DOCUMENT RESUME

ED 244 815 SE 044 540

TITLE	Federal R&D Funding by Budget Function. Fiscal Years 1983-85.
INSTITUTION	National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
REPORT NO	NSF-84-316
PUB DATE	Mar 84
NOTE	90p.
AVAILABLE FROM	Division of Science Resources Studies, National Science Foundation, Washington, DC 20550.
PUB TYPE	Reports - General (140) -- Statistical Data (110)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Agriculture; *Budgets; *Energy; *Federal Aid; *Federal Programs; Health; National Defense; Natural Resources; *Research and Development; *Sciences; Technology; Transportation
IDENTIFIERS	Department of Education; National Science Foundation

ABSTRACT

This report provides a distribution of research and development (R&D) programs by the functions of the federal budget. It includes only federal conduct of R&D programs, with R&D plant and all non-R&D activities excluded. The sections of the report are presented in descending order of R&D budget authority for the various functions in the fiscal year 1985 budget. Each section provides a summary table with text, followed by more detailed tables showing the chief R&D program areas within the function. Headings of these sections are: national defense; health; space research and technology; energy; general science, including National Science Foundation programs and two programs of the Department of Energy; transportation; natural resources and environment; agriculture; international affairs; veterans benefits and services; education (including Department of Education), training, employment, and social services; and all other functions (commerce and housing credit, community and regional development, administration of justice, income security, and general government). Also contained in the report is an agency/function crosswalk which provides an overview of agencies which contribute support to particular functional areas and a series of historical tables in which federal R&D funds by function are presented for the period 1955-85. (JN)

Note: Detail in tables may not add to totals because of rounding. Percent and dollar increases and decreases in the text are also based on unrounded numbers and may not conform exactly to amounts shown in or derived from tables.

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PREFACE

This report provides a distribution of R&D programs by the functions of the Federal budget. It includes only Federal conduct of R&D programs, with R&D plant and all non-R&D activities excluded. The sections of the report are presented in descending order of R&D budget authority for the various functions in the fiscal year 1985 budget. Each section provides a summary table with text, followed by more detailed tables showing the chief R&D program areas within the function. Some 600 R&D programs are identified with their funding levels for fiscal years 1983, 1984, and 1985.

Also contained in this report are two features not previously available. One is an agency/function crosswalk which provides an overview of agencies which contribute support to particular functional areas. The second is a series of historical tables in which Federal R&D funds by function are presented for the period 1955-85.

Most appropriations for research and development are not so labeled except in the case of certain program areas in defense, space, energy, and environment. In order to reach an overall Federal R&D figure for analytical purposes the Office of Management and Budget (OMB) requires the agencies to submit data on their R&D programs in terms of basic research, applied research, and development, and by R&D support to universities and colleges. R&D plant data are separately given. Special Analysis K: Research and Development, one of the documents of the 1985 Federal budget, provides a broad view of the R&D portion of the budget along with brief descriptions of the R&D programs of the larger support agencies.

The sources of data for this document are the Exhibit 44's submitted by agencies to OMB as part of their budget submission. In addition to these exhibits, budget justification documents of the leading R&D support agencies were also drawn upon to provide greater detail. Some information was additionally provided informally by some of the smaller agencies.

For organizational purposes the budget is divided into 18 functional areas, including interest. Funding for these functions plus allowances and undistributed offsetting receipts make up the budget total with no overlap occurring between functions or the agency programs within the functions. An immediate comparison is thus obtainable of the relative emphasis given to various areas of Federal responsibility. By categorizing R&D program data by these same budget functions the ratio of R&D funding to total Federal funding within each function can be viewed as one measure of the role assigned to research and development in meeting the needs embodied in the functions.

Function categories and definitions used in this report are the same as those used in the budget, with one exception. The budget function of general science, space, and technology has been divided into two functions: Space research and technology and general science. Three budget functions, general purpose fiscal assistance, interest, and social security and medicare, have no R&D components.

All the data shown in the following pages are based on budget authority dollars rather than obligations or outlays since budget authority is the basis of congressional funding decisions. 1/ The data shown agree for the most part with budget authority data supplied to OMB by the agencies. Some changes were made on the basis of information not available at the time Special Analysis K: Research and Development was prepared.

1/ Budget authority is the legal authorization that permits obligations to be incurred. 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. Outlays represent the amounts for checks issued and cash payments made during a given period, regardless of when the funds were appropriated.

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AGENCY/FUNCTION CROSSWALK: FISCAL YEARS 1983-85

AGENCIES	FUNCTIONS: National defense	Health	Space research and technology	Energy	General science	Transportation	Natural resources and environment	Agriculture	International affairs	Veterans benefits and services	Education, training, employment, and social services	Commerce and housing credit	Community and regional development	Administration of justice	Income security	General government
Dept of Defense (Mil)	X															
Dept of Hlth & Human Svcs.		X									X					
Dept of Energy	X			X	X											
Nat'l Aeronautics & Space Admin.			X			X										
Nat'l Science Foundation					X											
Dept of Agriculture							X	X								
Dept of Transportation						X										
Dept of Interior							X									
Environmental Protection Agency				X			X									
Dept of Commerce							X					X	X			
Agency for Internat'l Dev.									X							
Veterans Administration										X						
Nuclear Regulatory Commission				X												
Dept of Education											X					
Tennessee Valley Authority													X			
Smithsonian Institution											X					
Dept of Justice														X		
Corp of Engineers-Civil Works							X									
Dept of Housing & Urban Dev.													X			
Dept of Labor		X									X					
Dept of Treasury														X		X
Fed Emergency Management Agency	X															

RESEARCH AND DEVELOPMENT IN THE 1985 BUDGET

Total budget authority for all R&D programs, as proposed in the 1985 budget, is $52,660 million, 19 percent higher than the 1984 total of $44,367 million, allowing for considerable real growth. This increase contrasts with the 10-percent increase in 1985 budget authority in the overall Federal budget.

The 1985 budget represents continued high priority for research and development as relevant to the nation's long-term well-being. Federal R&D support was targeted especially at national defense and basic research. Within basic research special emphasis was given to the physical sciences and engineering to provide the foundation for the achievements of long-term national objectives of a strong defense and economic security.

At the same time, the 1985 budget continues to propose reductions in nearer term R&D programs that are not considered an appropriate Federal responsibility. These reductions occur in a number of programs and agencies, including nearer term technology development programs within energy and natural resources and environment.

The leading features of R&D planning in the 1985 budget are as follows:

- An increase of $7,699 million, or 26 percent in national defense R&D programs, following large relative increases in 1983 and 1984.
- An increase of $593 million or 4 percent for all other functions combined (excluding defense) compared with a 9 percent gain in 1984.
- An increase of $112 million, or 2 percent, in health R&D activities, compared with a 12-percent gain in 1984.
- An increase of $397 million, or 17 percent, for space research and technology, following a $152 million or 7 percent gain in 1984.
- A decrease of $143 million, or 6 percent, in energy R&D programs, following a decrease of $13 million, or 1 percent, in 1984.
- An increase of $656 million, or 9 percent, for basic research across all functions providing for real growth compared with a $726 million, or 12 percent gain in 1984, with every major functional area but health and natural resources and environment scheduled for increases ahead of the anticipated inflation rate.

- An increase of $225 million, or 13 percent, in general science programs in 1985, ahead of inflation, following a 14-percent gain in 1984.

- An increase of $57 million, or 5 percent, for transportation R&D activities in 1985, compared with a 25-percent increase in 1984.

- A decrease of $85 million, or 9 percent, in natural resources and environment R&D programs in 1985, following an increase of 4 percent in 1984.

R&D budget authority in 1985 is 5.2 percent of total Federal budget authority, compared with 4.5 percent and 4.9 percent, respectively in 1983 and 1984.

Shares of the R&D total

R&D priorities, measured in terms of shares of the total held by various functional areas, have continued to shift over the 1983-85 period, with the most dramatic change occurring in national defense. This functional area accounted for 64 percent of the total in 1983, then grew to 66 percent in 1984 and 70 percent in the 1985 budget.

The share held by the health function had been relatively constant in 1983 and 1984, at approximately 11 percent, but is expected to decline to 9 percent in 1985. Energy and space each account for 5 percent of the total, representing a slight decrease from 1983 for both functions.

In 1985 the five leading functions--national defense, health, space, energy, and general science--account for 93 percent of the total. Transportation, natural resources and environment, and agriculture each represent 2 percent. The remaining eight functions together account for almost 2 percent of the total.

Budget authority for research and development by budget function[a/]
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$38,768	$44,367	$52,660
National defense	24,936	29,275	36,975
Health	4,298	4,801	4,913
Space research and technology	2,134	2,286	2,683
Energy	2,578	2,565	2,422
General science	1,502	1,717	1,942
Transportation	876	1,091	1,148
Natural Resources and environment	952	985	900
Agriculture	745	760	795
International affairs	177	225	264
Veterans benefits and services	157	220	195
Education, training, employment, and social services	189	203	190
Commerce and housing credit	107	108	105
Community and regional development	44	47	47
Administration of justice	37	47	47
Income security	32	28	25
General government	6	9	11

[a]Listed in descending order of 1985 budget authority. One budget function--general science, space and technology--has been divided into two functions in this analysis: Space research and technology, and general science.

Annual percent change in R&D budget authority
for leading R&D support areas
[Dollars in millions]

	1983 actual	1984 estimate	Percent change 1983/84	1985 estimate	Percent change 1984/85
Total	$38,768	$44,367	14.4%	$52,660	18.7%
National defense	24,936	29,275	17.4	36,975	26.3
Health	4,298	4,801	11.7	4,913	2.3
Space research and technology	2,134	2,286	7.1	2,683	17.4
Energy	2,578	2,565	-0.5	2,422	-5.6
General science	1,502	1,717	14.3	1,942	13.1
Transportation	876	1,091	24.6	1,148	5.2
Natural resources and environment	952	985	3.5	900	-8.6
Agriculture	745	760	1.9	795	4.7
International affairs	177	225	27.1	264	17.2
Veterans benefits and services	157	220	40.0	195	-11.3
Education, training, employment, and social services	189	203	7.7	190	-6.6
All other functions	224	239	6.6	234	-2.2

NATIONAL DEFENSE

Approximately 31 percent of total Federal budget authority in 1985 is accounted for by the national defense function. As a fraction of total Federal R&D budget authority in 1985 defense R&D activities represent approximately 70 percent--the highest share since 1962. Over the 1983-85 period alone, the defense share of the Federal R&D total has grown nearly six percentage points.

In 1985, defense R&D budget authority is expected to grow $7,699 million over the 1984 level, reaching $36,975--an increase of 26 percent. The R&D activities in this function are sponsored by the Department of Defense (DOD) and the Department of Energy (DOE).

The key features of proposed 1985 R&D support within the defense function are as follows:

- An increase of 6 percent in DOD technology base between 1984 and 1985, to a total of $3,226 million. Basic research, included in technology base, is expected to advance 11 percent to a total of $934 million.
- An increase representing nearly two and one-half times the 1984 level in advanced technology development to a total of $3,442 million.
- An increase of 11 percent in DOD strategic programs, with most of the increase directed toward full scale development of the Peacekeeper, Trident II, and B-1 bomber as well as strategic communications satellite development.
- An increase of 33 percent in DOD tactical programs.
- An increase of 24 percent in DOD intelligence and communications programs.
- An increase of 8 percent in DOE atomic energy defense activities.

R&D budget authority in 1985 for national defense is an estimated 12 percent of total budget authority for defense.

Department of Defense - Military

DOD programs account for 95 percent of all national defense R&D budget authority in 1985. Virtually all defense R&D programs are funded under the research, development, test and evaluation (RDT&E) appropriation.

In the 1985 budget, all mission areas of the RDT&E appropriation receive increased support. Total budget authority for RDT&E would grow from $26,619 million to $34,145 million, or an increase of 28 percent.

Technology base is proposed to reach $3,226 million--an increase of 6 percent, or $184 million above 1984. This mission area supports programs of research as distinct from development. Basic research programs account for nearly 29 percent of technology base. Budget authority for these activities would grow 11 percent above the 1984 level, continuing a period of steady growth since 1976.

Advanced technology development is expected to grow $2,056 million, or approximately two and one-half times the 1984 level to $3,442 million in 1985. Increased emphasis would include the $1.8 billion space-related strategic defense initiatives program.

Strategic programs, with 1985 budget authority of $8,714 million, are expected to grow 11 percent, or $871 million over the 1984 level. The Peacekeeper and Trident II missile systems as well as the B-1 bomber are expected to receive continued emphasis in the 1985 budget. Other areas of continued effort include the Army joint tactical missile system also used by the Air Force, and the strategic communications satellite development.

