

RESEARCH AND DEVELOPMENT

No. 559.—RESEARCH AND DEVELOPMENT EXPENDITURES: 1941 TO 1952

[Government data derived from actual Federal budget expenditures for research and development plus estimates of procurement expenditures used for research and development. Industry data based on nationwide survey conducted in mid-1952 (see table 560). University data based on sample survey completed early in 1953]

YEAR	Total	SOURCE OF FUNDS			USE OF FUNDS BY—		
		Government	Industry	University	Government	Industry	University
EXPENDITURES (million dollars)							
1941	900	370	510	20	200	660	40
1942	1,070	490	560	20	240	780	50
1943	1,210	780	410	20	300	850	60
1944	1,380	940	420	20	390	910	80
1945	1,520	1,070	430	20	430	990	100
1946	1,780	910	840	30	470	1,190	120
1947	2,260	1,160	1,050	50	520	1,570	170
1948	2,610	1,390	1,150	70	570	1,820	220
1949	2,610	1,550	990	70	550	1,790	270
1950	2,870	1,610	1,180	80	570	1,980	320
1951	3,360	1,980	1,300	80	700	2,300	360
1952	3,750	2,240	1,430	80	800	2,530	420
PERCENT OF TOTAL							
1941	100.0	41.0	57.0	2.0	22.0	73.0	5.0
1942	100.0	46.0	52.0	2.0	22.0	73.0	5.0
1943	100.0	64.0	34.0	2.0	25.0	70.0	5.0
1944	100.0	68.0	30.0	2.0	28.0	66.0	6.0
1945	100.0	70.0	28.0	2.0	28.0	65.0	7.0
1946	100.0	51.0	47.0	2.0	26.0	67.0	7.0
1947	100.0	51.0	47.0	2.0	23.0	69.0	8.0
1948	100.0	53.0	44.0	3.0	22.0	70.0	8.0
1949	100.0	59.0	38.0	3.0	21.0	69.0	10.0
1950	100.0	56.0	41.0	3.0	20.0	69.0	11.0
1951	100.0	59.0	39.0	2.0	21.0	68.0	11.0
1952	100.0	60.0	38.0	2.0	21.0	68.0	11.0

Source: Department of Defense, Research and Development Board.

No. 560.—INDUSTRIAL RESEARCH AND DEVELOPMENT—RESEARCH COST AND PERSONNEL, BY INDUSTRY: 1951

[Figures cover approximately 85 percent of all industrial research and development. Based on nationwide survey of companies engaged in scientific and engineering research and development conducted in mid-1952]

INDUSTRY	Number of companies reporting	COST OF RESEARCH			RESEARCH PERSONNEL		COST RATIOS ¹	
		Total cost (\$1,000)	Percent of total sales	Percent financed by Federal government	Total research employees	Number of engineers and scientists ²	Average cost per research em- ployee	Average cost per engineer or scientist ³
All industries	1,934	1,783,662	2.0	47.0	220,157	89,851	\$8,900	\$22,100
Manufacturing	1,527	1,613,483	2.0	46.5	196,517	79,303	9,000	22,700
Food and kindred products	72	23,784	3.0	3.7	2,941	1,357	8,700	16,900
Textile mill products and apparel	49	15,817	9.0	14.4	1,989	734	8,500	19,200
Chemicals and allied products	275	204,170	2.5	7.1	23,211	13,181	7,900	16,500
Petroleum refining	49	92,942	.6	3.1	12,993	4,953	8,100	20,900
Stone, clay, and glass products	38	20,752	1.3	2.7	3,115	1,210	6,600	18,600
Primary metal industries	49	34,415	.4	9.5	3,705	1,703	10,100	21,600
Fabricated metal products	150	38,404	.9	31.1	5,311	2,491	8,000	16,500
Machinery (except electrical)	182	99,334	1.5	23.9	12,668	5,333	8,100	18,500
Electrical machinery	233	431,948	6.4	57.0	51,172	17,243	9,400	28,100
Transportation equipment	104	510,605	4.5	70.7	59,243	21,857	10,000	27,700
Motor vehicles and equipment	26	94,303	1.2	9.4	8,895	1,445	10,900	68,600
Aircraft and parts	62	410,985	12.7	85.0	49,913	20,166	9,700	24,300
Other transportation equipment	16	6,217	.9	52.8	433	246	15,500	30,800
Professional, scientific, and controlling instruments	152	91,447	5.7	57.6	13,442	5,694	7,500	17,900
Photographic equipment and supplies	24	30,794	4.8	29.1	4,330	1,954	7,500	17,300
Other professional, scientific, and controlling instruments	128	60,653	6.4	72.8	9,112	3,740	7,500	18,200
Other manufacturing	174	49,895	.8	31.4	7,327	3,547	8,400	16,300
Nonmanufacturing	407	170,169	1.7	50.8	23,640	10,548	8,300	18,000
Commercial consulting services	281	43,620	47.2	65.5	7,181	3,391	7,400	15,000
Nonprofit research agencies	37	28,517	86.3	56.0	4,588	2,518	6,900	11,700
Other nonmanufacturing	89	98,032	1.0	42.9	11,871	4,639	9,300	23,300

¹ Based on reports from 1,650 companies reporting both research cost and employment.

² Professional research staff.

³ Operating cost of all research and development divided by average employment of research engineers and scientists.

⁴ Based on reports from 1,754 companies; total including estimates for 180 companies not reporting is \$1,959,100,000.

⁵ Based on reports from 1,801 companies; total including estimates for 133 companies not reporting is 234,000.

⁶ Based on reports from 1,795 companies; total including estimates for 139 companies not reporting is 94,000.

Source: Department of Labor, Bureau of Labor Statistics, and Department of Defense, Research and Development Board; *Industrial Research and Development*, January 1953 (a preliminary report).

Source: Statistical Abstract of the United States: 1953 Edition.

Science and Technology

This section presents statistics on scientific, engineering, and technological resources, with emphasis on patterns of research and development (R&D) funding and on scientific, engineering, and technical personnel; education; and employment. Also included are statistics on space program outlays and accomplishments. Principal sources of these data are the National Science Foundation (NSF) and the National Aeronautics and Space Administration (NASA).

NSF gathers data chiefly through recurring surveys. Current NSF publications containing data on funds for research and development and on scientific and engineering personnel include detailed statistical tables; issue briefs; and annual, biennial, triennial, and special reports. Titles or the areas of coverage of these reports include the following: *Science and Engineering Indicators*; *National Patterns of R&D Resources*; *Women, Minorities, and Persons with Disabilities in Science and Engineering*—science and technology data presented in chart and tabular form in a pocket-sized publication—*Federal Funds for Research and Development*; *Federal R&D Funding by Budget Function*; *Federal Support to Universities, Colleges, and Selected Nonprofit Institutions*; *Research and Development in Industry*; R&D expenditures and graduate enrollment and support in academic science and engineering; and characteristics of doctoral scientists and engineers and of recent graduates in the United States. Statistical surveys in these areas pose problems of concept and definition and the data should therefore be regarded as broad estimates rather than precise, quantitative statements. See sources for methodological and technical details.

The National Science Board's biennial *Science and Engineering Indicators* contains data and analysis of international and domestic science and technology, including measures of inputs and outputs.

The Budget of the United States Government, published by the U.S. Office of Management and Budget, contains summary financial data on federal R&D programs.

