

Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year 2018

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Technical Notes

Survey Overview

Purpose. The Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions (Federal S&E Support Survey) is the only source of comprehensive data on federal science and engineering (S&E) funding to individual academic and nonprofit institutions.

Data collection authority. The information from this congressionally mandated survey is collected under the authority of the National Science Foundation Act of 1950, as amended, and the America COMPETES Reauthorization Act of 2010.

Survey contractor. Synectics for Management Decisions, Inc.

Survey sponsor. The National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation (NSF).

Key Survey Information

Frequency. Annual.

Initial survey year. FY 1963.

Reference period. FY 2018.

Response unit. Federal agencies.

Sample or census. Census.

Population size. The survey is a census of all federal agencies that obligate money to academic or nonprofit institutions or consortia for S&E. In the survey cycle for data collection on FY 2018, the population is 20 federal agencies.

Sample size. Not applicable; the survey is a census.

Survey Design

Target population. The target population was all federal agencies that obligated money in FY 2018 to academic or nonprofit institutions or consortia for S&E R&D or the construction or maintenance of R&D facilities. For FY 2018, there were 20 agencies. Twelve of the 20 agencies are department-level federal agencies (the Departments of Agriculture, Commerce, Defense [DOD], Education [ED], Energy, Health and Human Services [HHS], Homeland Security [DHS], Housing and Urban Development, the Interior [DOI], Justice [Office of Justice Programs], Labor, and Transportation [DOT]), and 8 of the 20

are independent federal agencies (the Agency for International Development, the Appalachian Regional Commission, the Environmental Protection Agency, the National Aeronautics and Space Administration [NASA], NSF, the Nuclear Regulatory Commission, the Patient-Centered Outcomes Research Trust Fund [PCORTF], and the Social Security Administration). Because multiple subdivisions of a federal department were in some cases requested to complete the survey, there were 57 agency-level respondents (2 federal departments, 47 department subdivisions, and 8 independent agencies) and 33 program-office level respondents, for a total of 90 respondents.

Academic institutions are institutions of higher education in the United States that engage primarily in providing resident or accredited instruction for a not less than a 2-year program above the secondary school level that is acceptable for full credit toward a bachelor's degree or that provide not less than a 1-year program of training above the secondary school level that prepares students for gainful employment in a recognized occupation. Included are colleges of liberal arts; schools of arts and sciences; professional schools, as in engineering and medicine, including affiliated hospitals and associated research institutes; and agricultural experiment stations. Nonprofit institutions are private organizations, other than educational institutions, whose net earnings in no part benefit a private stockholder or individual and other private organizations created for the exclusive purpose of turning over their entire net earnings to such nonprofit organizations. Consortia are organizations formed by the membership of a number of institutions from one or more types of performers in order to promote and support efforts to enhance knowledge in one or more disciplines. NCSSES has identified several consortia and classified them as either academic or nonprofit types based on the predominance of their membership at the time of identification. If a consortium's members are not primarily associated with an academic or nonprofit institution, but the consortium is legally organized as a nonprofit, NCSSES classifies that consortium as a nonprofit institution. For FY 2018, there were 1,010 academic institutions and consortia and 922 nonprofit institutions and consortia.

Sampling frame. This survey is a census. Its population is derived from the federal agencies identified in the Survey of Federal Funds for Research and Development as providing R&D or R&D plant obligations to academic or nonprofit organizations.

Sample design. Not applicable.

Data Collection and Processing Methods

Data collection. The Federal S&E Support Survey uses a Web-based data collection system, but some agencies submit files offline that the survey contractor will then enter into the data collection system. The FY 2018 survey cycle began with an e-mail to each agency to verify contact information for each agency-level survey point of contact. Data collection was conducted in two phases for FY 2018: for non-DOD agencies, it began 21 February 2019, and the requested due date for data submissions was 3 May 2019; for DOD agencies, it began 3 June 2019, and the requested due date for data submissions was 26 July 2019. Data collection is usually extended until all surveyed agencies have provided complete and final survey data. Information was collected for the federal fiscal year 2018 (i.e., 1 October 2017 through 30 September 2018).

