



REPORT TO THE SUBCOMMITTEES ON  
 RESEARCH AND DEVELOPMENT  
 SENATE COMMITTEE ON  
 ARMED SERVICES  
 AND  
 PRIORITIES AND ECONOMY  
 IN GOVERNMENT  
 JOINT ECONOMIC COMMITTEE

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Contractors' Independent  
 Research And  
 Development Program--  
 Issues And Alternatives

Department of Defense

BY THE COMPTROLLER GENERAL  
 OF THE UNITED STATES

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JUNE 5, 1975



COMPTROLLER GENERAL OF THE UNITED STATES

WASHINGTON, D.C. 20548

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R 1 1  
The Honorable Thomas J. McIntyre, Chairman  
Subcommittee on Research and Development  
Committee on Armed Services  
United States Senate

S. 03500

and

F 2 1  
The Honorable William Proxmire, Chairman  
Subcommittee on Priorities and Economy  
in Government  
Joint Economic Committee  
Congress of the United States

707-2071

As requested in your letter of October 8, 1973, we are reporting on the issues relating to the Government's support of the contractors' independent research and development program.

We are recommending that, if financial support for independent research and development is to be continued, the Congress clarify the policy for such support.

We have not obtained formal comments on this report from agency heads but have considered the views of Department of Defense and other agency officials.

As your office agreed, we are sending copies to the Chairmen of the House and Senate Committees on Appropriations, Armed Services, and Government Operations. Also, as agreed, we are sending copies to the Director, Office of Management and Budget; the Secretary of Defense; the Director of Defense Research and Engineering; the Assistant Secretary of Defense (Installations and Logistics); the Secretaries of the Army, Navy, and Air Force; the Director, Defense Contract Audit Agency; the Administrator, Energy Research and Development Administration; the Administrator, National Aeronautics and Space Administration; and the Council of Defense and Space Industry Associations.

Comptroller General  
of the United States

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## ABBREVIATIONS

AEC	Atomic Energy Commission
ASPR	Armed Services Procurement Regulation
B&P	bid and proposal
CWAS	contractor's weighted-average share
DCAA	Defense Contract Audit Agency
DOD	Department of Defense
DPC	Defense Procurement Circular
G&A	general and administrative
GAO	General Accounting Office
IR&D	independent research and development
NASA	National Aeronautics and Space Administration
PMR	potential military relationship
R&D	research and development
RDT&E	research, development, test, and evaluation



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JOINT ECONOMIC COMMITTEE

CONTRACTORS' INDEPENDENT  
RESEARCH AND DEVELOPMENT  
PROGRAM--ISSUES AND  
ALTERNATIVES  
Department of Defense

D I G E S T

Independent research and development (IR&D) is that part of a contractor's total research and development program not required to be performed by a contract or grant. The contractor decides on the independent research and development areas undertaken to maintain and improve its ability to compete for future products and services. (See p. 4.)

GAO recommends that, if financial support for IR&D is to be continued, the Congress clarify the policy for such support by establishing guidelines which set forth:

- The purposes for which the Government supports IR&D costs.
- The appropriate amount of this financial support.
- The degree of control to be exercised by the Government over contractors' supported programs. (See p. 88.)

The Commission on Government Procurement examined this subject in detail. (See p. 79.) The report of the Commission, as well as this report, should assist the Congress by providing information on which judgments can be reached.

The Chairman of the Research and Development Subcommittee and the Chairman of the Subcommittee on Priorities and Economy in Government asked GAO to present alternatives for consideration.

In testimony before the Armed Services Committees in 1970, GAO suggested that the Congress may wish to consider, as an alternative policy, how greater use could be made of direct contracting to obtain contractors' research and development efforts. Also, GAO suggested that the Congress may wish to explore the extent to which agencies could identify development projects of the type now included in IR&D for review and authorization in the same manner as those that are funded from research and development appropriations.

In its current study, GAO obtained a wide range of Government and industry views on alternatives to the present method including:

- Establishing a line item in the agency budget for research and development now funded by IR&D and contracting direct with companies.
- Recovering IR&D through overhead by formula-type approaches.
- Allowing recovery through overhead only if there is benefit to the particular contract.
- Including IR&D as an element of profit.
- Removing most of the present controls.  
(See ch. 7.)

After studying the comments received on the various alternatives, GAO continues to support the views expressed in dissenting position 1 of the Commission on Government Procurement. Dissenting position 1 agreed with the majority position in recommending:

- Recognizing IR&D expenditures as being in the Nation's best interest to promote competition, advance technology, and foster economic growth.
- Establishing a policy recognizing IR&D efforts as necessary cost of doing business.



--Uniform treatment for IR&D, Government-wide, with exceptions treated by the Office of Federal Procurement Policy.

Dissenting position 1 also recommended, in part, a policy providing:

1 / --That DOD procedures for negotiating advance agreements be retained when applicable and that, in all other cases, use of the DOD formula for reasonableness be continued. 5

--That Government have access to contractors' commercial records when needed to determine that costs are allowable.

--That nothing in this policy precludes a direct contract arrangement for specific research and development contracts proposed by a contractor.

--That allowable projects have a potential relationship to an agency function or operation in the opinion of the agency head. (See p. 89.)

An interagency committee of the executive branch considered the Procurement Commission's recommendation and dissenting positions and proposed adoption of the Armed Services Procurement Regulation policies and procedures for IR&D as a standard for the executive branch, with the relevancy requirement broadened to encompass relevancy to the Government's interest. (See p. 81.) If the Congress establishes a uniform, Government-wide policy of reimbursing IR&D expenditures similar to that provided for by the Armed Services Procurement Regulation, the Congress will have to consider the desirability of a test of Government-wide relevancy.

If a Government-wide policy is adopted, GAO recommends that the legislation also provide for:

--Having the Government present one face to industry; i.e., one advance agreement, a joint technical review, a single overhead rate, etc.

--Including in advance agreements patent and technical data provisions granting the Government royalty-free licenses and data rights, based on a scale of the agencies' cost participation.

If the Congress proceeds as above, the Federal agencies should consider:

--Having contractors continue to propose annual programs to the Government so that the technical data would be added to Government data banks.

--Making technical reviews less structured and not as administratively burdensome and encouraging intensive reviews and exchanges of views between Government and contractor personnel on defined areas of common concern.  
(See p. 90.)

## CHAPTER 1

### INTRODUCTION

During debate in the U.S. Senate on the bill to authorize appropriations for the Department of Defense (DOD) for fiscal year 1974, Senator William Proxmire introduced an amendment to reduce funds available to DOD for contractors' independent research and development (IR&D) and bid and proposal (B&P) costs by 50 percent. The amendment was later withdrawn after an understanding was reached with Senator Thomas J. McIntyre, Chairman, Subcommittee on Research and Development, Senate Committee on Armed Services, that a study would be requested of GAO.

By letter dated October 8, 1973 (see app. 1), the Senators requested an in-depth investigation into the underlying assumptions and overall justification of the IR&D (and B&P) program, as well as into the current provisions of law. Attached were 22 questions. We replied to some questions in our August 1974 report.<sup>1</sup> Appendix II shows where in that report or this one we have answered the 22 questions.

### PREVIOUS STUDIES BY GAO

An earlier study of IR&D resulted in our 1970 report to the Congress on the policies and practices of DOD, the National Aeronautics and Space Administration (NASA), and the Atomic Energy Commission (AEC).<sup>2</sup> The study followed a report to the Congress in March 1967 on the need for improved control by DOD and NASA over the costs of bidding and related technical efforts charged to Government contracts.

In March 1971, in response to an inquiry by Senator Proxmire, we reported<sup>3</sup> that a line-item control of IR&D

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<sup>1</sup>"Partial Report--In-Depth Investigation into Independent Research and Development and Bid and Proposal Programs" (B-164912, Aug. 16, 1974).

<sup>2</sup>"Allowances for Independent Research and Development Costs in Negotiated Contracts--Issues and Alternatives" (B-164912, Feb 16, 1970).

<sup>3</sup>"Feasibility of Treating Contractors' Independent Research and Development Costs as a Budget Line Item" (B-164912, Mar. 8, 1971).

payments to major defense contractors could be developed. But we felt that no further legislative controls should be imposed pending evaluation of the legislative restrictions that had become effective January 1, 1971 (Public Law 91-441).

At the request of the Senate Committee on Armed Services, we reported on DOD's implementation of section 203 of Public Law 91-441, which restricted DOD's payments for IR&D and B&P, for each of the first 3 years that the law was in effect.<sup>1</sup> These reports were concerned with the effectiveness of DOD's policies and regulations in implementing the restrictions imposed by section 203, recommending improvements in DOD's implementation, and ascertaining the effect of the law and DOD's regulations on defense contractors.

#### SCOPE OF REVIEW

In this study we have considered (1) the basic justifications given by Government and industry for maintaining Government support of IR&D programs, (2) how industry manages Government-supported IR&D programs as contrasted with other R&D programs, (3) whether IR&D program benefits can be tangibly measured, (4) whether the effectiveness of various tests and procedures instituted to limit IR&D and B&P costs justify their costs, and (5) alternatives to the present method of supporting IR&D.

We analysed the IR&D programs of four defense contractors for a 2-year period, identifying purposes or objectives of IR&D programs and examining DOD and contractor management of IR&D and B&P programs. We also used information obtained from (1) previous reviews at 11 contractor sites over a 2-year period, (2) DOD, NASA, AEC, and other Government agencies, (3) the Council of Defense and Space Industry

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<sup>1</sup>"Implementation of Section 203, Public Law 91-441, on Payments for Independent Research and Development and Bid and Proposal Costs" (B-167034, Apr. 17, 1972).

"Payments for Independent Research and Development and Bid and Proposal Costs" (B-167034, Apr. 16, 1973).

"Department of Defense's Implementation of Section 203, Public Law 91-441, Involving Contractors' Independent Research and Development" (B-164912, May 1, 1974).

Associations, its members, and individual contractors, and (4) individuals in Government, industry, educational, and other associations or institutions who contributed their views on various aspects of this report.

DOD and NASA generally follow the same policies with respect to IR&D and B&P. Although our study concentrated on DOD procedures, we included NASA's operation or position to the extent known. It is likely that most descriptions of DOD procedures also pertain to NASA even when not so indicated.

## CHAPTER 2

### BACKGROUND OF IR&D AND B&P ISSUE

#### WHAT IS IR&D?

The Armed Services Procurement Regulation (ASPR) defines "IR&D" as a contractor's technical effort not sponsored by, or required in performance of, a contract or grant. It consists of projects in the areas of (1) basic and applied research, (2) development, and (3) systems and other concept formulation studies. NASA's procurement regulation contains the identical language.

The term "IR&D" is used by Government agencies to distinguish the independent work of the contractor from research and development (R&D) performed for the agency under contract or grant arrangement. IR&D performed by a Government contractor is the same as the R&D performed by a commercially oriented contractor to come up with new products or services. In the commercial marketplace, R&D costs are normally recovered in the selling price of products. This is also true for products sold to the Government on a fixed-price, price-competitive basis. But for other contracts awarded by DOD and NASA, contractor-initiated IR&D is considered an indirect or overhead item and allocated proportionately.

Generally, IR&D is related more to future business than to current sales and is recognized as a normal cost of doing business.

#### WHAT IS B&P?

DOD and NASA regulations define costs incurred in preparing, submitting, and supporting bids and proposals on potential Government or non-Government contracts as B&P costs. The proposals may be solicited or unsolicited, successful or unsuccessful.

B&P costs include direct technical effort, including the costs of system and concept formulation studies and the development of engineering data. B&P costs can also include administrative or nontechnical effort for the physical preparation of the technical proposal documents and technical

and nontechnical effort for the preparation and publication of the necessary supporting cost and other administrative data.

Administrative costs incurred in proposal preparation are not required to be separately identified and classified as B&P costs. If, in accordance with the contractor's normal accounting practice, these costs are charged to an appropriate overhead account, they are considered by ASPR to be allowable costs subject to the general principles of reasonableness.

B&P effort is generally shorter range than IR&D effort. A contractor uses the techniques and know-how acquired under IR&D to prepare a technical package designed to convince the customer of the merit of the proposal. The B&P activity helps the customer to make an award on the basis of the demonstrated capabilities of competing suppliers.

#### HOW THE GOVERNMENT PAYS FOR IR&D AND B&P

DOD and NASA recognize IR&D and B&P costs as indirect costs to be allocated to a contractor's Government and commercial business. IR&D or B&P is not directly reimbursed. Costs generally are recovered by allocating a portion to each contract awarded to the contractor on the same basis as general and administrative expenses are allocated to each contract. If this basis does not provide an equitable cost allocation, the contracting officer may approve a different base to allocate the costs.

#### WHY IR&D AND B&P COSTS ARE CONTROVERSIAL AND RECEIVE SPECIAL TREATMENT

DOD recognizes contractors' IR&D and B&P expenditures as legitimate costs of doing business on the rationale that it is essential that contractors perform technical work, independently conceived and directed, to insure that DOD is provided with the most advanced technology needed in a prompt and technically competitive manner.

Generally, a direct relationship does not exist between current-period IR&D and B&P costs and current work in process. IR&D and B&P costs are generally accumulated and

distributed through overhead allocations to company activities. Thus current-year contracts bear the costs of future-year benefits. In a competitive environment, where awards are based primarily on price, IR&D reimbursement would present no problem, since competition for available contracts would restrict expenditures to those determined to be essential to economic survival.

#### Lack of price competition

In the defense and/or space industry, when price competition is lacking or the product is distinctive, there is widespread use of cost-plus or other flexibly priced contracts and the final prices are based on actual costs incurred. DOD has evidenced its concern that the Government pays a fair and reasonable price by substituting other controls for price competition.

The first ASPR cost principles were published in 1949. R&D costs specifically applicable to contract work were established as allowable, but general research costs were unallowable unless the contract terms specifically provided for them. Many defense contractors had such specific contract provisions and recovered all of their costs of the type now known as IR&D. B&P costs were not specifically mentioned, since they were considered allowable without question.

The existing IR&D and B&P cost principles were published in 1959. The term "independent research and development" was used for the first time, replacing general research. Independent research costs were generally allowable if allocated to all the contractor's business. Independent development costs were allowable if directly related to those product lines for which the Government had contracts. The principles stated that IR&D costs should be scrutinized and limited by advance agreements when appropriate.

In the 1959 principles, B&P costs were identified for the first time and made allowable, subject to the general test of reasonableness.



During the 1960s many problems arose regarding the 1959 cost principles. There was concern over the separation of research and development, differentiation between IR&D and B&P, the technical evaluations associated with advance agreement negotiations, and the application of overhead to IR&D and B&P.

Years of study culminated in 1969 in revisions to ASPR which placed tighter controls over the separation of IR&D and B&P, used the contractor's weighted-average share in cost risk (CWAS) concept, and provided a formula technique for contractors not using the CWAS concept.<sup>1</sup>

#### Difficulty in differentiating between IR&D and B&P

IR&D and B&P are often referred to as a single entity or as one program. Sometimes the total dollars spent for IR&D and B&P are inappropriately referred to as IR&D expenditures; i.e., the \$700 million IR&D program.

There are many similarities between IR&D and B&P. Both consist of technical effort. At times the same individuals are involved. Both are mostly related to future income rather than current sales. However, the objectives of each are different.

A company undertakes IR&D to put itself in a position from which it can technically compete for future business. Once the company has obtained the capability to respond to a specific need of a customer or to anticipate and propose a solution for a need which the customer has not clearly defined, the effort becomes B&P.

A company fixes a point in time for accounting purposes when IR&D ceases and B&P begins; e.g., when a request for proposal is received or a management decision is made to launch an all-out effort to convince the customer of the worthiness of the company's proposed effort. There are no accounting standards or principles that clearly define which charges are IR&D and which are B&P. The point of separation between IR&D and B&P differs among companies.

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<sup>1</sup>CWAS and the formula are discussed on p. 46.

Before 1971 the acceptance of IR&D for Government reimbursement was subject to limitation through negotiation of advance agreements, whereas the cost of technical effort for preparing bids and proposals generally was not limited. DOD and NASA had problems in distinguishing between the technical effort involved in IR&D and that related to B&P. Inasmuch as the amount of IR&D acceptable to the Government was limited, there was an incentive for the contractor to classify IR&D as B&P and increase the probability of full reimbursement.

Beginning January 1, 1971, companies required to negotiate advance agreements with the Government have had ceilings established on the allowability of both IR&D and B&P costs.

#### Increased costs

In 1963 DOD reported that major defense contractors incurred costs for IR&D and B&P in the amount of \$625 million. DOD's share of these costs amounted to \$325 million. By 1968 DOD's share (of \$1,157 million) had risen to \$609 million. In 1973, contractors incurred costs of \$1,578 million and DOD's share amounted to \$787 million.

Congressional concern over the escalation of IR&D and B&P costs surfaced in 1969 during consideration of the military procurement authorization bill for 1970. A statutory limitation of "93 per centum of the total amount contemplated for use for such purposes" was placed on the funds available to DOD for payment during fiscal year 1970 for IR&D, B&P, and other technical effort costs (Public Law 91-121).

#### PUBLIC LAW 91-441

Hearings on IR&D and B&P were held during the first half of 1970 by the Armed Services Committees. Section 203 of Public Law 91-441, enacted October 7, 1970, repealed the 93-percent limitation but placed other restrictions on DOD's payments for IR&D and B&P costs after 1970. Among other things, the law requires that:

--Funds authorized for appropriation to DOD not be available for payment of IR&D and B&P costs unless the Secretary of Defense determines that the work has

a potential relationship to a military function or operation.

