



## InfoBrief

# Federally Funded R&D Centers Report 6% Increase in R&D Spending in FY 2021

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The nation’s 43 federally funded research and development centers (FFRDCs) spent \$24.9 billion on research and development in FY 2021, an annual increase of 6.0% in current dollars ([table 1](#)).<sup>1</sup> The federal government’s share of support reached \$24.5 billion in FY 2021 and represented a 5.9% increase in federal R&D support to FFRDCs—the eighth consecutive year of nominal growth after performance declines in FYs 2011–13.<sup>2</sup> In constant dollars, total FFRDC R&D expenditures rose an average of 1.8% annually from FY 2012 to FY 2021 ([figure 1](#)). These and the other statistics in this report come from the FY 2021 FFRDC Research and Development Survey, conducted by the National Center for Science and Engineering Statistics within the National Science Foundation.

**Table 1**

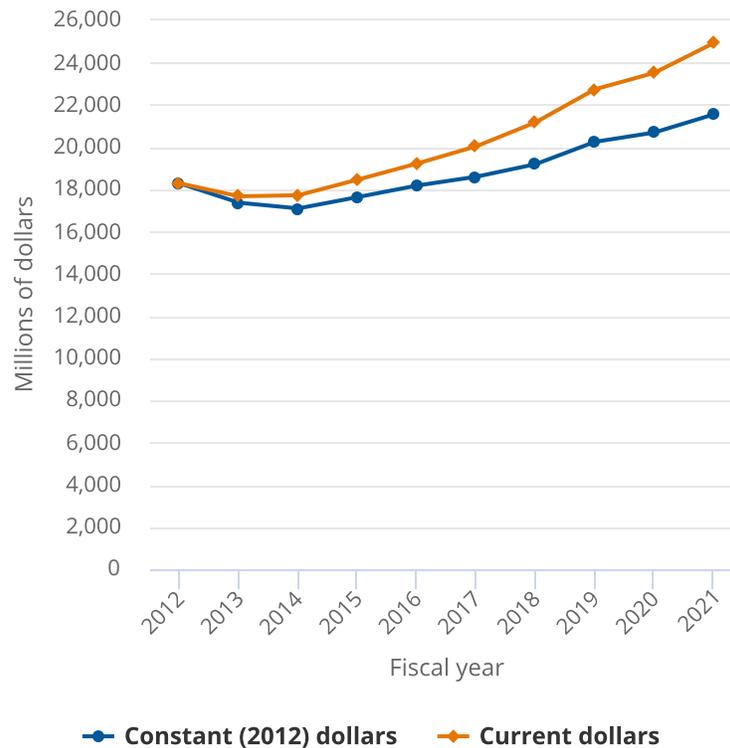
**R&D expenditures at federally funded research and development centers, by source of funds: FYs 2012–21**

(Thousands of current dollars)

Fiscal year	All R&D expenditures	Federal government	State and local government	Business	Nonprofit organizations	All other sources
2012	18,280,943	17,875,012	39,428	184,434	45,926	136,143
2013	17,667,184	17,284,513	50,449	186,911	39,390	105,921
2014	17,718,556	17,331,396	28,337	220,735	37,182	100,906
2015	18,458,257	18,097,189	18,427	208,780	27,984	105,877
2016	19,219,702	18,855,593	21,556	192,239	40,195	110,119
2017	20,038,307	19,667,804	29,029	192,107	46,526	102,841
2018	21,171,529	20,770,388	43,458	197,975	43,630	116,078
2019	22,737,500	22,338,855	51,167	180,583	48,238	118,657
2020	23,514,241	23,133,501	43,995	172,866	47,056	116,823
2021	24,921,476	24,509,691	43,774	195,954	49,016	123,041

**Source(s):**

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

**Figure 1****Total R&D expenditures at federally funded research and development centers: FYs 2012–21****Source(s):**

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

## R&D by Funding Source

FFRDCs are privately operated R&D organizations that are exclusively or substantially financed by the federal government. The federal government funded 98.4% (\$24.5 billion) of FFRDC R&D expenditures in FY 2021 ([table 1](#)). Nonfederal sources funded the remaining R&D, totaling about \$411.8 million, including businesses (\$196.0 million); nonprofit organizations (\$49.0 million); state and local governments (\$43.8 million); and all other sources (\$123.0 million), such as funds from foreign governments and foreign or U.S. universities.