Mode. Web-based data collection system; however, some agencies submit data offline. The FY 2018 Federal S&E Support Survey requested information from 57 departments, subdivisions, or independent agencies, but five (the Department of Agriculture's Foreign Agricultural Service, HHS's Agency for Toxic Substances and Disease Registry, DHS's U.S. Coast Guard, DOI's Bureau of Safety and Environmental Enforcement, and the Department of Labor's Employee Benefits Security

Administration) reported no funds. Of the remaining 52 respondents, 40 respondents (77%) submitted data through the Web-based data collection system, and 12 respondents (23%) submitted data offline.

Response rates. 100%.

Data editing. Neither data editing nor coding are used for Federal S&E Support Survey data. The data are checked through both manual reviews and automated data checks that include a comparison of current year obligations by category of support and the corresponding prior year obligations. Problems are referred to the agency that submitted the data for correction. Respondents' data are not changed by the survey contractor or NCSES.

Imputation. None.

Weighting. None.

Variance estimation. Not applicable.

Survey Quality Measures

Sampling error. Not applicable.

Coverage error. Occasionally, small amounts (less than \$100,000) of R&D may be obligated to a university or college by an agency other than the ones listed above, and these amounts are not captured by this survey.

Nonresponse error. Agencies are encouraged to estimate information when actual data are unavailable. Although every attempt has been made to ensure complete response from the survey universe and for all items, it is possible there may be some item nonresponse. The survey instrument allows respondents to enter data or skip data fields. There are several possible sources of nonresponse error by respondents, including inadvertently skipping data fields, skipping data fields under the false assumption that blank fields are equivalent to zero, and skipping data fields when data are unavailable.

Measurement error. The major source of nonsampling error in this survey is measurement error. Agencies are not always able to provide the precise information requested. For example, federal agencies are not always able to identify which branch of a university receives funding from them. Thus, complete disaggregation by actual university branch may not be feasible for some universities.

Other problems include agency difficulties in matching program descriptions with the proper funding category (e.g., R&D, facilities and equipment for instruction in S&E) in the federal S&E support database. At least one agency has said that the "general support for S&E" and "other S&E" categories are a catchall for programs that do not fit anywhere else.

Data Comparability

Data revisions. Annual data are available for FYs 1963–2018.¹ In some instances, prior year data have been modified based on discrepancies noted during the consistency reviews of the data across years. To obtain accurate historical data, data users should use only the most recent publication, which incorporates corrections agencies have made in prior year data. Do not use previously published data.

Changes in survey coverage and population. Eight federal agencies supplied data for FYs 1963–67 (data collection began in 1965). The initial survey elicited information about academic institutions only.

Additional agencies have been included in the years since then. The survey has been conducted annually since 1968. Information on nonprofit organizations was added in 1968.

- Beginning with the FY 2018 survey, this survey collects research, development, test, and evaluation (RDT&E) data from DOD for both academic and nonprofit institutions using four categories: research (Budget Activities 1–2), advanced technology development (Budget Activity 3), major systems development (Budget Activities 4–6), and operational systems development (Budget Activity 7). DOD reported \$5.3 million in operational systems development to academic institutions and \$4.8 million to nonprofit institutions for FY 2018; these data are excluded from major systems development totals. Although major systems development was redefined as Budget Activities 4–6 instead of Budget Activities 4–7 as of the FY 2016 survey, the FY 2018 survey is the first time that obligations were identified for Budget Activity 7, operational systems development.
- Beginning with the FY 2018 survey, the Department of Agriculture’s Agricultural Marketing Service and HHS’s Indian Health Service were dropped from the target population; DOI’s Office of Surface Mining Reclamation and Enforcement was added back to the target population after last reporting for FY 1995.
- Beginning with the FY 2017 survey, PCORTF was added to the target population. In FY 2017, PCORTF provided current year data for FY 2017 and past year data for FYs 2011–16.
- Beginning with the FY 2016 survey, the National Archives and Records Administration was dropped from the target population.
- Beginning with the FY 1999 survey, this survey no longer collects data for federally funded research and development centers (FFRDCs).
- Beginning with the FY 1998 survey, this survey collects S&E obligations for U.S. service schools.
- Beginning with the FY 1993 annual report, data collected for non-S&E support to universities and colleges are no longer published.
- Since FY 1990, DOD has reported research obligations separate from development obligations.
- Since FY 1990, data are no longer published on detailed field of S&E for obligations in R&D and fellowship, traineeship, and training grant programs (FTTGs) to academic institutions.

