

SF-83-I SUPPORTING STATEMENT

for

**Higher Education Research and Development Survey
and Federally Funded Research and Development
Centers R&D Survey**

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LIST OF ATTACHMENTS

- Attachment 1: FY 2013 Higher Education R&D Survey population review questionnaire
- Attachment 2: FY 2013 Higher Education R&D Survey questionnaire
- Attachment 3: FY 2013 Higher Education R&D Short Form Survey questionnaire
- Attachment 4: FY 2013 FFRDC R&D Survey questionnaire
- Attachment 5: OMB Notice of Approval 3145-0100
- Attachment 6: First Federal Register Notice for the 2013 Higher Education R&D Survey
- Attachment 7: Comment letter from the Bureau of Economic Analysis
- Attachment 8: Comment letter from the University of Rochester
- Attachment 9: Draft contact materials for FY 2013 Higher Education R&D Survey

Supporting Statement June 2013

A. JUSTIFICATION

This request is for a three-year extension of the previously approved OMB clearance for the Higher Education Research and Development (HERD) Survey and the FFRDC R&D Survey. The surveys were last conducted for FY 2012. The OMB clearance for the surveys will expire on October 31, 2013.

1. Need for Data Collection and Legislative Authorization

The National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation (NSF) collects, maintains, and disseminates information on science and engineering resources in the United States. Specifically, Section 505 within the America COMPETES Reauthorization Act of 2010 directs NSF as follows:

“(a) Establishment- There is established within the Foundation a National Center for Science and Engineering Statistics that shall serve as a central Federal clearinghouse for the collection, interpretation, analysis, and dissemination of objective data on science, engineering, technology, and research and development.

(b) Duties- In carrying out subsection (a) of this section, the Director, acting through the Center shall--

(1) collect, acquire, analyze, report, and disseminate statistical data related to the science and engineering enterprise in the United States and other nations that is relevant and useful to practitioners, researchers, policymakers, and the public, including statistical data on--

(A) research and development trends;...”

The HERD Survey (Attachment 2) 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. Conducted annually since FY 1972, the survey provides both summary data on R&D resources, by source and discipline, and data on individual institutions. Between 2007 and 2010, the survey underwent a full-scale redesign of both content and methodology. A new web survey was developed and pilot tested with 40 academic institutions during the FY 2009 survey. The FY 2010 survey cycle was the first full fielding of the redesigned survey and methodology. The upcoming FY 2013 survey cycle will be the fourth iteration of the expanded survey.

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 law cited above. In 2011, the university sector accounted for approximately 15% of the estimated \$414 billion spent on R&D in the United States. Without information from the HERD 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 (S&E)—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 HERD 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]).

The HERD Survey is one of several surveys directed to universities and colleges collected by NCSES. 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 S&E 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 at the NSF/NCSES web site: <http://webcaspar.nsf.gov>. The data in WebCASPAR provide basic information for planning and policy formulation regarding academic science and engineering resources.

NSF utilizes a subset of questions from the HERD survey (Attachment 4) to collect R&D performance data and the funding sources from all FFRDCs (39 FFRDCs in FY 2012). 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 FFRDC R&D 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 (4% in 2011).

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

Federal Uses

The HERD and FFRDC Surveys meet many information needs for federal policy makers. The data are used in policy formulation, implementation and evaluation, 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 HERD and FFRDC Survey data for long-range planning and policy formulation. Specific uses include the following:

(1) The NSF Office of Integrative Activities uses HERD 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) Data from the HERD and FFRDC Surveys 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."

(3) Data on HERD and FFRDC 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/NCSES website at <http://www.nsf.gov/statistics/>.

(4) The Bureau of Economic Analysis (BEA/DOC) uses data from the HERD and FFRDC Surveys for the development of R&D investment in the core accounts of U.S. gross domestic product (GDP) and other National Income and Product Accounts (NIPAs).

Professional Societies and Foundation Uses

Representative data users in this category include: the American Association for the Advancement of Science, the Association of Public and Land-grant Universities, the Association for Institutional Research, the National Research Council, the Council on Governmental Relations, the Association of American Universities, 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 Florida, 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 NCSSES.

University Uses

Universities extensively utilize the HERD data for their own purposes. Requests for the data are received from hundreds of individual institutions, as well as from national academic organizations. Specifically, NCSSES has an agreement with the Association of American Universities' Data Exchange Group to provide them with more timely and comprehensive data from the HERD 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

HERD 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 HERD and FFRDC survey data annually for use in their periodic publications and for international comparisons of total R&D efforts. Other foreign users include the Association of Universities and Colleges of Canada, the Canadian Institute for Public Policy and Public Administration, King Abdullah University of Science and Technology, and the National Institute of Science and Technology Policy in Tokyo, Japan.

3. Consideration of Using Improved Technology

The HERD and FFRDC Surveys are web-based data collection efforts, although respondents to the surveys may use an alternative approach, by downloading a PDF

or Excel version of the form. The response via the web was 99.9 percent in FY 2012. The vast majority of respondents prefer the web version of the survey for the ease of submission and error resolution capabilities. Respondents are electronically sent the survey package, including a letter of introduction, survey instructions and related materials (see Attachment 9 for examples of the FY 2013 contacts planned).

