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ABSTRACT

This report is the 24th in an annual series that provides information on the magnitude and distribution of federal Research and Development (R&D) programs. The data for the 1974-76 period on which the report is based were received from agencies early in 1975 and reflect plans in the President's 1976 budget. They were disaggregated in the survey by a number of measures, such as character of work, performer, and field, which are analyzed in detail in the various sections of the report. The aggregates are related in the first section to broader economic indicators. Some of the highlights of the report include: (1) a 15 percent increase in 1976 in federal R&D obligations budget program totals; (2) although the share of the federal budget represented by the R&D has declined continuously from 1965 to 1975, it is estimated to increase the share to 6.3 percent; (3) federal agencies continue to comprise the major source of national R&D funding; (4) industry sources have provided a great deal; and (5) a slight decline in applied research obligations is shown. (Author/EB)

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REPORTS	NSF No	Price
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Detailed Statistical Tables, Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1974, 1975, and 1976, Volume XXIV	75-323	——
Detailed Statistical Tables, Expenditures for Scientific and Engineering Activities at Universities and Colleges, Fiscal Yeor 1974	75-318	——
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(See inside back cover for Other Science Resources Publications.)

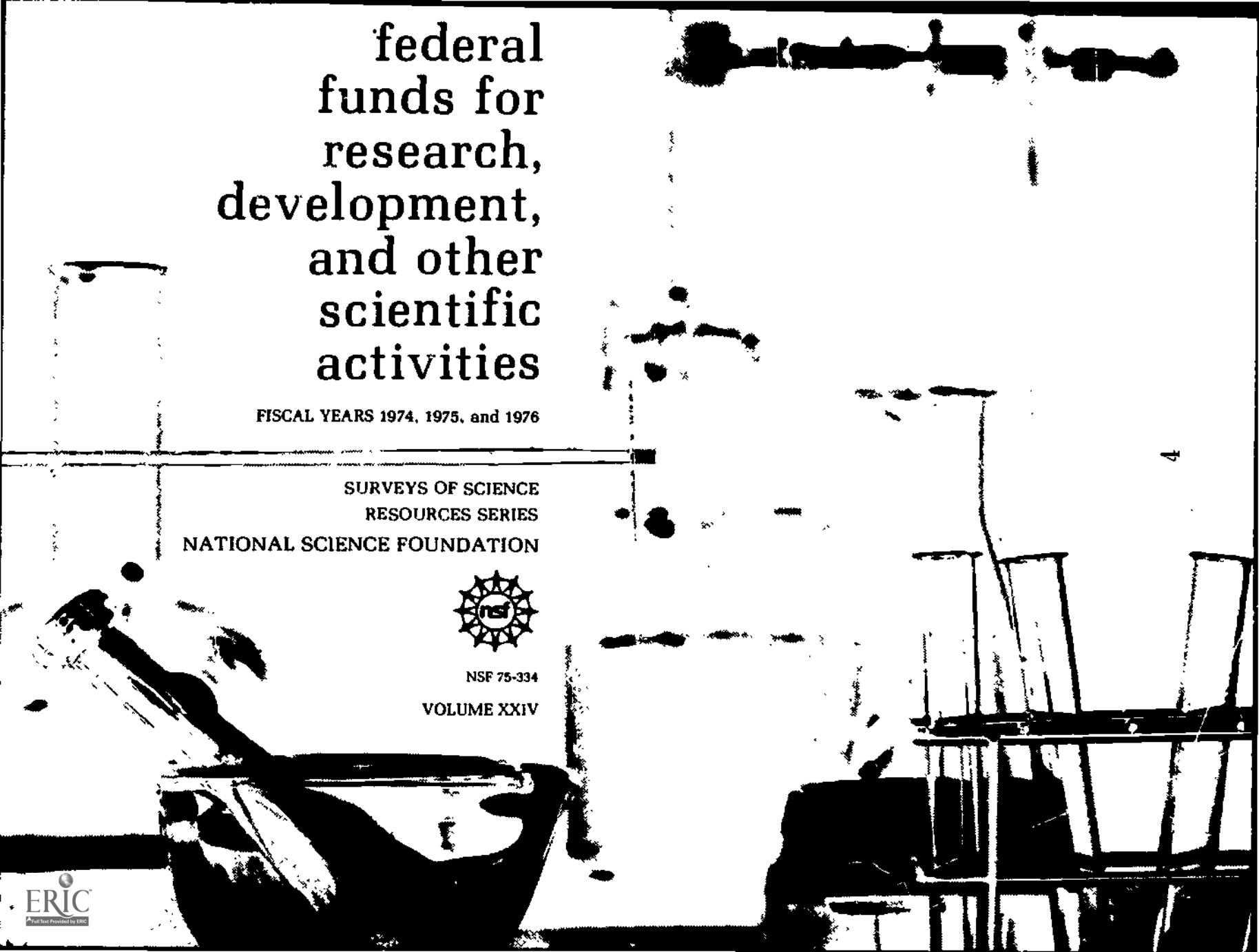
federal funds for research, development, and other scientific activities

FISCAL YEARS 1974, 1975, and 1976

SURVEYS OF SCIENCE
RESOURCES SERIES
NATIONAL SCIENCE FOUNDATION

NSF 75-334

VOLUME XXIV



FOREWORD

This report is the 24th in an annual series that provides information on the magnitude and distribution of Federal R&D programs. The data for the 1974-76 period on which the report is based were received from agencies early in 1975 and reflect plans in the President's 1976 budget. They were disaggregated in the survey by a number of measures, such as character of work, performer, and field, which are analyzed in detail in the various sections of the report. The aggregates are related in the first section to broader economic indicators. The uniform reporting guidelines provide a consistent basis for the study of trends by all the major measures over a timespan.

The National Science Foundation wishes to express appreciation for the cooperation of the staffs of participating Federal agencies, who made special efforts to meet the survey requirements. This report was prepared under the general guidance of Charles E. Falk, Director, Division of Science Resources Studies, and the special supervision of William L. Stewart, Head, R&D Economic Studies Section.

H. Guyford Stever
Director
National Science Foundation

December 1975

subsequent appropriations and apportionment actions

The data appearing in this report for fiscal year 1976 were compiled between March and May 1975. They are based on *The Budget of the United States Government, Fiscal Year 1976*, as submitted to the congress in February 1975, and do not reflect subsequent congressional actions or changes made by Executive apportionment. Based on estimates made in January 1976, these subsequent actions will reduce 1976 Federal R&D obligations from the $21.7 billion appearing in this report to approximately $21.3 billion. Estimated reductions from the levels shown for a number of agencies, particularly reductions for the Department of Defense ($755 million), the Department of Transportation ($60 million) and the National Science Foundation ($50 million) more than offset anticipated increases for other agencies, particularly the Energy Research and Development Administration ($430 million). More detailed and further revised information on 1976 R&D obligations will be presented in an NSF *Highlights* in mid-1976 covering fiscal years 1975-77, as well as in next year's *Federal Funds* report.

acknowledgments

This report was prepared in the Division of Science Resources Studies under the direction of Benjamin Olsen, Study Director, Government Studies Group. Responsibility for interpreting the data and for organization and writing of the report was taken by Howard Cihak, Jane Pugh, and Eleanor Stoddard. Dorothy K. Ham prepared statistical material and graphic illustrations.

note

In all tables and charts, details may not add to totals because of rounding. Percentages appearing in the text were calculated on the basis of thousands of dollars and may differ from percentages in text tables based on figures rounded to millions of dollars.

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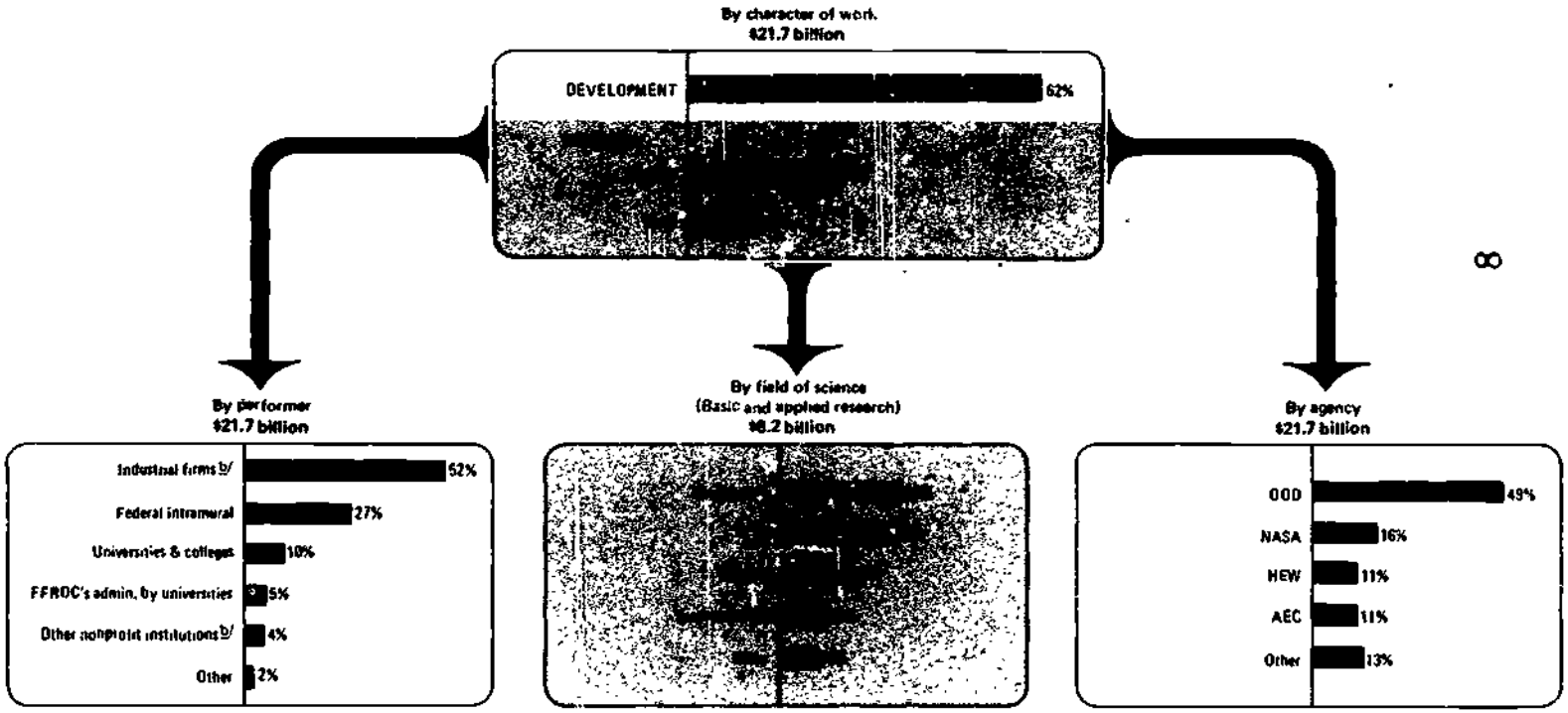
See note on p. 47

Distribution of Federal obligations for research and development,[a] FY 1976 (est.)



a/ Excludes R&D plant.

b/ Includes Federally Funded Research and Development Centers (FFRDC's) administered by this sector

SOURCE National Science Foundation

HIGHLIGHTS

- Federal R&D obligations (plant excluded) are expected to rise from $17.4 billion in fiscal year 1974 to $18.9 billion in fiscal year 1975 and $21.7 billion in fiscal year 1976. When an adjustment is made for inflation, the 8-percent increase for 1975 is converted to a decline.[1] The 1976 level, an increase of 15 percent, represents real growth unless final appropriations are far lower than the 1976 budget program totals.

- The share of the Federal budget represented by R&D and R&D plant programs has declined continuously from 1965, when the ratio reached a high of 12.6 percent, to 1975 when it was an estimated 6.2 percent. The estimated R&D total for 1976, however, would raise the share to 6.3 percent.

- When measured as a share of relatively controllable outlays—those that exclude fixed-cost and open-ended programs[2]—the R&D and R&D plant portion of the budget is found to be 14.9 percent in 1976, compared with 14.4 percent in 1975.

- Federal agencies continue to comprise the major source of national R&D funding. In 1975 they provided slightly more than one-half of the national R&D total, compared with almost two-thirds in 1966. Industry sources have provided most of the rest in the 1966-75 period.

- The national R&D total was $21.9 billion in 1966, and by 1975 was an estimated $34.3 billion. As a share of the gross national product (GNP), national R&D support declined from 2.9 percent in 1966 to an estimated 2.4 percent in 1975. Federal R&D support declined from 2.2 percent to an estimated 1.4 percent.

[1] In the absence of a reliable R&D cost index, the GNP (gross national product) implicit price deflator was used to convert R&D obligations to constant dollars. The GNP deflator includes the effects of the price change for all goods and services in the economy and therefore can only indicate approximate changes in costs of inputs specifically related to R&D performance.

[2] Social insurance, housing payments, interest, and other programs. See Office of Management and Budget, *The Budget of the United States Government, Fiscal Year 1976* (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office), pp. 354-5 and technical notes of this report (appendix A).

- Although DOD and NASA are still the leading agencies in R&D support, they reflect substantial constant-dollar declines in funding between 1966 and 1975: DOD down by 21 percent and NASA by 62 percent. In the same period, ERDA programs[3] fell 1 percent, whereas NSF programs rose by 60 percent, HEW by 49 percent, Interior by 34 percent, and USDA by 13 percent.

- In 1976 an estimated $15.9 billion, or 73 percent of the Federal R&D total, will be obligated to extramural performers. The remaining $5.8 billion, or 27 percent, will support intramural performance.

- Funds to industrial firms (including FFRDC's) are expected to increase 23 percent over 1975, while funds to universities and colleges will drop an estimated 3 percent.

- Basic research obligations will amount to an estimated $2.7 billion in 1976. Although a record high, this level represents a decrease in constant dollars from 1975. The total of $2.6 billion in 1975 (latest calculable year) is 16 percent lower than the 1967 high in real terms. As a share of the Federal R&D total, basic research is expected to be 12 percent in 1976, compared with 14 percent in 1975 and a high of 15 percent in 1972.

- Applied research obligations are expected to be $5.6 billion in 1976, another record high, although close to a leveling off in real performance. In constant dollars the total of $5.1 billion for 1976 is 6 percent lower than the 1966 peak. The applied research portion of the Federal R&D total is expected to be 26 percent in 1976, compared with 27 percent in 1975.

- Development obligations are estimated at $13.4 billion in 1976, a level higher than the previous high in 1967. In constant dollars, however, the total would be well below that level. The 1975 level of $11.2 billion is 36 percent lower than the 1967 total in real terms. As a share of the Federal R&D total, development is expected to be 62 percent in 1976, compared with 59 percent in 1975.

- In 1974 California continued to lead in Federal R&D support with 24 percent of the total (compared with 32 percent in 1965). Maryland accounted for 9 percent of the total, Massachusetts for 7 percent, and New York for 6 percent. These four States each received more than $1 billion in R&D funds. In 1974 more than $100 million was directed to each of 23 States, and every State received some R&D support.

[3] Prior to 1975 data for AEC were used.

INTRODUCTION

The changing nature of Federal support to science is closely watched both by policymakers and those who are affected by policy decisions. Each year the R&D portion of the Federal budget is analyzed and compared with past levels of funding at the time the budget is issued. Because the Federal Government provides more than one-half of the funds expended nationally on R&D activities (an estimated 53 percent in 1975) the plans of R&D performers—industrial firms, universities and colleges, and other nonprofit institutions—are directly affected by the anticipated expenditures of Federal agencies. Science planning and advisory groups and those who study the effects of R&D efforts on economic growth also have a strong interest in the direction and impact of Federal R&D funding. The first analysis of R&D programs appears with the budget document,[1] and other analyses are usually made shortly thereafter by groups in the scientific community, in research organizations, and by the press.

Federal Funds for Research, Development, and Other Scientific Activities represents a later and more detailed analysis of the R&D component of the Federal budget. A brief summary of the contents of *Federal Funds*, Volume XXIV was published as soon as broad survey totals were available.[2] The report is based on an extensive questionnaire distributed in January 1975 and completed by 93 agencies and agency subdivisions in the March-May period. Data were edited and processed by the National Science Foundation (NSF) and appendix tables prepared by computer processing. These tables were made separately available in advance of the report.[3]

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[1] See Office of Management and Budget, *Special Analyses, The Budget of the United States Government, Fiscal Year 1976*, "Special Analysis I: Research and Development Programs" (Washington, D.C.) 1975, p. 252.

[2] National Science Foundation, *Science Resources Studies Highlights*, "Federal R&D Funding Shows Significant Rise in FY 1976" (NSF 75-321), September 8, 1975 (Washington, D.C. 20550).

[3] National Science Foundation, *Detailed Statistical Tables, Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1974, 1975, and 1976*, Vol. XXIV (NSF 75-323) (Washington, D.C. 20550), 1975. These are obtainable gratis on request to NSF.

The data shown in this edition of *Federal Funds* are comparable to those included in the *Special Analysis* of Federal R&D programs in the President's budget to Congress for fiscal year 1976. The same definitions for research and development and R&D plant are used in both reports. Some differences exist in dollar amounts shown in the two reports because of the different timing of agency responses and because the *Federal Funds* report includes a few agencies omitted in the *Special Analysis*. The chief difference, however, is that *Federal Funds* provides detail on research performers, fields of science, and geographic distribution, as well as a more complete description of program changes between 1975 and 1976, and a comparison of R&D totals with broad economic indicators, which are not given in the *Special Analysis*.

Users of *Federal Funds* data should be mindful that figures for recent years are subject to continual change and that the timing of the survey is worth noting. Surveys are conducted at the midpoint of the middle fiscal year in each 3-year budget cycle. In *Federal Funds*, Volume XXIV, data for 1974 reflect transactions of a completed fiscal year and, thus, are "actual," while data for 1975 are subject to reprogramming and apportionment actions and for 1976 to appropriation, apportionment, and reprogramming actions and, thus, are estimated. The levels shown for 1975 in this report would, therefore, differ from those shown for 1975 in *Federal Funds*, Volume XXIII.

The most reliable historical record is the one given in the appendix tables for the latest edition. In the current report the historical time series covers R&D funding by agency, performing sector, character of work (basic research, applied research, and development), and field of science, as well as by State distribution. But the main emphasis of the analysis is on the current (1974-76) period. The report also covers R&D plant data and data on scientific and technical information activities.

While the statistics in this report do not reflect accounting precision, they do provide an accurate measure of trends. Most agency R&D programs are not identified as budget line items (although a number of them are so identified), and for this reason R&D programs usually have to be separated by respondents from larger appropriation accounts. They must then be further subdivided into the elements requested in the survey; e.g., research, development, R&D data by performers, research by fields, R&D data by State distribution, etc. Questions sometimes arise as to the exact boundaries of R&D activities, and the assignment of given programs to basic research, applied research, development, and fields of science is often judgmental. By this time, however, most agencies have had many years of experience in fulfilling *Federal Funds* survey requirements so that they have developed reliable response systems.

Agencies are both producers and users of the data, and this fact serves to increase the interaction between NSF staff and survey respondents in developing precision and clarifying definitions. Other users include members of Congress and congressional committee staffs, science administrators in the Executive branch, members of the scientific community, science historians, executives in industry and in research institutes, and members of the press. For some of these audiences the data in this series are sufficient for their purposes, although for others the data serve as a baseline for more detailed studies.

Part I

FEDERAL FUNDS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT

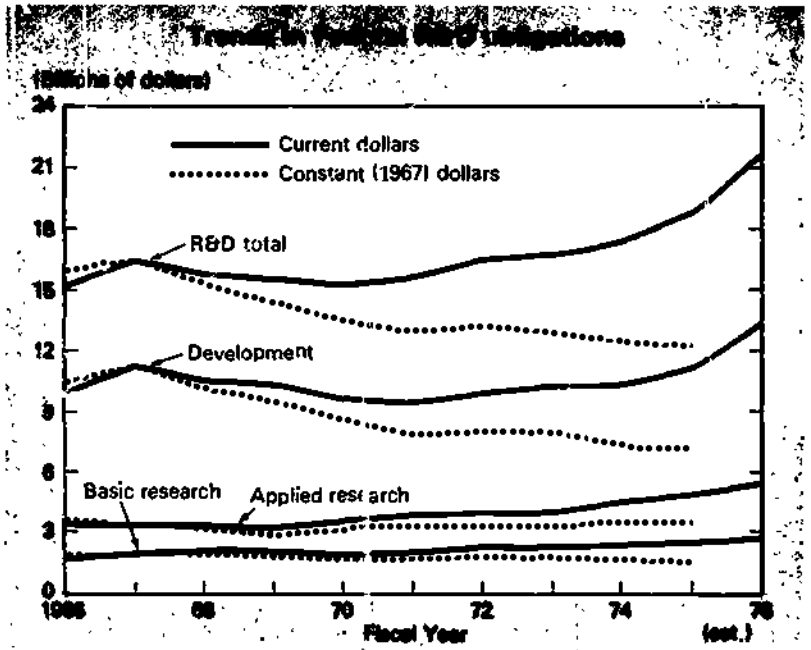
Section 1. FEDERAL R&D PERSPECTIVES

Federal R&D obligations (plant excluded) were $17.4 billion in fisca. year 1974 and an estimated $18.9 billion in fiscal year 1975 and were scheduled to reach $21.7 billion in fiscal year 1976 in the President's budget to Congress. All three years represent record highs in Federal R&D totals. The relative gains for the last two years are 8.4 percent and 14.5 percent, respectively.

When each of these figures is adjusted for an 11-percent rate of inflation, however, the 1975 increase reveals an actual decline, although the gain for 1976 will still represent an advance unless final appropriations are well below the President's requested program levels. Viewed against a 10-year perspective, 1976 represents only the third year in the 1966-76 decade that any real growth has been shown in overall Federal R&D funding. At no point has the 1967 peak been regained. In fact, the anticipated 1976 figure could be more than 20 percent below the 1967 level in terms of real performance.

In 1976, significant increases are shown for the Department of Defense (DOD), the National Aeronautics and Space Administration (NASA), and the Energy Research and Development Administration (ERDA), each of these increases large enough to reflect growth on a constant dollar basis. Accompanying this growth is a rise in share of total for the DOD/NASA component for the first time within the past decade. The two agencies together represented 79 percent of all Federal R&D obligations in 1966, but thereafter their share fell steadily to an estimated 63 percent in 1975. In the 1976 budget the trend is reversed with a rise in share to an anticipated 65 percent. Thus, despite the 1976 increase in ERDA programs, the "civilian" agencies will reflect only a 35-percent share in 1976, compared with 37 percent in 1975.

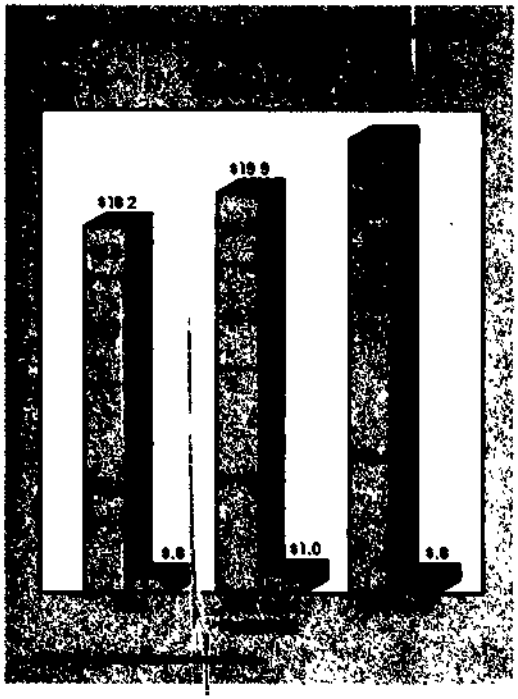
The program growth of DOD, the leading agency, more than any other factor, accounts for the significant rise in Federal R&D funding in 1976, and when the increase for NASA programs is added, these two agencies make up more than three-fourths of the overall Federal gain. Nearly all of the remaining agencies plan increases for 1976, but ERDA is the only one whose increase is ahead of anticipated inflation. The Department of Health, Education, and Welfare (HEW) shows an absolute decrease in 1976, the sole major agency with an overall loss.



Average Annual Percent Change

Character of work	1960-67	1976-74	1974-75	1975-76
Current dollars				
R&D total	11.8	.8	8.4	14.5
Research	15.4	4.5	7.9	6.5
Basic research	18.5	3.0	5.3	3.6
Applied research	13.7	5.3	9.2	8.0
Development	10.5	−1.3	8.8	20.1
Constant dollars[a]				
R&D total	9.9	−3.9	−2.2	(b)
Research	13.4	−.4	−2.7	(b)
Basic research	4.2	−1.8	−5.0	(b)
Applied research	11.7	−.5	−1.5	(b)
Development	8.5	−5.8	−1.8	(b)

[a]Based on GNP implicit price deflator.
[b]Not available.
SOURCE: National Science Foundation.



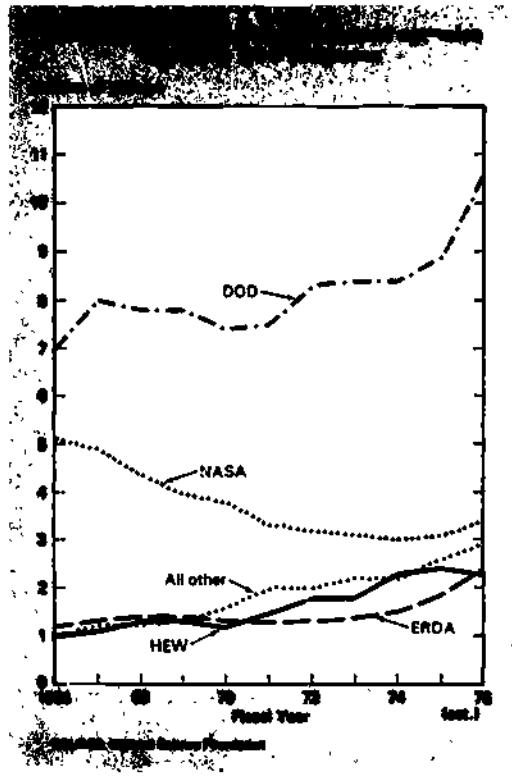
When support trends for leading agencies are analyzed for the period from 1966 to 1975 (the years for which actual deflators are available), it is found that DOD, NASA, and ERDA[1] are the only ones to reflect real declines in R&D funding. In constant dollars, DOD program levels fell 21 percent between 1966 and 1975, NASA program levels 62 percent, and ERDA levels 1 percent. The other important R&D support agencies increased their programs in terms of real performance: the National Science Foundation (NSF) by 60 percent, HEW by 49 percent, the Department of the Interior by 34 percent, and the Department of Agriculture (USDA) by 13 percent. Between 1970—the year of its founding—and 1975, the Environmental Protection Agency (EPA) showed a 139-percent increase in constant dollars.

On an aggregate basis the R&D programs of the DOD/NASA component were reduced by 38 percent in constant dollars between 1966 and 1975 while the joint programs of the remaining agencies were increased 35 percent.

The relative emphases placed on research and development changed accordingly. The chief weight of DOD and NASA programs is on development, and the size of their development programs has strongly influenced changes in overall Federal R&D trends. With the real decline in DOD/NASA funding, overall Federal development support showed a corresponding drop of 30 percent in constant dollars between 1966 and 1975. In the same period funding for research fell only 8 percent.

The 1976 budget moves in the opposite direction. The shares of the character of work components within the Federal R&D total are expected to be 12 percent for basic research, 26 percent for applied research, and 62 percent for development. The basic research share is 2 percentage points and the applied research share 1 percentage point lower than in 1975 and the development share 3 percentage points higher. These ratios reflect the planned increases in DOD, NASA, and ERDA funding in 1976 and the anticipated drop in the HEW research effort. Between 1966 and 1975 the development share, after reaching a high of 68 percent in 1967, had shown a tendency to decline as "civilian" programs grew.

[1] ERDA is based on Atomic Energy Commission (AEC) data prior to 1974.



R&D Plant

Federal obligations for R&D plant are expected to rise from $776 million in 1974 to an estimated $1,001 million in 1975 and then to fall to an estimated $837 million in 1976. In each of these years ERDA accounts for approximately one-half of the R&D plant activity. DOD accounts for approximately one-fourth and NASA for much of the rest.

Federal obligations and expenditures, fiscal years 1940-76

[Dollars in millions]

Fiscal year	Total budget outlays[2]	Research, development, and R&D plant[1]		Expenditures as percent of total budget outlays
		Obligations	Expenditures	
1940	$9,589	(3)	$74	0.8
1941	13,960	(3)	198	1.4
1942	34,500	(3)	280	.8
1943	78,909	(3)	602	.8
1944	93,956	(3)	1,377	1.5
1945	95,184	(3)	1,591	1.7
1946	61,738	(3)	918	1.5
1947	36,931	$691	900	2.4
1948	36,493	868	855	2.3
1949	40,570	1,105	1,082	2.7
1950	43,147	1,175	1,083	2.5
1951	45,797	1,812	1,301	2.8
1952	67,962	2,135	1,816	2.7
1953	76,769	3,331	3,101	4.0
1954	70,890	3,019	3,148	4.4
1955	68,509	2,715	3,308	4.8
1956	70,460	3,267	3,446	4.9
1957	76,741	4,319	4,462	5.6
1958	82,575	4,906	4,991	6.0
1959	92,104	7,113	5,806	6.3
1960	92,223	8,080	7,744	8.4
1961	97,795	9,607	9,287	9.5
1962	106,813	11,069	10,387	9.7
1963	111,311	13,663	12,012	10.8
1964	118,584	15,324	14,707	12.4
1965	118,430	15,746	14,889	12.6
1966	134,652	16,179	16,018	11.9
1967	158,254	17,149	16,859	10.7
1968	178,833	16,525	17,049	9.5
1969	184,548	16,310	16,348	8.9
1970	196,588	15,865	15,736	8.0
1971	211,425	16,175	15,992	7.6
1972	231,876	17,114	16,743	7.2
1973	246,526	17,596	17,510	7.1
1974	268,392	18,205	18,326	6.8
1975 (est)[4]	313,446	19,906	19,441	6.2
1976 (est)[4]	349,372	22,489	21,912	6.3

[1] Beginning in fiscal year 1953 amounts for both obligations and expenditures include pay and allowance of military personnel in research and development. [2] Outlays include expenditures plus net lending. Data through fiscal year 1953 are in terms of the Consolidated Cash Statement and data beginning with fiscal year 1954 are in terms of the Unified Budget. For purposes of trend information the data are considered to be reported on a generally comparable basis. [3] Not available. [4] These estimates are based on amounts shown in *The Budget, 1976* and do not reflect Congressional appropriations or changes made by Executive action subsequent to budget submission at the midpoint of fiscal 1975. SOURCES: Office of Management and Budget and Bureau of the Budget, *The Budget of the United States Government*, fiscal years 1940 through 1976; National Science Foundation annual surveys of R&D programs of Federal agencies.

Relationship to Total Budget

In the years following World War II the R&D portion of the Federal budget showed an increasing tendency to rise as a share of the budget total. In the fifties most R&D activities were devoted to defense and atomic energy missions, but by the sixties the rapidly expanding space program contributed measurably to Federal R&D totals and health research began to gain by much larger increments than in previous years. Federal R&D and R&D plant expenditures grew steadily, and as a share of the total budget they reached a peak of 12.6 percent in 1965.[2] Thereafter, even though total R&D funding often rose and even though many new R&D programs were initiated, the ratio continued to fall. This was partly caused by lower total dollar support for research and development in some years but more by the sheer growth of the overall budget.

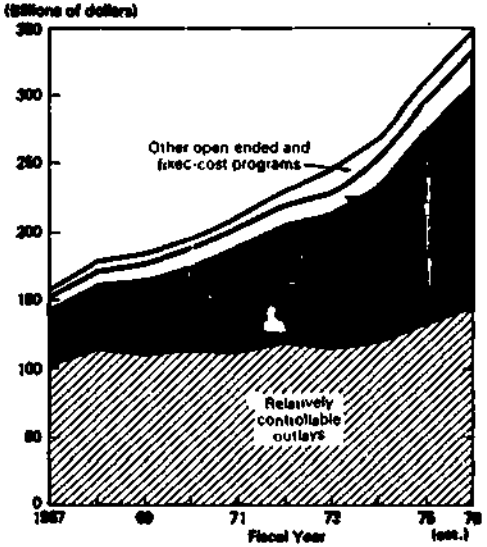
A slight reversal of this trend is indicated for 1976 when the ratio of R&D and R&D plant expenditures is expected to be 6.3 percent compared with 6.2 percent in 1975.