Changes in questionnaire. A Web-based data collection system was developed for the FY 1998 survey cycle.

Changes in reporting procedures or classification.

- NCSES has classified several consortia as either academic or nonprofit types based on the predominance of their membership at the time of identification. As of the FY 2017 cycle, NCSES further decided that if a consortium’s members are not primarily associated with an academic or nonprofit institution, but the consortium is legally organized as a nonprofit, that consortium will be classified as a nonprofit institution.

- As of the FY 2016 cycle, the method of determining high-American Indian-enrollment (HAIE) institutions and high-Hispanic-enrollment (HHE) institutions was corrected to use the official definitions per the National Center for Education Statistics (NCES) Integrated Postsecondary Education Data System. Therefore, HAIE institutions include institutions of higher education that are not tribal colleges or universities and that have an enrollment of undergraduate students that is not less than 10% Native American students, and HHE institutions include those institutions of higher education whose full-time-equivalent (FTE) enrollment of undergraduate students is at least 25% Hispanic. (Note: NCES determines FTE enrollment by calculating that approximately three part-time students are equivalent to one full-time student.) In FY 2015, the calculations were based on institutions' total enrollment.
- As of the FY 2013 cycle, the criteria used to determine nonprofit institutions for the Federal S&E Support Survey was broadened from Internal Revenue code 501(c)(3) organizations to Internal Revenue Code 501(c) organizations.
- Starting with the FY 2009 survey, survey information has been requested in actual dollars rather than rounded in thousands.

Changes in reporting.

Since data were first collected for FY 1963, there have been some changes in reporting. The most recent of these changes include the following:

- As of FY 2018, several additions were made to systems of universities and colleges: West Hills College Coalinga was added to California Community Colleges; West Virginia University at Parkersburg was added to the Community and Technical College Systems of West Virginia; Allen County Community College, Barton County Community College, and Cowley Community College were added to the Kansas Board of Regents; Finger Lakes Community College was added to the SUNY (State University of New York) System; and Savannah Technical College was added to the Technical College System of Georgia.
- As of FY 2017, 19 nonprofit consortia were reclassified as nonprofit institutions, 4 nonprofit consortia were reclassified as academic consortia, 3 nonprofit institutions were reclassified as academic consortia, 1 nonprofit institution was reclassified as an academic institution, and 1 academic consortium was reclassified as an academic institution. The 19 nonprofit consortia that were reclassified as nonprofit institutions were AASP-The Palynological Society, the Cascadia Region Earthquake Workgroup, the Coalition to Restore Coastal Louisiana, the Consortium for Mathematics and Its Applications, the Medical Device Innovation Consortium, the Montana Cancer Consortium, the National Alliance for Partnerships in Equity, the National Nurse-Led Care Consortium, the National States Geographic Information Council, the Nature Conservancy of Oregon, the New England Pediatric Device Consortium, the New Hampshire Lakes Association Inc., the North Central Emergency Medical Services Institute, the Northern Rockies Invasive Plants Council, the Ocean Foundation, the Open Geospatial Consortium, the Pennsylvania Association for Sustainable Agriculture, the Peregrine Fund Inc., and the Southeast Clinical Oncology Research Consortium. The 4 nonprofit consortia reclassified as academic consortia were Five Colleges, Inc., the Chesapeake Research Consortium Inc., the New Jersey Sea Grant Consortium Inc., and the New Mexico Consortium. The 3 nonprofit institutions reclassified as academic consortia were Northeast Radio Observatory Corp., UNAVCO, Inc., and Universities Research Association. The nonprofit institution reclassified as an academic institution was Dallas International University. The academic consortium that was reclassified as

an academic institution was the Dayton Area Graduate Studies Institute. All these changes were also applied retroactively; because of those changes, data were revised, replacing previously published data.

