



GOVERNMENT COMPETITION WITH INDUSTRY

Trends in Intramural Activity

GOVERNMENT COMPETITION WITH INDUSTRY

Trends in Intramural Activity

A Publication of
AEROSPACE RESEARCH CENTER
Allen H. Skaggs, Director

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1725 DE SALES STREET, N.W., WASHINGTON, D.C. 20036

MARCH 1978



The mission of the Aerospace Research Center is to engage in research, analyses and advanced studies designed to bring perspective to the issues, problems and policies which affect the industry and, due to its broad involvement in our society, affect the nation itself. The objectives of the Center's studies are to improve understanding of complex subject matter, to contribute to the search for more effective government-industry relationships and to expand knowledge of aerospace capabilities that contribute to the social, technological and economic well being of the nation.

CONTENTS

EXECUTIVE DIGEST	4
Background and Study Objectives	4
Major Findings	4
Conclusion	5
POLICY AND IMPLEMENTATION	6
History of Government Policy	6
Circular A-76 Exceptions	7
Assessment of Implementation	7
THE CASE FOR STRONGER POLICY & IMPLEMENTATION	10
Combat Inflation	10
Strengthen Free Enterprise & Tax Base	11
Sustain a Viable Defense Industry	11
TIME FOR CHANGE	11
The Key Issues	12
Recommendations	12
APPENDIX	14

EXECUTIVE DIGEST

BACKGROUND AND STUDY OBJECTIVES

During the past several years the Aerospace Industries Association (AIA) has studied many aspects of the government-industry relationship including procurement problems, research and development, and the general economic behavior of the industry. As a result of these investigations, AIA firmly believes that the economic strength of the United States as well as its dominant position in world markets has to a large extent been due to a national commitment to support the concept of free enterprise.

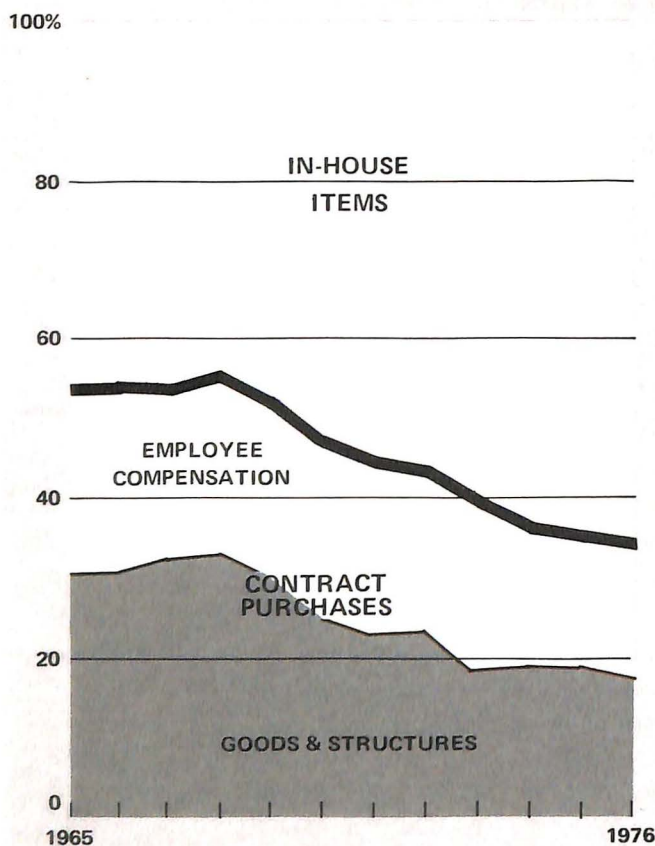
The capability of the private sector to support government requirements depends in large part on the continued support from the government for research and development (R&D), and the procurement and operations and maintenance (O&M) of its programs and systems. AIA

contends that a decline in the contract share in any of these areas could erode the economic and political position of the U.S. in the world community. In addition, a shift towards a higher proportion of federal in-house R&D and O&M could result in a decline in industrial capability and/or interest to support high priority national interest programs.

If the trend develops toward more federal in-house R&D and a concomitant decline is realized in the private sector's financial ability to support independent R&D, the result would be a weakening of the high technological position of the U.S. in the international scientific community. Such a decline in industrial capability would also result in a decrease in industrial technical expertise available to the nation. Moreover, a similar trend appears to have developed for industrial contracting by at least the Department of Defense for O&M.

The objective of this study is to analyze the trends in federal R&D support and O&M contracting in support of federal programs. Specifically, federal R&D funding is analyzed to determine if there is any long-term trend towards a growth of in-house R&D. Industrial contracting for O&M is examined to determine the degree of deviation from the long-term trend for contracting with private industry. The supporting data of this analysis is presented in the tables of the Appendix.

FEDERAL PURCHASES OF GOODS AND SERVICES As a Percent of Total Federal Budget



Purchases of goods and services by the federal government fell from over half of the budget to about one-third between 1965 and 1976. (Reference Table 3)

MAJOR FINDINGS

Purchase of Goods and Services

For many years the federal government's policy has held that it was in the national interest to rely to the greatest extent possible upon private industry for goods and services. Recently, while policy dictates that the government—with few exceptions—not compete with private enterprise, a practice has evolved whereby the share of total budget outlays available to industry has been reduced, thus diverting an ever-increasing percent of the budget to government in-house programs and operation.

An analysis of federal purchases of goods and services reveals that the government's role as a consumer of goods and services is growing. However, its impact on the private sector through its role as an employer and a contractor to private industry may be even more profound:

- Federal purchases of goods and services as a percent of the total federal budget dropped from 53 percent in 1965 to 34 percent in 1976.
- Federal purchases of goods and services *less compensation* dropped from 30 percent of the total federal budget in 1965 to only 18 percent in 1976. (Reference Table 3; see Appendix)
- Federal purchases of goods and services *less compensation* declined from nearly 58 percent of total goods and services purchased in 1965 to about 52 percent in 1976.

Research and Development

Historically the U.S. government has had a strong commitment to technological progress, which in turn has been highly responsible in the long-run for the strength of the

nation's economy and its position in the international community. In large measure, much of the growth of this nation's superior quality of life and its Gross National Product (GNP) is attributable to scientific and technological excellence. Constant increases in the quality as well as the mix and quantity of goods and services available to consumers worldwide is dependent upon sustained national commitments to R&D.

The tables in the Appendix bear ample evidence of the federal government's waning concern and acceptance of its commitment to support R&D in the private sector. Unfortunately, recent trends show a decline in R&D as a percent of the federal budget from 12.3 to 5.7 percent between 1965 and 1978; industry's performance of federal R&D outlays stands at 49.1 percent, 10 percent lower than 1965 and less than half of the total.

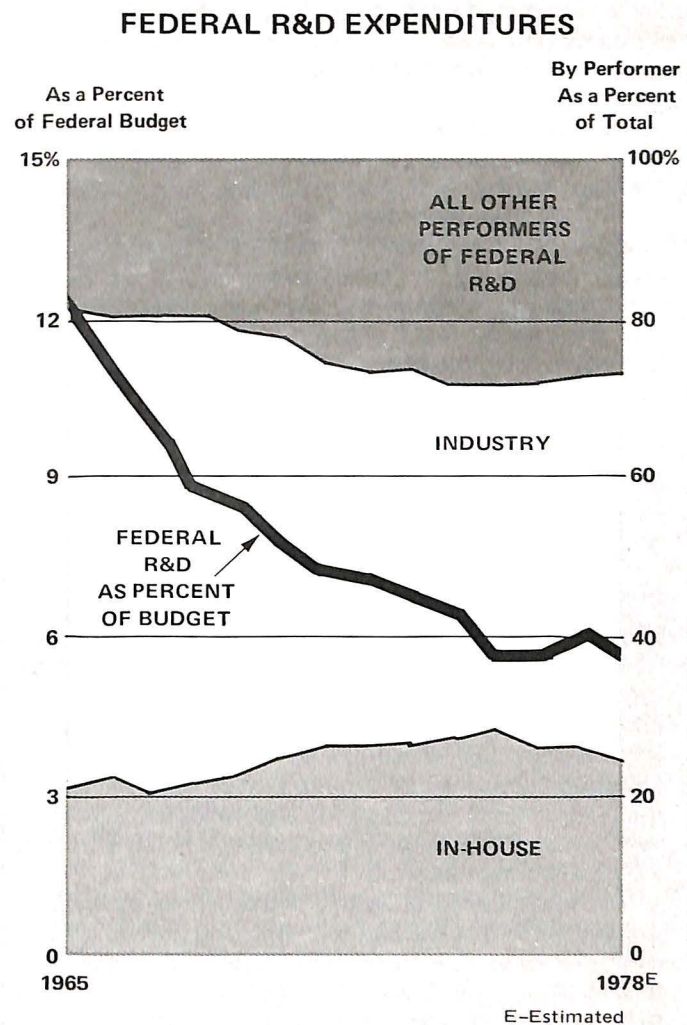
In the past decade national priorities have shifted from defense and space to social and economic concerns. Industrial teams of high-technology capability were dissipated; this afforded the government an opportunity to support increasingly more in-house R&D. During recent years of heightened technological demand to meet energy and environment pressures, this pattern has not been altered.

While the federal government continues to support active R&D programs not only within the government but also among various sectors of the private economy, the data reveals major changes in areas of effort. Specifically, shifting budget priorities and the changing nature of R&D support lead to the following conclusions:

- Changes in national priorities have resulted in a principal shift away from national defense and space research and technology support towards health and income security components of the budget. In 1965 defense and space claimed over 46 percent of total federal budget outlays; today they account for under 27 percent.
- Overall government support of R&D has declined significantly in recent years, dropping from 12.3 percent of total federal budget outlays in 1965 to 5.7 percent in 1976.
- The federal government's R&D funding emphasis is focused on more intramural (in-house) programs while reducing the share allocated to the private sector. In 1965, the government reserved 21 percent of its total R&D funds for intramural support; in 1976 the share had jumped to 28 percent. Concurrently, industrial R&D support dropped from 59 percent to 45 percent.

Operation and Maintenance

In addition to the trend toward increased support for intramural R&D programs there is a parallel effort on the part of the government to perform more of its support services in-house. While the ratio of contract to in-house depot level maintenance has moved erratically in recent years, it is clear that the Army and Air Force are moving away from their historical dependence on the private sector. The Navy, on the other hand, has been increasing its contracts to industry but even so this ratio is still below



R&D emphasis in the federal budget has fallen to less than one-half of the 1965 intensity even though dollars have nearly doubled. Industry performance of federal R&D has diminished while in-house and other programs have grown. (Reference Tables 7 & 8)

the other services. Depot level maintenance for aerospace work within the three military services shows a definite trend toward greater reliance on government in-house activities for goods and services that could have been obtained from the private sector.

Without question, the government's stated policy of "relying on the private enterprise system to supply its needs" is not practiced by contract officers responsible for implementing that policy.

CONCLUSION

In the last decade there has been a distinct shift on the part of the government away from the traditional reliance

on the private sector for needed goods and services. Employee compensation has reached nearly half of the total federal dollars used to support such needs, and furthermore, reliance on the private sector has diminished significantly.

Growth in federal in-house performance of R&D and O&M has unfortunate consequences for the nation. This trend is:

- contrary to government policy,
- anti-competitive, failing to support free enterprise,
- inflationary,
- quickening capital base erosion, impeding expansion and employment,
- eroding technological capability of the private sector, and
- threatening U.S. ability to compete in world markets.

The need for organic capability within the various federal agencies is recognized; however, national policy of reliance on the private sector for needed goods and services must be reconfirmed.

POLICY AND IMPLEMENTATION

The value of a competitive private enterprise economy has long been recognized by the government. Accordingly, congressional studies and commission reports over the past 46 years have established and supported the policy that the government shall rely primarily on the private sector for its goods and services. Successive executive actions have enunciated that policy and called for its implementation.

It is essential to a clear understanding of industry's concern with this subject that the long standing nature of this fundamental national policy be set forth. The fact that this policy—and the national interest—are not being adequately supported is the more remarkable in view of the extent to which the subject has been examined and the policy reaffirmed over a period of over four decades.

Competition with the private sector by government agencies has been a cause for grave concern for many years. During the past half century—encompassing World War II, the Korean conflict, and the Vietnam action—the exigencies of the times have led to expansion of government in-house activities as well as mobilization of industrial capability. Often these government activities were not cut back after the original need passed and most industry facilities returned to civilian requirements. Commercial organizations not only are competing more fiercely with each other for the current lower level of government requirements, but also find themselves competing with extensive federal in-house activities as well.

HISTORY OF GOVERNMENT POLICY

The first detailed inquiry into this matter was made in 1932 by a special committee of the House of Representatives. Later studies of various aspects were made by the Senate and House Appropriations Com-

mittees, the House Armed Services Committee, the Senate and House Committees on Government Operations, and the Senate Select Committee on Small Business. Further studies were made by the House and Senate Committees on Government Operations, and by both the First and Second Hoover Commissions.

The Second Hoover Commission in 1955 presented 22 recommendations aimed at eliminating or lessening government activities in competition with the private sector. In that same year, the Senate Committee on Government Operations introduced a bill to write those recommendations into law. Action was postponed, however, upon testimony from the Bureau of the Budget director that the executive branch had a program under way to implement the policy administratively. On January 15, 1955, the Bureau of the Budget had issued Bulletin 55-4, announcing to heads of executive departments and agencies that:

"It is the general policy of the Administration that the Federal Government will not start or carry on any commercial activity to provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary channels Exceptions to this policy shall be made by the head of any agency only where it is clearly demonstrated in each case that it is not in the public interest to procure such product or service from private enterprise."

This directive required agencies to review their in-house commercial and industrial activities to determine which should be continued and which terminated in keeping with the general policy. It required regular reports giving status and remedial action.

Bulletin 55-4 was superseded in February 1957 by 57-7 which set up a procedure for terminating government commercial activities and a means of controlling new ones. It was superseded in September 1959 by Bulletin 60-2, the stated purpose of which was to clarify its predecessors and to provide for evaluation of all government commercial and industrial activities not previously reviewed. It also specified the factors that might justify an agency in producing goods or services for its own use: (1) national security, (2) disproportionately high costs from industry, or (3) clear unfeasibility.

On March 3, 1966, the 1959 directive was canceled and replaced by Bureau of the Budget Circular A-76, which is currently in effect under OMB administration. Circular A-76 established new criteria for continuing or terminating in-house activity. It states:

"2. Policy—the guidelines in this circular are the furtherance of the government's general policy of relying on the private enterprise system to supply its needs

"In some instances, however, it is in the national interest for the Government to provide directly the products and services it uses."

Circular A-76 further provides that a government commercial or industrial activity may be authorized to provide goods or services only under one or more of the following conditions:

- "a. Procurement of a product or service from a commercial source would disrupt or materially delay an agency's program.
- b. It is necessary for the government to conduct a commercial or industrial activity for purposes of combat support or for individual and unit retaining of military personnel or to maintain or strengthen mobilization readiness.
- c. A satisfactory commercial source is not available and cannot be developed in time to provide a product or service when it is needed.
- d. The product or service is available from another federal agency.
- e. Procurement of the product or service from a commercial source will result in higher cost to the government."

The intent of this A-76 policy statement seems clear—that the *rule* is to acquire goods and services from the private sector, and the *exception* is to provide them in-house. Though this may be the policy, it is not practiced as widely as A-76 demands. President Carter has presented the position of his administration clearly: "When there's a choice to be made between the private sector and the government sector, my option would be for the private sector to assume the responsibility."

CIRCULAR A-76 EXCEPTIONS

Disregard of the general policy is made possible by exceptions taken under loose interpretations of Circular A-76 that allow a government agency to justify nearly any course of action it may choose. Agency directives and implementing instructions interpret and elaborate Circular A-76 in such a way as to reverse its intent in some cases—often causing bias not for, but rather against, reliance on the private sector.

A frequently used justification is the statement that procurement from a commercial source would "disrupt or materially delay an agency's program," but this statement is rarely supported by any evidence that such disruption is likely to result. "Mobilization readiness" is also used widely in DOD, but again without any supporting documentation.

