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THESIS

THE IMPACT OF INDEPENDENT RESEARCH AND
DEVELOPMENT REGULATIONS ON COMPANIES NOT
REQUIRED TO NEGOTIATE ADVANCED INDEPENDENT
RESEARCH AND DEVELOPMENT AGREEMENTS

by

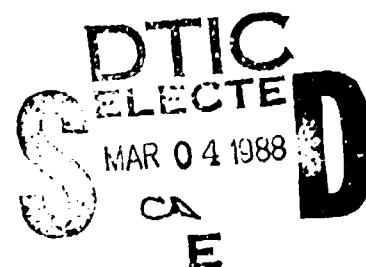
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The Impact of Independent Research and Development
Regulations on Companies not Required to Negotiate
Advanced Independent Research and Development Agreements

by

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Submitted in partial fulfillment of the
requirements for the degree of

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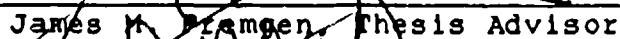
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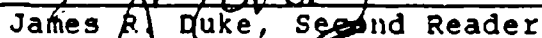
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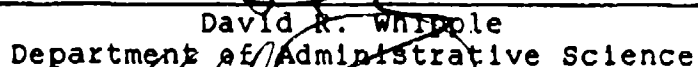
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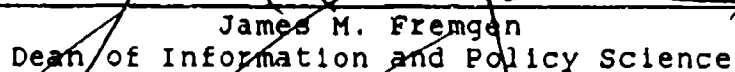

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ABSTRACT

The purpose of this study is to determine the impact of Independent Research and Development (IR&D) regulations on companies not required to negotiate advanced IR&D agreements. The study used data gathered from a survey questionnaire. The questionnaire addressed the contract characteristics of these companies and the impact of the regulations in the areas of (1) cost allowability and allocability, (2) the IR&D ceiling formula and (3) the nature of IR&D costs and their incurrence.

The responses to the survey showed that approximately 30% of the companies doing business with the Government were not involved in any significant IR&D efforts. A significant number of companies engaged in IR&D efforts expressed some dissatisfaction with the IR&D regulations. In general, however, most companies indicated the present system was acceptable.



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I. INTRODUCTION

A. GENERAL

Independent research and development (IR&D) efforts are contractor initiated, directed and controlled projects. They are not directly sponsored nor required for the performance of any contract. These efforts, however, are believed by many in industry and Government to be essential in maintaining industries, companies and products which are competitive and innovative. Reimbursement of these costs by the Government (though believed vital by many) is highly regulated. A ceiling is placed on the maximum amount of IR&D costs which can be recovered from the Government. This ceiling amount is set by a negotiated advanced agreement for firms which receive over \$4.4 million of IR&D and Bid and Proposal (B&P) cost reimbursement. The remaining firms have the ceilings set by a Federal Acquisition Regulations (FAR) formula or, in special cases, negotiated with the Defense Contract Administration Service (DCAS) Administrative Contracting Officer (ACO). As a result of these ceilings, contractors generally receive reimbursement of only a portion of their IR&D investment. For companies with advanced agreements, reimbursement averages around 40%. The remainder of the costs must be allocated to commercial contracts or borne by the contractor.

B. OBJECTIVES OF RESEARCH

This research is concerned with those companies not required to negotiate advanced agreements. The objective is to discover what impact they perceive federal regulations of IR&D reimbursement have on them.

C. RESEARCH QUESTIONS

The primary research question is as follows: Do current federal regulations regarding payment of IR&D costs cause cost allowability or allocability problems for companies not required to negotiate advanced IR&D? The following are subsidiary research questions:

1. What is the nature of these IR&D costs and how are they incurred?
2. In what industries do these companies operate?
3. What are the principal contract characteristics of these companies?
4. What cost allocability and allowability problems exist for the IR&D expenses incurred by these companies?
5. How might these cost problems be resolved?

D. SCOPE AND LIMITATIONS

The scope of this study consisted of a literature search, interviews and a questionnaire survey. The literature search and interviews were conducted to determine current issues and regulations for IR&D. Interviews were conducted with tri-service negotiators from the Army, Navy

and Air Force and with the head of pricing from one Defense Contract Administration Services Management Area (DCASMA). A survey was conducted of companies not required to negotiate advanced agreements on IR&D. The responses received were analyzed to determine the characteristics of these companies and how they perceived the impact of various IR&D issues.

The results of the study are limited by the degree to which the survey has received a representative response from industry, the degree to which the questionnaire addresses the issues of true concern to these companies, and the accuracy of the companies' responses.

E. METHODOLOGY

Survey questions were formulated upon the basis of an initial review of the IR&D literature. The survey was designed with the intent of obtaining data pertinent to the research questions. The survey was sent to companies which received \$10 million or more of defense contracts during Fiscal Year 1986 [Ref. 1] and were not contained on the tri-service negotiators' list of companies negotiating advanced agreements. The decision to select these companies was based on an interview with the Head of Pricing at a DCASMA, which indicated that the vast majority of companies included some form of IR&D costs in their overhead structure [Ref. 2]. The list of companies receiving \$10 million or more in

defense contracts was selected to narrow the universe of possible companies doing business with the Government. These were felt most likely to have a significant IR&D program and greater involvement with Government contracting and regulations. This list contained approximately 1,100 companies and divisions. After excluding those companies and divisions negotiating advanced agreements, addresses could be located for only 570 companies. These companies' mailing addresses were listed in one of three sources: Defense Industry Organization Service (Carroll Publishing Co.), Million Dollar Directory (Dun and Bradstreet), or Standard and Poor's Register of Corporations. [Refs. 3, 4 and 5]

II. BACKGROUND

A. GENERAL

Independent Research and Development (IR&D) is defined in the Federal Acquisition Regulation (FAR) as research and development cost

that is not sponsored by, or required in performance of, a contract or grant and that consists of projects falling within the four following areas: (1) basic research, (2) applied research, (3) development, and (4) systems and other concept formulation studies. [Ref. 6]

The last area consists of efforts to identify potential areas in which to expand research or development effort.

IR&D is effort incurred at a contractor's own discretion. The primary goal of IR&D is to enable the company to remain competitive in its industry and to discover, develop or improve products or services which will meet future demands and promote the firm's ability to survive in its industry. [Ref. 7]

Much of the controversy over IR&D costs arises out of this discretionary yet essential aspect of IR&D efforts. The discretionary aspect of the cost refers to the firm's ability to set the level and direction of IR&D. The essential aspect refers to the need (in many industries) to conduct some level of IR&D to develop new products or services in order to remain competitive. For this reason it

is often referred to as a "necessary cost of doing business". [Refs. 8 and 9]

Costs associated with manufacturing and production engineering are specifically excluded from IR&D. These costs are those associated with all aspects of improving the manufacturing or production process. IR&D costs apply only to research and development effort for products intended for sale.

A cost similar to IR&D is Bid and Proposal (B&P) cost. B&P is cost incurred in preparing, submitting and supporting bids and proposals (both Government and commercial). This cost can be quite extensive and may involve considerable R&D effort. Current regulations specifically separate technical effort associated with B&P from IR&D costs. Government regulations require IR&D and B&P costs to be accounted for separately, but both categories are treated similarly and are subject to combined IR&D/B&P thresholds, ceilings and limitations. [Refs. 6 and 10] This combination is due to the similarity and the discretionary method of incurring such costs. It was believed control over the shifting of costs between IR&D and B&P could not be maintained if separate restrictions were placed on each category. B&P costs include all costs from both successful and unsuccessful bids and proposals.

Costs associated with IR&D/B&P are not charged to or reimbursed directly by the Government (nor by commercial

customers). They are treated as indirect costs and allocated over all related business (both Government and commercial). IR&D costs include both direct costs and an appropriate allocation of allowable indirect costs. General and administrative (G&A) cost, however, is not included. Unless another basis of allocation is more reasonable, IR&D/B&P is allocated on the same basis as G&A. [Ref. 6]

B. REGULATORY HISTORY

IR&D costs started receiving Government attention during World War II. It was during this time that the Government increased its use of cost-type contracts. This necessitated the development of guidelines for costs which would be allowable for reimbursement under Government contracts.

"Indirect engineering" costs were first recognized as allowable costs in 1940 by Treasury Decision 5000. This category was later expanded to include "research, experimental and development" costs. Costs associated with bidding expenses were also included as allowable. [Ref. 11]

The Armed Services Procurement Regulations (ASPR), established in 1949, further defined cost principles. For cost-type contracts these regulations initially allowed reimbursement of "general type research" only when it was specifically stated in the contract. This regulation contained no limitation on the amount of costs recovered.