Research and development outlays—NSF defines research as “systematic study directed toward fuller scientific knowledge of the subject studied” and development as “the systematic use of scientific knowledge directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.”

National coverage of R&D expenditures is developed primarily from periodic surveys in four principal economic sectors: (1) *Government*, made up primarily of federal executive agencies; (2) *industry*, consisting of manufacturing and nonmanufacturing firms and the federally funded research and development centers (FFRDCs) they administer; (3) *universities and colleges*, composed of universities, colleges, and their affiliated institutions, agricultural experiment stations, and associated schools of agriculture and of medicine, and FFRDCs administered by educational institutions; and (4) *other nonprofit institutions*, consisting of such organizations as private philanthropic foundations, nonprofit research institutes, voluntary health agencies, and FFRDCs administered by nonprofit organizations.

The R&D funds reported consist of current operating costs, including planning and administration costs, except as otherwise noted. They exclude funds for routine testing, mapping and surveying, collection of general-purpose data, dissemination of scientific information, and training of scientific personnel.

Scientists, engineers, and technicians—Scientists and engineers are defined as persons engaged in scientific and engineering work at a level requiring a knowledge of sciences equivalent at least to that acquired through completion

of a 4-year college course. Technicians are defined as persons engaged in technical work at a level requiring knowledge acquired through a technical institute,

junior college, or other type of training less extensive than 4-year college training. Craftsmen and skilled workers are excluded.

Table 774. Research and Development (R&D) Expenditures by Source and Objective: 1970 to 2003

[In millions of dollars (26,271 represents \$26,271,000,000) except as indicated. For calendar years]

Year	Total	Sources of funds					Objective (percent of total)			Character of work		
		Federal government	Industry	Universities/colleges	Non-profit	Non-federal government ¹	Defense related ²	Space related ³	Other	Basic research	Applied research	Development
1970 . . .	26,271	14,984	10,449	259	343	237	33	10	56	3,594	5,752	16,925
1971 . . .	26,952	15,210	10,824	290	366	262	33	10	58	3,720	5,833	17,399
1972 . . .	28,740	16,039	11,715	312	393	282	33	8	59	3,850	6,147	18,743
1973 . . .	30,952	16,587	13,299	343	422	302	32	7	61	4,099	6,655	20,197
1974 . . .	33,359	17,287	14,885	393	474	320	29	7	64	4,511	7,344	21,504
1975 . . .	35,671	18,533	15,824	432	534	348	28	8	65	4,875	8,091	22,706
1976 . . .	39,435	20,292	17,702	480	592	369	27	8	65	5,373	8,976	25,085
1977 . . .	43,338	22,071	19,642	569	662	394	27	7	66	6,008	9,662	27,667
1978 . . .	48,719	24,414	22,457	679	727	443	26	6	68	6,959	10,704	31,056
1979 . . .	55,379	27,225	26,097	785	791	482	25	6	70	7,836	12,097	35,445
1980 . . .	63,213	29,975	30,929	920	871	519	24	5	70	8,790	13,745	40,678
1981 . . .	72,269	33,715	35,948	1,058	967	581	24	5	70	9,830	16,391	46,047
1982 . . .	80,783	37,168	40,692	1,207	1,095	621	26	5	69	10,824	18,280	51,679
1983 . . .	89,971	41,472	45,264	1,357	1,220	658	28	4	68	12,059	20,373	57,540
1984 . . .	102,251	46,477	52,187	1,514	1,351	721	29	3	68	13,484	22,505	66,261
1985 . . .	114,685	52,655	57,962	1,743	1,491	834	30	3	67	14,857	25,410	74,417
1986 . . .	120,259	54,633	60,991	2,019	1,647	969	31	3	66	17,247	27,259	75,754
1987 . . .	126,217	58,466	62,576	2,262	1,849	1,065	32	3	65	18,498	27,915	79,804
1988 . . .	133,880	60,130	67,977	2,527	2,081	1,165	30	4	66	19,786	29,528	84,566
1989 . . .	141,889	60,463	74,966	2,852	2,333	1,274	28	4	69	21,889	32,277	87,723
1990 . . .	151,990	61,607	83,208	3,187	2,589	1,399	25	4	71	23,028	34,896	94,067
1991 . . .	160,872	60,780	92,300	3,457	2,852	1,483	22	4	73	27,139	38,629	95,104
1992 . . .	165,347	60,912	96,229	3,568	3,113	1,525	22	4	74	27,604	37,933	99,810
1993 . . .	165,723	60,522	96,549	3,708	3,387	1,557	21	4	74	28,739	37,280	99,704
1994 . . .	169,195	60,769	99,203	3,937	3,664	1,622	20	5	76	29,644	36,615	102,936
1995 . . .	183,611	62,959	110,870	4,109	3,924	1,750	19	4	77	29,602	40,932	113,077
1996 . . .	197,330	63,383	123,416	4,434	4,238	1,860	18	4	78	32,790	43,165	121,375
1997 . . .	212,134	64,561	136,227	4,836	4,589	1,921	17	4	79	36,918	46,542	128,674
1998 . . .	226,321	66,356	147,843	5,168	4,984	1,970	16	4	80	35,256	46,353	144,712
1999 . . .	243,517	67,015	163,229	5,630	5,549	2,095	15	3	82	38,710	51,865	152,941
2000 . . .	264,634	66,327	183,688	6,211	6,170	2,238	13	2	84	42,321	56,481	165,827
2001 . . .	274,211	73,341	184,892	6,778	6,818	2,382	14	2	84	47,112	64,401	162,698
2002 ⁴ . . .	276,434	80,490	178,514	7,332	7,550	2,548	15	3	82	50,807	65,559	160,068
2003 ⁴ . . .	283,795	85,279	179,615	7,944	8,247	2,710	16	3	81	54,103	67,780	161,911

¹ Nonfederal R&D expenditures to university and college performers. ² R&D spending by the Department of Defense, including space activities, and a portion of the Department of Energy funds. ³ For the National Aeronautics and Space Administration only. ⁴ Preliminary.

Source: U.S. National Science Foundation, *National Patterns of R&D Resources*, annual. See also <<http://www.nsf.gov/sbe/srs/>>.

Table 775. Performance Sector of R&D Expenditures: 1995 to 2003

[In millions of dollars (183,611 represents \$183,611,000,000). For calendar year. FFRDCs are federally-funded research and development centers. For most academic institutions and the Federal Government before 1997, began on July 1 instead of October 1]