Industry concern over inequitable cost comparisons is based more on anticipation of their effect if the other loopholes are tightened than on actual use to date. As long as continuation of current government commercial and industrial activities can be justified by citing one of the first three exceptions, that is the easiest course and the one that will be followed. If more compelling arguments are required to support these exceptions, relative cost will be used more extensively. Cost comparisons are time-consuming, but generally support the in-house alternative because government costs are computed on the basis of

incrementally added costs of labor and material. Although directly contrary to policy intent, these cost guidelines are specified in Circular A-76. Allocation for many normal overhead items, such as full cost of Civil Service retirement benefits, general and administrative expenses, and facilities amortization, are not made. These very real costs to the government and the taxpayer go ignored, as does the loss of state and local taxes that would be paid by private industry.

The resulting decisions for in-house performance of commercial and industrial functions denies the government the benefits of the competitive private marketplace and increases the real costs to the taxpayers, while reducing the industrial tax base.

An agency of the executive branch noted this policy discrepancy. The Department of Commerce published a study of Circular A-76 implementation on January 4, 1972. A portion of the study report:

"A-76 requires government cost comparisons. This requirement is either ignored or abused in some departments primarily due to the expense of compiling such data. These factors raise two issues with regard to cost comparisons: (1) What costs should be included in any government agency costing evaluation, and (2) should a government agency be a bidding participant when adequate competition exists in the private sector [?]

"When cost comparisons are made, however, the guidelines pursuant to OMB Circular A-76 dictate that the government should only account for its own out-of-pocket or incremental costs. Private industry, in contrast, is required to fully allocate all direct and indirect costs."

ASSESSMENT OF IMPLEMENTATION

Many government agencies are in effect ignoring the government's long standing policy of reliance on the private sector for necessary goods and services. They conduct many in-house activities that compete with private industry—particularly in defense and aerospace industries. Continuation of these activities is rationalized in many ways, including use of a dual standard in cost comparisons that fails to account for all immediate and long-term costs and other disadvantages inherent in direct government provision of goods and services.

The result of this practice has been a growth of federal employment that inflates the national budget. This unnecessary expansion of government activities undercuts the basic role and function of private business in the U.S. and erodes one of our most valuable assets: the nation's private technological capability.

Areas in which government competition are most widespread include the service and support industries, particularly in the maintenance of facilities and equipment. In addition, certain government agencies, having acquired facilities and manpower beyond their needs, are now in effect "selling" to other agencies such services as R&D,

computer services, programming, printing, and transportation, in order to keep themselves in "business".

In a special report to OMB in 1971, requested by the Commission on Government Procurement, executive branch agencies reported 18,618 activities providing a product or service available from private industry, with a total capital investment of \$10 billion and annual operating cost of \$7 billion. The significance of these figures is increased by considering the areas that are not included—all activities providing a product or service to the general public, those excluded by agency regulations (e.g., all overseas activities, DOD laboratories, schools, health services, warehousing, etc.) and those omitted by local interpretation. The activities which were inventoried and reported to OMB include a wide variety of products and services; among them: aircraft and automotive repair, road construction and maintenance, photographic services, printing and reproduction, bus service, communications, clothing manufacture, export packing, laboratory testing, translation services, instrumentation fabrication, ADP and key punch services, laundry and dry cleaning, and architectural and engineering services.

Moreover, there is now a distinctly defined trend of government expansion into such significant areas of private sector competence as the engineering design and development of new products and systems, prototype fabrication and production, and the overhaul and repair of hardware produced by industry. This trend continues even as a number of government facilities are being closed.

Federal Employees

Union Pressures

Proper regard for the general policy by agencies is often made difficult by federal employee union pressures. These unions naturally want to protect jobs of members and they exert intensive continuous efforts to do just that—often at the expense of private sector unions. The U.S. Civil Service Commission, in its advisory and regulatory capacity, has been generally sympathetic to the federal employee unions.

Federal unions have taken a broad stand opposing service contracts and contracts for any work that can be performed by government employees. While they present their argument on the basis that federal employees can do a better job and at less cost than workers in private industry, their real interest is the preservation and expansion of membership. They have challenged the legality of service contracts in legal actions that are now pending before the courts. The unions have supported costing procedures that serve to make private contractor costs appear non-competitive with government costs, and have sponsored efforts that would give unions a bargaining right over decisions to contract with private industry.

The cumulative effect of these pressures—the numerous protests, lawsuits and "lobbying"—makes an agency apprehensive about obtaining services from private industry even when the agency may believe such action is warranted under established policy. The motivation of the government employee unions, while understandable, is

obviously the perpetuation and expansion of the federal payroll without regard to national policy or true efficiency in government operations. The unions in the private sector have not exerted comparable counterpressures and, in consequence, an imbalance of influences currently exists.

Civil Service Commission Position

In 1964 and 1967 the General Counsel of the U.S. Civil Service Commission issued opinions in which certain support contracts and "all others like them" were termed illegal on the basis that an employer-employee relationship existed between the government and contractor personnel. As a result, service contracts were re-structured to ensure that personnel would be supervised only by company officials and a proper contractual relationship maintained with the government.

In 1974 the General Counsel of the U.S. Civil Service Commission stated that the primary mission of his office was to serve as guardian of U.S.C. 2105(a), the statute which defines federal employees, and to ensure that contractor personnel are not handled in a manner which would make them federal employees *de jure* in regard to the benefits and privileges which accrue to a Civil Service employee.

Department/Agency Practices

New Trend Developing

Federal purchases of goods and services have been declining steadily as a percent of the total federal budget since 1968; in 1976 those purchases were 20 percent lower although their dollar value had more than doubled. Much of the inflated value is due to the rising cost of employee compensation which rose during that period from roughly 40 to 48 percent of the purchase cost of goods and services contracted by the federal government.

An overview of federal obligations for R&D shows 7 percent growth in intramural performance over the 1965–1975 decade; however, estimates for 1978 indicate that in-house performance will have declined by 3.4 percent since 1975—with other sectors realizing half of the previous gain in three years. In 1965 industry R&D performance under federal obligation stood at almost 60 percent of the total. It had slumped by about 15 percent by 1975 but has gained more than 5 percent since then.

DOD development obligations contracted to industry dropped by 7.4 percent during the 1965–1975 decade but have gained over 5 percent in the last three years. This trend offsets the previous increase in intramural performance of development by DOD which has shown a drop from 30.5 percent in 1975 to 25.4 percent for 1978.

Industry's share of NASA obligations for R&D have not risen as sharply from the 1975 low point of 58.4 percent as the federal R&D total increase; however, there has been a slight decrease in the intramural share of NASA R&D performance to 32.7 percent. Nevertheless, as these proportions are compared with 1965 performance of R&D for NASA, industry is performing more than 15 percent less of the total work today—certainly not 78 percent—just 61.5 percent.

The performance of R&D for the Department of Health, Education and Welfare illustrates a different trend. Between 1965 and 1975, intramural and industrial performance both increased as a percent of total HEW R&D obligations; however, industry's share increased from 3.5 to 5.5 percent while intramural performance advanced only from 17.9 to 19 percent. By far the largest performers of R&D for HEW are university laboratories but the industry sector is gaining on federal intramural activity.

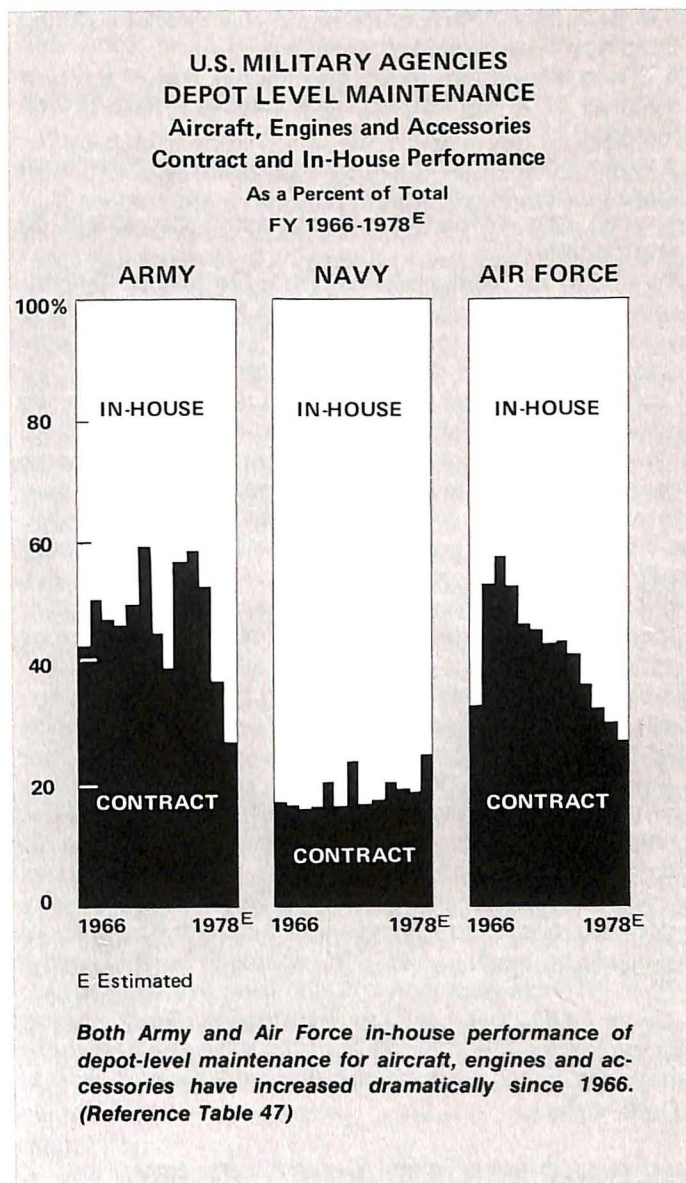
DOT obligations for R&D are still falling for industry performers and have declined by almost 20 percent since 1965. At the same time, intramural performance has also declined, but not as sharply; universities and other performers now account for more of DOT's R&D than the intramural laboratories.

DOD Interpretation

Review procedures outlined in DOD Directive 4100.33, "Commercial or Industrial Activities—Operation of," July 16, 1971, recognize that "(s)ignificant savings can be achieved by a systematic cost effectiveness review of these services to determine whether their best and most economical method of performance is by contract or by Government employees." It specifies that "In making this determination, strict limitations are imposed on the type and scope of in-house services that may be performed, and specific guidelines for cost comparisons are provided. *Contract is the preferred method of performance*, unless excess cost from commercial sources or other circumstances . . . necessitate in-house performance."

DOD interpretation of Circular A-76 in Directive 4100.33 criteria varies somewhat because of the character of the agency and its commitment to maintain mobilization readiness. As stated secondarily, "This criteria includes the need for troop units to conduct training and retraining in order to achieve and maintain self-sufficient military capability for the operation and direct maintenance support of their mission-essential equipment, and the requirement for DOD Components to retain an in-being depot level maintenance capability, . . . and an installation level capability to operate and maintain and accomplish *emergency repair of combat-essential facilities and utilities*."

In DOD Directive 4151.1, "Use of Contractor and Government Resources for Maintenance of Materiel," incorporating amendments through June 16, 1975, the stated purpose is to update policies and criteria in consonance with directives issued subsequent to June 20, 1971, and to further delineate military responsibilities for assuring materiel maintenance by either contracting or inter-servicing arrangements. Policy guidelines include the requirement that capability and capacity for depot support of mission-essential equipment will be kept to the minimum required to insure a ready and controlled source of technical competence and resources necessary to meet military contingencies. Further, this policy guideline states that: "Generally, organic depot maintenance capacity will be planned to accomplish no more than 70% of the gross mission-essential depot maintenance workload requirements. . . ." and that "The Services will attempt in the implementation of this Directive to utilize the DOD-wide



industrial organization. . . ." This latter provision contradicts the 70 percent indicator but upholds the intent of A-76—and the contention rests upon which is emphasized in implementation. Those criteria provide for maintenance of mission-essential military materiel with DOD organic resources when required under emergency or war conditions and when essential to (1) retain or upgrade technical ability, (2) provide experience and information for evaluation of performance or cost, and (3) develop competency to conduct evaluations.

In contrast to the limitations of emergency, war, or evaluation readiness, criteria for contract maintenance are principally applicable:

- to accomplish indirect maintenance in excess of military capacity,
- to accomplish direct and indirect maintenance when military control and performance is not required,

- to accomplish temporary direct maintenance during transitory peak workload periods,
- during interim to attain operational status for new materiel or to accomplish analytical overhaul of that materiel,
- when inherent technical ability of manufacturer is required, and
- when cost of contracting for small lots would be appropriate.

Inasmuch as policy requires, "that the Military Departments provide an adequate program for maintenance of assigned equipment to effectively and efficiently meet sustained readiness in accordance with responsibility for military missions," the salient point in reviewing these two groups of implementation criteria for in-house and contract performance of depot-level maintenance is that organic resources are to be utilized under emergency or war conditions and for up to 70 percent of mission-essential work. Exceptions include organic performance to gain experience, information or capability to evaluate performance and cost-effectiveness. Furthermore, depot-level maintenance performed in-house by all three military services is estimated at above 70 percent in 1978 for aircraft, engines and accessories. The Navy's in-house performance has fluctuated between 75 and 83.9 percent of all depot-level maintenance throughout the time frame examined in this study, since 1966. Air Force performance of this activity has grown steadily since 1968; Army in-house maintenance had fluctuated between about 40 and 50 percent until a sharp rise last year to 62 percent and an estimated 72.6 percent in 1978. With all three services performing more than 70 percent of their depot-level maintenance in-house this year, DOD seems to be challenging A-76 in its implementation of DOD Directive 4151.1.

These DOD directives and instructions clearly conflict with the policy and intent of Circular A-76 and show why it has not been more effectively implemented in that department.

THE CASE FOR STRONGER POLICY & IMPLEMENTATION

In the dialogue and debate on this subject during the past decade, proponents of direct government performance have placed their own interpretation on policy instructions. They have ignored the policy that the government should utilize industry unless there is strong overriding reason to perform the work in-house. They have ignored the principle that the role of the government is to "govern" and that any function which it performs that is not essential to its governing role serves to encumber that role. The *rule* should be to rely on industry—the *exception* to perform work in-house.

Industry has repeatedly demonstrated its capability to satisfactorily perform work that is also done by the government. Industry has further demonstrated an ability to be cost competitive with government activities, and has shown a wide range of skills and a capacity for flexibility that government cannot match. Decisions to create or

maintain a government capability to provide products or services that are available from the private sector should be limited to only the most compelling circumstances.

COMBAT INFLATION

The Commission on Government Procurement studied the subject of government competition with private industry for almost a year, performing extensive research and soliciting inputs from government, industry and the academic world. The study concluded that there is a substantial potential benefit to the nation through greater reliance on industry in providing the government's needs for services and supplies. It found that optimum economy and efficiency can be achieved if the government relies on competitive procurement for its supplies and services. A major recommendation of the study was that government agencies should rely on the private sector for any product or service that is available in a competitive market without making a cost comparison with in-house performance. This recommendation was based on the conclusion that competitive forces would assure reasonable prices and avoid the necessity of time consuming, expensive, and controversial cost studies.

One well-documented example is the operation of Vance AFB, Oklahoma, where base support, maintenance of aircraft and other equipment, and logistics are handled by a private firm under contract. A comparison of Vance with seven other USAF bases of a similar size and the same mission shows cost at Vance to be approximately 20 percent less than the average of the bases run by military and civilian government personnel.

Industry operates in a competitive environment with many capable companies seeking the same business. Prices are naturally driven down by competitive pressures which necessitate economy and efficiency, the key to profit and survival. Properly structured and administered contracts can ensure satisfactory performance at a reasonable cost. Procurement experts estimate that competitive procurement reduces costs by between 25 and 50 percent over sole-source acquisition, from either government or commercial sources.

Government facilities, by contrast, are not required to engage in price competition. They operate with a cost accounting system which reflects neither total costs of doing business nor the total costs of doing any specific task. Although operating budgets limit total funding and require some ingenuity in getting the work done, the profit incentive for cost reduction and greater efficiency does not exist. Operating under an established budget in a non-competitive environment produces limited motivation for effective cost management.

Reliance on the private sector also affords a greater degree of flexibility. As government priorities and programs change, contracts can be and are terminated or modified accordingly. If, however, the affected work is being done in-house, government management and personnel practices—unconstrained by the need to make a profit—make timely adjustments very difficult.