Fixed price contracts were not subject to the same restrictions as cost contracts. [Ref. 12] In 1959 the ASPR was revised. It specifically identified "general research" as IR&D and "bidding expenses" as B&P. Both costs were allowable, provided they were allocated as indirect costs over all the contractors' business. This regulation also included a provision allowing advanced agreements to be negotiated with contractors. Contracting officers were cautioned to "scrutinize IR&D costs with great care," and advanced agreements were suggested for contractors whose business was predominantly with the Government. These advanced agreements could accept costs for specific IR&D programs, place an overall dollar limitation on the amounts acceptable, or establish a cost sharing ratio. [Ref. 11]

In 1969 Congress enacted PL 91-121 Section 403, which limited reimbursement of IR&D costs to 93% of the IR&D amount contemplated. [Ref. 13] One year later Congress enacted Public Law 91-441, Section 203 (10 USC 2358) through enactment of the FY 1971 Military Procurement Authorization. This law canceled PL 91-121 and is the basis of our present regulations on IR&D/B&P. It places several requirements on the Department of Defense (DOD) regarding payment of IR&D and B&P costs. First, to be an allowable cost, the law requires the IR&D/B&P work to have a potential relationship with a military function or operation (frequently referred to as potential military relevance or PMR). It also

established a requirement that contractors negotiate individual advanced IR&D/B&P agreements if they received IR&D/B&P payments exceeding a threshold amount during the preceding fiscal year. An advanced agreement sets a ceiling on the amount of IR&D/B&P cost which will be considered allowable for the following year. [Ref. 14] The threshold amount was initially set at \$2 million but has since been raised to its present level of \$4.4 million. In 1983 a provision was added to 10 USC 2358 which allows the Secretary of Defense to adjust this threshold once every three years to compensate for changes reflected in economic indices.[Ref. 15] As part of the advanced agreement process contractors are also required to submit technical proposals in support of their IR&D programs. These proposals are to be evaluated by the Government and used in conjunction with the negotiation of advanced agreements. [Ref. 16]

PL 91-441 further requires that DOD submit an annual report to Congress on IR&D/B&P. The report must list all contractors required to negotiate advanced agreements pursuant to the law and the results of those negotiations. The report also provides the latest Defense Contract Audit Agency (DCAA) statistics on IR&D/B&P payments made to major contractors over the last calendar year, DOD's manner of compliance with PL 91-441 and any major policy changes proposed by DOD. [Ref. 14] The surveillance and administration of IR&D/B&P reports submitted to Congress are

implemented by DOD Instruction 7700.17 ("Report to the Congress on IR&D/B&P Advanced Agreements Negotiated with Defense Contractors", April 12, 1974) [Ref. 17].

DOD originally implemented PL 91-441 Section 203 through Defense Procurement Circulars numbers 84, 86, 87 and 90. These circulars were later incorporated into the ASPR in April 1972. DOD Instruction 5100.66 dated 29 February 1972 ("Establishment of Policy for, and Technical Evaluation of Independent Research and Development Programs") established the IR&D Policy Council and provided guidance on technical evaluation and review of IR&D programs. The policy council was responsible for the development and dissemination of DOD policy and guidance on IR&D matters. The directive also established an IR&D technical evaluation group responsible for managing the technical evaluation program. [Ref. 18]

The charter of the IR&D policy council expired in 1977 but was reactivated in 1982 by the Under Secretary of Defense for Research and Engineering (USDR&E), Dr. Richard Delauer. This action followed a committee report to Congress which was critical of DOD's administration of the IR&D program. The report criticized DOD's policies for not providing clear guidance on determining potential military relevance of projects, not providing proper use of the technical data bank, and for using arbitrary evaluation procedures. Dr. Delauer also established a negotiation working group to

complement the existing evaluation group and established mandatory submission of contractor IR&D project descriptions (required for technical evaluations) to the Defense Technical Information Center data bank. [Refs. 19 and 20]

In 1983 DOD Instruction 5100.66 was replaced by DOD Instruction 3204.1 ("Independent Research and Development"), which sets forth the current policy and responsibility for administering the IR&D program. This policy recognizes IR&D/B&P as a necessary cost of doing business, particularly in a high technology environment. Through support of IR&D programs DOD seeks to (1) encourage R&D of innovative concepts that complement and broaden the concepts developed by DOD, (2) develop technical competence of multiple contractors to foster competition and (3) contribute to the economic stability of DOD contractors by allowing the latitude to develop a broad base of technical products. [Ref. 17]

Beginning with the FY 1983 Defense Appropriations Act, Congress started placing an overall restriction on the amount of funds it would make available for reimbursement of IR&D costs. This was done by appropriating an amount less than that requested by the services for IR&D/B&P. This was initiated as a cost cutting measure. This Congressional cap only affects contractors required to negotiate advanced agreements under PL 91-441; it does not impact upon

contractors which are not required to negotiate advanced agreements, nor contractors negotiating voluntary advanced agreements through the Defense Contract Administration Service (DCAS). The same appropriation act also required that DOD make IR&D/B&P costs individual budget line items by FY 1985 and required the submission of proposed IR&D/B&P negotiated ceilings as an annex to the budget submission. (Refs. 21 and 22) The requirement for making IR&D/B&P an individual line item in the budget was later eliminated because of DOD and industry concern that this measure was not feasible and would be counterproductive (Refs. 20 and 23).

C. CURRENT IR&D REGULATIONS AND PROCEDURES

The current contract cost principles and procedures for IR&D/B&P costs are provided in FAR Section 31.205-18. This regulation requires the application of Cost Accounting Standard (CAS) 420 (covering the composition and allocation of IR&D/B&P costs), restricts allowable costs to some specified maximum, and allows deferred IR&D/B&P costs only under certain circumstances. (Ref. 6) The DOD FAR Supplement Section 31.205-18 adds the requirement that IR&D/B&P costs applied against DOD contracts must have a potential military relationship. (Ref. 24)

The Cost Accounting Standards are contained in Vol. 4 of the Code of Federal Regulations (CFR). The particular

regulation governing IR&D/B&P is 4 CFR 420. The fundamental requirements of this standard (for IR&D) are as follows:

1) The basic unit for identification and accumulation of IR&D/B&P costs is the individual project.

2) Project costs will include all allocable costs except general and administrative.

3) IR&D/B&P cost pools will contain all IR&D/B&P projects costs (including indirect costs except for G&A).

4) IR&D/B&P cost pools of a home office will be allocated to the segments. The basis of allocation will be a beneficial or causal relationship.

5) IR&D/B&P cost pools of the business unit will be allocated to that unit's final cost objectives. The basis of allocation will be the same as that for G&A.

6) IR&D costs incurred in one accounting period may not be allocated to another period except as permitted by (other) regulations. [Ref. 10]

All companies have a ceiling placed on the amount of IR&D/B&P costs which they are allowed to recover from the Government through negotiated contracts. Companies receiving over \$4.4 million in IR&D/B&P reimbursements in the previous year are required to negotiate advanced agreements. The advanced agreement will establish a ceiling amount on allowable IR&D/B&P costs. The \$4.4 million threshold includes only contracts requiring submission of certified cost and pricing data. [Ref. 6]

Companies failing to enter into negotiations for an advanced agreement when it is required will not be reimbursed for any IR&D/B&P costs. Companies entering negotiations for advanced agreements but failing to reach an agreement by the close of the contractor's fiscal year will have IR&D/B&P reimbursements reduced to a level below what they would have normally received. The new ceiling amount will be no more than 75% of the amount the contracting officer feels the contractor would have been eligible for under an advanced agreement. (Contractors may appeal this Contracting Officer's Final Decision). Regulations regarding negotiation of advanced agreements are contained in FAR Section 42.10. [Ref. 6]

Companies not required to negotiate advanced agreements have ceilings set by a predetermined formula (See Table 2-1). There is a provision, however, that allows the contracting officer to negotiate a voluntary advanced agreement if the company can demonstrate that the FAR formula does not provide equitable cost recovery. This situation is most likely to occur when sales are increasing very rapidly. [Ref. 6]

TABLE 2-1

SUMMARY OF FAR 31.205-18 (c) (2) IR&D CEILING FORMULA FOR
COMPANIES NOT REQUIRED TO NEGOTIATE ADVANCED AGREEMENTS

Step 1: Determine HISTORICAL RATIO

Yearly Ratio = $\frac{\text{IR\&D/B\&P}}{\text{Total Sales}}$

Historical Ratio = Average of highest two yearly
ratios over the last three years

Step 2: Determine AVERAGE IR&D/B&P

Average = Average of highest two IR&D/B&P
spending levels over the last
three years

Step 3: Compute Current Year IR&D/B&P Ceiling

Current Ceiling = Current Total Sales x Historical
Ratio

Subject to:

Current Ceiling shall be no more than 120% of the
AVERAGE IR&D/B&P or no less than 80% of the AVERAGE
IR&D/B&P.