A more useful comparison can be obtained by relating R&D funding levels to that portion of the budget that is relatively controllable. In recent years an increasing portion of the Federal budget has represented open-ended and fixed-cost programs, such as social security, veterans benefits, Medicare, unemployment assistance, general revenue sharing, and interest on the Federal debt. The part of the budget that contains these programs is relatively uncontrollable in that it cannot be changed without changes in existing substantive law. With each new budget year, however, appropriations are made for the rest of the budget, and within this area, the portion allotted to R&D programs is an indication of the priority given to research and development in relation to other Federal activities.

Between 1967 and 1976 total Federal budget outlays rose from $158.3 billion to an estimated $349.4 billion. Within these totals the relatively controllable portion, which includes R&D funding, is seen to have risen from $103.2 billion in 1967 (earliest calculable year) to an estimated $146.5 billion in 1976, a decline in share from almost

[2] R&D and R&D plant expenditures rather than obligations are used to relate to budget outlays since outlays are the same as expenditures except for the addition of net lending.

Federal budget outlays by relatively controllable and uncontrollable components



*Social insurance, housing payments and public assistance minus undistributed employer share and employee retirement.
SOURCES: Office of Management and Budget, National Science Foundation

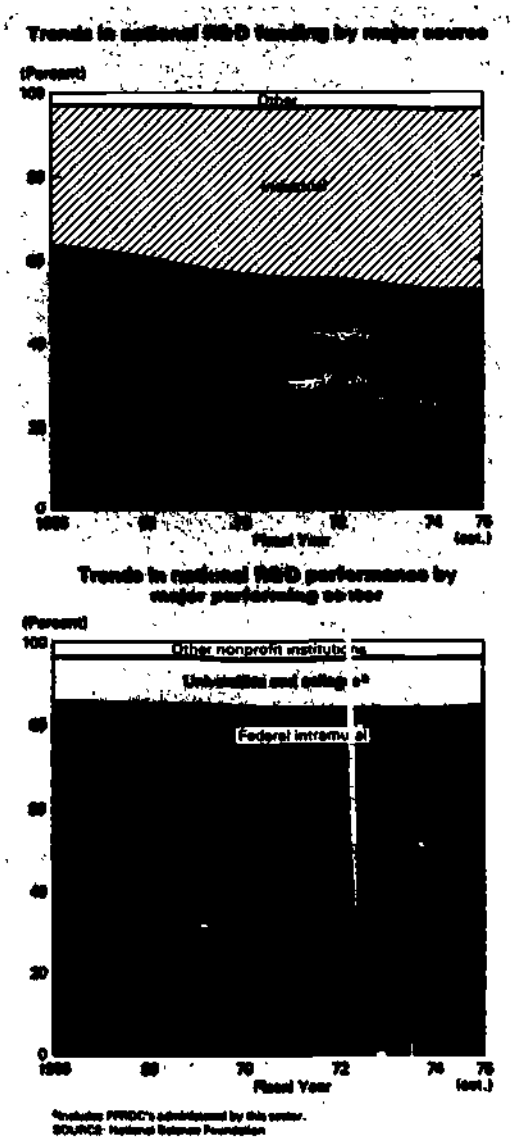
two-thirds of the budget to slightly more than two-fifths. As a portion of these relatively controllable outlays, R&D-related expenditures fell from 16.4 percent in 1967 to a low of 13.7 percent in 1970, but thereafter rose and are expected to be 14.9 percent in 1976.

Relationship to National R&D Total

Although the role of Federal support within national R&D undertakings diminished during the 1966-75 period, Federal funding remained dominant. In 1960 Federal agencies were the source of 64 percent of all national expenditures for R&D purposes, but by 1975 (latest calculable year) they were still responsible for an estimated 53 percent. The ways in which Federal agencies direct their funds—to performers, fields, and types of work—have far-reaching effects on the pattern of scientific activity within the economy. As the Federal support share has decreased, the industry support share has risen from 33 percent in 1966 to an estimated 43 percent in 1975. Over that period industry support to R&D activities has grown on a constant-dollar basis whereas Federal support has declined.

The national R&D total showed little change in real terms between 1966 and 1975, actually a decline of 2 percent. In current dollars, however, the national total grew each year—from $21.9 billion in 1966 to an estimated $34.3 billion in 1975.[1]

Within this total effort, performance sectors reveal a different pattern from



funding sources. Each year within the 1966-75 timespan industrial firms have accounted for more than two-thirds of the national workload—an estimated 69 percent in 1975. Federal intramural performance was expected to account for 15 percent that year, universities and colleges (including FFRDC's)[a] for 12 percent, and other nonprofit institutions for 4 percent. An almost identical performance pattern was shown in 1966.

Relationship to GNP

In the midfifties systematic studies began to be conducted by economists on the relationship between R&D activities and economic growth and productivity. As attention has continued to be focused on this question, the investigations have become increasingly sophisticated and precise, although considerable effort is still needed to achieve close cause and effect measurements. As part of the background for analyses in this field, data on trends in R&D/GNP ratios are useful.

In 1966, the share of national R&D expenditures in the gross national product (GNP) was 2.9 percent and remained the same in 1967, but each year thereafter declined until a low point of 2.3 percent (estimate) was reached in 1974. The indicated ratio for 1975 is 2.4, a slight increase.

During the same period the share of the Federal R&D effort[b] in the GNP total declined more steeply. In 1966, this share was 2.2 percent, but in both 1974 and 1975 the estimated share was 1.4 percent.

[1] See National Science Foundation, *National Patterns of R&D Resources: Funds and Manpower in the United States, 1953-1975* (NSF 75-307) (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office), 1975

[a] Federally Funded Research and Development Centers

[b] The Federal R&D figure also includes R&D plant in contrast to the national R&D figure, which does not include R&D plant data because such data are not fully obtainable

Current Programs

- In 1976 DOD will account for approximately one-half of the Federal R&D total, as has been the case for a number of years. The anticipated share is 49 percent. The overall program increase of an estimated $1,776 million is the largest for any agency and represents about two-thirds of the anticipated growth in Federal R&D obligations in 1976.*

- The Air Force and the Navy have each scheduled an increase that amounts to more than one-third of the DOD total. For the Air Force the major growth is attributed to development of the B-1 advanced strategic bomber, the F-16 air combat fighter, and the NAVSTAR global positioning system. Important efforts will also continue on the advanced warning and control system (AWACS), the Minuteman III, the advanced ballistic reentry system (ABRES), and the advanced medium STOL transport. The Navy increase is derived mainly from the Trident ballistic missile, the air combat fighter, and the submarine launched cruise missile. Major efforts also continue on such Navy programs as the Aegis fleet air defense system, the antisubmarine warfare system, and the Trident submarine. The growth in Army programs is chiefly related to the SAM-D air defense missile, site defense for Safeguard, the utility tactical transport helicopter (UTTAS), and the short range air defense missile system (SHORAD). Important efforts continue on the XM-1 tank and the ballistic missile advanced technology program.

- In 1976, for the first time in the 1966-76 decade, NASA is scheduled for a significant increase—$365 million. Between 1966 and 1974 funding for NASA declined steadily and in 1975 rose only to a slight extent. The NASA share of the Federal R&D total is expected to be 16 percent in 1976. The chief cause of the growth is expansion of the space shuttle program, followed by the lunar and planetary, physics and astronomy, aeronautical research and technology, and earth resources satellite programs. The NASA increase occurs despite completion of the Apollo-Soyuz Test Project in 1975, for which funding has not since been provided

Federal obligations for research and development, by agency

[Dollars in millions]

Agency	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$17,438	$18,905	+8.4	$21,652	+14.5
Department of Defense	8,420	8,860	+5.2	10,635	+20.0
National Aeronautics and Space Administration	3,002	3,068	+2.1	3,431	+11.9
Energy Research and Development Administration	1,489	1,907	+28.0	2,383	+25.0
Department of Health, Education, and Welfare	2,290	2,404	+5.0	2,326	-3.2
National Science Foundation	556	621	+11.5	678	+9.3
Department of Agriculture	379	423	+11.8	463	+9.4
Department of Transportation	370	370	+.2	402	+8.6
Department of the Interior	197	305	+55.2	335	+9.8
Environmental Protection Agency	169	287	+69.4	300	+4.8
Department of Commerce	181	210	+16.3	230	+9.4
Other agencies	385	453	+17.9	469	+3.5

Source: National Science Foundation

* As of January 1976 the DOD increase had been reduced through congressional action by approximately $735 million

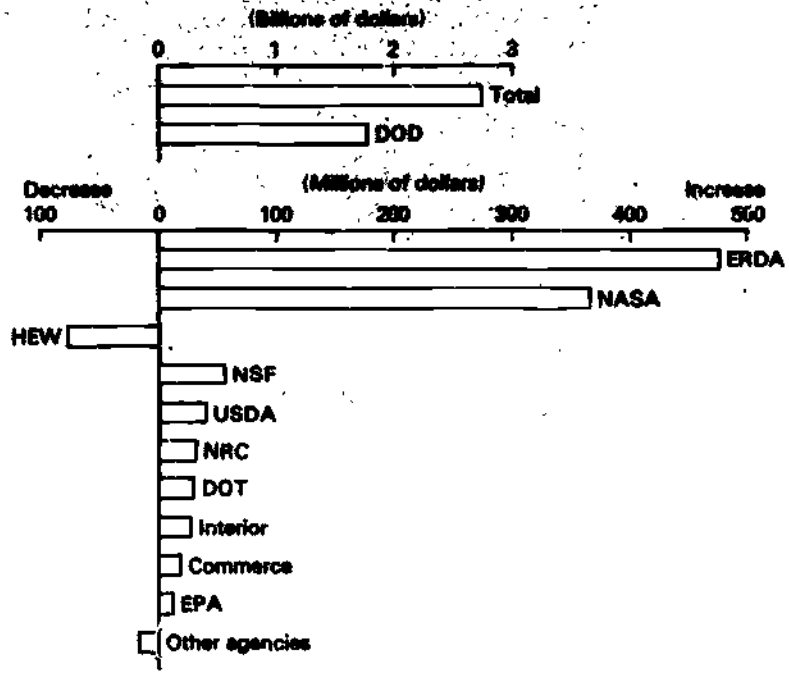
- ERDA represents the second largest increase in 1976 after DOD—$476 million. This new agency is expected to account for 11 percent of all Federal R&D obligations.[7] The broad programs covered by ERDA are fossil and nuclear energy development; solar, geothermal, and advanced energy systems development; energy conservation; environmental and safety research; and weapons R&D and testing activities. Expansion is planned for all ERDA programs in 1976, but coal utilization is scheduled to receive the largest share of the agency increase. Other areas receiving important additional funding are weapons work, solar energy development, fission and fusion power development, physical research, and biomedical and environmental research.

- HEW is the only leading R&D support agency to reflect a decrease in 1976. Its share of the Federal R&D total is expected to be 11 percent, compared with 13 percent in 1975. The estimated $78 million drop is the net result of a decline in funding primarily for the National Institutes of Health (NIH), which more than offsets proposed increases of other HEW subdivisions, especially the Office of Education (OE) in vocational education and other activities. The reason for the net decline for HEW is that the President's 1976 budget request was based upon 1975 levels that reflected proposed recissions of amounts already appropriated for 1975 for a number of HEW programs, especially those of NIH. Congress, by rejecting the recissions, restored 1975 totals to levels considerably higher than those proposed for 1976 in the President's budget.

- NSF is expected to increase its R&D support by $58 million in 1976 and to represent 3 percent of the Federal R&D total. The largest program area, Scientific Research Project Support, is scheduled for an 11-percent increase, which includes expanded support to fields in which efforts can be expected to contribute to long-term solutions to food and energy problems. National and Special Research Programs, the next area, reflects a 19-percent increase. But the RANN (Research Applied to National Needs) program is down 4 percent because of the transfer of most energy research to ERDA. Within RANN, research on productivity is receiving considerably increased support.

- USDA R&D programs are scheduled for an overall increase of $40 million in 1976, with this agency's programs representing 2 percent of the Federal R&D total. Chief growth is found in the Agricultural Research Service for work on animal and food production, management of natural resources, and marketing efficiency, and in the Cooperative State Research Service for research at State agricultural experiment stations.

Changes in Federal R&D obligation levels, by agency, FY 1975-76 (est.)



SOURCE: National Science Foundation

[7] ERDA encompasses programs transferred from other agencies in 1975: from Interior the Office of Coal Research, a portion of the Bureau of Mines, and energy research within the Office of the Secretary; from NSF most of the solar energy and geothermal energy research programs; from EPA certain energy-related programs; and from AEC all of its R&D programs except for nuclear regulatory and reactor safety functions.

- The $32 million increase proposed for the Department of Transportation (DOT) is primarily derived from advancing work within the Urban Mass Transportation Administration (UMTA) and the Federal Railroad Administration (FRA). The level of funding for the Federal Aviation Administration (FAA) reflects little change in 1976, although within FAA development of more efficient air traffic control and navigation systems will be increased. FAA is the largest DOT subdivision as far as R&D activities are concerned. DOT's National Highway Traffic Safety Administration (NHTSA) is scheduled for a reduction in funds.

- In 1976 the Department of the Interior plans an overall increase in R&D funds of $30 million, chiefly for the proposed mined area protection program under the Office of the Secretary. The larger rise of $108 million in 1975 covered expanded mining technology efforts within the Bureau of Mines and geologic and mineral resources surveys under the Geological Survey, both of which programs are expected to grow slightly in 1976.

- EPA is another agency that reflects comparatively small growth in 1976 after substantial growth in 1975. The increase of $14 million in 1976 will mostly cover increased research on energy-related environmental problems, as did the increase of $117 million in 1975. Additional funds in 1976 are to be devoted to developing standards for safe drinking water and the technology needed to attain these standards economically. A number of other program areas reflect small decreases.

- For the Department of Commerce a $20 million increase in 1976 is expected to cover expanded research in ocean fisheries and marine ecosystems on the part of the National Oceanic and Atmospheric Administration (NOAA) and growth in certain R&D programs of the National Bureau of Standards (NBS).

- For the period 1974-76 a total of 26 other agencies reported R&D program data. Those with largest programs are the Veterans Administration (VA), the Nuclear Regulatory Commission (NRC)—created to carry on regulatory and reactor safety programs in nuclear energy (formerly under the Atomic Energy Commission)—the Department of Housing and Urban Development (HUD), and the Department of Justice. Of these, NRC in 1976 reflects a sizable increase in funding and Justice a notable decrease.

Performers

- Estimates are that $15.9 billion, or 73 percent, of all obligations for Federal R&D programs in 1976 will be placed in the form of contracts and grants with extramural performers. The balance of the R&D total, $5.8 billion, or 27 percent, will be obligated for support of intramural performance, or work by Federal personnel.

INDUSTRY

The 23-percent increase in funding to industrial firms in 1976 will bring the dollar awards to this sector to the highest level on record. Nonetheless, industrial firms (including FFRDC's) are expected to account for just 52 percent of all Federal R&D performance, compared with 61 percent in 1966. Approximately four-fifths of the industrial work will be directed to development.

The growth in the anticipated use of industry in 1976 is derived largely from expansion of DOD programs, especially those of the Navy and Air Force, as well as from ERDA and NASA programs.

Federal obligations for research and development, by performer

(Dollars in millions)

Performer	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$17,438	$18,905	+8.4	$21,652	+14.5
Federal intramural	4,815	5,302	+10.1	5,756	+8.6
Industrial firms	7,845	8,398	+7.0	10,516	+25.2
FFRDC's[1] administered by industrial firms	593	726	+22.8	744	+2.2
Universities and colleges	2,215	2,293	+3.5	2,230	-2.8
FFRDC's[1] administered by universities	789	921	+16.7	1,044	+13.4
Other nonprofit institutions	703	759	+8.0	669	-11.9
FFRDC's[1] administered by nonprofit institutions	199	214	+7.4	222	+3.8
State and local governments	214	224	+4.7	394	+75.6
Foreign performers	65	66	+1.5	78	+18.5

[1] Federally Funded Research and Development Centers

Source: National Science Foundation

DOD, NASA, and ERDA jointly are the source of more than 90 percent of the support to industrial firms, but the relative contributions of these agencies have changed considerably in the 1966-76 period. The NASA share has declined from 42 percent in 1966 to an estimated 18 percent in 1976 even though the declining support trend for the years after 1966 was reversed in 1975. The DOD share has risen from 49 percent in 1966 to an estimated 63 percent in 1976, and the share of industrial R&D support represented by ERDA, from 7 percent to 12 percent.

INTRAMURAL

The Federal intramural sector reflects a continuous increase in R&D funding from 1966 to 1976. Even so, in 1976 for the first time since 1967 the share of the Federal R&D total represented by intramural work is expected to decline—to 27 percent, compared with 28 percent in 1975 and 21 percent in 1966. Federal intramural performance covers costs associated with the administration of extramural programs by Federal personnel as well as all costs associated with direct performance.

For most of the years between 1966 and 1973 a little more than one-half of all Federal R&D work was devoted to development, but the 1974-76 period reflects a gradual shift toward the research end of the spectrum. In 1976 research is expected to account for 53 percent of all intramural R&D performance.

DOD, which has provided more than one-half of the support for intramural performance in the 1966-76 decade, is largely responsible for the rising trend in overall support to this sector. NASA, the next agency, has also contributed to this rise. Other agencies in the aggregate, however, are expanding their support to intramural work at an even faster pace, especially HEW, USDA, Interior, and Commerce. Thus, the combined share of DOD and NASA has dropped from 80 percent in 1966 to an estimated 71 percent in 1976.

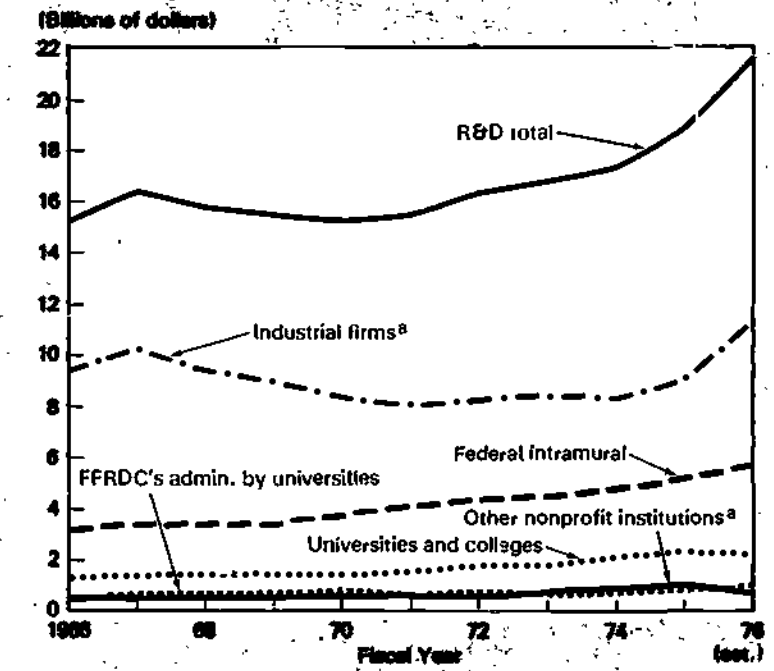
UNIVERSITIES AND COLLEGES

Federal support to universities and colleges for R&D performance is scheduled to drop in 1976 for the first time since 1970 as a result of proposed cutbacks for HEW. The share of the university and college sector in the Federal R&D total rose from 9 percent in 1966 to a high of 13 percent in 1974. The share in 1976, however, is expected to be just 10 percent.

A gradual trend is revealed in the reduced portion of the university and college effort devoted to basic research and the somewhat increased portion devoted to applied research, and to a lesser extent, development. In the current (1974-76) period basic research and applied research each represent approximately 45 percent of the university and college total, and development represents 10 percent.

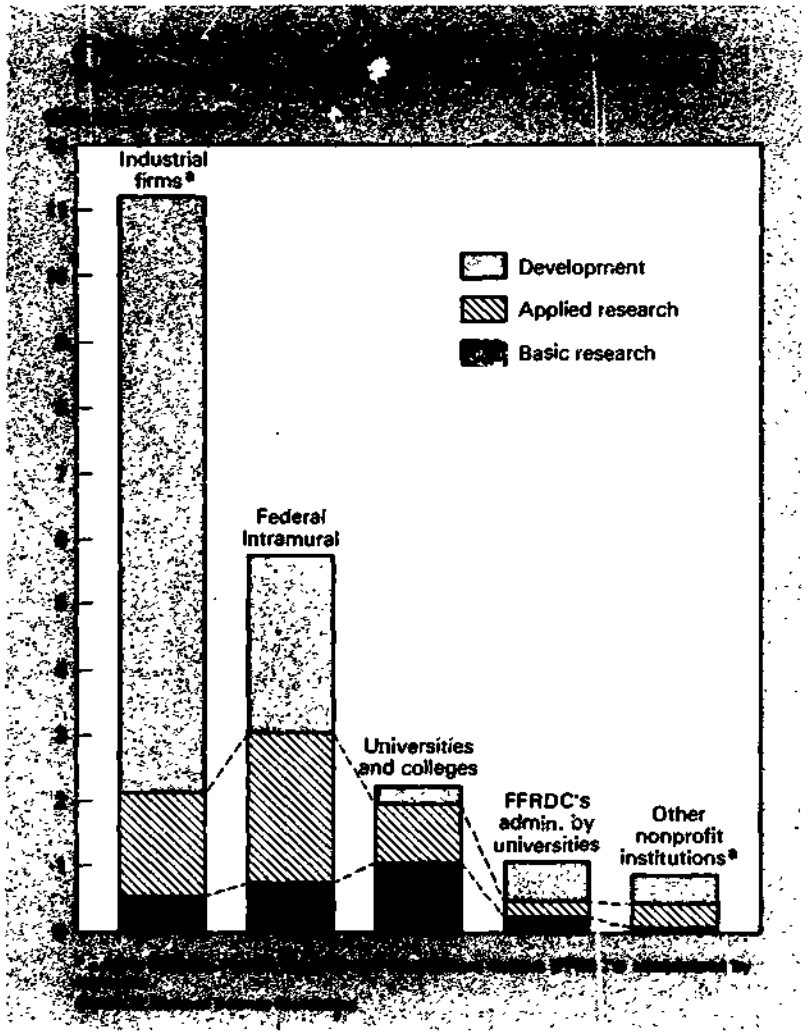
Between 1966 and 1975 the increasing support of HEW and NSF more than offsets the decreasing support on the part of DOD and NASA. In 1976, although DOD support to the university and college sector is expected to rise, DOD will remain the third agency after HEW and NSF, with ERDA and USDA in fourth and fifth place, respectively.

Trends in Federal R&D obligations by major performer



[a]Includes Federally Funded Research and Development Centers (FFRDC's) administered by this sector.

SOURCE: National Science Foundation



Research by Fields of Science

In the last two surveys data have been collected on research performed at universities and colleges by fields of science. Six agencies have been included, representing more than 90 percent of such Federal research funding: HEW, NSF, DOD, USDA, ERDA, and NASA. They provided approximately $1.9 billion in each of the years 1974, 1975, and 1976, with a slight drop scheduled between 1975 and 1976.

The life sciences are expected to make up 54 percent of the university and college research total in 1976, compared with 59 percent in both prior years. The physical sciences will account for an estimated 15 percent; engineering for 10 percent; environmental sciences (atmospheric, geological, and oceanography, excluding the biological sciences) for 8 percent; the social sciences for 5 percent; mathematics for 3 percent; and psychology for 3 percent.

Certain agencies are associated with support to certain fields. HEW provides more than three-fourths of the support to the life sciences and more than three-fifths of the support to psychology. NSF provides approximately three-fifths of the environmental sciences funding and more than two-fifths of the physical sciences funding. NSF and DOD combine to provide more than four-fifths of the mathematics dollars and almost four-fifths of the engineering dollars. HEW and NSF together support almost three-fourths of university and college research in the social sciences.

FFRDC's

Federally Funded Research and Development Centers (FFRDC's) are R&D-performing or -managing organizations exclusively or substantially financed by one or more Federal agencies and administered for them by industry, universities, or other nonprofit institutions. In 1976 ERDA is expected to be the principal source of support for FFRDC's, providing 70 percent of the total among all agencies. Since this agency operates almost no laboratories of its own, ERDA places most of its funds with FFRDC's.

As a share of all Federal R&D performance by FFRDC's, DOD will account for 17 percent in 1976 and NASA for 5 percent.

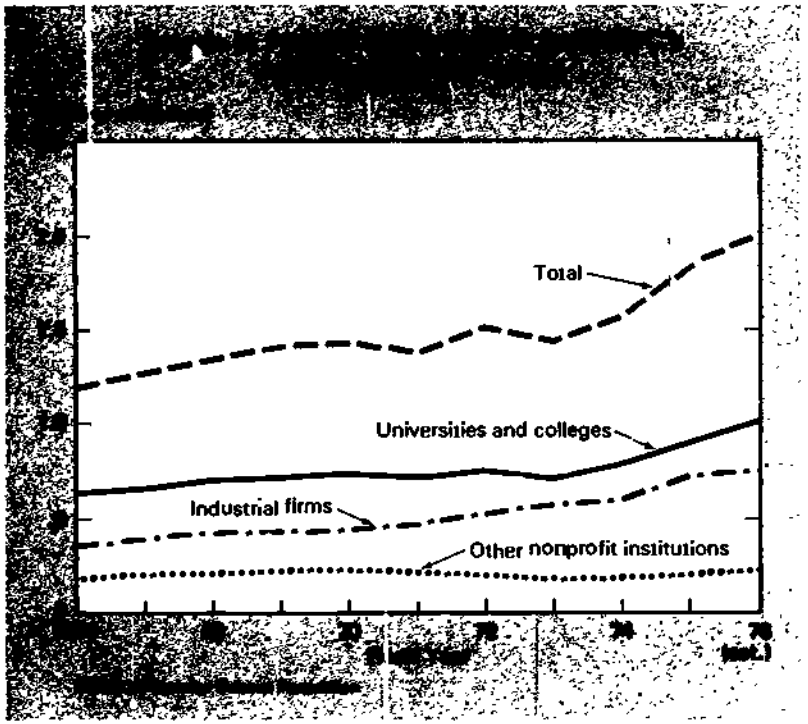
Federal R&D obligations to FFRDC's[1] by administering sector and agency: fiscal year 1976 (est.)

[Dollars in millions]

Sector	All agencies	ERDA	DOD	NASA	NRC	NSF	HEW	Other
Total	$2,099.9	$1,404.7	$339.9	$104.6	$61.4	$61.3	$9.9	$28.1
Industrial firms	743.8	690.2	.2	.1	48.4	4.3	—	.6
Universities and colleges	1,043.9	681.4	184.6	104.4	8.4	53.9	7.7	3.5
Other nonprofit institutions ..	222.2	33.1	155.1	.1	4.6	3.1	2.2	24.0

[1] Federally Funded Research and Development Centers

Source: National Science Foundation



In the 1966-76 period support of FFRDC's has risen almost steadily. The sharpest increase has been realized by FFRDC's administered by industry, but FFRDC's administered by universities still do more than one-half the work.

OTHER NONPROFIT

Between 1966 and 1975, the share of other nonprofit institutions (including FFRDC's) in the Federal R&D performance total rose from 4 percent to 5 percent but is expected to be 4 percent in 1976. HEW and DOD are the principal support agencies.

STATE AND LOCAL GOVERNMENTS

Agencies of State and local governments are expected to account for 1.8 percent of all Federal R&D activities in 1976. This sector is small in terms of performance for Federal agencies but has been showing signs of real growth as a performing area. The use of this sector will increase by an estimated 75 percent between 1975 and 1976. HEW is the chief agency to support State and local governments.

Major characteristics of R&D obligations of Federal agencies: fiscal year 1976 (est.)

Agency and subdivision	Total R&D obligations (millions of dollars)	Total research and development: Character of work (percent distribution)			Total research and development: Major performers[1] (percent of total)	Basic research: Major fields of science[1] (percent of total)	Basic research: Major performers[1] (percent of total)	Applied research: Major fields of science[1] (percent of total)	Applied research: Major performers[1] (percent of total)	Development: Major performers[1] (percent of total)
		Basic research	Applied research	Development						
Department of Agriculture, total	$ 463.1	3%	58	*	72 Intra. 25 Univ	68 Life 14 Phy. Sci 10 Soc.	70 Intra. 27 Univ.	58 Life 15 Soc. 13 Phy. Sci 11 Eng.	72 Intra. 26 Univ.	97 Intra.
Agricultural Research Service	241.2	42	53	5	95 Intra.	73 Life 20 Phy. Sci	94 Intra.	61 Life 21 Phy. Sci. 16 Eng.	95 Intra	96 Intra.
Cooperative State Research Service	118.3	38	62	–	98 Univ	69 Life 22 Soc	98 Univ.	69 Life 22 Soc.	98 Univ.	–
Economic Research Service	24.5	30	70	–	99 Intra.	100 Soc	99 Intra	100 Soc.	99 Intra.	–
Farmer Cooperative Service	1.2	–	100	–	92 Intra. 8 Univ.	–	–	100 Soc.	92 Intra. 8 Univ.	–
Forest Service	80.2	31	62	7	93 Intra.	68 Life 11 Phy Sci 10 Eng. 9 Environ	89 Intra. 10 Univ.	56 Life 15 Engl. 11 Soc. 9 Environ	98 Intra	100 Intra.
National Agricultural Library	–	–	100	–	78 Univ. 22 Intra.	–	–	100 Other	78 Univ. 22 Intra.	–
Statistical Reporting Service	1.6	1	76	23	97 Intra.	100 Math	87 Univ 13 Intra	100 Math	97 Intra.	100 Intra.
Department of Commerce, total	229.8	11	61	27	69 Intra 12 Ind. 10 Univ.	51 Environ. 21 Phy. Sci 16 Other 12 Eng	83 Intra 12 Univ	36 Life 33 Environ 14 Eng. 12 Phy Sci	73 Intra. 13 Univ 10 Ind	55 Intra. 38 Ind
Economic Development Administration	2.3	–	22	78	42 S & L gov't 18 N P 15 Univ 15 Ind. 10 Intra	–	–	100 Soc	42 N P 30 Univ 20 Ind.	53 S & L gov't 14 Ind. 11 Intra. 11 Univ. 11 N P.
Maritime Administration	21.8	7	18	75	95 Ind.	100 Eng	88 Ind	90 Eng. 10 Soc	87 Ind. 10 Intra.	98 Ind
National Bureau of Standards	157	14	65	21	98 Intra.	80 Phy Sci 20 Eng	92 Intra. 8 Univ.	56 Phy Sci 39 Eng.	99 Intra.	99 Intra.
National Fire Prevention and Control Administration	7.5	53	7	40	84 Intra. 16 Univ	100 Other	90 Intra. 10 Univ	100 Other	100 Intra.	73 Intra. 27 Univ.
National Oceanic and Atmospheric Administration	149.0	9	71	20	70 Intra. 14 Univ 13 Ind	100 Environ	86 Intra 14 Univ.	48 Life 44 Environ	67 Intra 17 Univ. 10 Ind	72 Intra. 26 Ind
Office of Minority Business Enterprise	1.9	–	12	88	83 N P. 17 Intra	–	–	100 Soc	56 Intra 44 N P.	88 N P. 12 Intra.
Patent and Trademark Office	.2	–	50	50	100 Intra.	–	–	100 Eng	100 Intra	100 Intra
Social and Economic Statistics Administration	1.1	18	47	35	90 Intra. 10 Univ	58 Math 35 Psych	58 Univ 42 Intra	72 Soc 15 Psych 13 Math	100 Intra	100 Intra.
Department of Defense, total	10,635.3	2	16	81	66 Ind 27 Intra.	29 Eng 23 Environ 22 Phy Sci 12 Life	44 Intra 38 Univ 18 Ind	69 Eng 10 Phy Sci	67 Ind 42 Intra.	72 Ind. 24 Intra
Department of the Army	2,260.6	2	15	84	64 Ind 33 Intra.	49 Life 25 Eng 11 Phy Sci	72 Intra. 14 Univ. 10 Ind	48 Eng 20 Life 20 Phy Sci	70 Intra 21 Ind.	73 Ind 26 Intra.
Department of the Navy	3,761.8	3	6	91	67 Ind 27 Intra.	35 Environ 29 Phy. Sci 18 Eng 10 Life	52 Univ 36 Intra 10 Ind	60 Eng 18 Phy Sci 11 Math	70 Intra. 17 Ind.	72 Ind. 23 Intra
Department of the Air Force	3,988.3	2	20	78	70 Ind 24 Intra	38 Eng 29 Environ 22 Phy Sci	55 Intra 30 Univ 14 Ind.	90 Eng	64 Ind 28 Intra.	73 Ind. 22 Intra.
Defense Agencies	624.6	6	58	36	58 Ind 31 Intra	51 Eng 15 Psych 11 Phy Sci 11 Math	40 Univ 28 Ind 11 Intra	37 Eng 20 Other 13 Phy Sci. 9 Math 8 Environ.	52 Ind 28 Intra	53 Ind 40 Intra.