## Federal Agency Sources of R&D Funding

Four agencies were responsible for 91.3% of federally funded R&D expenditures at FFRDCs: the Department of Energy (DOE), Department of Defense (DOD), National Aeronautics and Space Administration (NASA), and Department of Health and Human Services (HHS) ([table 2](#)). DOE (\$13.0 billion) accounted for 53.0% of federally funded R&D spending. DOD (\$5.5 billion, or 22.3%); NASA (\$2.6 billion, or 10.7%); and HHS (\$1.3 billion, or 5.3%), which includes the National Institutes of Health, were the only other agencies with funding greater than \$1 billion.

**Table 2****Federally financed R&D expenditures at federally funded research and development centers, by federal agency and FFRDC: FY 2021**

(Thousands of current dollars)

FFRDC	All federal R&D expenditures	DOD	DOE	HHS	DHS	DOT	NASA	NSF	Other
All FFRDCs	24,509,691	5,459,887	12,983,595	1,300,799	538,975	250,334	2,629,810	315,920	1,030,371
University-administered FFRDCs	6,700,555	1,132,607	2,587,693	38,095	84,437	34,884	2,448,098	307,909	66,832
Ames Laboratory	34,016	0	33,919	0	0	0	0	0	97
Argonne National Laboratory	832,400	28,310	746,382	5,550	25,883	5,181	400	2,420	18,274
Fermi National Accelerator Laboratory	317,812	57	317,755	0	0	0	0	0	0
Green Bank Observatory	8,629	0	0	0	0	0	0	8629	0
Jet Propulsion Laboratory	2,388,355	0	0	0	0	0	2,388,355	0	0
Lawrence Berkeley National Laboratory	910,428	14,845	860,091	24,463	738	573	4,166	0	5,552
Lincoln Laboratory	1,110,465	999,818	3,121	0	23,677	23,548	38,680	0	21,621
National Center for Atmospheric Research	161,163	5,841	3,665	232	0	5,357	12,627	120,193	13,248
National Radio Astronomy Observatory	93,313	540	0	0	0	0	347	92,425	1
National Solar Observatory	17,680	35	0	0	0	0	1032	16,613	0
NSF's National Optical-Infrared Astronomy Research Laboratory	73,393	16	5304	0	0	0	779	67,294	0
Princeton Plasma Physics Laboratory	113,591	77	112,975	0	0	0	440	99	0
SLAC National Accelerator Laboratory	382,252	3,049	366,771	6,741	1609	0	785	236	3,061
Software Engineering Institute	120,443	80,019	1,095	1,109	32,530	225	487	0	4,978
Thomas Jefferson National Accelerator Facility	136,615	0	136,615	0	0	0	0	0	0
Nonprofit-administered FFRDCs	8,215,876	2,948,125	3,428,488	383,901	358,749	213,850	122,770	7,971	752,022
Aerospace Federally Funded Research and Development Center	1,121,569	983,248	14,972	0	1,922	1018	80,019	153	40,237
Arroyo Center	38,304	38,304	0	0	0	0	0	0	0
Brookhaven National Laboratory	620,000	1259	590,230	3,431	1,189	0	8,600	77	15,214
Center for Advanced Aviation System Development	207,828	0	0	0	0	207,518	125	0	185
Center for Communications and Computing	65,255	65,255	0	0	0	0	0	0	0
Center for Enterprise Modernization	263,661	0	150	0	0	0	651	0	262,860
Center for Naval Analyses	96,391	96,391	0	0	0	0	0	0	0
Center for Nuclear Waste Regulatory Analyses	5,233	54	391	0	0	80	38	0	4,670
CMS Alliance to Modernize Healthcare	348,269	0	0	348,269	0	0	0	0	0
Homeland Security Operational Analysis Center	34,888	0	0	0	34,888	0	0	0	0
Homeland Security Systems Engineering and Development Institute	182,413	0	0	0	182,413	0	0	0	0
Judiciary Engineering and Modernization Center	5,493	0	0	0	0	0	0	0	5,493
National Biodefense Analysis and Countermeasures Center	44,968	487	0	1,146	30,305	0	0	0	13,030