IR&D costs cannot normally be deferred. An exception is allowed when a specific product is developed and all costs associated with that development can be identified and will be applied against the future sale of units of that product. [Ref. 6]

The cost recovery limitations placed on IR&D/B&P cost by PL 91-441 were initially applied to all Foreign Military Sales (FMS). In 1978, however, a change was incorporated into the acquisition regulations to allow full recovery of IR&D/B&P costs on FMS. [Ref. 25]

D. NEGOTIATION OF ADVANCED AGREEMENTS

Each business unit required to negotiate an advanced agreement is assigned to a single lead agency. A business unit may be the company or a separately reporting division of a company. DOD is the lead agency for any business unit receiving DOD reimbursement for IR&D/B&P. DOD divides the business unit between the Army, Navy and Air Force. When separate divisions of the same company each negotiate advanced agreements, it is possible that the divisions may have different lead agencies. The lead agencies are required to maintain all personnel responsible for negotiating advanced agreements in one central office. The advanced agreement negotiated by the lead agency then applies to all Government agencies. [Ref. 16]

The negotiation of the advanced agreement includes evaluation of the contractor's technical IR&D/B&P proposal. The contractor's technical proposal covers a one year period and states what IR&D projects are planned, what their objectives are and how resources will be employed to accomplish these. The Government rates these proposals on a scale of 0 to 10 points. The technical evaluation is divided into two parts, one part for the proposed plan (worth approximately 40%) and one for progress demonstrated in the execution of previous years' IR&D plans (worth approximately 60%). A preliminary review of potential military relevance is also made. Once every three years a special on-site review is conducted of the contractor's IR&D program. This is done as a validation to insure the contractor's brochures are a proper representation of its program. In the past, technical grades have normally gone up as a result of on-site reviews. [Refs. 27, 17 and 26]

In determining the negotiated ceiling, the Government takes into consideration the technical grade, the rating relative to other contractors, the company's business posture, historical data, and the Congressional cap on IR&D/B&P. Business posture concerns the company's rate of sales growth, the percentage of the company's business with DOD and its prior year's IR&D/B&P ceiling. Historical data concern how closely the actual IR&D expenditures matched the submitted IR&D plan. [Refs. 28 and 27]

At the end of its fiscal year the contractor submits two proposals covering the preceding year. One is financial and is reviewed by the DCAS Administrative Contracting Officer (ACO) and DCAA as an audit of the IR&D/B&P costs incurred. The other proposal is an abbreviated "mini-list" of the actual IR&D/B&P projects undertaken. This is submitted for an after-the-fact review of potential military relevance. This evaluation is done to close out the IR&D program year and is required to comply with the public law provision that DOD pay only for projects with a PMR. [Ref. 27]

In the actual practice of negotiating advanced agreements, the contractors submit their cost proposals 60 days prior to the start of their fiscal years, while their technical proposals are not submitted until approximately three months after the year has started. The technical proposals then take approximately three to six months to evaluate. As a result, the technical scores used to negotiate the advanced agreement are not those of the current year but of the prior year. This difference is due to Congress' desire that the ceiling agreements be reached as soon as possible so that the agreement is an advance and not a retroactive one. Contractors, on the other hand, often do not have a firm idea as to which IR&D programs will be pursued until they get their final company budget for that year. There is confidence in using the previous year's technical score with current year's cost estimates because

experience has shown technical grades do not fluctuate significantly from year to year. [Ref. 27]

E. ISSUES IN IR&D

1. Value of IR&D

A fundamental issue underlying the controversy over the Government's reimbursement of IR&D cost is value. Is the Government receiving its money's worth from the billions of dollars it spends on IR&D? Opponents of IR&D, such as Sen. William Proxmire (D-Wis.), feel that IR&D is "a subsidy and a giveaway" program of questionable value. He feels that the program is not controlled adequately and that there is no evidence that the Government receives benefits from IR&D in proportion to its expenditures. [Ref. 29]

Sen. Proxmire has characterized IR&D as a "taxpayer hand-out to the large Defense firms with inadequate expenditure accountability". [Ref. 30] He has argued strongly for the elimination or increased control of the IR&D program. He prefers that, if DOD has a requirement for any R&D, it be directly requested in annual appropriations, as for all other requirements. If the present system is continued, he favors IR&D ceilings with line item budgetary control. [Ref. 29]

Sen. Proxmire and Rep. J. Addabbo (D-NY) both have criticized the IR&D program as "subsidizing" sole source contracts. The DOD reimbursement of IR&D promotes some

Defense contractors to become experts in certain areas. Thus, new business opportunities are distributed unequally by reinforcing the market position of the largest Defense firms, which receive the majority of the IR&D reimbursements. This practice creates a barrier to market entry by new firms. [Refs. 19 and 30]

Similar views were expressed by Admiral H.G. Rickover in 1982 during hearings before the Joint Economic Committee of Congress. He stated that IR&D wasted public funds for the following reasons: (1) There was no Government supervision of the IR&D work; the reasonableness of costs and the actual work performed were not verified. (2) Contractor IR&D programs might be duplicating or overlapping other research already being conducted at Government expense. (3) The IR&D program works against competition by providing the largest IR&D payment to the largest DOD contractor, thus reinforcing its position in the market. (4) Contractors (not the Government) receive the patent rights for IR&D products. Admiral Rickover went on to say that the PMR implementation and DOD review procedures are ineffective and largely cosmetic. His recommendation was that DOD contract directly for any R&D it requires. [Ref. 31]

The General Accounting Office (GAO) issued a report in 1983 which addressed Admiral Rickover's recommendations for improving Defense procurement. GAO disagreed with the

Admiral's recommendation that IR&D support be abolished or drastically reduced. It concluded IR&D was essential for companies providing high technology products to the Government. [Ref. 32]

Many in industry and Government feel IR&D is not a give away. Further, they point out that it is a misconception to think that the Government is "buying" IR&D. They stress that IR&D is a normal part of a company's indirect cost of doing business and that the practice is commonly accepted throughout commercial firms. They cite such examples as automobile and appliance manufacturers, which routinely amortize the cost of product research and development over expected sales. [Refs. 33 and 34]

The importance of IR&D as a complement to DOD's technology base and a supplement to DOD R&D efforts is also stressed. It enables the Government to tap the vast intellectual and technological resources of the much larger market place. DOD by itself would be unable to judge all possible technological approaches to determine the optimal approach. The technical review of IR&D programs allows DOD to consider new technology at an early stage in the planning process. The work done by industry screens technological approaches and ideas for feasibility. Often more than one technically feasible solution is produced. The technical risk and the time required to develop the program is

frequently reduced for those programs ultimately selected for further R&D. [Refs. 35 and 36]

Infusion of funds into industry in support of IR&D will help to insure the strong technology base necessary for national defense. Also, many believe it fosters competition and increases industry competence by motivating companies to improve their market position through new or improved products. [Refs. 36 and 37]

Proponents argue industry lacks sufficient profits on its own to carry out appropriate levels of IR&D. Without the Government carrying its fair share, technical innovation would drastically decrease. [Ref. 38] Further, they point out that IR&D is a bargain for the Government. DOD historically has paid only about 40% of the total IR&D effort incurred by contractors negotiating advanced agreements. This is because of the ceiling (and Congressional cap) placed on IR&D/B&P and the requirement that the allowable costs be allocated over all business (both commercial and Government). Thus the Government has a highly leveraged investment in the technological future of U.S. industry. In FY 1986, \$7.4 billion was spent on IR&D/B&P, while DOD reimbursed contractors for only \$3.5 billion. [Ref. 39] During 1975-76 Congressional testimony, Director of Defense Research and Engineering, Dr. M.R. Currie, stated:

The notion that IR&D is a subsidy or a giveaway is erroneous. On the contrary, it actually represents a great bargain to the Government. ...For this discounted payment the Government is able to maintain the most advanced technology and innovative systems in the world. [Ref. 36]

IR&D is absolutely essential to the quality of defense RDT&E and weapon acquisition... It pays for itself many times over. [Ref. 26]

It is pointed out by industry that almost none of the major new technologies of this century were conceived as a result of a military requirement. [Ref. 40] The list of military projects which were predicated upon IR&D include Redeye and Stinger air defense missiles, the submarine launched Tomahawk cruise missile, the F-16 fighter, the F-101 engine, lasers, and advanced composite materials.

2. Control Over IR&D

It is often argued that the levels of IR&D expenditures are kept under control by the competitive forces of the market. Excessive, misdirected or inefficient IR&D programs and expenditures would drive up overhead rates and thus make the company's prices noncompetitive. On the other hand, inadequate expenditures on IR&D will result in a company losing its technological competitiveness. [Ref. 35]

In his report to Congress, Admiral Rickover attacked these arguments on two points. First, he felt there was no true competition in the Defense market; thus, contractors lack any true incentive to control costs. Secondly, IR&D should not be considered a normal business

expense like other indirect costs, such as utilities, because the company has an incentive to waste IR&D. This is because it can enhance its market position (both military and commercial) through IR&D expenditures. [Ref. 31]

Opponents of IR&D often argue in favor of directly contracted R&D efforts. They contend that direct R&D eliminates duplication or overlap of efforts. It also allows greater control over the direction and emphasis of the efforts. They believe these features will result in more directly relevant R&D at a lower cost. Others argue that the more limited scope resulting from only directly contracted R&D will result in a far smaller range of innovative approaches and ones which are less risky to pursue. [Ref. 35]

The Government has also acknowledged that industry IR&D programs tend to be well managed with high level management attention. [Ref. 38] Also, because IR&D programs are company initiated and funded, there is a much higher degree of flexibility. This flexibility allows more timely redirection of resources for the research. Company management also lowers costs by eliminating the Government administrative requirements for formalized financial data and technical reporting which exist under R&D contracts. [Ref. 26]