Tactical programs--the largest area in 1985 budget authority--are expected to increase 33 percent, or $2,601 million over the 1984 level for a total of $10,510 million. Efforts within this mission area which receive emphasis in the 1985 budget for the Army include development of a system to defend against tactical missiles as well as continued work on protective measures against chemical warfare and remotely piloted vehicles, and control of air defense weapons. Air Force programs include continued work on a derivative model of a existing fighter aircraft, the F-111 fighter-bomber avionics upgrade, the C-17 transport aircraft, and an advanced medium-range air-to-air missile. For the Navy, emphasis will be placed on an upgrade to the F-14 fighter aircraft, initiation of development efforts for a new attack submarine, and continued work on the new DDG-51 destroyer and on a lightweight antisubmarine torpedo.

Intelligence and communications programs in the 1985 budget show an increase of $812 million, or 24 percent, to a total of $4,216 million. ncluded in this mission area is continued effort in defense intelligence stems, command control and communication programs, and test and luation capabilities.

R&D budget authority for national defense
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$24,936	$29,275	$36,975
Department of Defense - military	23,337	27,399	34,946
Research, development, test and evaluation	22,646	26,619	34,145
Technology base	3,238	3,042	3,226
Advanced technology development	823	1,386	3,442
Strategic programs	5,825	7,843	8,714
Tactical programs	7,255	7,909	10,510
Intelligence and communications	2,709	3,404	4,216
Defensewide mission support	2,797	3,035	4,037
Other DOD military	691	780	801
Atomic energy defense activities (DOE)	1,595	1,873	2,023
Weapons research, development and testing	905	1,075	1,151
Naval reactors development	329	370	426
Inertial confinement fusion	140	145	125
Defense waste and by-products management	69	102	116
Materials production	90	112	121
Nuclear safeguards and security	43	48	58
Verification and control	19	21	25
Federal Emergency Management Agency	3	3	6

Defensewide mission support is expected to increase $1,002 million, or 33 percent, in 1985 reaching a total of $4,037 million. This activity supports ranges and test facilities and studies and analyses as well as major DOD support for the space shuttle.

Atomic energy defense activities (DOE)

Proposed R&D budget authority for atomic energy defense activities is $2,023 million in 1985--8 percent more than in 1984, for an increase of $150 million. These programs account for approximately 6 percent of total 1985 national defense budget authority.

Weapons research, development and testing accounts for 57 percent of atomic energy defense activities, or $1,151 million in 1985, an increase of 7 percent over 1984. Naval reactors development, with 21 percent of the total, or $246 million, is expected to grow by 15 percent.

Among the remaining programs, only inertial confinement fusion shows a reduction from the 1984 level, declining 14 percent for a total of $125 million. This reduction reflects completion of the development of the NOVA frequency-converted glass laser at the Lawrence Livermore National Laboratory. Nuclear safeguards and security as well as verification and control activities are expected to grow 20 percent in 1985 over 1984. Defense waste and by-products management and materials production show increases of 14 percent and 8 percent, respectively, in 1985 budget authority.

HEALTH

R&D budget authority for health is proposed to increase $112 million, or 2 percent, in 1985 over 1984, to a total of $4,913 million. Almost all programs within this function are conducted by the Department of Health and Human Services (HHS). Approximately 90 percent of these funds will support biomedical research conducted by the National Institutes of Health (HHS). Notable features of the proposed 1985 R&D health programs include the following:

- o A 5-percent increase in health basic research, to $2,914 million.
- o A 2-percent increase, to $4,342 million, for the National Institutes of Health (HHS).
- o A 3-percent increase, to $355 million, for the Alcohol, Drug Abuse, and Mental Health Administration (HHS).

R&D budget authority for health as a share of total budget authority for health is an estimated 15 percent in 1985. 1/

1/ This ratio is considerably higher than indicated in previous reports as a result of the transfer of Medicare and Medicaid programs (no R&D is included in these programs) to a new function--social security and medicare.

R&D budget authority for health
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$4,298	$4,801	$4,913
Health research	4,219	4,716	4,826
National Institutes of Health (HHS)	3,793	4,236	4,342
Alcohol, Drug Abuse, and Mental Health Administration (HHS)	302	346	355
Centers for Disease Control (HHS)	78	84	84
Disease control	29	29	30
Occupational health	50	55	54
Assistant Secretary for Health (HHS)	16	18	16
Health Care Financing Adm. (HHS)	20	23	23
Health Resources and Services Administration (HHS)	9	10	5
Consumer and occupational health and safety	80	85	87
Food and Drug Administration (HHS)	74	79	81
Occupational Safety and Health Administration (Labor)	6	6	6

National Institutes of Health (HHS)

The primary mission of the National Institutes of Health (NIH) is to advance research in the prevention, diagnosis, and treatment of disease through biomedical research.

The 1985 proposal of $4,342 million for NIH is an increase of $106 million, or 2 percent, over the 1984 funding level. Each of the 11 separate institutes would receive slight increases in 1985, varying from 2 percent to 4 percent. Absolute increases range from $2 million to $24 million.

The National Cancer Institute, with $1,074 million in 1985 R&D budget authority, commands one-quarter of the NIH 1985 budget. This represents a 2-percent, or $24 million, increase over 1984. Individual increases would emphasize research on carcinogenesis, diagnostics, nutrition, and epidemiology.

The National Heart, Lung, and Blood Institute, which accounts for 16 percent of the NIH R&D budget, is expected to increase $16 million or 2 percent to $689 million in 1985. Most of this increase is for support of heart and vascular diseases.

The National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases, is scheduled to increase $13 million, or 3 percent, to $456 million in 1985. This institute represents 10 percent of the NIH R&D budget.

The only other institute receiving $10 million or more over the 1984 level is the National Institute of Allergy and Infectious Diseases up $11 million, or 4 percent, to $316 million in 1985.

R&D budget authority for the National Institutes of Health (HHS)
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$3,793	$4,236	$4,342
Cancer	959	1,050	1,074
Epidemiology	n/a	65	67
Carcinogenesis (physical and chemical)	n/a	101	105
Biological carcinogenesis	n/a	95	100
Nutrition	n/a	24	26
Tumor biology	n/a	132	136
Immunology	n/a	90	92
Diagnostic research	n/a	46	48
Preclinical treatment research	n/a	167	171
Clinical treatment research	n/a	168	171
Rehabilitation research	n/a	1	1
Cancer centers support	n/a	80	79
Cancer control	n/a	66	67
Research manpower development	n/a	14	12
Heart, Lung, and Blood	596	673	689
Heart and vascular diseases	n/a	387	397
Lung diseases	n/a	97	100
Blood diseases and resources	n/a	98	100
Intramural research	n/a	56	57
Research management and support	n/a	35	35
Arthritis, Diabetes, and Digestive and Kidney Diseases	394	443	456
Arthritis, musculoskeletal and skin diseases	n/a	76	79
Diabetes, endocrinology and metabolism	n/a	154	159
Digestive diseases and nutrition	n/a	67	69
Kidney diseases, urology, and hematology	n/a	72	74
Intramural research	n/a	58	58
Research management and support	n/a	16	16
General Medical Sciences	319	365	374
Cellular and molecular basis of disease	n/a	117	121
Genetics	n/a	150	154
Pharmacological sciences	n/a	52	53
Physiology and biomedical engineering	n/a	34	33
Intramural research	n/a	1	1
Research management and support	n/a	11	11

Neurological and Communicative Disorders and Stroke	287	325	334
Biological basis research	n/a	151	157
Clinical research	n/a	109	113
Intramural research	n/a	47	48
Research management and support	n/a	17	17
Allergy and Infectious Diseases	270	305	316
Immunology, allergic and immunologic diseases	n/a	94	99
Microbiology and infectious diseases	n/a	142	146
Intramural research	n/a	53	56
Research management and support	n/a	16	16
Child Health and Human Development	243	264	270
Research for mothers and children	n/a	128	131
Population	n/a	88	90
Intramural research	n/a	34	34
Research management and support	n/a	14	14
Environmental Health Sciences	158	173	178
Characterization of hazards	n/a	19	21
Biological response	n/a	24	26
Applied toxicological research	n/a	55	55
Biometry and risk estimation	n/a	5	5
Resource development	n/a	12	12
Intramural research	n/a	51	52
Research management and support	n/a	6	6
Eye	138	151	154
Retinal and choroidal diseases	n/a	58	58
Corneal diseases	n/a	20	20
Cataract	n/a	11	11
Glaucoma	n/a	12	13
Strabismus, amblyopia and visual processing	n/a	28	29
Intramural research	n/a	16	17
Research management and support	n/a	6	6
Aging	91	112	114
Aging research	n/a	85	87
Intramural research	n/a	20	20
Research management and support	n/a	8	8

Dental Research	75	84	87
Diseases of the teeth and supporting tissues	n/a	36	40
Disorders of structure, function, and behavior	n/a	16	17
Dental research institutes	n/a	8	5
Intramural research	n/a	19	19
Research management and support	n/a	6	6
Research Resources	213	242	245
Clinical research	n/a	82	83
Biotechnology research	n/a	32	34
Laboratory animal sciences and primate research	n/a	30	31
Biomedical research support	n/a	68	68
Minority biomedical research support	n/a	22	22
Research management and support	n/a	7	7
John E. Fogarty International Center	10	11	11
National Library of Medicine	16	14	15
Office of the Director	23	25	25

Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA)

The $355 million requested in the 1985 budget for Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) R&D programs is 3 percent higher than the 1984 funding level.

R&D budget authority for the general mental health research at $178 million, is 2 percent lower than the 1984 level. Programs will continue to support basic and applied research in neurosciences, behavioral sciences, psychopharmacology, and treatment and services to the mentally ill.

Drug Abuse R&D programs are scheduled for a 16-percent increase--up $9 million, to $64 million. Basic research on prevention and treatment of drug abuse will continue new research efforts to address problems of drug abuse among youths.

For alcoholism research the $48 million budget request is $5 million, or 12 percent, higher than in 1984. Funding supports and stimulates the development of new knowledge of the causes and consequences of harmful alcohol use, as a means of reducing the incidence and prevalence of alcohol abuse and alcoholism.

Prevention is the chief focus of research in all three program areas.

R&D budget authority for the Alcohol, Drug Abuse, and Mental Health Administration (HHS)
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$302	$346	$355
General mental health research	159	181	178
Extramural research	107	128	124
Schizophrenic disorders	14	18	19
Depression and manic depressive illnesses	13	15	15
Mental disorders of aging	6	7	7
Childhood disorders	10	11	11
Anxiety disorders	4	5	5
Stress and psychosomatic disorders	6	8	8
Basic studies in brain and behavior	26	31	31
Epidemiology	9	12	12
Prevention	8	10	10
Demonstration	6	7	0
Other mental health areas	6	6	6
Intramural research	52	53	54
Drug abuse research	48	55	64
Extramural research	43	49	58
Basic drug research	8	9	12
Heroin and narcotics	13	10	11
Marijuana and cannabinoids	5	6	8
Cocaine and stimulants	3	5	6
Sedatives and tranquilizers	1	2	2
Hallucinogens	1	2	2
Other drugs of abuse	2	3	4
Prevention	4	5	6
Epidemiology	6	7	9
Intramural research	4	6	6
Alcoholism research	33	43	48
Program support	63	67	66

Centers for Disease Control (HHS)

This agency shows proposed R&D budget authority of $84 million in 1985, only slightly higher than the estimated budget authority in 1984. Funding would support applied research on prevention and control of diseases.

Food and Drug Administration (HHS)

The $81 million in R&D budget authority proposed in 1985 for this agency represents a $2 million, or 2-percent, increase over 1984. These funds would support research to assure the safety and efficacy of drugs, medical devices, and food.

SPACE RESEARCH AND TECHNOLOGY

The National Aeronautics and Space Administration (NASA) conducts all the R&D activity under the space function. R&D budget authority for space research and technology in 1985 is $2,683 million, a 17 percent increase, or $397 million, above the 1984 level. The amounts shown for 1983, 1984, and 1985 for NASA research and development exclude funding for shuttle production and operation, tracking and data acquisition activities, and related institutional support. Major features of the 1985 plan for space research and technology are these:

- An increase in basic research of $101 million, or 18 percent to $652 million.
- A increase of $108 million, or 20 percent, in space transportation systems, with emphasis given to space station and tethered satellite systems activities.
- A $196 million, or 19-percent, increase in space science, including $16 million to fund the Mars geoscience/climatology orbiter, a new initiative for 1985.
- A $64 million, or 16-percent, increase in space and terrestrial applications, chiefly related to increases in the Upper Atmosphere Research satellite program and initiation of the scatterometer program.

