- (3) Data from the Academic R&D Survey are incorporated into NSF's periodic analytical report, National Patterns of R&D Resources, and the National Science Board's biennial report, Science and Engineering Indicators (SEI). The SEI report is mandated by Congress (42 U.S.C. 1863, Section 4(j)), as follows:

"The Board shall render to the President and Congress, no later than January 15 of each even numbered year, a report on indicators of the state of science and engineering in the United States."

- (4) Data on academic R&D expenditures are used in conjunction with other data sources for maintaining current information on funding, staffing, and impacts of the Nation's scientific, engineering, and technological activities. The data and related reports may be found on the NSF/SRS website at <http://www.nsf.gov/statistics/>.

(5) The Bureau of the Census, Department of Commerce, uses data from the Academic R&D Survey, and other NSF surveys in its annual Statistical Abstract of the United States.

Professional Societies and Foundation Uses

Representative data users in this category include: the American Association for the Advancement of Science, the National Association of State Universities and Land Grant Colleges, the American Chemical Society, the Association for Institutional Research, the National Research Council, the Council on Governmental Relations, and the National Council of University Research Administrators.

State Uses

State governments frequently request R&D expenditures statistics that are unavailable from state records for cross-state comparisons. The data are requested regularly by individual state government agencies (such as State Boards of Higher Education in Maryland, Ohio, and Texas) and by national and regional state government organizations (such as the National Governors Association and the Southern Governors Association).

The data are also used in the compilation of the annual *Science and Engineering State Profiles* published by SRS.

University Uses

Universities extensively utilize the data for their own purposes. Requests for the data are received from numerous individual institutions, as well as from national academic organizations. Specifically, SRS has an agreement with the Association of American Universities' Data Exchange Group to provide them with more timely and comprehensive data from the Academic R&D survey. Institutional Profiles (summary reports containing institution-specific trend data on key data elements from several NSF surveys) are available electronically on the web (<http://www.nsf.gov/statistics/profiles/>).

Public universities and colleges often use R&D expenditures data in studies demonstrating the economic benefits of instruction and research to State legislatures.

Media Uses

Academic R&D expenditures data are well reported by the press, including the Washington Post, the New York Times, the Chronicle of Higher Education, Science, Chemical & Engineering News, USA Today, and the Wall Street Journal.

International Uses

The Organization for Economic Cooperation and Development (OECD) has requested that NSF provide R&D expenditures data annually for use in their periodic publications on academic R&D totals and on international comparisons of total R&D efforts. Other foreign users include the Association of Universities and Colleges of Canada and the National Institute of Science and Technology Policy in Tokyo, Japan.

3. Consideration of Using Improved Technology

The Academic R&D Expenditures Survey is a web-based data collection effort, although respondents to the survey may use an alternative approach, by downloading a survey form and email options. The response via the web was 99.9 percent in FY 2008. The vast majority of respondents have welcomed the web version of the survey for the ease of submission and error resolution capabilities. Respondents were electronically sent the survey package, including a letter of introduction, survey instructions and related materials.

Reporting burden is stable or potentially reduced when the survey population is constant and institutions are accustomed to providing the data requested. In the case of this survey, most respondents have established automated systems for assembling the requested data. In addition, the survey questions are intended to be as consistent as possible with the principles of financial accounting followed by institutions of higher education. Generally, these data are readily available from year-end financial records and other records maintained regularly by most institutions. To obtain the full set of data requested in the survey, business officers of some institutions must sometimes consult with multiple respondents, including heads of departments, research administrators, and other academic officials of the institution.

The web version of the survey has a real-time monitoring system, which allows NSF to monitor data, response status, and comments from respondents. From the perspective of the respondents, the web version is more convenient and simplifies the survey (e.g., by automatically calculating totals). NSF benefits from the use of the web version by receiving improved data quality.