Year	Federal government		Industry			Industry FFRDCs	Universities and colleges						Other nonprofit institutions				
			Funded by—				Funded by—						Funded by—				
			Total	Federal government	Industry ¹		Total	Federal government	Nonfederal government ²	Industry	Universities & colleges	Nonprofits	Universities' & colleges' FFRDCs ³	Total	Federal government	Industry	Nonprofits
RESEARCH AND DEVELOPMENT TOTAL																	
1995	183,611	16,904	129,830	21,178	108,652	2,273	22,603	13,582	1,750	1,547	4,109	1,616	5,367	5,827	2,847	671	2,308
1999	243,517	17,851	180,672	20,496	160,176	2,039	28,135	16,223	2,095	2,077	5,630	2,110	5,652	8,175	3,761	975	3,440
2000	264,634	17,917	197,539	17,118	180,421	2,000	30,566	17,637	2,238	2,165	6,211	2,316	5,742	9,404	4,447	1,103	3,854
2001	274,211	21,048	198,505	16,899	181,606	2,020	33,518	19,654	2,382	2,177	6,778	2,528	6,225	10,702	5,302	1,110	4,290
2002, prel.	276,434	23,788	192,379	17,085	175,294	2,235	36,846	22,052	2,548	2,150	7,332	2,764	7,132	11,766	5,910	1,070	4,786
2003, prel.	283,795	24,959	193,729	17,314	176,415	2,383	40,262	24,499	2,710	2,123	7,944	2,986	7,421	12,661	6,323	1,077	5,261
BASIC RESEARCH																	
1995	29,602	2,689	5,569	190	5,379	530	15,139	9,629	1,069	945	2,509	987	2,702	2,899	1,170	390	1,338
1999	38,710	3,347	6,560	1,198	5,362	557	20,900	12,773	1,429	1,417	3,841	1,439	2,765	4,185	1,734	541	1,910
2000	42,321	3,765	6,942	925	6,017	547	22,726	13,836	1,539	1,488	4,271	1,592	2,873	4,852	2,099	612	2,140
2001	47,112	4,317	7,911	754	7,157	552	24,862	15,299	1,643	1,501	4,675	1,744	3,041	5,518	2,520	616	2,382
2002, prel.	50,807	4,617	7,671	762	6,908	611	27,369	17,122	1,765	1,489	5,079	1,915	3,484	6,105	2,854	594	2,657
2003, prel.	54,103	4,463	7,725	773	6,952	651	29,940	19,022	1,877	1,470	5,503	2,069	3,625	6,709	3,190	598	2,921
APPLIED RESEARCH																	
1995	40,932	4,952	26,919	3,164	23,755	535	5,655	2,775	559	494	1,311	516	1,050	1,692	934	170	589
1999	51,865	5,530	36,418	3,109	33,309	274	5,843	2,740	546	542	1,467	550	1,251	2,419	1,300	247	872
2000	56,481	6,105	38,812	2,682	36,130	269	6,661	3,349	573	554	1,591	593	1,330	3,087	1,831	279	977
2001	64,401	7,164	43,486	3,603	39,883	916	7,366	3,839	606	554	1,724	643	1,548	3,570	2,202	281	1,087
2002, prel.	65,559	8,083	42,140	3,643	38,497	955	8,146	4,418	642	542	1,848	697	1,938	3,933	2,448	271	1,213
2003, prel.	67,780	8,837	42,434	3,691	38,743	1,040	8,927	4,954	683	535	2,002	753	1,968	4,215	2,609	273	1,333
DEVELOPMENT																	
1995	113,077	9,262	97,342	17,824	79,518	1,208	1,810	1,178	123	108	288	113	1,616	1,236	744	111	381
1999	152,941	8,974	137,694	16,189	121,505	1,208	1,392	711	120	119	322	121	1,636	1,570	726	187	658
2000	165,827	9,047	151,784	13,510	138,274	1,185	1,179	452	126	122	349	130	1,540	1,461	513	211	737
2001	162,698	9,567	147,108	12,542	134,566	552	1,290	516	133	122	378	141	1,636	1,614	581	212	821
2002, prel.	160,068	11,088	142,569	12,680	129,889	669	1,331	512	141	119	406	153	1,710	1,728	608	205	916
2003, prel.	161,911	11,658	143,569	12,850	130,719	692	1,395	523	150	117	439	165	1,828	1,736	524	206	1,006

¹ Includes all non-federal sources of industry R&D expenditures. ² Includes all non-federal sources. ³ Includes all R&D expenditures of FFRDCs administered by academic institutions and funded by the federal government.

Source: National Science Foundation. Data derived from: *Research and Development in Industry*, annual; *Academic Research and Development Expenditures*, annual; and *Federal Funds for Research and Development*, annual. Also see <<http://www.nsf.gov/sbe/srs/nprdr/start.htm>>.

Table 776. National R&D Expenditures as a Percent of Gross Domestic Product by Country: 1985 to 2001

Year	Total R&D						Nondefense R&D ¹					
	United States	Japan	Unified Germany	France	United Kingdom	Italy	United States	Japan	Unified Germany	France	United Kingdom	Italy
1985	2.76	2.54	2.68	2.22	2.24	1.12	1.9	2.5	2.6	1.8	1.8	1.1
1990	2.65	2.78	2.67	2.37	2.15	1.29	2.0	2.8	2.5	1.9	1.7	1.3
1995	2.51	2.69	2.26	2.31	1.95	1.00	2.0	2.8	2.2	2.0	1.7	1.0
1996	2.55	2.77	2.26	2.30	1.88	1.01	2.1	2.7	2.2	2.0	1.6	1.0
1997	2.58	2.83	2.29	2.22	1.81	1.05	2.1	2.8	2.2	2.0	1.5	1.1
1998	2.60	2.94	2.31	2.17	1.80	1.07	2.2	2.9	2.3	2.0	1.5	1.1
1999	2.65	2.94	2.44	2.18	1.88	1.04	2.3	2.9	2.4	2.0	1.6	1.1
2000	2.72	2.98	2.49	2.18	1.85	1.10	2.4	3.0	2.4	2.0	1.6	1.0
2001	2.82	(NA)	2.53	2.20	(NA)	(NA)	2.4	(NA)	2.5	2.0	(NA)	(NA)

NA Not available. ¹ Estimated.

Source: National Science Foundation, *National Patterns of R&D Resources*, annual; and Organization for Economic Cooperation and Development.

Table 777. Federal Obligations for Research in Current and Constant (1996) Dollars by Field of Science: 1980 to 2003

[In millions of dollars (11,597 represents \$11,597,000,000). For fiscal years ending in year shown; see text, Section 8. Excludes R&D plant]

Field of science	1980	1985	1990	1995	1999	2000	2001	2002, prel.	2003, prel.
CURRENT DOLLARS									
Research, total	11,597	16,133	21,622	28,434	33,528	38,471	44,714	49,809	53,377
Basic	4,674	7,819	11,286	13,877	17,444	19,570	21,958	24,174	25,977
Applied	6,923	8,315	10,337	14,557	16,084	18,901	22,756	25,635	27,400
Life sciences	4,192	6,363	8,830	11,811	15,422	17,965	23,057	25,868	28,673
Psychology	199	327	449	623	633	1,627	742	839	955
Physical sciences	2,001	3,046	3,809	4,278	4,066	4,788	4,601	5,145	5,200
Environmental sciences	1,261	1,404	2,174	2,854	3,095	3,329	3,252	3,668	3,879
Mathematics and computer sciences	241	575	841	1,579	1,981	2,206	2,611	2,751	2,866
Engineering	2,830	3,618	4,227	5,708	6,263	6,346	8,197	8,951	9,161
Social sciences	524	460	630	679	855	1,050	1,009	1,027	1,050
Other sciences, n.e.c.	350	342	664	902	1,212	1,160	1,246	1,559	1,593
CONSTANT (1996) DOLLARS ²									
Research, total	20,713	21,953	25,127	29,002	32,011	35,988	40,872	44,954	47,569
Basic	8,348	10,640	13,116	14,154	16,655	18,307	20,071	21,817	23,150
Applied	12,365	11,314	12,013	14,848	15,356	17,681	20,800	23,136	24,419
Life sciences	7,487	8,658	10,261	12,047	14,724	16,805	21,076	23,347	25,553
Psychology	355	445	522	635	604	1,522	678	757	851
Physical sciences	3,574	4,145	4,426	4,364	3,882	4,479	4,205	4,644	4,635
Environmental sciences	2,252	1,910	2,526	2,911	2,955	3,114	2,972	3,310	3,457
Mathematics and computer sciences	430	782	977	1,611	1,891	2,064	2,386	2,483	2,554
Engineering	5,054	4,923	4,912	5,822	5,980	5,936	7,493	8,079	8,164
Social sciences	936	626	732	693	816	982	922	927	936
Other sciences, n.e.c. ¹	625	465	772	920	1,157	1,085	1,139	1,407	1,419

¹ Not elsewhere classified. ² Based on gross domestic product implicit price deflator.

