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# Federally Funded Research and Development Centers (FFRDCs): Background and Issues for Congress

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# Summary

The federal government supports research and development (R&D) that is conducted by a wide variety of performers, including federally owned and operated laboratories, universities, private companies, and other research institutions. A special class of research institutions referred to as federally funded research and development centers, or FFRDCs, are owned by the federal government, but operated by contractors, including universities, other non-profit organizations, and industrial firms. FFRDCs are intended to provide federal agencies with R&D capabilities that cannot be effectively met by the federal government or the private sector alone. FFRDCs are required to have a long-term strategic relationship with the federal agency that supports them. This relationship is presumed to convey a number of benefits, including the ability of an FFRDC to recruit and retain scientific and technical expertise; an in-depth knowledge of, and the capability to rapidly respond to, the R&D needs of the federal agency; and the capacity to offer independent and objective scientific and technical advice. Currently, 12 federal agencies sponsor a total of 42 FFRDCs. These FFRDCs provide R&D capabilities in support of federal agency missions in a broad range of areas—from energy and cybersecurity to cancer and astronomy. In FY2015, the federal government obligated $11.1 billion or 8.6% of its total R&D spending to FFRDCs.

Congress maintains a continuing interest in FFRDCs due to their contributions to U.S. technological and economic leadership. However, some Members of Congress have questioned the appropriate role of FFRDCs in the federal R&D enterprise and the ability of FFRDCs to effectively address federal agency R&D needs. The following issues have been of particular interest: (1) the effectiveness of federal agency oversight and management of FFRDCs; (2) competition between FFRDCs and the private sector for federal R&D funding; (3) the diversification of FFDRC activities or “mission creep”; and (4) the award of noncompetitive FFRDC management and operation contracts.

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# Background

Federally funded research and development centers (FFRDCs) are a special type of government-owned, contractor-operated research centers—commonly referred to as "GOCOs"—that conduct research and development (R&D) and related activities in support of a federal agency's mission. FFRDCs operate under the framework of the Federal Acquisition Regulation.[1] They differ from other performers of federal R&D—such as federal laboratories, universities, non-profit organizations, and private firms—in that they are designed to meet a "special long-term research or development need which cannot be met as effectively by existing in-house or contractor resources" and that they have "access, beyond that which is common to the normal contractual relationship, to Government and supplier data, including sensitive and proprietary data, and to employees and installations equipment and real property."[2]

Over the years, Congress has been concerned with the oversight and management of FFRDCs, lack of competition in contracting, and mission creep. More recently, some Members of Congress have focused on the need to balance responsible oversight with improved efficiency, effectiveness, and innovation.[3] The appropriate role of FFRDCs in the federal R&D enterprise may remain an issue in the 115th Congress.

## Origins of FFRDCs

FFRDCs have their origin in World War II. During that time, the federal government sought to mobilize the country's scientific and engineering talent and apply it to the development of technologies that would aid U.S. war efforts. For example, the Department of Defense's (DOD's) Lincoln Laboratory was created to develop radar for identifying aircraft and ships and the Los Alamos and Oak Ridge National Laboratories (now under the auspices of the Department of Energy [DOE]) were established to support the development of the atomic bomb. The purpose of FFRDCs—to bring scientific and technical expertise to bear on pressing R&D challenges—remains.

Then, as now, it was widely believed that a lack of flexibility in the federal government made it difficult to recruit and maintain scientific and technical talent.[4] Since FFRDCs are operated by contractors, many federal restrictions, including restrictions on pay and hiring, do not apply, in effect increasing the flexibility of FFRDCs compared to the federal government.[5]

FFRDCs were called "Federal Contract Research Centers" until 1967.[6] In November 1967, the chairman of the Federal Council for Science and Technology, a predecessor to the National Science and Technology Council,[7] sent a memorandum to federal science agencies formally

[1] Federal Acquisition Regulation, 35.017.

[2] Ibid.

[3] U.S. Congress, House Committee on Science, Space, and Technology, *Recommendations of the Commission to Review the Effectiveness of the National Energy Laboratories*, hearing, 114th Cong., 1st sess., November 18, 2015.

[4] Jill M. Hruby et al., *The Evolution of Federally Funded Research & Development Centers*, Public Interest Report, Federation of American Scientists, Spring 2011, p. 24.

[5] CRS Report RL30533, *The Quasi Government: Hybrid Organizations with Both Government and Private Sector Legal Characteristics*, by Kevin R. Kosar.

[6] National Science Foundation, *Annotated List of 36 Federally Funded Research and Development Centers: Fiscal Year 2002*, General Notes, at https://wayback.archive-it.org/5902/20160210231601/http://www.nsf.gov/statistics/nsf02317/notes.htm.

[7] The National Science and Technology Council, located within the Executive Office of President, is tasked with

changing the name of Federal Contract Research Centers to FFRDCs and detailing criteria for the establishment of an FFRDC.[8] Accordingly, an FFRDC was required to:

- conduct basic research, applied research, or development, or perform R&D management;
- be independently incorporated or constitute a separate organizational unit within the parent organization;
- perform R&D under the direction of the federal government;
- receive 70% or more of its funding from one agency;
- have a long-term relationship with its sponsoring agency (five years or more);
- be government-owned; and
- have an average annual budget of at least $500,000.[9]

In 1984, the Office of Federal Procurement Policy (OFPP) issued a policy letter revising and updating the governance of FFRDCs.[10] The OFPP issued regulations in 1990 that incorporated the principles articulated in the policy letter as part of the Federal Acquisition Regulation (FAR).[11] The FAR now defines the purposes of an FFRDC in addition to the policies that direct an FFRDC's establishment, use, review, and termination. The "Characteristics of FFRDCs" as defined by the FAR are discussed in more detail later in this report.

## Current FFRDCs

Currently, 12 federal agencies sponsor a total of 42 FFRDCs.[12] These FFRDCs provide R&D capabilities in a broad range of areas—from energy and cybersecurity to cancer and astronomy. DOE and DOD sponsor a majority of the FFRDCs, 16 and 10 respectively. The National Science Foundation (NSF) sponsors 5 centers, the Department of Homeland Security (DHS) sponsors 3, and the Department of Health and Human Services (HHS) sponsors 2. The National Aeronautics and Space Administration (NASA), the National Institute of Standards and Technology (NIST), the Department of Transportation (DOT), the Nuclear Regulatory Commission (NRC), the Department of the Treasury (Treasury), the Department of Veterans Affairs (VA), and the United States Courts each sponsor a single FFRDC.[13]

FFRDCs are classified in three "activity type" categories under a system established by DOD and used by NSF: R&D laboratory, study and analysis center, or system engineering and integration center.[14]

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coordinating science and technology policy across the federal government.

[8] National Science Foundation, *Annotated List of 36 Federally Funded Research and Development Centers: Fiscal Year 2002*, General Notes.

[9] Ibid.