4. Identification of Duplication

The Academic R&D Survey collects essential information on the financial resources allocated to research and development by universities and colleges. There are no other statistical sources of comprehensive national data for this information.

The U.S. Department of Education/ National Center for Education Statistics' (NCES) Integrated Postsecondary Education Data System (IPEDS) finance survey series is related in that it collects data on a full range of financial resources and expenditures in institutions of higher education, while the NSF Academic R&D Survey requests data on research and development expenditures. However, the IPEDS survey does not collect the following information requested by the NSF survey: (1) separately budgeted R&D expenditures in the sciences and engineering, by field of S&E and character of work; and (2) current fund expenditures for scientific and engineering research equipment, by field of S&E, as defined by OMB Circular A-21, revised. NSF regularly consults with the NCES to ensure that the information sought by the Academic R&D Survey is unavailable from other sources.

The Association of University Technology Managers (AUTM) collects annual data on university technology transfer activities such as patents filed and licensing revenues. The survey also asks for total R&D expenditures to be reported. However, the survey is only administered to approximately 200 AUTM member institutions and does not cover the full population of research-performing universities and colleges. It also does not collect any detailed data on the fields or types of R&D expenditures.

5. Small Businesses Involvement

The survey universe consists entirely of universities and colleges that perform research and development and of federally funded research and development centers (FFRDCs). There is no small business involvement.

6. Consequences of Less Frequent Surveying

Academic R&D expenditures data were collected on a biennial basis for the period 1964 through 1972. The NSF Director and the National Science Board subsequently determined that annual information about academic R&D resources was necessary to support informed programmatic and policy analysis.

The availability of national totals of R&D resources on an annual basis provides a current and timely overview of the status of science and engineering activity in each sector of the economy. Given the sophistication and pace of science and technological development

worldwide, it is anticipated that the need for annual data on national R&D expenditures in science and engineering will continue.

The experience of NSF staff, academic advisory group members, and workshop participants indicate that survey respondents prefer to report a consistent set of data items on an annual basis. Many universities and colleges have automated their record keeping systems, facilitating their ability to respond to NSF on an annual cycle. These automated record systems reduce considerably the time required to assemble and report information needed for NSF concerning sources of R&D support, R&D expenditures by field, etc. Thus, collecting consistent data annually considerably reduces respondent burden for academic institutions with automated data systems, since the database and software are retained and kept current. Many responding academic institutions have indicated that if the data were to be collected on a less frequent basis, the database and related software might not be maintained, resulting in increased burden.

Furthermore, federal, institutional, and major data users have strongly expressed their need for R&D data on no less than an annual basis. Because NSF policies have a national impact, the timeliness of the data used to formulate policy, budget, and planning decisions is critical.

7. Special Circumstances

No special circumstances.

8. Federal Register Notice & Consultation with Persons Outside the Agency

An announcement of the NSF request for clearance was published in the Federal Register on Friday, January 9, 2009 (Volume 74, Number 006) (See Attachment 1) NSF received 3 public comments in response to the announcement. One comment came from Ms. Sachau of Florham Park, NJ who objected to the information collection. Ms. Sachau had no specific suggestions for altering the data collection plans other than to discontinue them entirely. Because the comment does not pertain to the collection of information on the required forms for which NSF is seeking OMB approval, NSF is proceeding with the clearance request. Another comment came from Jerry Stone with the Bureau of Economic Analysis (BEA). He requested a copy of the current survey form and instructions which were provided to him. Dr. Dennis Fixler, the Chief Statistician of BEA, also submitted a letter of support for the survey (see Attachment 2). This letter stated that the collected survey data are crucial to key components of BEA's economic statistics and requested some additional data elements be collected in future years. Some of these elements are planned to be collected on the redesigned survey instrument, which will be pilot tested with

40 institutions during the FY 2009 survey (see discussion of pilot test in section B4, "Tests of Procedures Used"). The letter also requested that BEA be kept informed about modifications to the survey instrument. A final letter of support for the redesigned survey instrument came from E.J. Reedy from the Kauffman Foundation in response to the final Federal Register notice. This letter (see Attachment 5) stated that the Kauffman Foundation has a strong interest in high-quality statistics on R&D, startups, and commercialization of innovations. The letter recommends that NSF collect two additional metrics on technology transfer. Unfortunately these metrics were discussed during our interviews with technology transfer offices and were deemed to be very difficult to collect at present. The letter also provides suggestions for revisions to the current draft IP module questions which NSF will consider and discuss during additional cognitive testing.