- DOD negotiate advance agreements to establish dollar ceilings on such costs with all companies which, during their preceding fiscal year, received more than \$2 million of IR&D and B&P payments from DOD.
- IR&D portions of the negotiated advance agreements be based on company-submitted plans that are technically evaluated by DOD before or during the fiscal year covered by the agreement.

#### DOD'S IMPLEMENTING REGULATIONS

On September 1, 1971, on the basis of the requirements of section 203 and its own continuing studies, DOD issued revisions to ASPR cost principles in Defense Procurement Circular (DPC) 90, effective January 1, 1972. DPC 90 requires that IR&D and B&P costs include all direct and allocable indirect costs, except that general and administrative costs are not considered allocable to IR&D and B&P. The provisions of DPC 90 were incorporated into ASPR on April 28, 1972.

For major contractors--those receiving annual payments of more than \$2 million from DOD for IR&D and B&P--advance agreements are negotiated. Separate dollar ceilings are required--one for IR&D and one for B&P. However, a contractor is permitted to recover one cost above the negotiated ceiling, provided that the ceiling on the recovery of the other is decreased by a like amount. Thus, in effect, they are considered jointly.

In negotiating a ceiling, particular attention is to be paid to the technical evaluation and the potential military relationship of IR&D projects, comparisons with previous years' programs, and changes in the company's business activities. For companies not required to negotiate advance agreements, allowable IR&D and B&P costs are determined using a formula based on previous years' costs and sales.

### CHAPTER 3

#### BENEFITS TO THE GOVERNMENT FROM DOD'S IR&D EXPENDITURES

The Senators' letter and accompanying questions were directed at two main points: (1) whether DOD's expenditures for IR&D and B&P result in benefits to the Government and (2) if so, whether there is a better way to handle the IR&D and B&P programs.

One of the major issues of IR&D is whether the benefits are worth the cost. It was not possible for us to make such a determination. Alternatively, we looked at the relationship of IR&D projects to customer requirements. We also considered contractor planning and management of IR&D programs.

#### IR&D OBJECTIVES

DOD considers that its support of IR&D encourages the evolution and maintenance of a strong, creative, and competitive technology-based industry, capable of providing new concepts and rapid responses to defense needs. Specific objectives are (1) the continued availability of technically qualified contractors who are willing and able to meet DOD needs by competing for contracts, (2) reduced costs through technically competitive proposals based on IR&D efforts, and (3) superior military capabilities through a choice of competitive technical options originating in IR&D.

Contractors see IR&D as essential if they are to remain competitive in existing business areas and obtain entry into new business areas through technical and cost competitions. Specific objectives of a contractor's IR&D program are to be a position to (1) respond quickly to the needs of the customer, (2) submit cost-competitive bids that are based on complete identification of technical risks and accurate cost and schedule estimates, and (3) provide greater technical excellence in proposals.

## IR&D BENEFITS

We were asked (question 12) to "identify what specific developments have been made by each of the top 25 defense contractors with respect to the amount of IR&D received" for each of the years 1968-72. In addition, for the same 25 defense contractors, each IR&D project in excess of \$25,000 a year was to be identified, indicating "the potential military benefit rationale used by the DOD in accepting the project."

IR&D benefits have been expressed by DOD and industry as satisfaction of the objectives enumerated above; i.e., developing an industrial technology base as a complement to the DOD in-house technology base, providing alternative solutions to technical problems, stimulating competitive capabilities and creativity, etc.

IR&D has at times been identified as contributing to the development of a specific military system or component or to the solution of a particular problem. For example, DOD officials testified in congressional hearings in 1970 that IR&D projects had led to the phased-array radar antenna and Huey Cobra helicopter and had contributed to gas-laser technology. But we know of no presentation that related all the IR&D dollars received by a contractor in any given year to specific developments.

### GAO's pilot study

The time interval between conception of an idea and completion of a specific development generally involves many years. DOD, in its attempt to identify reasons for successful developments, traced specific systems over a 20-year period. The study showed that the time between predecessor and successor in defense equipment was typically 10 to 20 years.

The National Science Foundation sponsored a study which documented significant events during the innovative process for 10 innovations that first came to realization during 1933-66. The average time from conception to realization for the 10 innovations studied was about 19 years. One innovation was in process for 32 years. The difference between the longest and the shortest time was caused mainly

by a difference in the availability of technology. The shortest time required only existing technology and so proceeded from first conception to first realization in 6 years.

Thus it did not seem likely that many specific developments directly attributed to projects funded in the years 1968-72 could be identified.

Our field staffs attempted to see if IR&D benefits could be quantified on a project-by-project basis by making pilot tests at four contractors' locations. The contractors were selected taking into consideration the locations where we had particularly capable staff interested in the issue.

#### Pilot study results

Preliminary tests confirmed that it would not be feasible to attribute developments to IR&D projects over a 5-year period. Projects were too numerous, and most projects did not, in themselves, become specific developments. Projects are often aimed at advancing technology without a known product application.

We initially looked into the feasibility of identifying IR&D benefits by tracing individual projects funded in 1968 to their ultimate use; this approach was difficult and time consuming. It proved to be impracticable because of the numerous projects involved, the lack of continuity of projects, changes in project titles, the merging or splitting of projects as work progress brought about changes in scope or emphasis, company reorganizations, and personnel changes.

We also tried to trace recent proposals and/or contract activity back to IR&D. Many relationships could be established, although in some cases the contribution of IR&D was indirect.

For example, at one company we examined the events leading to three high-technology proposals submitted to DOD. Two resulted in contracts. The company claimed that considerable IR&D technology had been used for two of the proposals and that it would not have been technically competitive without IR&D experience on the third. For two of the proposals, we identified a strong IR&D relationship. For

the other, IR&D and prior contract experience had similarly affected the company's competitive position. Although the examination was time consuming, we established that company-generated IR&D projects had been used in development of DOD systems, that technical alternatives had been offered, and that the company had relied on IR&D to develop products for DOD.

Although some examples of specific products or developments could be identified through these approaches, neither approach could practicably produce an evaluation of a total IR&D program for a specified period. We therefore decided to evaluate the IR&D programs of the four contractors for a 2-year period on the soundness of the companies' bases for undertaking projects. Since the objective of an IR&D program is to put a company in a position to meet customers' needs, we examined the business reasons for undertaking projects in the test period.

More than 400 of the contractors' 1972 and 1973 projects--valued in excess of \$60 million--were classified into three business objective categories: (1) improvements to existing products, (2) development of new products, or (3) basic research and other general engineering and technical efforts. We reviewed agency and/or customer planning documents or other bases for undertaking projects. When B&P or contract activity had resulted, this relationship was noted.

Evidence showed that contractors' IR&D programs generally were related to customers' needs, were undertaken to serve a Government purpose, or were directed toward meeting agency program goals.

Generally, a direct relationship existed between the IR&D project and an objective stated in an agency planning document. For example, an Air Force Required Operational Capability document stated the need for a modern off-the-shelf vehicle. The selected vehicle was to provide improvements in speed, range, productivity, and maintainability over those vehicles currently in use. The contractor responded to this need by planning IR&D to perform system analysis and configuration studies which, together with user inputs, would be used to develop preliminary requirements.

In other cases the planning documents stated needs for which the requirements were not as specific. For example, a directive stated DOD's policy to encourage innovation, inventiveness, and exercise of technical and managerial judgment in designing and producing systems and their logistics support to meet operation requirements. Contractor performance in carrying out the logistics-support approach was to be a major factor in evaluating overall contract performance.

To meet this need, the contractor planned an IR&D project on product-support research to consolidate research accomplished in previous years into an integrated program aimed at increasing the effectiveness of present systems and decreasing the cost of ownership of new systems. The 1972 program included a technical plan for reliability, maintainability, and system safety research to investigate and develop solutions to problem areas identified from field experience data.

The IR&D programs of the four contractors were each directed toward advancing the individual contractor's competitive position. Therefore, there was a difference in the number of projects that each devoted to existing product improvement; meeting new, customer needs; or looking toward future business. A tabulation of the four contractors' projects showed that about 80 percent of the projects could be directly related to an existing or new product or to a known need. The remaining 20 percent were projects for basic research, development of new concepts, or other work which could lead to new business at some future time. The analysis proved that it was feasible for contractors to categorize projects by objectives should such an analysis be useful to program managers.

#### Project Hindsight

To compare the effectiveness of IR&D efforts with other R&D efforts funded either in-house or by contract, we looked into Project Hindsight. Project Hindsight was a DOD effort to assess the importance and the benefit of science and technology to defense. The study took a retrospective look at 20 weapon systems developed between the end of World War II and 1963.



Project Hindsight involved analysis of successful R&D events to identify those management factors that led to their success. Teams of experienced technical specialists examined development of the 20 systems for evidence of science or technology that was not available or used in previous systems. Each instance (known as an event) was then traced historically to identify the people, place, and time associated with the generation of the knowledge which led to the advanced level of technology.

We asked the project director whether, during the study, IR&D had been identified as a source of funds used in support of the successful technological events. He told us that information as to IR&D as a source of funds had been obtained but had not been the subject of detailed analysis. At our request, a special analysis was made.

This analysis showed that in 40, or 5.7 percent, of the 698 events the original funding sources for the exploration of new technical concepts were considered IR&D. Expenditures identified as IR&D involved slightly over \$2 million, whereas the total funding for the 698 events in the Project Hindsight data bank approximated \$100 million. Thus the IR&D expenditure of just over 2 percent of the total funding accounted for 5.7 percent of the initial tests of concept feasibility.

#### Industry views

After the request to GAO appeared in the Congressional Record of October 11, 1973, industry associations prepared position papers, including responses to the 22 questions.<sup>1</sup> We reviewed the technical papers for their reaction to question 12. (See p. 11.) We found that industry identified technical outputs of IR&D as follows:

--Technology advancement--attaining or maintaining competitive capability in key technologies not

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<sup>1</sup>Technical Papers on Independent Research and Development and Bid and Proposal Efforts, March 1974. Aerospace Industries Association of America, Inc., Electronic Industries Association, National Security Industrial Association.

oriented toward specific new hardware and end-items but toward technology improvements.

- System and other concept formulation studies.
- Successful failures--beneficial to demonstrate that a given approach to resolution of a problem or meeting a need is inadequate or uneconomic.
- Evolution of superior systems or hardware--improved performance, lower cost, or both.
- Brilliant discoveries and great innovations.

The industry associations did not believe that specific developments during any 5-year period would prove the worth of IR&D because no standard had been devised to meaningfully measure R&D cost against the value of work done.

One company said that it was the exception rather than the rule that attaining a dramatically increased operational capability or cost reduction was directly traceable to a specific piece of research or development work. The company noted that the Project Hindsight director had said that it was the cumulative synergistic effect of many innovations which made the radical improvement and that each innovation, taken by itself, would produce little or no improvement. The company believed this finding to be equally as valid for IR&D work as for R&D in general.

Industry's technical papers documented, in some detail, 48 examples of benefits to DOD and the Nation from the IR&D efforts of about 20 contractors. Benefits were put in four categories--major systems, subsystems, new components, and technology advancement. The papers did not identify costs of IR&D applicable to each example.

#### PATENT AND DATA RIGHTS

Government contracts for R&D contain a patent rights clause requiring contractors to convey certain property rights, consistent with the subject item of the contract and its ultimate use, in whatever new or improved concepts result from the contract effort. DOD contracts use the

patent rights clauses contained in ASPR. However, it is DOD's and NASA's policy to not require contractors to furnish property rights in inventions or data resulting from IR&D. At issue is the equity of this policy when contractors recover from the Government a major part of the costs of their IR&D programs.

#### DOD policies

According to DOD, its IR&D patent practices are compatible with Government policy. This policy is to promote, insofar as feasible, the commercial exploitation of patents derived from Government-sponsored work, even to the extent of granting exclusive licenses to private companies which will undertake productive exploitation.

DOD believes the actual value of these patents is questionable since most of them relate primarily to technology that is largely or solely of interest to the Government. DOD states that its experience has been that the Government's use of such patents nearly always is granted royalty free. Data rights are usually available to the Government on a for-official-use-only basis.

A study in 1972 by a DOD working group showed that most companies seldom applied for patents. Fewer than 10 percent of IR&D projects resulted in patent applications. A small number of companies, however, made patent applications on the results of most of their IR&D projects.

#### Pilot contractor studies

We were asked to identify patent applications made by, and patents issued to, the 25 major contractors as a result of IR&D programs from 1968-72. Also we were asked to identify the income each contractor received from these patents or prior patents developed under IR&D and to determine whether this income was credited to DOD in proportion to its financial support of the project. (Question 12.) As noted previously, our study was confined to four contractors.

One contractor told us that it applied for patent rights on company developments because of their proprietary nature or to protect company interests. Company contract negotiators said that no effort was made to charge either Government or commercial customers for patent rights. Defense Contract Audit Agency (DCAA) auditors told us that the contractor paid all the engineering costs, legal fees, consultant fees for patent searches, and filing fees required to develop and obtain patents. We were told that patent income was small, about enough to cover the costs of marketing the patents. The contractor considers the exact amount of patent and royalty income to be proprietary.

DCAA auditors did not know the amount of income collected from patent rights but confirmed that the contractor did not charge the Government for patent rights on work done under Government contracts.

We examined a contractor document listing 135 patent applications over a 7-year period. About one-third of the total applications were noted by the contractor as having been developed under IR&D funds. Of the applications arising from IR&D, 31 applications were still pending, 9 patents had been issued, and the remaining applications had been abandoned.

Another contractor identified five patents on which it had royalty income during a 6-year period, but the contractor said that none of them had resulted from work done under IR&D programs.

A third contractor said that, until an invention proceeded beyond the conceptual stage, it was worthless. The contractor reported that 14 patents and patent applications had resulted from IR&D over a 5-year period. Royalty income was modest; the contractor considered the figure proprietary.

The fourth contractor reported its patent income for 1973 to be less than \$15,000.

#### Exploitation of inventions

DOD does not have a prohibition against contractors "exploiting" inventions in the commercial market developed

primarily under IR&D. (Question 15.) DOD believes that commercial customers should have the benefits of inventions growing out of defense work.

Industry representatives said that, before an invention conceived primarily for military benefit could be used commercially, a great amount of additional product development and marketing was usually needed. Industry believes that, as a matter of basic policy, the Government should not enter into commercial fields or restrain companies from engaging in their own lines of business.

DOD's concern is that defense contractors not develop items in defense plants and then spin them off to other commercial divisions, depriving the defense plant of the additional sales that would tend to reduce indirect costs allocated to Government contracts.

AEC's position on patents arising in IR&D is discussed on page 75.

#### INDUSTRY MANAGEMENT OF IR&D

The four contractors in our pilot study had developed management control systems for planning, initiating, reviewing, and revising their IR&D projects.

One contractor said that IR&D planning was an integral part of its business plan. A long-range business plan is updated annually, with primary attention being devoted to new business opportunities and their potential effects. Assumptions concerning DOD, NASA, and other Government agencies are included. Long-range technology trends and requirements are addressed and assessed.

An operating plan is the primary vehicle used for planning near-term business, controlling operations, and forecasting near-term results. Project and program IR&D and B&P plans for the following year are included as part of the detail of actions to be taken to insure ultimate accomplishment of long-range objectives. An integrated technology plan is used to define the contractor's total technology effort and relate it to the product goals in the business plan. After the plan for the following calendar year is

approved, IR&D project writeups are modified as necessary for final guidance and budget constraints, leading to document submittal to DOD and advance-agreement negotiations.

Most IR&D projects are defined and initiated on a basis of technology effort directed to a product or product line. The contractor said that performance was evaluated against cost and commitments at regular intervals by management echelons and that operating organizations were required to make changes in IR&D programs as soon as a need was recognized.

The other contractors also consider planning and developing IR&D and B&P programs to be an integral part of the short- and long-range business-planning function. Plans are formulated after evaluation of external planning documents from the military services, Government agencies, and civilian sources, as well as contractor-obtained market and state-of-the-art intelligence. These inputs are matched against company resources, product or system objectives, and technology requirements. IR&D and B&P projects compete for resources with all other proposed endeavors. Program size is determined by such factors as the anticipated level of Government funding, the level of contractor funding, and the need to maintain IR&D and B&P overhead rates at a competitive level.

We found that management procedures established by the four contractors provided for IR&D and B&P programs to receive the same financial and technical attention as that given to contract R&D.

## CHAPTER 4

### DOD'S EVALUATION OF IR&D

We were asked if DOD received detailed technical reports or other technical data regarding technology developed under IR&D programs and considered the information in developing weapons programs (question 13) and if DOD evaluated the results of contractors' IR&D efforts. (Question 14.)

DOD has said that it uses a number of ways to consider the quality of IR&D and to make the data known to its personnel. DOD finds no single mechanism to be totally self-sufficient. Information on data developed under IR&D is made available through the contractor's technical plan and the technical review process, direct professional-to-professional communication, and the IR&D data bank.

#### TECHNICAL PLANS AND REVIEWS

Every contractor required to negotiate an advance agreement submits a technical brochure describing proposed IR&D projects. The brochure, or IR&D technical plan, provides a basis for technically evaluating the program. A contractor can delete or add projects throughout the year without DOD approval. Each new project is then evaluated the following year.

The contractor's annual IR&D technical plan includes writeups on individual projects, generally 5 to 10 pages. Each writeup includes a statement of the problem being worked on, the technical objective and approach for the current year, and the progress and accomplishments of the preceding year.

Copies of the contractor's technical plan are sent to many Government organizations to obtain evaluations from the most expert persons available. In addition, an onsite evaluation of a portion of the IR&D program is made at the contractor's plant at least every 3 years. For example, in 1973 onsite and brochure reviews made by the Air Force involved more than 11,000 project evaluations. The Air Force estimated that the evaluation process required about 24.5 staff years.