Major characteristics of R&D obligations of Federal agencies: fiscal year 1978 (est.) — Continued

Agency and subdivision	Total R&D obligations (millions of dollars)	Total research and development				Basic research		Applied research		Development
		Character of work (percent distribution)			Major performers[1] (percent of total)	Major fields of science[1] (percent of total)	Major performers[1] (percent of total)	Major fields of science[1] (percent of total)	Major performers[1] (percent of total)	Major performers[1] (percent of total)
		Basic research	Applied research	Development						
Departmentwide Funds	2.0	–	100	–	35 Ind. 25 N.P. 25 Intra. 12 Univ. 9 N.P. FFRDC	–	–	31 Eng. 17 Phy. Sci. 17 Other 13 Life 8 Math. 8 Soc.	35 Ind. 28 N.P. 18 Intra. 12 Univ. 8 N.P. FFRDC	–
Director of Test and Evaluation	28.4	–	–	100	87 Intra.	–	–	–	–	87 Intra.
Department of Health, Education, and Welfare	2,325.8	21	54	26	46 Univ. 21 Intra. 15 N.P. 12 S & L gov't	84 Life	66 Univ. 21 Intra. 8 N.P.	79 Life 8 Soc.	48 Univ. 27 Intra. 14 N.P.	37 S & L gov't. 22 N.P. 21 Univ. 11 Ind.
Alcohol, Drug Abuse, and Mental Health Administration	123.0	34	66	–	52 Univ. 20 Intra. 17 N.P. 9 S & L gov't	51 Life 37 Psych. 11 Soc.	58 Univ. 20 Intra. 14 N.P.	53 Life 33 Psych. 10 Soc.	48 Univ. 20 Intra. 18 N.P. 10 S & L gov't.	–
Center for Disease Control	67.6	–	100	–	56 Intra. 13 Univ. 12 Ind. 10 Univ. FFRDC	–	–	74 Life 14 Phy. Sci.	66 Intra. 13 Univ. 12 Ind. 10 Univ. FFRDC	–
Food and Drug Administration	53.5	–	100	–	56 Intra. 22 Univ. 11 Ind.	–	–	100 Life	66 Intra. 22 Univ. 11 Ind.	–
Health Resources Administration	39.4	–	38	62	26 Univ. 21 Intra. 18 N.P. 18 Ind. 10 S & L gov't 8 For.	–	–	82 Soc. 34 Life 14 Other	48 Intra. 17 N.P. 13 Univ. 10 For. 10 Ind.	35 Univ. 22 Ind. 18 N.P. 18 S & L gov't.
Health Services Administration	13.8	20	81	19	32 Univ. 28 Intra. 19 N.P. 15 For 8 Ind	100 Life	78 For. 22 Intra.	96 Life	51 Univ. 27 Intra. 19 N.P.	39 Ind. 36 Intra. 21 N.P.
National Institute of Education	80.0	12	4	83	35 N.P. 34 S & L gov't. 15 Univ. 13 Intra	100 Soc.	60 N.P. 24 Intra. 10 S & L gov't	100 Soc.	71 N.P. 13 Intra. 10 S & L gov't.	38 S & L gov't 29 N.P. 17 Univ. 1 Intra.
National Institutes of Health	1,623.7	26	58	16	56 Univ 21 Intra. 14 N.P.	90 Life	72 Univ. 20 Intra.	89 Life	56 Univ. 24 Intra. 14 N.P.	33 Univ. 28 N.P. 21 Ind. 13 Intra.
Office of Education	201.0	(2)	4	96	66 S & L gov't.	100 Soc.	94 Univ.	100 Soc.	84 Univ. 18 Ind. 8 N.P.	66 S & L gov't.
Office of Human Development	74.1	–	33	67	38 N.P. 33 Univ. 13 S & L gov't.	–	–	60 Soc. 22 Life 18 Psych.	50 Univ. 22 N.P. 14 For.	45 N.P. 28 Univ. 20 S & L gov't.
Office of International Health	1.6	100	–	–	100 For.	100 Life	100 For.	–	–	–
Office of the Secretary	29.3	16	84	–	43 S & L gov't 30 N.P. 13 Intra. 11 Univ	100 Soc.	51 Univ. 31 Intra. 16 N.P.	100 Soc.	51 S & L gov't. 33 N.P. 10 Intra.	–
Social and Rehabilitation Service	13.0	–	100	–	30 N.P. 24 Ind. 20 Univ. 20 S & L gov't	–	–	100 Soc.	30 N.P. 24 Ind. 20 Univ. 20 S & L gov't.	–
Social Security Administration	25.9	7	93	–	98 Intra	100 Soc.	100 Intra.	100 Soc.	98 Intra.	–
Department of Housing and Urban Development	77.2	–	52	48	45 Ind 20 Intra. 13 N.P. 10 S & L gov't 9 N.P. FFRDC	–	–	66 Soc. 9 Eng.	39 Ind 28 Intra 19 N.P. FFRDC 8 N.P.	82 Ind. 18 N.P. 14 Intra. 14 S & L gov't.

See footnotes at end of table.

Major characteristics of R&D obligations of Federal agencies: fiscal year 1978 (est.) – Continued

Agency and subdivision	Total R&D obligations (millions of dollars)	Total research and development: Character of work (percent distribution)			Total research and development: Major performers[1] (percent of total)	Basic research: Major fields of science[1] (percent of total)	Basic research: Major performers[1] (percent of total)	Applied research: Major fields of science[1] (percent of total)	Applied research: Major performers[1] (percent of total)	Development: Major performers[1] (percent of total)
		Basic research	Applied research	Development						
Department of the Interior, total	2360	35	•1	34	61 Intra. 26 Ind. 8 Univ.	78 Environ. 13 Life	88 Intra. 8 Univ.	57 Eng. 22 Environ. 13 Life	50 Intra. 20 Ind. 12 Univ.	73 Ind. 26 Intra.
Bonneville Power Administration	55	•	9	91	67 Ind. 31 Intra.	•	•	100 Eng.	73 Ind. 18 Intra. 9 Univ.	67 Ind. 32 Intra.
Bureau of Land Management	8	–	98	2	51 Univ. 42 Intra.	–	–	100 Life	53 Univ. •1 Intra.	100 Intra.
Bureau of Mines	122 8	1	•8	51	51 Ind. 45 Intra.	86 Phy. Sci. 15 Eng.	85 Intra. 15 Univ.	88 Eng.	70 Intra. 22 Ind. 8 Univ.	78 Ind. 21 Intra.
Bureau of Reclamation	8 3	1	94	•	58 Intra 23 Ind. 17 Univ.	100 Eng.	56 Univ. 45 Intra	60 Environ. 35 Eng.	53 Intra 24 Ind. 16 Univ.	88 Intra. 9 Univ.
Geological Survey	121 0	79	21	–	96 Intra.	94 Environ.	96 Intra.	27 Environ. 13 Phy. Sci. 8 Eng.	90 Intra.	–
National Park Service	3 4	31	69	–	79 Univ. 15 Intra.	100 Soc	81 Univ. 15 S & L gov't	93 Life	78 Univ. 22 Intra.	–
Office of the Secretary *	23 7	–	75	25	62 Ind. 18 S & L gov't 11 Intra.	–	–	100 Eng.	62 Ind. 18 S & L gov't 11 Intra.	61 Ind. 18 S & L gov't. 10 Intra. 8 For.
Office of Water Research and Technology	17.3	20	61	18	62 Univ. 26 Ind. 12 Intra.	44 Environ. 15 Life 13 Soc. 12 Eng. 8 Phy. Sci 8 Other	71 Univ. 16 Ind. 12 Intra.	35 Eng 21 Environ. 18 Life 12 Soc.	78 Univ. 12 Intra 8 Ind.	88 Ind. 12 Intra.
Fish and Wildlife Service	32 1	46	41	14	68 Intra. 28 S & L gov't	100 Life	67 Intra. 24 S & L gov't. 8 Univ.	100 Life	57 Intra. 43 S & L gov t	100 Intra.
Department of Justice, total	•20	27	36	37	52 N.P. 18 Ind. 12 Intra. 8 N.P. FFRDC	100 Soc.	69 N.P. 17 Ind. 8 Intra.	57 Soc. 18 Phy. Sci. 12 Life 8 Eng	57 N.P. 19 Ind. 14 Univ.	36 N.P. 22 Intra. 20 N.P. FFRDC 17 Ind.
Bureau of Prisons	1 0	–	–	100	75 Intra 11 Univ. 10 Ind.	–	–	–	–	75 Intra. 11 Univ. 10 Ind.
Drug Enforcement Administration	4 •	–	35	65	51 Ind. 34 Intra 8 Univ.	–	–	68 Other 32 Life	50 Ind. 25 Univ. 20 N.P.	51 Ind. 48 Intra.
Federal Bureau of Investigation	1.3	–	–	100	84 Ind. 16 Intra	–	–	–	–	84 Ind. 16 Intra
Law Enforcement Assistance Administration	35 4	32	36	30	61 N.P 11 Ind. 9 N P. FFRDC 6 Intra	100 Soc.	69 N.P 17 Ind. 9 Intra.	53 Soc 18 Phy. Sci. 9 Life 9 Eng.	61 N P. 16 Ind. 13 Univ.	53 N P. 30 N P. FFRDC 11 Intra.
Department of Labor, total	23 5	5	77	18	45 Intra 28 Univ. 11 N.P 9 Ind	100 Soc.	34 Intra. 28 Univ. 22 N.P 11 Ind.	100 Soc.	48 Intra. 26 Univ. 10 N P. 9 Ind.	38 Univ. 34 Intra. 10 N.P. 10 S & L gov't. 8 Ind
Bureau of Labor Statistics	1 5	–	42	58	100 Intra	–	–	100 Soc	100 Intra.	100 Intra.
Employment Standards Administration	5 4	–	100	–	100 Intra	–	–	100 Soc	100 Intra.	–
Labor Management Services Administration	1 •	50	50	–	45 Intra 27 N.P. 16 Univ. 12 Ind	100 Soc.	45 Intra. 27 N.P. 16 Univ 12 Ind	00 Soc.	45 Intra. 27 N P. 16 Univ. 12 Ind.	–
Manpower Administration	12 5	4	69	27	47 Univ 18 Intra 13 N P. 12 S & L gov't. 10 Ind	100 Soc	•7 Univ. 18 Intra 13 N.P. 12 S & L gov't 10 Ind.	100 Soc	•7 Univ. 18 Intra. 13 N.P. 12 S & L gov't. 10 Ind.	47 Univ. 16 Intra. 13 N P. 12 S & L gov't. 10 Ind.

Major characteristics of R&D obligations of Federal agencies: fiscal year 1976 (est.) — Continued

Agency and subdivision	Total R&D obligations (millions of dollars)	Total research and development: Character of work (percent distribution)			Total research and development: Major performers[1] (percent of total)	Basic research: Major fields of science[1] (percent of total)	Basic research: Major performers[1] (percent of total)	Applied research: Major fields of science[1] (percent of total)	Applied research: Major performers[1] (percent of total)	Development: Major performers[1] (percent of total)
		Basic research	Applied research	Development						
Occupational Safety and Health Administration	8	–	100	–	75 Ind. 25 Intra.	–	–	100 Soc	75 Ind. 25 Intra.	–
Office of the Secretary	2 0	–	100	–	33 Intra. 26 N P. 24 Univ. 8 Ind	–	–	100 Soc.	33 Intra. 26 N P. 24 Univ. 8 Ind.	–
Department of State, total	35 7	–	80	20	62 Univ. 15 Intra. 15 For. 13 N P	–	–	64 Life 31 Soc. 8 Environ.	68 Univ. 18 Intra. 15 For. 8 N P.	36 N P. 24 Univ. 18 For. 18 Intra.
Departmental Funds	1 5	–	68	32	34 Ind 25 S & L gov t 24 Intra. 10 Univ.	–	–	100 Soc.	36 S & L gov't. 22 Intra. 18 Ind. 15 Univ. 8 N P. FFRDC	70 Ind. 30 Intra.
Agency for International Development	34 2	–	81	91	63 Univ. 18 For. 15 Intra. 14 N P	–	–	56 Life 26 Soc. 8 Environ.	60 Univ. 15 For. 15 Intra. 8 N P.	36 N.P. 26 Univ. 20 For. 15 Intra.
Department of Transportation, total	402 1	(2)	20	80	52 Ind 20 Intra. 15 S & L gov't	23 Environ. 27 Eng	75 Intra 25 Univ FFRDC	87 Eng. 8 Environ.	42 Ind. 33 Intra. 15 S & L gov't	56 Ind. 12 Intra.
Federal Aviation Administration	111 2	–	13	87	66 Ind 22 Intra 8 N P FFRDC	–	–	98 Eng.	78 Ind. 31 Intra.	66 Ind. 22 Intra. 10 N P. FFRDC
Federal Highway Administration	50 5		8	92	48 S & L gov't 25 Univ 22 Ind.	–	–	81 Eng. 8 Environ	33 Univ. 25 Ind. 23 N P. 10 Intra. 8 S & L gov't	53 S & L gov't 24 Univ 22 Ind
Federal Railroad Administration	59 8	–	17	83	55 Ind 35 Intra.	–		100 Eng.	75 Intra. 24 Ind.	62 Ind. 27 Intra.
National Highway Traffic Safety Administration	49.3	–	29	71	50 Ind. 29 S & L gov t 8 Univ. 8 N P	–	–	78 Eng. 15 Life	58 Ind. 13 Univ. 13 N P. 12 S & L gov't.	48 Ind. 36 S & L gov't.
Office of the Secretary	35 3	(2)	41	59	38 Intra. 35 Ind. 11 Univ. 11 S & L gov't	100 Eng	93 Univ FFRDC	56 Eng. 37 Environ.	41 Intra. 28 S & L gov t 25 Ind.	42 Ind. 36 Intra. 18 Univ.
Coast Guard	26 5	1	43	56	65 Ind. 27 Intra.	100 Environ.	100 Intra.	96 Eng	63 Ind. 30 Intra.	68 Ind. 25 Intra.
Urban Mass Transportation Administration	89 5	–	16	84	54 Ind. 22 S & L gov't 17 Intra.	–	–	99 Eng.	53 S & L gov't, 42 Intra.	84 Ind. 12 Intra. 18 S & L gov't. 8 Univ.
Department of the Treasury, total	1.8	–	28	71	100 Intra.	–	–	96 Phy. Sci.	100 Intra.	100 Intra.
Bureau of Engraving and Printing	1 8	–	28	71	100 Intra.	–	–	96 Phy Sci.	100 Intra.	100 Intra.
OTHER AGENCIES										
Action	2	40	60	–	49 N P 34 Univ 17 Intra.	100 Soc	24 Intra 34 N P 32 Univ	100 Soc.	58 N P. 36 Univ.	–
Advisory Commission on Intergovernmental Relations										
Civil Aeronautics Board	1 2	–	100	–	100 Intra.		–	100 Soc	100 Intra.	–
Civil Service Commission	4	–	100	–	100 Intra.	–	–	100 Soc.	100 Intra	–
	4 5	17	20	64	66 Intra 34 S & L gov't	100 Psych	100 Intra.	100 Psych.	100 Intra.	53 S & L gov't 47 Intra.

See footnotes at end of table

Major characteristics of R&D obligations of Federal agencies: fiscal year 1978 (est.)[1] – Continued

Agency and subdivision	Total R&D obligations (millions of dollars)	Total research and development: Character of work (percent distribution)			Total research and development: Major performers[3] (percent of total)	Basic research: Major fields of science[2] (percent of total)	Basic research: Major performers[3] (percent of total)	Applied research: Major fields of science[2] (percent of total)	Applied research: Major performers[3] (percent of total)	Development: Major performers[3] (percent of total)
		Basic research	Applied research	Development						
Community Services Administration	39.0	–	–	100	97 N.P.	–	–	–	–	87 N.P.
Consumer Product Safety Commission	2.0	–	65	35	90 Intra. 10 Univ.	–	–	61 Soc. 39 Life	92 Intra. 8 Univ.	85 Intra. 15 Univ.
Energy Research and Development Administration, other	2,382.7	12	18	70	29 Ind. 29 Ind. FFRDC 29 Univ. FFRDC	85 Phy.Sci.	64 Univ. FFRDC 24 Univ. 10 Ind. FFRDC	44 Phy. Sci. 26 Life 24 Eng.	40 Univ. FFRDC 18 Ind. 12 Ind. FFRDC 11 Univ. 9 Intra.	38 Ind. 37 Ind. FFRDC 20 Univ. FFRDC
Environmental Protection Agency	300.4	6	37	57	41 Ind. 33 Intra. 10 Univ.	58 Life 32 Phy. Sci.	91 Univ.	43 Eng. 25 Life 24 Phy. Sci.	43 Ind. 31 Intra. 12 Univ.	44 Ind. 36 Intra. 8 N.P.
Federal Communications Commission	1.6	–	100	–	52 Ind. 48 Intra.	–	–	56 Soc. 44 Eng.	52 Ind. 48 Intra.	–
Federal Energy Administration	3.8	–	35	65	90 Ind.	–	–	65 Eng. 35 Soc.	87 Ind.	91 Ind.
Federal Home Loan Bank Board	.8	–	100	–	93 Intra	–	–	100 Soc.	93 Intra.	–
Federal Trade Commission	1.2	–	100	–	100 Intra	–	–	100 Soc.	100 Intra.	–
General Services Administration	2.0	11	3	86	92 Ind.	73 Eng. 27 Other	73 Ind. 27 Intra.	100 Eng.	45 N.P. 31 Ind. 23 Intra.	97 Ind.
Library of Congress	3.1	–	15	85	86 Intra 14 Ind.	–	–	100 Other	100 Intra.	86 Intra. 14 Ind.
National Aeronautics and Space Administration	3,430.7	21	29	49	60 Ind. 34 Intra	63 Phy. Sci. 25 Environ.	62 Ind. 29 Intra.	63 Eng. 32 Environ.	60 Intra 35 Ind.	75 Ind. 20 Intra.
National Science Foundation	678.3	79	17	4	71 Univ. 10 Intra 8 Univ. FFRDC	29 Phy. Sci. 26 Environ. 18 Life 12 Eng.	74 Univ. 11 Intra 8 Univ. FFRDC	25 Eng. 23 Other 16 Soc. 15 Life 12 Environ.	56 Univ. 16 Ind. 12 N.P.	65 Univ. 29 N.P.
Nuclear Regulatory Commission	87.6	–	100	–	55 Ind. FFRDC 25 Ind. 10 Univ. FFRDC	–	–	100 Eng.	55 Ind. FFRDC 25 Ind. 10 Univ. FFRDC	–
Office of Telecommunications Policy	1.4	–	100	–	67 Ind 33 Univ.	–	–	60 Eng. 40 Soc.	67 Ind 18 Univ	–
Small Business Administration	1.1	–	100	–	81 Ind. 10 Univ. 8 Intra.	–	–	100 Soc.	81 Ind. 10 Univ. 9 Intra.	–
Smithsonian Institution	24.3	100	–	–	97 Intra	44 Life 28 Soc. 20 Phy. Sci. 8 Environ.	97 Intra.	–	–	–
Tennessee Valley Authority	19.4	–	89	11	57 N.P. 43 Intra.	–	–	78 Eng. 12 Life 9 Phy. Sci.	63 N.P. 36 Intra.	100 Intra.
U.S. Arms Control and Disarmament Agency	7.7	–	86	14	56 Ind 18 Intra 14 N.P. 12 Ind. FFRDC	–	–	48 Eng. 21 Math. 18 Soc. 8 Environ.	56 Ind. 16 N.P. 14 Intra. 14 Ind. FFRDC	59 Ind. 41 Intra.
U.S. Information Agency	.1	–	100	–	100 Intra.	–	–	100 Eng.	100 Intra	–
Veterans Administration	97.8	4	86	9	98 Intra.	90 Life	100 Intra	90 Life	100 Intra	81 Intra. 11 Univ.

[1] "Major" is here defined as any performer or field of science that singly accounts for at least 8 percent of total funds

[2] Less than 0.5 percent.

NOTE: Intramural activities cover costs associated with the administration of intramural and extramural programs by Federal personnel as well as actual intramural performance
Source: National Science Foundation

ABBREVIATIONS

Performers
Intra. = Intramural.
Ind. = Industrial firms excluding Federally Funded Research and Development Centers (FFRDC's).
Ind. FFRDC = FFRDC's administered by industrial firms.
Univ. FFRDC = FFRDC's administered by universities and colleges

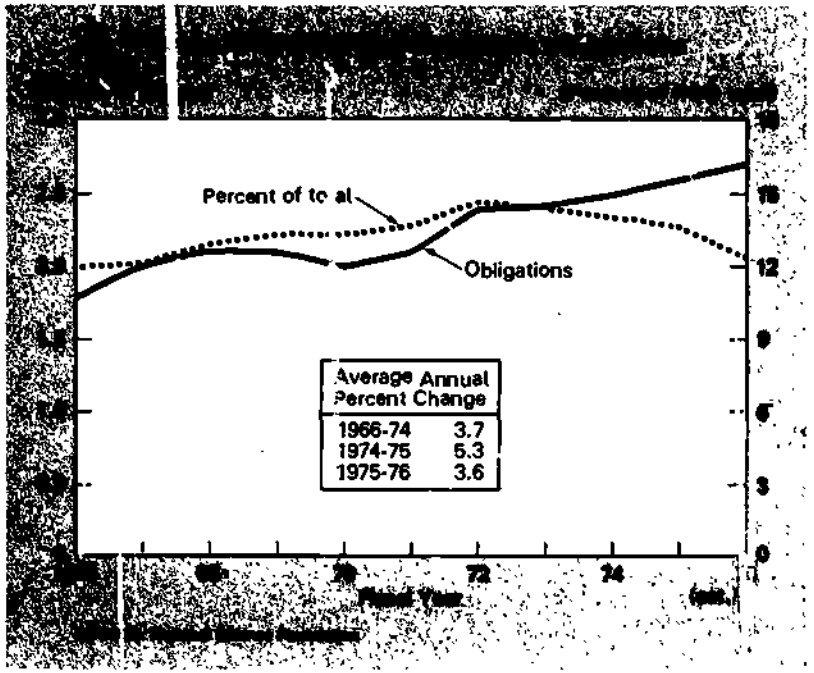
N P = Other nonprofit institutions excluding FFRDC's
N P FFRDC's = FFRDC's administered by other nonprofit institutions
S & L gov't. = State and local government
For. = Foreign.

Fields of Science
Life = Life sciences
Psych. = Psychology
Phy. Sci. = Physical sciences
Environ. = Environmental sciences.
Math = Mathematics
Eng = Engineering
Soc. = Social sciences

Section 3. BASIC RESEARCH

- Federal obligations for basic research amounted to $2,465 million in 1974 and were expected to increase to $2,596 million in 1975 and $2,689 million in 1976. Although these totals represent record highs, the increases in both years are expected to be offset by inflation.

- In real terms the basic research funding level for 1975 (latest calculable year) is 16 percent lower than 1967, the constant dollar high.



- As a share of the Federal R&D total, basic research support is an anticipated 12 percent in 1976, down from 14 percent in 1974 and 1975. This drop is partly the result of lower funding by HEW and partly a counterpart to the high development total in 1976.

Agencies

- Five agencies—NASA, NSF, HEW, ERDA, and DOD— accounted for an estimated 89 percent of the Federal support for basic research activities in 1974 and an estimated 86 percent in 1975 and 1976.

- NASA has since 1961 been the leading agency in basic research funding, largely because of the substantial cost of support equipment such as spacecraft and launch vehicles necessary for space exploration and the inclusion of costs for tracking and data acquisition. The NASA share in the Federal basic research total in 1976 is expected to be 27 percent.

- In 1976, for the first time, NSF will become the second agency in support of basic research, with an estimated 20 percent of the Federal total, compared with 12 percent in 1966. The NSF growth rate between 1966 and 1976 is highest of all agencies, and between 1974 and 1976 NSF shows both the largest relative and the largest absolute increases in basic research funding. Most of the $62 million growth in 1976 is planned for Scientific Research Project Support to all science disciplines. Special emphasis will be placed on energy-related general research, on inquiries likely to have a potential impact on food and materials resources, and on support for modern instrumentation.

Federal obligations for basic research, by agency

[Dollars in millions]

Agency	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$2,465	$2,596	+5.3	$2,689	+3.6
National Aeronautics and Space Administration[a]	733	698	-4.8	737	+5.7
National Science Foundation	415	476	+14.7	538	+12.9
Department of Health, Education, and Welfare	561	560	-.2	485	-13.3
Energy Research and Development Administration	232	261	+12.1	292	+12.0
Department of Defense	244	245	+.4	259	+5.8
Other agencies	280	356	+27.7	378	+6.0

[a] The large amounts reported by NASA for basic research are the result of the substantial cost of support equipment such as spacecraft and launch vehicles peculiar to space exploration, and the statistical proration of costs for tracking and data acquisition

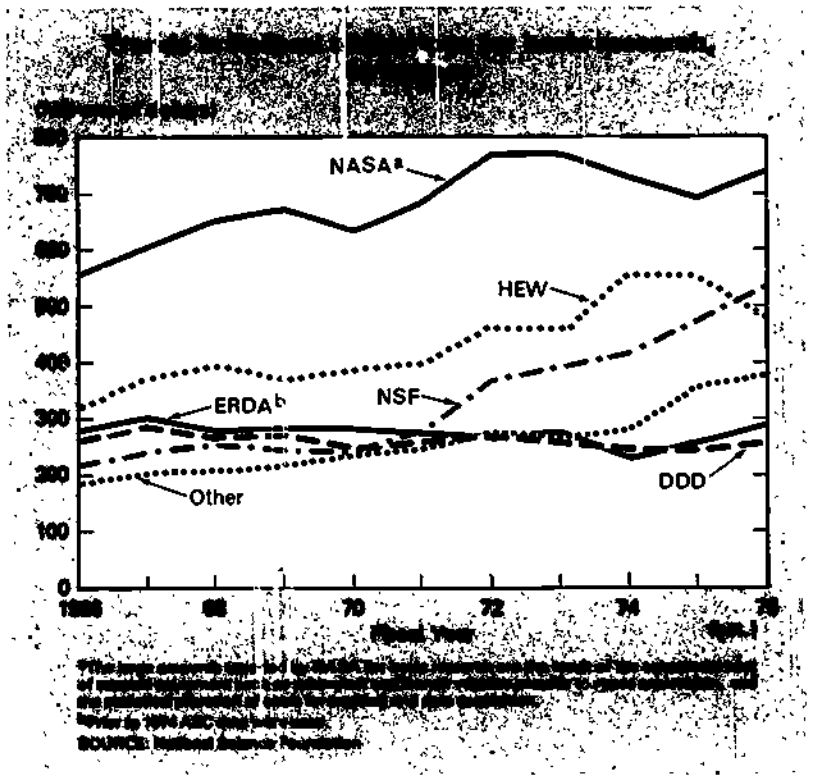
Source: National Science Foundation

- HEW is the only leading basic research support agency to reflect a decline in funding in 1976. Its share of the Federal total is an anticipated 18 percent (compared with 23 percent in 1974). In each year from 1966 through 1975 HEW was the second agency in size of basic research support. Most of the 1976 decrease of $75 million is accounted for by reduced funding for the National Institutes of Health.

- ERDA is second to NSF in dollar growth in basic research support between 1974 and 1976. The $31 million increase for 1976 is mostly found in the physical research program, much of it in high-energy physics to increase knowledge of the fundamentals and the behavior of atomic particles, matter, and energy.

- The $14 million rise for DOD in 1976 for the most part reflects effort within its military sciences program area. The share of DOD within the Federal basic research total has dropped from 14 percent in 1966 to an estimated 10 percent in 1976.

- Conversely, the share of all other agencies combined has grown from 10 percent in 1966 to an expected 14 percent in 1976. In 1975 a sharp relative rise was occasioned by the increased funding of the Agricultural Research Service (USDA), and in 1976 growth is chiefly expected to stem from the Geological Survey (Interior).



Performers

- Universities and colleges have always made up the leading performance sector for federally funded basic research. Their share of the Federal basic research total has been fairly stable in the 1966-76 period, ranging from a high of 40 percent in 1966 to a low of 35 percent in 1970. The expected share in 1976 is 38 percent.

  The parts played by various agencies in support of academic performance has shifted considerably. Although HEW was the leading agency from 1966 through 1975, NSF is expected to be the leading agency in 1976. HEW, which provided more than one-fourth of the support to universities and colleges for basic research in 1966, reflected a share as high as two-fifths by 1974, but is scheduled to provide an estimated one-third in 1976. In 1976 NSF is scheduled to account for two-fifths. Three mission-oriented agencies—DOD, ERDA, and NASA— represented more than two-fifths of the university-and-college total in 1966, but by 1976 their combined share is slightly more than one-fifth.

- Over the 1966-76 timespan the share of Federal basic research that has been intramurally performed has gradually grown from 24 percent to an estimated 28 percent.

Federal obligations for basic research, by performer

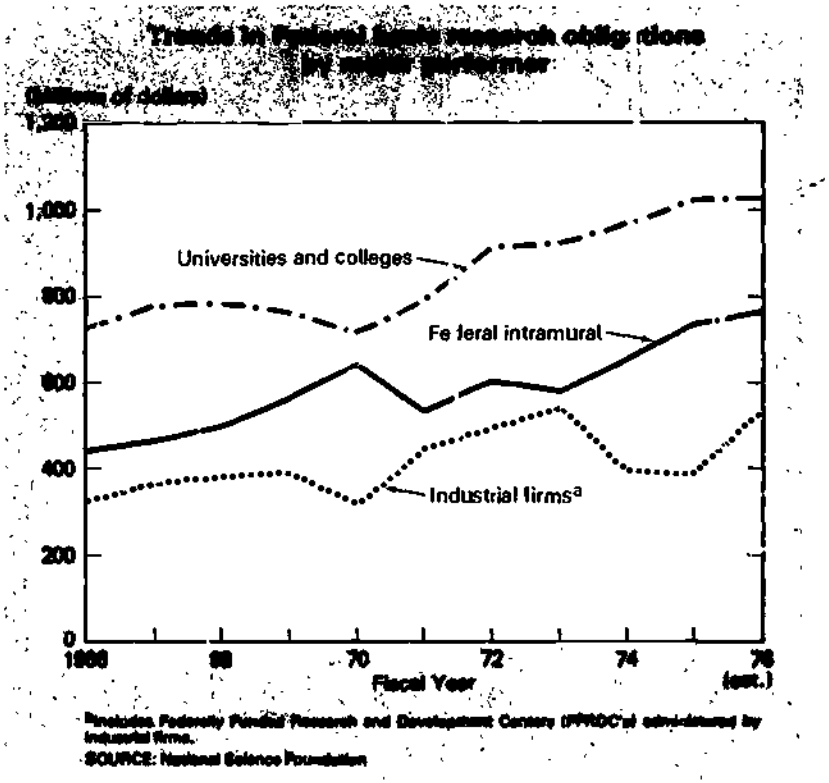
(Dollars in millions)

Performer	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$2,465	$2,596	+5.3	$2,689	+3.6
Federal intramural	661	736	+11.4	766	+4.1
Industrial firms[1]	495	487	-1.7	534	+9.6
Universities and colleges	970	1,025	+5.7	1,026	+.1
FFRDC's administered by universities	200	219	+9.3	247	+13.2
Other nonprofit institutions[1]	108	100	-7.7	88	-12.0
Other performers	31	31	-2.0	29	-5.1

[1] Includes Federally Funded Research and Development Centers (FFRDC's) administered by this sector
Source: National Science Foundation

NASA has been the primary support agency for basic research performed intramurally and is expected to account for more than one-fourth of the total in 1976. Other support agencies are USDA, DOD, Interior, and HEW, in that order. The increased share of intramural activity in the Federal basic research total between 1974 and 1976 is chiefly attributable to Interior and USDA.