[10] 49 *Federal Register* 14462, April 11, 1984.

[11] 55 *Federal Register* 3885, February, 1990. These regulations are codified in Federal Acquisition Regulation 35.017.

[12] National Science Foundation, *Master Government List of Federally Funded R&D Centers*, at http://www.nsf.gov/statistics/ffrdclist/.

[13] The Center for Enterprise Modernization is co-sponsored by Treasury and VA.

[14] U.S. Department of Defense, *Federally Funded Research and Development Center Management Plan*, April 25, 2011, at http://www.acq.osd.mil/fo/docs/FFRDC%20Management%20Plan%20and%20Associated%20How%20To%20Guides.pdf.

- R&D laboratories maintain long-term competencies in technology areas that cannot be effectively met by the federal government or the private sector alone.
- Study and analysis centers deliver independent and objective analysis and advice to federal agencies in support of policy development, decisionmaking, alternative approaches, and new concepts.
- System engineering and integration centers provide technical and engineering capabilities not available in a federal agency to ensure complex systems meet operational requirements.

NSF has the responsibility of maintaining a master list of FFRDCs across the federal government. According to NSF and as shown in **Appendix A**, 26 of the 42 current FFRDCs are R&D laboratories, 10 are study and analysis centers, and 6 are system engineering and integration centers.

## Characteristics of FFRDCs

The Federal Acquisition Regulation governs the establishment, use, review, and termination of FFRDCs.[15] According to the FAR, FFRDCs are intended to address an R&D need that cannot be met as effectively by the federal government or the private sector alone. Essentially, FFRDCs are intended to only perform work that cannot be done by other contractors. FFRDCs accomplish their R&D through a strategic relationship with their sponsoring agency. Two overarching characteristics—special access and longevity—define this strategic relationship.

An FFRDC may be given special access to government and supplier data, employees, and facilities.[16] This access is beyond what is typical in a normal contractual relationship and may include access to sensitive and proprietary information. Accordingly, the FAR requires that FFRDCs (1) operate in the public interest with objectivity and independence, (2) be free from organizational conflicts of interest, and (3) fully disclose their activities to their sponsoring agency.[17] Additionally, FFRDCs are not allowed to use their special access to privileged information, equipment, or property to compete with the private sector for federal R&D contracts. However, an FFRDC is allowed to perform work for other agencies when the capabilities of the FFRDC are not available in the private sector. Finally, the prohibition against competing with the private sector for federal R&D contracts does not apply to the parent organization or any subsidiary of the parent organization associated with an FFRDC.[18]

The other defining characteristic is the long-term relationship between an FFRDC and its sponsoring agency. Under the FAR, the initial contract period of an FFRDC may be up to five years, but these contracts may be renewed, following a review, in increments of up to five years.[19] For example, one DOE FFRDC—the Pacific Northwest National Laboratory—has been operating under the same contract since 1964. The FAR encourages long-term contracts to provide stability and continuity that are intended to allow an FFRDC to attract high-quality personnel.[20] Additionally, under the FAR, a long relationship is required to enable the FFRDC to maintain in-

[15] Federal Acquisition Regulation 35.017.

[16] Federal Acquisition Regulation 35.017(a)(2).

[17] Ibid.

[18] Federal Acquisition Regulation 35.017-1(c)(4).

[19] Federal Acquisition Regulation 35.017-1(e).

[20] Federal Acquisition Regulation 35.017(a)(4).

depth expertise, stay familiar with the needs of the agency, provide a quick response capability, and maintain objectivity and independence.[21]

In addition to the described characteristics and requirements, prior to establishing an FFRDC, a sponsoring agency must make sure that there are no existing alternatives for addressing the agency's R&D needs (i.e., the research cannot be done effectively by the federal government or the private sector) and that the agency has the expertise necessary to review the performance of the FFRDC.[22] The sponsoring agency must also ensure that cost controls are in place and that the purpose and mission of the FFRDC are clearly defined.[23]

Other organizations, such as University Affiliated Research Centers (UARCs), have characteristics and requirements similar to those of FFRDCs. A brief description of UARCs is provided in the following box.

**University Affiliated Research Centers (UARCs)**

University Affiliated Research Centers provide an engineering, research, or development capability to the federal agency that supports them. UARCs are located within a university or college and typically receive funding in excess of $6 million per year on a non-competitive basis from their sponsoring federal agency. Currently, there are 14 UARCs (13 DOD-sponsored centers and 1 NASA-sponsored center).

UARCs are not defined in federal statute. However, DOD has established policies and procedures for their management.[24] The characteristics of UARCs are very similar to FFRDCs. The defining feature of UARCs, like FFRDCs, is the long-term strategic relationship they have with their sponsoring federal agency. This relationship is intended to allow for in-depth knowledge of the agency's research needs, independence and objectivity, freedom from conflicts of interest, access to sensitive information, and the ability to respond quickly to emerging research areas.

The primary differences between UARCs and FFRDCs are that UARCs must be affiliated with a university, must have education as part of their overall mission, and have greater flexibility to compete for public and private R&D contracts.[25]

## Federal Funding of FFRDCs

According to NSF, the federal government spent $128.6 billion on R&D in FY2015.[26] Of this amount, $11.1 billion or 8.6% of the total was spent on R&D performed by FFRDCs, compared to $47.5 billion (36.9%) performed by industry, $34.9 billion (27.2%) performed by federal agencies (intramural), and $27.4 billion (21.3%) performed by universities and colleges (**Figure 1**, see box below for definitions of R&D performers). According to NSF, in FY2015, FFRDCs spent 22% of their R&D expenditures on basic research, 38% on applied research, and 39% in support of development activities.[27] The distribution of R&D expenditures by character of work performed, i.e., basic research, applied research, and development, has remained stable for the

[21] Ibid.

[22] Federal Acquisition Regulation 35.017-2.

[23] Ibid.

[24] U.S. Department of Defense, University Affiliated Research Center (UARC) Management Plan, July, 2010, at https://acc.dau.mil/adl/en-US/458427/file/58921/UARC%20%20Mgmt%20Plan-Jun%2023%2010%20FINAL%206811.doc.

[25] Jill M. Hruby et al., *The Evolution of Federally Funded Research and Development Centers*, Public Interest Report, Federation of American Scientists, Spring 2011, p. 25.

[26] National Science Foundation, National Center for Science and Engineering Statistics, *Survey of Federal Funds for Research and Development, Fiscal Years 2015–17*, at https://ncsesdata.nsf.gov/fedfunds/2015/.