## PROFESSIONAL COMMUNICATION

The onsite review provides technical communication between various DOD specialists and their counterparts at contractors' plants. DOD believes that the physical inspections enable Government representatives to obtain a better understanding of the projects and to assure themselves that the technical plan accurately describes the efforts. Through discussions, Government personnel learn what contractors are doing that is directly related to DOD interests and what other work is going on.

DOD laboratory personnel, using the brochure information, can obtain by letter, telephone, or visit detailed technical data on results and progress of individual IR&D projects by direct communication with the investigators conducting the work. Upon request of the Government, this data can be supplemented by the contractor's project report.

One Army command has instituted policies and procedures to increase its knowledge of contractor IR&D programs. Laboratory personnel when planning travel must consider visits to nearby IR&D contractors. Also personnel are instructed to call principal investigators regarding projects of interest.

## IR&D DATA BANK

At our suggestion, DOD established an IR&D data bank at the Defense Documentation Center in 1971. The data bank's objective is to provide a centralized source of information through which DOD scientists, engineers, and R&D managers can become familiar with IR&D projects.

The IR&D data bank was set up as a trial operation to end about July 1, 1975. Not all contractors preparing technical brochures for DOD were required to submit IR&D project record data to the Defense Documentation Center.

In August 1973 we reported to the Secretary of Defense that much of the data in the bank duplicated data in an Army's IR&D data bank, that use of the banks was limited, and that contractors were reluctant to participate because of the administrative burden of preparing both IR&D brochures and data in the data-bank format.



We suggested that DOD determine whether a data bank could be justified by projected usage; if so, which one; and how contractors could economically provide the data needed by its users.

In May 1974 DOD announced the results of a special review of the IR&D data bank made before completion of the trial period. The study group found that DOD should have one IR&D bank as a useful and needed supplement to the bank of in-house and contracted R&D effort. The bank, located at the Defense Documentation Center, is expected to be fully operational after July 1, 1975. The bank is to be expanded to include all contractors with whom DOD negotiates advance agreements. Contractors' data bank inputs are to be identical to the technical plan synopsis. Service R&D activities are to query the bank before starting new in-house or contracted efforts, to preclude unnecessary duplication of effort.

The bank provides data organized in a variety of ways and can be useful in searches to identify work in selected areas. Screening of IR&D projects can lead to the technical descriptions for more detailed information or provide the names and telephone numbers of the contractors' principal investigators for direct contact.

## CHAPTER 5

### IR&D AND B&P COSTS

Questions 1 through 5 relate to DOD's IR&D and B&P costs reported to the Congress by DCAA. They were answered in detail in our report of August 16, 1974.<sup>1</sup>

Two points should be kept in mind when reviewing the figures in the DCAA reports. IR&D and B&P costs are incurred for different purposes, and, although it is sometimes difficult to distinguish one from the other, their total costs should not be considered as representing either of them. Secondly, DOD shares with other customers in the total costs incurred by the contractors; in fact, DOD's share is less than the percentage its sales represent to total contractor sales.

This latter point was illustrated by the IR&D and B&P costs for 1968-73 of the four contractors we looked at in some detail. The ratio of the Government's share of IR&D and B&P costs to total costs was consistently lower than the ratio of Government sales to total sales for three contractors. The ratios of the fourth contractor were the same for each year.

### DOD'S COSTS REPORTED BY DCAA

A summary of sales and costs of IR&D and B&P as reported by DCAA follows (dollar figures represent millions).

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<sup>1</sup>"Partial Report--In-Depth Investigation into Independent Research and Development and Bid and Proposal Programs" (B-164912, Aug. 16, 1974).

	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973 prelimi- nary figures</u>
(000,000 omitted)						
Sales to DOD	\$22,275	\$22,692	\$21,315	\$19,568	\$19,117	\$20,941
Number of contractors	92	96	98	84	77	83
Contractor costs:						
IR&D	\$ 776	\$ 808	\$ 753	\$ 703	\$ 936	\$1,052
B&P	<u>381</u>	<u>426</u>	<u>413</u>	<u>427</u>	<u>469</u>	<u>526</u>
Total	<u>\$1,157</u>	<u>\$1,234</u>	<u>\$1,166</u>	<u>\$1,130</u>	<u>\$1,405</u>	<u>\$1,578</u>
Accepted by the Government:						
IR&D	\$ 579	\$ 653	\$ 597	\$ 567	\$ 725	\$ 809
B&P	<u>367</u>	<u>409</u>	<u>398</u>	<u>390</u>	<u>432</u>	<u>488</u>
Total	<u>\$ 946</u>	<u>\$1,062</u>	<u>\$ 995</u>	<u>\$ 957</u>	<u>\$1,157</u>	<u>\$1,297</u>
DOD's share:						
IR&D	\$ 338	\$ 410	\$ 376	\$ 354	\$ 392	\$ 441
B&P	<u>271</u>	<u>289</u>	<u>278</u>	<u>265</u>	<u>306</u>	<u>346</u>
Total	<u>\$ 609</u>	<u>\$ 699</u>	<u>\$ 654</u>	<u>\$ 619</u>	<u>\$ 698</u>	<u>\$ 787</u>
DOD's share of contractor costs (%)						
IR&D	44	51	50	50	42	42
B&P	71	68	67	62	65	66
IR&D and B&P	53	57	56	55	50	50
Sales to DOD (%)	68	62	65	61	63	61
IR&D and B&P costs to DOD sales (%)	2.73	3.08	3.07	3.16	3.65	3.76

The above figures are indicators of annual activity but should not be used for making absolute comparisons of one year to another for the following reasons:

- Technical effort not classified by contractors as IR&D or B&P was reported separately by DCAA through 1971. In 1972, after definitions were revised, \$14 million of these costs were classified as IR&D and B&P. DCAA did not determine how much was included in IR&D and B&P in 1973 because of reclassification. For 1968-71 it can be assumed that under current definitions some part of contractors' other technical effort would have been classified as IR&D or B&P.
  
- Effective in 1972 all contractors were required to allocate (burden) to IR&D and B&P an appropriate share of indirect or overhead costs except general and administrative (G&A) costs. Previously some contractors had burdened IR&D consistent with their accounting practices. Increases in IR&D and B&P costs solely for first-time burdening were \$32 million in 1972 and \$55 million in 1973. The amounts for previous years are not available. Although burdening increased the reported IR&D and B&P costs, it did not necessarily increase total DOD contract costs. Overhead costs were merely reclassified from other overhead accounts to IR&D and B&P accounts.
  
- Military sales to foreign governments through DOD contracts are included in the reported figures as are the IR&D and B&P costs allocable to these sales and reimbursed by the foreign governments. DOD's share of IR&D and B&P costs reported for 1972 and 1973 is, therefore, overstated by \$13.8 million and \$36 million, respectively. DOD sales data for these years should be similarly reduced by \$425 million and \$962 million, respectively. Previous years would require similar adjustment, but the amounts are not available.

Also, if the annual cost figures are to be used as indicators of changes in contractors' actual level of effort, consideration should be given to the impact of inflation.

Amounts of IR&D and B&P  
not reported by DCAA

We reported on August 16, 1974, that neither we nor DCAA had any data to determine the amount of IR&D and B&P paid to contractors which did not meet the \$2 million threshold for advance agreements. Therefore, this amount is not included in DCAA reports, (Questions 4, 5, and 10.) DCAA stated that an inordinate amount of effort would be required to obtain detailed data, since thousands of small companies were involved. Even this data would still not be complete because it would not include data on some major contractors. For example, contracts awarded on a firm fixed-price competitive basis or on the basis of rates or schedules set by law are not susceptible to DCAA audit and therefore are not available to DCAA for inclusion in its reports.

DOD has estimated in the past that it has reported 80 to 85 percent of the costs over which it has control (access to records for the purpose of audit). We asked DOD whether a calculation could be made to currently estimate the amount of additional IR&D and B&P it pays. DOD worked on a means of estimating the unknown portion but could not develop any reasonable basis for estimating more accurately the size of this IR&D and B&P effort.

How DCAA reviews and monitors  
incurred costs and ceiling adherence

DCAA is responsible for reviewing IR&D and B&P costs recovered through DOD contracts, to verify that such costs are properly classified in a contractor's accounting system and that recovery does not exceed the negotiated advance agreement or formula limitation. For cost-type contracts, IR&D and B&P costs are recovered as a part of the indirect costs allocated to all contracts through the application of an estimated overhead rate, which is adjusted to the actual rate at the end of the year.

For a contractor under negotiated ceiling, the estimated rate is based on the lesser of the contractor's estimated IR&D and B&P costs or the negotiated ceiling and the contractor's estimated allocation base; e.g., cost of sales, direct labor hours, etc.

Within 90 days after the close of a contractor's fiscal year, the contractor will submit its overhead costs to DCAA for final overhead rate determination. If a contractor is subject to use of the formula for determining the amount of IR&D and B&P to be allowed, DCAA audits the records to make certain the computations are accurate. According to the auditors, for a contractor under advance agreement they, with the assistance of Government technical personnel, review the data for accuracy and to determine whether the classification of IR&D and B&P is proper and in compliance with ASPR. This effort includes (1) verifying that the IR&D and B&P expenditures listed were actually incurred, (2) verifying that nonrelevant projects had no effect on the ceiling negotiated, and (3) determining that the contractor has not been reimbursed for more than it has spent or is entitled to under the ceiling.

According to the auditors, the final contract payments for the fiscal year will reflect any adjustments needed to bring the amount of IR&D and B&P recovered in line with the contractor's actual expenditures, subject to negotiated ceiling or formula limitation.

#### B&P costs

The law requires that the maximum number of qualified sources be solicited for proposals consistent with the nature and requirements of the procurement. The Commission on Government Procurement reported that translating this statutory requirement to practice posed a problem in R&D procurements.

R&D procurements embody two characteristics which give rise to the problem: (1) a large number of firms seeking Government contracts and (2) relatively complex proposals which are costly to prepare and evaluate. Most R&D procurements seek innovative ideas and frequently cannot be considered as essentially cost or price competitive. Therefore the Commission believed that participation of a maximum number of firms did not necessarily insure minimum costs to the Government.

The Commission recommended<sup>1</sup> that the statute provide for soliciting a competitive rather than a maximum number of sources, retaining the requirement for public announcement of procurements.

A study group of the Commission had sampled 396 competitive R&D contract awards and found examples of more than 100 contenders for a single solicitation, with an overall average of nearly 10 proposals for each award. The Commission reported that, because in many instances the Government ultimately paid the bidding costs through overhead and the evaluation costs as part of its in-house effort, the total costs might exceed the value of the resulting contract.

The Commission noted that these steps were performed in duplicate for each contender under the principle that the savings resulting from competitive pressures more than offset the bidding costs. The principle operates generally with respect to solicited R&D. When more than a few proposals are received, there is comparatively little added benefit and much added expense on the part of the bidders and the Government.

The Commission's report<sup>2</sup> stated that, when possible, the competitive announcement for proposals should identify not less than three nor probably more than five "best qualified potential sources" in the particular program being purchased.

Contractors claim that the Government has a powerful and direct influence on B&P costs through its procurement policies and that they are not in control of the amount of B&P effort required to be responsive to the Government's competitive procurement objectives. We therefore decided to see whether there was an opportunity for savings in DOD's solicitation process.

<sup>1</sup>Report of the Commission on Government Procurement, vol. 1, p. 22, recommendation 4.

<sup>2</sup>Report of the Commission on Government Procurement, vol. 2, p. 44.

From a selection of about 125 R&D contract awards made by the 3 services, we determined that the procurement centers were not receiving an inordinate number of responses to requests for proposals or quotations. At five Army, Navy, and Air Force procurement centers, the average number of bidders ranged from 3.4 to 5.6 for each solicitation. The highest number responding to a solicitation was 13 bidders. About 65 percent of the solicitations resulted in from two to five bids.

Should G&A be included in IR&D?

The Cost Accounting Standards Board asked us to consider whether IR&D and B&P costs were understated because they did not include G&A costs.

ASPR provides that IR&D and B&P include all allocable indirect costs except G&A. G&A are those costs which are necessary for the maintenance of the company as a whole. They are not directly allocable to a particular cost center, cost element, or function. We made a brief inquiry into whether the ASPR concept is sound and whether the results are equitable to the Government.

We found that there was a difference of opinion among accountants, educators, and others on the issue. The Financial Accounting Standard Board recently issued a standard for industry and the public accounting profession to follow in accounting for research and development costs. It provides that R&D costs include a reasonable allocation of indirect costs but that G&A costs which are not clearly related to R&D activities not be included as R&D costs. The Board stated that its conclusion conformed to present accounting practice.

We visited several contractors on this matter. They believed it inappropriate to allocate G&A to IR&D and B&P. They furnished us with estimates to show that there was a minimal relationship between the bulk of G&A activities and IR&D and B&P. In view of the subjective nature of these estimates, however, we did not attempt to verify them.

The limited number of contractors included in our study did not provide an adequate basis for a firm conclusion. However, we believe that, if it should become a requirement



that G&A be included in IR&D and B&P, certain G&A activities, such as contract administration, customer support, and regional sales offices, should be excluded because these activities do not contribute to the IR&D and B&P effort. These costs should be related to activities to which they do contribute.

Also we believe that the benefits of having full disclosure of IR&D and B&P costs should be weighed against the costs involved in the change in accounting procedures. Any actual effect on DOD contract costs would depend, in part, on the extent to which ceilings would be adjusted to recognize the accounting change.

### NASA'S COSTS

NASA is second to DOD in supporting IR&D and B&P. Its reported sales and costs follow.

	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
	----- (000,000 omitted) -----					
Sales to NASA	<u>\$3,192</u>	<u>\$2,602</u>	<u>\$2,129</u>	<u>\$1,990</u>	<u>\$1,991</u>	<u>\$1,801</u>
Contractor costs:						
IR&D	\$ 377	\$ 544	\$ 645	\$ 703	\$ 936	\$1,052
B&P	<u>256</u>	<u>330</u>	<u>365</u>	<u>428</u>	<u>469</u>	<u>526</u>
Total	<u>\$ 633</u>	<u>\$ 874</u>	<u>\$1,010</u>	<u>\$1,131</u>	<u>\$1,405</u>	<u>\$1,578</u>
Accepted by Government:						
IR&D	\$ 350	\$ 444	\$ 514	\$ 568	\$ 725	\$ 809
B&P	<u>250</u>	<u>316</u>	<u>352</u>	<u>390</u>	<u>433</u>	<u>488</u>
Total	<u>\$ 600</u>	<u>\$ 760</u>	<u>\$ 866</u>	<u>\$ 958</u>	<u>\$1,158</u>	<u>\$1,297</u>
NASA's share:						
IR&D	\$ 61	\$ 43	\$ 44	\$ 41	\$ 40	\$ 38
B&P	<u>46</u>	<u>49</u>	<u>48</u>	<u>51</u>	<u>50</u>	<u>47</u>
Total	<u>\$ 107</u>	<u>\$ 92</u>	<u>\$ 92</u>	<u>\$ 92</u>	<u>\$ 90</u>	<u>\$ 85</u>
NASA's share of contractor costs (%)						
IR&D	16	8	7	6	4	4
B&P	18	15	13	12	11	9
IR&D and B&P	17	11	9	8	6	5
Sales to NASA (%)	18	12	7	6	7	5
IR&D and B&P costs to NASA sales (%)	3.35	3.54	4.32	4.62	4.52	4.72

## CHAPTER 6

### DOD'S IMPLEMENTATION OF PUBLIC LAW 91-441

The Senators requested that, in addition to the overall study of IR&D and B&P, we look into the implementation of the current provisions of law and DOD regulations.

#### IR&D POLICY COUNCIL

The DOD IR&D Policy Council consists of its Chairman, the Director of Defense Research and Engineering; the Assistant Secretaries of Defense (Installations and Logistics) and (Comptroller); and the Assistant Secretaries of the Army, the Navy, and the Air Force (Research and Development) and (Installations and Logistics). Representatives of NASA and AEC participate as observers.

The Policy Council's mission is to develop policy and guidelines for administering DOD's IR&D and B&P programs, including such facets as the proper level of DOD support, the goals of IR&D and B&P, the overall level of effort, the validity of potential relevancy determinations, and the appropriateness of negotiation policies.

In September 1971 the IR&D Policy Council organized a working group to provide the Council with a concise definition of IR&D--what it was, what its objectives were (as seen by DOD, other Government agencies, and industry), its accomplishments, its deficiencies, and any impediments to the realization of its defined objectives. In December 1972 the working group produced a report, based on extensive interviews with Government and industrial executives directly involved with managing, evaluating, and using IR&D work. The report was presented to the Council and interested Government and industrial activities. An updated version was presented to the Council in June 1974.

The Council's review of the study report and its consideration of the results of previous guidance resulted in approval of revised guidance.

## DOD'S LATEST GUIDANCE

On October 21, 1974, DOD issued the following guidelines to the services to clarify and/or emphasize previous IR&D and B&P policies.

- Departmental negotiators are to take steps to achieve equitable treatment of contractors, regardless of which service conducts the negotiations. Issues are to be identified for resolution by the IR&D Technical Evaluation Group or Policy Council.
- Negotiators shall maintain sufficient documentation in the files to provide the rationale for the dollar levels established and other provisions of the advance agreements.
- Results of the technical evaluations of the contractors' IR&D programs shall have meaningful and traceable effects on the negotiated ceilings. A technical representative shall participate in establishing DOD's prenegotiation objectives.
- Three-year advance agreements, with provisions for appropriate adjustments as necessary in the second and third years, should be used to the extent practicable.
- Inflationary or deflationary economic factors shall be considered in negotiating IR&D ceilings.
- Negotiators shall have responsibility for determining the potential military relationship (PMR) of B&P projects. DOD-solicited proposals and unsolicited proposals resulting in DOD contracts are potentially related. Other B&P projects should be considered for the relationship of the efforts to the military functions or operations rather than to the customers to which the proposals are submitted. B&P determinations generally cannot be made until the end of the contractor's fiscal year but should be completed as soon thereafter as possible.