Source: U.S. National Science Foundation, *Federal Funds for Research and Development*, annual. See also <<http://www.nsf.gov/statistics/publication.cfm>>.

Table 778. Federal Budget Authority for R&D in Current and Constant (1996) Dollars by Selected Budget Functions: 2001 to 2004

[In millions of dollars (86,756 represents \$86,756,000,000). For year ending September 30. Excludes R&D plant. Represents budget authority. Functions shown are those for which \$1 billion or more was authorized since 1995]

Function	Current dollars				Constant (2000) dollars ¹			
	2001	2002	2003	2004, prel.	2001	2002	2003	2004, prel.
Total ²	86,756	97,624	112,544	122,045	84,772	93,734	106,324	113,805
National defense	45,713	53,016	63,048	69,852	44,668	50,904	59,564	65,136
Health	20,758	23,560	26,517	28,188	20,283	22,621	25,052	26,285
Space research and technology	6,126	6,270	7,355	7,597	5,986	6,021	6,948	7,084
Energy	1,314	1,327	1,403	1,441	1,284	1,274	1,325	1,343
General science	5,468	5,753	6,129	6,388	5,343	5,524	5,790	5,957
Natural resources and environment	2,096	2,160	2,151	2,220	2,048	2,074	2,032	2,070
Transportation	1,640	1,838	1,869	1,908	1,602	1,765	1,766	1,779
Agriculture	1,657	1,606	1,708	1,747	1,619	1,542	1,614	1,629

¹ Based on gross domestic product implicit price deflator. ² Includes other functions, not shown separately.

Source: U.S. National Science Foundation, *Federal R&D Funding by Budget Function*, annual. See also <<http://www.nsf.gov/statistics/nsf04329/htmstart.htm>> (released December 2004).

Table 779. R&D Expenditures in Science and Engineering at Universities and Colleges in Current and Constant (1996) Dollars: 1990 to 2002

[In millions of dollars (16,286 represents \$16,286,000,000). Totals may not add due to rounding]

Characteristic	Current dollars				Constant (1996) dollars ¹			
	1990	1995	2000	2002	1990	1995	2000	2002
Total	16,286	22,170	30,063	36,333	18,926	22,613	28,134	32,943
Basic research ²	10,643	14,808	22,243	26,959	12,368	15,104	20,815	24,443
Applied R&D ²	5,643	7,362	7,820	9,374	6,558	7,509	7,318	8,499
Source of funds:								
All governments	9,638	13,331	17,518	21,834	11,200	13,598	16,394	19,797
Institutions' own funds	1,324	1,689	2,198	2,501	1,539	1,723	2,057	2,268
Industry	3,006	4,047	5,940	7,109	3,493	4,128	5,559	6,446
Other	1,127	1,489	2,153	2,188	1,310	1,519	2,015	1,984
Fields:								
Physical sciences	1,807	2,256	2,711	3,008	2,100	2,301	2,537	2,727
Environmental sciences	1,069	1,434	1,764	2,022	1,242	1,463	1,651	1,833
Mathematical sciences	222	279	341	387	258	285	319	351
Computer sciences	515	682	876	1,126	598	696	820	1,021
Life sciences	8,726	12,188	17,468	21,404	10,141	12,432	16,347	19,407
Psychology	253	371	516	671	294	378	483	608
Social sciences	703	1,019	1,298	1,583	817	1,039	1,215	1,435
Other sciences	336	427	535	627	390	436	501	568
Engineering	2,656	3,515	4,554	5,504	3,087	3,585	4,262	4,990

¹ Based on gross domestic product implicit price deflator. ² Basic research and applied R&D statistics were re-estimated for FY 2001 and forward. These data are not directly comparable to those from earlier years.

Source: U.S. National Science Foundation, *Survey of Research and Development Expenditures at Universities and Colleges*, annual.

Table 780. Federal R&D Obligations to Selected Universities and Colleges: 2001 and 2002

[In millions of dollars (19,390.2 represents \$19,390,200,000), except rank. For years ending September 30. For the top 40 institutions receiving Federal R&D funds in 2002. Awards to the administrative offices of university systems are excluded from totals for individual institutions because that allocation of funds is unknown, but those awards are included in "total all institutions"]

Major institution ranked by total 2002 Federal R&D obligations	2001	2002	Major institution ranked by total 2002 Federal R&D obligations		
			2001	2002	
Total, all institutions ¹	19,390.2	21,117.9	Massachusetts Institute of Technology	252.5	268.8
Johns Hopkins University	838.0	974.7	Baylor College of Medicine	231.7	266.8
University of Washington	474.5	525.6	University Southern California	232.5	254.3
University of Pennsylvania	412.0	447.2	University of Alabama—Birmingham	201.6	224.2
University of Michigan	403.4	419.7	Vanderbilt University	166.1	215.5
University of California—Los Angeles	363.9	415.7	Case Western Reserve University	200.0	213.4
Stanford University	351.1	381.0	University of Illinois—Urbana in Champaign	186.9	194.0
University of California—San Diego	333.9	373.6	The Scripps Research Institute	157.4	193.6
University of California—San Francisco	344.9	361.0	University of Rochester	171.2	189.2
Washington University	314.7	348.0	University of California—Berkeley	210.6	187.3
University of Pittsburgh	300.8	335.8	University of California—Davis	166.2	185.3
Columbia University—Main Division	305.8	330.2	Boston University	154.4	182.9
University of Wisconsin—Madison	290.2	327.9	Emory University	161.9	180.6
Duke University	274.1	327.5	Ohio State University	156.6	174.7
Harvard University	321.7	313.4	Northwestern University	164.0	174.0
University of Colorado	290.7	308.3	University of Iowa	163.9	172.7
Yale University	276.2	306.9	University of Arizona	166.9	168.5
University of North Carolina at Chapel Hill	275.9	297.9	University of Florida	157.4	167.1
University of Minnesota	273.1	291.9	University of Texas SW Medical Center Dallas	146.9	162.3
Pennsylvania State University	253.6	287.1	University of Chicago	160.1	161.5
Cornell University	271.9	283.1			

¹ Includes other institutions, not shown separately. Source: U.S. National Science Foundation, *Federal S&E Support to Universities and Colleges and Nonprofit Institutions*, annual.