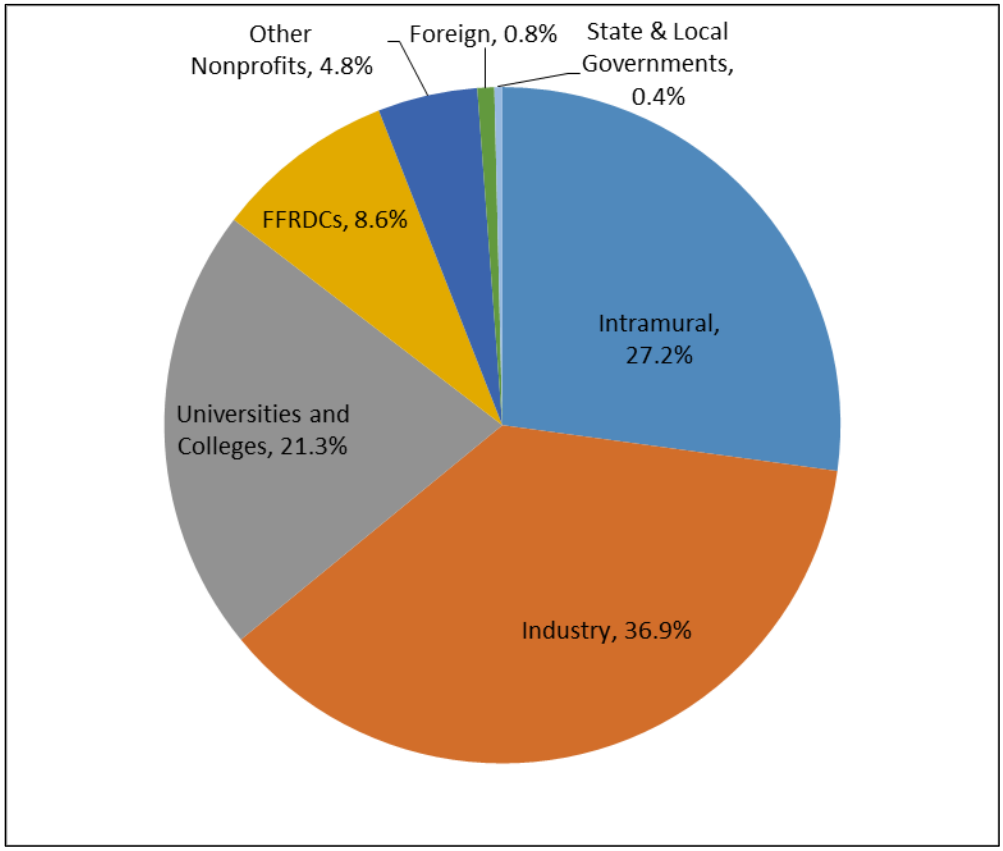
[27] Rhonda Britt, *Federally Funded R&D Centers Rebound to $18.5 Billion in R&D Spending in FY2015*, National Center for Science and Engineering Statistics, National Science Foundation, NSF 17-314, Arlington, VA, March 2017, https://www.nsf.gov/statistics/2017/nsf17314/.

past three years. Prior to FY2013, the proportion of R&D spending on basic research was consistently more than one-third of total R&D expenditures and spending on applied research was closer to one-quarter of total R&D expenditures.

**Figure 2** and **Figure 3** illustrate federal R&D spending trends for FFRDCs from FY1967 to FY2015. **Figure 2** shows that the proportion of total federal R&D spending obligated to FFRDCs has varied over time, ranging from a high of 11.6% in FY1983 to a low of 6.4% in FY2008. On average, between FY1967 and FY2015, the federal government has obligated 9.1% of its federal R&D spending to FFRDCs.

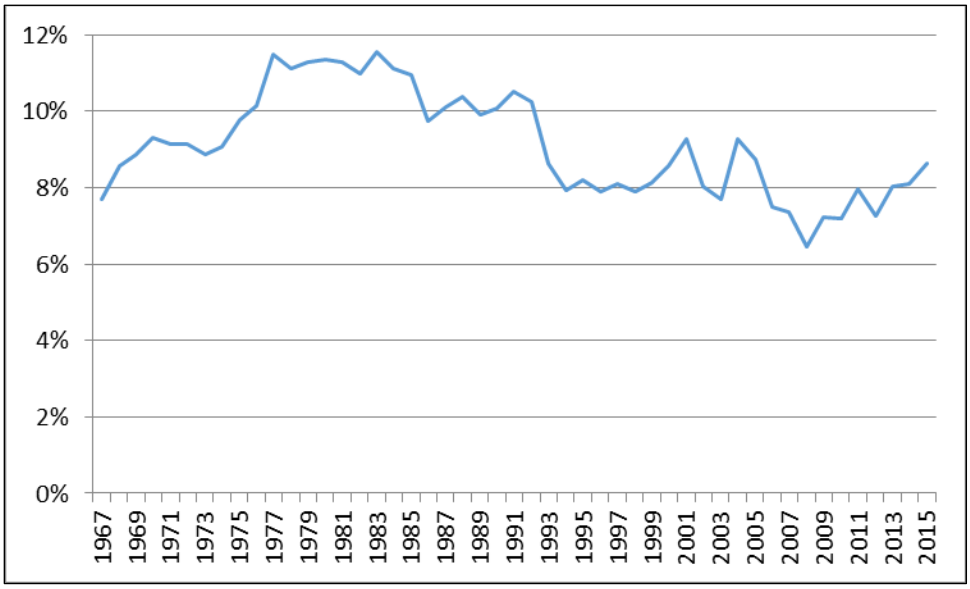
In constant dollars, federal funding for FFRDCs grew from $7.24 billion to $11.25 billion from FY1967 to FY2015 (**Figure 3**). This increase represents a compound annual growth rate (CAGR) of 0.90% compared to the CAGR of 0.67% for total federal R&D spending over the same period. Federal funding for FFRDCs in FY2015 was 4% higher than in FY2014. FFRDC funding peaked in FY2004 at $13 billion. As shown in **Appendix B**, the number of FFRDCs has fluctuated over time, from a high of 74 in FY1969 to a low of 34 in FY1982.

**Figure 1. Share of Federal R&D Obligations by R&D Performer, FY2015**




**Source:** CRS analysis of data from National Science Foundation, *Survey of Federal Funds for Research and Development, Fiscal Years 2015–17*, Table 8.

**Figure 2. Share of Federal R&D Obligations to FFRDCs, FY1967-FY2015**




**Source:** CRS analysis of data from National Science Foundation, *Survey of Federal Funds for Research and Development, Fiscal Years 2015–17*, Table 8.

### Definitions Associated with Federal R&D Performers[28]

**Intramural performers** are the agencies of the federal government. R&D is carried out directly by agency personnel.

**Extramural performers** are organizations outside the federal sector that perform R&D with federal funds under contract, grant, or cooperative agreement. Types of extramural performers:

*Industry*: organizations that may legally distribute net earnings to individuals or to other organizations.

*Universities and colleges*: institutions of higher education in the United States that offer at least one year of college-level study leading toward a degree.

*Other nonprofit institutions*: private organizations other than educational institutions whose net earnings in no part lead to the benefit of a private stockholder or individual and other private organizations organized for the exclusive purpose of turning over their entire net earnings to such nonprofit organizations.