A major factor in economy and efficiency is productivity,

and data available to the Procurement Commission reflected greater increases in productivity in the private sector than in government operations. Even in the services field, private sector statistics showed steady gains while government operations showed no change or negative trends. The private sector continuously demonstrates its ability to accommodate such changes with minimum disruption. Government organization and regulations do not lend themselves to the decisions which must be made to implement new technology, restructure organizations, and change personnel in order to maximize productivity.

The main attraction to contracting with private industry, however, is that such purchasing arrangements provide the best hedge to the inflationary spiral. The combination of greater productivity, flexibility in dealing with the changing demands of the marketplace, and the inexorable downward price movement which results from free competition cannot be duplicated by an intramural approach to meeting the needs of the federal government.

To argue that it is necessary to attain an organic capability within the federal government regardless of its impact on the private sector is short sighted. It ignores the adverse effect such intramural activity has on federal purchasing power. Further, it insinuates that the unfettered growth of in-house capability has little or no effect on the government's effort to stem the tide of rampant inflation. Nothing could be further from the truth.

In short, the facts show that the private sector is better able to cope with the demands made by the inflationary spiral and to adjust accordingly—than is the government.

STRENGTHEN FREE ENTERPRISE & TAX BASE

The U.S. has always been dedicated to the economic principle of free enterprise, which has maintained a strong domestic economy and led to the highest standard of living in the world. Inherent in this philosophy is the principle that the government should not compete with the private economy, but should support it as a customer. In addition to the benefit of obtaining products and services at reasonable cost from a healthy and competitive economy, the government is also able to levy taxes on the income, real estate, and other property owned by business. The stronger the private economy, the greater the revenue to the government and the less tax burden that must be placed directly on the citizens.

To the extent that the federal government provides goods and services that could be furnished by the private sector, the domestic economy is weakened. Sales and profits are decreased, real estate and property are held in the public sector and not subject to taxation. The tax burden on the individual, at the federal, state and local level, is increased.

A significant effect of government reliance on the private sector is more rapid transfer of technology to commercial applications which benefit the entire nation. Government sponsored R&D, when performed by private firms with related commercial products, can be much more rapidly applied to the civilian market than if performed in government facilities. This has been clearly demonstrated in our

space program due to NASA's extensive reliance on private firms for its R&D effort.

SUSTAIN A VIABLE DEFENSE INDUSTRY

The defense and aerospace industries are now faced with declining emphasis on total national defense and space which have dropped from 46 percent of the federal budget in 1965 to 27 percent in 1978. Furthermore, federal R&D has fallen to 5.7 percent of the federal budget from 12.3 percent in 1965. These industries strongly endorse and support the established national policy of reliance on the private sector to supply the weapons and equipment needed by the armed forces to carry out our international obligations and to protect our national interest. The pluralistic approach to advancing technology, and to applying technology to weapons systems, has served this country well. Highly competitive private industry, rather than a centralized system of arsenals is the hallmark of U.S. preeminence in military weapons and equipment.

In these days of proportionately declining R&D and procurement budgets, it is even more vital than before that the government goods and services which can be procured from the private sector be obtained from that source. Additional revenues arising from transfer of R&D work from government laboratories to industry will help to keep industry's R&D teams viable. A reversal of the declining trend of industry as a performer of federal R&D must gain greater momentum to improve this situation.

Industry must maintain and support its teams of scientists and engineers, even in time of peace, if this country's defense capability is to remain competitive. If industry is to produce the weapons needed, it is vital that industry advance the state of the art and then transfer it to production.

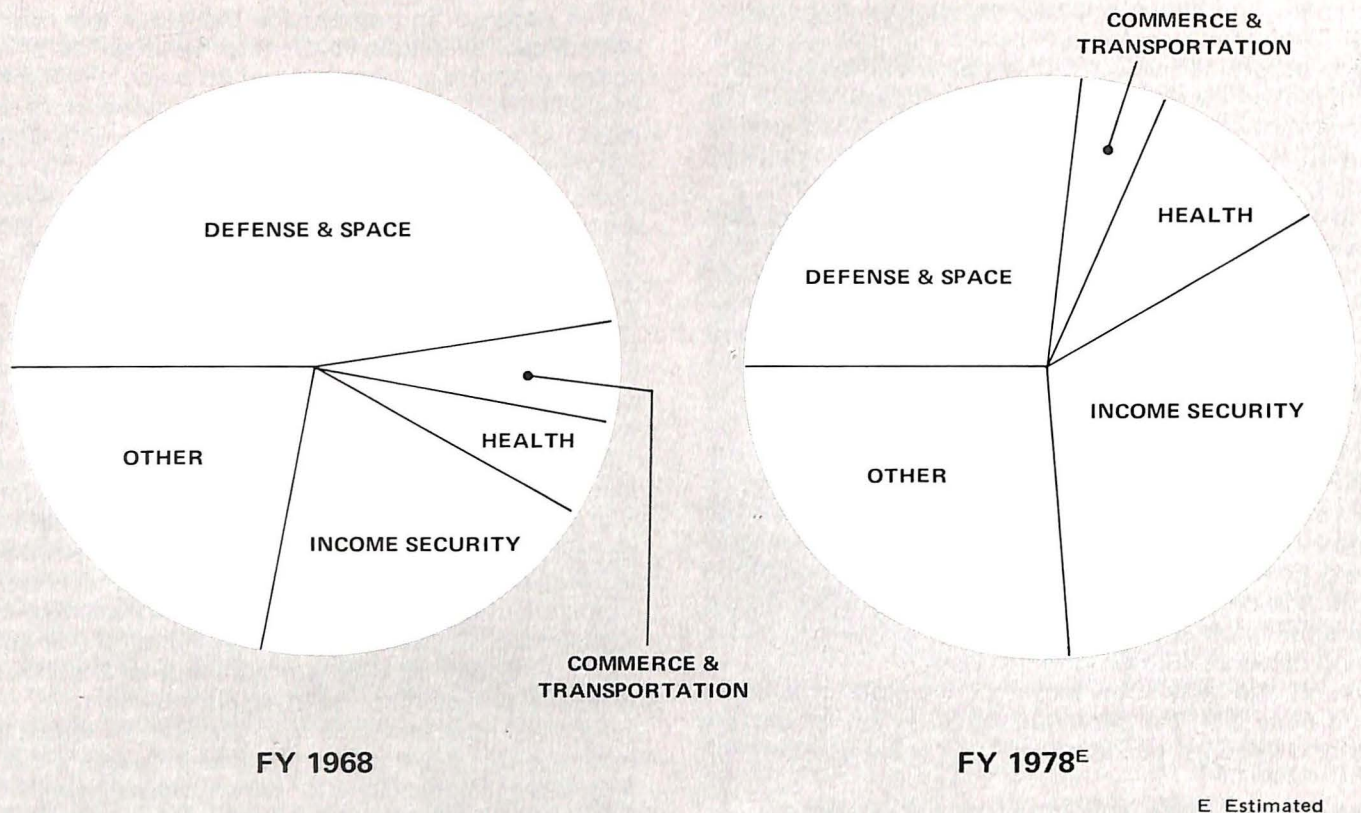
Potential revenues to industry arising from transfer of logistics work from government facilities are considerably higher than in the R&D area. This income would help significantly in maintaining a healthy defense industry capability.

The declining defense market, combined with the expansion capability needed for national emergencies, creates a condition wherein any revenue which helps retain private contractor capabilities is important to the future security of the nation. A vital part of this picture is the viability of small business which makes up a substantial part of the defense industry's subcontractors. Small business also serves the government in prime contracting for a significant amount of R&D, logistics and production work.

TIME FOR CHANGE

President Carter, in his fireside chat broadcast on February 2, 1977, stated, "When the government must perform a function, it should do it efficiently. Whenever free competition would do a better job of serving the public, the government should stay out." More recently, in his State of the Union address of January 19, 1978, the President reiterated this policy, "Private business and not the government must lead the expansion in the future."

FEDERAL BUDGET OUTLAYS By Selected Sectors



Federal emphasis has shifted radically from defense, space, science and technology in just one decade to compensate for rapid expansion of income security and public health programs. (Reference Table 2)

Although there has been an overall increase in the contracting of government goods and services to private industry during the last three years, this trend must gain momentum and continue over several years in order to reflect the intent of national policy as expressed in Circular A-76. That policy is not clearly stated or effectively implemented. As long as the policy, while acknowledged, is given faulty interpretations and not enforced, divergent interests will continue in a destructive contest.

THE KEY ISSUES

- Based on experience with existing guidance, the policy is not clearly stated.
 Exceptions allow justification of nearly any course of government action.
 Cost comparisons appear to take precedence over the principle of preference for the private sector.
 Cost comparisons are made under a dual standard that favors in-house work.

- The policy lacks an enforcement mechanism.
- The self interest of civilian federal employees conflicts with policy, and policy frequently loses.

RECOMMENDATIONS

One of the specific recommendations of the Commission on Government Procurement is that the U.S. Congress provide statutory expression of the national policy of reliance on private enterprise for needed goods and services. This point is clearly supported in studies conducted by the Department of Commerce and the General Accounting Office. Each of these studies concludes that there has been a lack of effective implementation of the policy throughout the executive branch. It is clearly shown that optimum economy and efficiency can be achieved through competitive procurement of needed goods and services.

AIA endorses the reports issued by the Commission and Commerce, as well as previous reports by industry

groups, all of which recommended essentially the same actions, namely:

- The executive branch should provide enforcement measures for the principles set forth in OMB Circular A-76.
- The executive branch should strengthen the current policy statement, returning its parameter to the intent expressed in the earlier Bulletin 55-4 and requiring federal agencies to rely on the private sector except for those cases wherein:

Such reliance would demonstrably disrupt or sig-

nificantly delay an urgent agency program.

In-house performance is mandatory for the national security.

The product or service is not and cannot be made available in the private sector and is available from a federal source.

- The Congress should establish through legislation that it is national policy to rely on the private sector for needed goods and services to the maximum extent feasible, and to strengthen the authority of federal agencies to contract for its goods and services.

APPENDIX

TABLE 1
THE RELATION OF FEDERAL BUDGET OUTLAYS TO
THE GROSS NATIONAL PRODUCT
FY 1960-1978
(Billions of Dollars)

FISCAL YEAR	FEDERAL BUDGET OUTLAYS	GROSS NATIONAL PRODUCT ^a	OUTLAYS AS PERCENT OF GNP
1960	\$ 92.2	\$ 496.3	18.6%
1961	97.8	514.7	19.0
1962	106.8	543.6	19.6
1963	111.3	579.3	19.2
1964	118.6	615.2	19.3
1965	118.4	661.9	17.9
1966	134.7	720.6	18.7
1967	158.3	774.7	20.4
1968	178.8	832.4	21.5
1969	184.5	902.0	20.5
1970	196.6	959.0	20.5
1971	211.4	1,022.9	20.7
1972	232.0 ^r	1,117.3	20.8
1973	247.1 ^r	1,238.9	19.9
1974	269.6 ^r	1,359.8	19.8
1975	326.1	1,470.9	22.2
1976	366.5	1,617.7	22.7
Tr. Qtr.	94.7	431.8	21.9
1977 ^E	411.2	1,811.7	22.7
1978 ^E	440.0	2,092.0 ^b	21.0
1980 ^T	533.0	2,579.0 ^b	20.7

Source: Economic Report of the President, January 1977.
Survey of Current Business, U.S. Department of Commerce, July 1977.

a Adjusted to a fiscal year base.

b The Budget of the U. S. Government.

E Estimate

T Trend

r Revised

Tr Qtr. Transition Quarter

TABLE 2
PERCENTAGE DISTRIBUTION OF THE FEDERAL BUDGET OUTLAYS
BY SELECTED SECTORS
FY 1965-1978

FISCAL YEAR	TOTAL	NATIONAL DEFENSE	GENERAL SCIENCE, SPACE & TECHNOLOGY	COMMERCE & TRANSPORTATION	HEALTH	INCOME SECURITY	OTHER
1965	100.0%	41.0%	5.0%	5.8%	1.5%	21.7%	25.0%
1966	100.0	41.5	5.0	6.7	1.9	21.5	23.4
1967	100.0	43.7	4.0	5.8	4.3	19.5	22.7
1968	100.0	44.4	3.1	5.9	5.4	18.8	22.4
1969	100.0	43.5	2.7	3.8	6.4	20.2	23.4
1970	100.0	40.3	2.3	4.6	6.7	21.9	24.2
1971	100.0	36.3	2.0	4.9	7.0	26.2	23.6
1972	100.0	33.4	1.8	4.6	7.5	27.5	25.2
1973	100.0	30.4	1.6	4.0	7.6	29.5	26.9
1974	100.0	29.2	1.5	4.9	8.2	31.3	24.9
1975	100.0	26.6	1.2	4.9	8.5	33.3	25.5
1976	100.0	24.6	1.2	4.7	9.1	34.8	25.6
Tr. Qtr.	100.0	23.8	1.3	5.0	9.2	34.6	26.1
1977 ^E	100.0	24.3	1.1	3.9	9.6	33.6	27.5
1978 ^E	100.0	25.5	1.1	4.4	9.8	32.7	26.5

Source: Economic Report of the President, January 1977.

E Estimate
Tr. Qtr. Transition Quarter

TABLE 3
FEDERAL GOVERNMENT PURCHASES OF GOODS AND SERVICES
1965-1976
(Millions of Dollars)

YEAR	TOTAL FEDERAL BUDGET (TFB) ^a	COMPENSATION OF EMPLOYEES	STRUCTURES	OTHER PURCHASES	TOTAL GOODS & SERVICES (TGS) 3+4+5	TOTAL TGS LESS COMPENSATION (TGS - C) 6-3	TGS AS A PERCENT OF TFB 6 ÷ 2	TGS - C AS A PERCENT OF TFB 7 ÷ 2	TGS - C AS A PERCENT OF TGS 7 ÷ 6
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1965	\$126,541	\$28,450	\$3,627	\$34,820	\$66,897	\$38,447	52.9%	30.4%	57.5%
1966	146,453	32,591	3,644	41,538	77,773	45,182	53.1	30.9	58.1
1967	168,544	35,865	3,191	51,650	90,706	54,841	53.8	32.5	60.5
1968	181,691	39,484	3,106	56,898	99,488	60,004	54.8	33.0	60.3
1969	190,568	42,177	3,021	53,583	98,781	56,604	51.8	29.7	57.3
1970	203,927	45,164	3,107	47,911	96,182	51,018	47.2	25.0	53.0
1971	220,333	47,265	3,957	46,420	97,642	50,377	44.3	22.9	51.6
1972	239,548	50,736	4,456	49,669	104,861	54,125	43.8	22.6	51.6
1973	258,347	51,923	4,946	45,319	102,188	50,265	39.6	19.5	49.2
1974	297,863	54,903	5,223	50,995	111,121	56,218	37.3	18.9	50.6
1975	346,286	58,999	5,534	58,797	123,330	64,331	35.6	18.6	52.2
1976	380,790	62,386	5,914	61,837	130,137	67,751	34.2	17.8	52.1
1980 ^T	526,820	74,015	7,317	76,012	157,344	83,329	29.9	15.8	53.0

Source: Survey of Current Business, U.S. Department of Commerce, July 1970, July 1973, July 1977.

a Adjusted to calendar year basis.
T Trend

TABLE 4

FEDERAL OBLIGATIONS FOR TOTAL RESEARCH AND DEVELOPMENT

FY 1965-1978
(Millions of Dollars)

YEAR	CURRENT DOLLARS	CONSTANT DOLLARS ^a (1972 = 100)	GNP DEFLATORS (1972 = 100)
1965	\$14,600	\$19,859	73.52
1966	15,304	19,737	77.54
1967	16,529	21,221	77.89
1968	15,924	19,686	80.89
1969	15,637	18,473	84.65
1970	15,330	17,217	89.04
1971	15,550	16,597	93.69
1972	16,553	16,889	98.01
1973	16,821	16,347	102.90
1974	17,438	15,723	110.91
1975	19,044	15,661	121.60
1976	20,759	15,904	130.53
1977 ^E	24,465	17,563	139.30
1978 ^E	26,317	N.A.	N.A.
1980 ^T	30,900	N.A.	N.A.