- Industry makes up the third most important sector for Federal basic research performance, and NASA has accounted for more than four-fifths of the support in the 1966-76 decade. Industrial performance within the Federal basic research total has ranged from a low of 16 percent in 1970 to a high of 23 percent in 1973. The anticipated share for 1976 is 20 percent.



Fields

- The physical sciences have almost always represented the largest share of the Federal basic research effort. In 1976 they are expected to make up 37 percent of the total, compared with a low of 32 percent in 1974. Funding for the physical sciences is scheduled to increase in both 1975 and 1976, mostly as a result of program increases on the part of NASA, ERDA, and NSF, which together account for approximately four out of five dollars provided to this field.
- The life sciences, although remaining second in size of support, are expected to reflect decreases in funding in 1975 and 1976. NIH (HEW) is responsible for approximately one-half of the obligations to this field and is the major factor in this decline. As a share of the Federal basic research total, the life sciences are expected to drop from a high of 34 percent in 1974 to 28 percent in 1976.
- The environmental sciences have since 1971 represented between 18 percent and 19 percent of the basic research total. The primary sources of support to this broad field are NASA, NSF, Interior, and DOD. Between 1974 and 1976 the increases planned by NSF and Interior's Geological Survey will more than offset the expected decreases in NASA support.
- In 1976 engineering will account for an estimated 8 percent of all Federal basic research, compared with 9 percent in 1966. In this period agencies have shifted in relative support to this field. From 1966 until 1972 NASA provided the chief support to engineering with DOD in second place. Since then DOD has provided the chief support, and since 1974 NSF has been in second place. In 1976 DOD will fund more than one-third of the basic research activity in engineering, NSF somewhat more than one-fourth, and NASA less than one-fifth.
- The social sciences share of the Federal basic research total has grown between 1966 and 1976 from 2 percent to 3 percent, while the share of mathematics has decreased from 3 percent to 2 percent.

Federal obligations for basic research, by field of science

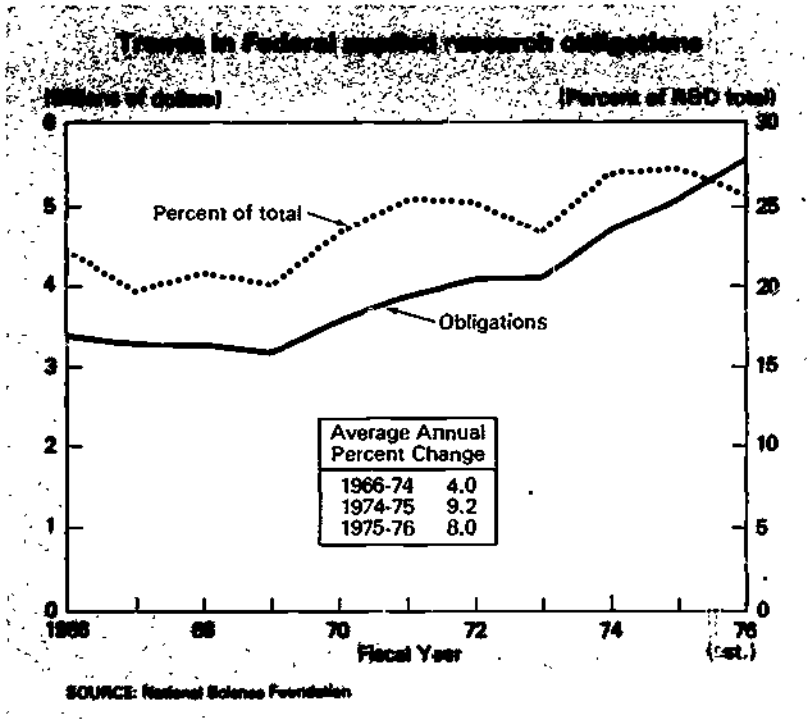
(Dollars in millions)

Field of science	Actual		Estimates	
	1966	1974	1975	1976
Total	$1,840	$2,465	$2,596	$2,689
Life sciences	552	843	822	753
Psychology	53	49	47	48
Physical sciences	667	797	898	1,000
Astronomy	170	203	246	265
Chemistry	119	199	207	236
Physics	350	389	436	490
Other	28	6	8	9
Environmental sciences	291	447	463	499
Atmospheric	176	212	207	235
Geological	66	162	170	174
Oceanography	49	67	82	86
Other	—	6	4	4
Mathematics	60	49	55	59
Engineering	168	189	210	218
Social sciences	44	73	82	91
Other sciences	4	16	19	21

Source: National Science Foundation

Section 4. APPLIED RESEARCH

- Federal applied research activities are expected to grow from $4,708 million in 1974 to estimated totals of $5,141 million in 1975 and $5,551 million in 1976. In constant dollars, however, little change in support is expected to be shown from one year to the next in the 1974-76 period.
- As a share of the Federal R&D total, applied research has increased to some extent from the 22-percent level of 1966. In 1976 the anticipated share is 26 percent, down one percentage point from 1974 and 1975.



SOURCE: National Science Foundation

Agencies

- Although almost all Federal agencies sponsor applied research activities, DOD, HEW, and NASA will account for an estimated 72 percent of the applied research total in 1976. These three agencies have led for many years in support to Federal applied research, but over the 1966-76 period their share of the total has dropped: it was 88 percent in 1966.
- Among all the agencies the DOD dollar increase is the largest in 1976. It is derived primarily from Army and Air Force programs, particularly for work in the engineering sciences. Although DOD's overall support to applied research has grown between 1966 and 1976, the DOD share of the Federal total has declined from 46 percent to an estimated 31 percent because of the growth of applied research efforts of other agencies.
- HEW is the only major agency to show a decline in dollar support in 1976, almost entirely from proposed cutbacks in programs of the National Institutes of Health. At present HEW is the second agency in size of applied research undertakings. Its share of the Federal applied research total grew from 19 percent in 1966 to 27 percent in 1975 but is expected to be only 22 percent in 1976. HEW has contributed substantially to long-term growth in Federal support to this area.
- NASA will account for the second-largest increase in 1976, much of the rise within the space sciences program. NASA is similar to DOD in that applied research support has grown between 1966 and 1976 but not to all performing sectors. The intramural sector has shown substantially increased support whereas the industrial sector has shown a decided drop. Also like DOD, the NASA share within the Federal applied research total has fallen: from 23 percent in 1966 to an estimated 18 percent in 1976.

Federal obligations for applied research, by agency

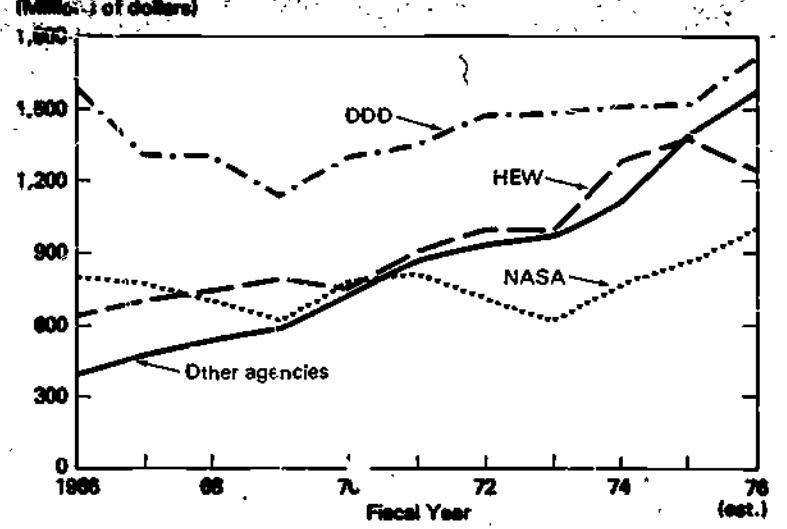
(Dollars in millions)

Agency	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$4,708	$5,141	+9.2	$5,551	+8.0
Department of Defense	1,516	1,522	+.4	1,727	+13.5
Department of Health, Education and Welfare	1,290	1,368	+6.0	1,245	-9.0
National Aeronautics and Space Administration	776	867	+11.8	1,004	+15.8
Energy Research and Development Administration	232	321	+38.4	421	+31.0
Department of Agriculture	219	245	+11.8	268	+9.4
Department of Commerce	111	127	+14.7	141	+10.9
Department of the Interior	74	113	+52.9	136	+21.1
National Science Foundation	105	115	+9.7	114	-.8
Environmental Protection Agency	87	117	+35.3	111	-5.9
Nuclear Regulatory Commission	42	56	+31.4	88	+57.4
Veterans Administration	75	86	+13.9	85	-1.3
Department of Transportation	62	63	+1.8	80	+26.0
All others	118	140	+18.8	131	-6.7

Source: National Science Foundation

- A number of other agencies have been responsible for substantial increases in applied research activity in the 1966-76 decade. The combined applied research obligations of ERDA, USDA, Commerce, Interior, NSF, and EPA have increased more than fivefold in this period. Their share of the Federal applied research total has grown from 9 percent in 1966 to an estimated 21 percent in 1976.
- The increase for ERDA in 1976 is third highest among the Federal agencies, and the increase between 1974 and 1976 (of $189 million) will move the ERDA share of the Federal applied research effort from 5 percent to an estimated 8 percent. This increased support will provide primarily for expansion in coal research, fusion power research, and biomedical and environmental research.
- The USDA sponsorship of applied research has shown steady growth throughout the 1966-76 decade, much of it for work within the Agricultural Research Service and in support of agricultural experiment stations. The USDA share of Federal applied research support has ranged between 4 percent and 5 percent.
- The Commerce share has risen from 1 percent in 1966 to an estimated 3 percent in 1976. Expanded applied research efforts of the National Oceanic and Atmospheric Administration (NOAA) are primarily responsible for this change.
- Interior is expected to almost double its applied research support from 1974 to 1976. The increase in 1975 provided for expansion in mining technology research within the Bureau of Mines, and the 1976 increase is primarily directed to proposed research under the Office of the Secretary in reclaiming mined areas. The Interior share of the applied research total remains 2 percent.
- The NSF share is now also 2 percent, having increased from one-tenth of 1 percent of the Federal applied research total in 1966. Since 1970 increased NSF support to applied research mainly reflects the sponsorship of programs within the broad Research Applied to National Needs (RANN) program but includes portions of Scientific Research Project Support and other programs as well.

Trends in Federal obligations for applied research, by agency



SOURCE: National Science Foundation

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- Although EPA reflects a slight decrease in 1976, the estimated applied research support for that year is significantly higher than the 1974 level. The net increase in the 1974-76 period is primarily for work on energy-related environmental research. The EPA share of the Federal applied research total in 1976 is an estimated 2 percent, compared with 1 percent in 1970, the year this agency was established.

- The applied research programs of the recently established NRC (Nuclear Regulatory Commission) are scheduled to double between 1974 and 1976. The largest NRC program is reactor safety research, which was formerly under the purview of AEC. The NRC share of the Federal applied research total is expected to be almost 2 percent in 1976, compared with just under 1 percent in 1974.

Performers

- Federal intramural establishments make up the prime area for applied research performance. The intramural sector is expected to account for 41 percent of the Federal applied research total in 1976, up from 31 percent in 1966. Since 1969 this sector has shown strong and steady growth.

Federal obligations for applied research, by performer

(Dollars in millions)

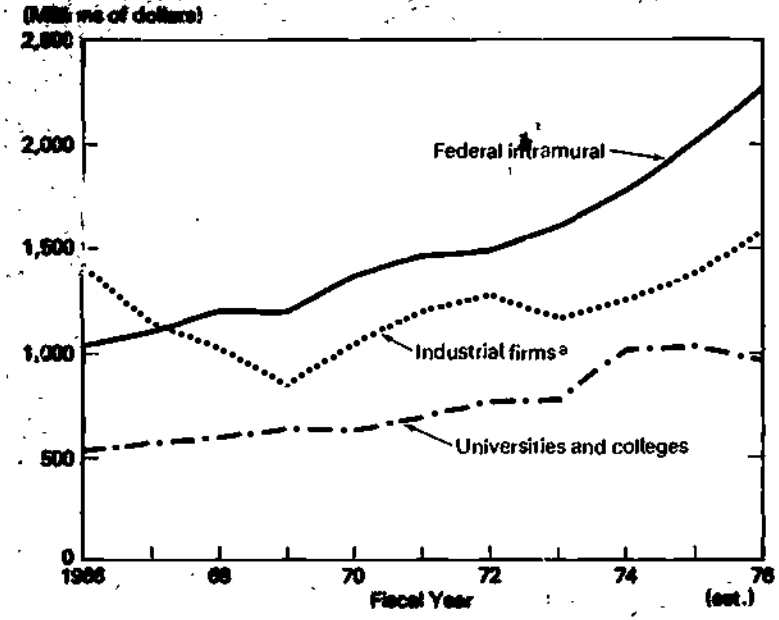
Performer	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$4,708	$5,141	+9.2	$5,551	+8.0
Federal intramural	1,783	2,009	+12.7	2,274	+13.2
Industrial firms[1]	1,254	1,381	+10.1	1,583	+14.6
Universities and colleges	1,014	1,031	+1.7	973	-5.7
FFRDC's administered by universities	184	218	+18.3	249	+14.4
Other nonprofit institutions[1]	367	397	+8.1	352	-11.4
Other performers	105	105	-.7	121	+15.4

[1] Includes Federally Funded Research and Development Centers (FFRDC's) administered by this sector
Source: National Science Foundation

The major agencies contributing to this long-term rise are DOD, NASA, and HEW, although USDA and Commerce have also reflected significant increases in support to intramural work.

- Dollar support to the industrial sector declined sharply between 1966 and 1969 but grew importantly in subsequent years, reaching an alltime high in the 1976 estimate. In 1976 industrial firms are expected to perform 29 percent of the Federal applied research total, a decided drop from the 41-percent share they represented in 1966.

Trends in Federal applied research obligations by major performer



[a] Includes Federally Funded Research and Development Centers (FFRDC's) administered by industrial firms.
SOURCE: National Science Foundation

In earlier years, 1966 to 1974, DOD and NASA were primarily responsible for the trend in applied research support to industry, but from 1974 to 1976 these agencies were joined by ERDA and NRC in terms of influence on the upward curve of industry funding.

- Applied research performance on the part of universities and colleges showed uninterrupted increases each year between 1966 and 1975 except for a slight drop in 1970. In 1976 another drop is anticipated, stemming more from curtailed plans by HEW than from any other factor.

The university-and-college share of the total Federal applied research effort grew from 15 percent in 1966 to 20 percent in 1975, but the share for 1976 is estimated at 18 percent.

Fields

- Between 1966 and 1976 engineering has been the leading field in Federal applied research support, making up 44 percent of the applied research total in 1966 and an estimated 42 percent in 1976. DOD and NASA are the chief agency sources of support to engineering, but in the 1974-76 period Interior, ERDA, and NRC are also expected to contribute significantly to the important scheduled growth for this field.

- The life sciences, second in degree of Federal support, grew strongly between 1966 and 1975, but are scheduled to decline in 1976. Their share of the Federal applied research total was 22 percent in 1966 and had grown to 32 percent by 1975. In 1976, however, the share is an anticipated 29 percent. HEW is the chief source of support to this field.

- The environmental sciences, mainly supported by NASA, received sharply diminished funding from 1966 to 1969 but reflected steady upward growth in subsequent years. The 1976 share of total is an estimated 10 percent, compared with 13 percent in 1966 and 7 percent in 1969.

- The physical sciences have shown little growth over the 1966-76 decade. Their share of the total Federal applied research effort was 12 percent in 1966 but will be an estimated 9 percent in 1976. DOD and ERDA provide most of the funding to this field.

- Support to the social sciences has doubled in the 1966-76 timespan while the social sciences share of the applied research effort has increased from 3 percent to 5 percent. HEW offers the principal support to the social sciences.

- Mathematics and psychology will each receive an estimated 2 percent of Federal funding for applied research in 1976. DOD and HEW provide the main impetus to support of psychology, and DOD is the principal agency in support to mathematics.

Federal obligations for applied research, by field of science

(Dollars in millions)

Field of science	Actual		Estimates	
	1966	1974	1975	1976
Total	$3,431	$4,708	$5,141	$5,551
Life sciences	749	1,546	1,649	1,595
Psychology	47	93	85	9[illegible]
Physical sciences	410	385	418	47[illegible]
Astronomy	14	3	4	[illegible]
Chemistry	139	132	139	15[illegible]
Physics	229	217	235	27[illegible]
Other	28	33	40	44
Environmental sciences	458	428	497	529
Atmospheric	122	218	229	231
Geological	296	80	97	109
Oceanography	29	59	85	84
Other	11	71	86	105
Mathematics	62	78	88	98
Engineering	1,514	1,814	1,992	2,327
Social sciences	121	218	260	265
Other sciences	69	144	151	171

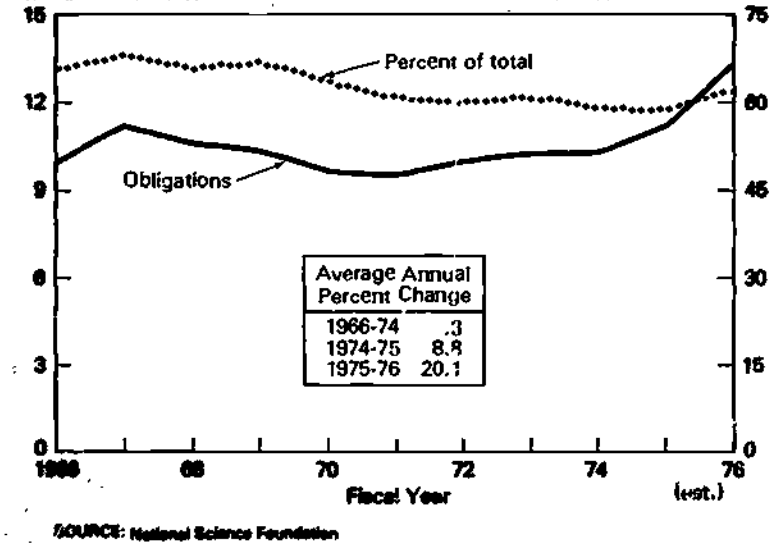
Source: National Science Foundation

Section 5. DEVELOPMENT

- Feder ' obligations for development are expected to increase from $10.3 billion in 1974 to $11.2 billion in 1975, and to increase further to $13.4 billion in 1976, a record high. This figure compares with the previous high of $11.3 billion in 1967.

- Despite the rise, the 1975 total represents an actual decline from the previous year in constant dollars and a 36-percent decline from the 1967 peak. The scheduled effort for 1976 will reflect expanded performance over 1975 in real terms based on any reasonably estimated deflator but will still be approximately 25 percent less than the 1967 level.

Trends in Federal development obligations



SOURCE: National Science Foundation

- The development share of the total Federal R&D effort declined from 66 percent in 1966 to 59 percent in 1974 and 1975. The share is expected to increase in 1976 to 62 percent.

Agencies

- DOD, NASA, and ERDA together are expected to account for 89 percent of the total Federal development effort in 1976, compared with a 97-percent share for these three agencies in 1966. In recent years other agencies have entered significantly into development programs, reducing the share of the leading three.

- The dollar increase for DOD in 1976 is the largest for any Federal agency. DOD has supported development to such an extent that its share of the Federal development total has grown from 51 percent in 1966 to an estimated 64 percent in 1976. Plans for 1976 include expanded development of the Navy's Trident submarine-launched missile system, air combat fighter, and sea-launched cruise missile. The Air Force plans significant increases to cover its version of the air combat fighter as well as the B-1 bomber. Smaller increases have been scheduled for the Army for such programs as the UTTAS logistic helicopter and the short-range air defense missile (SHORAD).

- NASA is still the second largest support agency for development efforts even though funding has declined sharply in the past decade, contributing to a drop in the NASA share of the Federal development total from 37 percent in 1966 to an estimated 13 percent in 1976. For 1976 an increase in funding is proposed, which primarily covers the continuing development of the space shuttle.

Federal obligations for development, by agency

[Dollars in millions]

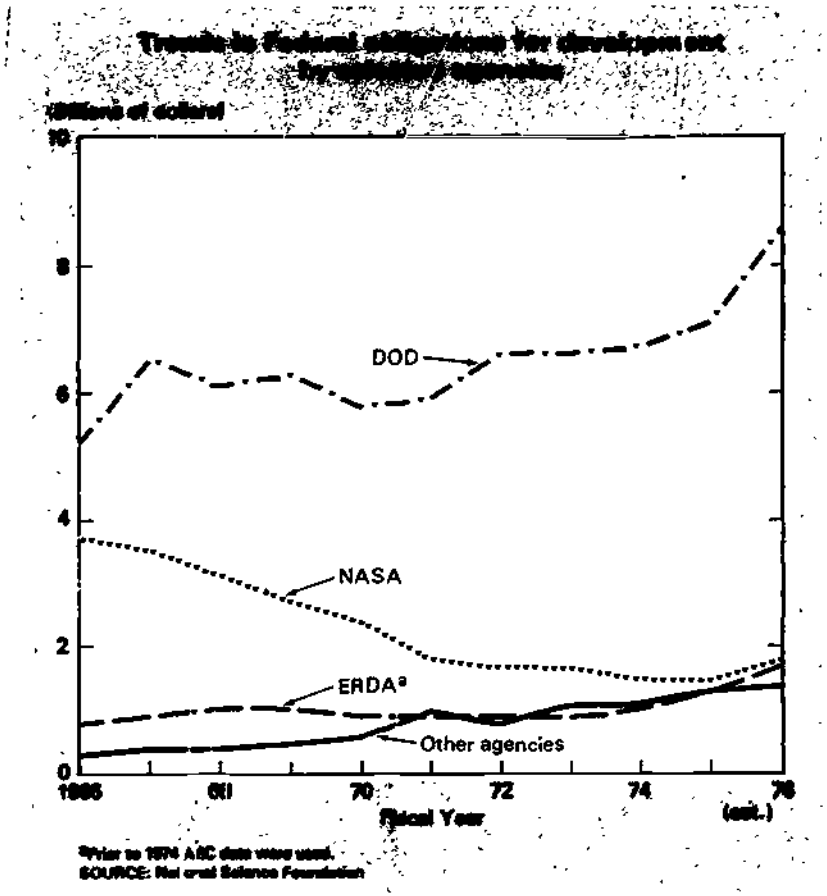
Agency	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$10,265	$11,168	+8.8	$13,411	+20.1
Department of Defense	6,660	7,093	+6.5	8,649	+21.9
National Aeronautics and Space Administration	1,494	1,501	+.5	1,690	+12.6
Energy Research and Development Administration	1,024	1,324	+29.3	1,669	+26.0
Department of Health, Education, and Welfare	439	476	+8.5	596	+25.2
Department of Transportation	308	308	-.2	322	+4.6
Environmental Protection Agency	73	154	+110.8	172	+12.2
Other agencies	267	313	+17.1	313	(1)

(1) Less than .05 percent.

Source: National Science Foundation

- ERDA shows the largest relative growth of any agency in development support in 1976, and the dollar increase is second only to that of DOD. Chief impetus to growth is found in coal utilization, solar energy development, fission power reactor development, and weapons development and testing activities. The activities covered by ERDA amounted to 8 percent of the Federal development total in 1966 but had grown to 10 percent by 1974 and are expected to reach 12 percent in 1976.

- The 10-percent share of the remaining agencies in 1976 is primarily divided among HEW, DOT, and EPA. Between 1966 and 1974 HEW and DOT were responsible for the largest part of the increase in the development effort of this group. In 1975 most of the growth was attributable to energy-related programs of EPA, and in 1976 most of the increase is derived from proposed expansion of programs of the Office of Education within HEW.



Performers

- The principal locus of most Federal development work has been industry, although the total of development performed by industrial firms fell sharply between 1967 and 1971, mostly as a result of the curtailment of NASA programs. After almost leveling off in the next three years, funding to industry (including FFRDC's) reflects a steep rise—from $6.7 billion in 1974 to an anticipated $9.1 billion in 1976. The 1976 figure surpasses the previous high in 1967.

  As a result of these changes in funding industrial performance as a share of the development total dropped from 76 percent in 1966 to 65 percent in 1974 and is expected to increase to 68 percent in 1976.

  DOD is primarily responsible for the upward movement in support to industrial development contracts in 1976, followed by ERDA and NASA.

Federal obligations for development, by performer

(Dollars in millions)

Performer	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$10,265	$11,168	+8.8	$13,411	+20.2
Federal intramural	2,371	2,557	+7.8	2,716	+6.2
Industrial firms	6,688	7,258	+8.5	9,143	+26.0
Universities and colleges	231	237	+2.5	231	-2.3
FFRDC's administered by universities	405	484	+19.6	547	+13.0
Other nonprofit institutions[1]	427	477	+11.6	452	-5.3
Other performers	143	155	+6.7	322	+107.9

[1] Includes Federally Funded Research and Development Centers (FFRDC's) administered by this sector.

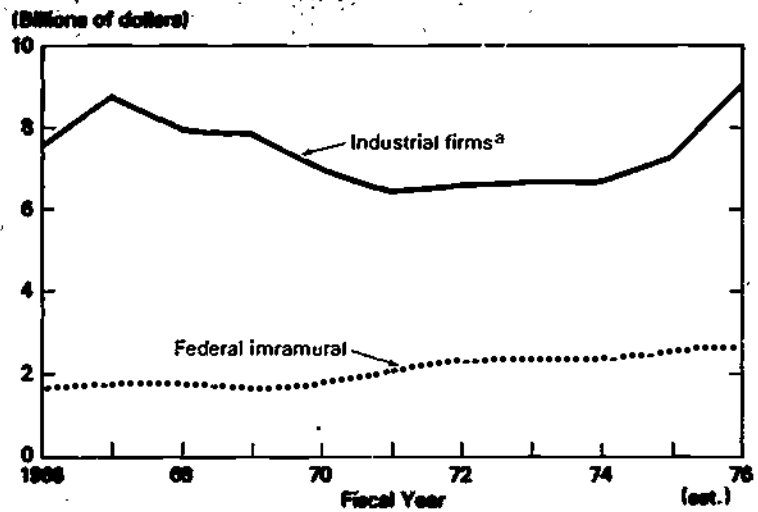
Source: National Science Foundation

- Federal intramural performance of development showed little change in level of effort from 1966 to 1970 but thereafter increased almost steadily, more as a result of DOD activities than those of any other agency. DOD accounts for approximately three-fourths of the support to this sector.

  In 1966, the Federal intramural sector accounted for 17 percent of the development total and by 1974 made up 23 percent. A drop to 20 percent is expected in 1976.

- Other sectors—universities and colleges, other nonprofit institutions, and State and local governments—performed 7 percent of all Federal development in 1966 but are expected to accomplish 12 percent in 1976.

Trends in Federal development obligations by major performer



[a] Includes Federally Funded Research and Development Centers (FFRDC's) administered by industrial firms.

SOURCE: National Science Foundation

Section 6. GEOGRAPHIC DISTRIBUTION, 1974

In 1963, 1965, and 1968, and annually since then, data have been collected on the geographic distribution of Federal R&D funds.

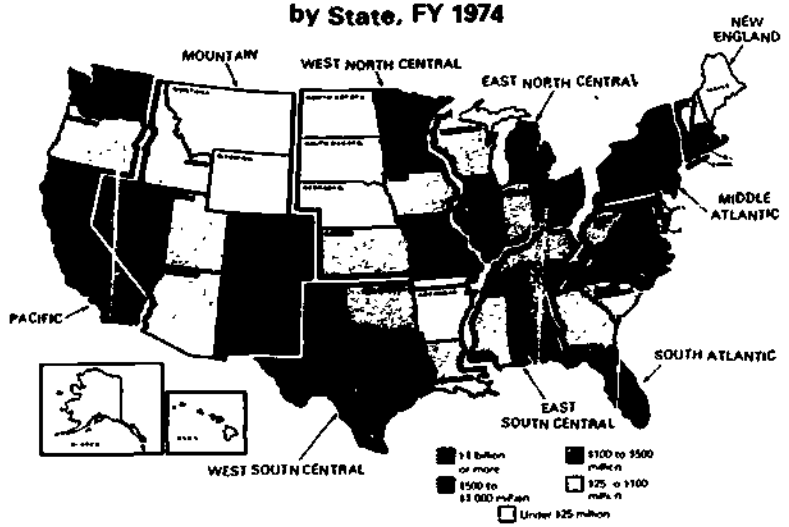
For 1974, almost $17.0 billion in Federal R&D obligations were reported by the 10 participating agencies representing more than 97 percent of the total Federal R&D effort. These agencies also reported $750 million for R&D plant.

Data are given on a prime contract basis, although additional data were obtained from NASA on the effects of first-tier subcontracting in 1974. Indications from the NASA data are that if subcontracting is taken into account, the dispersion of funds is greater than the pattern shown in the following pages.

Synopsis

- In 1974 every State and the District of Columbia received Federal R&D support. California received the largest amount—$4.1 billion, and Delaware the smallest amount—$10.4 million.
- Four States—California, Maryland, Massachusetts and New York—each received more than $1 billion in Federal R&D support in 1974.
- Eight States, including the District of Columbia, were recipients of Federal R&D funds in the $500 million-to-$1 billion category.
- Eleven States received from $100 to $500 million in Federal funds for R&D purposes in 1974.
- Twenty States reflected support levels between $25 million and $100 million, and eight were reported at levels below $25 million.
- In 1974 a total of 33 States, including the District of Columbia, received larger amounts of support than in 1973. Those with increases the previous year were only 27 in number, including the District of Columbia.
- Eighteen states were reported as declining in Federal R&D support between 1973 and 1974, a smaller number than in the previous year.

Distribution of total Federal R&D obligations by State, FY 1974

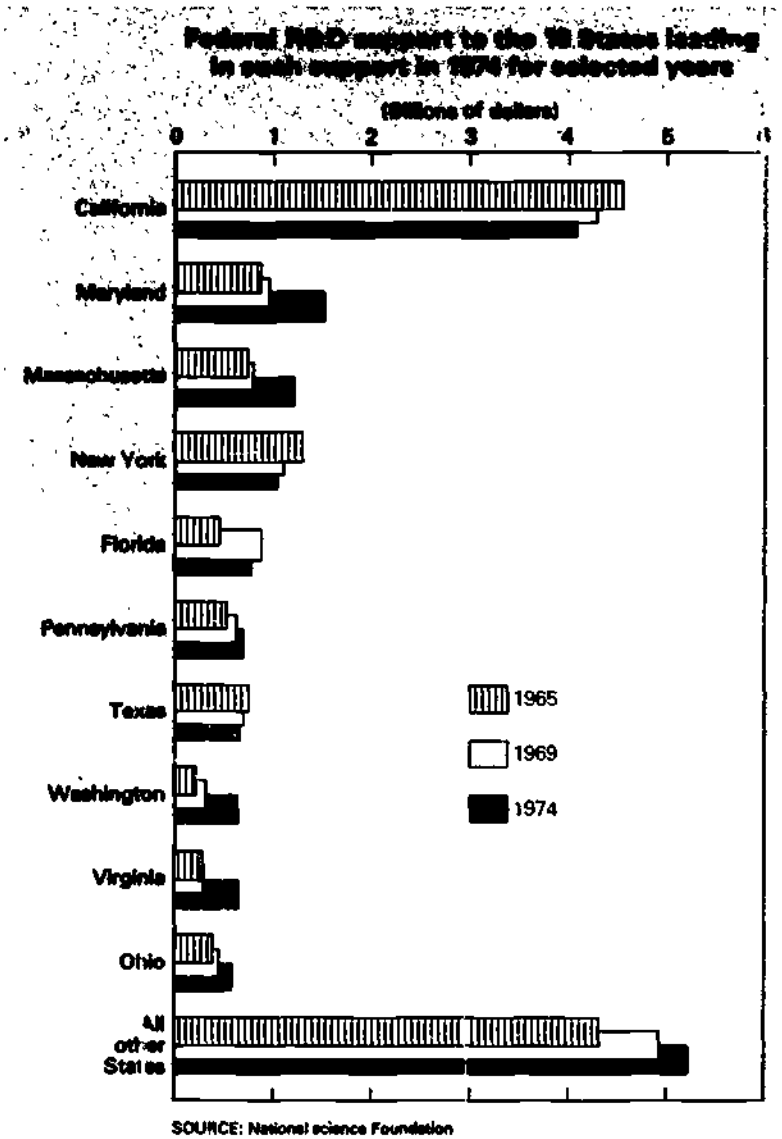


The Leading States

In 1974 the 10 leading States accounted for 69 percent of the Federal R&D total compared with 68 percent for the two preceding years. For the most part the same States are among the leading 10 each year. In the entire period surveyed, the list has included California, Maryland, Massachusetts, New York, Florida, Pennsylvania, and Texas. In 1974 New Jersey was not in this group, the first time this State has been omitted.