- As of FY 2017, six universities formerly under the Tennessee Board of Regents were given independent governing boards. The six universities are Austin Peay State University, East Tennessee State University, University of Memphis, Middle Tennessee State University, Tennessee State University, and Tennessee Technological University. Also, as of FY 2017, Pulaski Technical College joined the University of Arkansas System.
- DOI's National Park Service submitted its FY 2016 data after the close of the FY 2016 data cycle; because of those changes, FY 2016 data were revised in the FY 2017 cycle, replacing previously published data.
- As of FY 2017, PCORTF began reporting and provided past-year data for FYs 2011–16; because of those changes, data were revised, replacing previously published data.
- As of FY 2016, 22 nonprofit institutions were reclassified as academic institutions, and 1 nonprofit institution was reclassified as an academic consortium. The 22 nonprofit institutions that were changed to branches of academic institutions were the California State University San Marcos Corporation, the Clemson University Research Foundation, the Florida Solar Energy Center, the Foundation for California Community Colleges, the Georgia Tech Applied Research Corporation, the Immune Disease Institute (from 1986–2012, when it closed), the Joint Oceanographic Institutions, the Michigan Biotechnology Institute (from 2007 on), the Ohio Agricultural Research and Development Center, the Pennington Biomedical Research Foundation, the Research Foundation for the State University of New York, the Research Foundation of the City University of New York, the Rush University Medical Center, the San Jose State University Research Foundation, the Skidaway Institute of Oceanography (from 2013 on), the South Carolina Research Foundation, the Space Telescope Science Institute, the Texas A&M Research Foundation, the University Corporation at Monterey Bay, the Virginia Tech Applied Research Corporation, the West Virginia University Research Corporation, and the Western Kentucky University Research Foundation. The nonprofit reclassified as an academic consortium was the New York Structural Biology Center. One nonprofit institution (the Charlotte-Mecklenburg Hospital Authority, doing business as Carolinas HealthCare System) was deactivated because it is a special district local government public authority. Two nonprofit institutions were reinstated after having been deleted during the FY 2015 cycle (the Interstate Shellfish Sanitation Conference and the National Conference on Interstate Milk Shipments). All these changes were also applied retroactively; because of those changes, data were revised, replacing previously published data.
- In a September 2015 agreement, Yeshiva University transferred financial and operational responsibility for the Albert Einstein College of Medicine to Montefiore Health System, a nonprofit institution; however, for the FY 2016 survey, the Albert Einstein College of Medicine is reported as an independent academic institution.
- During the FY 2016 cycle, corrections for FY 2015 data were received from three agencies: the Administration for Children and Families reported corrections for one academic (Temple University) and one nonprofit institution (Child Trends), the National Institute of Standards and Technology reported correction for two institutions (Georgia Tech Applied Research

Corporation and Georgia Tech Research Corporation), and the Domestic Nuclear Detection Office reported corrections for six institutions—in this case, the data for all six were reported under the wrong category of support, and the data for one (Georgia Tech Research Corporation) were revised (the other five—Alabama A&M University, Texas A&M University-College Station, University of California-Berkeley, University of Minnesota-Twin Cities, and University of Texas at Dallas). As a result of those changes, data were revised, replacing previously published data.