The ratio of R&D budget authority to total budget authority for space research and technology is 39 percent in the 1985 budget.

R&D budget authority for space research and technology
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$2,134	$2,286	$2,683
National Aeronautics and Space Administration	2,134	2,286	2,683
Space transportation systems	524	546	654
Space science, applications, and technology	1,585	1,714	2,001
Space science	896	1,057	1,253
Space and terrestrial applications	468	412	476
Space research and technology	216	245	272
Energy technology	5	-	-
Supporting activities (advanced systems)	16	17	18
Technology utilization	9	9	10

Space transportation systems (STS)

R&D budget authority for the space transportation system (STS) program is $654 million in 1985, or $108 million more than the 1984 program level. Substantial NASA support of space station R&D, in the amount of $150 million, is proposed for 1985. Preliminary R&D for the space station was funded within the advanced programs component of capability development in 1983 and 1984. Major components of the program focus technology development in those areas that will support space station development, support brass-board/prototype demonstrations to evaluate technology alternatives, and advance the analysis and engineering design needed to define the elements that will make up the space station. A reduction of $72 million in capability development for the STS for 1985 over 1984 reflects completion of the pre-flight, flight, and post-flight activities for the first spacelab launched in November 1983, and of the development of the STS upper stages required to deploy shuttle-launched payloads to orbit not attainable by the shuttle alone. Substantially increased 1985 funding --from $3 million to $18 million--is proposed for the tethered satellite system to provide a new facility for conducting space experiments at distances up to 100 kilometers from the space shuttle orbiter while being held in a fixed position relative to the orbiter. The tethered satellite system is being undertaken as a cooperative development program with the Italian Government.

R&D budget authority for space transportation systems
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$524	$546	$654
Capability development	416	432	361
Advanced programs	13	20	15
Spacelab	121	113	69
Upper stages	167	143	92
Engineering and technical base	70	93	106
Tethered satellite system	-	3	18
Operations and support equipment	44	60	61
Space station	(a)	(a)	150
Research and program management	108	114	143

(a) Preliminary R&D for the Space Station was funded within the advanced programs component in 1983 and 1984.

ce science

Proposed budget authority for space science R&D activities in 1985 $1,253 million, 19 percent higher than the 1984 level. This represents e than one-half of the total space R&D budget authority for 1985. The ective of the space science program is to study the solar system and verse, using satellites in Earth orbit and spacecraft sent to planets their moons, and to carry out life sciences research related to the ce environment. Major projects in 1985 include continued development the space telescope and shuttle/spacelab payloads, the Galileo mission Jupiter, the Venus radar mapper mission, and advancement in the gamma observatory mission.

R&D budget authority of $677 million proposed for physics and ronomy in 1985 is $110 million, or 19 percent, more than in 1984. elopment of the space telescope will continue in preparation for a nch in 1986. The major activity during FY 1985 will be the assembly verification of the total space telescope system. The $120 million elopment request for the gamma ray observatory is $34 million above 1984 level. This observatory, an aid to research in high energy rophysics, is scheduled for orbit in 1988. In FY 1985, the major rication and assembly efforts on both the instruments and the ecraft will be continued, and the total mission critical design iew will be completed. The Explorer development program is eduled for a $3 million, or 7-percent, increase in 1985 to $52 lion. Program objectives in FY 1985 include continued development ivity on the cosmic ray isotope experiment, the extreme ultraviolet lorer, the ROSAT instrument, the cosmic ray isotope experiment, and instrumentation for the reflight of the long duration exposure ility to obtain cosmic ray data.

Proposed R&D budget authority for planetary exploration in 1985 is 37 million, or 32 percent, above the 1984 level. This program includes scientific exploration of the solar system with the objective of derstanding its origin and evolution. The Galileo mission, scheduled a launch to Jupiter in 1986, will continue development of ground stems to support operation of the spacecraft. Environmental testing the entire Galileo system will also be completed. The Venus radar pper mission will focus on fundamental questions regarding the origin d evolution of Venus by obtaining global radar imagery of the planet. 1985 funds will be used to complete the preliminary design reviews the spacecraft and radar systems, to initiate development of the ssion software, and to complete the radar development model. The rs geoscience/climatology orbiter, a new initiative in 1985, will rform geochemical, geophysical, and climatological mapping of Mars extend and complement the data acquired by the Mariner and Viking ssions. The mission is scheduled to be launched in 1990 with the ace shuttle.

Life sciences support is scheduled to increase 9 percent to $63 million. This program is developing a capability to sustain a permanent manned presence in space, utilizing the space environment to study living systems. Efforts include both ground-based and space research programs that are mutually supportive and integrated and that use a composite of disciplines and techniques in both biology and medicine to address space-related medical problems and fundamental biological processes. Program objectives in FY 1985 include definition and development of hardware which will be flown on future spacelab missions dedicated to life sciences research.

R&D budget authority for space science
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$896	$1,057	$1,253
Physics and astronomy	470	568	677
Space telescope development	183	196	195
Gamma ray observatory development	35	86	120
Shuttle/spacelab payload development and mission management	81	81	105
Explorer development	34	49	52
Mission operations and data analysis	61	68	109
Research and analysis	29	36	37
Suborbital programs	48	52	59
Planetary exploration	186	217	287
Galileo development	92	80	56
Venus radar mapper mission	-	29	93
International solar polar mission	6	6	9
Mars geoscience/climatology orbiter	-	-	16
Mission operations and data analysis	39	43	59
Research and analysis	50	60	55
Life sciences	56	58	63
Life sciences and flight experiments	24	23	27
Research and analysis	32	35	36
Research and program management	184	214	226

Space and terrestrial applications

Programs under this heading use space, aircraft, and ground-based systems to identify useful applications of space techniques in advanced communications satellite systems technology, materials processing research, and remote sensing to assist in solving Earth resources and environmental problems. The $476 million proposed for these programs in 1985 is $64 million, or 16 percent, above the prior-year support.

The solid earth observations program reflects a decrease of $12 million from 1984 to $64 million in 1985. This program develops and applies space observation techniques to management of food, fiber, water and land resources; improves our ability to evaluate the composition and geometry of the Earth's energy and mineral resources; and aids our understanding of the Earth's geodynamics. NASA's responsibility for operation of the thematic mapper on board Landsat-4 and associated data processing will end when it becomes fully operational in 1985. The Commerce Department's National Oceanic and Atmospheric Administration assumed control of Landsat-4 operations in 1983. FY 1985 funding will support operation of the large format camera and the shuttle imaging radar-B, and continued development of the multispectral linear array experimental instrument.

The environmental observations program shows a 1985 budget request of $221 million, 36 percent more than in 1984. The objectives of this program are an improved understanding of the atmosphere and oceans, and improved capability to predict environmental phenomena and their interaction with human activities. A large share of the increase in FY 1985 funding supports a higher level of design and development activity in the Upper Atmosphere Research (UAR) satellite program. Spacecraft design and development, and procurement of long-lead spacecraft instruments will be initiated. The UAR mission is scheduled for launch in 1989. New initiatives in the environmental observation program include development of scientific instruments for the first test flight of the tethered satellite system; and interdisciplinary research effort designed to integrate the discipline-specific research activities of oceanic processes, atmospheric dynamics and radiation, upper atmospheric/tropospheric chemistry, and land processes into a unified program to increase understanding of critical global processes; and the design and development of a scatterometer sensor for launch in 1988 to provide accurate, global measurements of ocean surface winds which will be useful for both oceanography and meteorology. The operational satellite improvement program was phased out in FY 1984.

The materials processing in space program is concerned with the science and technology of processing materials under constraints imposed by gravitational forces and discovering the unique capabilities made possible by controlling these processes in a space environment. Support of this activity will continue at about the same level in 1985 as in 1984.

R&D budget authority for space and terrestrial applications
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$468	$412	$476
Solid earth observations	129	75	64
Landsat 4	58	17	-
Extended mission operations	1	-	-
Shuttle/spacelab payload development	15	16	18
Geodynamics	28	28	30
AgRISTARS	15	-	-
Research and data analysis	12	15	16
Environmental observations	157	162	221
Upper atmosphere research program	28	29	31
Oceanic processes research and data analysis	17	18	19
Shuttle/spacelab payload development	4	8	8
Operational satellite improvement program	6	1	-
Earth radiation budget experiment	24	16	8
Tethered satellite payloads	-	-	3
Extended mission operations	23	27	30
Space physics	15	17	17
Atmospheric dynamics and radiation research and analyses	27	28	29
UAR satellite experiments and mission definition	14	20	61
Interdisciplinary research and analysis	-	-	1
Scatterometer	-	-	15
Materials processing in space	22	24	23
Communications and information systems	40	30	37
Research and program management	120	121	132

Space research and technology

The NASA space research and technology program provides a base of proven technology supporting future national programs in the conception and design of advanced spacecraft; develops a technology foundation for improving low-cost access to space through shuttle enhancements and orbital transfer concepts; supports activities related to a permanent human presence in space; and supports projected long-term needs of military and commercial use of space. The 1985 proposed budget authority of $272 million is $26 million, or 11 percent, more than the 1984 level. The increase would be spread across the spectrum of research and technology base projects. Spacecraft systems would receive the largest increase, up $5 million to $10 million in 1985, reflecting expansion of the effort to identify high-leverage technologies for future commercial and military spacecraft. Materials and structures research would receive a $4 million increase to $17 million.

R&D budget authority for space research and technology
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$216	$245	$272
Research and technology base	116	125	136
Fluid and thermal physics	8	8	9
Materials and structures	13	14	17
Computer science and electronics	16	16	16
Space energy conversion	18	22	23
Multidisciplinary	2	1	-
Controls and human factors	7	8	10
Space data and communication	17	18	18
Chemical propulsion	17	16	17
Spacecraft systems	5	5	10
Transportation systems	7	7	8
Platform systems	6	9	8
Systems technology program	5	7	9
Standards and practices	3	5	5
Research and program management	91	108	122

Total R&D budget authority for energy programs in 1985 is $2,422 million, which is 6 percent, or $143 million, less than the $2,565 million requested in 1984. Energy R&D activities in 1985 primarily emphasize long-term, high-risk efforts which support a mix of energy technologies aimed at expanding domestic energy supplies and achieving greater efficiency in energy use.

Three agencies are involved in conducting R&D efforts in energy: the Department of Energy (DOE), the Nuclear Regulatory Commission (NRC), and the Environmental Protection Agency (EPA). Major changes in 1985 for energy R&D programs are as follows:

- An increase of 15 percent in basic research over 1984, to $413 million.
- A 14 percent decrease in R&D funding to $488 million for nuclear fission, including a 26 percent decrease to $283 million for breeder reactor programs.
- An increase of 5 percent, to $417 million, for magnetic fusion.
- A decrease of 18 percent, to $263 million, for fossil energy, including a 24 percent decrease, to $178 million, in coal R&D programs.
- Decreases of 7 percent, to $161 million, in solar energy R&D programs; 19 percent, to $141 million, in uranium enrichment; 12 percent, to $124 million, in energy conservation; 22 percent, to $35 million, in electrical energy and energy storage systems; and 12 percent, to $27 million, in geothermal.
- A decrease of 12 percent to $168 million in NRC R&D programs for 1985.
- An increase of 35 percent to $49 million for EPA R&D activities, including a 65 percent increase, to $34 million for the acid rain activity.

Energy R&D budget authority as a percent of the total energy budget authority is 78 percent in 1985.

R&D budget authority for energy
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$2578	$2565	$2422
Department of Energy	2345	2338	2205
Solar	201	173	161
Geothermal	30	31	27
Hydropower	2	1	(a)
Nuclear fission	701	570	488
Magnetic fusion	374	397	417
Electrical energy and energy storage systems	42	44	35
Biological and environmental research	169	173	178
Supporting research	272	312	369
Fossil energy	307	323	263
Energy conservation	135	141	124
Uranium enrichment	113	173	141
Liquefied gaseous fuels	1	2	2
Nuclear Regulatory Commission	207	191	168
Environmental Protection Agency	26	36	49

[a] Less than $500,000.

Solar energy

R&D budget authority for solar energy is expected to decrease 7 percent, or $12 million, to $161 million in 1985. The goal of this R&D program is to aid U.S. private industry in advancing solar technologies as competitive energy supply options.