Preliminary results of a Congressional mandated study on IR&D (conducted by RAND Corporation) has concluded that IR&D:

- Substantially increases noncontract R&D efforts for DOD, without displacing money that the industry would spend otherwise
- Assures a greater diversity of technological areas being researched
- Encompasses more long-term, higher-risk research than contract efforts, thus generating high payoff defense capabilities. [Ref. 39]

There are several advantages cited for the controls the Government places on IR&D. Contractors are required to plan their IR&D programs in advance of the expenditures. This helps to clarify the scope and type of efforts involved and facilitates a preliminary determination of PMR. Contractors obtain an approximate estimate of the amount of costs which can be recovered. The DOD ceiling also allows control over the levels of expenditures the Government feels are reasonable. [Ref. 35]

There are possible disadvantages stemming from these controls. Ceiling restrictions may reduce rates of U.S. technology advances or require the commercial segment or stockholders to subsidize the Government. Increased amount of control tends to limit flexibility in the IR&D program's ability to respond to changes in the technological environment. Over-control also runs the danger of driving out the innovators and most efficient producers. [Ref. 38]

The issue of control over the IR&D program was addressed in a 1982 study by Congress. It reported that DOD may be funding IR&D without effective monitoring. This was because DOD could not accurately determine the total amount of annual IR&D/B&P reimbursements or the number of IR&D projects involved. The study also criticizes the way PMR was determined and the way on-site reviews were conducted. DOD disagreed with these findings. The finding that contractors' programs may not be properly monitored was based on the fact that only the contractors required to negotiate advanced agreements or requiring over 5000 hours of DCAA audit are included in the annual IR&D report submitted to Congress. This report covered approximately 250 contractors and product divisions in 1979. Congress estimated 13,000 contractor divisions were below the reporting threshold and, consequently, not monitored. Congress believed these 13,000 contractor divisions accounted for \$735 million in IR&D reimbursement. DOD contended lack of separate IR&D reporting did not mean programs were unmonitored. All contracts are subject to overall audits, which include IR&D/B&P. DOD also estimated the unreported amounts at \$35 to \$70 million instead of \$735 million. DOD contended the study had misinterpreted the facts given to it on the issues of PMR determination and on-site technical reviews. [Ref. 19]

3. Budget Line Item Control of IR&D

Advocates of greater control over IR&D often propose line item budget control. Under line item control, IR&D projects that DOD wanted funded would be submitted to Congress for funding within the normal appropriations process. The present method makes it difficult for Congress to hold DOD accountable for expenditure of public funds. [Ref. 34] Advantages of this alternative approach would be better visibility, accountability and control. The Government would also be able to expend funds only on those programs it specifically identified as needed. [Ref. 8]

Many problems have been predicted with line item control. One is that it would require a major administrative effort. The already complex and constrained line item budgeting process would become even more difficult to manage. Pressure would exist for programs to concentrate more on less risky, short-term efforts to obtain technical results in support of the budget submission. Much of the flexibility and motivation for quality inherent in a truly independent R&D program may be lost. Technical approaches not receiving direct funding may be abandoned prematurely. [Refs. 34 and 8]

The present system also allows the Government access to information about the contractor's complete IR&D program, while only reimbursing approximately 40% of the costs. Under line item budgeting, the range of programs DOD has

information about would be greatly reduced. Further, line item budgeting would of necessity require a dichotomy in the way companies were handled. The IR&D projects of the larger companies now negotiating advanced agreement might be handled under line item controls. However, due to the sheer number of small companies potentially involved in IR&D, their reimbursement would probably need to remain as an overhead charge. Thus, the larger firms would receive direct funding of IR&D, with smaller firms carrying the cost in overhead. This disparity would tend to lower the overhead of the larger firm and make the smaller firms' costs appear less competitive. Another factor to consider is that the present system allows for reimbursement of IR&D cost in proportion to the actual DOD business performed. Because of errors in sales forecasts, direct funding of IR&D projects may result in inequities of funding distribution when compared to actual sales. Finally, it is felt line item control would remove the flexibility of IR&D programs. [Ref. 20]

Dr. DeLauer, in testimony before Congress in 1983, stated that the current system already provided adequate controls over IR&D/B&P. He stressed that control meant the ability to influence a system to achieve desired goals, not the ability to reduce or freeze costs. [Ref. 20]

4. Dual Administration of CAS

The DAR Council has assigned responsibility for CAS 420 ("Accounting for Independent R&D Costs and Bid and Proposal Costs") compliance determinations to the Tri-service Contracting Officers (TSCO). All other CAS are administered by the ACO. The DAR Council based the decision to make the TSCO responsible for CAS 420 on "special and overriding considerations connected with IR&D/B&P costs". These considerations are based in part upon the requirements of PL 91-441, which requires Congressional oversight of IR&D/B&P payments and cost reimbursement based upon a PMR determination. Also, the council took into consideration DOD's requirement that the TSCO establish ceilings on allowable IR&D/B&P amounts. They believed this required a clear understanding of both the appropriate pool of allowable IR&D costs and the appropriate allocation base. [Ref. 41]

This policy has been criticized by industry, which felt it violated the "single cognizant ACO" concept. It created dual centers of CAS administration. All other CAS are administered by the ACO. Critics argue that this dual administration requirement will be onerous for the contractors, especially in coordinating differences in implementation between CAS 420 and CAS 410 ("Allocation of Business Unit General and Administrative Expenses to Final Cost Objectives"). They feel the ACO, through his close

ongoing contact with the contractor, is better able to evaluate the application of CAS requirements than the TSCO, whose contact may be limited to a single annual negotiation. Further, they feel that the integrity of CAS 420 would be in question if the organization responsible for negotiating costs also determined CAS 420 compliance. As stated by the Aerospace Industries Association,

the cost accounting treatment of IR&D/B&P costs must not be colored or improperly influenced by negotiation and political environment; accounting principles will be compromised by the obvious conflict of interest and the limited perspective of the negotiator. [Ref. 41]

5. IR&D and Data Rights

The Under Secretary of the Army James Ambrose recently stated he believed that the present DOD IR&D program was burdensome. He also felt that IR&D efforts are not concentrating on long-term research efforts and parallel DOD development efforts too closely. Influencing these views on the IR&D program has been the difficulty the Army experienced in obtaining data rights for items produced under IR&D. This problem has resulted in sole source contracts for several items the Army wanted to compete. Mr. Ambrose feels the benefits DOD receives are not worth the program's burdens. He recommended the present system be replaced by one which gave contractors more profit in consideration of IR&D efforts or that established new groupings of allowable overhead costs for IR&D. [Ref. 42]

This plan was opposed by many in both DOD and industry who feel the present IR&D program is essential for continued innovation. Ambrose later dropped these recommendations. Entering into this decision were findings that the proposed changes would require major revisions to Government procurement, the inability of the Army to get contractors to accept provisions allowing DOD data rights under IR&D, and favorable findings from the ongoing RAND Corporation study of the IR&D program. The Army is also now supporting the DOD position that data rights produced under IR&D programs belong to the company. [Ref. 43]

6. DOD Inspector General Audit Finding

The DOD Inspector General (IG) recently completed a review of DOD's administration of the IR&D program. It found that, for the most part, the program was effectively administered. It found the program made effective distribution of company technical plans and had taken steps to increase input of data into the Defense Technical Information Center (DTIC). Weaknesses cited by the review were (1) the lack of a uniform methodology to compute the prenegotiation cost objectives for advanced agreements, (2) ineffective procedures for determining PMR, and (3) lack of full realization of the potential of the DTIC data base. [Ref. 28]

The review found that the services used different methods to compute the prenegotiation objectives and that this resulted in inequitable treatment of the companies. The IG developed one possible uniform method and estimated potential saving of \$106 million in fiscal years 1984 and 1985. The Office of the Deputy Secretary of Defense (Research and Advanced Technology) disagreed with this finding. They felt a uniform policy would remove the ability for making adjustments and using professional judgment. They believed that contractors would become aware of the methodology and manipulate their proposals to "game" the system. They also felt the uniform methodology would not produce significantly different results from those presently used. [Ref. 28]

The IG review also concluded that DOD had not established procedures effective in screening out projects that had only incidental military application. It estimated 7.4% of the projects had only incidental military application in fiscal years 1984 and 1985 (accounting for an estimated \$365 million of inappropriate reimbursements). The IG recommended that the Under Secretary for Defense (USD)(Acquisition) clarify guidance on when a project has only "incidental" military application. Also USD(Acquisition) should insure that military relevance guidelines are fully understood by technical evaluators and

that they document the basis of their military relevance determinations. [Ref. 28]

The IG audit found that DOD has improved significantly in insuring that contractor program data were being submitted to the DTIC database. It found that 90% of company projects were being submitted to DTIC in fiscal years 1984 and 1985 (versus 60% in 1981). DOD laboratories are strongly encouraged, but not required, to perform literature searches prior to initiating a DOD sponsored R&D program. As a result, many efforts are initiated without literature searches and may overlap or duplicate existing projects. The IG recommended modifications to the existing instruction on IR&D to utilize the DTIC data bank more fully. [Ref. 28]

III. DATA PRESENTATION AND ANALYSIS

This chapter presents the methodology used to develop and distribute the survey questionnaire, the survey questions, response data and associated analyses. The primary findings and conclusions drawn from the data are summarized in Chapter IV.