California remains by far the chief recipient of Federal R&D support, with almost $4.1 billion in 1974, or 24 percent of the Federal R&D total nationwide. Even with recent increases, however, the amount for 1974 is still below the 1965 level, and the California share is lower than the 32-percent share in 1965. In 1974 a $236 million increase was shown over 1973, the largest for any State. DOD and NASA were the main sources of support, providing more than 80 percent of the R&D funds to California and nearly 84 percent of the 1974 gain. The principal ongoing DOD and NASA programs in California are the B-1 bomber and the space shuttle. The overall increase to this State would have been even more pronounced except for small decreases in support by ERDA, Commerce, Interior, and DOT. Industry made up nearly two-thirds of all R&D performance in California. The remaining one-third was mostly accounted for by Federal laboratories—15 percent, and universities and colleges—3 percent.

In 1974 **Maryland** received $1.5 billion, or 9 percent of total Federal R&D support. The increase of $94 million was the third highest of any State. More than three-fifths of the R&D support to Maryland in 1974 was for Federal intramural performance. Most of the remaining support was directed to industrial firms. Three agencies accounted for most of the Maryland R&D funding: DOD (42 percent of the total), HEW (29 percent), and NASA (18 percent). The overall increase in 1974 was largely attributable to DOD and HEW, which expanded their support to nearly all performers. The DOD rise primarily involved intramural performance for the Navy and Air Force and an increase in other nonprofit performance for the Navy. HEW, through NIH, provided a large part of the higher support total in the form of an industry contract assigned to the new Frederick Cancer Research Center. Other Federal R&D facilities in Maryland include the National Institutes of Health



SOURCE: National science Foundation

(HEW), the Goddard Space Flight Center (NASA), the National Bureau of Standards (Commerce), the Agricultural Research Center (USDA), the Naval Surface Weapons Center (Navy), and the Edgewood Arsenal Laboratories (Army).

Massachusetts showed a rise in R&D support of $235 million, almost the same as California. This gain moved the State above the $1 billion mark for the first time since the collection of geographic data was begun in 1963. DOD, which was responsible for almost three-fourths of Federal R&D activities in Massachusetts in 1974, accounted for most of the increase, largely directed to industrial firms. DOD's use of nonprofit institutions also grew—from $1 million in 1973 to nearly $53 million in 1974. The reason was that the Charles Stark Draper Laboratory, Inc. a large electronics organization in Cambridge, had been disassociated from the Massachusetts Institute of Technology and become a nonprofit institution. HEW, responsible for approximately one-eighth of the 1974 support to Massachusetts, concentrated its effort in universities and certain other nonprofit institutions. Most of the remaining work was funded by DOT, chiefly for intramural performance at the Transportation Systems Center; by NSF, for university performance; and by NASA, for industrial, university and other nonprofit performance.

Distribution of Federal R&D obligations to the 10 States leading in such support in fiscal year 1974 for selected years

[Dollars in millions]

State	1965	1969	1973	1974
Total, all States	$14,357	$15,355	$16,486	$16,991
	Percent distribution			
California	31.7%	27.9%	23.3%	24.0%
Maryland	6.1	6.3	8.7	9.0
Massachusetts	5.1	5.1	5.8	7.0
New York	9.0	7.2	5.7	8.0
Florida	3.2	5.8	5.8	4.6
Pennsylvania	3.7	4.0	3.6	3.9
Texas	5.1	4.5	3.9	3.8
Washington	1.5	2.5	3.4	3.8
Virginia	2.0	1.9	3.4	3.8
Ohio	2.6	2.8	2.9	3.3
All other States[1]	30.0	32.1	33.2	30.7

[1] Includes outlying areas and offices abroad

Note: Data are based on responses from agencies representing approximately 97 percent of the total Federal R&D effort

Source: National Science Foundation

New York, after two consecutive years of decline, received a $94 million increase in Federal R&D support, the fourth highest of any State, and again moved beyond the $1 billion level. The growth was sufficient to place New York fourth among all the States, compared with a fifth-place position in 1973. Most of the gain was caused by HEW—chiefly NIH—for biomedical research at universities and colleges. DOD, however, was the largest single source of R&D funds and made the second largest contribution to the 1974 increase. Contracts for the Air Force and the Army figured in the gain. Increases in support to New York were also shown by ERDA, DOT, and NASA.

A sharp decrease moved **Florida** to a level of $783 million in 1974, compared with a high of more than $1 billion in 1972 and almost that figure in 1973. The decrease of $169 million was the third largest for any State. DOD, which provided more than one-half of the R&D support to Florida in 1974, was responsible for most of the decrease, mainly through Air Force cutbacks to industry. NASA, the next largest source of support showed only a minor change in funding. Virtually all federally supported R&D work in Florida was performed either by industry or by Federal laboratories. While industrial performance dropped substantially in 1974, Federal intramural performance increased somewhat, largely through NASA activities at the Kennedy Space Center.

In 1974 **Pennsylvania** received a $31 million increase in Federal R&D funding that raised the State level to $669 million, a record high. DOD continued to provide approximately one-half of the support, followed by ERDA, with almost one-fifth, and HEW, with less than one-fifth. The increases of these three agencies in 1974 more than offset decreases on the part of NASA and Interior. More than two-fifths of the R&D performance was carried out by industrial firms, mostly for the Army and the Navy. One-fifth of the performance was in Federal laboratories, mostly for the Navy. Universities accounted for approximately one-sixth, largely accomplished for HEW subdivisions. Most of the research and development for ERDA was undertaken at the Bettis Atomic Power Laboratory, an FFRDC.

Texas reflected virtually no change in the level of federally funded R&D activities in 1974, which amounted to $652 million. NASA and DOD together provided almost four-fifths of the total. Decreases in support by DOD in 1974, primarily the Air Force, were offset by increases from HEW, NASA, and NSF. One-half of the R&D performance in Texas was undertaken by industrial firms, largely in

R&D obligations by geographic division and State for selected years

(Dollars in millions)

Division and State	1965	1969	1973	Net increase/ decrease 1965-73	1974	Net increase/ decrease 1973-74
Pacific	$4,849.0	$4,813.5	$4,562.0	-$287.0	$4,864.3	+$302.3
Alaska	14.4	68.6	41.8	+27.4	25.3	-16.5
California	4,553.3	4,289.8	3,840.1	-713.2	4,076.7	+235.6
Hawaii	41.5	37.7	47.9	+6.4	53.1	+5.2
Oregon	25.6	36.1	64.3	+38.7	59.9	-4.4
Washington	214.3	381.2	567.9	+353.6	650.4	+82.5
South Atlantic	2,154.9	2,961.3	3,706.2	+1,551.3	3,752.8	+46.6
Delaware	7.1	16.1	40.8	+33.7	10.4	-30.4
District of Columbia	374.3	444.3	490.0	+115.7	552.3	+62.3
Florida	459.8	884.5	952.0	+492.2	783.2	-168.8
Georgia	58.4	276.8	66.8	+8.4	70.9	+4.1
Maryland	876.6	961.8	1,434.8	+558.2	1,528.9	+94.1
North Carolina	57.8	56.5	101.9	+44.1	110.0	+8.1
South Carolina	17.1	17.1	23.7	+6.6	28.8	+5.1
Virginia	284.2	286.3	567.9	+283.7	642.3	+74.4
West Virginia	19.6	16.0	28.2	+8.6	25.9	-2.3
Middle Atlantic	2,228.6	2,435.1	2,206.7	-21.9	2,160.2	-46.5
New Jersey	410.7	706.9	645.2	+234.5	473.8	-171.4
New York	1,289.3	1,107.0	932.6	-356.7	1,026.3	+93.7
Pennsylvania	528.7	620.3	628.8	+100.1	660.1	+31.3
New England	992.7	1,085.7	1,264.4	+271.7	1,561.8	+297.4
Connecticut	184.5	223.8	193.9	+9.4	233.7	+39.8
Maine	4.3	14.3	9.6	+5.3	10.5	+.9
Massachusetts	733.7	775.0	953.6	+219.9	1,188.3	+234.7
New Hampshire	28.8	31.0	30.6	+1.8	29.3	-1.3
Rhode Island	37.5	32.8	59.3	+21.8	74.9	+15.6
Vermont	4.0	9.0	17.5	+13.5	25.1	+7.6
East North Central	923.7	1,044.3	1,082.8	+159.1	1,263.8	+181.0
Illinois	191.7	251.2	287.6	+95.9	325.4	+37.8
Indiana	71.9	108.8	82.9	+11.0	95.0	+12.1
Michigan	155.2	167.4	153.8	-1.4	196.6	+42.8
Ohio	379.1	432.6	478.8	+99.7	567.3	+88.5
Wisconsin	125.8	84.2	79.6	-46.2	79.6	—
Mountain	990.1	1,136.7	1,290.6	+300.5	1,213.0	-77.8
Arizona	76.6	79.2	94.8	+18.2	99.5	+4.7
Colorado	212.3	264.4	410.8	+198.5	323.3	-87.5
Idaho	63.6	69.6	81.8	+18.2	52.2	-29.6
Montana	8.6	8.3	19.9	+11.3	13.6	-6.3
Nevada	154.5	232.3	143.1	-11.4	112.5	-30.6
New Mexico	425.3	426.3	462.8	+37.5	532.0	+69.2
Utah	45.0	49.8	66.7	+21.7	68.7	+2.0
Wyoming	4.2	6.8	10.7	+6.5	11.0	+.3
West South Central	1,143.1	894.3	794.0	-349.1	772.1	-21.9
Arkansas	6.6	7.4	16.6	+10.0	14.2	-2.4
Louisiana	377.1	171.8	91.6	-285.5	75.7	-15.9
Oklahoma	28.4	20.1	34.8	+6.4	29.9	-4.9
Texas	731.0	695.0	651.0	-80.0	652.2	+1.2
East South Central	628.3	597.5	681.5	+53.2	726.7	+45.2
Alabama	370.7	358.4	376.5	+5.8	377.4	+.9
Kentucky	17.1	21.4	38.1	+21.0	31.3	-6.8
Mississippi	36.7	26.0	57.5	+20.8	76.3	+18.8
Tennessee	203.7	191.6	209.5	+5.8	241.7	+32.2
West North Central	408.7	328.5	830.8	+422.1	607.4	-223.4
Iowa	28.8	34.2	38.5	+9.7	46.5	+8.0
Kansas	25.7	39.6	30.4	+4.7	29.4	-1.0
Minnesota	106.3	89.3	120.2	+13.9	106.9	-13.3
Missouri	231.7	141.9	608.1	+376.4	387.0	-221.1
Nebraska	7.7	11.3	13.4	+5.7	14.7	+1.3
North Dakota	5.0	6.8	9.5	+4.5	10.5	+1.0
South Dakota	3.5	5.4	10.7	+7.2	12.4	+1.7

Source: National Science Foundation

aerospace, aircraft, and electronics work for DOD and NASA. These agencies also supported much of the Federal intramural work within the State, as, for example, at the Johnson Space Center in Houston. HEW provided most of the funds for university performance.

Washington experienced a gain in Federal R&D support of $82 million in 1974, raising the total to $650 million, a record high. DOD (largely the Air Force) accounted for almost three-fifths of the entire R&D effort and almost two-thirds of the 1974 increase. This funding was primarily directed to industry for aircraft development. ERDA also sponsored increased R&D performance in the State of Washington, at the Hanford Engineering Development Laboratory, an FFRDC located in Richland.

Virginia's receipt of Federal R&D funding increased in 1974 to a total of $642 million, the largest amount ever received by this State. More than four-fifths of the total was accounted for by DOD and NASA. More than one-half of the R&D effort in the State was carried out intramurally and one-third by industrial firms. Intramural facilities include the Army's Fort Belvoir laboratories, the Naval Weapons Laboratory at Dahlgren, and NASA's Langley Research Center. Industrial performance is focused mainly on DOD programs, especially those of the Navy.

For **Ohio** the R&D funding level of $567 million in 1974 was the highest since 1968. Four out of every five R&D dollars spent by the Federal Government in Ohio were spent by DOD and NASA. More than two-fifths of the R&D performance was intramural and included work in the Air Force laboratories at Wright-Patterson Air Force Base and at NASA's Lewis Research Center. Almost two-fifths of the effort reflected industrial contracts, mostly for DOD with special emphasis on the Air Force.

In 1974, the **District of Columbia** and **New Mexico** were in eleventh and twelfth place, respectively, in Federal R&D support. Nearly three-fourths of the District of Columbia effort represented intramural performance, mainly by DOD laboratories. In New Mexico virtually all of the R&D effort was funded by ERDA or DOD. The ERDA work was performed at the Sandia Laboratory and the Los Alamos Scientific Laboratory, both of them FFRDC's. Most of the DOD work was intramurally performed, at such installations as the Army's White Sands Missile Range and the Air Force Weapons Laboratory at Kirtland Air Force Base.

Distribution of Funds by Performers

When States are compared by performing sectors, contrasting patterns of rank are shown. Federal agencies seeking certain kinds of research or development competence to implement their missions have turned to existing organizations with specialized capabilities within given States, and often agency support of these organizations has furthered their expansion. Leadership by certain sectors in certain States becomes established in this way. Certain States show predominant strength in only one sector of R&D performance whereas other States show leadership in more than one area (both industrial and academic, for example). The latter situation is sometimes brought about by the fact that activities of one kind of R&D performer will encourage the growth of other kinds of R&D performers in a supporting capacity.

INDUSTRIAL FIRMS

Industrial performance tends to be widely separated geographically, clustering in coastal areas. In 1974, California and Massachusetts were the leading States in industrial R&D performance for Federal agencies. A number of firms located in those States are particularly well suited for work on defense and space programs. The next three States were New York, Washington, and Maryland, all of which contain specialized industrial capability in aircraft, aerospace, and electronics.

The pattern of geographic separation is further exemplified by the next five States to represent industrial performance: Florida, Pennsylvania, Texas, Missouri, and New Jersey. All of these are coastal States except Pennsylvania and Missouri.

These 10 leading States accounted for 76 percent of total performance by industrial firms (including FFRDC's) in 1974. That year the first eight States in industrial performance were also the first eight in total R&D performance, although in a different order, reflecting the fact that industrial performance made up nearly 50 percent of all Federal R&D performance. Chief support agencies were DOD and NASA.

FEDERAL INTRAMURAL

In 1974 the 10 leading States in intramural performance accounted for approximately 80 percent of the Federal intramural total, largely reflecting work connected with DOD and NASA programs. Five of these States were found on the east coast—Maryland, the District of Columbia, Virginia, Florida, and Massachusetts.

The location of a Federal R&D facility can be determined by the advantages of a particular physical site for certain missions, as in the case of weapons testing at the Army's White Sands Missile Range in New Mexico or nearness to mining sites at the Bureau of Mines Pittsburgh Mining and Safety Research Center in Pennsylvania. Or conditions propitious for space launch may govern the choice of a site, for example, the NASA Kennedy Space Center at Cape Canaveral, Fla.

Federal R&D facilities are often located near related Federal or private sector performers, as, for example, the Naval Ordnance Missile Test Facility at White Sands, N. Mex. near the Army missile range or the Air Force Space and Missile Test Center at Vandenberg Air Force Base, Calif. near private weapons manufacturers. Obvious advantages can also accrue from locating near agency headquarters, which have led to the important intramural status of Maryland, the District of Columbia, and Virginia.

Federal intramural performance represented 27 percent of the Federal R&D total in 1974.

UNIVERSITIES AND COLLEGES

The 10 leading States in performance by universities and colleges accounted for 61 percent of the university-and-college total in 1974. In all of these States HEW was the prime agency source of support, largely to medical schools, and, NSF was the second source except in the case of Massachusetts where DOD carried a support role equal to that of NSF.

Performance by universities and colleges is geographically more dispersed than is the case for industrial and intramural performance, partly because the academic sector tends to perform research rather than development, which is likely to require large-scale operations that concentrate in fewer locations. Thus dispersion is somewhat more attainable for the university-and-college sector. Federal agencies have, in fact, adopted a policy of avoiding undue concentration in the distribution of grants to academia.

The university-and-college sector was responsible for 13 percent of all research and development sponsored by the Federal Government in 1974.

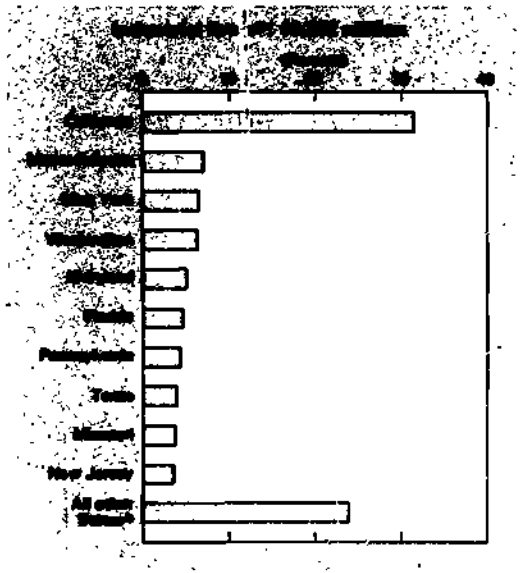
UNIVERSITY-ADMINISTERED FFRDC's

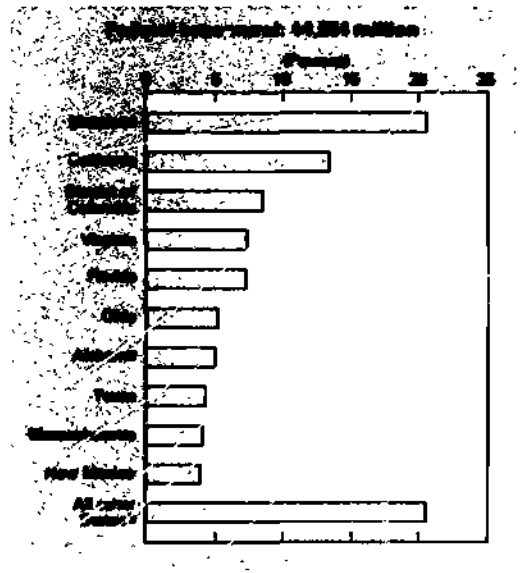
FFRDC's administered by universities were responsible for slightly less than 5 percent of the total Federal R&D effort in 1974. The five leading States were California, New Mexico, Illinois, Maryland, and New York. In six of the 10 leading States ERDA was the only sponsoring agency or the major one. Other support agencies were NASA, DOD, and NSF.

OTHER NONPROFIT INSTITUTIONS

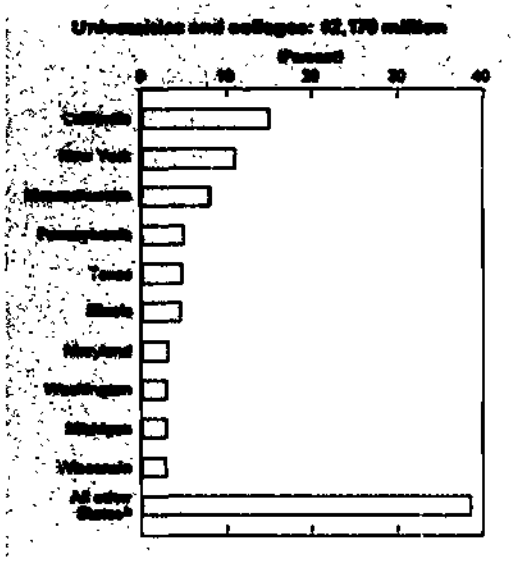
Other nonprofit institutions (including FFRDC's) accounted for almost 5 percent of total Federal R&D performance. The leading States were all among the leaders for other performing sectors in 1974.

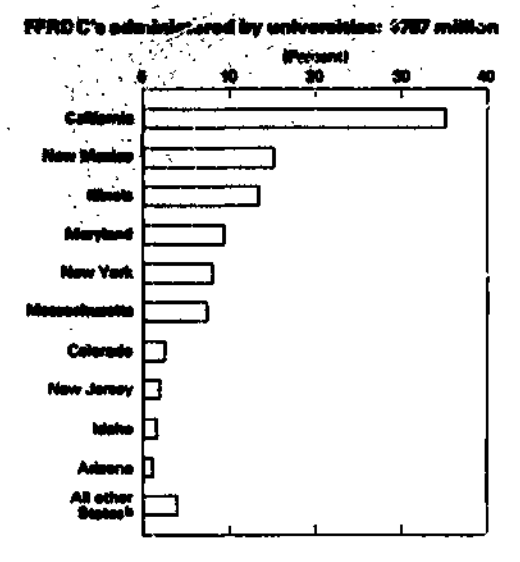
The 10 States leading in Federal R&D support to performing sectors, FY 1974

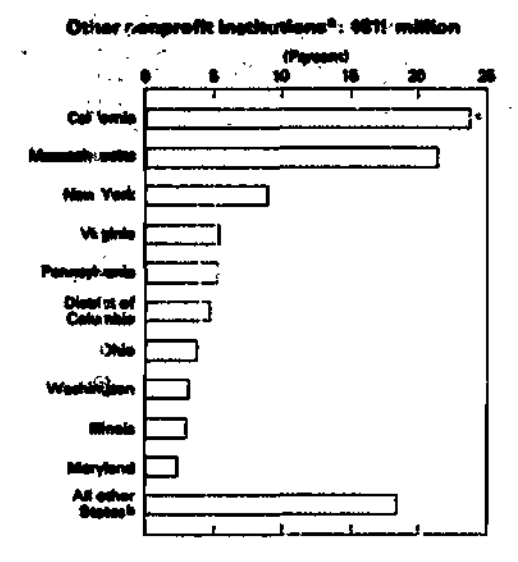




Includes FFRDC's administered by this sector
Includes outlying areas and offices abroad
SOURCE: National Science Foundation







R&D Plant

- The leading States to receive R&D plant support show a fairly close correlation with those States receiving R&D support. In all, 18 States appeared in the "leading 10" group at one time or another in the 1963-74 period. California, New York, Maryland, Florida, and New Mexico were always among this group.
- For the fourth consecutive year, California in 1974 led all the States as the principal recipient of Federal R&D plant support, and also reflected a 10-percent increase in funding. DOD, ERDA, and NASA were the leading sponsors.
- In 1974, ERDA was the primary source of R&D plant support in seven of the leading 10 States: Washington, New York, New Mexico, Illinois, Tennessee, Minnesota, and Pennsylvania. Six of these States contain FFRDC's that are under ERDA sponsorship.
- Minnesota appeared among the leading 10 States largely as the result of a contract for computer equipment to be used in support of certain ERDA atomic weapons development programs.

Factors in R&D Performing Strength

R&D obligations can be ranked by State and compared with such measures of national resources as population, total personal income, and total Federal taxes. Although no direct cause-and-effect relationships can be drawn, the data tend to indicate that the wider choice of skills and institutions found in more populous and wealth-producing areas is related to the selection of those areas for R&D performance.

Federal obligations for R&D plant in the 10 States leading in such support, by agency, fiscal year 1974

[Dollars in millions]

State	Total	ERDA	DOD	NASA	HEW	DOT	NSF	Commerce	Other[1]
Total	$750	$393	$169	$98	$41	$13	$12	$12	$12
California	141	38	53	30	12	1	1	6	(2)
Washington	102	101	(2)	(2)	(2)	—	(2)	—	(2)
New York	77	65	1	2	5	—	(2)	3	(2)
Maryland	61	(2)	46	2	6	4	1	1	1
Florida	52	—	26	24	—	—	(2)	(2)	1
New Mexico	50	41	6	(2)	—	—	3	—	(2)
Illinois	43	39	—	(2)	4	—	—	—	(2)
Tennessee	34	32	1	(2)	—	—	—	—	(2)
Minnesota	23	23	(2)	(2)	—	—	—	—	(2)
Pennsylvania	22	21	(2)	(2)	—	—	—	—	(2)
All other States[3]	145	31	35	39	13	8	7	1	10

[1] Includes the Departments of Agriculture and the Interior and the Environmental Protection Agency.
[2] Less than $500,000.
[3] Includes outlying areas and offices abroad.
Source: National Science Foundation.

Distribution of Federal R&D obligations by State compared with other national indicators, by State: FY 1974

State	Total Federal R&D obligations		Population		Total personal income		Total Federal taxes[2]	
	Rank	Percent of total	Rank	Percent of total	Rank	Percent of total	Rank	Percent of total
United States, total (in millions)	$16,991		[1]211		$1,148,720		$240,981	
California	1	23 99	1	9.89	1	10 91	2	8 87
Maryland	2	9 00	18	1 94	15	2.10	10	2.72
Massachusetts	3	6.99	10	2 74	10	2 89	11	2 66
New York	4	6 04	2	8 57	2	9.85	1	14.14
Florida	5	4 61	8	3 83	9	3 69	9	2.84
Pennsylvania	6	3 89	4	5 60	4	5 68	5	5 85
Texas	7	3 84	3	5 70	6	5.02	7	5 06
Washington	8	3 83	22	1.64	20	1 71	21	1.35
Virginia	9	3 78	13	2 32	12	2 25	19	1.63
Ohio	10	3 34	6	5 08	5	5.19	4	5 98
District of Columbia	11	3.25	44	.34	36	47	(3)	(3)
New Mexico	12	3.13	37	.53	41	.40	44	.22
New Jersey	13	2.79	9	3.47	8	4 07	8	3.81
Missouri	14	2.28	15	2 26	14	2.10	12	2.64
Alabama	15	2 22	21	1.69	24	1 31	28	.86
Illinois	16	1 92	5	5 27	3	6.14	3	7.65
Colorado	17	1.90	28	1.18	26	1 16	20	1.62
Tennessee	18	1.42	17	1.95	21	1.61	23	1.16
Connecticut	19	1.38	24	1 46	19	1.74	15	2.15
Michigan	20	1 16	7	4 30	7	4.69	6	5 53
Nevada	21	.66	47	.27	47	.30	[illegible]	[illegible]
North Carolina	22	65	11	2 54	13	2 15	14	2 20
Minnesota	23	63	19	1 85	18	1 86	16	1 94
Arizona	24	.59	32	1 02	31	.94	33	.60
Indiana	25	.56	12	2 52	11	2.44	13	2.42
Wisconsin	26	47	16	2.16	16	2 07	17	1.86
Mississippi	27	45	29	1 10	33	76	36	37
Louisiana	28	45	20	1 78	22	1 41	25	.94
Rhode Island	29	44	39	44	38	.44	35	.41
Georgia	30	42	14	2 31	17	1 98	18	1.72
Utah	31	40	36	55	37	.45	39	.27
Oregon	32	35	31	1 07	29	1.04	26	93
Hawaii	33	.31	40	.40	39	.43	38	29
Idaho	34	31	42	.38	43	34	40	.26
Iowa	35	.27	25	1 35	23	1 32	27	.90
Kentucky	36	18	23	1.59	25	1 31	22	1 33
Oklahoma	37	18	27	1 28	27	1 08	24	1.00
Kansas	38	17	30	1.07	28	1 07	29	84
New Hampshire	39	17	41	.38	42	36	41	.24
South Carolina	40	.17	26	1.32	30	1.03	32	63
West Virginia	41	.15	34	.85	34	.68	37	.32
Alaska	42	.15	51	.16	49	.21	50	.10
Vermont	43	15	49	.22	50	.19	48	.11
Nebraska	44	09	35	.73	35	.66	30	.68
Arkansas	45	.08	33	.98	32	.77	34	.41
Montana	46	.08	43	.35	46	31	45	.16
South Dakota	47	07	45	.32	48	.25	46	.15
Wyoming	48	.06	50	.17	51	.16	49	.10
North Dakota	49	06	46	.30	45	.31	47	.15
Maine	50	.06	38	.50	40	.40	42	.23
Delaware	51	.06	47	27	44	.31	31	.64
Outlying areas and offices abroad	—	.40	—	—	—	—	—	[4]43

[1] Provisional estimate of resident population as of July 1, 1974.
[2] Includes individual income and employment taxes, corporate income, excise, estate and gift taxes (minus refunds).
[3] Included in Maryland tax figures.
[4] Collections from and refunds to U.S. taxpayers in Puerto Rico, Canal Zone, and in foreign countries.

SOURCES: U.S. Department of Commerce, Bureau of the Census, *Current Population Reports*, Series P-25, No. 533, Oct. 1974, and Bureau of Economic Analysis, *Survey of Current Business*, Volume 55, No. 4, April 1975. U.S. Department of the Treasury, *Statistical Appendix to Annual Report of the Secretary of the Treasury on the State of the Finances for the Fiscal Year Ended June 30, 197a*

Impact of Subcontracting

As previously noted, data on geographic distribution in this report are based on the location of prime contractors performing R&D work. Therefore, they do not reflect the redistribution of Federal R&D funds among the States as a result of subcontracting. Data on NASA prime contract and subcontract awards for 1974 are provided to give some indication of the impact of subcontracting.

The NASA data represent information on all first-tier subcontracts in excess of $10,000 on each of the agency's prime contracts in excess of $500,000, and on second-tiar subcontracts in excess of $10,000 on each of the first-tier subcontracts in excess of $50,000.

The NASA data indicate that significant redistribution of R&D funds among States would be disclosed by availability of full subcontracting data from all agencies. The support to the leading R&D support States would tend to decrease somewhat (although the net change would be small in relation to their prime contracts), but in the case of many smaller support States, the net increase from subcontracts would be important in relation to prime contracts awarded.

NASA SYNOPSIS

- NASA prime contracts in 1974 totaled $2,166 million, of which $334 million was subcontracted. Of this amount, $142 million, or 43 percent, remained within the prime contract States. The remaining $192 million, or 57 percent, was awarded to other States. (See table.)
- Prime contractors in 22 States let contracts to subcontractors in 40 States.
- The net result of the subcontracting was that 33 States showed an increase in their share of procurements and 7, including the District of Columbia, showed a decrease.
- Three of the seven States showing a decrease were among the five leading States in 1974 prime contract awards.