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

a GNP Price Deflator Adjusted to Fiscal Year Base
E Estimate
T Trend
N.A. Not Available

TABLE 5

FEDERAL RESEARCH AND DEVELOPMENT OBLIGATIONS

By Agency
Selected Fiscal Years

AGENCY	MILLIONS OF DOLLARS				MILLIONS OF CONSTANT DOLLARS (1972 = 100) ^a			
	1965	1970	1975	1977 ^E	1965	1970	1975	1977 ^E
Agriculture	\$ 224.6	\$ 281.2	\$ 420.1	\$ 525.3	\$ 305.5	\$ 315.8	\$ 345.5	\$ 377.1
Commerce	61.3	121.6	215.4	247.4	83.4	136.6	177.1	177.6
Defense	6,796.5	7,360.4	9,012.5	11,171.8	9,244.4	8,266.4	7,411.6	8,019.9
HEW	869.4	1,221.0	2,363.1	2,959.5	1,182.5	1,371.3	1,943.3	2,124.5
Interior	113.2	157.9	286.8	348.4	154.0	177.3	235.9	250.1
Transportation	—	327.8	311.6	407.4	—	368.1	256.3	292.5
AEC	1,240.7	1,346.0	(See ERDA)		1,687.6	1,511.7	—	—
ERDA	—	—	2,072.3	3,609.8	—	—	1,704.2	2,591.4
EPA	—	88.5	257.7	361.4	—	99.4	211.9	259.4
FAA	64.4	(See Transportation)			87.6	—	—	—
NASA	4,951.5	3,799.9	3,064.4	3,609.8	6,734.9	4,267.6	2,520.1	2,591.4
NSF	187.2	289.0	595.0	686.2	254.6	324.6	489.3	492.6
Nuclear Regulatory Commission	—	—	64.2	113.9	—	—	52.8	81.8
VA	37.4	58.6	94.8	110.4	50.9	65.8	78.0	79.3
All Others	68.1	288.4	255.4	314.0	92.6	323.9	210.0	225.4
TOTAL	\$14,614.3	\$15,340.3	\$19,013.3	\$24,465.3	\$19,878.0	\$17,228.5	\$15,636.0	\$17,563.0

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

a See Table 4 for GNP Deflators.
E Estimate

TABLE 6

**FEDERAL RESEARCH & DEVELOPMENT FUNDS
DISTRIBUTION AS A PERCENT OF TOTAL**

 FY 1960-1977
(Millions of Dollars)

YEAR	TOTAL FEDERAL R&D	BASIC RESEARCH		APPLIED RESEARCH		DEVELOPMENT	
		AMOUNT	PERCENT	AMOUNT	PERCENT	AMOUNT	PERCENT
1960	\$ 8,738	\$ 715	8.2%	\$ 1,688	19.3%	\$ 6,335	72.5%
1961	9,250	874	9.4	1,754	19.0	6,622	71.6
1962	9,911	1,131	11.4	2,067	20.9	6,713	67.7
1963	11,204	1,311	11.7	2,125	19.0	7,768	69.3
1964	12,536	1,597	12.7	2,397	19.1	8,542	68.2
1965	13,012	1,809	13.9	2,524	19.4	8,679	66.7
1966	13,969	1,979	14.2	2,582	18.5	9,408	67.3
1967	14,395	2,184	15.2	2,717	18.9	9,494	66.0
1968	14,927	2,355	15.8	2,850	19.1	9,722	65.1
1969	14,890	2,421	16.2	2,810	18.9	9,659	64.9
1970	14,668	2,512	17.1	3,066	20.9	9,090	62.0
1971	14,892	2,425	16.3	3,114	20.9	9,353	62.8
1972	15,785	2,573	16.3	3,177	20.1	10,035	63.6
1973	16,389	2,635	16.1	3,456	21.1	10,298	62.8
1974	16,874	2,811	16.7	3,685	21.8	10,378	61.5
1975	18,307	3,042	16.6	4,098	22.4	11,167	61.0
1976 ^E	19,755	3,254	16.5	4,339	21.9	12,162	61.6
1977 ^E	21,798	3,530	16.2	4,754	21.8	13,514	62.0
1980 ^T	25,473	4,171	16.4	5,691	22.3	15,611	61.3

Source: National Patterns of R&D Resources, 1953-1977, National Science Foundation.

 E Estimate
T Trend

TABLE 7

**FEDERAL RESEARCH AND DEVELOPMENT OBLIGATION vs.
BUDGET OUTLAYS**

 FY 1965-1978
(Millions of Dollars)

YEAR	R&D OBLIGATION	BUDGET OUTLAYS	R&D AS PERCENT OF BUDGET OUTLAYS
1965	\$14,600	\$118,430	12.3%
1966	15,304	134,652	11.4
1967	16,529	158,254	10.4
1968	15,924	178,833	8.9
1969	15,637	184,548	8.5
1970	15,330	196,588	7.8
1971	15,550	211,425	7.4
1972	16,553	232,021	7.1
1973	16,821	247,074	6.8
1974	17,438	269,620	6.5
1975	19,044	326,092	5.8
1976	20,759	365,643	5.7
1977 ^E	24,465	401,902	6.1
1978 ^E	26,317	462,234	5.7
1980 ^T	30,900	533,000	5.8

 Source: Economic Report of the President, January 1977.
Federal Funds for Research, Development and Other Scientific Activities, FY 1965-FY 1977,
Volumes XV-XXV, National Science Foundation.

 E Estimate
T Trend

TABLE 8

FEDERAL R&D OBLIGATIONS BY PERFORMERS

 FY 1965-1978
(Millions of Dollars)

YEAR	TOTAL	INTRAMURAL		INDUSTRY		ALL OTHERS	
		AMOUNT	PERCENT	AMOUNT	PERCENT	AMOUNT	PERCENT
1965	\$14,599.6	\$3,092.7	21.2%	\$ 8,667.7	59.4%	\$2,839.2	19.4%
1966	15,304.1	3,396.7	22.2	8,881.3	58.0	3,026.1	19.8
1967	16,529.3	3,395.8	20.5	9,877.6	59.8	3,255.9	19.7
1968	15,924.4	3,493.2	21.9	9,045.8	56.8	3,385.4	21.3
1969	15,637.2	3,498.4	22.4	8,697.5	55.6	3,441.3	22.0
1970	15,329.8	3,875.4	25.3	7,950.6	51.9	3,503.7	22.9
1971	15,549.5	4,165.6	26.8	7,630.5	49.1	3,753.4	24.1
1972	16,552.6	4,495.8	27.2	6,851.6	47.4	4,205.2	25.4
1973	16,821.2	4,619.0	27.5	7,874.1	46.8	4,328.1	25.7
1974	17,438.2	4,814.8	27.6	7,845.2	45.0	4,778.2	27.4
1975	19,044.3	5,394.9	28.3	8,385.3	44.0	5,264.1	27.6
1976	20,758.6	5,710.0	27.5	9,414.6	45.4	5,634.0	27.1
1977 ^E	24,465.3	6,467.0	26.4	11,402.2	46.6	6,596.1	27.0
1978 ^E	26,316.7	6,547.6	24.9	12,918.9	49.1	6,850.2	26.0

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965-FY 1977, Volumes XV-XXV, National Science Foundation.

E Estimate

TABLE 9

SOURCES OF BASIC RESEARCH FUNDS

1965-1977
(Percent)

YEAR	FEDERAL GOVERNMENT	INDUSTRY	UNIVERSITIES & COLLEGES	OTHER NON-PROFIT INSTITUTIONS
1965	70.8%	18.0%	6.4%	4.7%
1966	70.3	18.1	7.0	4.6
1967	71.9	16.2	7.3	4.6
1968	71.0	16.1	8.3	4.5
1969	70.8	15.8	8.7	4.7
1970	70.3	14.8	9.8	5.1
1971	68.0	15.3	11.2	5.5
1972	68.5	14.7	11.0	5.8
1973	68.3	15.3	10.6	5.8
1974	68.5	15.4	10.4	5.8
1975	68.3	15.1	10.5	6.1
1976 ^E	68.1	14.9	10.8	6.2
1977 ^E	68.2	14.6	10.9	6.3
1980 ^T	68.0	14.1	11.1	6.7

Source: National Patterns of R&D Resources, 1953-1977, National Science Foundation.

E Estimate

T Trend

Note: Percents may not add to 100.0 due to rounding.

TABLE 10

SOURCES OF APPLIED RESEARCH FUNDS

1965-1977
(Percent)

YEAR	FEDERAL GOVERNMENT	INDUSTRY	UNIVERSITIES & COLLEGES	OTHER NON-PROFIT INSTITUTIONS
1965	58.2%	38.1%	2.0%	1.7%
1966	56.1	40.0	1.9	1.9
1967	56.6	39.3	2.1	2.0
1968	55.1	41.1	1.9	1.9
1969	52.6	43.4	2.0	2.0
1970	53.7	42.5	1.7	2.0
1971	53.3	42.6	2.0	2.1
1972	52.7	42.9	2.3	2.1
1973	52.4	42.8	2.6	2.1
1974	51.2	43.8	2.8	2.2
1975	52.4	42.4	2.9	2.3
1976 ^E	52.3	42.5	2.9	2.3
1977 ^E	52.8	42.0	2.9	2.3
1980 ^T	53.2	41.3	3.0	2.5

Source: National Patterns of R&D Resources, 1953-1977, National Science Foundation.

E Estimate

T Trend

Note: Percents may not add to 100.0 due to rounding.

TABLE 11

SOURCES OF DEVELOPMENT FUNDS

1965-1977
(Percent)

YEAR	FEDERAL GOVERNMENT	INDUSTRY	UNIVERSITIES & COLLEGES	OTHER NON-PROFIT INSTITUTIONS
1965	66.0%	33.7%	0.1%	0.2%
1966	65.2	34.5	0.1	0.2
1967	62.0	37.6	0.1	0.2
1968	60.3	39.4	0.1	0.2
1969	57.3	42.4	0.1	0.2
1970	54.7	45.0	0.1	0.2
1971	54.4	45.2	0.1	0.3
1972	54.3	45.3	0.1	0.2
1973	51.9	47.7	0.2	0.2
1974	49.5	50.0	0.2	0.3
1975	50.1	49.4	0.2	0.3
1976 ^E	50.1	49.4	0.2	0.3
1977 ^E	50.8	48.7	0.2	0.3
1980 ^T	49.7	49.7	0.2	0.3

Source: National Patterns of R&D Resources, 1953-1977, National Science Foundation.

E Estimate

T Trend

Note: Percents may not add to 100.0 due to rounding.

TABLE 12

INDUSTRIAL DEVELOPMENT FUNDS VS. FEDERAL GOVERNMENT DEVELOPMENT FUNDS

1965-1977
(Millions of Dollars)

YEAR	TOTAL FEDERAL & INDUSTRIAL FUNDING	INDUSTRIAL		GOVERNMENT	
		FUNDING	PERCENT OF TOTAL	FUNDING	PERCENT OF TOTAL
1965	\$ 13,112	\$ 4,433	33.8%	\$ 8,679	66.2%
1966	14,385	4,977	34.6	9,408	65.4
1967	15,255	5,761	37.8	9,494	62.2
1968	16,067	6,345	39.5	9,722	60.5
1969	16,809	7,150	42.5	9,659	57.5
1970	16,575	7,485	45.2	9,090	54.8
1971	17,127	7,774	45.4	9,353	54.6
1972	18,411	8,376	45.5	10,035	54.5
1973	19,769	9,471	47.9	10,298	52.1
1974	20,860	10,482	50.2	10,378	49.8
1975	22,179	11,012	49.7	11,167	50.3
1976 ^E	24,163	12,001	49.7	12,162	50.3
1977 ^E	26,482	12,968	49.0	13,514	51.0
1980 ^T	31,055	15,443	49.7	15,612	50.3

Source: National Patterns of R&D Resources, 1953-1977, National Science Foundation.

E Estimate

T Trend

TABLE 13

**DEPARTMENT OF DEFENSE R&D OBLIGATIONS
BY PERFORMER**

FY 1965–1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 6,796.5	\$ 1,647.4	\$ 4,373.3	\$ 22.8	\$ 292.1	\$ 144.9	\$ 144.0	\$ 138.9	\$ —	\$ 33.2
1966	7,023.6	1,894.9	4,412.6	13.9	291.9	129.6	126.4	131.4	1.0	22.0
1967	8,049.2	1,889.5	5,427.5	8.9	279.9	129.3	124.3	164.8	1.3	23.6
1968	7,709.3	1,959.5	5,089.9	11.5	244.4	143.9	102.0	151.9	0.6	14.7
1969	7,696.3	1,867.3	5,156.5	13.9	263.0	143.9	85.4	152.8	0.6	12.9
1970	7,360.4	1,995.6	4,737.3	15.1	213.5	139.9	93.5	154.8	0.5	10.2
1971	7,509.0	2,200.9	4,696.5	7.5	210.5	142.0	89.1	151.3	*	11.3
1972	8,318.1	2,459.9	5,216.5	6.3	215.4	147.5	117.4	144.6	—	10.4
1973	8,404.2	2,531.9	5,280.8	2.4	202.7	138.2	99.6	131.3	*	17.3
1974	8,420.4	2,530.0	5,266.1	0.9	197.9	152.8	117.6	141.0	*	14.1
1975	9,012.5	2,769.0	5,606.8	1.4	200.4	161.5	115.5	146.7	*	11.1
1976	9,654.7	2,823.2	6,098.1	81.7	230.2	156.3	109.4	145.6	—	10.1
1977 ^E	11,171.8	3,120.0	7,248.6	115.6	245.3	154.9	109.9	159.2	—	18.2
1978 ^E	12,108.1	3,201.4	8,181.4	90.2	309.4	78.6	111.7	120.0	—	15.5

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

^E Estimate

* Less than \$50,000

FFRDC: Federally Funded Research & Development Centers

TABLE 14

**DEPARTMENT OF THE ARMY R&D OBLIGATIONS
BY PERFORMER**

FY 1965–1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON- PROFIT)	OTHER	FOREIGN
1965	\$ 1,459.5	\$ 501.2	\$ 866.7	\$ 4.5	\$ 46.9	\$ 6.4	\$ 8.0	\$ 9.6	\$ *	\$ 16.1
1966	1,585.4	562.9	942.5	0.3	44.8	6.2	12.4	8.7	0.6	6.8
1967	1,661.3	543.1	1,041.3	*	43.2	6.6	16.5	5.5	1.3	3.8
1968	1,563.4	608.2	883.4	—	39.9	6.2	14.6	7.7	0.6	2.9
1969	1,643.8	567.6	966.5	—	48.4	26.2	24.2	8.7	0.6	1.7
1970	1,659.8	629.5	933.4	—	31.3	26.6	20.7	14.9	0.5	3.0
1971	1,682.4	650.4	933.5	—	25.5	28.4	23.7	15.9	*	4.8
1972	2,064.2	687.7	1,267.8	—	35.9	19.6	32.1	15.5	—	5.5
1973	2,013.6	758.3	1,170.3	—	29.2	20.4	26.7	4.7	*	3.9
1974	2,009.9	702.2	1,233.1	0.1	34.6	10.7	19.2	4.7	*	5.2
1975	1,896.7	733.4	1,092.6	0.1	31.5	20.9	14.6	1.6	*	2.0
1976	2,013.7	755.0	1,192.0	0.2	37.3	12.5	13.5	2.2	—	1.0
1977 ^E	2,495.6	906.0	1,509.4	0.2	43.3	12.5	16.4	4.0	—	4.0
1978 ^E	2,652.9	984.4	1,577.7	*	49.6	17.8	18.9	2.2	—	2.2