- As of FY 2015, two institutions were reclassified from nonprofit institutions to academic institutions (Cold Spring Harbor Laboratory and Erikson Institute), two institutions were reclassified from nonprofit institutions to academic consortia (Association of Universities for Research in Astronomy and Oak Ridge Associated Universities), five institutions were reclassified from nonprofit consortia to academic consortia (Consortium of Universities for the Advancement of Hydrologic Sciences, Consortium of Universities of the Washington Metropolitan Area, Marine Environmental Sciences Consortium, Southeastern Universities Research Association, and Southwestern Ohio Council for Higher Education), and six institutions were reclassified from nonprofit consortia to nonprofit institutions (Center for Regional Economic Competitiveness, International Anesthesia Research Society, Maricopa Integrated Health System, Patuxent Partnerships Inc., Saint Alphonsus Regional Medical Center, Inc., and Vaccine Research Institute of San Diego); these changes were also applied retroactively.
- As of FY 2014, the obligations of DOT, Office of the Assistant Secretary for Research and Technology's University Transportation Centers (UTCs) were moved from R&D to Other S&E; this change was also applied to FYs 2005–13.
- As of FY 2014, all data for Texas A&M Engineering Experiment Station and Texas A&M AgriLife Research were moved from nonprofit institutions to academic institutions (set as branches of Texas A&M University).
- After the close of the FY 2013 data cycle, HHS's National Institutes of Health (NIH) revised its data for FYs 2009–12.
- After the close of the FY 2013 data cycle, NSF revised its data for FYs 1999–2012.
- MITRE Corp. data prior to FY 2011 include obligations for FFRDCs that it administers.
- For FYs 2009 and 2010, data from HHS's Centers for Disease Control and Prevention were excluded due to their poor quality.
- After the close of the FY 2009 data cycle, HHS's Health Resources and Services Administration revised its FY 2008 and FY 2009 data.
- After the close of the FY 2009 data cycle, the ED revised its FY 2008 and FY 2009 data.
- Data for FY 2009 and FY 2010 include American Recovery and Reinvestment Act of 2009 obligations.
- After the close of the FY 2007 survey cycle, DOD discovered a programming error that was made during the FY 2005 survey cycle and caused each advanced technology development

dollar to be reported twice: as advanced technology development and as major systems development. Data for FYs 2005–07 were revised.

- Between FY 2006 and FY 2007, NASA R&D obligations decreased for two reasons: (1) in FY 2007, NASA excluded projects that were operational in nature that were not excluded in FY 2006, and (2) there was an overall decrease in obligations between FY 2006 and FY 2007, which accounts for the remainder of the decrease.
- In FY 2004, NASA implemented a full-cost budget approach, which includes all of the direct and indirect costs for procurement, personnel, travel, and other infrastructure-related expenses relative to particular programs and projects. Data for FY 2004 and later years may not be directly comparable to data for FY 2003 and earlier years.
- For the FY 2003 survey cycle, the DHS could not provide S&E obligations (with the exception of the U.S. Coast Guard) broken down into the categories shown in this report.
- Because the U.S. Coast Guard, formerly part of DOT, moved under DHS for FY 2003, its data were not part of the FY 2003 detailed statistical tables. The U.S. Coast Guard’s overall S&E obligations for FY 2003 are the following:
 - Total academic S&E, \$2,159,000
 - Academic R&D, \$1,824,000
 - Academic R&D plant, \$335,000
 - Nonprofit R&D, \$924,000
- Beginning in FY 2000, NASA reclassified the Space Station as a physical asset and Space Station research as equipment and transferred funding for the program from R&D to R&D plant. According to NASA, this classification change had a negligible impact on the data reported in this report for FY 2000. However, this classification change was reflected in the FY 2001 academic totals, which showed an R&D plant increase for NASA nearly five times over the FY 2000 R&D plant total.
- Beginning with the FY 1999 survey cycle, federal agencies no longer reported obligations to academic or nonprofit FFRDCs. Obligations to FFRDCs were deleted from all previous years shown in this report.
- Beginning with the FY 1996 survey cycle, federal agencies no longer reported obligations for fields of S&E.
- Since FY 1994, the survey has collected data on DOD development dollars in two categories: advanced technology development and major systems development. These categories better differentiate between that part of the federal R&D budget that supports “science and key enabling technologies” (including military and nondefense applications) and the part that primarily concerns “testing and evaluation of large technical systems prior to production” (of mostly defense-related systems).