Photovoltaic energy systems, the largest solar energy program in 1985, shows a proposed decrease of 5 percent, or $2 million. This decrease is the result of a relatively large reduction in R&D funding for systems research programs. The major objective of this program in 1985 will be activities planned in the areas of materials and collector research which are schedule for funding increases.

The 1985 budget authority request for the other solar energy programs will allow for the continuation of these activities, with continued emphases placed on biofuels energy systems, solar thermal energy systems and wind energy systems.

R&D budget authority for solar energy
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$201	$173	$161
Solar building energy systems	11	16	12
Photovoltaic energy systems	58	49	47
Materials research	NA	26	31
Collector research	NA	9	11
Systems research	NA	14	5
Biofuels energy systems	21	28	27
Solar thermal energy systems	49	37	37
Wind energy systems	31	27	23
Ocean energy systems	11	6	4
International solar energy	10	1	1
Solar technology transfer	3	3	6
Program support	1	1	1
Program direction	6	6	5

Geothermal energy

R&D budget authority for geothermal energy R&D programs is expected to decrease $4 million, or 12 percent in 1985 to a total of $27 million. The goal of this program is to aid in the development of a technology base that will be used for future commercial geothermal development.

This program is planned to be structured around three areas: geopressured resources, scheduled for a 30 percent reduction in R&D funding to $4 million in 1985; geothermal technology development, for which R&D funding remained unchanged at $22 million; and hydrothermal industrialization, for which funding is proposed to be terminated in 1985.

R&D budget authority for geothermal energy
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$30	$31	$27
Hydrothermal industrialization	6	2	-
Geopressured resources	8	5	4
Geothermal technology development	15	22	22
Hot dry rock research	8	8	6
Hydrothermal research	7	11	10
Hard rock penetration research	-	3	4
Magma energy extraction	-	1	1
Technology transfer	-	-	1
Program direction	1	1	1

Nuclear fission

R&D budget authority for nuclear fission is expected to decline 14 percent, or $82 million, to $488 million in 1985. The net reduction in the nuclear fission R&D programs includes a relatively large cutback in breeder reactor systems funding.

Converter reactor systems R&D budget authority is expected to decline 9 percent, or $8 million, to $81 million in 1985. This decrease includes the termination of the advanced reactor systems program. R&D funding for the high temperature reactors (HTR) program is expected to increase by 10 percent to $33 million in 1985. Efforts will be focused on the evaluation of the potential of small HTRs for unique domestic and international markets. Light water reactor systems and Three Mile Island activities both experienced reductions in their R&D funding for 1985.

A decrease of 7 percent, or $1 million, to $13 million is proposed for nuclear waste technology in 1985. This decrease reflects R&D budget reductions in the area of low-level waste activities.

The remedial actions program is scheduled to increase by 28 percent, or $12 million, to $55 million. Programs scheduled for the largest relative increase include uranium mill tailings and surplus facilities activities.

The breeder reactor systems program is expected to decrease 26 percent, or $99 million, to $283 million in 1985. Funding for liquid metal fast breeder reactor (LMFBR) R&D decreased 22 percent to $237 million reflecting the termination of funding for the Clinch River breeder reactor plant project and the large scale prototype breeder. A 26 percent, or $9 million, decrease to $26 million is scheduled for the water cooled breeder reactor program in 1985. The nuclear fuel cycle proposed R&D budget request is 65 percent, or $21 million, less than in 1984.

Advanced nuclear systems funding fell 1 percent, or $1 million, below the $32 million reported for 1984. Emphasis continues to be placed on the use of nuclear power sources that will be used in space missions such as NASA's Galileo and international solar polar missions.

Civilian radioactive waste management R&D funding more than doubled in 1985 to $25 million. The major components of this program are: spent fuel storage research and development; alternative disposal concepts; and generic methods and supporting activities. All of these projects are scheduled for large increases in budget authority for 1985.

R&D budget authority for nuclear fission
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$701	$570	$488
Converter reactor systems	71	89	81
High temperature reactors	33	30	33
Light water reactor systems	10	20	16
Three Mile Island activities	24	33	31
Advanced reactor systems	4	5	-
Program direction	-	1	1
Nuclear waste technology	14	14	13
Remedial actions	16	43	55
Breeder reactor systems	535	382	283
Liquid metal fast breeder reactor (LMFBR)	450	304	237
Clinch River breeder reactor plant project	188	40[a]	-
Large scale prototype breeder	15	15	-
Base program	247	249	237
Water cooled breeder	45	36	26
Nuclear fuel cycle	32	31	11
Program direction	8	11	8
Advanced nuclear systems	36	32	31
Civilian radioactive waste management	29	11	25

[a] An appropriation transfer of $40 million has been made from Uranium Enrichment as an emergency interim measure to fund immediate CRBRP termination requirements. Resolution of the final budget authority sources to fund the net termination requirement of $115 million is still pending.

Magnetic fusion

R&D budget authority for magnetic fusion shows an increase of 5-percent, or $21 million, to a total of $417 million in 1985. The mission of this program is to support fusion research based upon the perceived long-term need for the fusion energy option as well as the near-term benefits associated with the developments of advanced technology.

Confinement systems, the largest program within magnetic fusion received a 4 percent, or $8 million, increase to $196 million in 1985. This increase is the result of a 7-percent gain in funding for toroidal confinement systems, which is one of the two base types of magnetic confinement currently being pursued. The second base technology is mirror confinement, which shows a 5 percent decline in 1985 R&D funding.

Applied plasma physics is scheduled for a 10 percent, or $8 million, increase to $84 million in 1985. This growth will allow these programs to continue to develop fusion physics knowledge through theoretical studies and small experiments. Most of the net increase can be associated with the 19 percent gain in funding to upgrade the MFE computer network.

The development and technology program shows a 2 percent, or $1 million, increase in 1985 that will provide additional growth for systems design and fusion engineering design studies.

Planning and projects is expected to receive the second largest relative increase in R&D funding within magnetic fusion--8 percent, or $4 million, to $53 million in 1985. Budget authority for the mirror fusion test facility (MFTF) is scheduled for a 46 percent increase in 1985. The MFTF project is the major scaling experiment for the tandem mirror concept, and will produce the data base necessary for the next program step leading to an experimental power reactor.

R&D budget authority for magnetic fusion
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$374	$397	$417
Applied plasma physics	73	77	84
Advanced fusion concepts	19	20	23
Experimental plasma research	17	17	17
Fusion theory	22	23	25
National MFE computer network	15	16	19
Confinement systems	187	188	196
Toroidal confinement systems	138	144	154
Mirror confinement systems	49	44	42
Development and technology	74	78	80
Plasma technologies	36	33	32
Reactor technologies	27	31	30
Systems design studies	7	9	13
Fusion engineering design center	4	5	6
Planning and projects	36	49	53
Tokamak fusion test reactor	20	20	14
Mirror fusion test facility	13	25	36
Fusion materials irradiation test facility	4	4	3
Program direction	4	5	4

Electric energy and energy storage systems

R&D budget authority for electric energy and energy storage systems shows a proposed decrease of $10 million, or 22 percent, to $35 million in 1985.

Electric energy systems (EES) is scheduled for a $1 million, or 3 percent, reduction in funding to $18 million. EES supports research aimed at increasing the efficiencies, reliabilities and adaptability of our Nation's electric power transmission and distribution systems.

R&D budget authority for energy storage systems (STOR) in 1985 is $9 million, or 35 percent, less than the $26 million requested in 1984. The energy storage systems program serves as the nucleus for virtually all research activities related to energy storage, with special emphasis on electric vehicles, storage of electricity generated by solar energy, electric utility load-leveling, and energy and resource conservation.

R&D budget authority for electric energy and energy storage systems
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$42	$44	$35
Electric energy systems	17	19	18
Electric fields effects	3	3	4
Reliability R&D	4	4	5
Systems technology	10	12	9
Program direction	1	1	(a)
Energy storage systems	25	26	17
Battery storage	17	18	15
Thermal and mechanical storage	7	7	1
Program direction	1	1	(a)

[a] Less than $500,000.

Biological and environmental research

The $178 million requested in the 1985 budget for biological and environmental research represents a 3 percent, or $5 million, increase from 1984. This program represents the Nation's only long-term research effort specifically focused on energy-related health and environmental issues. The primary goals of this program are: to provide through basic and applied research, scientific data required to reduce the health and environmental uncertainties associated with energy technolgoy and weapons development; and to develop new application of nuclear science and technology for use in the diagnosis and treatment of human disease. Late effects on health and environmet of energy development and use, the largest program within biological and environmental research, shows a 4 percent increase to $129 million in 1985.

R&D budget authority for biological and environmental research
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$169	$173	$178
Late effects on health and environment of energy development and use	126	124	128
Source and dose determination	10	10	10
Environmental fate and behavior	30	28	33
Health effects	66	63	57
Basic biology	20	23	28
Risk analysis	2	2	-
Nuclear medicine	17	20	21
Carbon dioxide research	9	13	13
Facility operations	11	11	12
Program direction	3	4	4

Supporting research

An increase of $58 million, or 19 percent, to $369 million is expected in R&D budget authority for supporting research. Approximately 94 percent of the total R&D budget authority for this program can be accounted for in basic energy sciences activities which shows an increase of $53 million, or 18 percent, to $348 million in 1985.

The basic energy sciences (BES) program is responsible for generic long-range energy related research. BES provides the fundamental scientific and technical base for future advances in both nuclear and non-nuclear technology development. The larger share of BES funding is used to sponsor research in the traditional disciplines: materials sciences (up 13 percent to $142 million); chemical sciences (up 7 percent to $81 million); nuclear sciences (up 31 percent to $50 million); applied mathematical sciences (up 93 percent to $28 million); and engineering and geosciences (up 9 percent to $21 million). In addition, BES provides support for the operation of several unique national facilities used by researchers from industry, universities and national laboratories.

University research support and university research instrumentation show a 67 percent and 50 percent gain respectively over 1984 R&D funding. Emphasis in 1985 will be on strengthening university capabilities to do research and encouraging more students of a higher academic caliber to pursue energy-related careers.

R&D budget authority for supporting research
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$272	$312	$369
Basic energy sciences	261	296	348
Materials sciences	108	125	142
Chemical sciences	70	76	81
Nuclear sciences	31	38	50
Applied mathematical sciences	14	15	28
Engineering and geosciences	17	19	21
Advanced energy projects	8	9	11
Biological energy research	10	11	13
Program direction	3	4	4
Energy research analysis	3	3	3
University research support	6	6	9
Advisory and oversight program direction	3	3	3
University research instrumentation	-	4	6

Fossil energy

The R&D budget authority request of $263 million for fossil energy in 1985 is $60 million, or 18 percent, less than the 1984 request. The fossil energy program focuses on establishing an adequate scientific and engineering knowledge base to support private sector efforts to develop and apply new technologies for the recovery and production of fossil and synthetic fuels. The 1985 R&D request emphasizes activities which attract little or no private sector funding.

Coal R&D budget authority shows a $56 million, or 24 percent, decrease to $178 million. Large relative decreases are proposed for coal liquefaction, fuel cells, magnetohydrodynamics and surface coal gasification. Control technology and coal preparation, scheduled to increase 24 percent to $32 million, would emphasize the development of advanced coal cleaning technologies that will reduce the ash and sulfur content of U.S. coals. Budget authority for combustion systems, increased 74 percent to $32 million in 1985. The objective of this program is to conduct generic technology base development with potential for high risk and high payoff related to advanced coal and coal-derived fuel combustion concepts.

Petroleum R&D budget authority is proposed at $32 million, a $1 million, or 4 percent, increase over 1984 funding. This program funds research which could lead to improved technologies for the exploration, development and production of petroleum resources. The enhanced oil recovery program shows a $4 million, or 46 percent, increase in its R&D budget authority request in 1985. Research will concentrate on enhanced recovery of light and heavy oil, and tar sands.

Gas R&D programs show a $7 million, or 45 percent, decrease to $9 million in 1985. The goal of this program is to assist the private sector in developing cost-effective diagnostic and extraction technologies which are needed to produce gas efficiently and economically from vast unconventional gas resources.