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

^E Estimate

* Less than \$50,000

FFRDC: Federally Funded Research & Development Centers

TABLE 15

**DEPARTMENT OF THE NAVY R&D OBLIGATIONS
BY PERFORMER**

**FY 1965-1968
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 1,449.5	\$ 530.6	\$ 771.4	\$ —	\$ 63.4	\$ 59.3	\$ 13.1	\$ 6.8	\$ —	\$ 4.9
1966	1,601.7	728.5	723.4	—	61.1	58.5	18.4	7.0	—	4.8
1967	2,108.9	690.9	1,255.5	—	77.0	57.8	11.5	9.4	—	6.7
1968	2,024.8	667.3	1,191.6	—	82.4	67.4	12.6	0.3	—	3.2
1969	2,124.2	708.9	1,237.9	—	89.4	71.4	12.6	—	—	4.0
1970	2,257.9	708.5	1,393.6	—	73.9	65.5	12.7	*	—	3.7
1971	2,283.7	737.7	1,389.5	—	70.3	72.1	10.2	0.3	—	3.5
1972	2,519.4	862.2	1,478.9	—	79.6	81.9	11.6	2.3	—	2.9
1973	2,654.8	865.8	1,621.6	—	75.9	67.5	9.7	2.3	—	12.0
1974	2,718.5	909.0	1,599.2	—	57.2	87.1	55.5	3.6	—	6.8
1975	3,100.2	958.7	1,931.3	—	58.0	82.3	59.5	3.8	—	6.6
1976	3,328.0	1,015.8	2,020.9	81.0	57.7	88.8	53.2	4.7	—	6.0
1977 ^E	3,871.6	1,054.4	2,479.3	115.1	66.5	90.4	50.8	4.7	—	10.3
1978 ^E	4,273.7	1,059.7	2,909.9	90.0	131.8	11.8	54.5	4.7	—	11.3

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

* Less than \$50,000

FFRDC: Federally Funded Research & Development Centers

TABLE 16

**DEPARTMENT OF THE AIR FORCE R&D OBLIGATIONS
BY PERFORMER**

**FY 1965-1978
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 3,351.0	\$ 470.5	\$ 2,525.6	\$ 3.6	\$ 109.2	\$ 31.9	\$ 105.4	\$ 97.4	\$ *	\$ 7.4
1966	3,342.3	469.8	2,541.9	0.6	117.6	30.8	77.8	95.0	0.3	8.5
1967	3,794.3	525.9	2,930.3	*	96.1	34.4	71.9	123.4	*	12.3
1968	3,621.7	529.2	2,811.6	—	76.9	29.0	51.7	118.4	*	5.0
1969	3,498.5	458.7	2,776.3	—	80.6	30.6	31.9	115.9	*	4.7
1970	2,990.0	525.9	2,205.4	—	70.1	26.4	47.3	113.6	—	1.3
1971	3,113.5	676.6	2,190.1	—	68.1	25.5	41.4	109.7	—	2.0
1972	3,254.3	761.0	2,259.5	—	65.0	25.5	40.0	101.8	—	1.3
1973	3,273.5	741.1	2,292.6	—	66.3	29.8	37.1	105.2	—	1.3
1974	3,216.2	762.3	2,223.3	—	69.0	31.3	19.1	109.4	—	1.8
1975	3,513.5	917.8	2,357.6	—	77.3	26.3	16.6	115.9	—	1.9
1976	3,726.6	855.6	2,626.8	—	80.9	28.6	11.4	120.8	—	2.5
1977 ^E	4,091.1	921.6	2,908.1	—	84.5	29.5	11.6	132.2	—	3.6
1978 ^E	4,403.3	914.1	3,273.0	—	79.8	31.5	11.9	91.1	—	1.8

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

* Less than \$50,000

FFRDC: Federally Funded Research & Development Centers

TABLE 17

**DEPARTMENT OF DEFENSE RESEARCH OBLIGATIONS
BY PERFORMER**

FY 1965-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 1,751.5	\$ 551.7	\$ 719.0	\$15.7	\$ 262.6	\$ 107.4	\$ 38.5	\$ 41.5	\$ *	\$ 15.0
1966	1,849.3	561.7	841.9	13.2	258.9	96.1	37.0	28.4	0.5	11.5
1967	1,591.3	572.2	582.9	7.2	246.5	81.7	50.7	36.5	0.7	12.9
1968	1,576.9	629.8	594.6	2.8	207.3	64.4	41.8	25.4	0.5	10.3
1969	1,411.8	583.4	492.3	2.9	222.3	40.3	30.3	32.4	0.5	7.4
1970	1,556.8	582.2	684.2	3.9	180.5	38.8	34.2	27.8	0.5	4.8
1971	1,613.0	614.4	697.6	2.6	195.8	28.8	38.7	31.4	*	3.6
1972	1,763.7	661.8	779.7	4.3	184.8	39.7	62.0	28.2	—	3.1
1973	1,754.9	733.1	751.1	1.9	168.4	29.9	51.5	16.2	—	2.7
1974	1,760.2	743.4	719.2	0.4	186.3	39.6	49.2	19.1	—	3.0
1975	1,793.1	667.9	820.7	1.3	190.2	45.5	43.0	21.0	—	3.4
1976	1,787.8	674.2	795.8	0.6	211.6	43.3	45.1	13.4	—	3.8
1977 ^E	1,951.7	737.3	868.6	0.4	222.9	58.3	47.7	13.1	—	3.4
1978 ^E	2,178.5	779.0	1,064.6	0.2	247.8	21.5	46.0	15.7	—	3.7

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

* Less than \$50,000

FFRDC: Federally Funded Research & Development Centers

TABLE 18

**DEPARTMENT OF THE ARMY RESEARCH OBLIGATIONS
BY PERFORMER**

FY 1965-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 291.8	\$ 158.9	\$ 71.1	\$ *	\$ 36.9	\$ 6.4	\$ 6.0	\$ 9.6	\$ *	\$ 3.0
1966	299.3	177.8	66.7	—	35.7	5.5	9.9	0.7	0.1	2.9
1967	284.5	170.7	56.1	*	35.8	6.0	10.6	1.2	0.7	3.3
1968	280.6	184.2	45.5	—	34.1	5.5	6.8	1.5	0.5	2.6
1969	274.7	161.9	55.7	—	35.6	6.8	6.6	6.4	0.5	1.2
1970	291.5	212.8	41.6	—	24.5	3.0	4.1	3.8	0.5	1.3
1971	339.1	223.6	75.0	—	23.3	0.1	8.4	7.6	*	1.1
1972	351.0	220.0	77.3	—	30.5	4.9	11.9	5.0	—	1.4
1973	361.9	247.6	76.6	—	24.5	0.1	11.4	0.1	—	1.6
1974	348.7	234.7	71.5	*	30.7	0.4	10.2	*	—	1.1
1975	335.7	212.5	83.1	—	30.2	2.2	6.9	—	—	0.8
1976	306.4	210.4	58.1	—	28.0	0.1	8.9	0.1	—	0.8
1977 ^E	375.3	256.1	73.5	—	32.7	0.1	12.0	—	—	0.9
1978 ^E	461.4	294.1	110.5	*	41.1	0.2	14.4	—	—	1.1

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

Note: Items may not add to Total due to rounding.

* Less than \$50,000

TABLE 19

**DEPARTMENT OF THE NAVY RESEARCH OBLIGATIONS
BY PERFORMER**

**FY 1965-1978
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 319.5	\$ 139.4	\$ 88.2	\$ —	\$ 52.4	\$ 22.0	\$ 8.4	\$ 6.8	\$ —	\$ 2.4
1966	300.3	133.2	77.1	—	50.6	25.7	5.4	7.0	—	1.2
1967	301.2	146.2	65.8	—	57.5	11.0	9.4	9.1	—	2.2
1968	291.3	154.9	52.4	—	57.1	16.2	10.0	—	—	0.6
1969	294.9	158.7	43.6	—	67.5	18.3	6.3	—	—	0.4
1970	272.9	157.0	41.3	—	53.5	14.4	6.4	*	—	0.3
1971	273.2	155.8	36.6	—	62.8	12.5	5.3	—	—	0.1
1972	303.2	178.1	45.6	—	59.1	14.3	5.8	—	—	0.2
1973	284.1	177.2	40.8	—	50.6	10.2	4.7	0.4	—	0.2
1974	292.9	175.1	42.4	—	54.3	15.9	4.4	0.5	—	0.3
1975	302.7	175.2	54.6	—	55.4	12.9	3.6	0.5	—	0.5
1976	314.9	182.0	53.7	—	55.1	18.2	4.0	0.6	—	1.3
1977 ^E	354.8	192.0	55.8	—	63.7	36.2	5.4	0.6	—	1.1
1978 ^E	402.3	199.4	103.4	—	88.0	3.2	6.5	0.6	—	1.2

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

Note: Items may not add to Total due to rounding.

* Less than \$50,000

TABLE 20

**DEPARTMENT OF THE AIR FORCE RESEARCH OBLIGATIONS
BY PERFORMER**

**FY 1965-1978
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 667.4	\$ 138.5	\$ 381.3	\$ 1.0	\$ 101.8	\$ 31.9	\$ 8.3	\$ —	\$ *	\$ 4.8
1966	827.4	150.7	528.5	0.2	105.3	30.8	5.9	—	0.3	5.5
1967	599.2	159.9	299.2	*	90.9	34.4	8.1	—	*	6.6
1968	610.0	189.1	338.4	—	73.1	1.8	4.0	—	*	3.4
1969	516.5	174.0	260.0	—	75.9	0.2	3.2	—	*	3.2
1970	665.0	131.8	452.5	—	66.0	0.2	13.5	—	—	1.1
1971	677.2	146.8	450.4	—	64.6	0.3	13.6	—	—	1.5
1972	725.2	161.1	487.6	—	61.9	0.3	13.4	—	—	0.8
1973	777.2	204.5	495.5	—	63.8	0.3	12.3	—	—	0.8
1974	793.6	247.0	463.1	—	66.6	0.6	15.0	—	—	1.3
1975	822.4	201.5	533.9	—	73.3	0.2	12.1	—	—	1.4
1976	821.6	198.5	535.1	—	78.1	0.7	8.1	—	—	1.1
1977 ^E	817.6	195.7	530.8	—	80.7	1.0	8.2	—	—	1.2
1978 ^E	867.0	182.6	597.4	—	76.3	1.0	8.4	—	—	1.3

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

* Less Than \$50,000

FFRDC: Federally Funded Research & Development Centers

Note: Items may not add to Total due to rounding.

TABLE 21

**DEPARTMENT OF DEFENSE DEVELOPMENT OBLIGATIONS
INTRAMURAL vs. INDUSTRIAL**

FY 1965-1978
(Millions of Dollars)

YEAR	TOTAL	INTRAMURAL		INDUSTRIAL	
		AMOUNT	PERCENT OF TOTAL	AMOUNT	PERCENT OF TOTAL
1965	\$ 4,750.0	\$ 1,095.7	23.1%	\$ 3,654.3	76.9%
1966	4,903.8	1,333.2	27.2	3,570.6	72.8
1967	6,161.9	1,317.3	21.4	4,844.6	78.6
1968	5,816.0	1,320.7	22.7	4,495.3	77.3
1969	5,948.1	1,283.9	21.6	4,664.2	78.4
1970	5,466.5	1,413.4	25.9	4,053.1	74.1
1971	5,585.3	1,586.5	28.4	3,998.8	71.6
1972	6,234.9	1,798.1	28.8	4,436.8	71.2
1973	6,328.5	1,798.8	28.4	4,529.7	71.6
1974	6,333.6	1,786.6	28.2	4,547.0	71.8
1975	6,887.2	2,101.1	30.5	4,786.1	69.5
1976	7,451.4	2,149.0	28.8	5,302.4	71.2
1977 ^E	8,762.7	2,382.7	27.2	6,380.0	71.8
1978 ^E	9,539.2	2,422.4	25.4	7,116.8	74.6

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

TABLE 22

**DEPARTMENT OF THE ARMY DEVELOPMENT OBLIGATIONS
INTRAMURAL vs. INDUSTRIAL**

FY 1965-1978
(Millions of Dollars)

YEAR	TOTAL	INTRAMURAL		INDUSTRIAL	
		AMOUNT	PERCENT OF TOTAL	AMOUNT	PERCENT OF TOTAL
1965	\$ 1,138.0	\$ 342.4	30.1%	\$ 795.6	69.9%
1966	1,260.9	385.1	30.5	875.8	69.5
1967	1,357.6	372.4	27.4	985.2	72.6
1968	1,261.9	424.0	33.6	837.9	66.4
1969	1,316.6	406.7	30.8	910.9	69.2
1970	1,308.5	416.7	31.8	891.8	68.2
1971	1,285.4	426.8	33.2	858.6	66.8
1972	1,658.2	467.7	28.2	1,190.5	71.8
1973	1,604.4	510.7	31.8	1,093.7	68.2
1974	1,629.1	467.5	28.7	1,161.6	71.3
1975	1,530.4	520.9	34.0	1,009.5	66.0
1976	1,678.5	544.6	32.4	1,133.9	67.6
1977 ^E	2,085.7	649.8	31.2	1,435.9	68.8
1978 ^E	2,157.4	690.3	32.0	1,467.1	68.0

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

TABLE 23

**DEPARTMENT OF THE NAVY DEVELOPMENT OBLIGATIONS
INTRAMURAL vs. INDUSTRIAL**

FY 1965-1978
(Millions of Dollars)

YEAR	TOTAL	INTRAMURAL		INDUSTRIAL	
		AMOUNT	PERCENT OF TOTAL	AMOUNT	PERCENT OF TOTAL
1965	\$ 1,074.5	\$ 391.3	36.4%	\$ 683.2	63.6%
1966	1,241.7	595.3	47.9	646.4	52.1
1967	1,734.4	544.7	31.4	1,189.7	68.6
1968	1,651.5	512.4	31.0	1,139.1	69.0
1969	1,744.4	550.2	31.5	1,194.2	68.5
1970	1,903.8	551.6	29.0	1,352.2	71.0
1971	1,934.8	581.9	30.1	1,352.9	69.9
1972	2,117.3	684.0	32.3	1,433.3	67.7
1973	2,269.4	688.6	30.3	1,580.8	69.7
1974	2,290.6	733.8	32.0	1,556.8	68.0
1975	2,660.2	783.5	29.5	1,876.7	70.5
1976	2,801.0	833.8	29.8	1,967.2	70.2
1977 ^E	3,285.9	862.4	26.2	2,423.5	73.8
1978 ^E	3,666.7	860.2	23.5	2,806.5	76.5

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

TABLE 24

**DEPARTMENT OF THE AIR FORCE DEVELOPMENT
OBLIGATIONS
INTRAMURAL vs. INDUSTRIAL**

FY 1965-1978
(Millions of Dollars)

YEAR	TOTAL	INTRAMURAL		INDUSTRIAL	
		AMOUNT	PERCENT OF TOTAL	AMOUNT	PERCENT OF TOTAL
1965	\$ 2,476.5	\$ 332.1	13.4%	\$ 2,144.4	86.6%
1966	2,332.4	319.1	13.7	2,013.3	86.3
1967	2,997.0	365.9	12.2	2,631.1	87.8
1968	2,813.2	340.0	12.1	2,473.2	87.9
1969	2,800.9	284.4	10.2	2,516.2	89.8
1970	2,147.1	394.2	18.4	1,752.9	81.6
1971	2,269.5	529.8	23.3	1,739.7	76.7
1972	2,371.8	599.9	25.3	1,771.9	74.7
1973	2,333.7	536.6	23.0	1,797.1	77.0
1974	2,275.4	515.3	22.6	1,760.1	77.4
1975	2,540.1	716.4	28.2	1,823.7	71.8
1976	2,748.9	657.1	23.9	2,091.8	76.1
1977 ^E	3,103.2	725.9	23.4	2,377.3	76.6
1978 ^E	3,407.1	730.5	21.5	2,676.6	78.5

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

TABLE 25
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH AND DEVELOPMENT OBLIGATIONS
BY PERFORMER
FY 1965-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON-PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 4,951.5	\$ 863.1	\$ 3,852.1	\$ 1.0	\$ 124.1	\$ 84.1	\$ 16.7	\$ 1.6	\$ 8.1	\$ 0.6
1966	5,050.0	872.1	3,926.8	1.4	117.2	103.6	21.1	1.1	6.2	0.5
1967	4,867.0	813.2	3,795.9	2.4	124.1	106.1	23.6	0.8	—	0.9
1968	4,429.4	791.2	3,379.6	2.3	130.6	102.8	21.3	0.7	—	0.9
1969	3,963.3	820.9	2,895.4	3.5	125.1	100.1	17.2	0.5	—	0.6
1970	3,799.9	988.0	2,516.2	4.3	131.2	126.8	31.0	1.0	—	1.4
1971	3,257.9	909.1	2,073.6	3.1	134.0	109.2	26.8	0.4	—	1.8
1972	3,157.2	927.3	1,957.2	2.5	119.0	124.0	22.6	3.8	—	0.9
1073	3,060.9	893.3	1,957.8	2.8	111.4	77.8	12.8	3.4	1.3	0.3
1974	3,002.2	993.4	1,784.9	0.4	98.9	83.3	38.6	0.6	0.5	1.6
1975	3,064.4	1,042.7	1,791.8	*	108.0	89.3	28.1	1.6	0.3	2.5
1976	3,446.8	1,168.3	2,042.1	—	118.9	83.6	28.4	3.1	0.5	1.9
1977 ^E	3,609.8	1,220.8	2,154.6	—	117.0	82.7	29.7	2.6	0.5	1.8
1978 ^E	3,847.7	1,258.5	2,367.9	—	120.0	75.0	21.5	2.5	0.5	1.8

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

Note: Items may not add to Total due to rounding.