A. SURVEY DEVELOPMENT AND DISTRIBUTION

1. General

The data used for this research were obtained by means of a questionnaire survey. The questionnaire was mailed to 570 companies chosen from a listing of companies receiving DOD contract awards of \$10 million or more in FY 1986 [Ref 29]. Companies listed by the tri-service council as being required to negotiate advanced agreements were excluded. Of the approximately 1,100 companies listed as receiving \$10 million or more in DOD contract awards, questionnaires were sent to 570 companies. The questionnaires were mailed in August 1987. Advance personal contact with the companies surveyed was not established. Surveys were addressed "Attn: Government Contracts Division." A self-addressed postage paid envelope was enclosed for returns. Responses were received between August and October 1987.

2. Questionnaire Design

The questionnaire was designed after a preliminary review of the IR&D literature. It was focused on firms not required to negotiate advanced agreements. Most questions offered multiple choice responses which allowed for a range of views. Several questions allowed for unspecified responses (i.e., blank spaces were provided). The questionnaire consisted of 35 questions. Some questions contained more than one part, so that data from as many as 53 distinct items might be obtained from a single questionnaire.

B. SURVEY RESPONSES

1. Method of Data Analysis

Out of the 570 companies sent questionnaires, responses were received from 148. This is a gross response rate of 26%. Of these, 44 companies (30% of those responding) indicated they had no involvement with the Government IR&D program, and five did not respond to a significant amount of relevant questions. Both of these groups are excluded from the database. Ninety-nine responses (17% of the 570 companies sent questionnaires) were considered appropriate and were included in the database. These responses were converted into a numerical code and entered into a data matrix. The data were then

compiled by using the MINITAB function of the IBM 370 computer at the Naval Postgraduate School.

2. Data Presentation

The survey data which follow are presented by the questions as they appeared in the survey questionnaire. The questions are followed by the response data and data analyses. Data analyses for some questions are combined. The response data include responses which were provided for in the questionnaire (those preceded by a letter) and also any responses added by individual respondents (those preceded by an asterisk). These additional responses included "no response", "not applicable" (NA), a selection of more than one of the provided responses, or a commentary response when provision for one was not made. In recording the data a difference was recognized between responses specifically indicating NA and ones with no response at all. In many cases the responding company may have intended a nonresponse to indicate "not applicable" or "no opinion". The actual response data are displayed for the total population of 99 companies. Responses for the population as a whole do not list corresponding percentages. Because of rounding, the number of companies selecting a response for the population as a whole will equal the response percentage. The data for all questions, except 1 and 2, have been categorized on the basis of the company's primary effort (see Question 2). These data are presented along

with the responses for the population (POP) as a whole. The company efforts are broken down into five sectors, research and development (R&D), services (SVCS), manufacturing (MFG), assembly (ASSY) and other. The percentages of responses for these sectors are provided.

3. Company Characteristics

Questions 1 through 6 were designed to give a background profile of the type of business and contracting environment of the respondent.

a. Question 1

Question 1 asked, "What is your Primary Standard Industrial Classification (SIC) Code?" The responses received are listed below; analysis is provided in paragraph c below.

<u>SIC</u> <u>Nbr</u>	<u>Classification</u> <u>Description</u>	<u>Nbr of</u> <u>Companies</u>
None	SIC not provided	32
16	Heavy Construction Contractor	1
17	Special Trade Contractor	1
20	Food and Kindred Products	1
24	Lumber and Wood Products, except Furniture	1
28	Chemical and Allied Products	2
30	Rubber and Misc. Plastics Products	1
31	Leather and Leather Products	1
32	Stone, Clay, and Glass Product	1
34	Fabricated Metal Products	2
35	Machinery, Except Electrical	6
36	Electric and Electronic Equipment	11
37	Transportation Equipment	12
38	Instruments and Related Products	2
43	U.S. Postal Services	1
49	Electric, Gas and Sanitary Services	2
54	Food Stores	1
58	Eating and Drinking Places	1
59	Misc. Retail	1
73	Business Services	8
83	Social Services	1
87	Engineering and Management Services	4
89	Misc. Services	<u>6</u>
		99

b. Question 2

Question 2 asked, "Within your industry, which best describes the primary effort of your company?" The responses received are listed below; analysis is provided in paragraph c below.

<u>Category</u>	<u>Responses</u>
A. Research & Development	15
B. Services	18
C. Hardware Manufacturing	47
D. Assembly	5
E. Other	13
*No Response	<u>1</u>
	99

Companies selecting "other" provided a description of the primary effort they were involved in.

These responses were analyzed and it was concluded that nine could be classified under existing categories for purposes of the remaining survey questions. Seven of the responses selecting "other" were included under manufacturing and two were included under services. The remaining five companies, included here in the "other" category, consisted of four companies which listed both R&D and manufacturing and the one company which did not provide a response.

c. Analysis of Questions 1 and 2

Questions 1 and 2 attempted to identify which industries and types of efforts the responding companies were involved in. Thirty-two of the companies responding did not include a Standard Industrial Classification (SIC) Code. The companies providing an SIC code were dispersed throughout a wide range of industries. The largest concentration of responses is in the industries for transportation equipment (12 responses) and electric and electronic equipment (11 responses). The usefulness of categorizing responses by industry is limited by the large number of companies not providing SIC codes and the wide dispersion of reported industries. All but one of the companies provided an indication of their primary areas of effort. The majority of these can be classified as being primarily involved in some form of manufacturing (54 companies).

d. Question 3

Question 3 asked, "What percentage of your company's sales are made to the Government (either directly or indirectly through another contractor)?" The responses received are listed below; analysis is provided in paragraph g.

<u>Ranges</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. 0 - 20%	26			6	30	19	35	1	20		
B. 21 - 40%	2					1	2			1	20
C. 41 - 60%	6			1	5	4	7			1	20
D. 61 - 80%	15	2	13	1	5	10	19	1	20	1	20
E. 81 - 100%	<u>50</u>	<u>13</u>	<u>87</u>	<u>12</u>	<u>60</u>	<u>20</u>	<u>37</u>	<u>3</u>	<u>60</u>	<u>2</u>	<u>40</u>
	99	15	100	20	100	54	100	5	100	5	100

e. Question 4

Question 4 asked, "What percentage of these Government contracts are Fixed Price contracts?" The responses received are listed below; analysis is provided in paragraph g.

<u>Ranges</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. 0 - 20%	15	2	13	9	45	3	6	1	20		
B. 21 - 40%	12	6	40	3	15	1	20			2	40
C. 41 - 60%	11	4	27	3	15	4	7				
D. 61 - 80%	11	1	7	1	5	8	15	1	20		
E. 81 - 100%	<u>50</u>	<u>13</u>	<u>87</u>	<u>12</u>	<u>60</u>	<u>20</u>	<u>37</u>	<u>3</u>	<u>60</u>	<u>3</u>	<u>60</u>
	99	15	100	20	100	54	100	5	100	5	100

f. Question 5

Question 5 asked, "What percentage of your Government related contracts are awarded competitively (vice sole source)?" The responses received are listed below; analysis is provided in paragraph g.

<u>Ranges</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. 0 - 20%	15	1	6	4	20	10	18				
B. 21 - 40%	9	4	27	1	5	3	6			1	20
C. 41 - 60%	19	3	20	2	10	12	22	1	20	1	20
D. 61 - 80%	12	3	20			7	13	2	40		
E. 81 - 100%	<u>44</u>	<u>4</u>	<u>27</u>	<u>13</u>	<u>65</u>	<u>22</u>	<u>41</u>	<u>2</u>	<u>40</u>	<u>3</u>	<u>60</u>
	99	15	100	20	100	54	100	5	100	5	100

g. Analysis of Questions 3 through 5

Questions 3 through 5 attempted to identify principal contract characteristics of the companies responding. Question 3 addressed the importance of Government business. This should provide an indication of the potential significance of Government IR&D regulations for the company. Question 4 addressed the amount of fixed price contracts relative to cost-type contracts. Question 5 addressed the potential influence "competitive forces" might be expected to play. This would be an important factor in controlling IR&D spending levels. A high percentage of competitively awarded contracts would be required to support the argument that IR&D spending levels are controlled by the market place. In 65 of the companies the Government accounted for over 60% of their business. This would indicate that Government regulations have a major impact on the majority of the companies responding. The predominance of the Government contracts were indicated to be fixed price and competitively awarded. The large number of competitively awarded contracts would tend to indicate that

the levels of IR&D would be subject to the natural constraints of competitive forces.

h. Question 6

Question 6 asked, "Is your company required to negotiate advanced agreements regarding IR&D costs?" The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Yes	19	3	20	4	20	8	15	2	40	2	40
No	80	12	80	16	80	46	85	3	60	3	60
	99	15	100	20	100	54	100	5	100	5	100

The intent of Question 6 was to segregate companies required to negotiate advanced agreements in accordance with the requirements of PL 91-441 (see Chapter II, Section C) from companies not required to negotiate advanced agreements. It was expected that no company would respond "yes" to this question because the survey was not sent to any company known to be required to negotiate an advanced agreement. Thus, it is possible that some or even most of the 19 companies indicating they are required to negotiate an advanced agreement actually are not required to do so, but do so voluntarily. Of course it is also possible that firms voluntarily negotiating advanced agreements indicated they are not required to do so and are included in the non-advanced agreement group. Responses for the two groups were not significantly different for most questions, and the 19 companies indicating they are required to negotiate advanced agreements are included in the database.