Table 781. Graduate Science/Engineering Students in Doctorate-Granting Colleges by Characteristic and Field: 1990 to 2003

[In thousands (397.8 represents 397,800). As of fall. Includes outlying areas]

Field of science or engineering	Total			Characteristic							
				Female			Foreign		Part-time		
	1990	2000	2003	1990	2000	2003	1990	2000	2003	1990	2000
Total, all surveyed fields	397.8	433.3	507.2	149.7	195.3	233.4	122.3	148.0	123.2	118.2	135.5
Science/engineering	350.6	366.7	428.0	113.4	145.6	174.2	116.9	141.0	100.7	94.7	107.8
Engineering, total	99.9	98.4	119.3	13.6	19.6	25.5	46.1	58.2	35.9	27.8	31.6
Sciences, total	250.7	268.3	308.7	99.8	126.0	148.7	70.8	82.7	64.8	66.9	76.2
Physical sciences	32.5	29.3	33.3	7.6	8.7	10.4	11.5	13.9	3.6	3.2	3.3
Environmental	12.9	12.7	13.5	3.8	5.2	6.0	2.6	2.7	3.0	2.6	2.5
Mathematical sciences	17.3	13.8	17.4	5.3	4.9	6.3	5.7	7.1	4.0	2.7	3.5
Computer sciences	27.7	39.5	46.7	6.4	11.4	12.5	19.3	21.6	12.9	16.3	18.4
Agricultural sciences	10.9	11.2	12.4	3.2	4.7	5.6	2.4	2.5	2.0	2.3	2.9
Biological sciences	46.0	52.3	60.6	21.0	27.4	33.4	11.5	14.5	6.8	7.2	8.2
Psychology	35.8	37.7	41.8	23.6	27.0	30.8	2.1	2.8	10.3	9.5	11.6
Social sciences	67.7	71.8	82.8	29.0	36.8	43.8	15.7	17.6	22.1	23.0	25.9
Health fields, total	47.2	66.6	79.3	36.3	49.6	59.2	5.4	7.0	22.5	23.5	27.6

Source: U.S. National Science Foundation, *Survey of Graduate Science Engineering Students and Postdoctorates*, annual.

Table 782. Science and Engineering Degree Recipients, 1999 and 2000, and Post-Graduate Employment Status, 2001

[In thousands (758.3 represents 758,300). FT represents full-time. Based on a survey and subject to sampling error; see source for details]

Degree and field	Graduates 1999 and 2000 (1,000)	2001 ¹				
		In school ²	Employed		Not employed or not FT students	Median salary ⁴ (\$1,000)
			In S&E ^{3,4} (\$1,000)	In other		
Bachelor's recipients	758.3	168.4	171.5	373.8	44.6	34
All science fields	649.0	154.5	94.7	358.4	41.4	31
Computer and information sciences	61.5	(B)	35.6	19.5	4.4	51
Mathematical sciences	24.4	4.3	3.8	14.6	(B)	33
Life and related sciences	159.4	52.9	17.8	81.6	7.1	29
Physical and related sciences	32.2	10.1	10.6	9.9	1.6	34
Psychology	152.9	41.0	11.1	91.2	9.6	28
Social and related sciences	218.7	44.2	15.9	141.7	17.0	30
All engineering fields	109.2	13.8	76.8	15.3	3.3	49
Aerospace and related engineering	2.2	0.4	1.3	0.4	(B)	44
Chemical engineering	10.8	2.2	6.4	1.7	(B)	50
Civil and architectural engineering	16.8	1.5	12.5	2.2	(B)	42
Electrical, electronics, computer and communications engineering	34.2	4.3	25.8	3.3	(B)	54
Industrial engineering	6.9	(B)	4.6	1.7	(B)	49
Mechanical engineering	25.8	2.7	18.8	3.6	(B)	48
Other engineering	12.6	2.3	7.5	2.2	(B)	45
Master's recipients	160.1	29.5	77.3	45.9	7.4	51
All science fields	115.3	23.9	44.1	41.4	5.8	45
Computer and mathematical sciences	24.3	1.6	17.1	4.4	(B)	65
Mathematical sciences	6.2	1.6	2.5	2.0	(B)	45
Life and related sciences	16.2	4.7	5.9	5.0	(B)	37
Physical and related sciences	8.6	3.2	3.9	1.1	(B)	45
Psychology	33.0	5.8	9.1	16.1	2.0	35
Social and related sciences	27.1	7.1	5.6	12.8	1.5	43
All engineering fields	44.8	5.6	33.2	4.5	1.5	60
Aerospace and related engineering	1.2	0.2	0.8	(B)	(B)	62
Chemical engineering	2.0	0.6	1.2	(B)	(B)	58
Civil and architectural engineering	6.3	(B)	5.1	(B)	(B)	50
Electrical, electronics, computer and communications engineering	16.4	1.7	13.0	1.0	(B)	66
Industrial engineering	3.2	(B)	2.4	(B)	(B)	62
Mechanical engineering	6.1	1.0	4.5	(B)	(B)	60
Other engineering	9.5	1.6	6.3	1.2	(B)	61

B Base figure too small to meet statistical standards of reliability of a derived figure. ¹ As of April. ² Full-time students. ³ In science and engineering. ⁴ For the principal job. Excludes full-time students, the self-employed, and persons whose principal job is less than 35 hours per week. For definition of median, see Guide to Tabular Presentation. Source: National Science Foundation, *National Survey of Recent College Graduates: 2001*.

Table 783. Doctorates Conferred by Characteristics of Recipients: 2000 and 2003

[In percent, except as indicated. Based on the Survey of Earned Doctorate Awards; for description of methodology, see <http://www.nsf.gov/sbe/srs/ssed/sedmeth.htm>]

Characteristic	2000, total	2003									
		All fields ¹	Engin- eer- ing	Physi- cal sci- ences ²	Earth sci- ences	Math- ematics	Com- puter sci- ences	Biologi- cal sci- ences ³	Agricul- tural	Social sci- ences ⁴	Psychol- ogy
Total conferred (number)	41,368	40,710	5,265	3,284	783	994	866	5,694	922	4,139	3,275
Male	56.0	54.5	83.0	73.2	66.9	73.5	79.8	54.3	66.1	55.4	31.9
Female	43.8	45.2	17.0	26.8	33.1	26.5	20.2	45.6	33.9	44.6	67.1
Median age ⁵	33.6	33.3	31.4	31.8	32.7	30.3	32.5	30.4	33.4	33.8	32.2
CITIZENSHIP ⁶											
Total conferred (number)	39,485	38,629	4,807	3,011	702	910	763	8,183	835	3,748	2,973
U.S. citizen	75.6	72.6	39.5	59.6	67.5	51.6	50.3	46.2	53.1	67.5	93.4
Foreign citizen	24.4	27.4	60.5	40.4	32.5	48.4	49.7	17.1	46.9	32.5	6.6
RACE/ETHNICITY ⁷											
Total conferred (number)	29,837	28,044	2,166	1,949	514	516	443	4,065	481	2,690	2,853
White ⁸	79.3	76.6	71.8	78.7	83.5	78.9	68.6	75.1	82.3	75.8	79.0
Black ⁸	5.9	6.4	3.5	2.8	3.3	3.1	3.8	2.7	3.3	7.0	5.9
Asian/Pacific ⁸	7.8	7.2	15.8	9.5	5.1	9.9	18.5	13.3	4.8	6.6	4.4
Indian/Alaskan ⁸	0.6	0.5	0.5	0.1	0.4	0.4	0.5	0.3	0.8	0.6	0.8
Hispanic	4.3	5.1	4.8	3.7	3.5	3.1	2.3	4.3	4.6	5.7	5.9
Other/unknown ⁹	2.2	4.2	3.6	5.2	4.3	4.7	6.3	4.3	4.2	4.4	4.0

¹ Includes other fields, not shown separately. ² Astronomy, physics, and chemistry. ³ Biochemistry, botany, microbiology, physiology, zoology, and related fields. ⁴ Anthropology, sociology, political science, economics, international relations and related fields. ⁵ For definition of median, see Guide to Tabular Presentation. ⁶ For those with known citizenship. Includes those with temporary visas. ⁷ Excludes those with temporary visas. ⁸ Non-Hispanic. ⁹ For the year 2003, includes Native Hawaiians and Other Pacific Islanders, respondents choosing multiple races (excluding those selecting an Hispanic ethnicity), and respondents with unknown race/ethnicity. Source: U.S. National Science Foundation, *Science and Engineering Doctorate Awards*, annual. See also <http://www.nsf.gov/statistics/pubserf.cfm?TopID=2&SubID=5&SerID=11> (released December 2004).