* Less than \$50,000

TABLE 26
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH OBLIGATIONS
BY PERFORMER
FY 1965-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON-PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 1,289.9	\$ 405.6	\$ 694.2	\$ 0.8	\$ 95.6	\$ 78.1	\$ 6.5	\$ 0.5	\$ 8.1	\$ 0.4
1966	1,357.9	385.9	762.5	1.4	109.0	81.2	10.6	0.7	6.2	0.5
1967	1,379.7	408.2	757.6	2.1	99.7	100.3	10.8	0.4	—	0.5
1968	1,356.2	451.9	680.3	2.0	108.6	95.7	16.8	0.5	—	0.5
1969	1,295.9	487.7	591.9	2.5	106.0	92.1	15.0	0.3	—	0.4
1970	1,409.7	679.7	503.6	2.0	96.7	102.9	22.6	0.9	—	1.3
1971	1,497.0	547.0	742.1	0.7	96.4	88.2	20.8	0.1	—	1.6
1972	1,480.5	510.6	766.1	2.3	83.2	98.2	18.3	1.6	—	0.3
1973	1,378.6	478.6	740.4	2.6	80.4	60.8	11.7	3.1	0.8	0.3
1974	1,508.2	633.5	727.1	0.3	85.0	24.9	35.7	0.4	0.2	1.2
1975	787.3	469.4	184.2	*	90.7	27.1	13.1	1.2	0.3	1.3
1976	1,222.8	780.3	310.0	—	97.8	25.1	5.4	2.2	0.2	1.8
1977 ^E	1,310.3	816.1	363.9	—	96.0	24.8	5.7	1.8	0.2	1.8
1978 ^E	1,426.5	850.3	440.4	—	103.0	22.5	6.5	1.7	0.3	1.8

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

Note: Items may not add to Total due to rounding.

* Less than \$50,000

TABLE 27
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DEVELOPMENT OBLIGATIONS
BY PERFORMER

FY 1965-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON-PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 3,661.6	\$ 457.5	\$ 3,158.0	\$ 0.2	\$ 28.5	\$ 6.0	\$ 10.1	\$ 1.0	\$ —	\$ 0.3
1966	3,692.1	486.3	3,164.3	—	22.4	8.2	10.5	0.5	—	—
1967	3,488.3	405.0	3,039.2	0.3	24.4	5.8	12.8	0.4	—	0.4
1968	3,073.2	339.3	2,699.4	0.4	22.0	7.1	4.5	0.1	—	0.4
1969	2,667.4	333.2	2,303.5	1.0	19.1	8.1	2.2	0.2	—	0.2
1970	2,390.2	308.4	2,012.6	2.3	34.5	23.9	8.4	0.1	—	0.1
1971	1,761.0	362.1	1,331.4	2.4	37.6	21.0	6.0	0.3	—	0.2
1972	1,676.7	416.7	1,191.2	0.2	35.8	25.8	4.3	2.2	—	0.6
1973	1,682.3	414.8	1,217.4	0.2	30.9	17.0	1.1	0.3	0.5	—
1974	1,493.9	359.9	1,057.7	0.2	13.9	58.4	2.9	0.2	0.2	0.4
1975	2,277.1	573.3	1,607.6	*	17.3	62.2	15.1	0.4	*	1.2
1976	2,224.0	388.0	1,732.0	—	21.1	58.5	23.1	0.9	0.3	0.1
1977 ^E	2,300.0	404.8	1,790.8	—	21.0	57.9	24.0	0.8	0.3	*
1978 ^E	2,421.2	408.2	1,927.5	—	17.0	52.5	15.0	0.8	0.3	*

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate
FFRDC: Federally Funded Research & Development Centers
Note: Items may not add to Total due to rounding.
* Less than \$50,000

TABLE 28
ATOMIC ENERGY COMMISSION
RESEARCH AND DEVELOPMENT OBLIGATIONS
BY PERFORMER
BY 1965-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON-PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 1,240.7	\$ 30.9	\$ 342.5	\$ 381.1	\$ 74.4	\$ 320.1	\$ 9.1	\$ 78.2	\$ 0.3	\$ 4.1
1966	1,212.4	19.9	324.7	342.4	82.2	391.6	9.8	35.9	0.2	5.7
1967	1,257.3	15.1	320.6	372.2	89.5	405.7	11.0	39.3	0.2	3.6
1968	1,369.0	16.5	364.3	399.0	92.6	432.9	12.9	48.3	0.1	2.3
1969	1,405.9	17.0	373.1	407.2	101.4	441.4	10.9	54.1	0.2	0.6
1970	1,346.0	17.5	300.0	409.6	100.3	448.0	9.7	59.5	0.2	0.6
1971	1,302.9	16.8	265.6	465.6	93.9	432.3	8.2	19.7	0.2	0.6
1972	1,297.7	16.3	216.3	515.0	84.5	438.1	10.6	16.1	0.1	0.6
1973	1,363.2	15.8	200.0	572.5	82.7	464.2	8.6	18.6	0.2	0.5
ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION										
1974	\$ 1,488.9	\$ 30.0	\$ 263.9	\$ 552.3	\$ 94.0	\$ 499.0	\$ 26.0	\$ 21.9	\$ 0.5	\$ 1.4
1975	2,072.3	66.1	501.6	654.1	131.9	629.5	46.9	38.4	3.3	0.6
1976	2,498.9	73.7	758.3	675.2	145.1	754.4	48.5	39.1	3.6	1.1
1977 ^E	3,609.8	256.7	1,323.7	833.0	189.7	882.3	48.5	62.1	3.7	10.2
1978 ^E	4,143.0	165.4	1,733.6	922.6	215.9	972.6	59.7	63.9	8.6	0.7

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate
FFRDC: Federally Funded Research & Development Centers.
Note: Items may not add to total due to rounding.

TABLE 29

**ATOMIC ENERGY COMMISSION
RESEARCH OBLIGATIONS
BY PERFORMER**

**FY 1965-1968
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 334.0	\$ 6.1	\$ 3.7	\$ 53.0	\$ 70.8	\$ 146.1	\$ 5.7	\$ 44.3	\$ 0.3	\$ 4.0
1966	370.9	6.0	6.8	56.8	79.3	205.8	5.5	6.3	0.2	4.2
1967	391.7	5.6	4.1	59.6	85.8	220.3	5.5	9.9	0.2	0.8
1968	402.0	5.4	4.4	58.9	89.1	227.0	6.1	10.5	—	0.6
1969	417.3	5.2	4.7	62.5	97.7	230.3	5.5	10.6	0.1	0.6
1970	433.1	4.8	3.6	66.6	96.6	244.7	4.8	11.3	0.1	0.6
1971	429.0	4.9	3.0	69.6	89.6	244.7	4.5	12.0	0.1	0.6
1972	417.1	4.6	2.6	64.4	81.0	243.2	8.5	12.0	0.1	0.6
1973	424.8	5.6	3.3	60.6	78.7	254.6	7.4	13.9	0.1	0.5
ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION										
1974*	\$ 464.7	\$ 16.0	\$ 6.0	\$ 59.5	\$ 85.7	\$ 269.6	\$ 9.9	\$ 16.5	\$ 0.2	\$ 1.3
1975*	593.4	24.7	59.8	67.0	112.1	296.9	9.3	23.1	*	0.4
1976*	746.5	21.5	54.4	90.8	116.3	417.7	22.9	22.2	0.2	0.4
1977* ^E	879.7	31.7	65.1	109.4	143.6	478.0	26.7	24.4	0.3	0.4
1978* ^E	972.7	32.8	61.4	119.8	169.6	529.0	36.4	22.8	0.5	0.4

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

* 1974—1978 AEC functions transferred to ERDA.

Note: Items may not add to total due to rounding.

TABLE 30

ATOMIC ENERGY COMMISSION
DEVELOPMENT OBLIGATIONS
BY PERFORMER

BY 1965-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1965	\$ 906.7	\$ 24.8	\$ 338.8	\$ 328.1	\$ 3.6	\$ 174.0	\$ 3.4	\$ 33.9	\$ —	\$ 0.1
1966	841.5	14.0	317.9	285.6	2.9	185.8	4.2	29.7	—	1.4
1967	865.6	9.5	316.5	312.7	3.7	185.4	5.6	29.4	—	2.8
1968	967.0	11.2	359.9	340.2	3.5	205.9	6.8	37.8	0.1	1.7
1969	988.6	11.8	368.3	344.7	3.7	211.1	5.3	43.4	0.1	*
1970	912.9	12.7	296.5	343.0	3.7	203.3	4.9	48.6	0.2	*
1971	873.9	11.9	262.6	396.1	4.3	187.6	3.7	7.8	0.1	*
1972	880.5	11.6	213.7	450.6	3.5	194.9	2.1	4.1	0.1	—
1973	938.4	10.2	196.7	511.9	4.0	209.5	1.2	4.7	0.2	*
ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION										
1974*	1,024.2	14.1	257.8	492.8	8.3	229.3	16.1	5.4	0.3	0.1
1975*	1,478.8	41.3	441.8	587.1	19.7	332.6	37.6	15.3	3.3	0.1
1976*	1,752.4	52.1	703.8	584.5	28.8	336.7	25.6	16.9	3.3	0.7
1977* ^E	2,730.1	225.0	1,258.6	723.6	46.0	404.3	21.8	37.7	3.4	9.8
1978* ^E	3,170.3	132.6	1,672.2	802.8	46.3	443.6	23.3	41.1	8.1	0.3

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

FFRDC: Federally Funded Research & Development Centers.

E Estimate

* 1974—1978, AEC functions transferred to ERDA.

Note: Items may not add to total due to rounding.

TABLE 31

**DEPARTMENT OF TRANSPORTATION
RESEARCH AND DEVELOPMENT OBLIGATIONS
BY PERFORMER**

FY 1966-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1966	\$ 171.7	\$ 41.2	\$ 125.9	\$ *	\$ 1.4	\$ —	\$ 1.5	\$ 1.5	\$ 0.1	\$ *
1967	283.6	45.1	212.4	—	11.1	—	1.9	2.2	10.8	—
1968	171.7	51.9	90.0	—	11.9	—	2.1	3.3	12.5	*
1969	228.0	53.7	132.4	—	12.8	1.7	6.0	4.9	16.2	0.2
1970	317.3	64.2	206.4	—	10.9	—	10.3	3.2	22.4	—
1971	482.5	101.4	333.6	*	9.9	6.1	2.1	7.0	22.3	0.1
1972	351.2	71.5	218.1	—	13.3	0.8	6.6	9.5	31.4	—
1973	310.6	51.1	173.1	—	18.8	4.6	8.5	9.3	45.1	0.4
1974	369.8	66.9	204.7	—	21.5	3.6	7.3	12.6	52.5	0.7
1975	311.6	58.0	161.9	—	25.8	2.6	5.3	10.3	46.5	1.0
1976	294.5	63.1	158.7	—	14.8	2.4	3.6	11.0	40.8	0.1
1977 ^E	407.4	76.3	221.4	—	23.4	3.0	8.9	12.8	61.4	0.1
1978 ^E	398.4	73.4	213.5	—	24.1	3.0	7.7	13.2	63.5	0.1

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

* Less than \$50,000

Note: Items may not add to total due to rounding.

TABLE 32

**DEPARTMENT OF TRANSPORTATION
RESEARCH OBLIGATIONS
BY PERFORMER**

FY 1966-1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1966	\$ 18.4	\$ 12.7	\$ 3.4	\$ *	\$ 1.2	\$ —	\$ 0.9	\$ —	\$ 0.1	\$ *
1967	45.0	13.8	11.3	—	9.0	—	1.6	0.1	9.1	—
1968	55.6	21.0	12.9	—	9.2	—	1.7	0.9	9.9	*
1969	67.9	26.5	15.5	—	8.1	0.9	4.5	1.8	10.4	0.2
1970	88.2	31.8	16.8	—	10.6	—	9.7	0.3	19.1	—
1971	173.2	53.3	89.1	*	8.1	0.2	1.7	3.3	17.4	—
1972	120.3	31.0	58.3	—	7.6	0.8	4.5	1.7	16.5	—
1973	77.2	16.2	34.7	—	9.6	1.0	5.0	3.4	7.6	—
1974	61.8	15.9	29.1	—	3.9	0.3	3.8	—	8.8	—
1975	53.9	15.7	26.9	—	2.9	0.1	3.0	—	5.4	—
1976	31.1	10.8	14.3	—	2.5	0.1	1.0	0.1	2.3	—
1977 ^E	46.0	12.3	23.2	—	2.7	—	3.3	0.1	4.4	—
1978 ^E	36.5	10.7	17.2	—	2.7	—	2.3	0.1	3.6	—

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

* Less than \$50,000

Note: Items may not add to total due to rounding.

TABLE 33

**DEPARTMENT OF TRANSPORTATION
DEVELOPMENT OBLIGATIONS
BY PERFORMER**

**FY 1966-1978
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1966	\$ 153.3	\$ 28.5	\$ 122.5	\$ —	\$ 0.2	\$ —	\$ 0.6	\$ 1.5	\$ —	\$ —
1967	238.6	31.3	201.1	—	2.1	—	0.3	2.1	1.7	—
1968	116.1	30.9	77.1	—	2.7	—	0.4	2.4	2.6	—
1969	160.1	27.2	116.9	—	4.7	0.8	1.5	3.1	5.8	—
1970	229.1	32.4	189.6	—	0.3	—	0.6	2.9	3.3	—
1971	309.3	48.1	244.5	—	1.8	5.9	0.4	3.7	4.9	0.1
1972	230.9	40.5	159.8	—	5.7	—	2.1	7.8	14.9	—
1973	233.4	34.9	138.4	—	9.2	3.6	3.5	5.9	37.5	0.4
1974	308.0	51.0	175.6	—	17.6	3.3	3.5	12.6	43.7	0.7
1975	257.7	42.3	135.3	—	22.9	2.5	2.3	10.3	41.1	1.0
1976	263.4	52.3	144.4	—	12.3	2.3	2.5	10.9	38.5	0.1
1977 ^E	361.4	64.0	198.2	—	20.7	3.0	5.6	12.7	57.0	0.1
1978 ^E	361.9	62.7	196.3	—	21.4	3.0	5.4	13.1	59.9	0.1

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

Note: Items may not add to total due to rounding.

TABLE 34

**DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
RESEARCH AND DEVELOPMENT OBLIGATIONS
BY PERFORMER**

**FY 1966-1978
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1966	\$ 1,014.4	\$ 181.7	\$ 36.5	\$ —	\$ 537.6	\$ —	\$ 187.1	\$ —	\$ 50.2	\$ 21.3
1967	1,146.6	204.4	51.7	—	619.8	7.9	187.6	15.8	37.4	21.9
1968	1,251.8	221.5	48.1	—	671.3	13.0	188.7	24.2	59.7	25.3
1969	1,297.4	243.4	60.5	0.2	695.0	10.6	178.7	24.9	55.5	28.7
1970	1,221.0	246.6	43.7	—	646.6	8.0	184.4	27.7	48.4	15.6
1971	1,467.1	297.5	54.7	—	761.7	7.2	216.5	27.3	76.4	34.8
1972	1,751.1	327.6	85.3	—	915.9	9.2	249.9	25.9	111.9	25.4
1973	1,837.6	370.3	89.1	—	929.6	1.1	298.8	1.4	126.8	20.6
1974	2,290.1	401.6	142.3	—	1,207.7	4.0	387.7	3.0	120.5	23.4
1975	2,375.2	456.9	120.2	25.8	1,273.5	4.8	356.7	4.5	106.1	26.8
1976	2,545.9	493.4	133.3	36.0	1,349.4	5.8	385.1	4.6	109.0	29.4
1977 ^E	2,959.5	546.9	161.4	40.2	1,506.5	6.8	414.5	3.2	238.0	42.1
1978 ^E	3,009.4	572.6	165.9	46.0	1,526.4	12.0	425.5	4.3	225.8	31.0

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

Note: Items may not add to total due to rounding.