4. IR&D Cost Data

Questions 7 through 15 were designed to give a background profile of the nature of the companies' IR&D costs and how they were incurred.

a. Question 7

Question 7 asked, "Does effort expended under IR&D result in either unsolicited proposals or Engineering Change Proposals (ECP) being submitted?" The following responses were received regarding submission of unsolicited proposals.

<u>Category</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Submitting	48	11	73	3	15	29	54	2	40	3	60
Not Submitting	49	4	27	17	85	23	42	3	60	2	40
Not Applicable	<u>2</u>					<u>2</u>	<u>4</u>				
	99	15	100	20	100	54	100	5	100	5	100

Companies submitting unsolicited proposals as the result of IR&D effort were requested to indicate the number of proposals submitted during the last year. Only 45 of the 48 companies submitting unsolicited proposals provided this information. Data on the information provided by these 45 companies are listed below.

Range	1 - 40
Mean	6
Standard Deviation (S.D.)	7.45
Median	4
Mode	2

The following responses were received regarding submission of ECPs.

<u>Category</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Submitting	24	1	7	1	5	19	35	1	20	2	40
Not Submitting	72	14	93	19	95	32	59	4	80	3	60
Not Applicable	2					2	4				
No Response	<u>1</u>					<u>1</u>	<u>2</u>				
	99	15	100	20	100	54	100	5	100	5	100

Companies submitting ECPs as the result of IR&D effort were requested to indicate the number of proposals submitted during the last year. Only 23 of the 24 companies submitting ECPs provided this information. The information provided by these 23 companies is listed below.

Range	1 - 100
Mean	14
S.D.	25
Median	4
Mode	2

Question 7 addressed the extent to which IR&D efforts might result in direct submissions of ideas to the Government in the form of unsolicited proposals or ECPs. A significant percentage of positive responses would have been an indication that IR&D efforts were resulting in direct and unanticipated ideas being submitted to the Government. This appears to be the case with unsolicited proposals for companies involved in R&D and, to a lesser extent, manufacturing efforts. Companies involved with services had very little involvement in this area. Only a small portion of companies submitted ECPs. The

greatest involvement with ECPs occurred in the manufacturing area.

b. Question 8

Question 8 asked, "Which statement best characterizes how your company views IR&D expenditures?"

The categories available for selection were as follows:

- A. Not essential to company's survival in Industry
- B. Required for Industry leadership, but not Industry survival
- C. Required for company's survival in Industry

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	23	3	20	10	50	10	18			3	60
B	30	7	47	5	25	13	24	3	60	2	40
C	44	4	27	5	25	30	56	2	40		
*Other	2	1	6			1	2				
	99	15	100	20	100	54	100	5	100	5	100

Two companies indicated responses not provided for in the survey. One company selected both categories B and C. The second company wrote in that IR&D expenditures "were not available to a company this size with small DOD R&D investment".

c. Question 9

Question 9 asked, "How would you characterize the degree of investment in IR&D required to carry out your company's goals?" The categories available for selection were as follows:

- A. No significant investment
- B. Slight investment
- C. Moderate investment
- D. Major investment

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	14	1	7	5	25	8	15				
B	21	5	33	9	45	5	9			1	20
C	37	7	47	3	15	21	39	3	60	3	60
D	26	2	13	3	15	20	37	1	20		
*No Response	<u>1</u>									<u>1</u>	<u>20</u>
	99	15	100	20	100	54	100	5	100	5	100

d. Analysis of Question 8 and 9

Question 8 addressed the level of importance companies felt IR&D played in their industry. Question 9 addressed the degree of investment in IR&D the companies were engaged in. The population results show a substantial minority of companies feel IR&D efforts are required for survival in the industry. This opinion is reflected most strongly in the manufacturing sector. The degree of IR&D investment was at a moderate level for the largest proportion of firms. The manufacturing sector had the highest percentage of "major investment". The service sectors had the highest percentage of "slight investment".

e. Question 10

Question 10 asked, "What is the approximate percent of sales normally committed to the IR&D effort?" The responses received are listed below.

<u>Ranges</u>	<u>POP</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. 0 - 2%	46	7	46	14	70	21	39	2	40	2	40
B. 3 - 4%	20	3	20	2	10	11	20	2	40	2	40
C. 5 - 6%	11	1	7	1	5	7	13	1	20	1	20
D. 7 - 8%	5	1	7	1	5	3	5				
E. 9 - 10%	3	2	13			1	2				
F. Over 10%	<u>14</u>	<u>1</u>	<u>7</u>	<u>2</u>	<u>10</u>	<u>11</u>	<u>20</u>				
	99	15	100	20	100	54	100	5	100	5	100

Question 10 addressed the magnitude of companies' IR&D investment. It also enables a comparison with the average percent of sales invested by companies required to negotiate advanced agreements. This amount has been estimated as being 5.2% of sales [Ref. 34]. It was expected that survey responses would be in a range of 0 to 10% of sales. Slightly less than half of the responses indicated IR&D expenditures in the range of 0 to 2%. When a range of 0 to 4% is considered, approximately 66% of the companies are included. Responses are similar across the industry sectors; however, manufacturing contains a larger share of companies in the high percentage range. The responses received indicate that companies not required to negotiate advanced agreements tend to invest a smaller percentage of sales in IR&D than do those companies which are required to negotiate advanced agreements.

f. Question 11

Question 11 asked, "Is the planned level of IR&D investment primarily related to the expected level of sales?" The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. Yes	51	9	60	7	35	30	56	1	20	4	80
B. No	47	6	40	12	60	24	44	4	80	1	20
*Not Applicable	<u>1</u>			<u>1</u>	<u>5</u>						
	99	15	100	20	100	54	100	5	100	5	100

Companies stating expected sales were not the primary basis for budgeting IR&D were requested to indicate the primary basis used. Only 39 of the 47 companies not using expected sales provided this information. The 39 responses were grouped into like categories and are shown below. The two listed as "other" were unique responses not selected by any other companies.

<u>Response</u>	<u>Number</u>
Based on specific approved projects	17
Based on perceived need, new technology, new markets or industry leadership	13
Based on IR&D formula ceiling	5
Based on return on investment	2
Other	2
No Response	<u>8</u>
	47

Question 11 addressed the primary basis for planning IR&D expenditures. It was expected that the primary basis would be a percentage of sales. Only half of the companies for the population as a whole planned IR&D efforts primarily on the basis of expected sales. This proportion was fairly uniform across sectors, except for assembly and, to a lesser extent, services. The majority of the companies in these two sectors did not plan IR&D on the basis of sales. A perceived need of some form (specific project or opportunity) was the basis for planning IR&D

investments in 64% of the firms not using sales as the primary basis.

g. Question 12

Question 12 asked, "Which best classifies the type of IR&D effort undertaken by your company?" The categories available for selection were as follows:

- A. Long range exploratory R&D - no immediate sales foreseen
- B. Near term R&D - refinement of existing opportunities with near term sales potential
- C. Applied R&D - directly applicable to items manufactured or sold

The responses received are listed below:

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	10	1	7	2	10	6	11	1	20		
B	51	13	86	10	50	24	45	2	40	2	40
C	28	1	7	7	35	18	33	1	20	1	20
*Other	8					5	9	1	20	2	40
*Not Applicable	2			1	5	1	2				
	99	15	100	20	100	54	100	5	100	5	100

Eight companies indicated responses not provided for in the survey. These "other" responses indicated the combination of categories listed below:

Responses

(A) and (C)	1
(B) and (C)	4
(A), (B) and (C)	3
	8

Question 12 addressed the orientation of the IR&D efforts undertaken. One of the advantages attributed to IR&D is that it is a precursor to military R&D. This often occurs when IR&D efforts involve longer range projects of greater risk, which push the state of the art. If this

were the case with the smaller firms, it would be expected that responses would indicate long range R&D. For the population as a whole, 51% of the companies indicated that the primary thrust of their IR&D efforts was on near term R&D. Only a small number of firms were involved primarily with long range exploratory R&D. Most of the sectors were similar in their relative ranking of the three categories of IR&D effort. The R&D sector, however, was much more heavily involved in near term R&D efforts.

h. Question 13

Question 13 asked, "What percentage of IR&D effort is initiated with the Government in mind as the principal potential customer?" The responses received are listed below:

<u>Ranges</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. 0 - 20%	28	1	7	8	40	18	33	1	20		
B. 21 - 40%	9	1	7	1	5	6	11			1	20
C. 41 - 60%	10	3	19			7	13				
D. 61 - 80%	6	1	7	2	10	3	6				
E. 81 - 100%	43	9	60	8	40	18	33	4	80	4	80
*No Response	2					2	4				
*Not Applicable	<u>1</u>										
	99	15	100	20	100	54	100	5	100	5	100

Question 13 sought to determine to what extent the Government was intended to be the primary beneficiary of the IR&D effort. The alternative might be that IR&D efforts were more general or commercially oriented. The responses indicated concentrations at each end of the spectrum. This would tend to indicate firms were

oriented primarily toward either all commercial or all Government IR&D efforts. The results for the total population showed the largest percentage of companies were involved in Government oriented IR&D. This concentration was strongest in the R&D, assembly and other sectors. These had very few companies indicating low percentages of Government oriented IR&D. The services and manufacturing sectors were evenly split between the two extremes.