Over the past three years as part of a major survey redesign project, NSF has conducted over 30 institution visits and has also held several workshops and panels with respondents and regular data users. These meetings provided a wealth of information on the impact of the survey's current and planned data requests upon academic respondents. Copies of the summary reports from these visits are available upon request.

9. Payments or Gift to Respondents

There will be no payments or gifts to respondents.

10. Assurance of Confidentiality

In general, assurances of data confidentiality are not provided to respondents to the Academic R&D Survey. All items on the questionnaire are reported at the institutional level except for estimates for basic research expenditures, the amount of institutionally financed organized research, and the amount of unreimbursed indirect costs. These items will continue to be presented only as aggregate totals for future survey cycles. The following confidentiality statement, covering these excepted survey items, will be included on the questionnaire:

"Information received from individual institutions in lines d(1) and d(2), or estimates for basic research expenditures, will NOT be published or released; only aggregate totals will appear in tabulations. In accordance with the National Science Foundation Act of 1950, as amended, and other applicable federal laws, your responses will not be disclosed in identifiable form to anyone other than agency employees or authorized persons."

11. Sensitive Questions

There are no sensitive questions in the Academic R&D Survey. Data are collected on an institutional level.

12. Estimated Response Burden

Data for the Academic R&D Survey for FY 2007 were collected from 709 institutions and FFRDCs expending at least \$150,000 in separately budgeted R&D in S&E. The FY 2008 survey was collected from 745 institutions and FFRDCs. Although it is difficult to predict how many schools will join the population each year, for burden estimation purposes it is assumed that the number of institutions in future survey cycles will continue to increase by approximately 25 institutions per year.

Burden hours reported by institutions in four previous survey cycles (397 institutions reported burden hours in FY 1999, 448 institutions in FY 2000, 492 institutions in FY 2001, and 550 institutions in 2002) are summarized below.

Table A-12.1. Previously Reported Burden Hours per Respondent to the Academic R&D Survey

Year	Doctorate- granting institutions	Master's- granting institutions	Bachelor's degree institutions	FFRDCs
FY 1999	20.8	13.0	7.5	9.4
FY 2000	21.0	12.0	10.5	9.2
FY 2001	30.2	11.9	9.0	12.1
FY 2002	28.7	14.9	12.2	4.5

Response rates have consistently been over 94.0% each survey year; in FY 2006 the response rate was 97.3%, in FY 2007 it was 96.9% and in FY 2008 it was 98.5%.

The average burden hour estimate for the FY 1999-2002 surveys is 22 hours per respondent and includes responses from institutions that provided information on items related to non-S&E R&D and on federal agency sources for R&D, which were optional items in those years. Beginning with the FY 2003 survey, these items were no longer optional. Most participants in survey workshops held in FY 2002 (prior to making them non-optional), indicated that the response burden for answering these questions was either negligible or a one-time programming burden.

For the FY 2009 data collection, a subset of 40 institutions will be selected for participation in a pilot test of a redesigned survey. Details regarding this test are provided in section B.4. For the FY 2009 regular data collection (not including the pilot test), a slight increase of the estimate to 23 burden hours per respondent is assumed, in order to accommodate some increased burden now that all institutions respond to the items on non-S&E and federal agencies. An estimated 730 institutions and FFRDCs will complete the regular survey in FY 2009 (times an historical average response rate of 95% resulting in 694 responses) for an estimated respondent burden of 15,962 hours.