--Nonrelated IR&D and B&P projects may be included in negotiated ceilings, provided the costs allocated to DOD contracts do not exceed the total cost of all PMR projects.

#### NEGOTIATION OF ADVANCE AGREEMENTS

Section 203 of Public Law 91-441 made mandatory DOD's practice of establishing dollar ceilings on the IR&D costs of major contractors and extended the requirement to B&P costs as well. Advance agreements are to be negotiated with all contractors which, during their last preceding fiscal year, received more than \$2 million of IR&D or B&P payments from DOD

DOD interpreted the statute to apply to payments of \$2 million for IR&D and B&P. The desirability of negotiating agreements either before cost incurrence or early in the contractors' fiscal years was recognized in DOD's guidance to the services.

Advance agreements establish separate ceilings within which the Government will share. Costs incurred within the ceilings are allocated to DOD, other Government, and commercial contracts or sales. The contractors absorb costs incurred above the ceilings.

We learned from negotiators that each service uses basically the same factors to arrive at a contractor's IR&D and B&P ceiling. These factors include (1) the contractor's prior year's IR&D and B&P ceiling, (2) the contractor's historical and projected sales to DOD, and (3) DOD's historical and projected share of the ceiling.

We were informed that, in addition to the previously mentioned factors, there were other elements which the negotiators considered. Two of these factors were the potential relationship of the contractors' programs to DOD needs and the technical quality of IR&D projects. We could not determine from our review of negotiation files or from our inquiries the dollar effect on negotiated ceilings of PMR or technical reviews. Considering these factors in establishing ceilings is basically subjective.

## TECHNICAL EVALUATIONS

Section 203 requires that the IR&D part of the advance agreement be based on a plan, submitted by the contractor, which DOD has technically evaluated. DOD policy states that the basic purpose of the plan and its evaluation is to assist in determining the PMR of IR&D projects and in evaluating the reasonableness and technical quality of the contractor's IR&D program. DOD's guidance states that the results of the technical evaluation should have a meaningful and traceable effect on the negotiated ceiling.

Government personnel technically evaluate contractors' IR&D programs by two separate means--the onsite and the brochure reviews. Onsite reviews at the contractors' facilities are required at least once every 3 years. The brochure reviews are required yearly on the contractors' written descriptions of IR&D projects.

Within each of the services, organizations are assigned the responsibility for overseeing technical evaluations of contractors' IR&D programs. The number of companies or divisions of companies for which an organization has primary evaluation responsibility is dependent upon such factors as (1) the technical expertise available within the organization, (2) the organization's proximity to the contractors, and (3) the function of the organization within the service.

An organization which has primary responsibility for a technical evaluation must:

1. Schedule onsite reviews--This entails selecting projects for discussion by the Government and the contractor. It involves soliciting sufficient Government representation for the onsite review to adequately evaluate the contractor's programs.
2. Oversee onsite reviews--An individual within the organization is selected to oversee the onsite review, including briefing Government representatives, collecting project evaluation forms the representatives completed, and orally advising the contractor of the results of the onsite reviews.

3. Coordinate brochure reviews--DOD requires that a reasonable part of the dollar amount of a contractor's IR&D program be technically evaluated by a brochure review. Also DOD desires that the overall evaluation be sufficiently comprehensive to permit a reasonable conclusion concerning the technical quality of a contractor's program. The technical managers are responsible for compiling the individual project ratings into an overall contractor technical rating.

#### PMR TESTS

Section 203 does not permit DOD to pay for IR&D and B&P costs, unless the Secretary of Defense has determined that the work has a potential relationship to a military function or operation.

Our reports of April 1972 and April 1973 to the Senate Armed Services Committee noted that the statutory requirement was vague and that DOD had established its own criteria to test the relevancy of each project.

Under DOD's procedures, the determination is made as part of the technical evaluation. The technical managers make the final determinations of PMR for IR&D projects. The managers receive assistance from project evaluators who provide their written opinions as to whether projects have PMR. Also, a manager of one service will solicit the opinions of other service managers if projects are not relevant to his service.

The negotiators, with assistance from DCAA auditors, or the administrative contracting officers determine PMR for B&P projects. The Navy and Air Force make before-the-fact determinations; all three services make after-the-fact determinations.

Our studies have found that the PMR requirement has had no effect on DOD's reimbursement of contractors' costs. DOD's mission is so broad that almost all efforts of defense contractors can be shown to have PMR. Even though some attempts have been made to screen out projects in

areas where DOD does not have primary responsibility, the cost to DOD for sharing in IR&D programs was not reduced.

PMR has had no impact on DOD's payments, because the costs of non-military-related projects have been minor. DOD does not accept contractors' programs in full. DOD shares with other customers in the costs up to the ceiling amounts, and the contractors absorb incurred costs in excess of the ceilings. The costs of projects having PMR exceed the amounts allocated to DOD contracts.

NASA, which has no statutory relevancy requirement, believes contractors are slanting their IR&D efforts in favor of DOD, to insure reimbursement through compliance with DOD's relevancy requirement. Both agencies believe the requirement should be broadened to relevancy to the Government's interest.

#### Contractors without advance agreements

Question 10 asked about the legality of payments to a contractor receiving less than \$2 million of IR&D and B&P annually in the absence of a technical review for PMR. It is our opinion that section 203 does not require such a review if an advance agreement is not required; therefore we are unable to conclude that DOD payments in the circumstances are contrary to law. (See our report of Aug. 16, 1974.)

#### PROBLEMS OF TECHNICAL EVALUATORS AND NEGOTIATORS

Question 7 asked, "What problems are encountered by DOD and AEC contracting officers and technical or project personnel in evaluating and negotiating IR&D proposals?"

AEC told us that its field offices had not encountered any major problems in evaluating IR&D and B&P proposals. Problems generally were limited to such things as explaining the AEC reimbursement policy to contractors, obtaining sufficient information from contractors to evaluate the relationship of the project-to-contract work, late submissions by contractors of costs incurred, and questions on the percentage limitation on B&P.

We obtained information on problems within DOD by interviewing negotiators, individuals serving as IR&D focal points, and technical evaluators.

#### Negotiation of advance agreements

We talked with five of the negotiators from the three services. They mentioned no particular problems in arriving at ceilings or negotiating agreements with contractors.

#### Technical evaluations

We interviewed individuals assigned as focal points and technical evaluators to determine what problems they had had with technical evaluations. Although the problems they mentioned varied from organization to organization and individual to individual, they basically fell into four main categories.

1. Continuity in evaluations--Evaluators felt they could not make meaningful evaluations of contractors' projects because they did not have the opportunity to (1) review projects from all contractors within their area of technical expertise and (2) attend onsite reviews after being required to make brochure reviews. Evaluators believed that, without this continuity, they could not compare the quality of a contractor's research effort to other contractors in the technical field nor could they effectively determine whether a contractor had improved its program from year to year.
2. Quality of project descriptions--According to evaluators, the quality of project descriptions in brochures varied considerably from company to company. Although it is difficult to effectively explain a technical effort in writing, this shortcoming can best be overcome at an onsite review because evaluators can question the company's principal investigator working on the project and thus get a better understanding of the technical effort.



3. Caliber of evaluators--Several individuals serving as IR&D focal points stated that they had had a difficult time in getting personnel to evaluate projects. As a result, individuals within their own organizations had to evaluate projects of which they had minimal knowledge or interest. Some of the evaluators we spoke to felt they were doing the contractors and the services an injustice by not being able to effectively evaluate the projects.

The evaluation form required the evaluator to judge his qualifications for technically evaluating the project. We examined a Navy office's 1,526 evaluations of 445 projects proposed by 4 company divisions for 1973 and 1974. Of these 1,526 evaluations:

- 15 percent showed that the evaluators rated themselves as having minimal qualifications to evaluate the projects.
- 46 percent showed that the evaluators had general knowledge or past experience in the technical area.
- 26 percent showed that the evaluators had specific knowledge of current work in the technical area.
- 12 percent showed that the evaluators had specific knowledge of current work on similar projects.

Only 31 percent of the 1973 evaluations showed that the evaluators had specific knowledge of work in the area or on similar projects; in 1974 this figure increased to 45 percent

4. Allowable IR&D projects--Several evaluators thought that more restrictions should be placed on the types of projects funded by DOD through IR&D. These evaluators believed that industry would fund certain IR&D projects without

Government assistance simply because they appear profitable; IR&D funds should be used to stimulate research in areas in which the Government has an interest but which would probably not be funded by contractors with their own resources.

PMR determinations

Some evaluators felt that determining PMR did not present a problem because DOD's interests were so varied that almost any project could have PMR.

COST OF ADMINISTRATION

DOD's accounting or reporting system does not segregate the costs of administering IR&D and B&P. (Question 6.) The technical administration of IR&D within each service has been coupled, as much as possible, with the administration of ongoing research, technology, and conceptual systems programs the services directly support.

In response to our request, DOD furnished cost estimates which represent the best guesses of key personnel involved. Although these gross estimates are not susceptible to audit or verification, DOD believes that they are fairly representative of the annual costs of IR&D and B&P administration.

<u>Service</u>	<u>Cost of negotiation</u>	<u>Cost of technical evaluation</u>	<u>Total</u>
Army	\$ 30,000	\$ 350,000	\$ 380,000
Navy	85,000	564,500	649,500
Air Force	<u>108,500</u>	<u>984,000</u>	<u>1,092,500</u>
	<u>\$223,500</u>	<u>\$1,898,500</u>	<u>\$2,122,000</u>

NASA acknowledges that one of the important advantages of its cooperation with DOD is the administrative economy of such an arrangement. NASA's in-house costs of administering its programs are relatively small compared with what they would be if NASA had to assume the burden of independent technical review and negotiation functions.

AEC does not maintain a system which produces the in-house cost of administering IR&D and B&P programs. (Question 6.) One of the AEC offices most involved in IR&D activities estimated its costs to be minor.

Contractors told us that the increased emphasis on technical evaluations and relevancy reviews had increased their administrative costs. Although these costs are not generally quantified, some of the larger contractors have estimated their increased annual costs to have been between \$500,000 and \$1 million. Some of these costs eventually will be borne by the Government through indirect charges to contracts.

#### OTHER MATTERS

##### Should B&P be under ceiling?

Section 203 requires a ceiling on the allowability of both IR&D and B&P costs. Industry representatives contend that B&P should not be treated like IR&D because of the degree of control that a company can exercise over B&P expenditures. IR&D lends itself to advance planning, and each project is undertaken after evaluation against a business objective. On the other hand companies say that, although each B&P project is reviewed for its market potential, it is difficult to plan a year's B&P effort in advance.

Depending upon the nature of their operations, some companies spend more for B&P than they do for IR&D. Some companies spend heavily on unsolicited proposals rather than on responding to formally solicited proposals. However, any proposition to treat unsolicited-proposal costs differently from solicited-proposal costs (e.g., lumping unsolicited B&P costs with IR&D under one ceiling and exempting solicited-B&P costs) would be difficult to control because unsolicited proposals are often solicited by the Government informally.

When sales opportunities, unforeseen or forecasted for later periods, develop, a contractor can choose between (1) foregoing the opportunity, (2) funding the opportunity out

of profits, (3) reducing other B&P activities, or (4) curtailing IR&D projects to fund the B&P activity.

Although advance agreements permit shifting between IR&D and B&P costs as long as the total ceiling is not exceeded, industry feels that a ceiling prevents the Government from maximizing the quality and vigor of competition and limits the Government's options. Further, industry states that the Government has a direct influence on B&P costs through its procurement policies and that the contractor is not in sole control of the amount of B&P effort required to be responsive.

We recognize that there could be occasions when a contractor could become aware of upcoming Government procurements and not be in a position to respond because of expenditure limitations.

Since it appears that the Government could have a greater effect on the amount a contractor spent for B&P than IR&D, we considered the feasibility of clearly identifying B&P expenditures so that these costs could be separated from IR&D and controlled by normal competitive restraints, leaving it necessary to maintain controls over IR&D expenditures only.

We concluded that such a separation could not be enforced. The nature of the technical work and the records kept by the performers are such that the auditor cannot responsibly determine whether a particular effort is IR&D or B&P. The same performers are involved in both. We believe that, if restraints other than the forces of the marketplace are to be imposed on IR&D, similar restraints must be imposed on B&P.

#### Separate ceilings for IR&D and B&P

We were asked about the practicability and desirability of establishing separate ceilings for IR&D and B&P if a decision is made to establish a total ceiling in law. (Question 21.)

DOD has followed a policy of negotiating separate ceilings, while permitting some contractor flexibility to adapt to changing circumstances and to recognize the difficulty of precise classification of the two costs. The contractor can vary the division of effort between IR&D and B&P as long as the sum of the efforts does not exceed the sum of the individual ceilings. DOD believes that such a provision for latitude must be built into any funding arrangement.

NASA believes that the concept of separate ceilings in law is not realistic or desirable because of the inter-relationship between IR&D and B&P. Both types of costs should be allowed in reasonable amounts, without artificial, arbitrary controls that would be difficult to administer and more costly to operate.

Industry believes that the establishment in law of separate ceilings or a total ceiling for both would be incongruous with pricing practices of the present Government procurement process. It would create impracticalities and inequities. Industry sees enforcement as a practical impossibility, considering that DOD alone contracts with approximately 18,000 firms.

As previously explained, we believe that the nature of the two costs is such that, if it is considered necessary to institute a ceiling for one, the other must also be controlled by a ceiling. However, we recognize the administrative burden of enforcing a ceiling in law unless the statutory language clearly and narrowly identifies those companies whose costs the law is intended to control.

#### Contractors' submissions in support of cost estimates

We were asked to evaluate the adequacy of contractors' supporting data with respect to cost estimates, specifically as to whether contractors comply with the Truth-in-Negotiations Act by providing detailed cost or pricing data in support of project cost estimates and certifying as to their accuracy, currentness, and completeness. (Question 11.)

The advance agreements for IR&D and B&P do not in themselves provide for payments by DOD; rather, they are understandings with the contractors as to the amounts of these costs which are allowable as overhead on subsequent contracts. Ultimately, under the Truth-in-Negotiations Act, contractors will submit certified cost or pricing estimates in support of the negotiated contracts on which payments are to be made.

The Air Force and Army require that certified cost or pricing data be submitted with IR&D proposals. DOD is considering an ASPR change which would establish the requirement as a policy.

We found service personnel had some reservations about the value of obtaining certified data for a project which might never be undertaken or completed. Contractors can terminate or modify projects as they see fit. Some projects included in brochures as a basis for advance agreements never get started. Both Government and industry personnel believe that one advantage of IR&D is not having the contractor locked into a particular project, as it is with a contract. They prefer that the contractor have the flexibility to stop an unpromising project or increase the work on a promising project without the administrative formalities of negotiating a contract change.

The value of a requirement for submission of certified data with IR&D proposals in our opinion seems to instill some discipline in program preparation.

#### Nondefense contractors

Since DOD pays the most IR&D to the large, established defense contractors, the Senators asked what safeguards were in effect to offset this competitive advantage over new firms trying to enter defense business--particularly small firms. (Question 15.)

It is DOD's position that any company to which DOD has awarded a contract can recover a proportionate share of reasonable IR&D and B&P costs. This applies to small companies as well as large ones. Therefore DOD does not

consider that the large, established companies have a competitive advantage.

Industry representatives note that all companies engaged in advance technology, large and small, conduct self-initiated R&D to improve their product lines, regardless of who their customers are. These costs historically have been considered as current operating expenses by all industries. They point out that any company seeking to enter into a new market must compete its technology or product against the existing expertise of the market, which likewise has been customer funded. Consequently, every company is on an equal footing, whether it is a defense contractor seeking entry into commercial markets or a commercial contractor seeking entry into the military market.

DOD uses thousands of contractors each year in its R&D work. We believe that there is opportunity for any size company which has established a competency in a defense-related area to receive DOD support for its IR&D. Small companies are subject to a formula which tends to permit them to recover all expenditures except when their sales or expenditures vary widely from those of prior years. On the other hand, large contractors are required to negotiate advance agreements and the ceilings have historically been negotiated below actual expenditures. Large companies also have the burden of costs incurred in negotiations and technical evaluations; however, this disadvantage may be somewhat offset by the value of the technical evaluations received, which small companies do not get.

#### Small companies

DOD contracts with many companies which incur IR&D and B&P costs but which are not required to negotiate advance agreements. These companies recover their costs through overhead on contracts subject either to CWAS principles or to a formula computation.

## CWAS technique

CWAS is a technique set forth in ASPR for determining and expressing numerically, on the basis of an analysis of its contracts, the degree of financial risk a contractor has assumed. CWAS is available to all DOD contractors on a voluntary basis. To determine an annual CWAS rating, the contractor develops cost-incurred data on its Government business, broken down by types of contracts, and on its commercial business.

The CWAS rating given to a contractor depends upon the riskiness of its contracts. Under competitive firm-fixed-price-type contracts when the contractor has full-cost risk, the contractor is assigned a cost-risk percentage factor of 100. A zero-cost risk is assigned under cost-type contracts when the Government assumes the full-cost risk. The risk factors of other contracts range somewhere in between. If the computed CWAS rating of a profit center incurring costs is 65 points or higher--35 points having been derived from competitive firm-fixed-price contracts or commercial sales--the reasonableness of the costs will not be questioned. A contractor with a rating between 50 and 65 points can become CWAS-qualified at the discretion of the contracting officer. The contractor with a rating below 50 points is subject to audit.