- Before FY 1993, data were published on an obligations category covering non-S&E activity. At that time, however, ED made major software modifications to the automated system from which its federal S&E data were produced. The revamped coding structure introduced major trend differences for the department's institution data. Consequently, because ED accounted for 91% (\$5.9 billion) of the total federal support for non-S&E activity (\$6.5 billion) for FY 1993, non-S&E totals are no longer published. To explain ED's downward academic R&D trend between FY 1993 and FY 1994 (from \$95 million to \$49 million), the agency stated that academic R&D programs in FY 1994 either were not funded, did not have an S&E component, or received reductions in funding.
- As of FY 1990, the DOD reports research separately from development. DOD states that more than 90% of its development obligations reported for universities and colleges are performed at university-administered laboratories that are separate from academic departments. Furthermore, DOD states that much of its development obligations are for major systems development, that such obligations differ from its obligations for advanced technology development, and that DOD total development obligations are therefore not comparable with development obligations at other federal agencies.
- During the FY 1987 survey cycle, DOD determined that some funds reported in prior years as R&D obligations to Applied Physics Laboratory (Johns Hopkins University) were more appropriately classified as other S&E. Data for FYs 1984–86 were revised, but DOD was unable to revise data for earlier years. In FY 2009, the Applied Physics Laboratory accounted for more than 90% of DOD's total S&E funding of \$522 million to Johns Hopkins University.
- Beginning in FY 1978, two laboratories that were formerly considered academically administered FFRDCs became part of their respective institutions: the Applied Physics Laboratory (Johns Hopkins University) and the Applied Research Laboratory (Pennsylvania State University). Data for these laboratories are included in academic figures beginning in FY 1978.
- Draper Laboratories separated from the Massachusetts Institute of Technology as of FY 1974 to become an independent nonprofit institution; data for this laboratory are included in the Massachusetts Institute of Technology's figures prior to FY 1974.

Definitions

The terms used throughout the survey have remained relatively unchanged from the FY 1971 survey cycle to the present; however, for the FY 2016 cycle, the definitions of basic research, applied research, development, and R&D plant were aligned more closely to the definitions used by the Office of Management and Budget in the July 2016 version of Circular A-11. These definitions are also comparable to those used in the [Survey of Federal Funds for Research and Development](#).

Facilities and equipment for instruction in S&E include all programs whose principal purpose is to provide support for construction, acquisition, renovation, modification, repair, or rental of facilities, land, works, or equipment for use in instruction in S&E.

If the instructional facilities are part of a larger facility devoted to other purposes as well, the funds should be distributed among the categories of support involved as appropriate. In general, the other category most likely to be involved is R&D plant.

FTTGs include all fellowship, traineeship, and training grant programs that are directed primarily toward the development and maintenance of the scientific and technical manpower. The total amounts pertaining to such awards (stipends and cost-of-education allowances) are reported in terms of the institution at which the recipient performs research or study.

Excluded are projects that support research and educational institutes, seminars, and conferences such as teacher-training activities provided through teacher institutes, short courses, research participation, and in-service seminars; activities aimed at the development of educational techniques and materials for use in S&E training; and programs that provide special opportunities for increasing the scientific knowledge and experience of precollege and undergraduate students. These activities are reported either under other S&E, or they are not reported if they are not S&E-related.

General support for S&E includes activities that provide support for nonspecific or generalized purposes related to scientific research and education. Such projects are generally oriented toward academic departments, institutes, or institutions as a whole. “General support” implies a spectrum of varying types of support. At one extreme is support provided without any specification of purpose other than that funds be used for scientific activities. Another kind of general support is to be found in projects that provide funds for activity within a specified field of S&E but without specifying an explicit purpose. The distinguishing feature of general support for S&E projects is that they permit a significant measure of freedom as to purpose (e.g., research, faculty support, education, institutional support). It is intended that among the projects to be reported under this category are projects awarded through the following agency programs:

- NIH Minority Biomedical Research Support for Undergraduate Colleges
- NIH Minority Biomedical Support Grants

Other programs consistent with the above guidelines may also be reported under this category.

R&D activities are defined as creative and systematic work undertaken in order to increase the stock of knowledge—including knowledge of people, culture, and society—and to devise new applications using available knowledge.

For reporting R&D activities, the following are included:

- Administrative expenses for R&D, such as the operating costs of research facilities and equipment and other overhead costs.