*Federally funded research and development centers (FFRDCs)*: R&D-performing organizations that are exclusively or substantially financed by the federal government and are supported by the federal government either to meet a particular R&D objective or in some instances to provide major facilities.

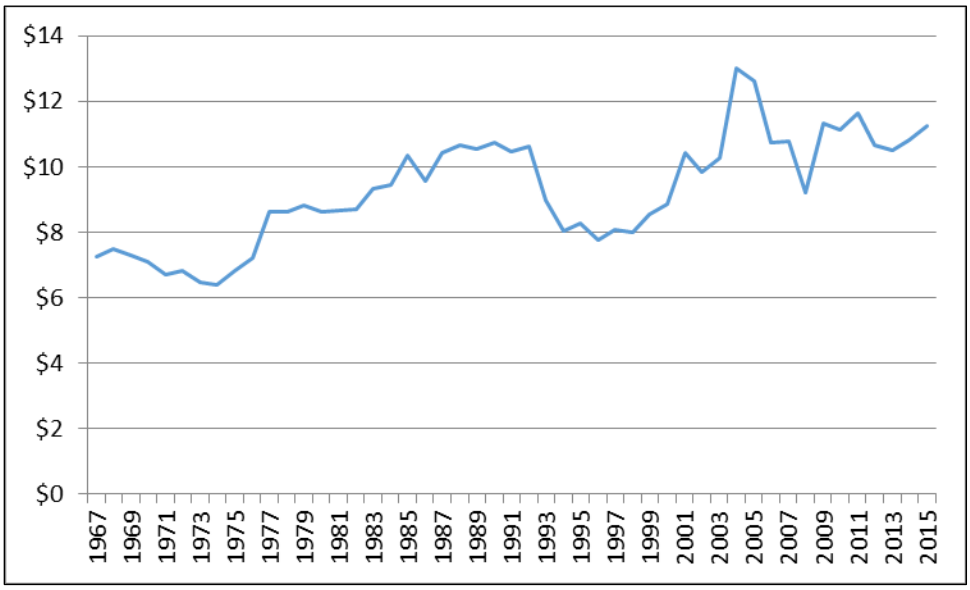
*State and local governments*: State and local government agencies, excluding state or local universities and colleges, agricultural experiment stations, medical schools, and affiliated hospitals. R&D activities are performed either by the state or local agencies themselves or by other organizations under grants or contracts from such agencies.

*Foreign performers*: Foreign citizens, organizations, or governments, as well as international organizations performing R&D work abroad financed by the federal government.

[28] National Science Foundation, National Center for Science and Engineering Statistics, *Survey of Federal Funds for Research and Development, Fiscal Years 2014–16*, Technical Notes, at https://ncsesdata.nsf.gov/fedfunds/2014/fedfunds_2014_tech_notes.pdf.

**Figure 3. Federal R&D Obligations to FFRDCs, FY1967-FY2015**

in billions of constant 2016 dollars




**Source:** CRS analysis of data from National Science Foundation, *Survey of Federal Funds for Research and Development, Fiscal Years 2015–17*, Table 8.

**Table 1** shows the amount of FFRDC funding in FY2015, the share of total FFRDC funding provided by each agency, and the share of each agency's R&D budget spent at FFRDCs. DOE accounted for nearly $7 billion (60.5%) of the total $11.1 billion in FFRDC funding for FY2015. This represented 60.5% of DOE's total R&D budget, indicating the central role FFRDCs play in fulfilling the agency's research needs. By comparison, DOD spent $1.9 billion on R&D at FFRDCs in FY2015, representing 3.1% of its R&D budget, NASA spent $1.4 billion or 12.2% of its R&D budget, NSF spent $225.6 million or 3.9% of its R&D budget, and DHS spent $120.1 million or 16.2% of its R&D budget at FFRDCs (**Table 1**).

**Table 1. Federal Agency R&D Obligations to FFRDCs, FY2015**

dollars in millions

| Agency | FFRDC Obligations | % of Total Federal R&D Obligations to FFRDCs | % of Agency R&D Budget to FFRDCs |
|---|---|---|---|
| Department of Energy | $6,892.1 | 62.0% | 60.5% |
| Department of Defense | $1,914.1 | 17.2% | 3.1% |
| National Aeronautics and Space Administration | $1,384.9 | 12.5% | 12.2% |
| Department of Health and Human Services | $486.4 | 4.2% | 1.5% |
| National Science Foundation | $225.6 | 2.0% | 3.9% |
| Department of Homeland Security | $120.1 | 1.1% | 16.2% |
| Nuclear Regulatory Commission | $35.2 | 0.3% | 38.3% |
| Department of Transportation | $67.4 | 0.6% | 7.9% |

| Agency | FFRDC Obligations | % of Total Federal R&D Obligations to FFRDCs | % of Agency R&D Budget to FFRDCs |
|---|---|---|---|
| Other Agencies | $11.1 | 0.1% | 0.2% |
| **Total** | **$11,119.0** | **100.0%** | **8.6%** |

**Source:** CRS analysis of data from National Science Foundation, *Survey of Federal Funds for Research and Development, Fiscal Years 2015–17*, Table 8.

# Issues for Congress

FFRDCs have attracted the attention of Congress for decades. Historically, congressional concern focused on the growth of FFRDCs and their cost to the government. In more recent years, Congress has focused on the management and oversight of FFRDCs and their insulation from competition. Many of these concerns remain. The following sections describe some of these issues.

## Effectiveness of Oversight and Management

The adequacy of agency oversight and management of FFRDCs is a long-standing congressional concern. Some Members of Congress have repeatedly expressed concern about the ability of federal agencies to control costs and address perceived mismanagement at FFRDCs. For example, in 1992, a Senate subcommittee report indicated "that FFRDCs today operate under an inadequate, inconsistent patchwork of federal cost, accounting and auditing controls, whose deficiencies have contributed to the wasteful or inappropriate use of millions of federal dollars."[29] More recently, in a 2016 hearing examining the mission and management of DOE's FFRDCs, Representative Fred Upton, Chairman of the House Committee on Energy and Commerce, stated,

> DOE's safety, security, and contract management problems span administrations, span Congresses. From my experience, and as our witnesses will explain, improving DOE's performance requires long, sustained attention to ensure sustained improvement in agency performance.[30]

Congressional scrutiny is driven, in part, by a number of high-profile incidents. For example, in 2000, two Los Alamos National Laboratory (LANL) computer hard drives went missing and an employee was accused of planning to sell nuclear information to China.[31] In 2004, the mishandling of classified data and the partial blinding of a student from a laser accident closed LANL for seven months, costing $370 million.[32] More recently, an investigation found that

[29] Subcommittee on Oversight of Government Management, Committee on Governmental Affairs, U.S. Senate, *Inadequate Federal Oversight of Federally Funded Research and Development Centers*, 102nd Cong., 2nd sess., S.Prt. 102-98, (Washington, DC: GPO 1992), p. iii.