1. Question 14

Question 14 asked, "What percentage of your total IR&D expenditures are recovered through allocations to Government contracts (either as prime or subcontractor)?" The responses received are listed below:

<u>Ranges</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. 0 - 15%	36	2	13	8	40	26	48				
B. 16 - 30%	9			2	10	5	9	2	40		
C. 31 - 45%	5	1	7			3	6			1	20
D. 46 - 60%	6	1	7	2	10	2	4			1	20
E. 61 - 75%	9	1	7	1	5	6	11	1	20		
F. 76 - 90%	12	2	13	2	10	5	9			3	60
G. 91 - 100%	21	8	53	4	20	7	13	2	40		
*Not Applicable	<u>1</u>			<u>1</u>	<u>5</u>						
	99	15	100	20	100	54	100	5	100	5	100

Question 14 addressed the range of IR&D cost recovery resulting from the current regulations. It also enabled comparison with the average cost recovery rate of companies required to negotiate advanced agreements. Companies required to negotiate advanced agreements recover approximately 43% of IR&D costs through allocation to Government contracts. [Ref. 38] If the current

regulations produce inequitable cost recovery, it would be expected that the responses would be skewed toward the low end. It is expected that a close relationship would exist between the percentage of sales a company makes to the Government (question 3) and the percentage of IR&D costs a company recovers from the Government. Responses for the population as a whole indicated the amount of cost recovery was primarily split between the two extreme ends of the spectrum. The largest proportion (36%) is in the 0 to 15% cost recovery range. These responses are similar in distribution to those for the percentage of sales a company makes to the Government. However, the distribution of IR&D costs recovered from the Government is skewed slightly more toward the lower levels. The service and manufacturing sectors had the greatest concentrations falling in this range. The R&D sector was the primary one having a high concentration of companies receiving greater than 90% recovery. While companies were concentrated at either extreme, there was a significant number of companies spread throughout the spectrum. This indicates that companies experience a wide range of cost recovery.

j. Question 15

Question 15 asked, "What percentage of IR&D costs (allocable to Government contracts) are usually determined unallowable for reimbursement under Government contracts?" The responses received are listed below.

<u>Ranges</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. 0 - 5%	51	9	60	10	50	29	54	2	40	1	20
B. 6 - 10%	8	1	7	1	25	3	5	2	40	1	20
C. 11 - 15%	4			1	5	3	5				
D. 16 - 20%	4	1	7	1	5	2	4				
E. 21 - 25%	4			1	5	1	2	1	20	1	20
F. Over 25%	20	2	13	5	25	12	23			1	20
*No Response	6	1	7			4	7			1	20
*Not Applicable	2	1	6	1	5						
	99	15	100	20	100	54	100	5	100	5	100

Question 15 addressed potential problems of cost allowability. If significant inequities or problems existed in determining the allowability of IR&D costs, it would be expected that the responses would be skewed toward the high end of the scale. The majority (51%) of the population indicated little problem with unallowability of costs. A notable amount (20%), however, were at the other end of the spectrum and indicated over 25% of costs were unallowable. A similar pattern existed throughout the sectors, indicating that the bi-modal results were not the result of differences in sectors.

5. Impact and views on IR&D regulations

Questions 16 through 29 were designed to provide information on how companies viewed various aspects of IR&D regulations. They also provide information on the impact these regulations have on IR&D efforts.

a. Question 16

Question 16 asked, "What is the impact of the following areas on your company's IR&D programs?" Three areas were listed and responses were to indicate the level

of impact ranging from strongly adverse to strongly favorable. The responses received are listed below by area of impact.

(1) Impact of IR&D cost allowability rules.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Strongly Adverse	5			1	5	4	7				
Adverse	25	4	27	4	20	12	22	3	60	2	40
Neutral	55	8	53	13	65	30	56	2	40	2	40
Favorable	8	2	13	1	5	5	9				
Strongly Favor	1									1	20
*No Response	3	1	7			2	4				
*Not Applicable	2			1	5	1	2				
	99	15	100	20	100	54	100	5	100	5	100

(2) Impact of IR&D cost allocability rules.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Strongly Adverse	3			1	5	2	4				
Adverse	23	2	13	5	25	12	22	2	40	2	40
Neutral	57	8	54	12	60	32	59	3	60	2	40
Favorable	8	2	13	1	5	5	9				
Strongly Favor	0										
*No Response	5	2	13			2	4			1	20
*Not Applicable	3	1	7	1	5	1	2				
	99	15	100	20	100	54	100	5	100	5	100

(3) Impact of the IR&D ceiling formula.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Strongly Adverse	13	1	7	4	20	7	13			1	20
Adverse	26	5	33	6	30	11	20	2	40		
Neutral	49	5	33	9	45	31	57	3	60	1	20
Favorable	3	2	13			1	2				
Strongly Favor	0										
*No Response	5	1	7			3	6			1	20
*Not Applicable	3	1	7	1	5	1	2				
	99	15	100	20	100	54	100	5	100	5	100

Question 16 addressed the company's perception of how these three aspects of Government regulations were affecting its IR&D program. If any of these aspects

provided significant positive or negative effects, it would be expected the overall responses would be skewed in that direction. Overall, the pattern of responses were the same for all three areas of IR&D regulations. The largest percentage of the companies (approximately 50% or more) were neutral and did not feel the regulations had either a positive or negative impact on IR&D programs. In all three areas there was a significant number of firms (approximately 30%) which felt the regulations did have some negative impact on programs. Of the three areas, regulations on the IR&D ceiling had the greatest number of responses that the impact was adverse. The individual sector responses closely patterned the overall response results. These results would tend to indicate that the IR&D programs of most firms are not being seriously impacted by these three aspects of IR&D regulations. However, there is a significant number of firms for which the regulations have some sort of adverse impact. Of the three aspects examined, the IR&D ceiling formula had the strongest adverse impact.

b. Question 17

Question 17 asked, "Does the current formula for computing ceilings on the amount of IR&D cost the Government will reimburse provide an acceptable level of reimbursement?" The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Yes	43	7	47	8	40	25	46	2	40	1	20
No	43	7	47	10	50	21	39	2	40	3	60
*No Response	8	1	6	1	5	5	9			1	20
*Not Applicable	5			1	5	3	6	1	20		
	99	15	100	20	100	54	100	5	100	5	100

Companies which indicated the IR&D ceiling formula did not allow an acceptable level of reimbursement were asked to indicate the percentage of IR&D costs exceeding the ceiling. Only 30 of those 43 companies provided this information. It is summarized below:

<u>Response</u>	<u>Pop</u>	<u>R&D</u>	<u>SVCS</u>	<u>MFG</u>	<u>ASSY</u>	<u>OTHER</u>
Range	4-100%	5-100%	18-40%	4-80%	4-28%	10-25%
Mean	29%	38%	26%	31%	16%	18%
S.D.	22%	39%	10%	20%	17%	8%
Median	25%	20%	20%	25%	4%	20%
Mode	25%	N/A	N/A	25%	N/A	N/A
Number	30	5	4	16	2	3

Question 17 addressed the percentage of companies feeling the level of IR&D reimbursement was not acceptable. Those feeling the level was not acceptable were requested to indicate what percentage of IR&D costs exceeded the ceiling. This was to provide an indication of the level of IR&D costs companies were required to bear. The responses regarding acceptability of reimbursement were evenly split for the population as a whole and throughout the industry sectors. This indicates that the regulations do not impact companies uniformly.

c. Question 18

Question 18 asked, "Which aspect of the IR&D ceiling computation formula creates the greatest inequity?"

(This formula is described in Table 2-1). The categories available for selection were as follows:

- A. Use of a historical ratio (average of 2 highest IR&D/Sales ratios during the past 3 years) to determine the current ceiling
- B. Limiting the current ceiling as determined by the historical ratio to between 80 - 120% of the "average" IR&D costs
- C. Computing the "average" IR&D costs as the average of the 2 highest yearly IR&D costs during the past 3 years
- D. Other (specified response)

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	28	3	21	6	30	17	31	1	20	1	20
B	24	6	40	2	10	13	24			3	60
C	16	2	13	7	35	6	11	1	20		
D	7	2	13	1	5	3	6	1	20		
*No Response	17	2	13	4	20	9	17	1	20	1	20
*Not Applicable	<u>7</u>					<u>6</u>	<u>11</u>	<u>1</u>	<u>20</u>		
	99	15	100	20	100	54	100	5	100	5	100

Seven companies selected "other" and specified their own response. These responses are shown below.