R&D budget authority for fossil energy
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$307	$323	$263
Coal	230	234	178
Control technology and coal preparation	28	26	32
Advanced research and technology development	32	39	40
Coal liquefaction	38	29	14
Combustion systems	24	18	32
Fuel cells	30	43	14
Heat engines and heat recovery	5	7	8
Underground coal gasification	6	6	6
Magnetohydrodynamics	29	30	18
Surface coal gasification	39	37	15
Petroleum	24	30	32
Advanced process technology	5	5	6
Enhanced oil recovery	7	9	13
Oil shale	12	16	12
Gas	14	16	9
Unconventional gas recovery	14	16	9
Policy and management	39	43	45

Energy conservation

Energy conservation R&D activities are scheduled to decline 12 percent, or $16 million, to $124 million in 1985. This program would emphasize support to the private sector in developing technical means to use energy economically by conducting research in areas of energy conservation where new knowledge can expand the technology base.

The building and community systems program shows a 9 percent, or $3 million, reduction to $33 million in 1985. Budget authority for 1985 emphasizes building systems research in such areas as wall and roof systems, indoor air quality, infiltration and ventilation, lighting, and retrofit of existing buildings. In addition, the legislatively mandated building energy efficiency guidelines and standards, appliance standards, residential conservation services and Federal energy management programs will be continued.

Industrial R&D programs are scheduled to decrease 14 percent, or $5 million, to $29 million in 1985. This program supports R&D activities which have the potential to increase energy use efficiency and the use of alternative fuels in private industry.

The budget authority request for transportation R&D declined 33 percent, or $19 million, to $38 million in 1985. The transportation program focuses on research efforts to improve energy efficiency of vehicle systems and allow for a switch from petroleum to electricity and alternative fuels. Vehicle propulsion, the leading activity within this program fell 51 percent to $19 million in 1985.

The $23 million requested in 1985 for multi-sector R&D programs is 80 percent, or $10 million, higher than 1984. This increase reflects a significant gain, 99 percent to $18 million, in R&D for the energy conversion and utilization technologies (ECUT) program. ECUT research emphasizes increased understanding and improved techniques, processes, and materials which encourage the efficiency and applications of energy conversion.

R&D budget authority for energy conservation
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$135	$141	$124
Building and community systems	39	36	33
Building systems	13	14	12
Residential conservation service	3	1	1
Community systems	4	4	2
Urban waste	3	2	-
Analysis and technology transfer	1	(a)	5
Technology and consumer products	11	10	5
Appliance standards	1	2	3
Federal energy management program	1	1	2
Program direction	3	3	3
Industrial	28	34	29
Waste energy reduction	12	12	12
Process efficiency	8	14	8
Implementation and deployment	2	2	4
Cogeneration	5	4	3
Program direction	2	2	2
Transportation	54	56	38
Vehicle propulsion R&D	35	38	19
Electric and hybrid vehicle R&D	14	12	7
Transportation systems utilization	-	1	2
Alternative fuels utilization	2	3	2
Advanced materials development	2	2	7
Program direction	2	2	2
Multisector	13	13	23
Appropriate technology	2	1	-
Inventors program	2	3	5
Energy conversion and utilization technologies	9	9	18
Program direction	(a)	(a)	(a)
Policy management	1	1	2
Policy analysis	-	1	-

[a] Less than $500,000.

Nuclear Regulatory Commission

The 1985 R&D budget authority request for the Nuclear Regulatory Commission (NRC) is $168 million, $23 million, or 12 percent, less than 1984. The decreases in NRC R&D funding reflect the completion of a number of projects in 1984, and a consolidation of programs with industry. The Office of Nuclear Regulatory Research has the authority and responsibility under the Energy Reorganization Act of 1974 to conduct research in support of the nuclear regulatory process. A primary focus of the research program is the development of a complete and sound base of technical information on basic safety issues. In addition, it provides an independently verified source of safety, health and environmental information. This information is coordinated with information supplied by applicants or licensees to be used as a basis for licensing and regulatory decisions.

Reactor and Facility Engineering activities are expected to increase slightly, $2 million, to $39 million in 1985. The program will continue to develop tools and data for the reevaluation of operating plants under conditions not anticipated when the plants were originally approved to ensure continued safety.

Thermal Hydraulic Transients funding is scheduled to decrease 24 percent, or $7 million, to $21 million in 1985. Work on transient models and codes will shift from code development to a limited assessment of the accuracy and range of the codes and an adaptation of the codes for use by the NRC staff for evaluation and analysis.

Funding for Accident Evaluation and Mitigation is expected to decrease 14 percent, or $7 million, to $45 million in 1985. The Power Burst Facility (PBF), which conducts research on damaged fuel, is scheduled for completion in 1985. As a result of the Clinch River Breeder Reactor termination, the fast breeder safety research program has been reduced to a minimum level.

LOCA (loss-of-coolant accidents), which provides experimental data and analytical methods needed to understand and predict the behavior of primary and secondary coolant systems during large-break loss-of-coolant accidents will be significantly curtail in 1985. Funding is expected to decrease 45 percent from $10 million in 1984 to $6 million in 1985. This decrease reflects the completion of the Upper Plenum Test Facility (UPTF) and a greater emphasis on LOCA research being conducted by the private sector.

R&D budget authority for the Nuclear Regulatory Commission
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$207	$191	$168
Reactor and facility engineering	35	38	39
Facility operations	12	13	9
Thermal hydraulic transients	23	28	21
Siting and health	8	8	7
Risk analysis	14	16	16
Accident evaluation and mitigation	57	52	45
LOCA (loss-of-coolant accidents)	28	10	6
Waste management	12	9	9
Program technical support	18	18	17

Environmental Protection Agency

The energy R&D program under EPA is expected to increase $13 million, or 35 percent, to $49 million in 1985. All energy R&D activities are scheduled to be performed under the multi-media energy research program. Acid rain activities show a proposed R&D budget authority of $34 million in 1985, a 65 percent, or $13 million, increase over 1984. This increase will allow for enhanced data on the physical and chemical mechanisms governing the acid deposition phenomenon. Funding for the remaining R&D activities within the multi-media energy research program will remain unchanged from the levels requested in 1984.

R&D budget authority for the energy R&D program of the Environmental Protection Agency
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$26	$36	$49
Multi-media energy	26	36	49
Acid rain	13	21	34
Health effects	2	2	2
Environmental engineering and technology	11	12	12
Environmental processes and effects	1	(a)	-

(a) Less than $500,000

GENERAL SCIENCE

This function consists of National Science Foundation (NSF) programs and two programs of the Department of Energy. The programs that fall within this function are viewed as contributing to the Nation's scientific base in an even broader sense than the basic research that supports agency missions.

R&D budget authority for 1985 general science programs is expected to increase 13 percent over the 1984 level of $1,717 million for a total of $1,942 million. The key elements of the general science function are as follows:

- An increase of 14 percent above the 1984 level for NSF programs, to a total of $1,414 million in 1985.
- An increase in NSF basic research of 14 percent to $1,330 million in 1985.
- An increase of $58 million in NSF mathematical and physical sciences programs, or 16 percent above the 1984 level.
- An increase of $40 million in NSF astronomical, atmospheric, earth and ocean sciences programs, or 12 percent above the 1984 level.
- An increase of $29 million in NSF biological, behavioral, and social sciences programs, or 12 percent above the 1984 level.
- An increase of $27 million in NSF engineering R&D, or 21 percent over 1984, the highest relative growth in NSF.
- An increase in DOE general science programs of 10 percent over 1984 to a total of $528 million.

Budget authority for general science R&D as a share of total general science budget authority in 1985 is 86 percent. Virtually all of the activities within the general science function are research or development with the remainder consisting of R&D plant and some NSF information collection activities. Of the R&D total, 96 percent consists of basic research.

R&D budget authority for general science
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$1,502	$1,717	$1,942
National Science Foundation	1,056	1,238	1,414
Mathematical and physical sciences	308	365	423
Astronomical, atmospheric, earth and ocean sciences	289	337	377
Biological, behavioral, and social sciences	200	231	260
Engineering	106	125	152
U.S. Antarctic program	81	94	107
Science and engineering education	1	7	8
Scientific, technological, and international affairs	43	46	52
Special foreign currency	3	3	3
Program development and management	32	31	33
Adjustment for carryovers	-5	-	-
Department of Energy	446	479	528
High energy physics	326	343	382
Nuclear physics	119	134	145
General science program direction	1	2	2

National Science Foundation

The mathematical and physical sciences (MPS) budget authority proposed for 1985 is 16 percent, or $58 million, above the 1984 level. Growth in budget authority is evenly distributed across all of the MPS disciplines. In mathematics, emphasis is placed on the support of graduate students and to research visitors at major centers, while programs in computer research continue support for experimental and theoretical activities. Physics programs emphasize support on instrumentation, particularly for the many university-based groups for research with the Tevatron accelerator at Fermilab, improved computing capabilities, and increased support for postdoctoral scientists and graduate research assistants. Chemistry research continues to focus on areas presenting significant promise for rapid advancement and on increased support for research instrumentation. In materials research, instrumentation and student support are also emphasized, and modest relative attention is given to solid state physics and chemistry, condensed matter theory, metallurgy and polymers.

R&D budget authority for mathematical and physical sciences
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$308	$365	$423
Mathematical sciences	35	42	51
Computer research	29	34	39
Physics	89	106	122
Chemistry	68	80	92
Materials research	81	98	113
Program development and management	6	6	7

The astronomical, atmospheric, earth and ocean sciences (AAEO) activity is proposed for an increase of 12 percent--$40 million higher than in 1984. Support for astronomical sciences, up 17 percent or $13 million, provides funds for university research project support grants and for five National Astronomy Centers. Astronomy project support in the 1985 budget emphasizes astronomical instrumentation and detectors, theory and data analysis, digital detectors for telescopes, and computational facilities. Funds are also provided for studies of Comet Halley, laboratory astrophysics, infrared astronomy and support of ground-based observatories at universities. Support for the development of a unique submillimeter-wave radio facility, initiated in 1984, will continue in 1985. The five National Astronomy Centers provide a variety of optical, infrared, radio and other specialized instrumentation, on a competitive basis, to scientists throughout the nation and abroad. Additional funds proposed for the National Radio Astronomy Observatory reflect initiation of development of the Very Long Baseline Array radio astronomy facility.

Atmospheric sciences are scheduled to grow 9 percent in 1985--an $8 million increase. The four areas designated to significant growth in 1984 continues to be emphasized in 1985. These areas are instrument and research equipment acquisition, mid-latitude storm research, global tropospheric chemistry, and climate studies emphasizing the interaction between the atmosphere and the oceans. The other major component of the atmospheric sciences activity, the National Center for Atmospheric Research (NCAR), emphasizes the development of an Advanced Vector Computer (AVC) system. This computer is expected to have greatly increased central memory and speed compared to the current NCAR mainframe computers. The AVC system strengthens current research efforts requiring large-scale computing in atmospheric and ocean sciences.

The earth sciences program grows 17 percent, or $7 million, in the 1985 budget. In addition to proposing increases in areas where instrumentation needs are critical, research areas to be emphasized include planning, site selection, and preliminary studies for a possible program of scientific drilling on the continents as well as projects in lithospheric seismology, a global digital seismograph array, and laboratory studies of geological materials. Also, support is proposed for research on ancient asteroid impacts and their possible influence on the mass extinctions of life forms as seen in the fossil record, the tectronic and thermal history of sedimentary basins, the structures and properties of rocks and minerals at the pressures and temperatures of earth's interior, and volcanoes and their historical patterns of eruption.

Ocean sciences are scheduled for growth of 10 percent, or $11 million in 1985. In the area of ocean sciences research support considerable attention is given to instrumentation improvements in all areas supported. In addition, increases in submarine geology and geophysics will support submersible research on the evolution of the oceanic crust, the chemistry at hydrothermal events, and the microbiology of vent organisms.

R&D budget authority for astronomical, atmospheric, earth, and ocean sciences
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$289	$337	$377
Astronomical sciences	63	78	91
Astronomy project support	22	28	29
National Astronomy and Ionosphere Center	5	6	6
Kitt Peak National Observatory Cerro Tololo Inter-American Observatory National Solar Observatory	20	24	25
National Radio Astronomy Observatory	16	21	31
Atmospheric sciences	75	89	97
Atmospheric sciences project support	40	46	49
National Center for Atmospheric Research	32	40	45
Upper Atmospheric Research Facilities	3	3	4
Earth sciences	35	42	49
Ocean sciences	102	114	125
Ocean sciences research support	50	55	61
Oceanographic facilities and support	31	33	36
Ocean drilling program	21	26	28
Arctic research	6	7	8
Program development and management	8	8	8

R&D budget authority for the biological, behavioral, and social sciences (BBS) program activities is expected to grow 12 percent in the 1985 budget, or an increase of $29 million. Physiology, cellular and molecular biology, the largest of the BBS activities, increases 14 percent or $14 million and emphasizes support for molecular and genetic biosciences, cellular and physiological biosciences, and biological instrumentation. The biotic systems and resources activity area is scheduled for growth of 12 percent, or $7 million. The increase proposed emphasizes plant biology and support for innovative research areas such as transformations of biogenic elements in soils and sediments, as well as funds for research equipment and associated requirements of the molecular emphasis in systematic biology. The behavioral and neural sciences activity grows 10 percent, or $ 4 million, with special attention given to research in neurosciences and required instrumentation for studies of the nervous system. Social and economic sciences are proposed to increase 14 percent, or $3 million, with most of the added support intended to enhance cumulative data resources on economic, political, and social change.