SRS estimates the pilot test will require 80 hours per respondent, primarily due to the upfront programming time needed. The pilot test is expected to have a response rate of close to 100%; therefore the estimated response burden is 3,200 hours. Actual burden hour reports will be collected from each pilot test participant in order to more accurately estimate burden hours for the fully implemented redesigned survey. However, as the majority of the burden will be a one-time programming effort, the burden hours are not expected to remain as high in future years.

Both of these efforts add up to a total of 19,162 burden hours for FY 2009. A summary of the FY 2009 burden estimates is included in the table below. At an estimated cost of \$29 per hour (based on the Bureau of Labor Statistics May 2007 average hourly wages for “Financial Analysts” and “Budget Analysts” within NAICS 611300 - Colleges, Universities, and Professional Schools), the total FY 2009 cost to respondent institutions is \$555,698 (or approximately \$757 per institution).

Table A-12.2. Burden Estimates for the FY 2009 Academic R&D Survey

Category	# of Units	Burden/Unit (Hours)	Total Burden (Hours)
FY 2009 population screening	145	1	145
FY 2009 regular survey	694	23	15,962
FY 2009 redesigned survey pilot test	40	80	3,200
Total FY 2009	734		19,307

If the pilot test is successful and the redesigned survey is ready to be implemented in the FY 2010 survey cycle, a revised clearance package with updated burden information will be submitted to OMB. If, however, the regular survey continues in FY 2010 and FY 2011, the burden estimates will remain at 23 hours per institution. Since SRS estimates that the survey population will continue to grow by approximately 25 institutions per year, the estimated burden is 17,457 hours for FY 2010 (759 institutions at 23 hours each) and 18,032 hours for FY 2011 (784 institutions at 23 hours each) if a redesigned survey is not administered for those years.

13. Estimate of Annual Cost Respondent Burden

Not Applicable. There are no capital or startup costs to the respondents to the Academic R&D Survey.

14. Estimate of Annual Cost to Federal Government

The estimated annual cost of the FY 2009-FY 2011 Academic R&D Survey to the federal government is \$884,032. See table below for how this estimate was derived. Because the pilot test is a one-time task, costs for future years will include only the data collection contract and the survey manager's salary.

Annual Academic R&D Survey Federal Government Costs

	FY 2009	FY 2010*	FY 2011*
Data collection and processing contract	\$720,385	\$742,000	\$764,260
Academic R&D survey manager (1.0 person years)	\$104,000	\$107,120	\$110,333
Pilot testing task	\$104,000	N/A	N/A
Total	\$928,385	\$849,120	\$874,593

*assumes 3% inflation rate.

15. Changes in Burden

Changes in burden hours and federal government costs are a result of the additional pilot test that will occur at the same time as the regular FY 2009 survey.

16. Schedules for Data Collection and Publication

The FY 2009 web survey information is planned to be electronically sent to institutions in November 2009 with a due date of January 31, 2010. Actual closeout of the survey will be approximately mid May 2010, in order to allow time for late responses, corrections, and updating of previous years' data.

The contractor is responsible for all data collection and processing activities, including editing data submissions to resolve errors. For FY 2009, the same procedures will be used as those used for FY 2008 survey. For the FY 2009 survey, following the closeout of data

collection in May 2010 the contractor will generate inflator/deflator factors to impute for non-response, based on data reported by responding institutions. After closeout, data for non-respondent institutions will be machine-imputed using an imputation plan developed and approved by NSF.

The data from the FY 2009 survey will be analyzed in an SRS Info Brief to be published in the fall of 2010. A report containing all of the detailed statistical tables, Academic Research and Development Expenditures: Fiscal Year 2009 subsequently will become available on the web.

17. Displaying the OMB Expiration Date

The OMB number and expiration date will appear on the survey form.

18. Exceptions in Item 19 on Form 83-I

No exceptions sought.