ASPR designates which cost principles are subject to CWAS determination for reasonableness. The sections of the IR&D and B&P cost principles which pertain to companies required to negotiate advance agreements indicate that CWAS is not applicable. For other companies, whose allowable costs are subject to formula, CWAS provisions are applicable.

## Formula approach

The large number of small companies (under \$2 million of IR&D and/or B&P paid by DOD) have the allowability of their IR&D and B&P costs determined by a formula. A combination of previously incurred contractor costs and sales is used to determine a ceiling; i.e., the amount of IR&D and B&P costs to be accepted by the Government. The formula limits allowable costs for the current year to 120



percent of the average annual costs for the two highest of the preceding 3 years. Costs up to 80 percent are allowable as a minimum.

However, at the discretion of the contracting officer, an advance agreement may be negotiated when the contractor can demonstrate that the formula would produce a clearly inequitable cost recovery.

In September 1973 we reported to DOD that young, fast-growing companies were concerned about inequities under the formula approach and that their recourse to advance agreements was unsatisfactory. DOD told us that these situations had not surfaced to the extent that they represented a widespread problem. DOD plans to work out solutions on a case-by-case basis.

## CHAPTER 7

### ALTERNATIVES TO PRESENT METHOD OF FUNDING AND PAYING FOR IR&D AND B&P

We were asked for "alternative recommendations" to give the Senate Armed Services Committee a choice of actions which might be adopted. The Senators also included four questions related to eliminating or modifying the present method by which DOD supports contractors' IR&D and B&P programs.

#### ELIMINATION OF IR&D AND B&P AS ALLOWABLE COSTS

In commenting on "the practicability of completely eliminating Department of Defense payments to contractors for IR&D and B&P as allowable costs" (question 17), DOD stated its opinion that IR&D was not wasted or redundant effort. DOD felt that, if IR&D were replaced dollar for dollar by direct contract R&D, the added cost of contract administration would reduce the R&D effort. The Director of Defense Research and Engineering stated that:

"\* \* \* this might be offset by more discriminatory direction of R&D work to eliminate redundancy, but this presupposes that the Government is so perceptive as to be capable of not only discerning every salient and essential requirement but also has the wisdom to direct the technology down the path leading to the optimum solutions."

DOD believes that much of the capability of scientists in industry, educational institutions, and other non-Government organizations would be lost to DOD if they were not permitted the freedom to pursue concepts they have evolved.

DOD pointed out that B&P effort relates to work the contractor is proposing to perform, mostly on new contracts. Any contractor, unless it is the sole source, cannot hope to win every proposal, yet the cost of unsuccessful proposals must be recovered if the contractor is to continue in business. DOD believes that the savings realized by encouraging competition through contractors' recovery of IR&D

and B&P costs can be expected to more than offset the costs of IR&D and B&P.

Competition stimulated by IR&D and B&P can also be expected to yield higher quality results for the Government's outlay. DOD believes that competition to maintain and increase the quality of the Nation's technological base is every bit as important in the long run as is competition to develop and produce major weapon systems in the short run.

NASA took the position that, if IR&D and B&P costs were disallowed:

"\* \* \* contractors would have no choice but to attempt to finance the cost of this work through profits. Since profits are uncertain, the resources available for IR&D and B&P support would lack stability and continuity. Periods of high profits would be likely to result in higher allocations and periods of low profits in lower allocations. This is just the reverse of what is desirable."

NASA's experience has been that, without stability, R&D is inefficient because personnel and facilities cannot be programmed beyond the short term.

An industry representative responded that, if IR&D and B&P were eliminated entirely, defense contractors would have to provide these essential activities from already inadequate profits until they were no longer able to survive. DOD and NASA would lose the basis for competitive negotiation of major weapons and space systems contracts. It would diminish national technological leadership and would destroy the viable industrial defense capability.

Industry spokesmen also made the point that the question referred to "payments" to contractors for IR&D and B&P. They emphasized that DOD did not pay for IR&D and B&P. It buys products and services which are generally priced in accordance with cost or pricing data following strict formats as to allowable costs. At present, due to statutory, regulatory, and administrative restrictions, only part of the IR&D and B&P costs become eligible for consideration in

defense contract pricing. This share has always been lower than the ratio of defense sales to commercial sales.

Industry contends that the general level of defense contract profits is low and that many fixed-price contracts are loss contracts. If a contractor is not permitted to include IR&D and B&P costs in DOD contracts, questions are raised as to what it should do and what the Government policy is to be on using private companies.

#### DIRECT FUNDING OF IR&D AND B&P

Three of the Senators' questions related to the practicability of eliminating or reducing IR&D and B&P reimbursement as allowable costs while providing some measure of direct funding. One supposition eliminated allowability completely while:

"\* \* \* establishing a separate program in each of the RDT&E appropriations for IR&D and B&P with an amount of funds to be distributed directly, by contract or grant, to industry. This distribution could be based upon such factors as the experience of negotiating teams, including technical review panels, and the same criteria presently used under the existing procedures." (Question 18.)

Another hypothesis combined "the present system, with an established dollar ceiling substantially lower than the \$700 million level and a separate, directly financed program" of contracts or grants. (Question 19.) The third question asked "the practicability of the continuation of the present system but based upon a dollar ceiling which is reduced 10 percent each year with an equal increase in the directly financed program." (Question 20.)

We asked DOD for its views on these questions. DOD responded that direct distribution of IR&D and B&P dollars to contractors by contracts or grants was not considered practicable for several reasons. DOD deals with 18,000 to 20,000 contractors, all of which incur B&P expense and many of which incur IR&D. Direct distribution to so many contractors would increase the negotiation, technical review, and administrative workload far beyond DOD's current IR&D and B&P management capabilities.

Also, direct IR&D support would reduce or eliminate the ingredient of independence which DOD considers essential. Any contractual instrument would have to be sufficiently definitive that it would eliminate contractor independence and freedom to adopt a needed change.

NASA does not favor line-item appropriation and direct funding by contract or grant to industry because "the work would tend to become directed research and development with the consequent loss of independence and flexibility inherent under the present system." Administration "would be inefficient and uneconomical with great difficulty to be experienced in allocating funds among the contractors in an acceptable manner." NASA believes that the present balance between R&D and the independent effort conducted under IR&D and B&P is adequate.

Industry groups reported that these questions:

"\* \* \* assume a gradual transition to the Federal Government of control over the defense-related R&D activity of the private companies by gradually removing the benefits of company-initiated technology development, discouraging private finance sources, and making these companies in effect dependent on contracts and grants rigorously controlled \* \* \*.

"Whether intended or not, they seek an evaluation of methods for achieving such control over private companies \* \* \*."

Industry believes the issue, rather than being a question of accounting or administrative detail, is the soundness of a policy which has consistently encouraged an incentivized, competitive, and privately owned enterprise.

#### SAMPLING OF OPINION ON ALTERNATIVES

Over the years many ideas have been proposed to modify or replace the DOD-NASA method of supporting a contractor's IR&D program. To be able to respond to the Senators' request for alternatives, we selected 14 of these approaches, described each briefly, and listed the known advantages and

disadvantages of each. The resulting package of alternatives was sent for comment to a number of knowledgeable persons with widely divergent views on the need for supporting IR&D.

We received responses from 18 individuals and 1 industry association. The individual respondents represented Government, industry, and academia. All had direct working experience with IR&D programs from one or more of these vantage points.

The responses varied considerably in the amount of detail presented. However, the respondents generally agreed on the following points.

- Before considering the alternatives, it was necessary to establish personal criteria for the objectives or goals of the IR&D program.
- Measured by the individual's criteria, a characteristic, such as "increased Government control," could be seen as an advantage or a disadvantage.
- None of the alternatives represented an important enough improvement over the present system to warrant a change.

We have synopsisized most of the alternatives, combining them when they reflected somewhat similar approaches to the problem. We have not included all the presupposed advantages and disadvantages but rather let the experts' comments reflect the pros and cons. We selected comments on each alternative or group of alternatives to indicate their strengths or weaknesses. In most instances, in the interest of conserving space, we have taken the liberty of paraphrasing the actual comments submitted.

No constraints on recovery, except  
reasonableness and allocability

One alternative approach removed most of the restrictions of the present DOD-NASA method.

Remove present controls and limitations on the recovery by industry of normal IR&D costs. As defined in ASPR, IR&D would be allowable as overhead to the extent determined to be reasonable and allocable. Administrative costs would be reduced and contractors would have maximum flexibility in conducting their programs. IR&D costs could increase.

#### Favorable comments

1. Since this alternative retains the controls of reasonableness and allocability, in reality only the relevancy and technical quality controls would be removed, but this should considerably reduce administrative costs. The reasonableness control with its negotiation and advance agreements would be retained, so costs of IR&D should not increase. Retention of the IR&D data bank should minimize the reduction in visibility to the Government of contractor programs. This alternative essentially represents DOD's position and procedure during the 1960s until the release of DPC 90 and the enactment of section 203 of Public Law 91-441. Reinstitution of this alternative would require a major change to section 203.

2. This method is the most likely to foster the kinds and amounts of IR&D necessary to achieve national economic and social objectives while insuring that the work is efficiently managed and performed.

3. On the basis of the fundamental principles of IR&D, recognized in both Government and industry, this could be considered a completely acceptable alternative to the present system. Constraints of the marketplace do exist and would hold IR&D expenditures to a constrained level.

4. Cost competition would limit expenditures; only high-value programs would survive internal company reviews.

#### Unfavorable comments

1. This approach is not practicable because it does not eliminate the key issues which are responsible for the present controversy; i.e., how do we determine the reasonableness and allocability of IR&D overhead costs?

2. The removal of all controls would greatly increase IR&D costs for two reasons. First, there would be a step increase because DOD contracts would get a full allocation of contractors' expenditures which are greater than ceilings presently being negotiated. Second, the competitive advantage to be gained by contractors through increased technological capabilities would drive IR&D costs higher than they are today.

3. Congress would never accept this method.

4. Philosophically, to rely on an after-the-fact evaluation of reasonableness is to abandon any idea of effective control, direction, or screening. This alternative would surrender on all the points thought important enough to bring about the present attempts at control.

#### Recovery based on formula-type approaches

Each of several proposed alternatives would simplify the administration of IR&D, and thereby reduce administrative costs, and would provide more uniform procedures for all contractors. Technical and relevancy tests could be eliminated. IR&D costs would likely increase, and Government visibility of programs would decrease. The principal alternatives in this group are:

All contractors would be subject to DOD's CWAS formula. Those qualifying under a CWAS rating (65 or higher based on fixed-price and commercial sales) would have no limitations on IR&D recovery through overhead. Other contractors would be subject to the DOD formula or advance agreements.

Contractor cost centers with 50 percent or more fixed-price Government contracts and commercial sales would be accepted as overhead, subject to a reasonableness determination. (Commission on Government Procurement recommendation.)

DOD's formula based on prior years' experience (now applicable to contractors not meeting requirements for advance agreements) would be applicable to all contractors.



### Favorable comments

1. Applying CWAS at a 50-percent threshold to screen out those contractors whose contract mix is considered such as to force a cost consciousness that eliminates the need for technical evaluation, reasonableness checks, and relevancy determinations is an excellent possibility if (1) the CWAS qualification procedures can be simplified, (2) CWAS is limited to major contractors (incurring over \$2 million in IR&D), and (3) the philosophy of the commercial marketplace, that an adequate cost-consciousness environment will cause any industrial organization to act in a prudent manner both technically and financially, is acceptable.

There is no way of determining how many of the more than 200 profit centers which now receive technical evaluations and which negotiate advance agreements would qualify at a 50-percent CWAS threshold. However, there is potential for reducing the administrative burden.

As for visibility of IR&D programs, it has always been the practice of most major defense contractors to maintain close contact with those defense organizations which may have interest in specific IR&D programs. In addition, the newly expanded IR&D data bank could be continued, regardless of CWAS qualification.

There would be a need to considerably change section 203 of Public Law 91-441.

2. The combination of the CWAS approach and the formula ceiling approach is feasible, subject to a few refinements. When applicable, the CWAS concept would rely on the natural competitive forces and would eliminate unnecessary redtape. Only the threshold needs to be decided. For those not meeting the CWAS threshold, the formula approach could be applied uniformly for all agencies, not just for DOD.

3. The DOD formula could also apply to all contractors with \$2 million or more in IR&D payments with the following modifications.

- A longer period to equalize any unusual fluctuations.
- IR&D costs predicated on allowable (ceiling) IR&D costs.
- Evaluation of the contractor's technical quality and effective management of its IR&D program.
- Relief for either party when it can be demonstrated that the method is clearly inequitable.

Brochures, as currently prepared, would no longer be necessary and relevancy would be considered by the modification which considers allowable costs as one of the bases.

4. The present formula approach could be successful if appropriate guidance were distributed to Government IR&D decisionmakers to make it suited to small business.

5. If the DOD study now underway to revise CWAS were to result in a practicable administrative procedure and if the formula approach were modified to consider radical changes in the business environment and to provide for the treatment of new companies with no track record, they would be viable alternatives and would reduce administrative costs.

#### Unfavorable comments

1. It is not clear how such procedures, although acceptable from a concept standpoint, would be achieved, since those companies which would not qualify would be subject to the same procedures (evaluations, advance agreements, relevancy, etc.) that are in effect now. The formula does not recognize the real-time problem (i.e., as sales go down, the need for increased expenditures in IR&D goes up) in the reimbursement of IR&D.

2. These are, in fact, simply approaches which eliminate advance agreements. DOD and NASA have determined that it is cost beneficial from their points of view to negotiate these agreements, and these agreements provide at least some certainty to industry. Focusing on cost-type versus fixed-price-type contracts misses the fact that the IR&D issue arises because of the lack of real competition involved

in letting many DOD-NASA contracts. It is the uncertainty about the degree to which the Government can count on the restraints of the marketplace to hold down prices and hence count on its suppliers to control their IR&D and B&P expenditures which causes the issue.

3. Available information indicates that few major contractors' cost centers have more than 50 percent of cost-type contracts. At the same time, some very small research-type firms do. Applying CWAS would eliminate many major contractors from the requirement to negotiate advance agreements and would require negotiation with some small contractors who are not now subject to this procedure. There would be inadequate control of large IR&D dollars and overcontrol of small amounts. Applying DOD's formula would result in a quantum increase in costs to the Government because current negotiation ceilings are less than those computed under the formula.

4. The alternatives don't give the assurance that a company is using its resources, in technical areas, in a way that promises to produce results, or that the company is doing an intelligent job of managing these resources so that the Government will benefit from its partial sponsorship (through acceptance of its share of the cost of the effort).

The value of CWAS and its theoretical base never has been tested. Like any mechanical approach, the formula gives an appearance of control but is applied using numbers that have little to say about the quality and effectiveness of past IR&D efforts.

5. Certainly there may be a point where commercial and firm, fixed-price sales are so predominant that administrative controls of any kind would be nonproductive. However, it is highly questionable whether that point can be fixed in advance to apply to all contractors. Another factor that ought to be considered, and one which is applicable to all automatic schemes for recovery, such as CWAS, is the loss of technical visibility and interchange which is inherent under the present system.

The formula approach would perpetuate a sort of status quo. Large companies or companies whose ratios of IR&D and

B&P to sales have been historically high would seem to prosper, or at least be assured of maintaining a comparable position in relation to ceilings established for other contractors. Small companies or new firms entering the Government market might find it extremely difficult to compete effectively for Government business.

Line-item funding; contracts  
and grants for IR&D

A series of alternatives centered around budget line item funding, contracts, and grants. Features of these alternatives included assured relevancy; more Government control than the present method; assured Government rights to patents and data; increased administration procedures and costs; a need for increased funds for IR&D unless effort is reduced; and a lessening of contractor independence, Government visibility of contractors' programs, and technical innovation. The principal alternatives in this group are:

Contractors' IR&D would be treated as a budget line item. Awards would be made in whole or in part through contract- or grant-type arrangements.

A contractor required to submit a program for technical review would have projects selected for direct R&D funding from the research, development, test, and evaluation (RDT&E) appropriation. The amounts would be deducted from the ceiling. Remaining projects would be funded through overhead up to the reduced ceiling.

Independent research projects would be funded through overhead. Independent development projects would be submitted for evaluation and those selected would be directly contracted for.

A contractor now required to enter into an advance agreement would be awarded a level-of-effort contract. The contract would have considerable latitude, and results would be reported at the year's end.

### Favorable comments

1. Under line-item funding the Government could buy what it needs; it could adopt successful R&D procurement contract practices. While making the transition, selected projects could be contracted for and the remaining projects could be funded through overhead, which would provide a bridge for improving present systems.

2. If a line item for IR&D could be established in the RDT&E budget, the Government could contract directly with contractors for the IR&D it has decided it needs. The proposals for this contracted effort could be as simple as the IR&D brochures that are currently the basis of the IR&D advance-agreement negotiations. Companies that are not now in the advance-agreement category could likewise prepare IR&D proposals seeking a contract for IR&D effort. The method of contracting should be a level-of-effort-type contract with flexibility on the part of the contracting officer to start, stop, revise, and reprogram projects when necessary. Any R&D that a contractor wishes to undertake on its own would be financed from the contractor's profit.

3. A combination of (1) direct funding of selected projects and overhead recovery of others and (2) direct funding of independent development and recovery of independent research costs through overhead could become an acceptable alternative if certain changes were made. Research should be independent, and some downstream development work now being done on IR&D could be more effective if done under a contract. In so doing, it is absolutely essential that such work is done in a competitive environment. Further, this sort of activity should be initiated by a Government-need statement with industry responding by proposals rather than by industry submitting a listing of proposed projects in areas of its own interest.