R&D budget authority for biological, behavioral, and social sciences
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$200	$231	$260
Physiology, cellular and molecular biology	87	102	116
Biotic systems and resources	46	53	60
Behavioral and neural sciences	34	39	42
Social and economic sciences	20	25	28
Information science and technology	6	6	7
Program development and management	6	7	7

The engineering program shows increased support of 21 percent, or $27 million, in 1985 budget authority. Electrical, computer and systems engineering activities, proposed for growth of 24 percent, emphasize research in areas such as free electron radiation sources, non-linear optics, radio frequency power generation, and magnetics; microstructure fabrication of three dimensional integrated circuits; and microsensors and robotics to aid the handicapped. Chemical process engineering, with a 22 percent increase, focuses on biochemical engineering of mammalian and plant cell cultures, molecular thermodynamics, and energy-efficient separation processes relevant to biotechnology. Civil and environmental engineering is scheduled to grow 18 percent while mechanical engineering and applied mechanics is proposed for a 23-percent increase to accomodate expanded equipment funding and young investigator support, and research areas such as robotics/automated manufacturing, biosolid mechanics, and the flow of biological fluids.

R&D budget authority for engineering
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$106	$125	$152
Electrical, computer, and systems engineering	30	36	45
Chemical and process engineering	23	27	33
Civil and environmental engineering	31	34	40
Mechanical engineering and applied mechanics	19	24	30
Program development and management	4	4	5

The U.S. Antarctic Program is proposed to increase 14 percent, or $13 million, with most of these funds programmed for operations support. The research program grows 8 percent, or $1 million, with emphasis on magnetosphere-ionosphere interactions, the Antarctic marine ecosystem, study of the history, structure and tectonics of the Transantarctic mountains, the dynamics of the West Antarctic ice sheet, and the marine geophysics of the Scotia and Weddell Seas.

R&D budget authority for U.S. Antarctic program
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$81	$94	$107
U.S. Antarctic research program	9	10	11
Operations support program	72	84	96
Program development and management	-	-	-

Research activities within scientific, technological and international affairs (STIA) increase 14 percent in the 1985 budget--a gain of $6 million. STIA continues to be the primary NSF activity with responsibility for coordinating research programs that cut across scientific disciplines and international boundaries. The largest activity, industrial science and technological innovation, grows 34 percent, or $6 million. Its primary objectives are to support cooperative research efforts between the Nation's universities and industry, and research in small high technology businesses, with the long-term goal of improving technological innovation. Areas of concentration include increased opportunities for small science and technology-based firms to perform research leading to more rapid commercialization of new products as well as improved links between university and industrial fundamental research. The research initiation and improvement subactivity increases 1 percent to $9 million in 1985. This subactivity supports research and related activities that strengthen the National resources base of science and engineering. Program elements of this subactivity are directed at increasing opportunities for individuals and groups under-represented in scientific and engineering research.

R&D budget authority for scientific, technological, and international affairs
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$43	$46	$52
Industrial science and technological innovation	14	17	23
International cooperative scientific activities	5	6	6
Policy research and analysis	4	4	5
Science resources studies	1	1	1
Research initiation and improvement	11	8	9
Program development and management	9	9	10

Department of Energy

General science programs of the Department of Energy (DOE) are proposed for growth of 10 percent, or $50 million, in the 1985 budget, reaching a total of $528 million.

High energy physics, the largest activity in the DOE general science program, receives a 11-percent increase in the 1985 budget--$39 million above the 1984 level, for a total of $382 million. A major feature of the program proposed for 1985 is the operation of the Energy Saver/Tevatron superconducting synchrotron at Fermilab for research in the GeV energy range. Priority is also given to operation and research utilization of the Positron-Electron Project (PEP) accelerator facility and of the Alternating Gradient Sychrontron (AGS) at the Brookhaven National Laboratory with its new polarized proton beam and excellent low energy neutrino capabilities. The budget also requests funds to continue support for university-based research groups emphasizing accelerator user group efforts, non-accelerator experiments, and theoretical research efforts. High priority is placed on implementation of research programs using the major new research capabilities being provided by the Tevatron I and Tevatron II projects at Fermilab and the Stanford Linear Collider at the Stanford Linear Accelerator Center (SLAC).

Budget authority for nuclear physics is scheduled for growth of 8 percent, or $11 million, reaching a total of $145 million. Emphasis in this program would be given to research utilizing the seven national accelerator facilities which make possible the acceleration of ions as heavy as uranium to low energies in the SuperHILAC, and to high energies in the Bevalac (Lawrence Berkeley Laboratory); use of Bates Electron Accelerator recirculator project (MIT), which provides electron beams for precision electron-nuclear scattering studies at higher energies than previously available; and use of heavy ion beams at the Holifield Heavy Ion Research Facility (Oak Ridge National Laboratory) and the Argonne Tandem/Linac (Argonne National Laboratory) which will allow high precision heavy ion physics studies at higher energies than previously available. Nuclear physics directly supports 75 university-base user groups who conduct most or all of their research at these national facilities. To complement the national facilities, the nuclear physics program supports on-campus accelerators at Yale University, Duke University, University of Washington, and Texas A&M University. The 1985 request provides for initiation of the Continuous Electron Beam Accelerator Facility (CEBAF) project with emphasis on key accelerator components, architect/engineer studies, minor site work, and detailed design.

R&D budget authority for the general science programs of the Department of Energy
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$446	$479	$528
High energy physics	326	343	382
Physics research	90	100	108
Facility operations	145	161	182
High energy physics technology	90	82	92
Nuclear physics	119	134	145
Medium energy nuclear physics	59	65	72
Heavy ion nuclear physics	40	47	50
Low energy nuclear physics	12	13	14
Nuclear theory	8	9	9
General science program direction	1	2	2

Basic Research: All Functions

The 1985 budget proposes growth of 9 percent for basic research, an increase of $656 million for a total of $7,629 million. Of the major functions, all but health and natural resources and environment are scheduled for increases ahead of the anticipated inflation rate.

The general sciences function, which accounts for nearly one-fourth of all Federal basic research, increases 13 percent in proposed 1985 budget authority, or $208 million, reaching $1,859 million. NSF basic research programs show the largest planned growth, advancing 14 percent, or $158 million, to $1,330 million. DOE budget authority for basic research would grow 10 percent--$50 million--reaching $528 million.

The health function, accounting for more than one-third of all Federal basic research, would grow 5 percent in 1985 budget authority, or $133 million, for a total of $2,914. The National Institutes of Health provide approximately 94 percent of Federal health basic research funding.

National defense basic research activities are anticipated to increase 11 percent in 1985, growing $92 million to a total of $934 million. Basic research in defense accounts for 12 percent of all Federal basic research in the 1985 budget, all of it conducted within the DOD technology base mission area.

The space research and technology area is expected to increase support for basic research by 18 percent or $101 million, reaching a total of $652 million. Most of the NASA basic research effort is in space science programs relating to physics and astronomy and planetary exploration.

The energy function is scheduled for growth in basic research of 15 percent--$54 million, reaching $413 million in the 1985 budget. Programs of DOE in basic energy sciences are primarily responsible for this growth.

The agriculture function shows a proposed increase of 10 percent, growing $35 million and reaching $379 in the 1985 budget. Most of this growth is related to basic research programs of the Agricultural Research Service (USDA).

The transportation function, comprised mainly of the NASA aeronautical basic research program, is scheduled for growth of 27 percent in the 1985 budget, to $175 million.

Natural resources and environment is the only major function to show a decrease in 1985--5 percent, or $8 million to $163 million. The basic research programs of the Geological Survey (Interior) and the Forest Service (USDA) are expected to decrease 5 percent and 3 percent, respectively, in 1985. These two agencies account for approximately two-thirds of the total basic research for this function.

The remaining functions account for only 2 percent of all Federal basic research budget authority in 1985.

Budget authority for basic research by function
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$6,247	$6,973	$7,629
General science	1,439	1,651	1,859
National Science Foundation	993	1,172	1,330
Department of Energy	446	479	528
All other functions	4,808	5,322	5,771
Health	2,475	2,781	2,914
National defense	788	841	934
Space research and technology	501	552	652
Energy	320	359	413
Agriculture	326	344	379
Transportation	117	138	175
Natural resources and environment	156	172	163
Education, training, employment, and social services	70	78	87
Commerce and housing credit	19	20	18
Veterans benefits and services	14	15	15
International affairs	10	10	9
Community and regional development	6	6	6
Administration of justice	4	4	3
General government	3	4	2
Income security	-	-	-

TRANSPORTATION

The budget authority request for transportation R&D activities in 1985 is $1,148 million, 5 percent greater than the 1984 level. This function is comprised of subdivisions of the Department of Transportation (DOT) and the aeronautical research and technology program of the National Aeronautics and Space Administration (NASA). Highlights of 1985 changes in R&D support are as follows:

- An increase of 27 percent, to $175 million, in budget authority for basic research, represented chiefly by the NASA aeronautical research and technology program.
- An increase of 7 percent in air transportation R&D programs, mostly from an increase in NASA aeronautical research and technology programs.

R&D budget authority for transportation as a share of total budget authority for this function is approximately 4 percent in the 1985 budget.

R&D budget authority for transportation
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$876	$1,091	$1,148
Ground transportation	173	171	177
Federal Highway Administration (DOT)	49	52	60
National Highway Traffic Safety Administration (DOT)	49	54	63
Federal Railroad Administration (DOT)	17	16	16
Urban Mass Transportation Administration (DOT)	58	49	38
Air transportation	655	875	934
Federal Aviation Administration (DOT)	127	272	277
Air traffic control	49	67	70
Advanced computer	40	147	153
Navigation	5	9	7
Aviation weather	8	16	17
Aviation medicine	3	4	6
Aircraft safety	11	18	15
Environment	2	2	3
Operations development	10	9	8
Aeronautical research and technology (NASA)	527	603	657
Research and technology base	199	216	233
Fluid and thermal physics	43	45	49
Materials and structures	23	23	25
Controls and guidance	12	12	13
Human factors	10	11	11
Multidisciplinary	4	4	6
Computer science and applications	19	22	24
Propulsion systems	17	20	22
Rotorcraft	23	23	27
High-performance aircraft	39	37	37
Subsonic aircraft	9	19	20
Systems technology programs	82	87	109
Rotorcraft	22	28	27
High-performance	15	20	21
Subsonic aircraft	17	5	19
Advanced propulsion	27	17	16
Numerical aerodynamic simulation	-	17	27
Research and program management	247	301	314
Water transportation	37	35	28
Maritime Administration (DOT)	17	13	4 (a)
Coast Guard (DOT)	20	23	24
Other transportation	11	10	9
Office of the Secretary (DOT)	5	5	7
Research and Special Programs Administration (DOT)	6	5	3

(a) An additional $7 million for R&D activities of the Maritime Administration will be transferred from the ship construction account.

Ground transportation

Ground transportation R&D support is expected to increase approximately 3 percent in 1985, to $177 million. R&D programs of the Federal Highway Administration (DOT) and the National Highway Traffic Safety Administration (DOT) show increases of 15 percent and 18 percent, respectively. These increases are partially offset by a $11 million decrease in Urban Mass Transportation Administration (DOT) R&D programs.

Air transportation

In 1985, air transportation R&D support is expected to increase $59 million, or 7 percent, over 1984, to $934 million. The NASA aeronautical research and technology program accounts for $54 million of the increase, with most R&D programs receiving higher funding levels in 1985 than in 1984. This program is scheduled for a 9-percent increase in 1985, to $657 million. The $18 million increase for research and technology base reflects increases for most ongoing efforts in aeronautical disciplines and vehicle-oriented programs. Systems technology activities support is scheduled for an overall $23 million increase. Subsonic aircraft systems funding increases reflect the need to establish the engineering data and confidence required for the application of composite primary structures to large civil and military transport aircraft in the 1990's. In the numerical aerodynamic simulation program, FY 1985 funding of $27 million will provide for acquisition of the first high-speed processor required for a capability for numerical simulation of aerodynamic flows.