**Table 2****Federally financed R&D expenditures at federally funded research and development centers, by federal agency and FFRDC: FY 2021**

(Thousands of current dollars)

FFRDC	All federal R&D expenditures	DOD	DOE	HHS	DHS	DOT	NASA	NSF	Other
National Cybersecurity Center of Excellence	33,671	0	0	0	0	0	0	0	33,671
National Defense Research Institute	66,170	64,452	0	0	0	0	0	0	1718
National Renewable Energy Laboratory	497,047	17,333	463,952	0	2,147	917	285	0	12,413
National Security Engineering Center	1,463,965	1,238,466	0	0	0	0	42	0	225,457
Oak Ridge National Laboratory	1,746,756	68,364	1,509,726	7,092	11,087	4,317	31,100	0	115,070
Pacific Northwest National Laboratory	1,142,925	170,244	848,956	22,567	83,872	0	1,612	815	14,859
Project Air Force	47,966	47,966	0	0	0	0	0	0	0
Science and Technology Policy Institute	9,784	780	33	1,396	23	0	223	6,926	403
Systems and Analyses Center	173,320	155,522	78	0	10,903	0	75	0	6,742
Industry-administered FFRDCs	9,593,260	1,379,155	6,967,414	878,803	95,789	1,600	58,942	40	211,517
Frederick National Laboratory for Cancer Research	861,605	164	0	861,420	0	0	0	0	21
Idaho National Laboratory	503,977	79,649	391,056	0	13,210	416	3293	0	16,353
Lawrence Livermore National Laboratory	1,580,263	279,178	1,262,813	7,445	21,909	0	1,989	0	6,929
Los Alamos National Laboratory	2,950,380	80,032	2,724,200	8,249	5,294	0	52,996	40	79,569
Sandia National Laboratories	3,507,607	917,136	2,424,747	1689	53,568	1,184	664	0	108,619
Savannah River National Laboratory	189,428	22,996	164,598	0	1,808	0	0	0	26

DHS = Department of Homeland Security; DOD = Department of Defense; DOE = Department of Energy; DOT = Department of Transportation; FFRDC = federally funded research and development center; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation.

**Source(s):**

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey, FY 2021.

**Expenditure Trends at Specific FFRDCs**

The majority of FFRDCs (33 centers) increased R&D spending in FY 2021 compared with FY 2020, with 6 centers reporting an increase greater than 27.0% (table 3).<sup>3</sup> Nine FFRDCs reported more than \$1 billion each (a combined \$17.2 billion) in R&D expenditures for FY 2021—the NASA-sponsored Jet Propulsion Laboratory; 5 DOE-sponsored national laboratories specializing in energy and the environment, national security, and nuclear science (Lawrence Livermore, Los Alamos, Oak Ridge, Pacific Northwest, and Sandia National Laboratories); the DOD-sponsored National Security Engineering Center and Lincoln Laboratory; and the Aerospace FFRDC, which is jointly sponsored by DOD and the Air Force. Sandia National Laboratories was the largest performer, with more than \$3.5 billion in total R&D. Six FFRDCs reported R&D expenditure increases greater than \$100 million. The National Security Engineering Center (\$325 million increase) and Los Alamos National Laboratory (\$252 million increase) were the two sole FFRDCs reporting increases greater than \$150 million in FY 2021. Lower expenditures were reported by 9 FFRDCs in FY 2021, with 4 centers declining more than 14.0%. Of the 42 FFRDCs listed continuously since 2017, 33 centers reported larger expenditures in FY 2021 than in FY 2017.