TABLE 35

**DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
RESEARCH OBLIGATIONS
BY PERFORMER**

**FY 1966-1978
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1966	\$ 966.2	\$ 173.6	\$ 35.3	\$ —	\$ 520.6	\$ —	\$ 168.0	\$ —	\$ 47.8	\$ 21.0
1967	1,082.0	188.3	50.6	—	599.9	7.8	178.2	*	35.9	21.3
1968	1,147.1	193.2	40.1	—	649.7	8.7	172.4	1.5	56.6	24.7
1969	1,174.1	220.4	45.4	—	659.4	5.8	166.4	1.1	48.1	27.5
1970	1,129.3	235.7	38.9	—	621.9	4.9	163.3	2.6	46.9	15.1
1971	1,302.3	278.2	37.9	—	698.2	4.9	189.2	3.3	56.2	34.4
1972	1,464.4	302.2	47.2	—	805.7	4.3	216.8	3.2	61.2	23.7
1973	1,459.1	334.5	53.9	—	802.1	0.9	196.7	1.1	51.7	18.1
1974	1,851.6	360.2	80.3	—	1,062.0	3.7	263.0	1.7	60.9	19.7
1975	1,926.2	419.9	66.3	25.8	1,077.6	4.5	248.4	3.1	61.2	19.5
1976	2,162.9	463.8	63.2	36.0	1,198.3	5.7	299.1	3.6	71.2	22.0
1977 ^E	2,430.1	513.9	75.6	40.2	1,336.6	6.6	324.7	2.5	94.1	35.8
1978 ^E	2,488.4	536.9	78.8	46.0	1,363.3	11.9	329.8	3.3	94.4	23.8

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

* Less than \$50,000

Note: Items may not add to total due to rounding.

TABLE 36

**DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
DEVELOPMENT OBLIGATIONS
BY PERFORMER**

**FY 1966-1978
(Millions of Dollars)**

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1966	\$ 48.2	\$ 8.1	\$ 1.2	\$ —	\$ 17.0	\$ —	\$ 19.2	\$ —	\$ 2.4	\$ 0.4
1967	64.6	16.2	1.1	—	19.9	0.1	9.5	15.8	1.4	0.7
1968	104.7	28.3	7.9	—	21.6	4.3	16.3	22.6	3.1	0.6
1969	123.4	23.0	15.1	0.2	35.7	4.8	12.3	23.8	7.4	1.2
1970	91.7	10.9	4.8	—	24.7	3.1	21.1	25.2	1.5	0.5
1971	173.7	19.3	16.9	—	63.6	2.2	27.2	24.0	20.2	0.4
1972	286.7	25.4	38.1	—	110.2	4.9	33.0	22.7	50.7	1.8
1973	378.4	35.8	35.1	—	127.5	0.1	102.1	0.2	75.1	2.5
1974	438.6	41.4	62.0	—	145.6	0.2	124.6	1.3	59.6	3.7
1975	449.0	37.0	54.0	—	195.9	0.3	108.3	1.4	44.9	7.3
1976	383.0	29.6	70.1	—	151.1	0.2	85.9	1.0	37.7	7.3
1977 ^E	529.4	33.1	85.8	—	169.7	0.1	89.7	0.7	143.9	6.4
1978 ^E	521.0	35.6	87.1	—	163.1	0.1	95.6	1.0	131.4	7.1

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

FFRDC: Federally Funded Research & Development Centers

Note: Items may not add to total due to rounding.

TABLE 37

NATIONAL SCIENCE FOUNDATION
RESEARCH AND DEVELOPMENT OBLIGATIONS
BY PERFORMER

FY 1966–1978
(Millions of Dollars)

FISCAL YEARS	TOTAL	PERFORMER								
		INTRAMURAL	INDUSTRY	FFRDC (IND.)	UNIV. & COLLEGES	FFRDC (UNIV. & COLLEGES)	OTHER NON- PROFIT	FFRDC (OTHER NON-PROFIT)	OTHER	FOREIGN
1966	\$ 227.3	\$ 13.3	\$ 2.9	\$ —	\$ 179.9	\$ 15.3	\$ 14.4	\$ —	\$ 1.0	\$ 0.5
1967	262.4	12.2	1.7	—	208.8	16.9	22.3	—	0.1	0.5
1968	283.5	12.2	1.4	—	221.0	21.2	22.2	5.0	0.1	0.3
1969	273.8	15.0	1.5	—	212.6	24.5	17.3	2.7	—	0.2
1970	289.0	13.9	2.8	—	228.0	25.7	15.9	0.8	0.1	1.8
1971	336.9	19.4	3.5	2.6	266.6	31.5	7.8	1.9	2.9	0.8
1972	454.8	17.9	4.7	4.8	362.5	40.4	16.3	5.6	0.8	1.9
1973	479.9	18.4	6.8	3.5	374.5	38.8	32.7	0.1	2.2	2.9
1974	556.4	53.6	14.7	2.9	389.4	44.5	37.3	4.3	4.0	5.7
1975	595.0	49.5	17.7	2.2	434.9	40.1	41.6	3.4	1.9	3.7
1976	609.3	64.9	15.4	2.1	436.6	45.4	33.8	2.3	3.3	5.5
1977 ^E	686.2	81.3	17.9	2.4	492.3	45.7	33.8	0.7	6.0	6.1
1978 ^E	757.5	83.6	20.9	2.9	543.2	55.1	34.3	1.8	8.6	7.2

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate
FFRDC: Federally Funded Research & Development Centers
Note: Items may not add to total due to rounding.

TABLE 38
ARMY RESEARCH, DEVELOPMENT, TEST AND EVALUATION
ACTIVITIES BY FACILITY

Selected Fiscal Years
(Millions of Dollars)

INSTALLATION	1969		1973		1976		1977 ^E	
	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E
Aeromedical Research Lab.	\$ 0.5	\$ 0.5	\$ 1.8	\$ 1.8	\$ 2.3	\$ 2.3	\$ 2.2	\$ 2.2
Air Defense Board	2.2	2.2	2.8	2.7	2.5	2.5	2.3	2.3
Airborne Communications & Electronics Board	1.2	1.2	2.1	2.1	1.7	1.7	1.2	1.2
Air Mobility R&D Lab.	—	—	37.9	12.4	47.5	14.0	38.7	15.6
Arctic Test Center	2.4	2.4	2.9	2.9	3.2	3.2	3.7	3.7
Armor & Engineer Board	1.9	1.9	2.2	2.2	2.0	2.0	3.5	3.5
Atmospheric Sciences Lab.	—	—	9.8	8.7	13.1	10.6	13.2	10.1
Aviation Test Board	5.7	3.4	6.3	3.8	6.1	5.9	—	—
Avionics Lab.	—	—	12.7	10.5	10.6	7.2	11.1	6.0
Ballistics Research Labs.	19.0	13.8	38.4	23.9	38.0	27.5	41.5	28.0
Benet Weapons Lab.	—	—	10.7	8.3	10.1	7.1	10.1	6.3
Cold Regions R&E Lab.	3.7	3.4	4.7	3.9	6.1	4.7	7.9	5.6
Combat Surveillance Labs.	—	—	40.7	14.2	28.1	12.3	25.8	11.0
Communications ADP Lab.	—	—	21.6	10.9	18.2	15.0	16.7	11.1
Construction Engineering Research Lab.	2.3	2.3	6.2	3.5	13.1	11.2	11.4	7.0
Edgewood Arsenal Labs.	43.6	32.5	31.5	29.3	48.7	43.5	54.3	41.2
Electronic Proving Ground	13.0	9.9	7.9	5.3	4.5	4.0	4.0	3.5
Electronic Warfare Lab.	—	—	32.1	14.8	49.8	18.1	40.4	17.2
Electronic Technology & Devices Lab.	—	—	16.7	9.9	21.2	11.0	21.8	11.6
Engineer Topographic Lab.	9.4	4.2	10.0	6.2	15.4	6.9	14.6	7.3
Engineer Waterways Experimental Station	10.9	9.6	14.5	12.2	12.4	10.8	14.2	12.3
Field Artillery Board	—	—	1.1	1.1	0.8	0.8	1.1	1.1
Frankford Arsenal Lab.	33.0	17.6	27.2	20.3	23.5	17.0	17.2	9.2
Harry Diamond Lab.	24.3	12.1	43.0	23.2	65.3	30.0	61.8	30.9
Herman Engineering Lab.	3.1	2.3	6.0	4.7	7.2	5.1	6.4	4.9
Infantry Board	0.9	0.7	1.2	1.2	1.2	1.2	1.6	1.6
Institute of Dental Research	0.5	0.5	0.9	0.9	0.8	0.8	0.9	0.9
Institute of Surgical Research	0.9	0.9	1.6	1.6	1.6	1.6	1.8	1.8
Letterman Army Institute of Research	0.5	0.5	0.6	0.6	6.2	6.2	6.3	6.3
Materials & Mechanics Research Station	\$ 8.0	\$ 7.2	\$ 19.0	\$ 11.3	\$ 22.5	\$ 13.8	\$ 22.2	\$ 12.0
Material Testing Directorate	—	—	9.5	9.4	25.5	25.3	25.1	24.8
Medical Bioengineering R&D Lab.	—	—	1.4	1.4	2.8	2.8	2.5	2.5
Medical Research Institute of Infectious Diseases	3.5	2.0	6.6	6.6	7.2	7.2	7.5	7.5
Missile Research, Development & Engi- neering Lab.	71.9	29.9	91.6	33.4	88.5	38.6	85.7	36.5
Mobility Equipment Research & Devel- opment Center	40.4	14.1	49.7	19.0	52.0	22.3	50.2	22.7
Natic Labs	18.4	11.3	22.8	15.6	25.3	15.8	25.5	17.7
Night Vision Lab.	—	—	38.2	16.0	41.0	17.5	51.2	17.6
Picatinny Arsenal Lab.	63.1	41.0	80.3	42.3	85.4	43.4	75.7	36.7
R&D Technical Support Activity	—	—	9.9	9.7	10.1	9.9	12.7	12.6
Research Inst. for Behavioral & Social Sciences	—	—	9.9	9.7	10.1	9.9	12.7	12.6
Research Inst. of Environmental Medicine	2.3	2.3	2.9	2.9	3.5	3.5	3.5	3.5
Tropic Test Center	3.4	3.3	2.6	2.6	2.3	2.2	2.3	2.1
Walter Reed Inst. of Research	13.7	13.3	15.2	15.2	15.1	15.1	15.2	15.2
White Sands Missile Range	94.1	74.5	92.7	73.8	103.3	80.9	126.3	91.3
Yuma Proving Ground	7.1	7.1	10.9	9.8	19.1	19.1	15.1	15.1

Source: Department of Defense

TABLE 39

**ARMY RESEARCH, DEVELOPMENT, TEST AND EVALUATION
ACTIVITIES BY INSTALLATION**

Selected Fiscal Years
(Millions of Dollars)

INSTALLATION	1969		1973		1976		1977 ^E	
	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E
Material Systems Analysis Agency	\$ 13.7	\$ 11.8	\$ 11.0	\$ 6.6	\$ 17.4	\$ 11.7	\$ 17.9	\$ 12.2
Desert Test Center	26.3	23.1	11.8	11.1	—	—	—	—
Medical Research & Nutrition Lab.	2.2	2.2	2.6	2.6	—	—	—	—
Medical Research Lab.	1.7	1.7	1.7	1.7	—	—	—	—
Medical Research Unit (K.L.)	0.2	0.2	0.3	0.3	—	—	—	—
Medical Research Unit (C.Z.)	0.2	0.2	0.1	0.1	—	—	—	—
Rock Island Arsenal Lab.	16.7	5.9	14.7	10.0	—	—	—	—
Tank Automotive Lab.	23.8	11.6	34.1	14.9	—	—	—	—
Land Warfare Lab.	—	—	7.2	4.5	—	—	—	—
Limited War Lab.	8.4	4.5	—	—	—	—	—	—
Behavioral Scientific Research Lab.	2.7	1.7	—	—	—	—	—	—
Engineer Reactor Group	1.4	1.0	—	—	—	—	—	—
Engineer Topographic Lab.	9.4	4.2	—	—	—	—	—	—
Coating & Chemical Lab.	2.3	0.7	—	—	—	—	—	—
Nuclear Defense Lab.	2.7	2.3	—	—	—	—	—	—
Aviation Material Lab.	22.3	5.8	—	—	—	—	—	—
Aviation Test Activity	2.8	2.8	—	—	—	—	—	—
Electronic Research & Development Lab.	196.2	94.6	—	—	—	—	—	—
Biological Lab.	21.1	18.7	—	—	—	—	—	—
Waterviolet Arsenal	5.5	4.8	—	—	—	—	—	—
Development & Project Services	8.8	8.5	—	—	—	—	—	—
Ground Equipment Test Activities	2.7	2.2	—	—	—	—	—	—
Aberdeen R&D Center	0.3	0.2	—	—	—	—	—	—
Aviation Engineering Flight Activity	—	—	—	—	4.0	4.0	3.8	3.8
Dugway Proving Ground	—	—	—	—	11.7	9.8	14.3	11.4
Kwajalein Missile Range	—	—	—	—	89.3	4.0	92.7	3.9
Mobility Systems Lab.	—	—	—	—	26.9	10.7	36.3	15.6

Source: Department of Defense

TABLE 40

**NAVY RESEARCH, DEVELOPMENT, TEST AND EVALUATION
ACTIVITIES BY INSTALLATION**

Selected Fiscal Years
(Millions of Dollars)

INSTALLATION	1969		1973		1976		1977 ^E	
	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E
Aerospace Medical Research Lab.	\$ 3.0	\$ 2.8	\$ 3.3	\$ 3.3	\$ 5.4	\$ 5.4	\$ 5.0	\$ 5.0
Air Development Center	68.7	43.9	87.5	42.4	123.4	53.2	129.7	52.4
Air Engineering Center	9.9	6.2	9.8	6.7	20.9	18.8	18.1	15.3
Air Propulsion Test Center	9.1	7.7	12.6	9.1	17.0	11.2	19.6	13.3
Air Test Center	32.7	29.2	31.8	27.9	56.7	47.6	62.7	49.9
Air Test Facility	5.3	4.9	1.5	1.4	2.6	1.7	5.4	2.2
Civil Engineering Lab.	5.2	3.8	10.6	9.6	11.6	7.3	14.6	9.1
Clothing & Textile Research Inst.	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.7
Coastal Systems Lab.	—	—	10.5	9.1	24.7	17.3	29.4	17.1
Dental Research Inst.	0.2	0.2	0.3	0.3	0.5	0.5	0.6	0.6
Electronics Lab Center	27.3	24.8	32.1	22.5	55.1	34.9	54.5	39.3
Environmental Prediction Research Facility	—	—	1.4	0.9	2.3	1.2	2.3	1.1
Explosive Ordnance Disposal Facility	1.3	0.6	2.7	1.5	3.5	1.7	4.6	1.8
Medical Field Research Lab.	0.6	0.6	0.8	0.8	0.8	0.8	—	—
Medical Research Institute	4.7	4.7	5.1	5.1	10.0	10.0	11.7	11.7
Medical Research Unit #2	1.3	1.3	1.6	1.6	1.9	1.9	1.9	1.9
Medical Research Unit #3	1.1	1.1	0.9	0.9	1.1	1.1	1.3	1.3
Medical Research Unit #4	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6
Ordnance Missile Test Facility	1.7	1.2	2.2	1.6	3.5	2.4	3.0	1.3
Pacific Missile Test Center	97.5	59.5	94.5	67.5	120.2	92.9	104.0	80.1
Personnel Research & Development Center	2.6	2.6	6.2	5.7	8.4	5.2	10.4	6.7
Research Laboratory	89.9	80.9	158.9	153.6	141.4	115.3	151.8	130.1
Ship Research & Development Center	30.9	28.3	96.7	44.9	83.3	63.7	92.4	67.9
Submarine Medical Research Lab.	1.3	1.3	1.4	1.4	1.7	1.7	1.9	1.9
Surface Weapons Center	61.4	42.7	73.6	41.6	174.9	81.2	156.3	80.8
Undersea Center	37.9	26.4	50.3	33.2	69.8	43.4	85.5	49.9
Underwater Systems Center	—	—	47.7	40.4	69.4	49.7	101.1	62.6
Weapons Center	107.4	60.3	101.7	63.3	125.1	79.3	159.9	99.6
Weapons Evaluation Facility	1.7	1.7	1.0	1.0	1.7	1.7	1.6	1.6