[30] Statement of Chairman Fred Upton, in U.S. Congress, House Committee on Energy and Commerce, Subcommittee on Oversight and Investigations, *DOE for the 21st Century: Science, Environment, and National Security Missions*, hearing, 114th Cong., 2nd sess., February 24, 2016.

[31] Suzanne Struglinski, "DOE: Abraham Announces Los Alamos Contract Will Undergo Competitive Bidding," *Greenwire*, May 1, 2003.

[32] Mary O'Driscoll, "Nuclear Safety: Lawmakers Seek GAO Help in Solving Los Alamos Problems," *Greenwire*, February 21, 2007.

LANL mishandled hazardous waste, and nine LANL workers were injured during routine maintenance of an electrical substation.[33]

Since the early 1990s, the Government Accountability Office (GAO) has designated DOE's contract management as a high-risk area for fraud, waste, abuse, and mismanagement.[34] In 2013, GAO narrowed its high-risk designation to major contracts and projects within DOE's Office of Environmental Management and the National Nuclear Security Administration, which manages three DOE FFRDCs.[35] In 2015, while noting some of the progress made by DOE in addressing its oversight and management challenges, GAO indicated that "more work is needed."[36]

Since 2002, DOE has been shifting its FFRDC oversight from a transactional model to a systems-based approach that assesses analytical information collected by the FFRDCs through what is known as contractor assurance systems (CAS).[37] Many stakeholders recognize the use of CAS as a positive step to improving DOE oversight.[38] However, in 2013, the National Academy of Public Administration (NAPA) called on DOE to exercise caution as it transitioned to this oversight model.[39] NAPA indicated that the maturity of CAS varies and that DOE needs to verify the ability of an FFRDC's CAS to identify problems before they occur.

In contrast, others view DOE's overall oversight and management activities as burdensome, counterproductive, and a distortion of the FFRDC model.[40] Critics assert that the original benefit of the FFRDC model—flexibility—has been substantially diminished because DOE now micromanages its FFRDCs. According to a 2013 report by the Information Technology and Innovation Foundation, the Center for American Progress, and the Heritage Foundation,

> Decisions that should be made by research teams and lab managers are instead preapproved and double checked by a long and growing chain of command at DOE. There is no better example of this oversight than the hundreds of DOE site-office[41] employees staffed to regulate lab managers and research by proxy. This adds considerable delay and introduces additional costs to routine business decisions.[42]

Some of those concerned about the detrimental effects of increased micromanagement would like to see a return to the original intent of the FFRDC model: a model where the government sets the

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[33] "National Labs: Los Alamos' Mission in Question amid Management Turmoil," *Greenwire*, January 4, 2016.

[34] U.S. Government Accountability Office, *High-Risk Series: An Update*, GAO-15-290, February, 2015, p. 294.

[35] Ibid.

[36] Allison Bawden, Acting Director, Natural Resources and Environment, U.S. Government Accountability Office, Testimony before the Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, *Department of Energy: Actions Needed to Improve DOE and NNSA Oversight of Management and Operating Contracts*, June 12, 2015, p. 17.

[37] Transactional oversight is an oversight model that ensures contractor performance by identifying those technical areas, activities, or actions that will be observed, reviewed, or approved by the oversight organization. A systems-based approach, on the other hand, is intended to ensure performance through the implementation of an effective management system that provides high-quality information for decisionmaking. For an example of a DOE contractor assurance system, see https://commons.lbl.gov/download/attachments/77332681/PUB+5520+UC+CAS+Description.pdf.

[38] National Academy of Public Administration, *Positioning DOE's Labs for the Future: A Review of DOE's Management and Oversight of the National Laboratories*, January 2013, p. 47.

[39] Ibid.

[40] Information Technology and Innovation Foundation, Center for American Progress, and the Heritage Foundation, *Turning the Page: Reimagining the National Labs in the 21st Century Innovation Economy*, June 2013, p. 19.

[41] Each DOE FFRDC has a co-located field office staffed by agency employees who supervise the day to day operations of the FFRDC.

[42] Ibid., p. 20.

overall strategic direction and provides the necessary funding and the FFRDC is given the flexibility to determine how to address the identified challenges.[43] Critics indicate that a lack of trust currently exists between DOE and its laboratories and that in order to return to the partnership envisioned by the FFRDC model, this trust needs to be restored. They recommend that DOE provide its FFRDCs with more authority and flexibility, and then hold each FFRDC to a high standard of transparency and accountability.[44] According to the Information Technology and Innovation Foundation, the Center for American Progress, and the Heritage Foundation, if an individual FFRDC does not meet its obligations, corrective actions, including punitive restrictions and possibly the firing of the FFRDC contractor, are valid options, but they assert that the mistakes of one FFRDC should not result in new regulations and additional oversight for all DOE FFRDCs.[45]

More recently, the committee report accompanying the Senate version of the National Defense Authorization Act for Fiscal Year 2017 (S. 2943) expressed a desire by the committee to "undertake comprehensive defense lab governance reform," and called on GAO to complete a study of the governance models used by defense and non-defense federal laboratories, including FFRDCs.[46] According to the committee report,

> This study should identify all different governance models used across the government, the benefits and drawbacks of each model, and how successful each governance model has been at fostering efficiency and innovation. The study should also compare the relative autonomy given to each of the different lab directors, and conclude with recommendations on best governance practices.[47]

## Competition with the Private Sector

Congress and the executive branch have been interested in promoting competition in federal procurement, including the procurement of R&D, for decades. However, federal law explicitly exempts FFRDCs from competitive practices.[48] Historically, critics of this exemption have asserted that it prohibits the federal government from receiving the best possible R&D at the most competitive price.[49] For example, in a 1997 report, the Defense Science Board stated, "the lack of competition for much of the work being done in the FFRDCs is not justified, nor in the long run is it in the best interests of the DOD."[50] Additionally, some critics have pointed out that the R&D

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[43] U.S. Department of Energy, Commission to Review the Effectiveness of the National Energy Laboratories, *Securing America's Future: Realizing the Potential of the Department of Energy's National Laboratories, Volume 2*: Technical Chapters and Appendices, October 28, 2015, p. 15.

[44] Ibid., p. 27.

[45] Information Technology and Innovation Foundation, Center for American Progress, and the Heritage Foundation, *Turning the Page: Reimaging the National Labs in the 21st Century Innovation Economy*, June 2013, p. 24.

[46] U.S. Senate, Senate Committee on Armed Services, *National Defense Authorization Act for Fiscal Year 2017*, report to accompany S. 2943, 114th Cong., 2nd sess., S.Rept. 114-255, (Washington, DC: GPO, 2016), pp. 76-78.

[47] Ibid.