**Table 3****R&D expenditures at federally funded research and development centers, by FFRDC: FYs 2017–21**

(Thousands of current dollars and percent change)

FFRDC	2017	2018	2019	2020	2021	% change 2020–21
All FFRDCs	20,038,307	21,171,529	22,737,500	23,514,241	24,921,476	6.0
University-administered FFRDCs	6,155,252	6,715,338	6,946,262	7,003,132	6,850,276	-2.2
Ames Laboratory	53,527	36,858	33,612	32,844	34,214	4.2
Argonne National Laboratory	723,824	777,246	810,693	859,658	856,568	-0.4
Fermi National Accelerator Laboratory	320,516	328,419	334,258	300,002	319,051	6.3
Green Bank Observatory <sup>a</sup>	NA	NA	NA	NA	8,629	NA
Jet Propulsion Laboratory	2,324,826	2,733,908	2,709,063	2,638,412	2,388,355	-9.5
Lawrence Berkeley National Laboratory	813,267	832,457	872,237	916,082	966,972	5.6
Lincoln Laboratory	969,090	1,013,320	1,103,870	1,115,927	1,136,133	1.8
National Center for Atmospheric Research	171,551	158,260	199,476	188,484	181,010	-4.0
National Radio Astronomy Observatory	91,720	100,691	101,901	100,078	94,202	-5.9
National Solar Observatory	11,841	14,733	15,931	16,892	17,684	4.7
NSF's National Optical-Infrared Astronomy Research Laboratory	25,906	33,874	38,262	72,686	75,251	3.5
Princeton Plasma Physics Laboratory	81,444	82,435	91,271	107,662	115,505	7.3
SLAC National Accelerator Laboratory	327,453	341,615	368,938	382,264	396,780	3.8
Software Engineering Institute	132,967	142,891	140,954	141,291	120,443	-14.8
Thomas Jefferson National Accelerator Facility	107,320	118,631	125,796	130,850	139,479	6.6
Nonprofit-administered FFRDCs	6,413,612	6,617,274	7,033,162	7,419,509	8,370,508	12.8
Aerospace Federally Funded Research and Development Center	942,704	1,020,827	1,065,989	1,114,741	1,128,241	1.2
Arroyo Center	42,723	39,738	37,956	35,248	38,304	8.7
Brookhaven National Laboratory	556,875	552,640	590,470	595,466	637,658	7.1
Center for Advanced Aviation System Development	168,169	177,530	174,123	180,634	230,484	27.6
Center for Communications and Computing	66,692	68,237	68,371	67,072	65,255	-2.7
Center for Enterprise Modernization	154,933	162,690	174,712	190,408	263,661	38.5
Center for Naval Analyses	90,401	95,198	96,697	95,874	96,391	0.5
Center for Nuclear Waste Regulatory Analyses	6,312	5,054	6,987	6,762	5,630	-16.7
CMS Alliance to Modernize Healthcare	169,013	175,030	213,369	228,162	348,269	52.6
Homeland Security Operational Analysis Center	8,622	46,321	54,751	44,736	34,888	-22.0
Homeland Security Systems Engineering and Development Institute	104,414	104,689	115,813	136,874	183,588	34.1
Judiciary Engineering and Modernization Center	8,030	6,697	7,331	6,765	5,493	-18.8
National Biodefense Analysis and Countermeasures Center	34,991	37,598	39,003	42,330	44,968	6.2
National Cybersecurity Center of Excellence	13,436	19,556	22,205	23,557	33,671	42.9
National Defense Research Institute	69,013	57,743	67,647	64,134	66,170	3.2
National Renewable Energy Laboratory	357,916	388,500	455,016	511,585	559,151	9.3
National Security Engineering Center	1,012,155	1,078,610	1,124,861	1,143,701	1,468,298	28.4
Oak Ridge National Laboratory	1,403,204	1,399,445	1,470,372	1,632,684	1,760,578	7.8
Pacific Northwest National Laboratory	983,962	956,193	1,012,136	1,071,249	1,168,268	9.1
Project Air Force	48,521	48,858	48,325	46,936	47,966	2.2
Science and Technology Policy Institute	8,401	8,086	9,080	9,256	9,784	5.7
Systems and Analyses Center	163,125	168,034	177,948	171,335	173,792	1.4
Industry-administered FFRDCs	7,469,443	7,838,917	8,758,076	9,091,600	9,700,692	6.7
Frederick National Laboratory for Cancer Research	704,223	748,500	751,452	745,726	861,605	15.5
Idaho National Laboratory	482,840	395,112	478,324	494,094	516,691	4.6
Lawrence Livermore National Laboratory	1,290,134	1,386,687	1,517,429	1,558,071	1,613,673	3.6
Los Alamos National Laboratory	1,972,769	2,145,232	2,461,275	2,722,375	2,974,164	9.2
Sandia National Laboratories	2,878,000	3,009,105	3,373,217	3,395,241	3,542,756	4.3