TABLE 41
NAVY RESEARCH, DEVELOPMENT, TEST AND EVALUATION
ACTIVITIES BY INSTALLATION

Selected Fiscal Years
(Millions of Dollars)

INSTALLATION	1969		1973		1976		1977 ^E	
	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E
Space Systems Activity	\$ 2.4	\$ 0.4	\$ 4.4	\$ 0.8	\$ —	\$ —	\$ —	\$ —
Naval Unit (Ft. Detrick)	0.2	0.1	0.1	0.1	—	—	—	—
Weapons Lab.	22.1	19.2	37.9	30.6	—	—	—	—
Weapons Neuropsych Research Unit	0.7	0.7	1.3	1.3	—	—	—	—
Toxicology Unit	0.1	0.1	0.4	0.4	—	—	—	—
Aerospace Recovery Facility	—	—	2.5	2.4	—	—	—	—
Underwater Weapons Station	15.0	10.4	—	—	—	—	—	—
Ship R&D Lab #1	12.5	9.2	—	—	—	—	—	—
Training Devices Center	16.6	9.5	—	—	—	—	—	—
Ship R&D Lab #2	13.6	12.4	—	—	—	—	—	—
Applied Sciences Lab.	12.7	9.1	—	—	—	—	—	—
Radiological Defense Lab.	8.9	2.6	—	—	—	—	—	—
Aerospace Recovery Facility	2.6	2.4	—	—	—	—	—	—
Electronic Systems Testing & Evaluation Center	1.3	1.3	—	—	—	—	—	—
Arctic Research Lab.	—	—	—	—	6.8	—	6.8	—
Biomedical Research Lab.	—	—	—	—	2.2	0.3	2.0	0.4
Blood Research Lab.	—	—	—	—	0.8	0.8	0.9	0.9
Health Research Center	—	—	—	—	2.1	2.1	2.4	2.4
National Parachute Test Range	—	—	—	—	8.1	7.4	7.4	6.5
Underwater Ranges Directorate	—	—	—	—	15.4	3.8	16.4	4.6

Source: Department of Defense

TABLE 42

**AIR FORCE RESEARCH, DEVELOPMENT, TEST AND EVALUATION
ACTIVITIES BY INSTALLATION**

Selected Fiscal Years
(Millions of Dollars)

INSTALLATION	1969		1973		1976		1977 ^E	
	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E	TOTAL	IN-HOUSE RDT&E
Aero Propulsion Lab.	\$ 47.4	\$ 5.8	\$ 54.5	\$ 8.5	\$ 60.4	\$ 10.5	\$ 61.5	\$ 11.1
Armament Development & Test Center	76.1	41.1	114.8	57.6	98.5	33.0	126.1	37.2
Arnold Engineering Development Ctr.	48.7	6.8	47.3	12.6	97.4	97.4	99.1	99.1
Avionics Lab.	91.5	6.1	103.6	11.9	125.3	15.6	127.0	17.0
Flight Dynamics Lab.	43.3	10.5	51.5	24.1	89.6	27.9	73.3	24.6
Flight Test Center	34.1	29.6	48.1	36.3	71.6	53.8	72.4	53.6
Frank J. Seeler Research Lab.	0.3	0.3	0.5	0.5	0.8	0.6	0.8	0.6
Human Resources Lab.	3.3	1.5	13.8	4.5	13.2	5.6	19.2	6.3
Materials Lab.	30.4	1.7	35.4	10.2	41.9	14.6	45.9	15.3
Rocket Propulsion Lab.	36.0	10.8	24.3	10.0	29.1	11.6	33.7	11.7
Rome Air Development Center	68.4	20.5	95.5	22.2	57.7	15.1	69.1	16.2
School of Aerospace Medicine	—	—	10.3	8.5	10.2	8.7	11.4	8.8
Space & Missile Test Center	—	—	57.5	7.9	48.2	9.8	50.8	10.3
Weapons Lab.	50.3	12.3	19.3	29.2	99.6	17.7	133.3	24.3
Aerospace Medical Research Lab.	9.0	3.4	13.1	5.8	12.7	4.8	13.1	5.1
Aerospace Research Lab.	13.1	6.5	11.4	6.5	—	—	—	—
Cambridge Research Lab.	62.4	26.5	54.4	33.5	—	—	—	—
Civil Engineering Center	—	—	—	—	4.1	0.4	6.2	0.9
Eastern Test Range	—	—	—	—	1.2	1.2	—	—
Geophysics Lab.	—	—	—	—	55.8	21.0	46.4	23.8

Source: Department of Defense

TABLE 43

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION R&D PLAN
BY CENTER, IN-HOUSE vs. CONTRACT**

Selected Fiscal Years
(Millions of Dollars)

CENTER	1970 ¹		1975 ¹		1976 ²		1977 ²	
	IN-HOUSE	CONTRACT	IN-HOUSE	CONTRACT	IN-HOUSE	CONTRACT	IN-HOUSE	CONTRACT
Johnson Space Center	\$ 87.6	\$ 932.1	\$ 79.4	\$ 713.6	\$ 100.2	\$ 900.0	\$ 124.1	\$ 847.2
Kennedy Space Center	5.4	261.6	2.7	99.8	2.9	107.1	11.8	156.5
Marshall Space Flight Center	40.8	691.5	18.6	272.3	26.4	388.6	18.7	447.0
National Space Flight Center	*	*	1.3	0.4	8.3	2.2	6.3	5.5
Goddard Space Flight Center	46.8	385.2	46.3	337.9	43.5	317.7	44.4	358.6
Wallops Flight Center	1.9	8.0	3.2	11.4	3.2	11.7	2.8	11.9
Ames Research Center	3.8	60.9	10.6	105.7	12.8	127.5	13.4	101.9
Flight Research Center	0.9	10.0	1.8	14.4	2.3	18.6	2.1	17.5
Langley Research Center	7.5	99.2	17.7	176.3	13.9	138.8	13.3	135.5
Lewis Research Center	2.0	109.6	2.3	128.4	2.9	161.8	2.8	152.0

* Prior to 1974 included with Marshall Space Flight Center

¹ Estimates based on NASA Budget Plan and Federal Funds for Research, Development & Other Scientific Activities

² Source: 1977 NASA Authorization Hearings (House) Vol. 1, Pt. 2, Pg. 442

TABLE 44

**DEPARTMENT OF TRANSPORTATION RESEARCH AND DEVELOPMENT SUPPORT BY SUBDIVISION
INTRAMURAL VS. EXTRAMURAL**

Selected Fiscal Years
(Millions of Dollars)

	1970		1973		1976		1978 ^E	
	INTRAMURAL	EXTRAMURAL	INTRAMURAL	EXTRAMURAL	INTRAMURAL	EXTRAMURAL	INTRAMURAL	EXTRAMURAL
Federal Aviation Administration	\$ 35.1	\$ 21.0	\$ 13.7	\$ 65.8	\$ 21.9	\$ 76.2	\$ 27.4	\$ 95.8
Federal Highway Administration	5.8	27.0	0.4	23.2	0.5	28.4	0.7	53.7
Federal Railroad Administration	1.1	10.4	10.1	25.4	19.6	30.8	15.5	28.7
National Highway Traffic Safety Adm.	1.4	18.1	3.4	51.2	1.1	30.3	2.3	49.0
Office of the Secretary	6.1	163.4	10.4	13.2	10.1	15.7	12.3	18.9
U. S. Coast Guard	14.7	3.7	3.7	24.0	3.3	9.1	5.4	16.6
Urban Mass Transportation Adm.	*	9.5	9.5	56.7	6.6	40.9	9.5	61.6
Materials Transportation Bureau	—	—	—	—	—	—	0.2	0.8

Source: National Patterns of R&D Resources, 1953—1977, National Science Foundation.

^E Estimate

* Less than \$50,000

TABLE 45

DEPARTMENT OF THE NAVY SERVICE SUPPORT CONTRACTS

FY 1968-1976
(Millions of Dollars)

YEAR	CONTRACTS					O&M OUTLAYS	CONTRACTS AS PERCENT OF O&M OUTLAYS
	TECHNICAL ENGINEERING	PERSONNEL SERVICES	MANAGEMENT SERVICES	CONTRACTOR- OPERATED FACILITIES	TOTAL		
1968	\$ 103.2	\$ 41.0	\$ 10.0	\$ 9.9	\$ 164.0	\$ 4,730.3	3.5%
1969	76.3	35.3	9.1	15.1	135.8	5,336.5	2.5
1970	52.1	30.8	2.4	14.2	99.6	5,108.8	1.9
1971	34.4	23.0	1.6	15.0	73.9	5,072.1	1.5
1972	29.9	24.7	0.4	16.2	71.2	5,308.0	1.3
1973	34.2	24.4	0.4	16.7	75.7	5,196.1	1.5
1974	74.8	32.4	0.5	83.9	191.6	6,556.5	2.9
1975	85.1	30.7	0.1	19.9	135.8	7,317.2	1.9
1976 ^E	80.6	37.9	0.1	20.2	139.2	7,948.0	1.8
1977TQ ^E	10.1	9.5	*	5.2	34.9	1,963.3	1.8

* Less than \$50,000

E Estimate

TQ Transition Quarter

TABLE 46

DEPARTMENT OF THE AIR FORCE SERVICE SUPPORT CONTRACTS

FY 1968-1976
(Millions of Dollars)

YEAR	CONTRACTS					O&M OUTLAYS	CONTRACTS AS PERCENT OF O&M OUTLAYS
	TECHNICAL ENGINEERING	NON- PERSONNEL SERVICES	MANAGEMENT SERVICES	CONTRACTOR- OPERATED FACILITIES	TOTAL		
1968	\$ 147.1	\$ 91.6	\$ *	\$ 97.3	\$ 336.0	\$ 5,943.8	5.7%
1969	192.3	58.4	0.2	117.0	368.0	6,811.9	5.4
1970	161.8	33.4	*	122.6	317.7	6,658.8	4.8
1971	125.6	31.3	*	146.3	303.2	6,384.6	4.7
1972	112.8	232.0	*	178.7	523.5	6,751.2	7.8
1973	116.7	289.6	—	169.6	575.9	6,369.8	9.0
1974	142.2	402.7	—	125.7	670.6	6,881.7	9.7
1975	165.8	288.8	—	275.4	730.0	7,445.5	9.8
1976	196.1	372.6	—	284.9	853.6	7,593.6	11.2
1977 ^E	244.7	414.9	—	359.0	1,018.6	8,265.0	12.3
1977TQ ^E	55.7	104.8	—	79.4	239.9	1,891.3	12.7
1978 ^E	276.2	521.6	—	367.4	1,165.2	8,495.1	13.7

* Less than \$50,000

E Estimate

TQ Transition Quarter

TABLE 47

**DEPOT-LEVEL MAINTENANCE
AIRCRAFT, ENGINES AND ACCESSORIES**

FY 1966-1978
(Millions of Dollars)

YEAR	TOTAL	CONTRACT		IN-HOUSE	
		AMOUNT	PERCENT	AMOUNT	PERCENT
ARMY					
1966	\$ 87.1	\$ 37.8	43.4%	\$ 49.3	56.6%
1967	123.1	62.0	50.4	61.1	49.6
1968	186.6	89.0	47.7	97.6	52.3
1969	279.0	129.4	46.4	149.6	53.6
1970	285.0	142.6	50.0	142.4	50.0
1971	262.4	156.1	59.5	106.3	40.5
1972	239.7	108.0	45.1	131.7	54.9
1973	207.1	82.2	39.7	124.9	60.3
1974	258.6	147.7	57.1	110.9	42.9
1975	260.1	151.8	58.4	108.3	41.6
1976	158.6	83.6	52.7	75.0	47.3
1977 ^E	169.8	64.0	37.7	105.8	62.3
1978 ^E	122.4	33.5	27.4	88.9	72.6
NAVY					
1966	\$ 351.3	\$ 60.5	17.2%	\$290.8	82.8%
1967	383.3	64.3	16.8	319.0	83.2
1968	400.3	64.3	16.1	336.0	83.9
1969	654.8	106.3	16.2	548.5	83.8
1970	595.4	121.3	20.4	474.1	79.6
1971	527.2	87.8	16.7	439.4	83.3
1972	526.6	126.0	23.9	400.6	76.1
1973	513.2	88.1	17.2	425.1	82.8
1974	594.4	105.4	17.7	489.0	82.3
1975	601.2	122.7	20.4	478.5	79.6
1976	693.5	134.8	19.4	558.7	80.6
1977 ^E	800.8	153.6	19.2	647.2	80.8
1978 ^E	1,074.3	268.9	25.0	805.4	75.0
AIR FORCE					
1966	\$ 375.9	\$123.9	33.0%	\$252.0	67.0%
1967	586.0	311.2	53.1	274.8	46.9
1968	662.3	383.3	57.9	279.0	42.1
1969	1,154.5	604.9	52.4	549.6	47.6
1970	1,074.1	495.0	46.1	579.1	53.9
1971	1,039.3	469.4	45.2	569.9	54.8
1972	1,072.8	463.1	43.2	609.7	56.8
1973	1,095.2	474.1	43.3	621.1	56.7
1974	1,150.5	478.2	41.6	672.3	58.4
1975	1,144.6	417.8	36.5	726.8	63.5
1976	1,050.9	341.9	32.5	709.0	67.5
1977 ^E	1,083.5	328.5	30.3	755.0	69.7
1978 ^E	1,113.1	301.8	27.1	811.3	72.9

Source: Department of Defense

E Estimate

TABLE 48
FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT TO FOREIGN PERFORMERS
SELECTED FISCAL YEARS
(Millions of Dollars)

	1965	1970	1975	1976	1977 ^E	1978 ^E
TOTAL, All Agencies	\$ 68.6	\$ 40.2	\$ 61.6	\$ 73.1	\$ 102.2	\$ 77.5
Dept. of Agriculture	8.9	5.5	7.0	8.2	9.1	8.0
Dept. of Defense	33.2	10.2	11.1	10.1	18.2	15.5
H.E.W.	19.8	15.6	26.8	29.4	42.1	31.0
Other	6.7	8.9	16.7	25.4	32.8	23.0
TOTAL, Special Foreign Currency Program, All Agencies*	\$ 17.2	\$ 17.3	\$ 18.4	\$ 26.3	\$ 45.8	\$ 30.7
Dept. of Agriculture	\$ 8.9	\$ 5.5	\$ 6.6	\$ 6.8	\$ 7.7	\$ 6.6
Dept. of Defense	0.9	1.1	2.1	2.5	3.7	2.5
H.E.W.	6.6	9.4	6.9	10.5	22.5	11.6
Other	0.8	1.3	2.8	6.5	11.9	10.0
BY AREA:						
Canada	\$ 6.0	\$ 4.2	\$ 8.4	\$ 7.1	\$ 6.2	NA
Latin America	3.7	4.0	2.1	3.1	3.6	NA
Europe	30.4	14.0	23.8	23.5	40.5	NA
Middle East	9.3	7.1	10.6	15.4	25.4	NA
Asia	15.2	8.4	7.5	13.6	17.7	NA
Australia and New Zealand	1.2	0.4	0.9	1.2	1.5	NA
Africa	1.1	1.0	3.1	2.8	2.6	NA
International Organizations	1.7	1.1	5.1	6.4	4.6	NA

Source: Federal Funds for Research, Development and Other Scientific Activities, FY 1965—FY 1977, Volumes XV—XXV, National Science Foundation.

E Estimate

NA Not Available

* "Special Foreign Currency Program" is included in the TOTAL, All AGENCIES, and refers to foreign currencies accruing abroad to the U.S. in exchange for surplus agricultural commodities that can be used to sponsor research and other scientific activities in the countries concerned, as designated by the Department of the Treasury.



aerospace research center

1725 DE SALES STREET, N.W., WASHINGTON, D.C. 20036