4. If the alternative (the deduction feature when contracting for part of a contractor's program) were modified to deduct from the ceiling only the amount of funds required to conduct the project as an IR&D project, it would be a viable option to add to the current recovery approach.

## Unfavorable comments

1. Assuming that IR&D as a separate budget line item were adopted, "how to cut the pie" (the appropriated dollars) presents a serious problem. The first budget line item could be developed from the records of dealings with "major" contractors, and justification could rest on the experiences and results of earlier transactions. How do companies not on that initial list get their share? In addition, wouldn't it be necessary, in justifying budgets for subsequent years, to point to concrete results? Wouldn't this cause pressures to direct efforts into areas of high potential for short-term payoff? Won't the use of a contract or grant to funnel the money to a company mean the end of "independent" R&D?

2. Proposals for the Government to obtain a pot of money for disbursing to IR&D performers through contracts or grants would lead to the wrong priorities, delays of the best programs, and a gradual decrease in the Government's procurement options.

Although direct contracting might assure the Government that work is relevant to an agency's mission, it may not be an advantage because it would require applying a potential relationship test for every agency a contractor does business with and with which it might negotiate a contract.

The problems of a contractor's planning an organized continuing program under the budget problems involved in a level-of-effort contracting for IR&D would be impossible to solve. No contractor would know what would be appropriated by the Congress or allocated by agencies.

3. The Government's rights to patents is considered "an unequivocal advantage" for direct contracting, although a genuine question exists as to whether the Government's acquisition is clearly in the Nation's best interests. Independent of this broader question, the acquisition of patent rights clearly represents an extremely debatable advantage when it involves loss of innovation.

4. Contracts, in any form, or grants are not viable alternatives. No one has the wisdom or ability to judge or determine all the technical projects and approaches which

may produce beneficial results. The thrust of these proposed approaches ignores the innovative ability and productivity of the thousands of "brains" within companies across the country.

5. Line-item budgeting would cost the Government considerably more, even when maintaining present spending levels, since the Government does not now foot the entire bill. In addition, long-range IR&D programs would suffer and thus the technical base of the country would be weakened.

6. IR&D as a separate line item will entail establishing elaborate machinery within each R&D contracting agency to estimate, budget, coordinate, select, justify, parcel out, and award thousands of contracts to hundreds of contractors. If applied to B&P, line item budgeting would completely disrupt the acquisition process and would create massive disputes.

The difficulty with direct funding of IR&D projects is that, in the context of a typical R&D life cycle, it is usually much too early to incite the interest of the contracting agency to the point of a direct-funding commitment. It appears that many good IR&D ideas might not be pursued, either as directed R&D or as IR&D.

The obvious disadvantage of the level-of-effort-contracts approach is the huge resources that would be required to administer the program, both by the Government and by the contractors involved. There is a danger in any contractual approach, even level-of-effort transactions, becoming more and more restrictive so that, in time, IR&D would be transformed into something more akin to directed research and development.

7. The budget line item approach would substantially reduce the number of contractors with technical capability in any field because those which were not granted funds would fall too far behind to catch up.

Contracting for selected IR&D suggests that all worthy projects would be funded, but the number of projects could not exceed the amount established many months earlier in the budget, authorization, and appropriation cycles. Unless

the RDT&E budget were actually increased, the result would be a reduction in R&D effort. It is questionable that the Government would obtain any appreciable number of new royalty-free licenses. It receives many now from projects started in IR&D.

Separation of independent research and independent development implies a simplistic view that development relates only to development of a product for sale. For most defense contractors, development is more likely to be directed toward taking research to the point where the feasibility of new and better or less expensive solutions are demonstrated. There is no practicable way to draw the line between research and development.

Level-of-effort contracts would free contractors with nondefense business to conduct any program they wished for that part of the program to be supported by commercial or even firm, fixed-price defense work. The Government would lose visibility of all such projects and would lose the capability to influence the work being done.

#### Recovery only if there is benefit to contract

IR&D would be allowable only to the extent specifically set forth in the contract, and then only to the extent the costs provide a direct or indirect benefit to the contract work. (AEC method.)

#### Favorable comment

There is a need to recognize the Government's interests and abolish the practice of subsidizing contractor IR&D. A system similar to that employed by AEC should be adopted.

--Treat IR&D costs on a contract-by-contract basis. IR&D costs would be unallowable except when the contracting agency has made an affirmative determination that an IR&D project provided enough benefits to the contract to warrant the cost.

--Allow contractors to submit to DOD any military-related research projects which they want the Government to finance completely. DOD would then



contract directly for whichever of these projects it desired to pursue. The funds would be provided as a separate line item in the RDT&E appropriation.

- Allow B&P costs if the subject matter of the bids and proposals were applicable to defense work. B&P costs for nondefense work would be unallowable. Place a ceiling, such as 1 percent of the total direct material and direct labor costs of the contract work, on the allowable B&P expenses.
- Reserve and protect Government rights to technical data and patents commensurate with the percentage of the research costs borne by the Government, regardless of whether funding of those costs is direct or indirect.

This system would greatly reduce the Government's funding of contractors' projects. However, DOD's money would be spent on specific defense projects when responsible officials have to review, approve, justify, and defend the expenditures. This system would also permit the Congress to review and oversee these expenditures.

#### Unfavorable comments

1. The AEC system is hard to administer. The disadvantages (disallowance would vary on every contract because of contracting officers' judgments; program continuity would be difficult because project support would be known only after a contract had been negotiated; technological effort might slacken; unsuccessful bidders would have their chances reduced for the next competition; and direct R&D costs might have to be increased to provide innovative approaches) are overwhelming.

2. Disadvantages include the complications of negotiating and justifying IR&D on each contract. However, the major disadvantage is the stagnation of industry into precise, present lines of business. Many, if not most, great ideas are byproducts of effort totally unrelated to the initial application area.

3. Allowing IR&D costs only to the extent they relate to specific contracts raises the questions: Isn't such work actually required in the performance of the individual contracts? and shouldn't it be a direct charge? The United States is not so far advanced over the technology of other nations that it can afford to reduce its total R&D effort. If this approach were adopted, using the savings for other R&D effort should be considered.

4. The advantages (only those costs determined to provide benefit to existing contract work would be accepted; IR&D costs would be reduced because much IR&D is directed toward the future) are, in fact, disadvantages when the welfare of the country is considered. Moreover, planning for IR&D would be virtually impossible, since a firm contract base could not be forecasted and allowability would always be in question, retroactively.

5. The requirement for contract relevancy would mean that long-range research and development, if it is to be done at all, would have to be directed and covered by contract. The contract-by-contract relevancy requirement would pose some difficult, if not insurmountable, cost allocation problems.

6. Using the AEC approach for DOD, the Energy Research and Development Administration, or any agency in need of research and development, would turn off the technological strength essential for coping with the Nation's social, economic, energy, and defense needs. It is important that there be an awareness that AEC's operational orientation was unique for Government agencies.

#### IR&D recovery as a profit factor

IR&D would be included as an element of the contractor's profit instead of an acceptable contract cost. This method would recognize that the amount of IR&D incurred by a contractor is influenced by the contractor's long-term objectives and is subject to adjustment.

### Favorable comments

1. In presenting this alternative, no provisions were made to establish the mechanics for computing a percentage to be added to profit. To give due weight to factors that should be considered, such as technical quality and management efficiency, it would be appropriate to provide the rationale and mechanical means of computing the profit percentage for IR&D, such as the percentage of IR&D to DOD sales.

The modified approach would eliminate advance agreements and would give contractors incentive to eliminate unproductive engineering efforts. However, incorporating a profit factor into the weighted guidelines could, in time, defeat the concept of IR&D as an additional element of profit because some negotiators would be inclined to standardize the profit rate on the basis of previous negotiations. Therefore it is suggested that this percentage be added "below the line" as a special profit item.

Allowing IR&D as a profit element would not deprive the Government of assurance that the contractor actually would continue to perform IR&D. Over a long period, contractors would have to keep up with competition or fail.

Increasing the statutory limits on profit is a mechanical problem which can be done within the framework of any future legislation. The objection that IR&D might be subject to adjustment by the Renegotiation Board can be overcome.

The objection that there may be a tendency to apply the same profit factor for IR&D to all contractors represents a serious problem. One possible solution would be to include the item below the line in computing the profit factor and not include it in the weighted guidelines. Another possibility is using a different factor for different industries. Below-the-line treatment would also take care of the assertion that profits would be the first to be reduced in periods of economic tightening. Many unallowable but necessary and allocable cost items, such as donations and interest, are considered to be covered by the profit factor, and therefore IR&D could also be considered in this context.

2. The factors of originality and motivation, together with many criticisms of the present system, are overcome with this proposal. A major problem, from the Government's viewpoint, with this approach is arriving at an equitable percentage for the wide diversity of industries. One approach might be to collect averages for various kinds of industry (including commercial companies) and use those averages in the weighted guidelines. Another approach might be to let the Renegotiation Board evaluate IR&D expenses when evaluating profit.

#### Unfavorable comments

1. The additional profit to compensate for IR&D costs would undoubtedly be gradually reduced over a few years, which would eliminate IR&D.

2. IR&D as a profit factor would be implemented only on noncompetitive, negotiated procurements when negotiations are predicated on a contractor's proposal that includes cost or pricing data that, in turn, is subjected to analysis and used and relied on to negotiate the pricing agreement. There is a real chance that this would mean a cutback in total money companies spend to support IR&D. It also would mean that IR&D would be allowable, subject to tests of allocability and reasonableness, with no other control. It would put a premium on shortrun objectives with quick and reasonably sure payback.

3. A disadvantage is that a number of Government contractors having large IR&D programs recover a major part of the cost of those programs under Government subcontracts. Even if the Government, in negotiating prime contracts, were able to establish a consistent and equitable increment in profit in lieu of reimbursing IR&D as a cost, it seems an impossible task for the Government to insure that prime contractors or higher tier subcontractors also would do so. Industry has grave doubts that the profit method could be uniformly implemented by the numerous services and agencies of the Government.

4. There would be a loss of technical visibility and interchange--an awareness of what is being done, by whom, and how it relates to our in-house and contracted R&D

programs. How much IR&D and B&P costs are recovered as a part of profit may have more to do with bargaining position on individual contracts than with the quality and need for IR&D and B&P. IR&D would lack a steady and reliable source of capital. Finally, there would be no consistency or continuity in an approach that entailed a multitude of contract-by-contract negotiations involving a host of different contracting officers, each with varying capabilities and points of view.

5. The suggestion is too mechanistic for application to the wide spectrum of industry and too often inappropriate for rapidly changing situations, and therefore many exceptions would be required. Also it fails to recognize the different accounting practices or management emphasis among contractors. Adjusting the weighted guidelines to allow more profit to reimburse for IR&D and B&P would, in effect, be a fixed charge which would not vary with the IR&D effort.

#### Long-term solution to IR&D problem

Adopt new definitions for R&D and other technical effort conceived for commercial businesses. Establish new cost accounting standards and appropriate procurement regulations. Consider new treatments of cost allocations, such as special cost-sharing arrangements.

#### Favorable comments

1. This approach would establish three categories for all technical effort: (1) shortrun product improvement, (2) long-range research leading to new business and new products in the same line of products and in the same market, and (3) development of a product, process, or market in which a company has no direct manufacturing, marketing, or management experience or technology.

Although revised definitions and new cost allocation criteria might simplify matters somewhat by making costs in categories (1) and (2) more clearly relevant, there still would be a need to be concerned with how much the contractor was spending and for what. To use ceilings with some assurance in those instances where the contractor isn't excused by reason of a CWAS-type calculation seems to require

review of projects underway and planned. The alternative is intriguing but needs development and evaluation in depth.

2. This approach warrants further study. Contractors would be reluctant to entertain this proposal unless liberal definitions of "new ventures" and "new business project research" were given.

3. This may well be a useful endeavor, provided the redefinition effort recognizes the objectives of IR&D stated in terms of benefit both to the contractor and to DOD, whereas the proposed categories reflect only the contractor's business objectives.

#### Unfavorable comments

1. Much more work has to be done before changes and definitions can be developed that would relate to both the commercial and the Government marketplace. An initial approach might be evaluating the activities of the Cost Accounting Standards Board. Even if such new definitions could be developed, this approach still would not resolve the major problem; that is, how to treat those cost centers that do the majority of their work for the Government under cost-type contracts.

2. The concept of defining IR&D into classifications relating to business objectives rather than technical objectives might simplify the IR&D problem, but the three categories proposed are not the answer. Requiring costs related to product lines to be allocated to those product lines was included in the original DOD cost principle on IR&D and was found to be unworkable. Among other problems, there is no definition of a product line. A category for exploratory research would be difficult, if not impracticable, to police, because there is no clear definition of what exploratory research is. The third category, new ventures, would suffer from the same malady.

3. In addition to the fact that the proposed definitions were conceived for purely business reasons and without regard to the Government's treatment of IR&D and B&P allowances, the definitions are based on the existence of proprietary product lines and are singularly inappropriate to IR&D by DOD or NASA contractors.

4. The probability of industry's investing capital with no guarantee of control over future business potential (monopsonistic customer) is remote.

5. It is not certain what the suggested definitions will buy in terms of more equitable, efficient, or effective controls. Some projects and work defy exact categorization; also, interpretative judgments will have to be made which will lead inevitably to arguments and disputes. Furthermore, the current allocation practices are not too unlike those proposed for the first two categories. Many companies do have corporate research programs and allocate costs related thereto across all corporate sales.

Eliminating technical reviews is not an advantage. There are valuable benefits to be derived from the technical interchange itself. The approach contemplated for new ventures would deny the application of our best technological talent to solving technological problems and challenges, whatever they are and wherever they may be.

6. This proposal shifts the basis of cost accountability from a known and useful set of definitions to an unfamiliar, less objective base. It eliminates or reduces only some administrative actions without providing for either reducing IR&D costs or improving program quality.

Present DOD-NASA method  
versus proposed alternatives

Ten of the respondents explicitly stated that the present method DOD and NASA used was preferable to any of the proposed methods. Three others either implied a preference by rejecting all the proposed alternatives or said that only a method which would ease some of the constraints of the present method would be as acceptable as the present method.

Only four respondents preferred an alternative method: one preferred using a combination of CWAS and formula; one preferred using the AEC method; and two preferred using combinations of budget line item funding and contracting.

One of these four also proposed a cost-sharing arrangement. Another respondent submitted an original alternative which proposed that contractor IR&D supported by the Government be set at a level which best approximates what a similar contractor would have allocated for its own R&D purposes were it competing in a free market for the sale of commercial products similar in technology to those being supplied by the Government contractor.



## CHAPTER 8

### NEED FOR A UNIFORM GOVERNMENT-WIDE IR&D POLICY

The Senators asked us to specifically consider the recommendations in the report of the Commission on Government Procurement. The Commission considered, among other IR&D and B&P issues, the need for and desirability of uniformity among agencies' policies and procedures to assure equitable treatment of all contractors. The Commission recommended that IR&D and B&P receive uniform treatment Government-wide. The policies of Federal agencies other than DOD show varying degrees of acceptance of IR&D and B&P costs.

#### NASA POLICY AND PROCEDURES

NASA's IR&D and B&P policy is similar to DOD's. NASA allows, as an indirect charge to its contracts, reasonable costs of IR&D and B&P undertaken by NASA contractors. This policy is based on the conviction that these expenditures are necessary costs of doing business, which have proven to be beneficial to NASA.

Companies, at their discretion, undertake a level of IR&D and B&P activity which enables them to compete effectively for new business. NASA believes that, to keep abreast of the rapidly advancing technology in aerospace and related industrial sciences, contractors have no practicable alternative but to join the search for technology, a search undertaken mostly under IR&D and B&P. This basic fact of economic life in a competitive system cannot, in NASA's opinion, be altered or ignored without radically changing the system itself.

NASA believes the R&D done under IR&D and B&P has been a major contributing factor to maintaining a strong and creative technological and industrial capability, a condition of utmost importance to the success of NASA's mission. NASA's policy is to preserve the independent character of this activity as a prime motivator of new ideas and new technology which has supported NASA's mission. The constraint is on dollars, not on the directions taken in R&D.

NASA believes that any controls should be compatible with the independent nature of the activity.

NASA cooperates with DOD in controlling the level of IR&D and B&P expenditures. NASA sees advantages in common controls, including economies in administration. The common approach allows many NASA regulations to be identical to those of DOD, which eases the administrative burden on NASA's contractors. NASA's policy is to accept all DOD-executed advance agreements. The only difference in procedures results from DOD's relevancy requirement which does not apply to NASA.

NASA states that the impact of DOD's relevancy requirement is a problem of unknown proportions. DOD has declared and is declaring certain IR&D work of interest and value to NASA to be nonrelevant to a military function or operation. NASA finds that contractors are inclined to slant their IR&D in favor of DOD interests, to the detriment of NASA.

Although available evidence is that DOD's relevancy requirement has not yet had a financial impact on NASA-oriented IR&D, NASA does not know to what extent contractors are being motivated by this rule to structure their IR&D programs to avoid being caught in the financial crunch of DOD's relevancy requirement. NASA feels that new technology of value to NASA may be neglected.

NASA believes that the benefits of IR&D are reflected in the quality of contractors' proposals received and the contracted work.

#### AEC IR&D POLICY

The Energy Research and Development Administration recently assumed AEC's responsibilities; its IR&D policy is not known. AEC's policy differed from the DOD-NASA policy. The differences were highlighted in the congressional hearings of 1970 when the Congress was considering a bill to control the expenditures of funds by DOD and NASA through the application of controls similar to AEC's procurement regulations.