U.S. geographical distribution of NASA prime contract and subcontract awards: fiscal year 1974

[Dollars in thousands]

States	Prime contract awards to States		Subcontract awards			Net total—prime contract and subcontract awards	
	Amount	Percent of total	Received from other States	Awarded to other States	Net total[2]	Amount[3]	Percent of total
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
TOTAL	$2,165,945	100.0	$192,002	$192,002	—	$2,165,945	100.0
Alabama	80,399	3.7	2,214	699	$1,515	81,914	3.8
Alaska	813	(1)	—	—	—	813	(1)
Arizona	5,881	.3	9,859	72	9,787	15,668	.7
Arkansas	171	(1)	—	—	—	171	(1)
California	849,319	39.2	[illegible]	133,739	(113,504)	735,815	34.0
Colorado	193,405	8.9	5,332	15,266	(9,934)	183,471	8.5
Connecticut	35,287	1.6	20,390	7,723	12,667	47,954	2.2
Delaware	1,957	.1	57	—	57	2,014	.1
District of Columbia	13,873	.6	—	28	(28)	13,345	.6
Florida	183,191	8.5	17,736	1,888	15,848	199,039	9.2
Georgia	5,598	.3	508	—	508	6,106	.3
Hawaii	3,130	.1	—	10	(10)	3,120	.1
Idaho	15	(1)	—	—	—	15	(1)
Illinois	7,480	.3	3,920	—	3,920	11,400	.5
Indiana	5,630	.3	735	420	315	5,945	.3
Iowa	3,398	.2	255	—	255	3,653	.2
Kansas	1,806	.1	100	—	100	1,906	.1
Kentucky	469	(1)	—	—	—	469	(1)
Louisiana	38,428	1.8	40	759	(719)	37,709	1.7
Maine	69	(1)	46	—	46	115	(1)
Maryland	164,174	7.6	1,113	2,617	(1,504)	162,670	7.5
Massachusetts	46,037	2.1	11,591	475	11,116	57,153	2.6
Michigan	7,085	.3	1,159	35	1,124	8,209	.4
Minnesota	10,121	.5	3,058	—	3,058	13,179	.6
Mississippi	14,727	.7	332	237	95	14,822	.7
Missouri	31,591	1.5	5,494	869	4,625	36,216	1.7
Montana	45	(1)	—	—	—	45	(1)
Nebraska	423	(1)	137	—	137	560	(1)
Nevada	734	(1)	35	—	35	769	(1)
New Hampshire	719	(1)	353	—	353	1,072	(1)
New Jersey	32,579	1.5	9,997	12,184	(2,187)	30,392	1.4
New Mexico	6,351	.3	33	—	33	6,384	.3
New York	68,236	3.2	38,227	1,108	[illegible]	105,355	4.9
North Carolina	2,605	.1	287	—	287	2,892	.1
Ohio	35,807	17	3,852	529	3,323	39,130	1.8
Oklahoma	1,223	1	5,134	—	5,134	6,357	.3
Oregon	1,129	.1	171	—	171	1,300	.1
Pennsylvania	26,514	1.2	5,621	823	4,798	31,312	1.4
Rhode Island	354	(1)	42	—	42	396	(1)
South Carolina	296	(1)	34	—	34	330	(1)
South Dakota	139	(1)	—	—	—	139	(1)
Tennessee	1,877	.1	187	—	187	2,064	.1
Texas	202,945	9.4	12,592	10,266	2,326	205,271	9.5
Utah	9,258	.4	533	—	533	9,791	.5
Vermont	89	(1)	74	—	74	163	(1)
Virginia	47,971	2.2	902	27	875	48,046	2.3
Washington	19,096	.9	5,725	2,436	3,289	22,385	1.0
West Virginia	139	(1)	—	—	—	139	(1)
Wisconsin	3,077	.1	3,892	(208)	4,100	7,177	.3
Wyoming	265	(1)	—	—	—	265	(1)

[1] Less than .05 percent

[2] The awards to other States exceed the awards from other States

[3] Column (b) plus or minus column (f)

NOTE: Prime contract awards include awards on R&D contracts and awards to educational and nonprofit institutions of $10,000 and over and on all contracts of $25,000 and over, exclude awards placed through other Government agencies, awards outside the United States and its possessions, all contracts subcontract[illegible] awards include those of $10,000 and over on prime contracts of $500,000 and over

SOURCE: National Aeronautics and Space Administration, Office of Procurement, *Annual Procurement Report, Fiscal Year 1974*, Washington, D.C. 20546

Part II

FEDERAL FUNDS FOR SCIENTIFIC AND TECHNICAL INFORMATION

Scientific and technical information (S&TI) is defined as knowledge or data resulting from the conduct of research and development, or required for organizing, administering, or performing research and development. Such information is used largely by scientists and engineers engaged in R&D work.

S&TI activities cover a broad range, including publication and distribution; documentation, reference and information services; symposia and audiovisual communication; and R&D work in the information sciences. This last category directly overlaps the R&D activities reported in part 1 of this survey.

The data on S&TI in *Federal Funds* surveys include only direct S&TI obligations of Federal agencies; S&TI costs under R&D contracts and grants are specifically excluded. It follows, therefore, that the totals in this report only partly reflect the S&TI activities supported by the Federal Government.

Despite this limitation, the broad measurement of direct S&TI costs on a functional basis can be useful as a guide to analysis and planning.

AGENCIES AND ACTIVITIES

- S&TI funding continued to grow during the period from 1974 to 1976. The increase for 1975 was somewhat less than that estimated for 1976.
- DOD remains the largest support agency, followed by Commerce and HEW. Together, these agencies are expected to provide more than two-thirds of the support to S&TI activities in 1976. The chief impetus to growth in the current (1974-76) period comes from Commerce and DOD.

Federal obligations for scientific and technical information, by agency

[Dollars in millions]

Agency	Actual	Estimates			
	1974	1975	Percent change 1974-75	1976	Percent change 1975-76
Total	$442.8	$464.2	+4.8	$492.0	+6.0
Department of Defense	151.0	153.4	+1.6	161.2	+5.1
Department of Commerce	88.9	98.9	+11.2	108.9	+10.1
Department of Health, Education, and Welfare	76.7	75.1	-2.0	76.8	+2.2
Library of Congress	28.7	29.2	+1.7	31.6	+8.1
Department of the Interior	20.0	25.4	+27.1	27.0	+6.3
National Aeronautics and Space Administration	22.7	23.6	+4.1	24.2	+2.3
Department of Agriculture	13.4	14.7	+9.2	15.6	+6.2
National Science Foundation	9.9	6.8	-31.5	7.8	+14.4
Other agencies	31.4	37.0	+17.9	39.0	+5.2

Source: National Science Foundation

Trends

- Between 1960 and 1976 federally funded S&TI activities have expanded almost 6-1/2 times.
- In 1976 S&TI obligations are expected to be equal to 2.3 percent of all Federal R&D obligations, compared with 1.0 percent in 1960.
- The greatest increase in absolute terms has been for documentation, reference, and information services. In 1976, this category is expected to represent 45 percent of the S&TI total, compared with 37 percent in 1960. The increases in support reflect rapidly growing library and specialized information center services and the high costs of modern retrieval systems.
- Funding for publication and distribution, the second largest S&TI category, is expected to account for 31 percent of the total for S&TI in 1976, down from 49 percent in 1960. Despite the decline as a share of the total, growth in terms of dollars is significant.
- Research and development in information sciences has grown from 4 percent of the S&TI total in 1960 to 17 percent in 1976. This category has shown the greatest relative increase.
- Symposia and audiovisual media is expected to account for less than 8 percent of the total in 1976, compared with 10 percent in 1960.

Trends in Federal obligations for scientific and technical information activities, by major categories

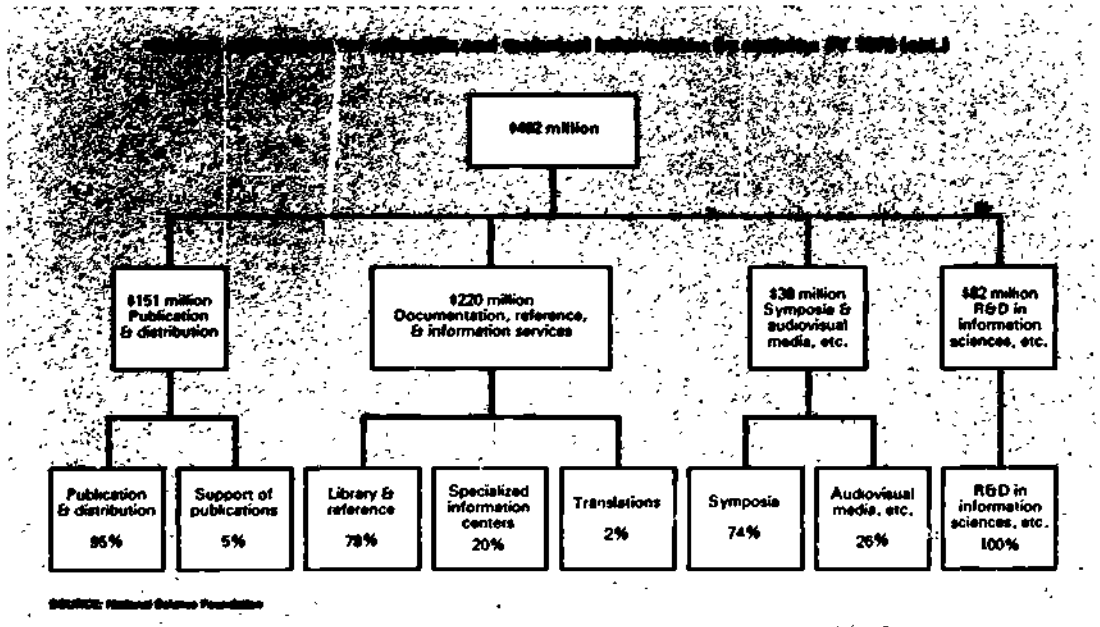
[Dollars in millions]

Fiscal year	Total	Publication and distribution	Documentation, reference and information services	Symposia and audiovisual media	R&D in information sciences, documentation and information systems, techniques and devices
1960	$ 75.9	$ 37.0	$ 28.4	$ 7.6	$ 2.9
1961	91.6	48.7	29.0	6.7	7.2
1962	128.5	55.7	42.4	17.0	13.3
1963	164.5	67.7	64.0	21.0	11.9
1964	[1]203.2	59.9	90.8	22.7	12.6
1965	224.7	68.2	102.0	32.0	22.5
1966	277.7	82.7	124.6	22.5	48.0
1967	324.4	87.1	152.5	31.7	53.1
1968	359.2	100.7	165.6	34.1	58.8
1969	362.5	96.0	170.9	31.8	63.7
1970	386.8	98.9	198.1	32.6	62.1
1971	397.6	106.0	193.8	32.8	65.0
1972	419.4	116.6	196.5	36.5	69.7
1973	427.1	120.9	194.8	34.1	77.3
1974	442.8	129.1	199.4	35.0	79.3
1975 (est)	464.2	140.7	211.4	37.7	74.4
1976 (est)	492.0	151.2	220.5	38.0	82.3

[1] Includes $17.2 million for management which was reported separately from the other categories in 1964 only
Source: National Science Foundation

Categories

- Within each of the major categories one subcategory receives most of the funding. This has been a consistent pattern throughout the 1960-76 period.
- In 1976, more than 9 out of 10 dollars for publication and distribution are allotted to direct costs for this category of activity.
- Under documentation, reference, and information services the subcategory of library and reference services is expected to account for almost 8 out of 10 dollars in 1976.
- Symposia and technical meetings is expected to represent approximately 3 out of 4 dollars in 1976 within the symposia and audiovisual media category.



Agencies

- Of the 23 agencies reporting obligations for S&TI activities in 1976, seven account for 90 percent of the S&TI total.
- S&TI costs are not wholly comparable among agencies; some agencies have full reporting systems while others lack the means to identify relevant S&TI costs. In the 1974-76 period, 13 Federal agencies reported R&D programs but did not report any S&TI activities, although some of their programs may have included such activities. Some S&TI programs are included within extramural R&D contracts and grants and, thus, are not reported.
- Only in some cases do S&TI efforts bear a direct relationship to an agency's R&D work. S&TI efforts can represent services that are independent of agency R&D programs, such as the Patent and Trademark Office within Commerce, the National Agricultural Library within USDA, and the S&TI activities of the Library of Congress.
- DOD, Commerce, and HEW combined will account for 71 percent of the S&TI total in 1976.
- DOD is expected to account for 33 percent of the S&TI total in 1976, as much a reflection of the Army's S&TI reporting system as any other factor. Although Navy and Air Force R&D program totals are larger than those of the Army, their reported S&TI totals are lower. The Defense Agencies represent a substantial portion of the DOD total, largely because they include the activities of the Defense Documentation Center.
- The gain in 1976 in funding for Commerce is the largest of any agency in absolute terms and reflects higher obligations for S&TI activities in the Patent and Trademark Office. Commerce is expected to represent 22 percent of the Federal total S&TI effort.
- HEW is expected to account for 16 percent of the S&TI total in 1976; more than three-fourths is represented by the National Institutes of Health, mainly the National Library of Medicine.
- NASA and ERDA report relatively small amounts of S&TI funding despite their sizable R&D programs. This results from the fact that so much of their R&D work is performed extramurally and no data are reported on the S&TI portion of extramural R&D grants and contracts.

Distribution of Federal obligations for scientific and technical information, by agency and subdivision: fiscal year 1976 (est)

[Dollars in millions]

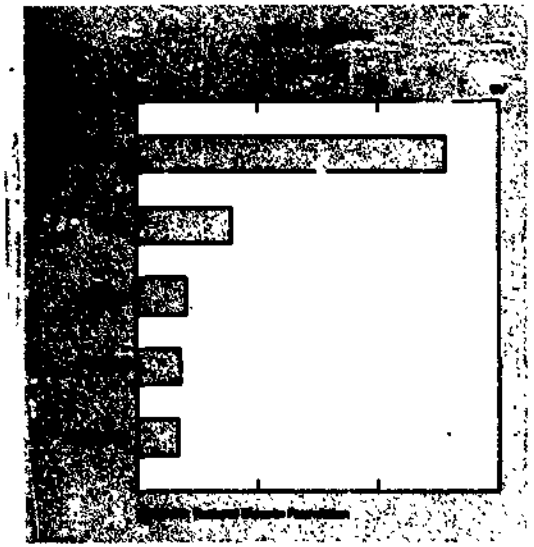
Agency and subdivision	Total obligations	Percent
Total, all agencies	$492.0	100.0
Department of Defense	161.2	32.8
Department of the Army	70.0	14.2
Department of the Navy	20.3	4.1
Department of the Air Force	12.7	2.6
Defense Agencies	58.2	11.8
Department of Commerce	108.9	22.1
Patent and Trademark Office	80.6	16.4
National Technical Information Service	13.4	2.7
National Bureau of Standards	9.0	1.8
National Oceanic and Atmospheric Administration	5.0	1.0
Other	1.0	.2
Department of Health, Education, and Welfare	76.8	15.6
National Institutes of Health	61.9	12.6
(National Library of Medicine)	(28.5)	(5.8)
Alcohol, Drug Abuse, and Mental Health Administration	4.2	.9
Food and Drug Administration	4.1	.8
Health Resources Administration	3.6	.7
Other	3.0	.6
Library of Congress	31.6	6.4
Department of the Interior	27.0	5.5
Geological Survey	21.1	4.3
Other	5.9	1.2
National Aeronautics and Space Administration	24.2	4.9
Department of Agriculture	15.6	3.2
National Agricultural Library	5.4	1.1
Forest Service	4.8	1.0
Agricultural Research Service	4.2	.9
Other	1.2	.2
National Science Foundation	7.8	1.6
Energy Research and Development Administration	7.3	1.5
Veterans Administration	6.7	1.4
Smithsonian Institution	6.1	1.2
Department of Transportation	5.5	1.1
Consumer Product Safety Commission	3.8	.8
Environmental Protection Agency	3.5	.7
Other agencies	6.2	1.3

Source: National Science Foundation

Activities

- Certain agencies tend to account for most of the work in certain categories of activity. Commerce is predominant in publication and distribution; DOD is predominant in symposia and audiovisual media and R&D in information sciences; and DOD and HEW are predominant in documentation, reference, and information services. S&TI functions, of course, tend to flow back and forth between categories and often an agency will extend its activities so that more than one category is important.

Category 1. Publication and distribution



COMMERCE: Patent and Trademark Office
- 80,000 patents in FY 1976 (est.)
- *Official Gazette*, weekly abstracts of current patents

DOD: Departments of the Army, Navy, and Air Force
- Journal articles
- Technical reports
- Technical notes
- Technical memorandums
- Contractors' and grantees' reports
- Research reviews
- Research bulletins
- Research reports
- Newsletters
- Surveys
- Monographs
- Proceedings of symposia
- Handbooks
- Books
- Abstracts and bibliographies

NASA
- Journal articles
- Technical reports, notes, and memorandums
- Contractors' reports
- Conference proceedings
- *Scientific and Technical Abstracts (STAR)*
- *International Aerospace Abstracts*
- Indexes
- Biographies
- Technical reprints
- Special publications

INTERIOR: Geological Survey
- Books
- Maps
- Charts
- Atlases
- Research summaries
- Journal articles
- *Bibliography of North American Geology*
- *Geophysical Abstracts*

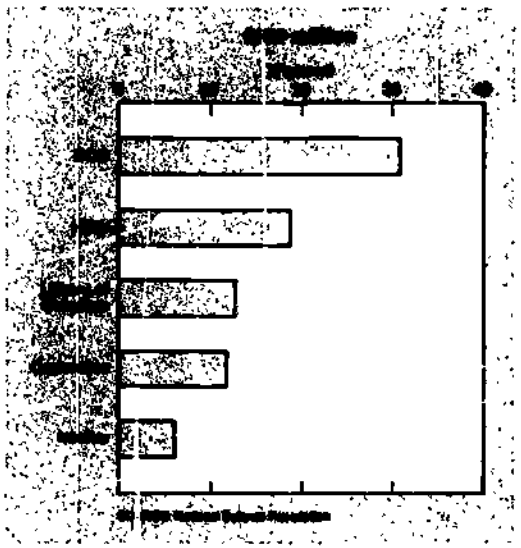
HEW: National Institutes of Health
- Journals of the institutes
- Journal articles
- Indexes
- Bibliographies
- Abstracts
- Monographs
- Books
- Reports

Alcohol, Drug Abuse, and Mental Health Administration
- Scientific and technical papers
- Manuals
- Reviews and analyses
- Journal articles

USDA
- Papers
- Bulletins
- Reports
- Periodicals

ERDA
- Technical reports
- Progress reports
- Summary reports
- Topical reports
- Journal articles
- Proceedings of meetings
- *Nuclear Science Abstracts*
- Progress reviews
- Books
- Monographs
- Bibliographies

Category 2. Documentation, reference, and information services



DOD: Defense Agencies
- Defense Documentation Center

Departments of the Army, Navy, and Air Force
- Libraries
- Specialized information centers
- Technical information analysis centers
- Translations

HEW: National Institutes of Health
- National Library of Medicine
- Specialized information centers
- Translations

Food and Drug Administration
- Specialized information centers

Alcohol, Drug Abuse, and Mental Health Administration
- Specialized information centers

LIBRARY OF CONGRESS
- Science and technology portion

COMMERCE: Patent and Trademark Office
Search Room
National Bureau of Standards
National Technical Information Service (NTIS)
National Standard Reference Data System (NSRDS)

NASA
S&TI documentation facility
Headquarters and field center libraries
Specialized information centers
Regional dissemination centers
Translations

DOT
Specialized information centers

USDA
National Agricultural Library

Category 3. Symposia and audiovisual media

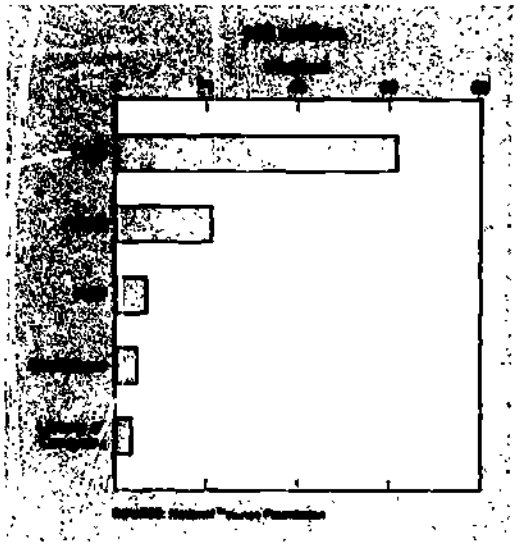
DOD: Departments of the Army, Navy, and Air Force
Science conferences
Support of symposia with professional groups, scientific societies, and educational institutions
Motion pictures
Slides
Video tapes
Exhibits

HEW: National Institutes of Health
Travel to scientific meetings, U.S. and abroad
Support of conferences and symposia
Support of international congresses
Sound films on body functions, diseases, and treatment
TV interviews
Slides
Photographs
Exhibits

NASA
Participation in and support of scientific symposia and technical meetings

VA
Participation in seminars and symposia
Films
Slides

Category 4. Research and development in information sciences, documentation and information systems, techniques, and devices



DOD: Defense Agencies (largely ARPA)
Departments of the Army, Navy, and Air Force
R&D in advanced information systems
Development of engineering data systems
Support of development of discipline-based information systems
Studies of man-computer relationships (Project MAC)
Basic research in information sciences

HEW: National Institutes of Health (including NLM)
Improvement of Medlars system at NLM
Development of mechanized searching services in the institutes
Development of computer time-sharing techniques
Alcohol, Drug Abuse, and Mental Health Administration
Improvement of information systems

NSF
Research in storage and retrieval strategies
Development of access improvement systems and user-oriented science information services

APPENDIXES

A. Technical Notes

B. Federally Funded Research and Development Centers

C. Statistical Tables, Part I

D. Statist.cal Tables, Part II

Note

The detailed statistical tables for this volume for parts I and II, appendixes C and D, have been published separately under one cover.

Included on pp. 60-64 in this volume are appendix C summary tables 1, 2, and 3, as well as a complete listing of all the tables in appendixes C and D. **Detailed statistical tables may be obtained gratis from the National Science Foundation, Washington, D.C. 20550.**

APPENDIX A

Technical Notes

SCOPE AND METHOD

This report is organized in two parts. Part I is concerned with Federal funds for research, development, and R&D plant, and part II reports on funds for activities associated with the collection and dissemination of scientific and technical information.

Between March and May of 1975 a total of 35 Federal agencies and their subdivisions—93 individual respondents—submitted data in response to a survey questionnaire developed by the Foundation and distributed in January 1975. With the exception of ERDA and NASA, the data received from the agencies were in terms of obligations and expenditures incurred, or expected to be incurred, regardless of when the funds were appropriated or whether they were identified in the respondent's budget specifically for R&D activities. The ERDA data for research and development were reported in terms of accrued costs, while the R&D plant transactions were reported in terms of obligations. NASA reported its 1974 transactions in terms of obligations incurred, whereas the 1975 and 1976 transactions were in terms of the budget plan, which approximates obligations.

Federal agencies also provided R&D data to the Office of Management and Budget for inclusion in "Special Analysis P: Federal Research and Development Programs" in *The Budget of the United States Government, Fiscal Year 1976*. Although the R&D data in the two reports are reconcilable (see Relation to Other Reports, p. 53), the data in the *Federal Funds* report are more comprehensive and are tabulated in greater detail. Furthermore, the *Federal Funds* report incorporates data revisions that have resulted from changes made within the R&D portion of the budget subsequent to its presentation by the President to Congress in February 1975.

DEFINITIONS

Definitions are presented for the two parts of the report. Some definitions in part I are also applicable to part II. The definitions are essentially unchanged from prior issues of the *Federal Funds* series.

Part I. Research, Development, and R&D Plant

(1) RESEARCH, DEVELOPMENT, AND R&D PLANT

This term includes all direct, indirect, incidental, or related costs resulting from or necessary to research, development, and R&D plant, regardless of whether the research and development are performed by a Federal agency (intramural) or performed by private individuals and organizations under grant or contract (extramural). Research and development exclude routine product testing, quality control, mapping and surveys, collection of general-purpose statistics, experimental production, and activities concerned primarily with the dissemination of scientific information and the training of scientific manpower.

a. **Research** is systematic, intensive study directed toward fuller scientific knowledge or understanding of the subject studied. Research is classified as either basic or applied.

In **basic research** the investigator is concerned primarily with gaining a fuller knowledge or understanding of the subject under study.

In **applied research** the investigator is primarily interested in a practical use of the knowledge or understanding for the purpose of meeting a recognized need.

b. **Development** is systematic use of the knowledge and understanding gained from research, directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes. It excludes quality control, routine product testing, and production.

c. **R&D plant** (R&D facilities and fixed equipment, such as reactors, wind tunnels, and radio telescopes) includes acquisition of, construction of, major repairs to, or alterations in structures, works, equipment, facilities, or land, for use in R&D activities at Federal or non-Federal installations. Excluded from the R&D plant category are expendable equipment and office furniture and equipment. Obligations for foreign R&D plant are limited to Federal funds for facilities located abroad and used in support of foreign research and development.

(2) OBLIGATIONS AND EXPENDITURES

a. **Obligations** represent the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when future payment of money is required.

b. **Expenditures** represent the amounts for checks issued and cash payments made during a given period, regardless of when the funds were appropriated.

For those agencies operating on a cost-type budget, accrued expenditures and costs are reported instead of obligations. Accrued expenditures represent all costs accrued during the reporting period except those subject to reimbursement from other agencies. The information on expenditures represents net cash payments for research, development, and R&D plant, exclusive of any receipts of the agency for those purposes.

The obligations and expenditures reported cover all transactions from all funds available to the agency from direct appropriations, trust funds or special account receipts, corporate income, or other sources, including funds appropriated by the President, that the agency received or expects to receive. The amounts reported for each year reflect obligations and expenditures for that year regardless of when the funds were originally authorized or received and regardless of whether they were appropriated, received, or identified in the agency's budget specifically for research, development, or R&D plant.

An agency making a transfer of funds to another agency includes such transfers in its report of obligations and expenditures. The receiving agency does not report, for purposes of this survey, funds transferred to it from another agency. Similarly, a subdivision of an agency that transfers funds to another subdivision within that agency reports such obligations or expenditures as its own.

Obligations and expenditures for work performed in foreign countries include funds directly available to Federal agencies and special foreign currencies separately appropriated. The latter currencies are derived largely from provisions of Public Law 480, 1954, as amended.

(3) COST COVERAGE

Funds reported for research and development reflect full costs. In addition to costs of specific R&D projects, the applicable overhead costs are also included. The amounts reported include the costs of planning and administering R&D programs, laboratory overhead, pay of military personnel, and departmental administration.

(4) FISCAL YEAR

For the three years covered by this report, the fiscal year is the Government accounting period beginning July 1 of one year and ending June 30 of the following calendar year; thus, fiscal year 1976 began on July 1, 1975 and will end June 30, 1976.

(5) AGENCY

An agency is an organization of the Federal Government whose principal executive officer reports to the President. The only exception is the Library of Congress, which is also included in the survey. The term subdivision refers to any major organizational unit of a reporting agency, such as a bureau, division, office, or service.

(6) PERFORMERS

Performers are either intramural organizations accomplishing operating functions or extramural organizations or persons receiving support or providing services as a result of a contract or grant.

a. **Intramural performers** are the agencies of the Federal Government. Their work is carried on directly by their own personnel. Obligations reported under this category are for activities performed by the reporting agency itself, or they represent funds that the agency transfers to another Federal agency for performance for work. The ultimate performer must be a Federal agency. If the ultimate performer is not a Federal agency, the funds so transferred are reported by the transferring agency under the appropriate extramural performer category (industrial firms, universities and colleges, other nonprofit institutions). Intramural performance includes the costs of supplies and equipment, essentially of an "off-the-shelf" nature, that are procured for use in intramural research and development. Also included as part of the intramural performance total are the expenses of Federal personnel engaged in planning and administering intramural and extramural R&D programs.

b. **Extramural performers** are all organizations outside the Federal complex that perform with Federal funds under contract or grant. Only costs of actual extramural R&D performance are reported. For example, the purchase from an extramural source of a launch vehicle which is operational, i.e., has gone beyond the development or prototypes age and which is used in an intramural Federal installation for the performance of research and development, is reported as part of the cost of intramural research and development. Extramural performers are identified as follows:

(i) *Industrial firms* are those organizations that may legally distribute net earnings to individuals or to other organizations.

(ii) *Universities and colleges* are institutions engaged primarily in providing resident instruction for at least a 2-year program above the secondary school level. Included are colleges of liberal arts, schools of arts and sciences, professional schools, such as in engineering and medicine, including affiliated hospitals, associated research institutes, and agricultural experiment stations.

(iii) *Other nonprofit institutions* are private organizations other than educational institutions, no part of whose net earnings inure 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. Also, private individuals directly awarded R&D grants or contracts are included under nonprofit institutions.

(iv) *Federally Funded Research and Development Centers* are R&D-performing organizations exclusively or substantially financed by the Federal Government that are supported by the Federal Government either to meet a particular R&D objective or, in some instances, to provide major facilities at universities for research and associated training purposes. Each center is administered by one of the above extramural performers.

In general, all of the following qualification criteria are met by an institutional unit before it is included in the Federally Funded Research and Development Center category. (1) Its primary activities include one or more of the following basic research, applied research, development, or management of research and development (specifically excluded are organizations engaged primarily in routine quality control and testing, routine service activities, production, mapping and surveys, and information dissemination); (2) it is a separate operational unit within the parent organization or is organized as a separately incorporated organization; (3) it performs actual research and development or R&D management either upon direct request of the Federal Government or under a broad charter from the Federal Government, but in either case under the direct monitorship of the Federal Government; (4) it receives its major financial support (70 percent or more) from the Federal Government, usually from one agency, (5) it has or is expected to have a long-term relationship with its sponsoring agency (about 5 years or more), as evidenced by specific obligations assumed by it and the agency, (6) most or all of its facilities are owned or are funded for in the contract with the Federal Government; and (7) it has an average annual budget (operating and capital equipment) of at least $500,000.

(v) *State and local governments* are State and local government agencies, excluding State and local universities and colleges, agricultural experiment stations, medical schools, and affiliated hospitals. Federal R&D funds obligated directly to such State and local education institutions are included under the nonprofit institutions and colleges performing sector in this survey. Research and development under the State and local category or either performed by the State or local agencies themselves or granted or contracted by such agencies for performance by other organizations. Regardless of the ultimate performer, Federal R&D funds directed to State and local governments are reported under the State and local government sector and no other.

(vi) *Foreign performers* are confined to foreign citizens, organizations, or governments, as well as international organizations, such as NATO, UNESCO, WHO, performing work abroad financed by the Federal Government.

Excluded are payments to U.S. agencies, organizations, or citizens performing research and development abroad for the Federal Government (the survey objectives do not include information on "offshore" payments). Also excluded are payments to foreign scientists performing in the United States.

(7) FIELDS OF SCIENCE

The fields of science in this survey are divided into eight broad field categories, most of them consisting of a number of detailed fields. The broad fields are life sciences, psychology, physical sciences, environmental sciences, mathematics, engineering, social sciences, and other sciences not elsewhere classified. The following listing presents the fields grouped under each of the broad fields, together with illustrative disciplines.

a. **Life sciences** consist of the biological, clinical medical, other medical sciences, and life sciences not elsewhere classified.

Life sciences include the following disciplines: Anatomy; animal sciences; bacteriology; biochemistry; biogeography; biological oceanography; biophysics; dentistry; ecology; embryology; entomology; evolutionary biology; genetics; immunology; internal medicine; microbiology; neurology; nutrition and metabolism, opthalmology; parasitology, pathology, pharmacology; pharmacy; physical anthropology; physical medicine and rehabilitation; physiology; plant sciences; podiatry; preventive medicine and public health; psychiatry, radiobiology; radiology, surgery; systematics; veterinary medicine.

Research in some of these disciplines may be classed as biological, clinical medical, or other medical, depending upon the nature of the particular project.

Biological sciences are those which, apart from the clinical medical and other medical sciences as defined below, deal with the origin, development, structure, function, and interactions of living things.

Clinical medical sciences are concerned with the study of the pathogenesis, diagnosis, or therapy of a particular disease or abnormal condition in living human subjects under controlled conditions.

Other medical sciences are concerned with studies of the causes, effects, prevention, or control of abnormal conditions in man or in his environment as they relate to health, except for the clinical aspects as defined above.

Life sciences, nec

b. **Psychology** deals with behavior, mental processes, and individual and group characteristics and abilities. Psychology is divided into three categories: biological aspects, social aspects, and psychological sciences not elsewhere classified. Examples of the disciplines under each of these fields are:

Biological aspects:

experimental psychology; animal behavior; clinical psychology; comparative psychology; ethology.

Social aspects

social psychology; educational, personnel, vocational psychology and testing; industrial and engineering psychology; development and personality.

Psychological sciences, nec

c. **Physical sciences** are concerned with the understanding of the material universe and its phenomena. They comprise the fields of astronomy, chemistry, physics, and physical sciences not elsewhere classified. Examples of the disciplines under each of these fields are:

Astronomy

laboratory astrophysics; optical astronomy; radio astronomy; theoretical astrophysics; X-ray, Gamma-ray, neutrino astronomy

Chemistry

inorganic, organo-metallic organic, physical.

Physics

acoustics, atomic and molecular; condensed matter; elementary particles, nuclear structure; optics, plasma

Physical sciences, nec

d. **Environmental sciences** (terrestrial and extraterrestrial) are concerned with the gross nonbiological properties of the areas of the solar system which directly or indirectly affect man's survival and welfare; they comprise the fields of atmospheric sciences, geological sciences, oceanography, and environmental sciences not elsewhere classified. Obligations for oceanography are confined to studies supporting physical oceanography. Studies pertaining to life in the sea, or other bodies of water, are reported as support biology. Support of ship operations is, where appropriate, prorated between physical and biological oceanography. Examples of the disciplines under each of these fields follow:

Atmospheric sciences:

aeronomy; solar; weather modification; extraterrestrial atmospheres; meteorology.