Excluded from R&D activities are the following:

- Investments in physical assets such as major equipment and facilities that support R&D programs. These investments should generally be reported under physical assets, discussed under R&D plant.
- Routine product testing, quality control, collection of general-purpose statistics, routine monitoring, and evaluation of an operational program (when that program is not R&D). Spending of this type should generally be reported as non-investment activities.
- Training of scientific and technical personnel should be reported as conduct of education and training.

Research is systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Research is classified as either basic or applied according to the objectives of the sponsoring agency. Basic research is defined as experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts. Basic research may include activities with broad or general applications in mind, such as the study of how plant genomes change, but should exclude research directed toward a specific application or requirement, such as the optimization of the genome of a specific crop species. Basic research represents DOD Budget Activity 1. Applied research is defined as original investigation undertaken in order to acquire new knowledge. Applied research is, however, directed primarily toward a specific practical aim or objective. Applied research represents DOD Budget Activity 2.

Research equipment is any item (or interrelated collection of items comprising a system) of nonexpendable tangible property or software having a useful life of more than 2 years and an acquisition cost of \$500 or more that is used wholly or in part for research. Research equipment is included under R&D.

Experimental development is creative and systematic work, drawing on knowledge gained from research and practical experience, which is directed at producing new products or processes or improving existing products or processes. Like research, experimental development will result in gaining additional knowledge.

For reporting experimental development activities, the following are included:

- The production of materials, devices, and systems or methods, including the design, construction, and testing of experimental prototypes.
- Technology demonstrations, in cases where a system or component is being demonstrated at scale for the first time, and it is realistic to expect additional refinements to the design (feedback R&D) following the demonstration. However, not all activities that are identified as “technology demonstrations” are R&D.

Excluded from the experimental development category are the following:

- User demonstrations where the cost and benefits of a system are being validated for a specific-use case. This includes low-rate initial production activities.
- Pre-production development, which is defined as non-experimental work on a product or system before it goes into full production, including activities such as tooling and development of production facilities. For example, exclude activities and programs that are categorized as “operational systems development” in DOD’s budget activity structure. Activities and programs of this type should generally be reported as investments in other major equipment.
- Note: Through the FY 2015 survey, amounts reported by DOD agencies included Budget Activities 1–7, which are classified as research, development, test, and evaluation (RDT&E). As of FY 2016, the Budget Activity numbers were added to the questionnaire to make it clear that the survey was requesting R&D data, which covered Budget Activities 1–6. The FY 2018 DOD questionnaire was revised to collect RDT&E again by adding operational systems development (Budget Activity 7) as a separate category of support.

R&D plant is defined as materials for use in R&D activities including the following:

- R&D facilities;
- Intellectual property (e.g., software or applications);
- Major fixed equipment, such as reactors, wind tunnels, and particle accelerators; and
- Major moveable equipment, such as mass spectrometers, research vessels, DNA sequencers, and other major moveable instruments.

Amounts include acquisition of, construction of, major repairs to, or alterations in structures, works, equipment, facilities, or land for use in R&D activities at federal or nonfederal installations, and housing for R&D personnel at remote locations.

Excluded from the R&D plant category are the following:

- Costs of expendable or movable equipment (e.g., simple spectrometers, standard microscopes), personal computers, and office furniture and equipment; and
- Costs of predesign studies (e.g., those undertaken before commitment to a specific facility).

These excluded costs are reported under “total conduct of research and development.”

Obligations for foreign R&D plant are limited to federal funds for facilities that are located abroad and used in support of foreign R&D.

If the R&D facilities are to be a larger facility devoted to other purposes as well, the funds should be distributed among the categories of support involved as appropriate. In general, another category that would be involved is facilities and equipment for instruction in S&E.

Other S&E include all academic S&E activities that cannot be meaningfully assigned to one of the five categories previously set forth. Among the types of activities to be included in this category are support for scientific conferences and symposia, teacher institutes, and activities aimed at increasing the scientific knowledge of precollege and undergraduate students.

Notes

¹ Data from this survey are published annually in the series *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions*. Data from this survey are also available in the *Academic Institutional Profiles* and in the NCSES interactive data tool (<https://ncesdata.nsf.gov/ids/>). Users can create custom tables about federal S&E funding to academic and nonprofit institutions by federal agency and type of support.