**Table 3****R&D expenditures at federally funded research and development centers, by FFRDC: FYs 2017–21**

(Thousands of current dollars and percent change)

FFRDC	2017	2018	2019	2020	2021	% change 2020–21
Savannah River National Laboratory	141,477	154,281	176,379	176,093	191,803	8.9

NA = not available.

FFRDC = federally funded research and development center; NSF = National Science Foundation.

<sup>a</sup> Prior to the FY 2021 collection, the National Center for Science and Engineering Statistics discovered that the Green Bank Observatory had split from the National Radio Astronomy Observatory on 1 October 2016; both retained FFRDC status. For FYs 2017–20, R&D expenditures reported for National Radio Astronomy Observatory include the expenditures for the Green Bank Observatory. The Green Bank Observatory began reporting separately on the FY 2021 survey.

**Source(s):**

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

## Expenditures by Type of R&D

In FY 2021, basic research activities accounted for 20.1% of total FFRDC R&D expenditures (table 4). The remaining R&D expenditures were divided evenly between applied research and experimental development (39.9% each). Overall, total basic research expenditures at FFRDCs increased by \$910 million in current dollars from FY 2017 to FY 2021. Applied research expenditures and experimental development each increased by around \$2.0 billion during the same period.

**Table 4****R&D expenditures at federally funded research and development centers, by type of R&D: FYs 2017–21**

(Millions of current dollars and percent)

Fiscal year	All R&D expenditures	Basic research		Applied research		Experimental development	
		Amount	Percent	Amount	Percent	Amount	Percent
2017	20,038	4,111	20.5	7,931	39.6	7,996	39.9
2018	21,172	4,180	19.7	8,391	39.6	8,600	40.6
2019	22,738	4,536	19.9	9,200	40.5	9,002	39.6
2020	23,514	4,712	20.0	9,433	40.1	9,369	39.8
2021	24,921	5,021	20.1	9,951	39.9	9,949	39.9

**Note(s):**

Detail may not add to total because of rounding.

**Source(s):**

National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

## Data Sources, Limitations, and Availability

The statistics on FFRDC R&D expenditures presented in this report come from the FY 2021 FFRDC Research and Development Survey. This annual survey is completed by FFRDC administrators and collects data from FFRDCs on R&D expenditures by source of funds (federal government, state and local governments, businesses, nonprofit organizations, or other); federal agency source; type of R&D (basic research, applied research, or experimental development); type of cost (salaries, software, equipment, subcontracts, other direct costs, and indirect costs); and total operating budget. This survey has been a census of the full population of FFRDCs since FY 2001. For a list of criteria used to define the set of FFRDCs, see the general guidelines of the Master Government List of FFRDCs at <https://www.nsf.gov/statistics/ffrdclist/#guide&gennotes>.

The full set of data tables from this survey and more information on the survey methodology are available at <https://nces.nsf.gov/pubs/nsf22332/>.

## Notes

- 1 The National Center for Science and Engineering Statistics was informed in June 2021 that the Green Bank Observatory separated from the National Radio Astronomy Observatory in October 2016 to become an independent institution; both retained FFRDC status. The Master Government List of FFRDCs was subsequently updated to reflect this change.
- 2 See table 1 in the full set of data tables for annual totals from FY 2001 to FY 2021 (available at <https://nces.nsf.gov/pubs/nsf22332/>).
- 3 Comparative R&D totals for the Green Bank Observatory and the National Radio Astronomy Observatory are not available for FYs 2020–21 because they reported together for FY 2020 but reported separately for FY 2021. The combined totals for FY 2021 are 2.8% greater than what was reported in FY 2020.

## Suggested Citation

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