Water transportation

Budget authority for water transportation R&D activities shows a decrease of $7 million. However, 1985 obligations for water transportation R&D will include $7 million that will be transferred by the Maritime Administration (DOT) from the ship construction account to R&D activities. This transfer will be added to obligations derived from the 1985 budget authority for Maritime Administration R&D of $4 million. Coast Guard (DOT) programs show a $1 million increase in 1985 to $24 million.

NATURAL RESOURCES AND ENVIRONMENT

R&D budget authority for natural resources and environment is proposed at $900 million in 1985, a decrease of $85 million, or 9 percent below the 1984 level. Major aspects of the proposed program for 1985 include the following:

- A 5-percent decrease in funding of basic research in 1985 from 1984 for a total of $163 million.
- A 4-percent reduction in conservation and land management, resulting from reduced support to Forest Service R&D programs.
- A 6-percent increase in recreational resources from increases in Fish and Wildlife Service programs.
- A 4-percent increase for pollution control and abatement programs of the Environmental Protection Agency to $231 million.
- A 30-percent reduction in support for the National Oceanic and Atmospheric Administration to a total of $168 million.

R&D budget authority for natural resources and environment as a share of total Federal budget authority for this function is estimated at 8 percent in 1985.

R&D budget authority for natural resources and environment
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$952	$985	$900
Water resources	45	39	46
Bureau of Reclamation (Int)	16	11	12
Corps of Engineers (DOD)	29	28	34
Conservation and land management	118	118	113
Forest Service (USDA)	108	109	103
Bureau of Land Management (Int)	7	6	5
Office of Surface Mining and Reclamation (Int)	2	1	3
Minerals Management Services (Int)	2	2	2
Recreational resources	115	119	126
Fish and Wildlife Service (Int)	104	106	112
National Park Service (Int)	11	13	14
Pollution control and abatement	208	221	231
Environmental Protection Agency	208	221	231
Other natural resources	466	488	385
National Oceanic and Atmospheric Administration (Commerce)	222	239	168
Geological Survey (Int)	147	161	148
Bureau or Mines (Int)	97	87	69
Office of the Secretary	-	(a)	-

(a) Less than $500,000

Water resources

The 1985 budget request for water resources R&D activities is $46 million, an increase of $6 million, or 15 percent above 1984. This increase reflects increased R&D funding for the Army Corps of Engineers. Research efforts currently underway related to dam safety, protection of coastal areas, navigation, flood control, environmental impacts in wetlands, effects of contaminant mobility and toxic substances in dredged materials, and water conservation and supply planning will continue. The increase in funding reflects the building up to full scope of activities in the river ice management program and the repair, evaluation, maintenance, and rehabilitation program. R&D funding for the Bureau of Reclamation to support conservation, development, and use of western water and related land resources remains the same in 1985 as in 1984.

Conservation and land management

The $113 million proposed for this subfunction in 1985 is $5 million, or 4 percent, below the 1984 level. The Forest Service accounts for almost all of the decrease in this subfunction, with the decrease distributed across four research programs. Currently, research is conducted on genetics, silviculture and timber management, watershed management, wildlife, range and fish habitats, recreation, protection of forest resources from fire and forest pests, surface environment and mining, forest engineering, utilization, and economics of forest commodity production, processing and distribution.

R&D budget authority for the Forest Service (USDA)
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$108	$109	$103
Fire and atmospheric sciences	9	8	8
Forest insects and disease	22	22	21
Forest inventory and analysis	12	12	12
Renewable resources economics	5	5	5
Trees and timber management	21	22	20
Watershed management and rehabilitation research	11	11	10
Wildlife, range, and fish habitat	9	9	8
Forest recreation	2	2	2
Forest products and harvesting research	18	18	18

Recreational resources

The 1985 budget request for R&D efforts within recreational resources is $126 million, a increase of $7 million from the 1984 level. The U.S. Fish and Wildlife Service (Interior), which conducts approximately 90 percent of the R&D activities within this subfunction, would receive $6 million more in 1985 than in 1984. An estimated $3 million increase in Federal aid to state fish and wildlife agencies is derived from increased special tax receipts.

The National Park Service (Interior) R&D request in 1985 is $14 million, $1 million more than in 1984. It would support continued research programs in natural science, archeology, and social sciences.

R&D budget authority for the Fish and Wildlife Service (Interior)
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$104	$106	$112
Resources Management	49	46	54
Habitat preservation	15	19	19
Wildlife resources	12	12	12
Fishery resources	10	11	11
Endangered species	3	4	4
Reimbursible program	9	1	8
Executive direction	(a)	(a)	(a)
Federal aid, fish restoration	18	18	22
Federal aid, wildlife restoration	37	37	37
Construction	1	4	-

Pollution Control and Abatement

All programs under this subfunction are conducted by the Environmental Protection Agency. The $231 million proposed R&D budget authority for 1985 is $10 million, or 4 percent, above the 1984 level. Priorities in EPA's 1985 research program include better understanding of the risks posed by hazardous and toxic chemicals, assessing technologies which control pollutants, and improving the scientific basis for estimating the human health consequences of environmental pollutants.

The air quality research program would be increased by $3 million to $65 million in 1985. Research would focus on assessing the relationship between air pollution and the incidence of cancer in the United States, emission reduction technologies for volatile organic compounds, and epidemiology studies to improve pollutant population exposure information.

Water quality research would increase from $25 million in 1984 to $27 million in 1985--an 8-percent rise. Research under this program would emphasize improving compliance for municipal wastewater treatment plants, toxics treatability methods, and integrated water quality planning procedures.

Hazardous waste research funding would increase 8 percent to $35 million in 1985, and emphasize the validation of waste characterization procedures to support listing decisions and evaluations of alternative treatment technologies to land disposal.

The interdisciplinary research program would decrease by $1 million in 1985. This reflects transfer of a $2 million economic benefits research area to the Office of Policy, Planning and Evaluation. Funding of the intermedia programs increases by $1 million to support efforts designed to strengthen quality of EPA scientific data.

Toxic substances research and development would increase $3 million to $27 million. The additional funds will be used to develop measurement methods for organic chemicals, provide quality assurance in support of Polychlorinated Biphenyl (PCB) regulations and develop exposure monitoring systems.

R&D budget authority for the Environmental Protection Agency
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$208	$221	$231
Programs funded by the EPA R&D and S&E appropriations	193	205	217
Air quality	58	62	65
Oxidants	13	15	16
Hazardous pollutants	8	13	15
Mobile sources	6	6	5
Gases and particles	31	29	29
Water quality	31	25	27
Water quality research	14	15	15
Municipal wastewater	11	8	9
Industrial wastewater	6	2	3
Drinking water	21	24	23
Hazardous waste	32	32	35
Pesticides	6	6	8
Radiation	1	2	2
Interdisciplinary	9	21	20
Toxic substances	26	24	27
Management and support	9	9	9
Program funded under the abatement control and compliance appropriation	8	7	2
Hazardous substance response trust fund	7	9	13

Other natural resources

The agencies in this group would receive reduced R&D funding under the proposed 1985 budget so that as a total, the requested budget authority of $385 million is $103 million, or 21 percent less than the 1984 level.

The National Oceanic and Atmospheric Administration (Commerce) decrease of $71 million reflects reduced support in applied areas of research deemed more appropriately supported by the private sector or by State and local governments. Cuts in such programs as sea grants, marine pollution activities, fishing service resource information research and development, and fishery grants to States are examples of this policy.

Geological Survey (Interior) R&D programs are expected to decrease $13 million, or 8 percent to $148 million in 1985, reflecting an overall reduction in survey programs. Most of the reductions would be in water resources investigations. A $3 million increase for land resource surveys research only partially offsets declines or level funding in all other R&D areas of the agency.

R&D budget authority for the National Oceanic and Atmospheric Administration (Commerce)
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$222	$239	$168
Operations, research and facilities	214	229	168
Ocean and coastal programs	62	65	34
Marine fishery resources programs	47	47	28
Atmospheric programs	63	79	74
Satellite and environmental data and information services	10	10	10
Program support	32	29	22
Fishery products promotion and development (Saltonstall-Kennedy Act)	8	10	-

R&d budget authority for the Geological Survey (Interior)
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$147	$161	$148
National mapping, geography and survey	11	12	11
Primary mapping and revision	-	-	2
Primary quadrangle mapping	2	2	-
Digital cartography	1	1	1
Map revision and orthophotoquads	1	1	-
Small, intermediate, and special mapping	4	5	2
Modernization of mapping technology	-	-	1
Earth resourses observation systems	4	4	5
Cartographic and geographic information	(a)	(a)	(a)
Geologic and mineral resource surveys and mapping	110	116	113
Geologic hazards surveys	41	39	34
Land resource surveys	7	15	18
Mineral resource surveys	28	32	32
Energy geologic surveys	20	14	12
Offshore geologic surveys	13	16	16
Water resources investigations	26	33	24
National water data system	16	24	18
Energy hydrology	10	8	6

(a) Less than $500,000

AGRICULTURE

All R&D activity within this function is conducted by the Department of Agriculture (USDA). R&D budget authority for agriculture is expected to increase by 5 percent, or $36 million, to $795 million in 1985. Agricultural R&D is conducted in order to ensure the continued high productivity of the U.S. agricultural sector. A higher priority has been placed on long-term basic research.

The special areas of emphasis in the 1985 budget are highlighted below:

- An increase of 3 percent over 1984 levels, to $85 million in animal production research.
- An increase of 4 percent, to $93 million, in processing, storage, distribution, food safety and consumer services research.
- An increase of 4 percent, to $36 million, in human nutrition research.
- A decrease of 42 percent, to $16 million, in special research grants.
- A nearly three-fold increase to $50 million, in competitive research grants, including $29 million in new appropriations to conduct biotechnical research.
- An increase of 7 percent, to $48 million, in Economic Research Service activities.

R&D budget authority for agriculture as a share of the total budget authority for this function is 7 percent in 1985.

R&D budget authority for agriculture
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$745	$760	$795
Agricultural Research Service (USDA)	446	453	467
Animal production	87	82	85
Plant production efficiency research	180	185	188
Use and improvement of soil, water, and air	64	64	66
Research on conservation and use of land and water resources and maintaining evironmental quality	47	47	49
Research on watershed development	17	17	17
Processing, storage, distribution, food safety, and consumer services research	88	89	93
Processing, storage, and distribution efficiency research	62	64	67
Research to improve human health and safety	25	24	25
Research on consumer services	1	1	1
Human nutrition research	28	34	36
Cooperative State Research Service (USDA)	235	238	257
Payments under the Hatch Act	149	152	155
Cooperative forestry research	13	13	13
Payments to 1890 colleges and Tuskegee Institute	22	23	23
Special research grants	28	27	16
Competitive research grants	17	17	50
Plant science	15	15	15
Human nutrition	2	2	2
Animal science	-	-	5
Biotechnology	-	-	29
Animal health and disease research	6	6	-
Administration	(a)	1	(a)
Economic Research Service (USDA)	39	44	48
Statistical Reporting Service (USDA)	8	8	9
Human Nutrition Information Service (USDA)	8	7	8
Office of International Cooperation and Development (USDA)	5	5	5
Agricultural Cooperative Service (USDA)	2	2	1
Office of Transportation (USDA)	1	1	1
Agricultural Marketing Service (USDA)	2	2	-

[a] Less than $500,000.

Agricultural Research Service

The 1985 R&D budget authority request for the Agricultural Research Service (ARS) is $467 million, $14 million, or 3 percent greater than in 1984. The Agricultural Research Service conducts basic and applied research in the fields of livestock and plant science; pest control; use and improvement of soil, water and air resources; processing, safety and use of agricultural products; consumer services; and human nutrition. This research is designed to assure the Nation's food and agricultural enterprise. In 1985 increased emphasis will be placed on animal and plant production efficiency; land and water conservation; post-harvest technologies; and higher education.

Cooperative State Research Service

The Cooperative State Research Service (CSRS) plans to increase its 1984 research funding by $19 million, or 8 percent, to $257 million in 1985. The CSRS supports research on agriculture, forestry, the rural home and the rural community. This support is primarily through payments and grants to land-grant colleges.

Included in the CSRS 1985 budget is $50 million in the Competitive Research Grants program. This is an approximate three-fold increase over 1984 funding and includes $29 million for new basic research initiatives in biotechnology. The competitive Research Grants program funds basic research in the areas of plant and animal science, human nutrition and biotechnology. Most of the current research in biotechnology has been on bacteria and animals such as mice, although some recent progress has been made using plants.