Table 784. **Doctorates Awarded, by Field of Study and Year of Doctorate: 1995 to 2003**

	1995	1998	1999	2000	2001	2002	2003
Grand total, all fields	41,748	42,645	41,090	41,357	40,808	39,964	40,710
Science and engineering, total	26,535	27,278	25,932	25,966	25,540	24,571	25,258
Engineering, total	6,008	5,924	5,330	5,321	5,502	5,071	5,265
Aeronautical/astronautical	252	241	206	214	203	208	199
Chemical	708	776	674	725	728	705	643
Civil	656	650	584	556	594	625	672
Electrical	1,731	1,596	1,478	1,544	1,576	1,392	1,463
Industrial/manufacturing	284	229	211	176	205	230	211
Materials/metallurgical	588	565	469	451	497	396	473
Mechanical	1,025	1,022	855	864	953	827	814
Other	764	845	853	791	746	688	790
Science, total	20,527	21,354	20,602	20,645	20,038	19,500	19,993
Biological/agricultural sciences	6,412	6,882	6,548	6,797	6,543	6,580	6,616
Agricultural sciences	1,036	1,037	966	943	853	893	922
Biological sciences	5,376	5,845	5,582	5,854	5,690	5,687	5,694
Earth, atmospheric, and ocean sciences, total	780	814	805	758	749	785	783
Atmospheric	130	125	124	143	116	117	139
Earth	454	504	452	386	393	428	373
Oceanography	115	112	130	134	121	128	133
Other environmental sciences	81	73	99	95	119	112	138
Mathematical/computer sciences, total	2,187	2,104	1,938	1,909	1,833	1,725	1,860
Computer sciences	997	927	855	859	826	807	866
Mathematics	1,190	1,177	1,083	1,050	1,007	918	994
Physical sciences, total	3,841	3,824	3,579	3,407	3,393	3,209	3,320
Astronomy	173	206	159	185	186	144	167
Chemistry	2,162	2,216	2,132	1,989	1,980	1,923	2,037
Physics	1,479	1,378	1,271	1,204	1,197	1,124	1,080
Other	27	24	17	29	30	18	36
Psychology	3,429	3,675	3,668	3,618	3,442	3,198	3,275
Social sciences, total	3,878	4,055	4,064	4,156	4,078	4,003	4,139
Economics	1,152	1,156	1,075	1,086	1,081	1,023	1,051
Political science	894	959	1,016	987	984	938	1,026
Sociology	555	579	572	637	577	565	612
Other social sciences	1,277	1,361	1,401	1,446	1,436	1,477	1,450
Non-science and engineering, total	15,213	15,367	15,158	15,391	15,268	15,393	15,452
Education	6,650	6,571	6,546	6,429	6,337	6,487	6,627
Health	1,329	1,500	1,407	1,591	1,620	1,655	1,633
Humanities	4,691	5,116	5,034	5,213	5,160	5,009	5,015
Professional/other/unknown	2,543	2,180	2,171	2,158	2,151	2,242	2,177

Source: U.S. National Science Foundation, *Science and Engineering Doctorate Awards*, annual. See also <<http://www.nsf.gov/sbe/srs/nsf05300/start.htm>> (released December 2004).

Table 785. R&D Funds in R&D-Performing Manufacturing and Nonmanufacturing Companies by Industry: 2000 to 2002

Industry	NAICS ¹ code	Total R&D funds as a percent of net sales			Company R&D funds as a percent of net sales		
		2000	2001	2002	2000	2001	2002
All industries, total	(X)	3.8	4.1	3.9	3.4	3.8	3.6
All manufacturing industries, total	(X)	3.6	4.0	3.6	3.3	3.6	3.2
Food	311	(D)	0.5	(D)	0.4	0.5	0.6
Paper, printing, and support activities	322, 326	(D)	(D)	(D)	1.6	2.1	1.3
Petroleum and coal products	324	(D)	(D)	(D)	0.3	0.3	0.4
Chemicals	325	5.9	4.9	6.0	5.9	4.8	5.9
Plastic and rubber products	326	(D)	(D)	(D)	1.8	2.9	1.8
Nonmetallic mineral products	327	1.8	2.4	(D)	1.8	2.3	1.2
Primary metals	331	0.5	0.7	0.7	0.5	0.7	0.7
Fabricated metal products	332	1.4	1.7	1.5	1.4	1.6	1.4
Machinery	333	3.9	4.3	4.4	3.8	4.2	4.3
Navigation, measuring, electromedical, and control instruments	3345	12.0	12.6	8.7	8.0	7.3	5.4
Electrical equipment, appliances, and components	335	(D)	3.1	2.8	2.1	2.9	2.7
Motor vehicles, trailers, and parts	3361-3363	(D)	(D)	(D)	3.2	3.5	3.1
Aerospace products and parts	3364	7.3	5.7	4.1	2.8	3.0	2.3
All nonmanufacturing industries, total	(X)	4.1	4.3	4.4	3.3	4.0	4.1
Transportation and warehousing services	48, 49	(D)	2.5	(D)	0.4	2.4	0.5
Software publishing	5112	20.5	19.4	21.5	1.6	19.3	21.4
Architectural, engineering, and related services	5413	10.8	7.5	7.8	0.3	5.2	5.3
Computer systems design and related services	5415	12.3	17.4	16.5	5.9	16.5	14.3
Scientific R&D services	5417	42.9	47.7	21.3	1.8	36.5	17.6
Management of companies and enterprises	55	4.4	7.8	7.6	1.8	7.8	7.6

D Figure withheld to avoid disclosure of information pertaining to a specific organization or individual. X Not applicable.
¹ North American Industry Classification System 1997 (NAICS); see text, Section 15.

Source: U.S. National Science Foundation, *Research and Development in Industry*, annual. See also <<http://www.nsf.gov/statistics/pubseri.cfm?TopID=2&SubID=5&SerID=26>>.