[48] The Competition in Contracting Act (CICA) of 1984 (Title VII of P.L. 98-369) directs competition practices in federal contracting. CICA requires the use of "full and open competition" in the procurement of goods and services. However, the CICA also permits the use of noncompetitive procedures in a number of circumstances, including "establishing or maintaining an essential engineering, research, or development capability" provided by an FFRDC.

[49] U.S. General Accounting Office, *Competition: Issues on Establishing and Using Federally Funded Research and Development Centers*, GAO-88-22, March, 1988, p. 8.

[50] U.S. Department of Defense, Defense Science Board, Office of the Under Secretary of Defense for Acquisition and Technology, *Report of the Defense Science Board Task Force on Federally Funded Research and Development Centers (FFRDC) and University Affiliated Research Centers (UARC)*, January, 1997, p. 5.

capabilities of the private sector have increased dramatically since World War II and the continued use of FFRDCs is in direct opposition to their original intent—to conduct R&D that cannot be done as effectively by the private sector or the federal government.[51]

More recently, critics have focused on the use of FFRDCs for systems engineering and integration (SE&I) services.[52] The Professional Services Council (PSC), the national trade association of the government professional and technical services industry, has asserted that the SE&I capabilities of the private sector are as good as or better than those of FFRDCs.[53] According to PSC, "prior to the 1990s, FFRDCs were often favored over for-profit systems engineering companies on grounds of avoiding potential conflicts of interest."[54] However, PSC also suggested that congressionally initiated reforms through the Weapon System Acquisition Reform Act of 2009 (P.L. 111-23) have resulted in a sizable number of private sector SE&I companies that are conflict free, independent, and capable of performing the SE&I work currently going to FFRDCs.[55]

In the National Defense Authorization Act for Fiscal Year 2016 (Section 895 of P.L. 114-92), Congress included a provision to address concerns about conflicts of interest and unfair competitive advantages associated with SE&I services. Specifically, the provision requires DOD to review and, if necessary, issue policy guidance related to the identification, mitigation, and prevention of potential unfair competitive advantages conferred to technical advisors to acquisition programs. As detailed in the joint explanatory statement accompanying the bill, technical advisors are contractors, FFRDCs, university-affiliated research centers, non-profit entities, and federal laboratories that provide, among other services, systems engineering and technical direction.[56] In carrying out the provision, the joint explanatory statement directs DOD

> To review the efficacy of current conflict-of-interest policies, the use of non-disclosure agreements, the application of appropriate regulations, and decisions to allocate resources through direct award of funds to intramural programs or sole-source task orders to entities that provide technical advice on defense programs versus open and competitive extramural solicitations.[57]

However, it is less clear if the private sector could fully address the work being performed by FFRDCs categorized as R&D laboratories. According to PSC, FFRDCs "maintain laboratories and specialized test and evaluation facilities beyond those available to the government and its for-profit contractors."[58] Additionally, proponents assert that FFRDCs "occupy a key role in the nation's S&T [science and technology] community that cannot be carried out solely by academic institutions or the business sector."[59] FFRDCs are widely seen as contributing to U.S. technological and economic leadership.

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[51] Professional Services Council, *Federally Funded Research and Development Centers: A Strategic Reassessment for Budget-Constrained Times*, June 5, 2012, pp. 8-9.

[52] Ibid., p. 2.

[53] Ibid., p. 4.

[54] Ibid,. p. 9.

[55] Ibid., pp. 9-10.

[56] Joint Explanatory Statement on S. 1356 published in Congressional Record, November 5, 2015, p. H7989.

[57] Ibid.

[58] Professional Services Council, *Federally Funded Research and Development Centers: A Strategic Reassessment for Budget-Constrained Times*, June 5, 2012, p. 4.

[59] U.S. Department of Energy, Commission to Review the Effectiveness of the National Energy Laboratories, "Securing America's Future: Realizing the Potential of the Department of Energy's National Laboratories," Volume 1:

## Mission Creep

The diversification of FFDRC activities or "mission creep" is an issue closely related to concerns about competition with the private sector. A poorly defined mission or scope may make it more difficult to determine what R&D tasks are appropriate for an FFRDC to perform and what tasks are better left to the private sector. Concerns over mission creep are associated not only with the broadening of FFRDC activities into new fields, but also with the broadening of FFRDC clients (e.g., work for other agencies). Some analysts have asserted that diversification of FFRDC activities is contrary to the intent of FFRDCs—to serve a special R&D need—and an ineffective means for accomplishing the federal agency's mission.[60] In 1995, a task force examining the future of the DOE national laboratories stated that applying the technical competencies of the national laboratories to new problem areas needed to be carefully managed.[61] Specifically, the task force said such activities

> should not be a license to expand into areas of science and technology which already are being addressed effectively or more appropriately by other Research and Development (R&D) performers in government, academia and the private sector.[62]

Agencies have approached mission creep concerns in different ways. DOE has placed limits on the amount of work its FFRDCs can perform for other agencies. Specifically, if the work for other agencies and non-governmental entities in a DOE Office of Science FFRDC is 20% above the FFRDC's operating budget, then DOE requires an in-depth review prior to approving the work.[63] Such a review is intended to ensure the work that DOE FFRDCs are performing for other entities will not impede its ability to meet DOE's research needs. However, in a 2013 report, GAO indicated that DOE is not consistently fulfilling agency requirements—project approval, cost recovery, or program review—to ensure its work for others program is not negatively affecting the laboratories' mission.[64]

In regards to DOD, Congress has included language each year since 1993 in the defense appropriations bill that prohibits DOD from establishing new FFRDCs.[65] Congress has also placed an annual limit on the number of Staff Years of Technical Effort (STE) that DOD FFRDCs can use to perform work for the agency.[66] STE is a cap on personnel time which translates into a cap on funding levels for each FFRDC. DOD allocates a portion of STE to each of its FFRDCs. Limiting the personnel time available to each DOD FFRDC is believed to drive prioritization of needs and provide greater assurance that the work being performed by FFRDCs is appropriate in

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Executive Report, October 28, 2015, p. 7.

[60] Letter from Stan Soloway, President and Chief Executive Officer of Professional Services Council, to Dr. Reginald Brothers, Under Secretary for Science and Technology, U.S. Department of Homeland Security, at http://www.pscouncil.org/PolicyIssues/GovernmentCompetition/FFRDCCompetition/Letter_to_DHS_on_HSOAC_FFRDC.aspx.

[61] U.S. Department of Energy, Secretary of Energy Advisory Board, Report of the Taskforce on Alternative Futures for the Department of Energy Laboratories, *Alternative Futures for the Department of Energy Laboratories*, February, 1995, at, http://www2.lbl.gov/LBL-PID/Galvin-Report/index.html.

[62] Ibid.

[63] Ibid., p. 22.

[64] U.S. Government Accountability Office, *National Laboratories: DOE Needs to Improve Oversight of Work Performed for Non-DOE Entities*, GAO-14-78, October, 2012, p. 25.