AEC did not accept a general allocation of IR&D costs. Such costs were unallowed except to the extent specifically set forth in the contract. Then they were allowed only to the extent that they provided a direct or indirect benefit to the contract work.

About 80 percent of AEC's procurement activity was represented by AEC's operating contracts; i.e., contracts for the management of Government-owned plants and laboratories under no-risk, cost-type contracts. AEC owned the facilities, provided the materials, and advanced the funds. The generation of new ideas through R&D was an integral part of the program which was completely financed by AEC. There was, therefore, no IR&D, as such, by the contractor under an AEC operating contract. However, the equivalent thereto was performed and fully funded as a part of the AEC program.

The remaining 20 percent of AEC's business generally was with contractors which performed the contract work in their own facilities without advances of Government funds. In addition, the contractors which operated the AEC-owned plants and laboratories subcontracted some work to industrial firms. These subcontractors, as well as the prime contractors which performed work in their own facilities, frequently engaged in contract work also with DOD or NASA. AEC accepted a limited amount of IR&D costs incurred by those contractors and subcontractors.

AEC's study of 1972 showed that there were 36 contracts totaling about \$127 million on which AEC allowed about \$1.9 million for IR&D, or 1.5 percent of the contract costs. AEC estimated that, under DOD procedures, its IR&D costs would have increased by a factor of at least 2.

#### Rationale for differences in DOD and AEC policies

Since DOD accepted IR&D as a general overhead cost and AEC reimbursed as overhead only those costs shown to be of direct or indirect benefit to specific contracts and since both agencies were involved extensively in R&D work, we looked into the reasons for the differences. (Question 16.)

DOD generally accepts contractors' IR&D costs because it relies on private industry to maintain capabilities and competitively explore alternatives in a broad spectrum of technological fields. Because of the broad involvement of DOD in practically all aspects of the economy, it seems likely that most independent effort by defense contractors would be of potential value to the Government.

AEC stated that this was not true in its case. Unlike DOD, AEC concentrated much of its procurement in a highly technical field where the Government had developed most of the technology. AEC contracted directly for the R&D it considered necessary, because initially there was little or no commercial R&D work.

AEC did not rely primarily upon private industry using contractor-owned facilities for nuclear R&D efforts and was not concerned with maintaining this capability since most of AEC's activities were conducted and financed in Government-owned, contractor-operated laboratories and plants. AEC said that, although it was attractive to say that undirected R&D led to more imaginative and advanced work and should be supported by the Government through IR&D, it was not a desirable mechanism for AEC work.

Part of DOD's rationale for reimbursing IR&D rests upon developing and maintaining competition. IR&D was a relatively small part of AEC's total activity and was not used to develop and maintain competitive capability.

One of AEC's missions was to develop a competitive, private, nuclear industry. AEC said that it had used policies other than IR&D to encourage competition and bring about a nuclear power industry and that, to a real extent, it helped with needed industrial R&D through the device of Government R&D contracts which had helped to build and maintain the industry's capability for further Government and private work. AEC said that it also actively disseminated the technology and patents developed in AEC laboratories and by other contractors to insure that industry had use of all unclassified information.

## Patent and technical data rights

AEC acquired rights to technical data and inventions or discoveries made or conceived under an IR&D project based upon its percentage share of the total project cost. AEC regulations provided that:

- When AEC's cost participation in the IR&D project was less than 20 percent, the contractor was required, if so requested, to submit a summary report and the agency did not seek patent rights.
- When AEC's cost participation was between 20 and 75 percent, the contractor had to submit a project summary report specifying any invention or discovery made or conceived and giving a nonexclusive, irrevocable, paid-up license to AEC for AEC purposes. The contractor could also be required to submit a complete and detailed technical report.
- If the cost participation exceeded 75 percent, the contractor was required to furnish scientific and technical information and data and to give the Government a nonexclusive, irrevocable, paid-up license for all purposes and the right to grant sublicenses for all purposes.

In the past, AEC sought to avoid substantial participation in contractors' IR&D efforts and its participation level was consistently below 20 percent. In some cases its policy served to hold down or avoid transferring rights to the Government. AEC said that recently there had been a few times when AEC had received licenses, licenses had been tendered to AEC, or AEC's entitlement to rights had been identified through contractors' applications for patents.

## Unallowable IR&D projects

AEC regulations provided that, in addition to any project which did not provide a direct or an indirect benefit to AEC contract work, the following projects should be excluded.

- Any R&D project primarily of a promotional nature, such as a project directed toward developing new business or a project connected with proposals for new business.
- Any study or project which was undertaken in whole or in part for other sources.
- Any otherwise acceptable project which duplicated AEC-sponsored R&D work.

We were asked whether DOD paid for similar IR&D projects. (Question 8.)

DOD's policy is to allow, as charges to overhead, reasonable costs of IR&D projects directed toward new concepts, products, or services judged to be relevant to DOD's mission and responsibility. Our examinations have shown IR&D projects to be largely technical in content rather than related to selling or marketing activities.

DOD recognizes that some of the projects undertaken by its contractors may be of interest to commercial customers. However, IR&D accepted by the Government is allocated to both Government and commercial contracts. DOD absorbs a little over half of the IR&D accepted by the Government and a much greater amount is determined to be relevant to DOD.

DOD acknowledges that creating and maintaining multiple-bidding sources in the various technologies necessarily results in some duplicative effort among contractors in any particular area. DOD believes that this duplication provides alternative approaches to a problem and is thus beneficial to some degree. DOD states that, because of the proprietary nature of IR&D, it has no authority to single out competitors to support. (For a more detailed discussion of question 8, see our report of Aug. 16, 1974.)

#### Bid and proposal costs

AEC followed a policy of requiring B&P costs to be applicable to the AEC program to be allowed as a contract cost. The bid or proposal could be made to AEC or to a

contractor for work under an AEC contract or to others for work determined to benefit the AEC program.

The contractors' costs of preparing bids or proposals were allocated to the contract as indirect costs and were limited to 1 percent of the direct material (exclusive of capital equipment) and the direct labor costs of the contract work.

Under AEC regulations, B&P expense pools excluded negotiation and promotional expense and the expense of salesmen, representatives, or agents who did not provide technical services for B&P. We were asked whether the B&P costs DOD paid included these costs. (Question 9.)

ASPR distinguishes between B&P costs and selling costs, defining the latter as being the costs for sales promotion, negotiation, liaison between Government representatives and contractor personnel, and related activities. DOD therefore said that selling and promotional costs of the type usually associated with those words were not allowed as part of B&P. The costs of marketing products are fully recoverable as indirect costs, subject only to tests for allocability and reasonableness.

ASPR permits nontechnical personnel engaged in proposal preparation to charge their time direct to B&P or to an overhead account. DCAA auditors found, as we did, that B&P costs generally did not include nontechnical services as direct costs. B&P is ultimately burdened with a proportionate share of allowable indirect nontechnical effort, except G&A. Since contractors can recover reasonable amounts of selling expenses in their entirety, they have no incentive to charge them to B&P. B&P expenses, recovery of which may be limited, are primarily used for technical activities responding to stated, or sometimes anticipated, customer needs. (Question 9 was discussed in greater detail in our report of Aug. 16, 1974.)

#### POLICIES OF OTHER AGENCIES

IR&D and B&P costs are minor in the procurements of agencies other than DOD and NASA. The Federal Procurement Regulations allow IR&D and B&P as indirect costs on

cost-reimbursable-type contracts similar to the DOD-NASA approach. However, Federal agencies have the option of using these principles or alternative principles, and they are not uniform in their treatment of IR&D and B&P costs.

Some agencies, as a policy, do not allow IR&D or B&P. If IR&D and B&P costs are allowed, it is generally to the extent that the contractor has demonstrated to the agency that the costs are reasonably related to the agency's program. In some cases, when exceptions are made, the rates established by DOD are accepted to avoid the cost of additional negotiations and to facilitate contract closeouts.

#### NEED FOR AN INDEPENDENT IR&D AGENCY

We were asked to consider the practicability and desirability of establishing an independent Government agency to be responsible for the IR&D program on a Government-wide basis as opposed to the present separate-agency basis. (Question 22.)

DOD strongly opposed the concept of a single executive branch agency's exercising control of all Government-supported IR&D. DOD's primary concern was the loss of responsiveness in IR&D to defense needs and priorities. IR&D is one of the prime means DOD uses to advance the technological base on which its acquisition depends. This advancement is fostered along DOD's lines of interest through close interaction between the contractor and DOD.

DOD's second concern involved the independence of the IR&D effort. To exercise control, the single agency would have to put the IR&D effort under a contract or grant. DOD believes this would have a detrimental effect on independence and innovativeness.

NASA assumed that an independent agency meant one receiving its own appropriation and solely responsible for funding all Government IR&D by contract or grant. NASA believes such an approach is neither practicable nor desirable. The loss of independence and flexibility that NASA sees inherent in line item funding would be compounded by the centralization of all Government decisionmaking authority in a single agency. The complementary



relationship of mission agency-funded R&D and its contractors' IR&D would be lost or seriously eroded. NASA believes the single agency approach is bound to result in IR&D's being less responsive to the actual needs and priorities of the individual agencies.

Other agencies' comments included: (1) the relative magnitude of the problem was not such as to justify creating an agency devoted to its solution, (2) there was no need for an independent agency unless the intent of the Government was to change IR&D to directed R&D, and (3) the agency would not oppose such an action if it could be shown to result in overall cost savings.

Industry associations reported that it was hard to conceive of an agency's having the wisdom and dependability needed to decide the degree of participation of all Government agencies in a national IR&D program that would be suitable to the Congress, acceptable to the public and industry, economically efficient, and technically sound. Industry favors Government agencies' having a common policy and practice for IR&D and B&P, but believes it is neither practicable nor desirable to establish a new Government agency responsible for operational aspects of IR&D.

#### RECOMMENDATIONS OF THE COMMISSION ON GOVERNMENT PROCUREMENT

The Commission on Government Procurement took note of the emotion and controversy over IR&D and B&P, attributing it to the many Government procurements which could not be satisfied by the sealed-bid, fixed-price-contract technique. The Commission found that this situation, which had led to applying controls rarely applied to indirect costs which averaged less than 4 percent of sales, had resulted largely from poor communication and misunderstanding.

The Commission's recommendation was (1) that cost allowability principles recognize IR&D and B&P as being in the Nation's best interests to promote competition, advance technology, and foster economic growth, (2) that a policy recognizing IR&D and B&P as necessary costs of doing

business and providing for uniform treatment, Government-wide, be established, (3) that IR&D and B&P be accepted without question as an overhead item for contractor cost centers with 50 percent or more fixed-price Government contracts and commercial sales and that other contractors be subject to the present DOD formula, and (4) that there be a relevancy requirement of a potential relationship to the agency function or operation for contractor cost centers with more than 50 percent cost-type contracts. Six Commissioners supported this recommendation.

Five other Commissioners, including the Comptroller General, agreed that IR&D and B&P were in the Nation's best interests, were necessary costs of doing business, and should receive uniform treatment.

However, they believe that DOD's method should be retained. The recommendation of dissenting position 1 was, in part, a policy which provided (1) that allowable projects have a potential relationship to an agency function or operation in the opinion of the agency head, (2) that the Government be given enough access to the contractor's records of its commercial business for determining that IR&D and B&P costs were allowable,<sup>1</sup> (3) that advance agreements be negotiated with major contractors; in other cases the DOD formula be continued, and (4) that nothing in the policy preclude a direct contract arrangement for specific R&D projects proposed by a contractor.

Another Commissioner, joined by one of the Commissioners supporting the majority recommendation, suggested a number of mechanisms to be explored for a long-range solution to the IR&D and B&P dilemma.

GAO believes that the majority recommendation of the 50-percent rule would increase DOD's annual IR&D and B&P costs by making many large contractors' costs acceptable without question. At the same time, many small contractors would become subject to the relevancy requirement, which would complicate DOD's administration.

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<sup>1</sup>/This position was predicated on the situation described in our report, "Independent Research and Development Allocations Should Not Absorb Costs of Commercial Development Work, Department of Defense" (B-164912, Dec. 10, 1974).

DOD found that adoption of the majority position would increase DOD's costs by over \$100 million annually. DOD was concerned that this method would increase administrative costs.

As for the recommendation contained in dissenting position 1 (that the Government be given enough access to the contractor's record for determining that IR&D and B&P costs were allowable), DOD expressed concern about the size of the workload if non-Government contracts were subject to review by DOD technical personnel. DOD is considering the feasibility of requiring contractors with whom advance agreements are negotiated to certify that costs incurred for IR&D projects sponsored by or required in the performance of a contract or other arrangement will not be allocated to DOD contracts.

#### PROPOSED EXECUTIVE BRANCH POSITION

An interagency committee, with DOD as lead agency, considered, at length, the Procurement Commission's recommendation and the dissenting positions. In November 1974 the task group proposed that the executive branch:

- Adopt ASPR policies and procedures for IR&D and B&P costs as the standard for the executive branch.
- Broaden the relevancy requirement to encompass Government-wide relevancy and amend ASPR and section 203 of Public Law 91-441 accordingly.
- Consider ASPR, as amended for relevancy, a satisfactory standard for Government-wide use when dealing with a competitive industrial base.
- Consider the Procurement Commission's recommendation and dissenting position 1 unacceptable as proposed.
- Recognize the Office of Federal Procurement Policy as the authority for review and authorization of exceptions to the uniform Government-wide IR&D and B&P policy and procedures.

- Recommend that the Office of Federal Procurement policy initiate, at the appropriate time, studies of those concepts of dissenting position 2 that appear sufficiently viable to be considered in depth.
- Consider applying CWAS to the IR&D and B&P cost principles of ASPR and the executive branch document which would implement, Government-wide, similar policies and procedures.

The committee noted that (1) the Procurement Commission's report accepted the current practices and concepts of IR&D and primarily concerned itself with examining the degree of control exercised by the Government, (2) the majority recommendation and dissenting position 1 accepted the premise that IR&D and B&P efforts were in the Nation's best interests to promote competition, advance technology, and foster economic growth, and (3) both the majority recommendation and the dissenting position 1 recognized these costs as necessary to do business in a high-technology environment.

The committee included the following issues in its findings and conclusions.

#### Relevancy requirement

The committee concluded that DOD had implemented the relevancy requirement but said that it had been difficult to find anything not potentially relevant to a military function or operation. Relevancy put added weight on a close tie-in to projects of current interest and undoubtedly caused DOD to classify as nonrelevant some IR&D projects which would lead to products used at a later date for military functions or operations.

The majority of the interagency committee concluded that the relevancy requirement placed on DOD was vague in concept, difficult to administer, and appeared to work against the best interests of the Nation by prohibiting defense contractors from making substantial contributions to resolving such national problems as public transportation, energy shortages, and pollution.

### Allowances by AEC

Over 80 percent of AEC's expenditures for procurement were in its Government-owned, contractor-operated laboratories and plants. In these facilities R&D programs were totally directed and reimbursed by AEC. The contractors' costs of preparing annual budget proposals were reimbursable contract costs borne by AEC. Therefore the committee found that IR&D and B&P costs, as defined by DOD, were nonexistent in that environment.

The committee majority agreed with AEC that IR&D and B&P were inappropriate for AEC's contractors using Government-owned, contractor-operated laboratories and plants. However, the majority felt that AEC, when it contracted for the 20 percent of its work to be done by competitive industry in those contractor-owned facilities, should have followed the same cost allowance practices as other Federal agencies followed.

AEC's member of the interagency committee attached a dissenting-position paper to the report. The paper supported AEC's policy of requiring a direct or indirect benefit to the contract or AEC program as valid and reasonable since AEC's procurements did not extend across almost the entire national economy but were concentrated in a highly technical field.

AEC said that it had supported basic and advanced work by direct contract in response to presentations of ideas through contractors' unsolicited proposals. Also, it had an active program of disseminating technology and patents to the nuclear energy industry. AEC concluded that the device of Government R&D contracts had helped to build and maintain industry's capability for further Government and private work.

### CWAS

The committee found that applying a 50-percent CWAS computation would either eliminate control over most major defense contractors and not provide an acceptable level of control over the amounts expended for IR&D or have an unknown impact on the number of IR&D evaluations and negotiations, depending on how the Commission intended CWAS to be

applied. For major contractors with a CWAS rating under 50 percent, the committee concluded the present ASPR provision for negotiation of major contractors' levels offered a more equitable approach than did automatic application of a formula.

#### Small companies

The Commission recommended negotiated ceilings for IR&D and B&P with all contractors whose sales under cost-type Government contracts exceeded 50 percent. The committee found that a number of small contractors would be included and that the administrative cost to them and to the Government would exceed the benefit of negotiated ceilings. The committee concluded that reasonable levels of IR&D and B&P for small contractors should be determined by the formula provisions of ASPR.

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Upon receipt and analysis of agency and private sector views on the task group's report, an executive branch position will be established on the IR&D and B&P recommendation. This action is currently targeted for June 1975.

## CHAPTER 9

### CONCLUSIONS AND RECOMMENDATIONS

#### IR&D

DOD's statement of principles for R&D, signed by the Director of Defense Research and Engineering and the three services' Assistant Secretaries (Research and Development), includes the position that a strongly supported IR&D program is essential. The program must be well directed, mostly by industry, and the benefits must be clearly visible.

DOD and NASA, the principal users of contractors' IR&D efforts, find IR&D necessary for maintaining a competitive, technically qualified industry which can respond rapidly to defense and space needs with new, alternative concepts.

According to the Council of Defense and Space Industry Associations, IR&D is essential if companies are to remain competitive and to obtain new business by meeting current and future needs of customers; the Government, as one of these customers, should pay its fair share of IR&D costs.