Table 786. Civilian Employment of Scientists, Engineers, and Technicians by Occupation and Industry: 2002

[In thousands (6,703.1 represents 6,703,100). Based on sample and subject to sampling error. For details, see source]

Occupation	Total ¹	Wage and salary workers							
		Mining ²	Construction	Manufacturing	Information	Professional, scientific and technical services	Government	Other service-providing industries	Self-employed ³
Scientists, engineers, and technicians, total	6,703.1	42.2	86.8	1,301.9	529.8	1,799.2	1,075.1	1,544.3	304.7
Scientists	998.6	7.0	1.4	99.3	29.4	210.0	323.6	224.3	93.5
Physical scientists	251.1	6.8	(NA)	47.7	1.3	77.4	84.3	22.4	10.2
Life scientists	214.0	(NA)	(NA)	23.5	0.1	43.4	90.1	38.9	9.6
Mathematical science occupations	107.0	(NA)	0.2	9.7	7.4	24.0	20.7	39.8	5.1
Social scientists and related occupations	426.4	0.2	1.2	18.3	20.6	65.2	128.4	123.3	68.6
Computer specialists	2,911.2	5.0	11.9	269.6	407.9	853.4	313.8	916.9	131.5
Engineers ⁴	1,478.3	16.0	42.5	565.6	59.8	354.5	191.6	192.9	54.8
Civil engineers	228.1	0.7	19.8	4.1	0.8	106.2	72.0	9.1	15.3
Electrical/electronics engineers	291.9	0.5	5.5	106.7	34.1	62.3	31.6	41.9	9.3
Mechanical engineers	215.1	0.7	5.2	116.2	2.4	44.8	12.8	26.4	6.6
Drafters, engineering, and mapping technicians ⁵	904.8	5.0	27.6	297.7	31.3	268.9	119.5	133.9	20.2
Electrical/electronics engineering technicians	203.6	0.9	3.5	82.9	22.0	26.3	17.0	49.9	0.9
Other engineering technicians	274.7	1.3	5.4	105.6	3.5	70.7	51.4	35.6	1.1
Drafters	216.1	0.6	14.3	60.5	1.9	105.4	6.7	18.6	8.1
Surveying and mapping technicians	60.1	0.7	1.0	(NA)	0.4	38.7	11.0	3.9	3.3
Life, physical, and social science technicians	345.9	8.3	0.3	69.6	0.9	66.3	118.0	73.3	2.4
Surveyors, cartographers, and photogrammetrists	64.3	0.8	3.1	0.1	0.4	46.1	8.6	2.9	2.2

NA Not available. ¹ Includes agriculture, forestry, and fishing not shown separately. ² Includes oil and gas extraction. ³ Includes secondary jobs. ⁴ Includes kinds of engineers and technicians not shown separately. ⁵ Includes other drafters, technicians, and mapping technicians not shown separately.

Source: U.S. Bureau of Labor Statistics, *National Industry-Occupation Employment Matrix*, February 2004. (Data collected biennially.)

Table 787. Funds for Performance of Industrial R&D by Selected Industries: 2000 to 2002

[In millions of dollars (199,539 represents \$199,539,000,000). For calendar years. Covers basic research, applied research, and development. Based on the Survey of Industry Research and Development]

Industry	NAICS ¹ code			2002	
		2000	2001	Total	Percent from company funds
CURRENT DOLLARS					
Total funds²	(X)	199,539	198,505	190,809	91.4
Chemicals and allied products	325	20,918	17,892	20,641	98.8
Machinery	333	6,580	6,404	6,429	99.0
Navigational, measuring, electromedical, and control instruments	3345	15,116	12,947	13,729	62.3
Electrical equipment, appliances, and components	335	(D)	4,980	2,039	97.0
Aerospace products and parts	3364	10,319	7,868	9,654	55.4
CONSTANT (1996) DOLLARS³					
Total funds²	(X)	186,677	181,416	172,491	91.4
Chemicals	325	19,570	16,352	18,659	98.8
Machinery	333	6,156	5,853	5,812	99.0
Navigational, measuring, electromedical, and control instruments	3345	14,142	11,832	12,411	62.3
Electrical equipment, appliances, and components	335	(D)	4,551	1,843	97.0
Aerospace products and parts	3364	9,654	7,191	8,727	55.4

D Figure withheld to avoid disclosure of information pertaining to a specific organization or individual. X Not applicable.
¹ North American Industry Classification System, 1997; see text, Section 15. ² Includes other industries not shown separately.
³ Based on gross domestic product implicit price deflator.

Source: U.S. National Science Foundation, *Research and Development in Industry*, annual.

Table 788. R&D Scientists and Engineers—Employment and Cost, by Industry: 2000 to 2002

[1,037.5 represents 1,037,500]

Industry	NAICS ¹ code	Employed scientists and engineers ² (1,000)			Cost per scientist or engineer, Constant (1996) dollars ^{3,4} (\$1,000)		
		2000	2001	2002	2000	2001	2002
All industries⁵	(X)	1,037.5	1,050.8	1,063.2	179.9	172.7	170.9
Chemicals	325	82.0	81.4	84.2	238.6	200.9	225.3
Machinery	333	51.9	53.8	56.2	118.7	108.8	108.7
Electrical equipment, appliances, and components	335	23.3	11.4	7.0	(D)	(D)	(D)
Motor vehicles, trailers, and parts	3361-3363	75.4	74.4	78.4	(D)	(D)	(D)
Aerospace products and parts	3364	40.2	22.1	25.8	(D)	325.9	(D)
Transportation and warehousing services	48, 49	1.5	1.3	0.4	(D)	(D)	(D)
Software publishing	5112	79.7	82.2	81.0	148.3	145.8	153.6
Architectural, engineering, and related services	5413	33.0	28.9	28.0	95.9	107.3	143.8
Computer systems design and related services	5415	41.6	54.6	76.8	116.2	153.2	125.5
Scientific R&D services	5417	52.4	58.4	55.0	230.3	223.1	245.1
Management of companies and enterprises	55	0.4	0.9	1.5	124.4	386.1	157.9

D Withheld to avoid disclosure. X Not applicable. ¹ North American Industry Classification System 1997 (NAICS); see text, Section 15. ² The mean number of full-time equivalent R&D scientists and engineers employed in January of the year shown and the following January. ³ Based on gross domestic product implicit price deflator. ⁴ Represents the arithmetic mean of the numbers of R&D scientists and engineers reported in each industry for January in 2 consecutive years divided into total R&D expenditures in each industry. ⁵ Includes other industries not shown separately.

Source: U.S. National Science Foundation, *Research and Development in Industry*, annual.

Table 789. Space Vehicle Systems—Net Sales and Backlog Orders: 1970 to 2003

[In millions of dollars (1,956 represents \$1,956,000,000). Backlog orders as of Dec. 31. Based on data from major companies engaged in manufacture of aerospace products. Includes parts but excludes engines and propulsion units, except where noted]

Year	Net sales			Backlog orders			Year	Net sales			Backlog orders		
	Total	Military	Non-military	Total	Military	Non-military		Total	Military	Non-military	Total	Military	Non-military
1970 . . .	1,956	1,025	931	1,184	786	398	1998 . .	9,490	4,227	5,264	20,371	7,970	12,402
1975 . . .	2,119	1,096	1,023	1,304	1,019	285	1999 . .	9,022	5,107	3,915	22,356	10,666	11,690
1980 . . .	3,483	1,461	2,022	1,814	951	863	2000 . .	8,164	3,723	4,441	21,395	8,942	12,453
1985 . . .	6,300	4,241	2,059	6,707	4,941	1,766	2001 . .	5,112	3,605	1,507	18,893	8,039	10,854
1990 . . .	9,691	6,556	3,135	12,462	8,130	4,332	2002 ¹ .	7,946	(D)	(D)	21,968	(D)	(D)
1995 . . .	11,314	4,782	6,532	15,650	5,872	9,778	2003 ¹ .	7,392	(D)	(D)	14,365	(D)	(D)

D Withheld to avoid disclosing data for individual companies. ¹ Includes engines and/or propulsion units for space vehicles, including parts.

Source: U.S. Census Bureau, *Current Industrial Reports*, M336G, *Civil Aircraft and Aircraft Engines*, annual. See also <<http://www.census.gov/industry/1/m336g0313.pdf>>.