Geological sciences:

engineering geophysics; general geology; geodesy and gravity; geomagnetism; hydrology; inorganic geochemistry; isotopic geochemistry; organic geochemistry; laboratory geophysics; paleomagnetism; paleontology; physical geography and cartography; seismology; soil sciences.

Oceanography.

chemical oceanography; geological oceanography; physical oceanography; marine geophysics.

Environmental sciences, nec

e. **Mathematics** employs logical reasoning with the aid of symbols and is concerned with the development of methods of operation employing such symbols. Examples of mathematical disciplines are algebra; analysis; applied mathematics; computer science, foundations and logic; geometry; numerical analysis; statistics; topology.

f. **Engineering** is concerned with studies directed toward developing engineering principles or toward making specific scientific principles usable in engineering practice. Engineering is divided into eight fields: aeronautical, astronautical, chemical, civil, electrical, mechanical, metallurgy and materials, and engineering not elsewhere classified. The following are examples of disciplines under each of these fields:

Aeronautical

aerodynamics.

Astronautical

aerospace; space technology

Chemical

petroleum; petroleum refining; process.

Civil

architectural, hydraulic, hydrologic; marine, sanitary and environmental, structural; transportation

Electrical

communication, electronic, power.

Mechanical

engineering mechanics

Not elsewhere classified includes multiple-purpose projects within the broad field and single-purpose projects for which a specific field has not been assigned.

Metallurgy and materials:

ceramic; mining; textile; welding.

Engineering, nec[1]

agricultural; industrial and management; nuclear; ocean engineering; systems.

g. **Social sciences** are directed toward an understanding of the behavior of social institutions and groups and of individuals as members of a group. These sciences include anthropology, economics, history, linguistics, political sciences, sociology, and social sciences not elsewhere classified. The following are examples of the disciplines under the fields of social sciences.

Anthropology.

archaeology; cultural and personality; social and ethnology; applied anthropology.

Economics:

econometrics and economic statistics; history of economic thought; international economics; industrial, labor, and agricultural economics; macroeconomics; microeconomics; public finance and fiscal policy; theory; economic systems and development.

History:

cultural; political; social; history and philosophy of science.

Linguistics.

anthropological-archaeological; computational; psycholinguistics; sociolinguistics.

Political science:

area or regional studies, comparative government; history of political ideas; international relations and law; national political and legal systems; political theory; public administration.

Sociology:

comparative and historical; complex organizations; culture and social structure, demography; group interactions, social problems and social welfare; sociological theory.

Social sciences, nec[1]

research in law and education not elsewhere classified; socioeconomic geography.

h. **Other sciences not elsewhere classified** includes multidisciplinary and interdisciplinary projects that cannot be classified within one of the above broad fields of science.

(8) GEOGRAPHIC DISTRIBUTION OF 1974 R&D OBLIGATIONS

a. Ten agencies participated in the survey on the geographic distribution of obligations for research and development and R&D plant. These 10 respondents accounted for 97 percent of total Federal R&D and R&D plant obligations in 1974. The respondents were the Departments of Agriculture; Commerce; Defense, the Interior; Transportation; and Health, Education, and Welfare; the Energy Research and Development Administration; the Environmental Protection Agency; the National Aeronautics and Space Administration; and the National Science Foundation.

b. Data for 1974 were requested in terms of the principal location (State or outlying area) where the work was performed by the prime contractor, grantee, or intramural organization. Where this information was not available in their records, the respondents were asked to assign the obligations to the State, outlying area, etc. where the prime contractor, grantee, or intramural organization was located.

c. Obligations were reported for research and development as a combined amount.

d. Specifically omitted from the survey were R&D obligations to foreign performers and obligations for R&D plant used in support of foreign performers.

Part II. Scientific and Technical Information

Scientific and technical information consists of knowledge or data resulting from the conduct of research and development, or knowledge or data required for organizing, administering, or performing research and development. It encompasses any information in recorded or other communicable form which presents the status, progress, or results of research and development in science or technology.

Exclusions:

(a) training costs for personnel engaged in scientific and technical information activities.

(b) raw scientific and technical data that have not been processed for use by scientific personnel engaged in research and development (covered in part I of this survey);

(c) statistical and general-purpose data that are collected and organized for other than specific use in research and development;

(d) information that has been prepared primarily to inform or instruct the general public or others below the graduate or professional level of scientific activity.

Scientific and technical information activities include all management, administrative, R&D, and operational efforts directed to the planning, support, control, and improvement of the functions or tasks that deal with the acquisition, processing, handling, and communication of scientific and technical information. These may include the acquisition, maintenance, or rental of special equipment primarily for use in connection with scientific and technical information activities.

Categories of Scientific and Technical Information Activity

(1) PUBLICATION AND DISTRIBUTION

(a) **Publication and distribution.** This subcategory includes two activities.

Publication includes all document production tasks performed after the author's manuscript or similar initial recording of the information has been finished and leading to but not including initial issuance or distribution of the finished document. Examples of publication activities: evaluation of a manuscript or patent; professional writing; technical or copy editing and revising not performed by the author, abstractor, or bibliographer; technical drawing and artwork; preparation of final copy for printing or other reproduction; also composing; typesetting, proofreading, display, illustrating, photographing, layout, makeup, printing, mimeographing, and photoduplication.

These publication activities may be concerned with any of the following: data compilations, proceedings of conferences and symposia, specifications and manuals used in the R&D process, technical reports, journal articles, monographs, reviews, dissertations, summaries, abstracts, bibliographies, indexes, special reports, patents, reference books, and treatises.

Distribution includes functions related to the actual transmission or dissemination of newly documented scientific and technical information from source to user, for example, mailing, shipping, and maintenance of controls.

Excluded from category 1 are professional efforts involved in the compilation and preparation of reference documents or bibliographies. These activities are included under category 2, below. Also excluded are audiovisual aids, such as taped talks, slide presentations, and motion picture films. These are included under category 3, below.

b. **Support of publications** includes all page charges paid out of Federal funds to primary journals; special subscription arrangements to maintain primary journals; and grants or contracts for publication and distribution of journals, conference proceedings, monographs, or textbooks.

(2) DOCUMENTATION, REFERENCE AND INFORMATION SERVICES

a. **Library and reference services** includes the acquisition, collection, exchange, loan, and storage of scientific and technical documentary materials. These may be books, periodicals, manuals, reports, and drawings, and such reference sources as abstract journals, indexes, and subject heading and title lists. This subcategory includes such activities as the organizing and processing of scientific and technical documentary materials. Such work may consist of indexing, coding, filing, subject classifying, abstracting, announcing, listing, preparing bibliographies, reviewing, screening, documenting, and cataloging.

This category includes rental or acquisition and maintenance of computers and other equipment and costs of their operation. It includes special retrieval services provided in response to user needs (reprography, SDI, demand bibliographies, etc.), sale and loan of documentary materials, dissemination of documents via mail and personal visits, and liaison activities with users and other information services.

Documentation centers, depositories, clearinghouses, and libraries are included under this subcategory (a).

b. **Specialized information center services** (including technical information analysis center services) cover the collection, review, summarization, and evaluation of scientific and technical information and data in well-defined, specialized fields. They include advisory and other user services. Specialized information centers may be either discipline- or mission-oriented. The services of these centers are distinguished from those of documentation centers, clearinghouses, and libraries, whose functions are primarily concerned with the handling of documents rather than with the technical information contained in the documents.

c. **Translations** include all costs involved in the translation of documents and other materials from one language to another in support of R&D activities, also the purchase of foreign journals and other materials to be translated.

(3) SYMPOSIA AND AUDIOVISUAL MEDIA

a. **Symposia and technical meetings** include all efforts directed to planning, scheduling, announcing, supporting, sponsoring, conducting, and attending symposia, conferences, and meetings primarily concerned with dissemination of scientific and technical information. The travel and subsistence of participants in such symposia, conferences, and meetings are covered in these costs.

b. **Audiovisual media and other forms of nonprinted communication** refer to the costs of producing technical and documentary motion picture films, slides, and photographs for R&D purposes, as well as audio and visual aids, such as taped talks, television film or visual magnetic tape. This category also includes exhibits but excludes media primarily intended for training or public information purposes.

(4) RESEARCH AND DEVELOPMENT IN INFORMATION SCIENCES, DOCUMENTATION AND INFORMATION SYSTEMS, TECHNIQUES AND DEVICES

This category includes the conduct and support of research and development of new and nonconventional methods, techniques, systems, and machines for improving scientific and technical information functions under each of the other three categories. Such support would include meetings related specifically to such R&D work.

It also includes the conduct and support of studies and surveys to identify broad and specific aspects of scientific information problems. Examples of activities included under this category are development and testing of machines, devices, and techniques for storage and retrieval of information and data, linguistics research focused on information processing, language and machine translation; information theory, automata theory; artificial intelligence, logic and switching theory, operations or systems research on scientific and technical information systems and processes, documentation or document storage and retrieval, library science, network design, studies of subject classification and indexing schemes, and studies of scientific and technical information communication systems.

Also included under this category are applicable R&D costs for improving, modernizing, and renovating current scientific and technical information data and communication systems. Research and development conducted at documentation centers, libraries, and specialized information centers are included but not the costs associated with establishing new centers or systems once past the development state. As soon as a new system moves out of the experimental phase and into the operational phase, its costs are included under the appropriate category and subcategory above (1, 2, or 3) and no longer under category 4.

CHANGES IN REPORTING

Responses from the agencies in this survey, as in the previous ones, reflect updating of estimates for the latest two years of the previous report. Such updating is normal in the budgetary cycle. In addition, from time to time responses have reflected reappraisals and revisions in classification of various phases of agencies' R&D programs. When this has occurred, the National Science Foundation has revised prior-year data to maintain consistency and comparability with the most recent reporting. Since no statistical inquiry is free of problems of concepts and definitions for the respondents, revisions to improve the reporting are encouraged by NSF. No significant revisions in reporting, however, were made for the agencies in this present survey.

LIMITATIONS OF THE DATA

Funds for research, development, and other scientific activities are reported on a three-year basis comparable with the 1976 budget, upon which the data are based. The respondents have reconciled the data reported here with amounts for scientific activities shown in *The Budget of the United States Government, Fiscal Year 1976*. The amounts reported for each year indicate the obligations or expenditures incurred in that year, regardless of when the funds were authorized or received by an agency and regardless of whether or not the funds were identified in the agency's budget specifically for research, development, R&D plant, or scientific and technical information activities.

Data submitted by the Federal agencies for 1974 are considered to be actual since they represent essentially completed transactions. Amounts reported for 1975 and 1976 are estimates in that they are subject to further appropriation, apportionment, or allocation decisions. The actual effects of those and other later actions on 1975 and 1976 expenditures and obligations will be reflected in next year's report.

It is important to bear in mind that subjective determinations are often necessary in classifying the data. Because of the scope of R&D programs and their multidisciplinary nature, it is difficult to establish consistent criteria for allocating efforts among the character-of-work categories and the various fields of science. Also, funds for R&D activities may not be specifically identified in an agency's budget. However, to meet survey requirements, the participating agencies over the years have developed increasingly consistent bases for classifying R&D data. Any data revisions resulting from changes in an agency's reporting practices have been incorporated into the historical data to improve the comparability and consistency of the statistical series.

In some cases it has not been possible to report the full cost of research and development. For example, the headquarters costs of planning and administering R&D programs of DOD and ERDA are not included in these reports because these agencies have indicated that it is administratively impracticable to identify the amounts.

R&D plant data reported here are to some extent understated because of the difficulty encountered by some agencies in identifying and reporting this information, particularly in the case of DOD and NASA. While DOD reports obligations for R&D plant funded by its construction

appropriation, DOD is able to identify only a small portion of the amount of R&D plant support included in R&D contracts that were funded from its RDT&E appropriation. NASA faces similar problems in reporting R&D plant data.

In the area of scientific and technical information, extramural obligations are limited to funds allocated for grants and contracts that are primarily for the support of scientific and technical information activities. As in prior volumes of this series, extramural funds for information activities performed as supplemental, supporting services under grants or contracts primarily for research and development have been excluded because it is not feasible for the respondent to determine what portion of an R&D grant or contract actually supports information activities. Some R&D projects receive support from several agencies through a number of grants and/or contracts, and in such instances, related information activities pertaining to the overall R&D project may not be identifiable under a specific grant or contract.

RELATION TO OTHER REPORTS

[1] FEDERAL SUPPORT TO UNIVERSITIES AND COLLEGES

The National Science Foundation prepares reports covering Federal support of individual colleges and universities. These reports are based on data provided by the Federal agencies in response to the reporting system established by the Committee on Academic Science and Engineering (CASE) of the Federal Council for Science and Technology. These reports are referred to in this publication as the CASE reports.

Both the CASE and *Federal Funds* reports provide data on Federal obligations for research and development and R&D plant to universities and colleges and to university-administered Federally Funded Research and Development Centers (FFRDC's). The CASE report, however, is based on obligations of Federal agencies to each individual academic institution, while the *Federal Funds* report is concerned with obligations to universities and colleges as a performer group. The CASE report also includes funds for non-R&D activities, such as science education and nonscience support. Further, the CASE study is based on reports of only 14 agencies (the Departments of Agriculture, Commerce, Defense; Health, Education, and Welfare, Housing and Urban Development; the Interior; Labor; and Transportation; the Energy Research and Development Administration; the Environmental Protection Agency, the National Aeronautics and Space Administration; the National Science Foundation; the Agency for International Development; and the Nuclear Regulatory Commission) while *Federal Funds* is composed of obligations of all agencies. The 14 respondents for CASE account for more than 99 percent of the Federal R&D total to universities and colleges and virtually all obligations to university-administered FFRDC's.

The different reporting procedures have led to different amounts being reported by CASE and *Federal Funds* as follows.

a. The obligations for research and development to universities and colleges reported for *Federal Funds* in 1974 amounted to $2,215 million, or $129 million more than the amount reported for CASE. Part of this difference can be attributed to variations in the amounts reported by HEW's National Institutes of Health. The *Federal Funds* R&D total for the National Institutes of Health included funds for General Research Support grants, whereas in CASE they were placed under the category of "general support for science," which is defined to cover such grants. A difference in reported totals for NSF programs was another factor contributing to the overall higher *Federal Funds* total. For *Federal Funds*, NSF reported a portion of general science support funds as R&D support, whereas for CASE these funds were reported under the "general support for science" category.

b. The R&D obligation total to university-administered FFRDC's reported for *Federal Funds* was $789 million in 1974, or $190 million less than reported for CASE. The $125 million subcontracted by NASA's Jet Propulsion Laboratory accounted for two-thirds of this difference. For *Federal Funds* this amount is included in eliminate-performer categories (mainly industry), while for CASE the subcontracted amount was included in the R&D obligations to FFRDC's administered by universities.

c. The total R&D plant obligations to universities and colleges reported for *Federal Funds* was $25 million in 1974 or $4 million less than the amount reported for CASE.

d. The total R&D plant obligations to FFRDC's administered by universities and colleges reported for *Federal Funds* was $118 million in 1974, or $21 million more than reported for CASE. Most of this difference arose from ERDA reporting "costs" for CASE and "obligations" for *Federal Funds*.

The following factors should also be considered in comparing the data appearing in the two reports.

For *Federal Funds*, each agency includes in its own obligations the amounts transferred to other agencies for furtherance of its work, and the receiving agencies do not report funds transferred to them. On the other hand, in the CASE survey, the data are reported by the agency that made the final distribution of the funds to a given institution. Thus, for the CASE survey, agencies included funds received from other agencies, and excluded funds transferred to other agencies, the reverse of the *Federal Funds* process. While such transfers should balance each other out with no resulting changes in total R&D obligations, these varying reporting practices do add to the possibility of differences between the two reports.

The CASE reports, in most instances, are prepared by different operational units within each agency than those that prepare the *Federal Funds* responses. Furthermore, the CASE data are collected several months earlier than the *Federal Funds* statistics. Although, in theory, these conditions in themselves should not lead to reporting differences, in practice differences do arise.

[2] SPECIAL ANALYSES, BUDGET OF THE UNITED STATES

In a section of *Special Analyses, Budget of the United States Government*, the Office of Management and Budget (OMB) publishes estimates of obligations and expenditures for research, development, and R&D plant. However, the data in "Special Analysis P, Federal Research and Development Programs" in the 1976 budget do not provide as much detail on character of work or performers as *Federal Funds* and no information on fields of science or geographic distribution.

However, "Special Analysis P" and *Federal Funds* utilize the same definition for research and development and for R&D plant. The estimates for research and development published in the two reports are comparable, even though minor differences do exist. The differences between the two reports are as follows:

Total R&D obligations
[Billions of dollars]

	FY 1974	FY 1975	FY 1976
Federal Funds	$17.4	$18.9	$21.7
Special Analysis P	17.4	18.8	21.6

[3] AN ANALYSIS OF FEDERAL R&D FUNDING BY FUNCTION, FY 1969-76

NSF has published a report under the above title, providing an analysis of Federal R&D obligations by functional categories. The annual *Federal Funds* series, by contrast, reports on Federal R&D obligations by agencies but not by functional categories. The R&D obligation data for 1969-76 in the function report were based on information submitted by the agencies for the *Federal Funds* series. Thus, the overall R&D obligations are the same for the same years covered in both reports.

[4] OTHER REPORTS

a. Individual agencies may classify their R&D programs for purposes other than those for which the *Federal Funds* surveys conducted. Definitions and guidelines that are suitable to

those other purposes may result in information that is not comparable with the data transmitted to the Foundation for Federal Funds.

b. *The Budget of the United States Government, Fiscal Year 1976* is the source of data on outlays, but the NSF definition of "relatively uncontrollable" outlays differs from that of OMB in that OMB designates outlays from prior-year contracts and obligations as relatively uncontrollable, whereas NSF considers this category of outlays to be initially controllable and therefore different in concept from fixed-cost and open-ended programs like social security, veterans compensation and pensions, and interest on the national debt. See the *1976 Budget*, p. 354.

SOURCES

Data on R&D funds in this report for years prior to 1952 were compiled by the Bureau of the Budget, which later became the Office of Management and Budget. Subsequent data were based on NSF surveys. These data have been published in previous issues of this series, but certain adjustments have been made to reflect comparability with the latest reporting concepts evolved by the agencies.

Supplementing the statistical data collected through the NSF survey of Federal agencies, a variety of sources were used for the text of this report, including the narrative statements submitted by the agencies in the NSF survey, published records of testimony presented by agencies to committees of the Senate and the House, the *1976 Budget Appendix*, and personal contacts with agency respondents.

APPENDIX B

Federally Funded Research and Development Centers, Fiscal Years 1974-76

Department of Defense

OFFICE OF THE SECRETARY OF DEFENSE

Administered by other nonprofit institutions:

Institute for Defense Analysis (IDA)

DEPARTMENT OF THE NAVY

Administered by universities and colleges:

Applied Physics Laboratory (Johns Hopkins University)
Center for Naval Analyses (University of Rochester)
Applied Research Laboratory (Pennsylvania State University)

DEPARTMENT OF THE AIR FORCE

Administered by universities and colleges:

Lincoln Laboratory (Massachusetts Institute of Technology)

Administered by other nonprofit institutions:

Aerospace Corporation
Analytic Services, Inc. (ANSER)
MITRE Corporation
RAND Corporation

Energy Research and Development Administration

Administered by industrial firms:

Bettis Atomic Power Laboratory (Westinghouse Electric Corp.)
Hanford Engineering Development Laboratory (Westinghouse - Hanford Corp.)
Knolls Atomic Power Laboratory (General Electric Company)
Liquid Metal Engineering Center (Rockwell International Corporation)
Mound Laboratory (Monsanto Research Corp.)
Idaho National Engineering Laboratory (Aerojet Nuclear Corp.)[1]
Holifield National Laboratory (Union Carbide Corp.)[2]
Saodia Laboratory (Western Electric Co., Inc. - Sandia Corp.)
Savannah River Laboratory (E.I. du Pont de Nemours & Co., Inc.)

Administered by universities and colleges:

Ames Laboratory (Iowa State University of Science and Technology)
Argonne National Laboratory (University of Chicago and Argonne Universities Assn.)
Brookhaven National Laboratory (Associated Universities, Inc.)
Cambridge Electron Accelerator (Harvard University)[3]
E. O. Lawrence Berkeley Laboratory (University of California)
E. O. Lawrence Livermore Laboratory (University of California)
Los Alamos Scientific Laboratory (University of California)
Fermilab (Universities Research Association, Inc.)[4]
Oak Ridge Associated Universities
Plasma Physics Laboratory (Princeton University)
Stanford Linear Accelerator Center (Stanford University)

Administered by other nonprofit institutions:

Atomic Bomb Casualty Commission (National Academy of Sciences)
Pacific Northwest Laboratory (Battelle Memorial Institute)

National Aeronautics and Space Administration

Administered by universities and colleges:

Jet Propulsion Laboratory (California Institute of Technology)
Space Radiation Effects Laboratory (College of William and Mary)

National Science Foundation

Administered by universities and colleges:

Cerro Tololo Inter-American Observatory (Association of Universities for Research in Astronomy, Inc.)
Kitt Peak National Observatory (Association of Universities for Research in Astronomy, Inc.)
National Astronomy and Ionosphere Center (Cornell University)
National Center for Atmospheric Research (University Corporation for Atmospheric Research)
National Radio Astronomy Observatory (Associated Universities, Inc.)

[1] Formerly National Reactor Testing Station (Aerojet Nuclear Corp.)
[2] Formerly Oak Ridge National Laboratory (Union Carbide Corporation)
[3] Closed down in 1974. Obligation reported for FY 1973 and 1975 only.
[4] Formerly National Accelerator Laboratory (Universities Research Association, Inc.)

APPENDIX C

A Listing of Statistical Tables Part I

Federal Funds for Research, Development, and R&D Plant

BASIC RESEARCH PERFORMED AT UNIVERSITIES AND COLLEGES — AGENCY AND FIELD OF SCIENCE

C-80. By detailed field of science, fiscal years 1974, 1975, and 1976 .....
C-81. By agency and field of science, fiscal year 1974 .....
C-82. Psychology and physical sciences, by agency and detailed field of science, fiscal year 1974 .....
C-83. Life and environmental sciences, by agency and detailed field of science, fiscal year 1974 .....
C-84. Engineering, by agency and detailed field of science, fiscal year 1974 .....
C-85. Social sciences, by agency and detailed field of science, fiscal year 1974 .....

APPLIED RESEARCH PERFORMED AT UNIVERSITIES AND COLLEGES — AGENCY AND FIELD OF SCIENCE

C-86. By detailed field of science, fiscal years 1974, 1975, and 1976 .....
C-87. By agency and field of science, fiscal year 1974 .....
C-88. Psychology and physical sciences, by agency and detailed field of science, fiscal year 1974 .....
C-89. Life and environmental sciences, by agency and detailed field of science, fiscal year 1974 .....
C-90. Engineering, by agency and detailed field of science, fiscal year 1974 .....
C-91. Social sciences, by agency and detailed field of science, fiscal year 1974 .....

FOREIGN PERFORMERS — RESEARCH AND DEVELOPMENT

C-92. By region, country, and agency, fiscal year 1974 .....
C-93. By region, country, and agency, fiscal year 1975 (estimated) .....

FOREIGN PERFORMERS — BASIC RESEARCH

C-94. By region, country, and agency, fiscal year 1974 .....
C-95. By region, country, and agency, fiscal year 1975 (estimated) .....

SPECIAL FOREIGN CURRENCY PROGRAM

C-96. For research and development, by agency, fiscal years 1974, 1975, and 1976 .....
C-97. For basic research, by agency, fiscal years 1974, 1975, and 1976 .....
C-98. For applied research, by agency, fiscal years 1974, 1975, and 1976 .....
C-99. For development, by agency, fiscal years 1974, 1975, and 1976 .....

GEOGRAPHIC DISTRIBUTION — RESEARCH AND DEVELOPMENT AND R&D PLANT

C-100. Research, development, and R&D plant, by geographic division and State, fiscal year 1974 .....
C-101. Research and development, by State and performer, fiscal year 1974 .....
C-101A. Percent distribution to each performer, by State, fiscal year 1974 .....
C-101B. Percent distribution to each State, by performer, fiscal year 1974 .....
C-102. Research and development, by State and agency, fiscal year 1974 .....
C-102A. Percent distribution of each agency, by State, fiscal year 1974 .....
C-102B. Percent distribution of each State, by agency, fiscal year 1974 .....
C-103. Research and development, by geographic division, State, agency, and performer, fiscal year 1974 .....
C-104. R&D plant, by geographic division, State, and performer supported, fiscal year 1974 .....
C-105. R&D plant, by geographic division, State, and agency, fiscal year 1974 .....

FEDERAL INTRAMURAL PERSONNEL COSTS

C-106. Total research and development by agency, fiscal years 1974, 1975, and 1976 .....
C-107. Basic research, by agency fiscal years 1974, 1975, and 1976 .....
C-108. Applied research, by agency, fiscal years 1974, 1975, and 1976 .....
C-109. Development, by agency, fiscal years 1974, 1975, and 1976 .....

HISTORICAL DATA

Expenditures

C-110. Research, development, and R&D plant, by agency, fiscal years 1966-76 .....
C-111. Research and development, by agency, fiscal years 1966-76 .....
C-112. R&D plant, by agency, fiscal years 1966-76 .....

Obligations

C-113. Research, development, and R&D plant, by agency, fiscal years 1966-76 .....
C-114. Research and development, by agency, fiscal years 1966-76 .....
C-115. R&D plant, by agency, fiscal years 1966-76 .....
C-116. Research and development, by character of work and R&D plant, fiscal years 1966-76 .....
C-117. Total research, by selected agency, fiscal years 1966-76 .....
C-118. Basic research, by selected agency, fiscal years 1966-76 .....
C-119. Applied research, by selected agency, fiscal years 1966-76 .....
C-120. Development, by selected agency, fiscal years 1966-76 .....
C-121. Research and development, by performer, fiscal years 1966-76 .....
C-122. Total research, by performer, fiscal years 1966-76 .....
C-123. Basic research, by performer, fiscal years 1966-76 .....
C-124. Applied research, by performer, fiscal years 1966-76 .....
C-125. Development, by performer, fiscal years 1966-76 .....
C-126. Total research, by field of science, fiscal years 1966-76 .....
C-127. Basic research, by field of science, fiscal years 1966-76 .....
C-128. Applied research, by field of science, fiscal years 1966-76 .....
C-129. Research and development, by geographic division and State, fiscal years 1963, 1965, 1968, 1969, 1970, 1971, 1972, and 1973 .....
C-130. R&D plant, by geographic division and State, fiscal years 1963, 1965, 1968, 1969, 1970, 1971, 1972, and 1973 .....

NOTES

- Estimates for 1976 are based on *The Budget, FY 1976*, as submitted to Congress, and do not reflect subsequent appropriations and apportionment actions.
- Asterisks appearing in lieu of figures indicate that the amounts are less than $50,000.
- The abbreviation "FFRDC" appearing in statistical tables refers to Federally Funded Research and Development Centers.
- Defense Agencies within the Department of Defense include agencies such as the Advanced Research Projects Agency, the Defense Nuclear Agency, and the Defense Communications Agency.
- Departmentwide Funds of the Department of Defense include the Defense Civil Preparedness Agency.
- The R&D data of the Energy Research and Development Administration reflect accrued costs rather than obligations or expenditures.
- In tables showing extramural performers, obligations to agricultural experiment stations are included under obligations to universities and colleges.
- Within the Department of Commerce the Patent and Trademark Office is the new name of the former Patent Office, and the National Fire Prevention and Control Administration is the new name of the former National Bureau of Fire Prevention.
- Within the Department of the Interior the Office of Water Research and Technology includes the former Office of Water Resources Research and the saline water research program formerly included under the Office of the Secretary; the Fish and Wildlife Service is the new name of the former Bureau of Sport Fisheries and Wildlife.
- The Energy Research and Development Administration includes programs that were transferred from other agencies: from the Department of the Interior the Office of Coal Research, a portion of the Bureau of Mines, and energy research programs within the Office of the Secretary; from the National Science Foundation most of the solar energy and geothermal energy research programs; from the Environmental Protection Agency certain energy-related programs; and from the Atomic Energy Commission all of its R&D programs except for nuclear regulatory and reactor safety functions.
- The Nuclear Regulatory Commission includes the nuclear regulatory and reactor safety functions transferred from the former Atomic Energy Commission as well as new programs.
- The Federal Energy Administration is a newly established agency to deal with energy policy and analysis, and it includes certain activities formerly within the Department of the Interior.
- The Community Services Administration is the successor agency to the Office of Economic Opportunity.