For several years we have examined contractors' IR&D programs. We looked at the procedures DOD established to control costs and evaluate the technical content of contractors' programs. In our reviews we found but one instance of DOD's allowing questionable projects as IR&D. Acceptance of these projects resulted from the lack of clarity in the ASPR definition of IR&D and from the DOD auditors' lack of access to the contractor's commercial records.<sup>1</sup>

For this study we attempted to determine whether the benefits of IR&D are worth the cost. We found that we could not.

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<sup>1</sup>See GAO report, "Independent Research and Development Allocations Should Not Absorb Costs of Commercial Development Work, Department of Defense" (B-164912, Dec. 10, 1974).

Alternatively, we evaluated four contractors' programs on the soundness of the basis for initiating projects. Nearly all projects could be related to documentation forecasting customer needs or outlining agency program goals. We found that the four contractors' managements provided for IR&D projects to receive the same financial and technical attention as contract R&D received.

### B&P

Contractors incur, and DOD and NASA allow, B&P expenditures as the means of translating new ideas and concepts from IR&D to competing proposals to give the agencies technical options. DOD has instituted management procedures to control B&P costs similar to those for IR&D.

Contractors have said that they have an incentive to control B&P costs to keep overhead rates competitive. However, they feel that their ability to do so is somewhat limited because the timing and amount of their expenditures are dependent upon the requests for proposals issuing from the Government. Advance planning cannot be precise when the volume of effort, to a high degree, will be out of their control.

### PROVISIONS OF SECTION 203

DOD has established elaborate procedures to make the technical evaluation of a contractor's program required by section 203. One of the evaluation's purposes is to fix a rating to influence the advance agreement. Yet the result of the evaluation is a negligible factor in the final agreement.

The evaluation's second purpose is to familiarize the evaluator with the contractor's work. Yet, many evaluators are only marginally familiar with the technical area of the projects reviewed. Once the evaluator has read the project description and fixed the rating, he often makes no further use of the knowledge nor does he follow up on the project.

We suggest that DOD consider changing the technical evaluation procedures to enable Government personnel to see a broader spectrum of industry technology confined to a



narrower area of their expertise. This knowledge, plus increased use of the IR&D data bank, should be useful in planning in-house and contract R&D work.

We suggest that, until the capabilities of evaluators are better correlated to the projects being evaluated, the evaluations not be precisely scored for use by negotiators in arriving at contractor ceilings.

Industry and some agency officials have suggested that, if there is to be a relevancy requirement, it be to the Government's interest. It will become particularly important if the provisions of ASPR are applied Government-wide, as the committee considering the recommendation of the Commission on Government Procurement has recommended.

Relevancy to the Government's interest could be interpreted as broadly as relevancy to a military function and determinations would be just as subjective. We have been told, however, that a requirement for relevancy to the Government's interest would forego each agency's having to review every project of virtually every contractor doing any appreciable business with the Government, as would be the case if each agency had its own relevancy requirement. Also relevancy to the Government's interest would ease the burden of contractors that otherwise would have to keep accounting records which would provide an allocation of the costs, or a share of the costs, of each IR&D and B&P project to each agency with which they contract, based on the degree of relevancy of the project to the mission of the particular agency.

#### ALTERNATIVES TO THE DOD-NASA METHOD FOR SUPPORTING IR&D

The Research and Development Subcommittee asked that we present alternatives for its consideration. A body of expert opinion was solicited from Government, industry, and academia on alternatives which would have the Congress determine the amount of funds available to agencies for IR&D and/or change the method by which agencies allocate IR&D funds to contractors.

Respondents could not agree on any alternative or combination of alternatives as representing a considerable improvement over the present method. Several pointed out that the DOD-NASA procedure for recognizing such costs in overhead represented the culmination of many years of deliberation and compromise, including rejection of many of the proposed alternatives.

Most respondents found it difficult to assess the alternatives because of the lack of criteria for measuring them. One respondent characterized the exercise as being solutions in search of the problem. Many responses were prefaced by statements of the criteria used in the evaluation. These criteria generally mirrored the individual's views on the purposes and worthiness of a Government-supported, contractor-initiated IR&D program.

We believe that this lack of agreement is indicative of the basic problem which perpetuates the IR&D controversy. IR&D and B&P have many strong supporters in Government and industry. On the other hand critics, although fewer in number, are adamant in their views that the program is a giveaway and should be cut back or terminated. We suggest that the issue may be resolved only by a statement of congressional policy on the Government's support or nonsupport of IR&D and B&P.

#### RECOMMENDATIONS TO THE CONGRESS

We recommend that, if financial support for IR&D and B&P is to be continued, the Congress clarify for Federal agencies and industry the policy for such support by establishing guidelines which set forth:

- The purposes for which the Government supports IR&D and B&P costs.
- The appropriate amount of this financial support.
- The degree of control to be exercised by the Government over contractors' supported programs.

The Congress could use the studies and recommendations of the Commission on Government Procurement, as well as this report, to assist it in reaching its judgments.

In this report we have presented alternatives to the DOD-NASA method. In testimony before the Armed Services Committees in 1970, we suggested that the Congress may wish to consider, as an alternative policy, how greater use could be made of direct contracting to obtain contractors' R&D efforts. Also, we suggested that the Congress may wish to explore the extent to which agencies could identify development projects of the type now included in IR&D for review and authorization in the same manner as those that are funded from research and development appropriations.

After studying the comments received on the various alternatives, we continue to support the views of dissenting position 1 of the Commission on Government Procurement. Dissenting position 1 agreed with the majority position in recommending:

- Recognizing IR&D and B&P expenditures as being in the Nation's best interest to promote competition, advance technology, and foster economic growth.
- Establishing a policy recognizing IR&D and B&P efforts as necessary costs of doing business.
- Uniform treatment of IR&D and B&P, Government-wide, with exceptions treated by the Office of Federal Procurement Policy.

Dissenting position 1 departed from the majority position and recommended, in part, a policy providing:

- That DOD procedures for negotiating advance agreements be retained when applicable and that, in all other cases, use of the DOD formula for reasonableness be continued.
- That the Government have access to contractors' commercial records when needed to determine that costs are allowable.

- That nothing in this policy precludes a direct contract arrangement for specific research and development contracts proposed by a contractor.
- That allowable projects have a potential relationship to an agency function or operation in the opinion of the agency head.

The interagency committee, which considered the Procurement Commission's recommendation and dissenting positions, proposed adoption of the ASPR policies and procedures as a standard for the executive branch. The committee also proposed that ASPR and section 203 of Public Law 91-441 be amended to broaden the relevancy requirement to encompass Government-wide relevancy. If the Congress establishes a uniform, Government-wide policy similar to that of ASPR, it will have to consider the desirability of a test of relevancy to the Government's interest.

If a Government-wide policy is adopted, we recommend that the legislation also provide for:

- Having the Government present one face to industry; i.e., one advance agreement, a joint technical review, a single overhead rate, etc.
- Including in advance agreements patent and technical data provisions granting the Government royalty-free licenses and data rights, based on a scale of the agencies' cost participation.

If the Congress proceeds as above, the Federal agencies should consider:

- Having contractors continue to propose annual programs to the Government so that the technical data would be added to Government data banks.
- Making technical reviews less structured and not as administratively burdensome and encouraging intensive reviews and exchanges of views between Government and contractor personnel on defined areas of common concern.

APPENDIX I

COMMITTEES:  
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CHAIRMAN: SUBCOMMITTEE ON RESEARCH  
AND DEVELOPMENT  
BANKING, HOUSING AND URBAN AFFAIRS  
CHAIRMAN: SUBCOMMITTEE ON  
FINANCIAL INSTITUTIONS  
SELECT COMMITTEE ON SMALL BUSINESS  
CHAIRMAN: SUBCOMMITTEE ON  
GOVERNMENT REGULATION

*United States Senate*  
WASHINGTON, D.C. 20510

October 8, 1973

APPENDIX I

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B-164912

The Honorable Elmer B. Staats  
Comptroller General of the United States  
General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Mr. Staats:

During the Senate debate on the Fiscal Year 1974 Military Procurement bill, Senator William Proxmire introduced an amendment which, if adopted, would have reduced Independent Research and Development (IR&D) and Bid and Proposal (B&P) funds by 50 percent. The amendment was withdrawn by Senator Proxmire pursuant to his agreement with me, as Chairman of the Research and Development Subcommittee, to request GAO to conduct an in-depth investigation of the underlying assumptions and the overall justification of the IR&D program, as well as into the implementation of the current provisions of law and Department of Defense regulations. The discussion of this subject appears on pages S17517-S17519 of the September 24, 1973 Congressional Record.

The subject of IR&D has been one of continuing interest, and the sustained high level of expenditures is not consistent with the recent trend of Department of Defense purchases from the Procurement and Research, Development, Test and Evaluation appropriations. A primary objective is to establish a better balance between these elements, and to insure that due consideration is given to sound business and accounting practices but consistent with the best interests of the government.

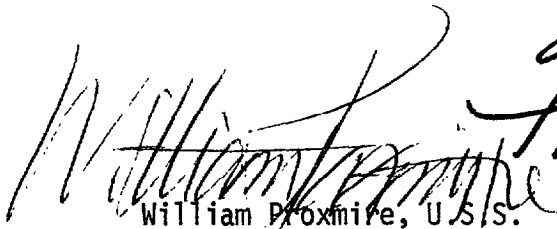
The attached questions reflect the results of a joint review and discussion conducted by Senator Proxmire's staff, Armed Services Committee staff, and representatives of your office. These questions should be answered in conjunction with the review of the IR&D program requested by the Committee letter of October 4, 1973. For the purposes of this study, the term IR&D will be inclusive of B&P.

The Hon. Elmer B. Staats

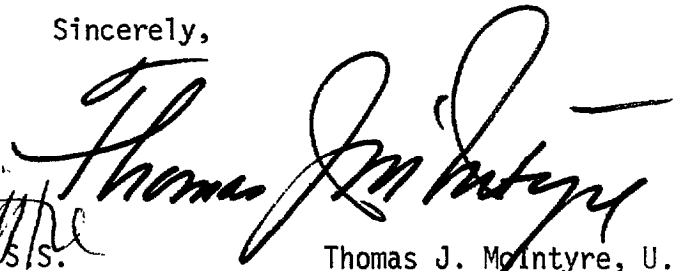
October 8, 1973

The review should be comprehensive and result in a report which should provide comments and recommendations for appropriate changes to the language of Section 203, P.L. 91-441. The report should consider the experience gained both before and after enactment of Section 203, and reflect the viewpoint of industry, the Department of Defense, other governmental agencies, and the General Accounting Office. Specific consideration should be given to the recommendations contained in the report of the Commission on Government Procurement and to the comments of the Department of Defense on that report. The report also should include alternative recommendations so that the Committee will have a choice of actions which may be adopted. The report should be submitted by April 1, 1974, so that the Subcommittee may consider it during the review of the Fiscal Year 1975 budget.

Sincerely,



William Proxmire, U.S.S.  
Chairman, Subcommittee on  
Priorities and Economy in  
Government



Thomas J. McIntyre, U.S.S.  
Chairman, Research and  
Development Subcommittee

TJM:Fa  
Attachment (6 pages)

1. The DCAA audits of IR&D costs show that the ratio of IR&D costs to defense sales increased from 2.73% in 1946 to 3.83% in 1972. What accounts for this increase? What is the rationale to support a high level of contractor IR&D expenditures even in the face of declining defense sales?

2. Reconcile the apparent inconsistencies in the figures for IR&D expenses from 1968 to 1972 between your April 16, 1973, report, reports by the DCAA, and the figures given by DOD to the Senate Armed Services Committee as printed in the committee report of September 6, 1973.

3. In its report to Congress, the DOD includes an amount for "other technical effort (OTE)" in its IR&D figures. What are the audit substantiated amounts for OTE for the years 1968 to the present? Why are these amounts not included in the DCAA audit report? Do the same rules apply for OTE as for IR&D and Bid and Proposal Costs?

4. The DCAA audit report of IR&D covers only those defense contractors with "an annual auditable volume of costs incurred of \$15 million or more and other contractors who, although not meeting the auditable volume criteria, required 4,000 or more manhours of DCAA's direct audit effort per year." What does the term "auditable volume" of costs incurred mean? What is the difference between auditable volume of costs and total defense sales (including both prime contracts and defense subcontracts)? What is your estimate of total IR&D including contractors that do not meet

the criteria of \$15 million of annual auditable costs incurred and 4,000 manhours of defense audit effort?

5. The IR&D figures reported to Congress are based on a DCAA statistical report covering 77 defense contractors. The top 77 defense contractors account for only 69% of defense prime contracts. How much additional IR&D costs are reimbursed by the DOD to divisions, contractors, and subcontractors not covered in the DCAA report?

6. What is the total in-house cost of administering the IR&D program -- include the cost of reviewing contractor proposals, DOD negotiation teams, technical review effort, administration of disputes, etc.? What are the comparable costs for AEC?

7. What problems are encountered by DOD and AEC contracting officers and technical or project personnel in evaluating and negotiating IR&D proposals?

8. Does DOD pay contractors' costs for:

a. research and development projects primarily of a promotional nature, such as projects directed toward the development of new business or projects connected with proposals for new business;

b. studies or projects which are undertaken, in whole or in part, for other customers; and

c. projects which represent unwarranted duplication of other research and development work sponsored by the DOD.



Cite examples if any such costs are paid.

9. Do Bid and Proposal costs paid by the DOD include negotiating and promotional costs or the cost of salesmen, representatives or agents who do not provide technical services in connection with bids or proposals?

10. Public Law 91-441, section 203, provides that appropriated funds may not be spent for IR&D unless the Secretary of Defense determines that the IR&D has potential military value. However, it appears that the DOD does not technically review IR&D proposals in cases where it is charged less than \$2 million a year. What is your evaluation of the adequacy of the DOD's technical review of such programs? Of the \$700 million in IR&D expenses in 1972, how much goes to contractors under the \$2 million ceiling? What is the Comptroller General's opinion of the legality of IR&D payments made in the absence of any technical review as to potential military value? Would it be feasible to lower the technical review threshold below \$2 million?

11. With respect to IR&D proposals where the DOD is expected to pay in excess of \$2 million per year, evaluate the adequacy of the contractors supporting data both with respect to estimated cost and technical justification? Since negotiated advance agreements on IR&D are of necessity sole source negotiations, do contractor submissions comply with the requirements of the Truth-in-Negotiations Act--that is does the contractor have to provide detailed cost or pricing data in support of his estimates and certify as to their accuracy, currentness and completeness? If not, why not?

12. For each of the years 1968 through 1972, identify what specific developments have been made by each of the top 25 defense contractors with respect to amount of IR&D received. For these same top 25 defense contractors identify each IR&D project in excess of \$25,000 per year and indicate the potential military benefit rationale used by the DOD in accepting the project. Identify what patent applications have been made and what patents issued during this period to these top 25 contractors as a result of IR&D programs that have been subsidized by the DOD. Identify what income each company received from these patents or from prior patents developed under IR&D and determine whether or not this income has been credited to the DOD in proportion to its financial support of the project.

13. Does the DOD receive detailed technical reports or other technical data regarding technology developed under IR&D programs so that this information is considered in the development of weapons programs?

14. Does the DOD conduct reviews to evaluate the results of IR&D efforts by its contractors? What do such reviews, if any, show?

15. Apparently IR&D amounts are accepted (if under \$2 million a year) or negotiated (if over \$2 million a year) based primarily on historical rates of expenditures. Moreover, the DOD pays the most IR&D to the largest defense contractors. What safeguards are in effect to offset the competitive advantage this gives large, established firms in

relation to new firms trying to enter defense business -- and particularly small firms? What safeguards are in effect to prevent defense contractors from exploiting inventions developed primarily at public expense under IR&D in competition with other firms for non-defense business? Should safeguards be established in each of the aforementioned instances if they are not now in effect?

16. Since the DOD accepts IR&D as a general overhead cost and the AEC instead reimburses only IR&D costs, which are shown to be of direct or indirect benefit to specific contracts, and since both agencies are involved extensively in research and development work, what, if any, differences exist in the nature of the work or the circumstances under which it is performed that would justify the continued acceptance of IR&D costs by the DOD?

17. What is the practicability of completely eliminating Department of Defense payments to contractors for IR&D and B&P as allowable costs under Department of Defense contracts?

18. Same as previous question, except establishing a separate program in each of the RDT&E appropriations for IR&D and B&P with an amount of funds to be distributed directly, by contract or grant, to industry. This distribution could be based upon such factors as the experience of negotiating teams, including technical review panels, and the same criteria presently used under the existing procedures.

19. What is the practicability of a combination of the present system, with an established dollar ceiling substantially lower than the \$700 million level, and a separate, directly financed program as described under the previous question?

20. What is the practicability of the continuation of the present system but based upon a dollar ceiling which is reduced 10 percent each year with an equal increase in the directly financed program described under question 2 above?

21. What is the practicability as well as the desirability of establishing a separate ceiling for IR&D as distinguished from B&P if the decision is made to establish a total ceiling in law?

22. What is the practicability as well as the desirability of establishing an independent government agency which will be responsible for the IR&D program on a government-wide basis, as opposed to the present separate agency basis?

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KEY TO LOCATION OF ANSWERS  
TO SENATORS' 22 QUESTIONS

<u>Question</u>	<u>Pages of this report</u>	<u>Pages of report of 8-16-74</u>
1 to 5	24 and 27	1 to 10
6	40	11
7	37	
8 and 9	76 and 77	13
10	27 and 37	19
11	43	
12	11 and 17	
13 and 14	21	
15	18 and 44	
16	73	
17	48	
18 to 20	50 and 51	
21	42	
22	78	

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