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 these surveys, 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 and FFRDCs. 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 colleagues, including heads of departments, research administrators, and other academic officials of the institution.

The web versions of the surveys have 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 versions are more convenient and simplify the survey (e.g., by automatically calculating totals). NSF benefits from the use of the web versions by receiving improved data quality.

4. Identification of Duplication

The HERD 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 expenses in institutions of higher education including research expenses, while the NSF HERD 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 accounted for R&D expenditures by field, source of funding, and character of work; and (2) current fund expenditures for research equipment by field. NSF regularly consults with the NCES to ensure that the information sought by the HERD 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 AUTM 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.

The FFRDC R&D Survey also collects information that cannot be obtained from any other existing statistical data source. Although NSF's Federal Funds for R&D Survey collect data on R&D obligations from the Federal agencies that obligate those funds, there are no other known sources of *total* FFRDC expenditure data. In late 2011 NSF requested to add agency-specific funding details to the FFRDC Survey. In response, OMB encouraged NCSES to examine differences between Federal agency and institutional reporting on R&D, consistent with the findings of the Committee on National Statistics (NOA 3145-0100) (Attachment 5). These investigations are ongoing, and once the analysis is complete, results will be shared with OMB.

5. Small Businesses Involvement

The survey universe consists entirely of universities and colleges that perform R&D and of 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 R&D 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 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 and FFRDCs have automated their record keeping systems, facilitating their ability to respond to NSF on an annual cycle. These automated record systems considerably reduce 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 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. As a specific example, annual HERD and FFRDC data are needed by the Bureau of Economic Analyses to use in updating the National Income and Product Accounts. Further, 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 Tuesday, January 8, 2013 (Volume 78, Number 5) (See Attachment 6). NSF received two public comments in response to the announcement.

One comment came from the Bureau of Economic Analysis (BEA). They expressed general support for the survey and requested several additional data elements to be considered for future collection (Attachment 7). NSF is in regular contact with BEA about their data needs and the feasibility of adding questions to the HERD or FFRDC Surveys to address these needs. As always, there is a need to balance the burden on the respondents with requesting new data that will be of limited use to the general public. In recent years NSF has added several items requested by BEA to the questionnaire, where the additional detail posed no significant increase in burden for the institutions. NSF will continue to consider additional items in future years while still prioritizing respondent burden. There are no plans to incorporate these data items on the HERD or FFRDC Surveys for FY 2013.

The second comment came from the University of Rochester (Attachment 8). They requested consideration for a modification to the survey to collect headcounts of principal investigators by academic discipline in order to allow more detailed benchmarking across academic institutions. NSF agrees this level of detail would be useful to academic institutions, and attempted to collect the personnel counts by department during the pre-testing phase of the HERD redesign. Unfortunately the effort was deemed too burdensome in addition to the other items being newly requested on the FY 2010 HERD Survey. Now that respondents have seen an overall reduction in burden for the HERD Survey, NSF will consider testing the personnel question by academic discipline during this clearance period. However, this effort will need to follow the completion of NCSES's ongoing effort to

harmonize the academic disciplines across the NSF surveys. Once the fields are standardized across the surveys, the HERD Survey will need to make changes to the taxonomy of its R&D fields. After this taxonomy revision is completed, the personnel question can be revisited and revised to include totals by field if the testing proves successful.

Since 2011, NSF has conducted 10 institution visits, 7 telephone interviews, 15 web usability tests, and has also held a workshop with survey respondents to discuss the collection of departmental research. 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 activities are available upon request and were the basis for modifying—with OMB approval—the 2012 HERD to include questions on the composition of reported institutionally financed R&D. NSF will continue to analyze those findings.

9. Payments or Gift to Respondents

There will be no payments or gifts to respondents.

10. Assurance of Confidentiality

No items on the FFRDC R&D Survey are deemed confidential. All items on the HERD Survey are reported at the institutional level except for the breakdown of institution funds within question 1 (institutionally financed research, cost sharing, and unrecovered indirect costs), and the amount of recovered vs. unrecovered indirect costs in question 13. These items are presented only as aggregate totals in resulting publications. The following confidentiality statement, covering these excepted survey items, is included on the questionnaire:

"Information from confidential items is NOT published or released for individual institutions; only aggregate totals will appear in publications. 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 HERD or FFRDC R&D Surveys. Data are collected at the institution level.

12. Estimated Response Burden

Data for the FY 2010 HERD Survey were collected from 747 institutions expending at least \$150,000 in R&D. The FY 2011 survey was collected from 916 institutions. The FY 2012 survey included 931 institutions, however these institutions were split into separate populations based on their R&D expenditures thresholds. Institutions reporting \$1 million or more in R&D expenditures in FY 2011 were asked to respond to the full HERD survey in FY 2012, whereas institutions reporting under \$1 million were sent a short form version of the survey containing only a few questions (Attachment 3). In FY 2012, 659 institutions were included in the full HERD survey and 272 institutions were included in the Short Form Survey. NSF expects modest increases in both the HERD and the Short Form populations each year as new institutions meeting the threshold are added. For purposes of estimating total burden during this clearance period, NSF assumes a total HERD population of 1,000 (700 in the full survey and 300 in the Short Form).