Table C-1. Summary of Federal funds for research, development, and R&D plant, fiscal years 1974, 1975, and 1976

[Millions of dollars]

Item	Actual 1974	Estimate 1975	Estimate 1976
TOTAL EXPENDITURES FOR RESEARCH, DEVELOPMENT, AND R&D PLANT	18,325.7	19,441.1	21,912.0
Research and Development	17,621.5	18,594.0	20,987.8
R&D Plant	704.2	847.0	924.2
TOTAL OBLIGATIONS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT	18,204.5	19,966.1	22,489.3
Research and Development	17,438.2	18,905.1	21,651.9
Total Research	7,172.9	7,736.9	8,240.6
Basic research	2,465.2	2,596.4	2,689.5
Applied research	4,707.7	5,140.6	5,551.1
Development	10,265.2	11,168.2	13,411.3
R&D Plant	766.3	1,001.0	837.4
Research and Development			
Performers			
Federal intramural[1]	4,814.8	5,302.0	5,755.5
Industrial firms	7,245.2	8,398.2	10,515.5
FFRDC's administered by industrial firms	592.8	727.7	743.8
Universities and colleges	2,214.5	2,292.7	2,229.6
FFRDC's administered by universities and colleges	789.1	920.6	1,043.9
Nonprofit institutions	702.9	759.4	669.1
FFRDC's administered by nonprofit institutions	139.3	214.1	222.2
State and local governments	214.4	224.4	394.1
Foreign	95.1	66.1	78.3
Research			
Performers			
Federal intramural[1]	2,413.6	2,745.2	3,039.9
Industrial firms	1,661.7	1,758.0	1,985.0
FFRDC's administered by industrial firms	98.3	109.5	131.4
Universities and colleges	1,963.6	2,056.1	1,998.5
FFRDC's administered by universities and colleges	394.1	436.3	496.5
Nonprofit institutions	448.4	440.8	381.7
FFRDC's administered by nonprofit institutions	40.4	55.6	57.7
State and local governments	93.1	87.7	93.7
Foreign	83.7	47.7	56.4
Fields of science			
Life sciences	2,389.1	2,471.0	2,342.9
Psychology	142.7	132.3	137.5
Physical sciences	1,182.8	1,315.3	1,475.9
Environmental sciences	875.8	960.5	1,028.4
Mathematics	127.4	142.7	157.2
Engineering	2,003.2	2,201.9	2,545.4
Social sciences	291.5	342.7	397.7
Other sciences	160.5	170.1	192.6
Basic Research			
Performers			
Federal intramural[1]	660.8	735.8	765.9
Industrial firms	472.7	459.6	503.3
FFRDC's administered by industrial firms	23.5	27.3	30.3
Universities and colleges	969.5	1,024.6	1,025.6
FFRDC's administered by universities and colleges	200.0	218.6	237.4
Nonprofit institutions	192.0	93.5	80.3
Basic Research — Continued			
FFRDC's administered by nonprofit institutions	6.0	6.2	7.4
State and local governments	14.6	13.8	12.4
Foreign	16.9	17.1	16.9
Fields of Science			
Life sciences	843.1	821.7	753.2
Psychology	49.4	47.1	47.7
Physical Sciences	797.3	897.7	1,000.0
Environmental sciences	447.4	463.5	499.4
Mathematics	49.3	55.2	59.0
Engineering	189.3	209.5	218.2
Social sciences	73.2	82.4	90.7
Other sciences	16.3	19.2	21.3
Applied Research			
Performers			
Federal intramural[1]	1,782.8	2,009.4	2,274.0
Industrial firms	1,179.3	1,298.4	1,481.6
FFRDC's administered by industrial firms	77.2	82.2	101.1
Universities and colleges	1,014.1	1,031.4	972.9
FFRDC's administered by universities and colleges	184.1	217.8	249.1
Nonprofit institutions	322.5	347.3	301.4
FFRDC's administered by nonprofit institutions	44.4	49.5	50.3
State and local governments	78.6	73.9	81.3
Foreign	26.8	30.6	39.5
Fields of Science			
Life sciences	1,545.9	1,649.4	1,594.7
Psychology	93.3	85.1	89.3
Physical Sciences	385.5	417.5	475.9
Environmental sciences	428.4	497.0	529.1
Mathematics	78.1	87.5	98.2
Engineering	1,813.9	1,992.4	2,327.2
Social sciences	218.3	260.3	265.0
Other sciences	144.2	151.3	171.3
Development			
Performers			
Federal intramural[1]	2,371.2	2,556.9	2,715.6
Industrial firms	6,193.6	6,640.1	8,530.5
FFRDC's administered by industrial firms	494.5	618.2	612.4
Universities and colleges	230.9	236.6	231.1
FFRDC's administered by universities and colleges	405.0	484.3	547.4
Nonprofit institutions	278.5	318.6	287.4
FFRDC's administered by nonprofit institutions	148.9	158.5	164.6
State and local governments	121.2	136.7	300.4
Foreign	21.4	18.4	22.0
R&D Plant			
Performers supported			
Federal intramural	308.7	466.1	389.9
Industrial firms	64.3	62.1	68.3
FFRDC's administered by industrial firms	229.8	261.8	193.1
Universities and colleges	25.0	41.3	25.7
FFRDC's administered by universities and colleges	118.4	157.3	154.7
Nonprofit institutions	6.2	8.1	1.0
FFRDC's administered by nonprofit institutions	2.1	4.0	4.6
State and local governments	11.9	1	1
Foreign		.3	.1

[1] Intramural activities cover costs associated with the administration of intramural and extramural programs by Federal personnel as well as actual intramural performance

TABLE C-2. FEDERAL FUNDS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT, BY AGENCY, FISCAL YEARS 1974, 1975, AND 1976

(MILLIONS OF DOLLARS)

AGENCY AND SUBDIVISION	OBLIGATIONS			EXPENDITURES		
		ESTIMATES			ESTIMATES	
	ACTUAL, 1974	1975	1976	ACTUAL, 1974	1975	1976
TOTAL, ALL AGENCIES	19,754.5	17,481.1	22,419.1	18,125.7	19,441.1	21,912.0
DEPARTMENTS						
DEPARTMENT OF AGRICULTURE, TOTAL	387.5	433.4	473.4	391.5	419.9	478.3
AGRICULTURAL RESEARCH SERVICE	203.1	237.1	247.5	210.5	216.7	256.7
COOPERATIVE STATE RESEARCH SERVICE	91.4	101.6	111.3	85.2	91.1	103.9
ECONOMIC RESEARCH SERVICE	19.1	21.5	24.5	19.1	21.5	24.5
FARMER COOPERATIVE SERVICE	1.4	1.2	1.7	1.2	1.7	1.7
FOREST SERVICE	69.6	71.1	74.7	65.9	72.6	86.7
NATIONAL AGRICULTURAL LIBRARY	.1	-	.1	.2	.1	-
STATISTICAL REPORTING SERVICE	.6	.1	1.6	.6	.8	1.6
DEPARTMENT OF COMMERCE, TOTAL	191.7	220.1	230.1	181.2	211.4	224.7
ECONOMIC DEVELOPMENT ADMINISTRATION	4.1	7.1	2.3	5.4	4.8	3.1
MARITIME ADMINISTRATION	25.9	24.4	22.3	25.9	21.1	26.4
NATIONAL BUREAU OF STANDARDS	41.1	44.9	65.9	42.5	61.6	44.1
NATIONAL FIRE PREVENTION AND CONTROL ADMINISTRATION	-	4.7	7.5	-	4.5	5.6
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	117.0	141.4	156.5	103.5	129.7	140.9
OFFICE OF MINORITY BUSINESS ENTERPRISE	1.0	1.3	1.3	1.5	1.7	1.9
OFFICE OF TELECOMMUNICATIONS	2.6	.7	-	2.0	1.0	-
PATENT AND TRADEMARK OFFICE	.5	.5	.5	.5	.5	.5
SOCIAL AND ECONOMIC STATISTICS ADMINISTRATION	1.0	1.1	1.1	1.1	1.1	1.1
DEPARTMENT OF DEFENSE, TOTAL	8,587.5	9,019.1	11,463.9	8,379.7	9,075.4	10,767.0
DEPARTMENT OF THE ARMY	2,207.0	1,934.7	2,301.9	2,108.6	2,019.4	2,163.7
MILITARY FUNCTIONS	2,192.6	1,901.2	2,287.1	2,297.4	1,996.0	2,151.7
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION	1,941.6	1,775.6	2,172.9	2,071.7	1,877.0	2,035.0
PAY AND ALLOWANCES OF MILITARY PERSONNEL IN R&D	91.1	89.6	94.1	86.6	91.0	49.4
MILITARY CONSTRUCTION	25.7	36.1	24.0	21.1	24.0	75.0
CIVIL FUNCTIONS	11.4	13.5	15.5	11.7	16.4	16.0
DEPARTMENT OF THE NAVY	2,777.5	3,079.1	3,518.0	2,715.3	2,977.4	3,511.4
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION	2,674.4	2,963.7	3,410.9	2,621.4	2,913.7	3,355.7
PAY AND ALLOWANCES OF MILITARY PERSONNEL IN R&D	94.4	95.4	92.5	94.7	91.6	98.4
MILITARY CONSTRUCTION	11.3	15.5	26.7	5.5	19.4	18.9
SPECIAL FOREIGN CURRENCY PROGRAM	2.0	4.1	7.3	1.9	1.4	3.7
DEPARTMENT OF THE AIR FORCE	3,271.9	3,447.2	4,234.4	3,442.1	3,610.1	3,990.4
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION	3,052.7	3,216.9	3,994.2	3,201.3	3,373.5	3,695.1
PAY AND ALLOWANCES OF MILITARY PERSONNEL IN R&D	214.4	231.5	239.6	216.4	231.5	239.6
MILITARY CONSTRUCTION	1.9	41.3	56.3	17.0	15.1	61.2
DEFENSE AGENCIES	461.1	535.7	675.6	485.7	531.4	564.5
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION	457.7	491.9	519.9	474.5	524.7	543.8
PAY AND ALLOWANCES OF MILITARY PERSONNEL IN R&D	4.1	6.5	5.1	4.1	5.9	5.5
MILITARY CONSTRUCTION	.6	.1	-	.1	2.5	.7
DEPARTMENT-WIDE FUNDS	4.7	1.5	2.0	2.3	2.7	2.8
DIRECTOR OF TEST AND EVALUATION, DEFENSE	24.2	26.1	24.4	25.5	24.0	26.9
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, TOTAL	2,135.0	2,045.1	2,355.1	1,969.4	2,177.1	2,457.0
ALCOHOL, DRUG ABUSE, AND MENTAL HEALTH ADMINISTRATION	145.6	172.1	173.9	177.1	135.1	179.4
CENTER FOR DISEASE CONTROL	44.9	41.5	47.9	42.7	43.0	46.4
FOOD AND DRUG ADMINISTRATION	44.0	51.5	64.5	20.1	24.9	27.9
HEALTH RESOURCES ADMINISTRATION	65.4	59.5	99.4	46.4	41.1	37.3
HEALTH SERVICES ADMINISTRATION	17.5	14.1	13.6	17.1	14.7	11.6
NATIONAL INSTITUTE OF EDUCATION	75.7	78.4	90.5	96.9	70.6	80.0
NATIONAL INSTITUTES OF HEALTH	1,777.1	1,999.9	1,851.3	1,615.4	[illegible]	[illegible]
OFFICE OF EDUCATION	91.5	45.1	201.5	66.9	56.3	111.1
OFFICE OF HUMAN DEVELOPMENT	51.0	79.9	74.9	51.0	11.6	74.1
OFFICE OF INTERNATIONAL HEALTH	2.7	2.3	1.5	1.7	1.6	1.4
OFFICE OF THE SECRETARY	21.4	27.1	29.1	21.9	37.3	29.3
SOCIAL AND REHABILITATION SERVICE	9.9	9.3	11.9	9.2	9.6	9.5
SOCIAL SECURITY ADMINISTRATION	17.4	27.4	25.1	13.7	22.0	25.6
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT	54.1	41.1	77.7	54.4	67.1	61.2
DEPARTMENT OF THE INTERIOR, TOTAL	151.7	204.5	156.1	141.6	247.4	271.4
[illegible] POWER ADMINISTRATION	2.5	9.1	5.6	1.9	5.0	9.2
BUREAU OF LAND MANAGEMENT	.7	.5	.9	.7	.8	.9
BUREAU OF MINES	55.1	115.2	177.1	46.7	94.0	119.7
BUREAU OF OUTDOOR RECREATION	-	-	-	-	-	-
BUREAU OF RECLAMATION	7.4	7.6	4.1	6.9	8.5	8.3
GEOLOGICAL SURVEY	71.9	114.2	121.1	71.4	137.1	119.9
NATIONAL PARK SERVICE	2.5	1.3	3.4	2.5	3.3	3.4
OFFICE OF THE SECRETARY	.5	5.2	21.7	.6	4.0	15.2
OFFICE OF WATER RESEARCH AND TECHNOLOGY	22.5	21.5	17.1	22.1	21.1	17.1
UNITED STATES FISH AND WILDLIFE SERVICE	75.5	31.2	31.1	24.6	29.4	32.1
DEPARTMENT OF JUSTICE, TOTAL	84.7	64.1	42.0	40.5	55.4	41.4
BUREAU OF PRISONS	.5	.7	1.0	.5	.7	.9
DRUG ENFORCEMENT ADMINISTRATION	5.5	5.3	4.4	4.9	4.7	1.2
FEDERAL BUREAU OF INVESTIGATION	1.9	1.0	1.3	.6	.9	.5
LAW ENFORCEMENT ASSISTANCE ADMINISTRATION	77.1	55.5	35.4	34.5	50.0	35.9
DEPARTMENT OF LABOR, TOTAL	27.4	21.3	21.9	22.5	24.0	21.6
BUREAU OF LABOR STATISTICS	1.7	1.1	1.4	1.7	1.5	1.5
EMPLOYMENT STANDARDS ADMINISTRATION	.3	4.5	4.4	.9	4.5	5.4
LABOR-MANAGEMENT SERVICES ADMINISTRATION	1.7	1.1	1.4	.6	7.0	1.5
MANPOWER ADMINISTRATION	16.1	12.3	12.5	16.1	12.5	12.5
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	1.4	.9	.5	1.4	.4	.5
OFFICE OF THE SECRETARY	2.5	2.5	2.3	3.5	2.4	2.0

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TABLE C-2. FEDERAL FUNDS FOR RESEARCH, DEVELOPMENT, AND RED PLANT, BY AGENCY, FISCAL YEARS 1974, 1975, AND 1976
CONTINUED (MILLIONS OF DOLLARS)

AGENCY AND SUBDIVISION	OBLIGATIONS			EXPENDITURES		
		ESTIMATES			ESTIMATES	
	ACTUAL, 1974	1975	1976	ACTUAL, 1974	1975	1976
DEPARTMENT OF STATE, TOTAL	22.4	33.0	31.1	24.0	26.1	29.0
DEPARTMENTAL FUNDS	1.5	1.1	1.5	1.4	1.7	2.5
AGENCY FOR INTERNATIONAL DEVELOPMENT	21.4	32.0	30.6	23.2	27.4	26.4
DEPARTMENT OF TRANSPORTATION, TOTAL	383.2	494.0	414.1	343.2	396.4	463.2
FEDERAL AVIATION ADMINISTRATION	129.4	111.6	111.2	105.6	122.5	112.0
FEDERAL HIGHWAY ADMINISTRATION	43.2	47.0	31.0	33.5	41.0	31.0
FEDERAL RAILROAD ADMINISTRATION	37.4	59.5	40.6	30.3	42.0	52.6
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION	51.4	54.6	40.3	41.6	60.5	40.0
OFFICE OF THE SECRETARY	29.7	34.0	35.1	26.1	35.2	36.0
UNITED STATES COAST GUARD	20.4	24.5	30.0	47.4	39.5	30.0
URBAN MASS TRANSPORTATION ADMINISTRATION	40.2	63.9	76.3	57.0	65.3	66.7
DEPARTMENT OF THE TREASURY, TOTAL	1.1	1.0	1.0	1.1	1.0	1.0
BUREAU OF ENGRAVING AND PRINTING	1.1	1.0	1.0	1.1	1.0	1.0
OTHER AGENCIES						
ACTION	.2	.2	.2	.1	.2	.2
ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS	1.1	1.2	1.2	1.0	1.1	1.2
CIVIC AERONAUTICS BOARD	.*	.*	.0	.*	.*	.*
CIVIL SERVICE COMMISSION	3.1	4.1	4.0	3.1	4.1	4.1
COMMUNITY SERVICES ADMINISTRATION	45.2	65.1	39.0	49.1	48.6	39.8
CONSUMER PRODUCT SAFETY COMMISSION	.*1	4.2	2.4	.*1	4.2	2.4
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION	1,491.8	2,37*.0	2,793.1	1,425.8	2,114.4	2,814.5
ENVIRONMENTAL PROTECTION AGENCY	176.5	242.1	342.5	178.2	242.2	388.5
FEDERAL COMMUNICATIONS COMMISSION	.1	1.1	1.6	1.2	1.4	1.6
FEDERAL ENERGY ADMINISTRATION	-	1.3	3.1	-	1.1	4.1
FEDERAL HOME LOAN BANK BOARD	.1	.1	.1	.1	.1	.1
FEDERAL TRADE COMMISSION	.1	1.2	1.1	.1	1.1	1.1
GENERAL SERVICES ADMINISTRATION	1.1	6.5	2.0	1.1	6.5	2.0
LIBRARY OF CONGRESS	2.2	2.5	3.1	2.1	2.4	3.0
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	3,178.5	3,204.0	3,515.3	3,256.2	3,267.2	3,490.0
NATIONAL SCIENCE FOUNDATION	559.1	538.7	784.1	496.7	546.1	560.7
NUCLEAR REGULATORY COMMISSION	46.1	54.1	93.1	46.1	54.1	93.1
OFFICE OF TELECOMMUNICATIONS POLICY	.1	1.1	1.1	.1	.1	1.1
SMALL BUSINESS ADMINISTRATION	-	.1	1.1	-	.1	1.1
SMITHSONIAN INSTITUTION	25.1	26.1	29.1	23.1	22.1	28.1
SPECIAL ACTION OFFICE FOR DRUG ABUSE PREVENTION	11.1	.1	-	11.1	4.1	-
TENNESSEE VALLEY AUTHORITY	42.1	32.1	33.1	34.1	23.1	48.1
UNITED STATES ARMS CONTROL AND DISARMAMENT AGENCY	1.1	1.1	1.1	1.1	1.1	1.1
UNITED STATES INFORMATION AGENCY	.1	.1	.1	.1	.1	.1
VETERANS ADMINISTRATION	46.1	134.1	111.1	45.1	163.2	44.2

TABLE C-1. FEDERAL FUNDS FOR TOTAL RESEARCH AND DEVELOPMENT, BY AGENCY, FISCAL YEARS 1974, 1975, AND 1976

(MILLIONS OF DOLLARS)

AGENCY AND SUBDIVISION	OBLIGATIONS			EXPENDITURES		
		ESTIMATES			ESTIMATES	
	ACTUAL, 1974	1975	1976	ACTUAL, 1974	1975	1976
TOTAL, ALL AGENCIES	17,433.2	19,535.1	21,451.9	17,621.5	19,594.0	20,992.0
DEPARTMENTS						
DEPARTMENT OF AGRICULTURE, TOTAL	379.7	421.4	461.1	375.4	427.0	444.0
AGRICULTURAL RESEARCH SERVICE	231.5	221.0	241.7	242.1	222.7	249.1
COOPERATIVE STATE RESEARCH SERVICE	93.4	141.6	114.3	45.4	93.8	144.4
ECONOMIC RESEARCH SERVICE	19.1	21.5	26.9	10.1	21.5	24.5
FARMER COOPERATIVE SERVICE	1.4	1.7	1.2	1.7	1.7	1.2
FOREST SERVICE	65.5	75.3	94.2	61.1	77.4	91.7
NATIONAL AGRICULTURAL LIBRARY	.1	-	-	.7	.1	-
STATISTICAL REPORTING SERVICE	.6	.7	1.0	.6	.9	1.4
DEPARTMENT OF COMMERCE, TOTAL	319.0	231.1	229.9	170.1	202.7	221.1
ECONOMIC DEVELOPMENT ADMINISTRATION	4.1	2.5	2.1	5.4	4.1	1.6
MARITIME ADMINISTRATION	21.1	24.3	21.4	21.5	24.5	25.6
NATIONAL BUREAU OF STANDARDS	41.2	41.7	45.7	40.7	41.5	42.7
NATIONAL FIRE PREVENTION AND CONTROL ADMINISTRATION	-	4.7	2.5	-	4.5	5.4
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	119.1	133.7	149.1	111.6	121.0	130.9
OFFICE OF MINORITY BUSINESS ENTERPRISE	1.9	1.9	1.4	1.4	1.7	1.4
OFFICE OF TELECOMMUNICATIONS	1.0	.7	-	2.0	1.0	-
PATENT AND TRADEMARK OFFICE	.5	.5	.5	.4	.5	.4
SOCIAL AND ECONOMIC STATISTICS ADMINISTRATION	1.9	1.1	1.1	1.4	1.1	1.1
DEPARTMENT OF DEFENSE, TOTAL	9,029.4	9,014.5	10,035.1	8,914.9	9,491.1	10,035.7
DEPARTMENT OF THE ARMY	2,419.9	2,071.5	2,260.6	2,277.7	2,077.0	2,125.7
MILITARY FUNCTIONS	1,999.5	1,650.1	2,249.1	2,266.0	1,959.1	2,112.7
RDT&E APPROPRIATIONS	1,911.3	1,264.1	2,152.1	2,174.4	1,870.1	2,023.3
PAY AND ALLOWANCES OF MILITARY PERSONNEL IN R&D	39.1	59.5	90.9	86.6	31.0	66.6
CIVIL FUNCTIONS	23.4	12.2	17.5	11.7	15.5	13.8
DEPARTMENT OF THE NAVY	2,721.5	3,121.1	3,701.4	2,097.1	2,986.5	3,639.1
RDT&E APPROPRIATIONS	2,651.4	3,375.0	3,544.3	2,547.4	2,771.7	3,541.7
PAY AND ALLOWANCES OF MILITARY PERSONNEL IN R&D	50.4	51.4	37.5	46.2	42.6	41.9
SPECIAL FOREIGN CURRENCY PROGRAM	2.4	4.9	2.9	1.7	1.4	3.2
DEPARTMENT OF THE AIR FORCE	3,216.2	3,301.1	3,999.1	3,170.1	3,566.9	3,891.9
RDT&E APPROPRIATIONS	2,999.5	3,112.9	3,747.7	3,157.7	3,331.4	3,661.7
PAY AND ALLOWANCES OF MILITARY PERSONNEL IN R&D	216.4	239.5	239.6	216.6	230.5	230.0
DEFENSE AGENCIES	461.9	492.0	594.6	487.0	519.0	512.4
RDT&E APPROPRIATIONS	467.5	489.7	598.4	461.1	512.7	547.1
PAY AND ALLOWANCES OF MILITARY PERSONNEL IN R&D	6.3	5.1	5.9	6.3	6.4	5.1
DEPARTMENTWIDE FUNDS	2.1	1.6	2.3	2.9	2.7	2.4
DIRECTOR OF TEST AND EVALUATION, DEFENSE	20.7	24.1	21.4	25.5	24.0	26.0
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, TOTAL	2,233.1	2,411.7	2,375.9	1,977.1	2,127.7	2,610.3
ALCOHOL, DRUG ABUSE, AND MENTAL HEALTH ADMINISTRATION	105.6	174.5	423.1	127.5	130.1	176.4
CENTER FOR DISEASE CONTROL	44.4	48.1	47.9	62.2	41.0	46.4
FOOD AND DRUG ADMINISTRATION	41.9	47.9	55.5	21.1	21.7	26.4
HEALTH RESOURCES ADMINISTRATION	58.4	53.9	39.4	63.4	46.3	35.7
HEALTH SERVICES ADMINISTRATION	17.6	4.4	11.5	12.1	14.7	11.5
NATIONAL INSTITUTE OF EDUCATION	75.7	70.4	90.2	96.9	70.4	41.0
NATIONAL INSTITUTES OF HEALTH	1,776.8	1,369.7	1,423.7	1,467.6	1,591.1	1,429.7
OFFICE OF EDUCATION	51.5	45.9	201.1	62.9	54.3	111.1
OFFICE OF HUMAN DEVELOPMENT	53.0	71.9	74.1	51.0	71.4	74.1
OFFICE OF INTERNATIONAL HEALTH	2.7	2.1	1.6	1.7	1.4	1.4
OFFICE OF THE SECRETARY	23.6	27.1	29.1	29.9	27.3	29.1
SOCIAL AND REHABILITATION SERVICE	1.9	4.5	15.1	9.7	4.4	4.5
SOCIAL SECURITY ADMINISTRATION	19.4	27.4	25.9	14.7	22.0	25.4
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT	64.4	61.9	72.2	39.4	62.1	44.7
DEPARTMENT OF THE INTERIOR, TOTAL	236.6	305.1	395.3	191.0	254.7	327.0
BONNEVILLE POWER ADMINISTRATION	2.4	1.0	5.5	1.9	.2	...
BUREAU OF LAND MANAGEMENT	.7	.9	.9	.7	.4	.5
BUREAU OF MINES	55.1	116.2	177.9	60.7	94.0	119.7
BUREAU OF OUTDOOR RECREATION	-	-	-	-	-	-
BUREAU OF RECLAMATION	7.4	7.6	8.3	6.9	9.5	9.3
GEOLOGICAL SURVEY	73.4	114.7	121.0	71.4	107.1	119.5
NATIONAL PARK SERVICE	4.9	1.1	3.4	4.5	1.1	1.4
OFFICE OF THE SECRETARY	.5	5.7	23.7	.6	4.0	15.2
OFFICE OF WATER RESEARCH AND TECHNOLOGY	22.3	21.3	17.3	22.3	21.9	17.9
UNITED STATES FISH AND WILDLIFE SERVICE	24.3	27.4	32.1	23.1	24.4	29.7
DEPARTMENT OF JUSTICE, TOTAL	54.7	64.1	47.3	40.1	55.0	41.0
BUREAU OF PRISONS	.5	.7	1.9	.5	.9	.4
DRUG ENFORCEMENT ADMINISTRATION	3.0	5.3	4.4	4.3	4.2	3.2
FEDERAL BUREAU OF INVESTIGATION	1.9	1.9	1.1	.0	.5	.5
LAW ENFORCEMENT ASSISTANCE ADMINISTRATION	[illegible]	56.0	35.4	34.5	49.0	36.5
DEPARTMENT OF LABOR, TOTAL	25.4	21.3	25.4	22.5	20.9	21.6
BUREAU OF LABOR STATISTICS	1.7	1.1	1.5	1.7	1.1	1.5
EMPLOYMENT STANDARDS ADMINISTRATION	.9	4.5	5.4	.4	4.4	4.4
LABOR-MANAGEMENT SERVICES ADMINISTRATION	1.7	1.3	1.4	.6	2.0	1.9
MANPOWER ADMINISTRATION	16.5	12.5	17.5	15.1	12.5	17.5
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	1.4	.9	.9	1.4	.4	.4
OFFICE OF THE SECRETARY	2.4	2.1	2.3	1.5	2.4	2.0

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TABLE C-9. FEDERAL FUNDS FOR SOCIAL RESEARCH AND DEVELOPMENT, BY AGENCY, FISCAL YEARS 1974, 1975, AND 1976
CONTINUED (MILLIONS OF DOLLARS)

AGENCY AND SUBDIVISION	OBLIGATIONS			EXPENDITURES		
		ESTIMATES			ESTIMATES	
	ACTUAL, 1974	1975	1976	ACTUAL, 1974	1975	1976
DEPARTMENT OF STATE, TOTAL	22.5	32.3	15.7	24.9	26.4	29.5
DEPARTMENTAL FUNDS	1.5	1.0	1.5	1.6	[illegible]	[illegible]
AGENCY FOR INTERNATIONAL DEVELOPMENT	21.1	31.3	14.2	21.4	27.4	13.9
DEPARTMENT OF TRANSPORTATION, TOTAL	364.1	370.4	442.1	329.4	371.2	379.3
FEDERAL AVIATION ADMINISTRATION	125.4	149.4	111.2	115.2	117.2	105.4
FEDERAL HIGHWAY ADMINISTRATION	48.8	46.7	58.9	33.1	41.8	58.4
FEDERAL RAILROAD ADMINISTRATION	33.9	44.7	69.5	34.4	35.2	47.1
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION	43.6	55.6	49.1	44.4	54.5	49.9
OFFICE OF THE SECRETARY	29.7	30.9	15.3	25.8	35.7	34.4
UNITED STATES COAST GUARD	21.4	22.4	26.5	21.1	28.1	24.7
URBAN MASS TRANSPORTATION ADMINISTRATION	65.4	44.7	49.1	54.1	52.9	63.5
DEPARTMENT OF THE TREASURY, TOTAL	1.1	1.6	1.0	1.1	1.6	1.4
BUREAU OF ENGRAVING AND PRINTING	1.1	1.5	1.6	1.1	1.4	1.4
OTHER AGENCIES						
ACTION	.2	.1	.2	.1	*	.2
ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS	1.1	1.2	1.7	1.4	1.1	1.2
CIVIL AERONAUTICS BOARD	.4	.4	.4	.4	.4	.4
CIVIL SERVICE COMMISSION	1.1	4.1	4.5	3.1	4.1	4.5
COMMUNITY SERVICES ADMINISTRATION	45.2	46.3	39.5	65.3	49.6	31.9
CONSUMER PRODUCT SAFETY COMMISSION	.4	1.9	2.8	.3	1.5	2.4
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION	1,698.4	1,995.5	2,342.7	1,449.1	1,915.5	2,142.7
ENVIRONMENTAL PROTECTION AGENCY	153.2	246.4	509.4	161.1	234.1	303.4
FEDERAL COMMUNICATIONS COMMISSION	.1	1.9	1.4	1.2	1.4	1.6
FEDERAL ENERGY ADMINISTRATION	*	1.3	3.5	-	1.0	4.1
FEDERAL HOME LOAN BANK BOARD	.7	.2	.4	.7	.7	.5
FEDERAL TRADE COMMISSION	.9	1.2	1.3	.9	1.2	1.3
GENERAL SERVICES ADMINISTRATION	1.4	4.5	2.0	1.5	5.5	2.0
LIBRARY OF CONGRESS	2.2	2.5	3.1	2.1	7.4	3.7
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	3,092.2	[illegible]	3,410.7	1,161.1	1,102.2	3,369.9
NATIONAL SCIENCE FOUNDATION	355.4	[illegible]	579.1	370.2	477.6	479.4
NUCLEAR REGULATORY COMMISSION	42.3	55.4	47.5	42.3	55.6	47.6
OFFICE OF TELECOMMUNICATIONS POLICY	.3	1.1	1.4	.5	.4	1.1
SMALL BUSINESS ADMINISTRATION	*	.2	1.1	*	.2	1.1
SMITHSONIAN INSTITUTION	24.7	24.3	24.1	22.2	21.5	20.9
SPECIAL ACTION OFFICE FOR DRUG ABUSE PREVENTION	11.3	4.7	*	11.1	4.8	*
TENNESSEE VALLEY AUTHORITY	11.4	[illegible]	19.4	11.2	16.4	19.4
UNITED STATES ARMS CONTROL AND DISARMAMENT AGENCY	1.1	1.3	1.7	1.4	1.5	1.5
UNITED STATES INFORMATION AGENCY	.1	.1	.1	.1	.1	.1
VETERANS ADMINISTRATION	[illegible]	44.4	47.0	44.4	35.9	47.0

APPENDIX D

Statistical Tables Part II

Federal Funds for Scientific and Technical Information

NOTES

- Estimates for 1976 are based on *The Budget, FY 1976*, as submitted to Congress, and do not reflect subsequent appropriations and apportionment actions.
- Obligations reported for extramural performance are limited to contracts or grants with private individuals or organizations outside the Government that have as their primary purpose the support of scientific and technical information. Excluded are obligations for information efforts that supplement or support work under R&D contracts or grants.
- Obligations for category 4, Research and Development in Information Sciences, Documentation and Information Systems, Techniques and Devices, are also reported under R&D obligations in Part I.
- Defense Agencies include the Advanced Research Projects Agency, the Defense Nuclear Agency, the Defense Supply Agency, and the Defense Communications Agency.
- Within the Department of Commerce the Patent and Trademark Office is the new name of the former Patent Office, and the National Fire Prevention and Control Administration is the new name of the former National Bureau of Fire Prevention.
- The Energy Research and Development Administration includes programs that were transferred from other agencies: from the Department of the Interior the Office of Coal Research, a portion of the Bureau of Mines, and energy research programs within the Office of the Secretary; from the National Science Foundation most of the solar energy and geothermal energy research programs; from the Environmental Protection Agency certain energy-related programs; and from the Atomic Energy Commission all of its R&D programs except for nuclear regulatory and reactor safety functions.
- The Nuclear Regulatory Commission includes the nuclear regulatory and reactor safety functions transferred from the former Atomic Energy Commission as well as new programs.

Other Science Resources Publications

REPORTS	NSF No.	Price
Reviews of Data on Science Resources. No. 26. "Energy R&D and Related Activities of Federal Installations and Federally Funded Research and Development Centers: Funds and Manpower. Fiscal Years 1973-75"	76-304	In press
Reviews of Data on Science Resources. No. 25. "Doctoral Scientists and Engineers in Private Industry, 1973"	76-302	In press
Projections of Degrees and Enrollment in Science and Engineering Fields to 1985	76-301	In press
Characteristics of the National Sample of Scientists and Engineers. 1974. Part I. Demographic and Educational	75-333	In press
Detailed Statistical Tables. Manpower Resources for Scientific Activities at Universities and Colleges, January 1975	75-329	——
The 1972 Scientist and Engineer Population Redefined. Volume 2. Labor Force and Employment Characteristics	75-327	In press
Detailed Statistical Tables. Graduate Science Education: Student Support and Postdoctorals. Fall 1974	75-322	——
Research and Development in Industry. 1973: Funds. 1973: Scientists & Engineers. January 1974	75-315	$1.95
The 1972 Scientist and Engineer Population Redefined. Volume 1. Demographic, Educational, and Professional Characteristics	75-313	$3.70
Detailed Statistical Tables. Characteristics of Doctoral Scientists and Engineers in the United States. 1973	75-312-A	——
Characteristics of Doctoral Scientists and Engineers in the United States. 1973	75-312	$1.15
Reviews of Data on Science Resources. No. 23. "R&D Expenditures of State Public Institutions, Fiscal Year 1973"	75-311	$0.35
Reviews of Data on Science Resources. No. 24. "Work Activities of Employed Doctoral Scientists and Engineers in the U.S. Labor Force. July 1973"	75-310	$0.65
R&D Activities of Independent Nonprofit Institutions. 1973	75-308	$1.90
Research and Development in State Government Agencies. Fiscal Years 1972 and 1973	75-303	$1.80
Young and Senior Science and Engineering Faculty. 1974: Support, Research Participation, and Tenure	75-302	$1.70
Projections of Science and Engineering Doctorate Supply and Utilization. 1980 and 1985	75-301	$1.30
HIGHLIGHTS		
"Graduate Science Enrollment in Fall 1975 is Up Again for Second Straight Year"	75-335	——
"National Sample of Scientists and Engineers: Median Annual Salaries. 1974"	75-332	——
"National Sample of Scientists and Engineers: Participation in National Programs and Changes in Educational Attainment. 1972-74"	75-317	——
"Racial Minorities in the Scientist and Engineer Population"	75-314	——
"National Sample of Scientists and Engineers: Changes in Employment. 1970-72 and 1972-74"	75-309	——
"Federal Scientific and Technical Personnel Declines in 1973"	74-316	——
"Immigration of Scientists and Engineers Drops Sharply in FY 1973: Physician Inflow Still Near FY 1972 Peak"	74-302	——