[65] See, for example, Section 8024 of P.L. 144-113.

[66] Ibid.

scope.[67] The STE limitation, however, does not apply to work that DOD FFRDCs perform for other agencies.

In general, according to GAO, federal agency approval of annual FFRDC R&D plans should ensure activities remain within the scope, mission, and purpose of the FFRDC.[68]

## Competition of FFRDC Contracts

A hallmark of FFRDCs is the long-term relationship each has with its sponsoring agency. A long-term relationship is believed to provide stability and continuity and is considered central to attracting and retaining scientific and technical expertise. Many FFRDCs have been managed by the same contractor since they were created. For example, Associated Universities, Inc. has operated NSF's National Radio Astronomy Observatory since 1956; RAND Corporation has operated DOD's Project Air Force since 1946; and MITRE Corporation has operated FAA's Center for Aviation System Development since 1990. However, some Members of Congress, GAO, and others have criticized the use of noncompetitive procedures for FFRDC contracts.[69] These critics view competition as the best way to decrease costs and increase quality. For example, in 2003, a report by the Blue Ribbon Commission on the Use of Competitive Procedures for the Department of Energy Labs found that "competition imposes discipline and can elicit quality performance and efficient operation in ways simply not inspired by oversight alone."[70]

DOE has shifted from a position of not regularly conducting full and open competitions for its FFRDCs to routinely subjecting its FFRDCs to competition. Congressional action spurred this shift. Specifically, between FY1998 and FY2009 congressional appropriations acts mandated the use of competition for all DOE FFRDC contracts unless the Secretary of Energy granted a waiver to competition and provided the appropriations committees with a detailed justification for the waiver.[71]

Annual appropriations language was not included after FY2009 because on December 22, 2009, the Secretary of Energy released a policy on the agency's use of competition for the management and operation of its FFRDCs.[72] The policy states,

> DOE does not default to a posture of determining *a priori* either that the Department will conduct competitions for all its M&O contracts, or that it will extend all these contracts. DOE recognizes a preference for full and open competition, and exercises, on a case-by-case basis, the authorities available to the Secretary.

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[67] U.S. Government Accountability Office, *Federal Research: Opportunities Exist to Improve the Management and Oversight of Federally Funded Research and Development Centers*, GAO-09-15, October, 2008, p. 16.

[68] Ibid, p. 15.

[69] See, for example, Subcommittee on Oversight of Government Management, Committee on Governmental Affairs, U.S. Senate, *Inadequate Federal Oversight of Federally Funded Research and Development Centers*, 102nd Cong., 2nd sess., S.Prt. 102-98 (Washington, DC: GPO 1992), p. 31.

[70] U.S. Department of Energy, Report of the Blue Ribbon Commission on the Use of Competitive Procedures for the Department of Energy Labs, *Competing the Management and Operations Contracts for DOE's National Laboratories*, November 2003, p. 10.

[71] See, for example, Section 301 of the Energy and Water Development Appropriations Act, 2002, P.L. 107-66.

[72] U.S. Department of Energy, *Policy Regarding the Competition of Contracts to Manage and Operate Its National Laboratories*, December 22, 2009, at, http://science.energy.gov/~/media/lp/pdf/management-and-operating-contracts/DOE_Policy_Extension_or_Competition_of_Contracts_for_National_Labs_2009-12-22.pdf.

According to DOE, the agency generally uses full and open competition under the following circumstances: when the performance of an FFRDC operator is viewed as unsatisfactory; when the potential for improved costs or technical performance has been identified; when viable alternatives exist in the marketplace; or when the agency decides to change the focus or mission of an FFRDC.[73] According to a 2014 GAO report, DOE has competed 6 of its 16 FFRDCs since 2004.[74]

Although competition is widely seen as an important tool for increasing performance and efficiency, some experts have asserted that there are downsides associated with the competition of FFRDC contracts.[75] Specifically, critics view competition of existing FFRDCs as disruptive, costly, and harmful to FFRDC productivity.[76] According to DOE, the time to conduct an FFRDC competition is approximately 18 months and it is estimated to cost a contractor preparing a bid between $3 million and $5 million.[77] In describing its experiences with increased competition, DOE has stated,

> although some efficiencies or improved contractual agreements have been made possible as a result of the new contracts the overall performance of the new contractors has in most cases not surpassed that of the old, and it is arguable that what improvements have been observed could have been achieved even in the absence of competition.[78]

In 2008, GAO found that while most agencies required full and open competition for their FFRDC contracts, DOD continued to award noncompetitive or sole-source contracts to its FFRDCs.[79] However, GAO also found that in response to criticism DOD began conducting more detailed and comprehensive reviews before renewing its FFRDC contracts.[80] Additionally, a 2009 report by NASA's Office of Inspector General (OIG) found that the agency did not conduct an assessment of possible competitors, as required by the FAR, for operation of the Jet Propulsion Laboratory.[81] According to the NASA OIG, without performing the assessment NASA could not determine if it was getting the best value for the operation of its FFRDC.[82]

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[73] Ibid.

[74] U.S. Government Accountability Office, *Federally Funded Research Centers: Agency Reviews of Employee Compensation and Center Performance*, GAO-14-593, August 2014, p. 26.

[75] U.S. Department of Energy, *Report of the Blue Ribbon Commission on the Use of Competitive Procedures for the Department of Energy Labs: Competing the Management and Operations Contracts for DOE's National Laboratories*, November 2003, p. 14.

[76] Ibid.

[77] U.S. Department of Energy, *Policy Regarding the Competition of Contracts to Manage and Operate Its National Laboratories*, December 22, 2009, at, http://science.energy.gov/~/media/lp/pdf/management-and-operating-contracts/DOE_Policy_Extension_or_Competition_of_Contracts_for_National_Labs_2009-12-22.pdf.

[78] Ibid.

[79] The Competition in Contracting Act of 1984 (P.L. 98-369) includes a statutory exemption for FFRDCs.

U.S. Government Accountability Office, *Federal Research: Opportunities Exist to Improve the Management and Oversight of Federally Funded Research and Development Centers*, GAO-09-15, October, 2008, p. 9.

[80] Ibid., p. 29.

[81] Office of Inspector General, National Aeronautics and Space Administration, *NASA Should Reconsider the Award Evaluation Process and Contract Type for the Operation of the Jet Propulsion Laboratory*, Report No. IG-09-022-R, September 25, 2009, p. iii.

[82] Ibid.