Table 790. Federal Outlays for General Science, Space, and Other Technology, 1970 to 2004, and Projections, 2005 and 2006

[In billions of dollars (4.5 represents \$4,500,000,000). For fiscal years ending in year shown; see text, Section 8]

Year	Current dollars			Constant (2000) dollars		
	Total	General science/basic research	Space and other technologies	Total	General science/basic research	Space and other technologies
1970	4.5	0.9	3.6	19.3	4.0	15.2
1980	5.8	1.4	4.5	12.0	2.8	9.1
1985	8.6	2.0	6.6	13.7	3.2	10.5
1990	14.4	2.8	11.6	20.0	3.9	16.1
1995	16.7	4.1	12.6	18.7	4.6	14.1
2000	18.6	6.2	12.4	18.6	6.2	12.4
2001	19.7	6.5	13.2	19.3	6.4	12.9
2002	20.7	7.2	13.5	19.7	6.9	12.8
2003	20.8	7.9	12.9	19.3	7.4	12.0
2004	23.0	8.3	14.6	20.9	7.6	13.3
2005, proj.	23.9	9.0	14.8	21.2	8.0	13.2
2006, proj.	23.8	8.9	14.9	20.8	7.8	13.0

Source: U.S. Office of Management and Budget, *Budget of the United States, Historical Tables, Fiscal Year 2006*, annual. See also <<http://www.gpoaccess.gov/usbudget/fy06/hist.html>>.

Table 791. U.S. and Worldwide Commercial Space Industry Revenue by Type: 2000 to 2003

[In billions of dollars (35.4 represents \$35,400,000,000). For calendar years]

Industry	U.S.				World			
	2000	2001	2002	2003	2000	2001	2002	2003
Revenue, total	35.4	20.8	22.7	24.9	73.7	78.6	86.1	91.0
Satellite manufacturing ¹	6.0	3.8	4.4	4.6	11.5	9.5	12.1	9.8
Launch industry	2.7	1.1	1.0	2.1	5.3	3.0	3.7	3.2
Satellite services ²	11.8	15.9	16.6	18.2	39.2	46.5	49.1	55.9
Ground equipment manufacturing ³	10.7	(NA)	(NA)	(NA)	17.7	19.6	21.2	22.1

NA Not available. ¹ Includes revenues from the construction and sale of satellites to both commercial and government. ² Includes revenues derived from transponder leasing and subscription/retail services such as direct-to-home television and satellite mobile and data communications. ³ Includes revenues from the manufacture of gateways and satellite control stations, satellite news-gathering trucks, very small aperture terminals, direct-to-home television equipment and mobile satellite phones.

Source: Satellite Industry Association/Futron Corporation, Bethesda, MD, *2002-2003 Satellite Industry Indicators Survey* (copyright). See also <<http://www.sia.org/>>.

Table 792. World-Wide Successful Space Launches: 1957 to 2004

[Criterion of success is attainment of Earth orbit or Earth escape]

Country	Total, 1957-04	1957-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-2002	2003	2004
Total	4,358	289	586	555	607	605	550	466	586	61	53
Soviet Union/Russia ¹	2,723	82	302	405	461	483	447	283	217	21	22
United States	1,293	207	279	139	126	93	61	122	227	23	16
Japan	60	-	-	5	10	12	11	9	11	2	-
ESA ²	155	-	-	-	1	8	21	33	85	4	3
China	83	-	-	2	6	6	9	15	31	6	8
France	10	-	4	3	3	-	-	-	-	-	-
India	15	-	-	-	-	3	-	3	6	2	1
Israel	4	-	-	-	-	-	1	1	2	-	-
Ukraine ¹	13	-	-	-	-	-	-	-	7	3	3
Australia	1	-	1	-	-	-	-	-	-	-	-
United Kingdom	1	-	-	1	-	-	-	-	-	-	-

- Represents zero. ¹ Launches conducted by the former Soviet Union are listed separately as Russia or Ukraine. ² European Space Agency. Includes launches by Arianespace.

Source: Library of Congress, Congressional Research Service, Science Policy Research Division, *Space Activities of the United States, CIS, and Other Launching Countries/Research Services 1957-1999*; thereafter, Resources, Science, and Industry Division, 2004.

Table 793. National Aeronautics and Space Administration—Budget Appropriations, 2005 and Projections, 2006 to 2010

[In millions of dollars (16,070.4 represents \$16,070,400,000). Figures may not add due to rounding]

Item	2005	2006	2007	2008	2009	2010
Appropriation, total.	16,070.4	16,456.3	16,962.0	17,305.9	17,611.9	18,027.1
Science, exploration, & aeronautics	9,334.7	9,661.0	10,549.8	11,214.6	12,209.6	12,796.1
Science	5,527.2	5,476.3	5,960.3	6,503.4	6,853.0	6,797.6
Solar system exploration.	1,858.1	1,900.5	2,347.7	2,831.8	2,998.9	3,066.1
The universe	1,513.2	1,512.2	1,531.5	1,539.4	1,495.0	1,406.7
Earth-sun system	2,155.8	2,063.6	2,081.2	2,132.2	2,359.0	2,324.8
Exploration systems	2,684.5	3,165.4	3,707.0	3,825.9	4,473.7	5,125.5
Constellation systems	526.0	1,120.1	1,579.5	1,523.7	1,990.9	2,452.2
Exploration systems research & technology	722.8	919.2	907.3	989.2	1,050.3	1,078.5
Prometheus nuclear systems & technology	431.7	319.6	423.5	500.6	614.0	779.0
Human systems research & technology	1,003.9	806.5	796.7	812.4	818.5	815.8
Aeronautics research & technology	906.2	852.3	727.6	730.7	727.5	717.6
Education programs	216.7	166.9	154.9	154.7	155.4	155.4
Exploration capabilities	6,704.4	6,763.0	6,378.6	6,056.7	5,367.1	5,193.8
Space operations	6,704.4	6,763.0	6,378.6	6,056.7	5,367.1	5,193.8
International space station	1,676.3	1,856.7	1,835.3	1,790.9	2,152.3	2,375.5
Space shuttle	4,543.0	4,530.6	4,172.4	3,865.7	2,815.1	2,419.2
Space & flight support	485.1	375.6	370.9	400.0	399.7	399.1
Inspector General.	31.1	32.4	33.5	34.6	35.2	37.3

Source: U.S. National Aeronautics and Space Administration, *Fiscal Year 2006 Budget* <<http://www.nasa.gov/pdf/107486mainFY06high.pdf> (accessed June 2005).

Table 794. Nobel Prize Laureates in Selected Sciences: 1901 to 2003

[Presented by location of award-winning research and by date of award]

Country	1901–2003				1901–1930	1931–1945	1946–1960	1961–1975	1976–1990	1991–2002	2003
	Total	Physics	Chemistry	Physiology/Medicine							
Total	494	171	143	180	93	49	74	92	98	82	7
United States	219	74	51	90	6	14	38	41	63	54	5
United Kingdom	76	21	27	28	15	11	14	20	9	5	1
Germany ¹	63	19	29	15	27	11	4	8	7	4	-
France	25	11	7	7	13	2	-	5	2	3	-
Soviet Union	12	9	1	2	2	-	4	3	1	1	1
Japan	8	4	4	-	-	-	1	2	1	4	-
Other countries	91	30	22	39	30	11	13	13	15	4	-

- Represents zero. ¹ Between 1946 and 1991, data are for the former West Germany only.

Source: U.S. National Science Foundation, unpublished data.