The FY 2010-12 FFRDC R&D Surveys have included the full population of FFRDCs each year (39 in FYs 2010 and 2012, and 40 in FY 2011). The size of the FFRDC population has been highly stable over time.

High response rates have consistently been obtained: in FY 2010 the response rate for the HERD Survey was 98.0%, in FY 2011 it was 96.0%, and in FY 2012 the response rate was 95.5%. The FFRDC R&D Survey response rate has been 100% each year.

The FY 2012 HERD and FFRDC Surveys were estimated to require 41 hours and 11 hours, respectively, based on burden reports supplied by respondents (see Tables A-11.1 and A-11.2). These burden estimates have declined from FY 2010, the first year of the survey expansions.

NSF did not request a burden estimate for the HERD survey population screener, but based on interactions with respondents it is estimated to be one hour per institution. The screening instrument is designed with broad category questions that require minimal time for the institutional respondent to answer (see B-2 for more information).

Table A-11.1. Reported Burden Hours per Respondent to the HERD and FFRDC Surveys

Year	All HERD	Doctorate-granting	Professional degree-granting	Master's degree-granting	Bachelor's degree-granting	FFRDCs
FY 2010	53.9	70.8	NA	35.2	22.0	14.6
FY 2011	41.4	59.3	26.1	24.5	18.3	9.9

FY 2012	41.2	59.1	26.7	24.3	14.9	11.0
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Table A-11.2. Reported Burden Hours per Respondent to the FY 2012 HERD and HERD Short Form Surveys

FY 2012 HERD populations	Total	Doctorate-granting	Professional degree-granting	Master's degree-granting	Bachelor's degree-granting
HERD	53.8	63.6	39.4	36.7	27.8
HERD Short Form	8.2	7.0	6.2	10.2	6.2

For FY 2013-15, NSF is estimating an average annual burden of 1 hour for the HERD population screener, 54 hours for the HERD Survey, 8 hours for the HERD Short Form, and 11 hours for the FFRDC Survey.

A summary of the annual burden estimates is included in the table below. At an estimated cost of \$33 per hour (based on the Bureau of Labor Statistics May 2012 average hourly wages for “Financial Analysts” and “Budget Analysts” within NAICS 611300 - Colleges, Universities, and Professional Schools), the total annual cost to respondent institutions is \$1,346,070 (\$1,131 per respondent).

Table A-12.3. Annual Burden Estimates for FY 2013-15 Surveys

Category	Estimated # of Responses	Respondent Burden (hours)	Total Burden Hours	Total Cost Burden
HERD population review	150	1	150	\$4,950
HERD Survey	700	54	37,800	\$1,247,400
HERD Short Form	300	8	2,400	\$79,200
FFRDC Survey	40	11	440	\$14,520
Total annual burden	1,190	-	40,790	\$1,346,070

13. Estimate of Annual Cost Respondent Burden

Not Applicable. There are no capital or startup costs to the respondents to the HERD Survey.

14. Estimate of Annual Cost to Federal Government

The estimated annual cost of the FY 2013-FY 2015 HERD and FFRDC Surveys to the federal government is \$1,351,063. See table below for how this estimate was derived.

Table A-14.1. Annual HERD and FFRDC Surveys Federal Government Costs

	FY 2013	FY 2014	FY 2015
Data collection and processing contract	\$1,060,782	\$1,166,860	\$1,283,546
NSF survey manager (1.0 person years)	\$123,000	\$123,000	\$126,000
NSF management and statistical support (0.33 person years)	\$55,000	\$55,000	\$60,000
Total	\$1,238,782	\$1,344,860	\$1,469,546

15. Changes in Burden

The increase in overall burden hours is due to the expected increase in the size of the population. The only change being made to the surveys for FY 2013 is a clarifying revision to the instructions on question 1 of the HERD and HERD short form surveys (see page 2 of Attachments 2 and 3 for details). NSF does not anticipate this change to have any impact on the overall burden of the survey. The slight increase in burden cost is the result of higher hourly wages for the university respondents.

16. Schedules for Data Collection and Publication

The FY 2013 survey will begin with a population review and screening in late summer 2013 (Attachment 1). The HERD and FFRDC Surveys will be sent electronically to all institutions in the FY 2013 survey population and meeting our R&D expenditures threshold of \$150,000 in November 2013 with a due date of January 31, 2014. Actual closeout of the surveys will be in approximately mid-May 2014, 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 2013, the same procedures will be used as those used for FY 2012 survey. For the FY 2013 survey, following the closeout of data collection in May 2014 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 2013 survey will be analyzed in an NCSES Info Brief to be published in the late fall of 2014. A report containing all of the detailed statistical tables showing institution-level data, *Higher Education Research and Development Expenditures: Fiscal Year 2013* will also be 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.