# Appendix A. List of Federally Funded Research and Development Centers, FY2017

| Sponsoring Agency | Name of FFRDC | Activity Type | Contractor |
|---|---|---|---|
| Department of Defense | Aerospace Federally Funded Research and Development Center | Systems Engineering and Integration Center | The Aerospace Corporation |
| | Arroyo Center | Study and Analysis Center | RAND Corp. |
| | National Security Engineering Center | Systems Engineering and Integration Center | MITRE Corp. |
| | Center for Naval Analyses | Study and Analysis Center | The CNA Corporation |
| | Center for Communications and Computing | R&D Laboratory | Institute for Defense Analyses |
| | Lincoln Laboratory | R&D Laboratory | Massachusetts Institute of Technology |
| | National Defense Research Institute | Study and Analysis Center | RAND Corp. |
| | Project Air Force | Study and Analysis Center | RAND Corp. |
| | Software Engineering Institute | R&D Laboratory | Carnegie Mellon University |
| | Systems and Analyses Center | Study and Analysis Center | Institute for Defense Analyses |
| Department of Energy | Ames Laboratory | R&D Laboratory | Iowa State University |
| | Argonne National Laboratory | R&D Laboratory | UChicago Argonne, LLC |
| | Brookhaven National Laboratory | R&D Laboratory | Brookhaven Science Associates, LLC |
| | Fermi National Accelerator Laboratory | R&D Laboratory | Fermi Research Alliance, LLC |
| | Idaho National Laboratory | R&D Laboratory | Battelle Energy Alliance, LLC |
| | Lawrence Berkeley National Laboratory | R&D Laboratory | University of California |
| | Lawrence Livermore National Laboratory | R&D Laboratory | Lawrence Livermore National Security, LLC |
| | Los Alamos National Laboratory | R&D Laboratory | Los Alamos National Security, LLC |
| | National Renewable Energy Laboratory | R&D Laboratory | Alliance for Sustainable Energy, LLC |

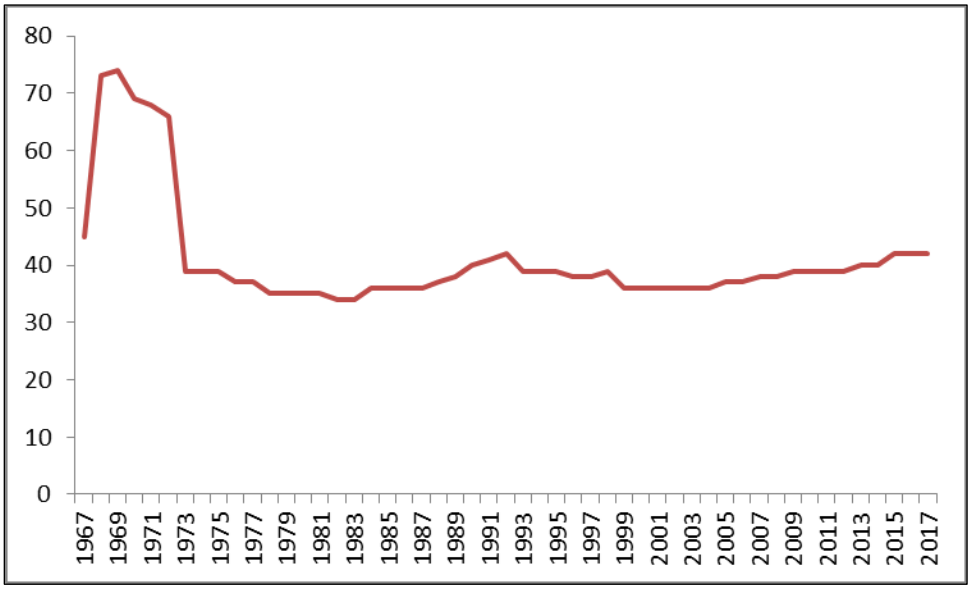
| Sponsoring Agency | Name of FFRDC | Activity Type | Contractor |
|---|---|---|---|
| | Oak Ridge National Laboratory | R&D Laboratory | UT-Battelle, LLC |
| | Pacific Northwest National Laboratory | R&D Laboratory | Battelle Memorial Institute |
| | Princeton Plasma Physics Laboratory | R&D Laboratory | Princeton University |
| | Sandia National Laboratories | R&D Laboratory | Sandia Corporation |
| | Savannah River National Laboratory | R&D Laboratory | Savannah River Nuclear Solutions, LLC |
| | SLAC National Accelerator Laboratory | R&D Laboratory | Stanford University |
| | Thomas Jefferson National Accelerator Facility | R&D Laboratory | Jefferson Science Associates, LLC |
| Department of Health and Human Services | CMS Alliance to Modernize Healthcare | Study and Analysis Center | MITRE Corp. |
| | Frederick National Laboratory for Cancer Research | R&D Laboratory | Leidos Biomedical Research, Inc. |
| Department of Homeland Security | Homeland Security Operational Analysis Center | Study and Analysis Center | RAND Corp. |
| | Homeland Security Systems Engineering and Development Institute | Systems Engineering and Integration Center | MITRE Corp. |
| | National Biodefense Analysis and Countermeasures Center | Study and Analysis Center | Battelle National Biodefense Institute |
| Department of Transportation | Center for Advanced Aviation System Development | R&D Laboratory | MITRE Corp. |
| Department of the Treasury and Department of Veterans Affairs | Center for Enterprise Modernization | Systems Engineering and Integration Center | MITRE Corp. |
| National Aeronautics and Space Administration | Jet Propulsion Laboratory | R&D Laboratory | California Institute of Technology |
| National Institute of Standards and Technology | National Cybersecurity Center of Excellence | Systems Engineering and Integration Center | MITRE Corp. |

| Sponsoring Agency | Name of FFRDC | Activity Type | Contractor |
|---|---|---|---|
| National Science Foundation | National Center for Atmospheric Research | R&D Laboratory | University Corporation for Atmospheric Research |
| | National Optical Astronomy Observatory | R&D Laboratory | Association of Universities for Research in Astronomy, Inc. |
| | National Radio Astronomy Observatory | R&D Laboratory | Associated Universities, Inc. |
| | National Solar Observatory | R&D Laboratory | Association of Universities for Research in Astronomy, Inc. |
| | Science and Technology Policy Institute | Study and Analysis Center | Institute for Defense Analyses |
| Nuclear Regulatory Commission | Center for Nuclear Waste Regulatory Analyses | Study and Analysis Center | Southwest Research Institute |
| United States Courts | Judiciary Engineering and Modernization Center | Systems Engineering and Integration Center | MITRE Corp. |

**Source:** National Science Foundation, *Master List of Federally Funded R&D Centers,* at http://www.nsf.gov/statistics/ffrdclist/.

# Appendix B. Number of FFRDCs, FY1967–FY2017

**Figure B-1. Number of FFRDCs by Fiscal Year, 1967-2017**




**Source:** CRS generated figure. Data from U.S. Congress, Office of Technology Assessment, A History of the Department of Defense Federally Funded Research and Development Centers, OTA-BP-ISS-157 (Washington, DC: U.S. Government Printing Office, June 1995), pp. 51-52; and National Science Foundation, Master List of Federally Funded R&D Centers, at http://www.nsf.gov/statistics/ffrdclist/.

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