Economic Research Service

An increase of $3 million, or 7 percent, to $48 million is proposed for the Economic Research Service (ERS) in 1985. Emphasis will be placed on indepth research on relationships between the macroeconomies of the U.S. and foreign countries, their respective agricultural sectors, and international agricultural trade. The ERS will continue to provide agricultural economic information that includes research results, forecasting of major agricultural economic indicators, and policy analysis and data.

INTERNATIONAL AFFAIRS

All R&D activity within the international affairs function is conducted by the Agency for International Development (AID). The budget authority request for AID in 1985 is $264 million, an increase of $39 million, or 17 percent over 1984 funding. AID's R&D activities consist mainly of applied research to solve specific problems associated with basic human needs and economic research aimed at understanding the barriers to development. R&D priorities reflect the important development problems faced by the Third World: food and agriculture, health and population, education and human resources, energy and natural resources, and small enterprise development. Significant research efforts are being pursued in two promising areas: oral rehydration therapy and a malaria vaccine.

R&D budget authority is approximately 1 percent of the total budget authority for this function in 1985.

R&D budget authority for international affairs
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$177	$225	$264
Agency for International Development	177	225	264
Africa	37	56	72
Asia	13	31	34
Latin America and the Caribbean	7	6	8
Near East	3	3	15
Central programs	118	129	135

VETERANS BENEFITS AND SERVICES

All R&D activity within the veterans benefits and services function is conducted by the Veterans Administration (VA). The R&D budget authority request for the VA is $195 million, a decrease of $25 million, or 11 percent from 1984.

Typically, the R&D funds in this function emphasize medical and rehabilitation research to improve the quality and effectiveness of health care for the veteran. Investigator-initiated studies, the largest activity within medical research, is scheduled for a $11 million, or 10 percent gain over 1984. The overall decrease in the VA reflects the proposed transfer of epidemological studies activities from the VA to the Centers for Disease Control within HHS. This transfer represents a decrease of $45 million, or 84 percent, to $9 million within this function in 1985.

R&D budget authority is approximately 1 percent of the total budget authority for this function in 1985.

R&D budget authority for veterans benefits and services
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$157	$220	$195
Veterans Administration	157	220	195
Medical research	141	202	173
Investigator-initiated studies	105	109	120
Cooperative studies	12	14	15
Career development	13	14	15
High priority research	8	8	10
Agent orange studies	4	4	4
Epidemiology study (CDC)	-	54	9[a]
Rehabilitation research	10	11	14
Health services research	4	5	6
Program direction	3	3	3

[a]Management of the resources associated with this study is the responsibility of the Department of Health and Human Services (HHS) through the Centers for Disease Control (CDC) in Atlanta, Georgia.

R&D budget authority in 1985 of $190 million for this function is $13 million, or 7 percent, less than the 1984 funding level.

Research and general education aids programs account for approximately three-quarters of the 1985 proposed R&D funding for this function. Overall funding for such programs within the Department of Education would remain the same in 1985 as in 1984. Increase in funding for the National Institute of Education and special institutions are offset by decreases in special purpose funds for education of the handicapped and other programs.

Training and employment R&D programs, all conducted by the Department of Labor Employment and Training Administration, show proposed 1985 budget authority of $7 million. New research initiatives will attempt to measure the reduction of welfare dependency and increased earnings attributable to the Job Training Partnership Act. Further efforts will be directed to continuation of the National Longitudinal surveys.

Social services research and development programs show a 37-percent decline in 1985, to $38 million. Nearly $15 million of this decrease represents a 71-percent reduction in funding for the Office of Human Development Services within HHS. The decrease from 1983 and 1984 levels reflects continued efforts to reduce Federal spending, particularly for programs which do not provide client services. The rehabilitation services and handicapped research program of the Department of Education is reduced by 17 percent to $32 million in 1985. Most 1984 R&D activities of the National Institute of Handicapped Research will be continued, although no new projects are anticipated.

R&D budget authority for this function as a share of total budget authority is estimated at 1 percent in 1985.

R&D budget authority for education, training, employment, and social services
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$189	$203	$190
Research and general education aids	124	132	139
Department of Education	70	72	72
National Institute of Education	37	32	37
Education for the handicapped: special purpose funds	14	20	16
Vocational and adult education	8	8	8
Chapter 1 evaluation and studies	1	1	2
Special institutions	4	3	5
Bilingual education	6	6	4
Fund for the improvement of postsecondary education	(a)	(a)	(a)
Higher education	1	2	-
Library research and demonstrations	(a)	(a)	-
Smithsonian Institution	54	60	66
Training and employment	4	7	7
Employment and Training Adm. (Labor)	4	7	7
Other labor services	4	4	6
Bureau of Labor Statistics (Labor)	1	1	1
Labor Management Services Adm. (Labor)	1	2	3
Employment Standards Adm. (Labor)	1	(a)	(a)
Departmental management	2	2	3
Social services	57	59	38
Human Development Services (HHS)	24	21	6
Administration for Children, Youth, and Families	5	2	1
Administration on Aging	1	1	(a)
Administration for Native Americans	1	1	1
Human resources research and demonstrations	18	17	4
Rehabilitation services and handicapped research (Educ.)	32	39	32

(a) Less than $500,000

ALL OTHER FUNCTIONS

The remaining five functions represent areas in which R&D activities play a relatively small role. The function tables are presented in descending order according to their 1985 R&D budget authority funding. Together the R&D budget authority for these five functions accounts for $234 million, which is a 2-percent decrease from the $239 million in 1984.

R&D budget authority funding for 1985 for these functions are highlighted below:

- Commerce and housing credit R&D funding decreased 3 percent, or $3 million, to $105 million, including a 4 percent, or $4 million, decrease in National Bureau of Standards (Commerce) R&D programs.
- Funding for community and regional development remained constant at $47 million.
- Funding for administration of justice remained unchanged at $47 million.
- Income security experienced an 11 percent, or $3 million, decrease to $25 million in 1985 R&D funding.
- All R&D activity within general government is conducted by the Internal Revenue Service (Treasury). In 1985 funding increased 18 percent, or $2 million, to $11 million.

For the individual functions the highest share of R&D programs within the budget authority totals is 2 percent for commerce and housing credit. For each of the other functions the individual R&D share is a fraction of 1 percent.

The share of R&D budget authority within the total budget authority for all of these functions together is slightly more than 1-tenth of 1 percent in 1985.

R&D budget authority for commerce and housing credit
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$107	$108	$105
Department of Commerce	107	108	105
National Bureau of Standards	94	95	91
Measurement research and standards	38	39	46
Engineering measurements and standards	20	20	18
Core measurement research for new technologies	12	12	12
Technical competence fund	7	7	8
Computer sciences and technology	9	9	5
Fire research	5	5	-
Central technical support	3	3	3
National Telecommunications and Information Administration	9	8	9
Bureau of the Census	4	4	4
General administration	1	1	1

R&D budget authority for community and regional development
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$44	$47	$47
Department of Housing and Urban Development	18	18	20
Housing markets	10	9	11
Housing programs	3	6	3
Local government management	2	(a)	(a)
Community and urban development	1	(a)	2
Safety and standards	1	1	2
Fair housing	(a)	(a)	1
Research support	2	2	2
Tennessee Valley Authority	21	24	27
Economic Development Administration (Commerce)	5	5	-

(a) Less than $500,000.

R&D budget authority for administration of justice
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$37	$47	$47
Federal Bureau of Investigation (Justice)	3	12	18
Office of Justice Assistance Research and Statistics (Justice)	22	23	17
Customs Service (Treasury)	3	3	2
Drug Enforcement Administration (Justice)	2	2	2
Federal Prison System (Justice)	5	6	5
General administration (Justice)	(a)	1	(a)
Immigration and Naturalization Service (Justice)	(a)	(a)	(a)
Office of Protection Research (Treasury)	(a)	(a)	1

(a) Less than $500,000

R&D budget authority for income security
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$32	$28	$25
Department of Health and Human Services	32	28	25
Social Security Administration	17	18	17
Departmental Management	15	10	9

R&D budget authority for general government
[Dollars in millions]

	1983 actual	1984 estimate	1985 estimate
Total	$6	$9	$11
Internal Revenue Service (Treasury)	6	9	11

BUDGET FUNCTION HISTORICAL TRENDS

NOTE: Data for earlier years are not available in as much detail as provided for the 1967-85 period.

Federal R&D obligations by selected budget function: fiscal years 1955-60
[Dollars in millions]

Function	1955	1956	1957	1958	1959	1960
Total	$2,533	$2,988	$3,932	$4,570	$6,694	$7,552
National defense	2,151	2,535	3,327	3,801	5,556	6,107
Health	67	83	140	177	233	305
All other functions	315	370	465	592	904	1,140

Federal R&D obligations by selected budget function: fiscal years 1961-66
[Dollars in millions]

Function	1961	1962	1963	1964	1965	1966
Total	$9,059	$10,290	$12,495	$14,225	$14,614	$15,320
National defense	7,005	7,238	7,764	7,829	7,342	7,536
Health	405	551	626	728	792	900
Space research and technology	777	1,413	2,812	4,241	4,887	4,976
Energy	373	448	515	571	585	575
General science	137	187	246	27[illegible]	304	377
Transportation	55	101	142	122	147	251
Natural resources and environment	73	108	120	134	159	189
Agriculture	125	136	146	165	195	201
All other functions	108	107	125	160	203	315

Federal R&D obligations by budget function: fiscal years 1967-76
(Dollars in millions)

Function	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Total	$16,529	$15,921	$15,641	$15,339	$15,543	$16,496	$16,800	$17,410	$19,039	$20,780
National defense	8,566	8,275	8,356	7,981	8,110	8,902	9,002	9,016	9,679	10,430
Health	915	1,021	1,088	1,084	1,288	1,547	1,585	2,069	2,170	2,351
Space research and technology	4,778	4,304	3,799	3,606	3,048	2,932	2,824	2,702	2,764	3,130
Energy	600	657	597	574	556	574	630	759	1,363	1,649
General science	409	437	433	452	513	625	658	749	813	858
Transportation	380	304	404	535	728	558	572	693	635	631
Natural resources and environment	320	331	323	340	416	479	554	516	624	683
Agriculture	218	217	221	238	259	294	308	313	342	383
International affairs	18	17	28	32	32	29	28	24	29	42
Veterans benefits and services	41	45	50	59	63	69	74	85	95	98
Education, training, employment, and social services	154	166	169	164	215	235	290	236	239	255
Commerce and housing credit	43	48	54	79	90	50	50	51	65	69
Community and regional development	37	34	32	47	65	66	78	82	93	109
Administration of justice	(a)	1	5	9	10	23	33	35	44	35
Income security	48	50	78	136	145	106	106	71	72	48
General government	3	5	5	6	7	8	7	9	12	12

a/ Less than $500,000.

Federal R&D funding by budget function: fiscal years 1977-85
(Dollars in millions)

Function	1977	1978	1979	1980	1981	1982	1983	1984 est.	1985 est.
Total	$23,450	$25,976	$28,208	$29,773	$33,735	$36,115	$38,768	$44,367	$52,660
National defense	11,864	12,899	13,791	14,946	18,413	22,070	24,936	29,275	36,975
Health	2,629	2,968	3,401	3,694	3,871	3,869	4,298	4,801	4,913
Space research and technology	2,832	2,939	3,136	2,738	3,111	2,584	2,134	2,286	2,683
Energy	3,462	3,134	3,461	3,603	3,501	3,012	2,578	2,565	2,422
General science	974	1,050	1,119	1,233	1,340	1,359	1,502	1,717	1,942
Transportation	708	768	798	888	870	791	876	1,091	1,148
Natural resources and environment	753	904	1,010	999	1,061	965	952	985	900
Agriculture	457	501	552	585	659	693	745	760	795
International affairs	66	57	117	127	160	165	177	225	264
Veterans benefits and services	107	111	123	126	143	139	167	220	195
Education, training, employment and social services	230	345	354	468	298	228	189	203	190
Commerce and housing credit	71	77	93	102	106	104	107	108	105
Community and regional development	101	92	127	119	104	63	44	47	47
Administration of justice	30	44	47	45	34	31	37	47	47
Income security	55	67	57	77	43	32	32	28	25
General government	13	20	23	22	22	10	9	9	11

Note: Data for 1977 are shown in obligations; data for 1978-85 are shown in budget authority. 1984 and 1985 are estimates as shown in the 1985 budget published in January 1984.