<u>Response</u>	<u>Number</u>
(A) and (B)	1
(A), (B) and (C)	2
Limited access to IR&D by smaller firms	1
Combining IR&D with B&P. Increased requirements for B&P have reduced IR&D.	2
Allocating IR&D to current contract costs.	$\frac{1}{7}$

Question 18 addressed the issue of which aspects of the IR&D ceiling formula caused the greatest amount of concern for companies. For the population as a whole, responses were approximately the same for those selecting the historical ratio as for those selecting the limitation of the ceiling to an 80 to 120% range. The answer citing

the computation method for average IR&D costs received a smaller but significant response. Some interrelationship may exist between responses citing the limitation of the ceiling to an 80 to 120% range and those citing the computation method of average IR&D costs. This is so because the average IR&D cost referred to in (C) is used in conjunction with the 80 to 120% range cited in response (B) to limit the fluctuation of the ceiling. Companies impacted most by the formula's limitation on the amount of change per year may have selected either (B) or (C). Companies selecting (A) would be more concerned with the basic current amount computed (before fluctuation ranges are applied) and, thus, may not be impacted by the fluctuation limitations. The responses varied considerably between the individual sectors.

d. Question 19

Question 19 asked, "The formula for computing ceilings on allowable IR&D costs prevents wide fluctuations by limiting the range to between 80% and 120% of the "average" IR&D expenditures for the past 3 years. Do you feel this range allows (specified fluctuation)?" The alternatives available for selection were as follows:

- A. Reasonable fluctuation
- B. Too great fluctuation
- C. Too small fluctuation
- D. Other (specified response)

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	33	5	33	4	20	21	39	2	40	1	20
B	2			1	5	1	2				
C	44	9	60	11	55	20	37	1	20	3	60
D	2					2	4				
*No Response	14	1	7	4	20	7	13	1	20	1	20
*Not Applicable	4					3	5	1	20		
	99	15	100	20	100	54	100	5	100	5	100

Two companies selected "other" and specified their own responses. For one company the range of fluctuation was "reasonable in most instances" and the other indicated, "It is not the range but the methodology of what is allowed". While not selecting "other," several companies added amplifying remarks. One response citing that the range was reasonable added that the range would be reasonable if it were based on constant dollars, but inflation could eat up a majority of the increase allowed. Four responses citing that the range was too small emphasized that the fluctuation allowed was too small for fast growth companies. One response citing that the range was too small stated the process should be "zero based" and evaluated annually on the basis of actual investments and strategies.

Question 19 addressed whether companies perceive the fluctuation allowed by the ceiling formula as adequate. It was expected that companies which experience rapid growth might incur IR&D levels which exceeded the allowed 20% increase over the historical IR&D average. The responses

were basically divided between the views that the range allowed too little fluctuation (44%) and the view that the fluctuation allowed was reasonable (33%).

e. Question 20

Question 20 asked, "Which best describes your company's actions when the maximum amount of IR&D costs reimbursable by the Government has been reached?" The responses provided were as follows:

- A. IR&D efforts continued at the same spending level for the remaining company year
- B. All IR&D efforts decreased for the remaining company year
- C. DOD related IR&D decreased for the remaining company year
- D. All IR&D efforts discontinued for the remaining company year

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	44	2	13	9	45	30	56	2	40	1	20
B	18	6	40	4	20	5	9			3	60
C	10			2	10	6	11	1	20	1	20
D	9	4	27	2	10	2	4	1	20		
*Not Applicable	12	3	20	3	15	5	9	1	20		
*No Response	6					6	11				
	99	15	100	20	100	54	100	5	100	5	100

Question 20 addressed whether spending on IR&D was independent of the Government's level of reimbursement or whether reduced reimbursement of IR&D costs by the Government resulted in reduced IR&D efforts. For the overall population, the majority of the companies continued IR&D efforts at the same spending level after the maximum reimbursement had been reached. Very few companies

discontinued all IR&D efforts or only DOD related IR&D efforts. The R&D and Other sectors did not reflect this trend. The R&D sector had a much greater proportion of companies decreasing or discontinuing all IR&D efforts. These results would lead to the conclusion that, once IR&D efforts are planned and initiated, the amount of actual Government reimbursement has a limited impact on the IR&D effort incurred by most companies. Companies in the R&D sector were exceptions, as they appeared to be more dependent on the level of reimbursement for all types of IR&D.

f. Question 21

Question 21 asked, "If IR&D efforts are continued after the maximum amount of IR&D costs have been recovered from the Government, how is this cost handled?"

The answers available for selection were as follows:

- A. From an increased share of IR&D costs allocated to the commercial sales
- B. Out of the profit of Government sales (no increase to commercial sales price)
- C. Other (specified response)

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	21	1	7	6	30	13	24	1	20		
B	42	8	53	9	45	21	39	1	20	3	60
C	10	2	13	1	5	5	9	1	20	1	20
*No Response	11			1	5	8	15	1	20	1	20
*Not Applicable	15	4	27	3	15	7	13	1	20		
	99	15	100	20	100	54	100	5	100	5	100

Ten companies selected "other" and specified their own responses. Eight of these companies responded that the costs were shared out of the revenues from all sales (Government and commercial). One company responded that it would request a voluntary advanced agreement to allow the additional spending. Another company responded it would "use cash flow funds hoping to get reimbursement by the Government".

Question 21 addressed how the costs of IR&D efforts not reimbursed by the Government were recovered, if at all. The majority of companies take the excess cost of IR&D effort out of profit from sales. This group accounted for 50 of the 73 companies (68%) providing an applicable response. Less than 30% of these 73 companies indicated they passed the excess cost of IR&D on to the commercial customers. These results tend to support a conclusion that the Government regulations limiting IR&D reimbursement are not causing commercial customers to subsidize the Government to a great extent. These regulations do appear to reduce the level of profitability of Government and, to a lesser extent, commercial contracts when companies have to absorb the excess IR&D costs out of profits.

g. Question 22

Question 22 asked companies to indicate the impact "DOD policies on IR&D cost recovery" had with regard to three aspects of their IR&D programs. A statement was

included regarding these three aspects and companies were requested to indicate their level of agreement, ranging from "strongly agree" to "strongly disagree". The responses received are listed below by the three aspects examined.

The following responses relate to the statement that "DOD policies on IR&D cost recovery significantly affect our company IR&D investment decisions":

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Strongly Agree	15	6	40	4	20	2	4			3	60
Agree	24	3	20	4	20	15	28	2	40		
Neutral	37	5	33	6	30	22	41	3	60	1	20
Disagree	11	1	7	3	15	6	11			1	20
Strongly Disagree	8			2	10	6	11				
*No Response	4			1	5	3	5				
	99	15	100	20	100	54	100	5	100	5	100

The following responses pertain to the statement that "DOD policies on IR&D cost recovery provide incentives to pursue IR&D":

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Strongly Agree	3	1	7			1	2			1	20
Agree	24	7	46	4	20	10	18			3	60
Neutral	32	3	20	7	35	21	39	1	20		
Disagree	23	3	20	6	30	11	20	3	60		
Strongly Disagree	14	1	7	2	10	9	17	1	20	1	20
*No Response	3			1	5	2	4				
	99	15	100	20	100	54	100	5	100	5	100

Following are the reactions to the statement that "DOD policies on IR&D cost recovery provide an equitable method of cost recovery":

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Strongly Agree	1			1	2						
Agree	15	3	20	3	15	8	15			1	20
Neutral	38	7	47	5	25	22	40	2	40	2	40
Disagree	28	4	26	8	40	12	22	3	60	1	20
Strongly Disagree	14	1	7	3	15	9	17			1	20
No Response	3			1	5	2	4				
	99	15	100	20	100	54	100	5	100	5	100

Question 22 addressed how companies perceive the impact of DOD's policies on IR&D investment and incentives. It also addressed whether the policies are seen as equitable. The overall population responses indicate DOD policies have a neutral impact on roughly one third of the companies for all three areas examined. Approximately 40% of the companies in each area indicated that DOD policies (1) significantly impacted the investment decision, (2) did not provide incentives to pursue IR&D and (3) did not provide an equitable method of cost recovery. Of this 40%, approximately 15% indicated strong impacts. Very few of the companies which expressed the opposite opinions indicated a strong impact.

h. Question 23

Question 23 asked, "What impact do Government regulations regarding cost allowability and allocability have on the type of IR&D conducted?" The responses available for selection were as follows:

- A. No significant impact on type of research
- B. Tends to direct research toward military application
- C. Tends to direct research toward commercial application
- D. Other (specified response)

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	64	7	47	15	75	37	68	3	60	2	40
B	21	7	47	2	10	8	15	2	40	2	40
C	11	1	6	2	10	8	15				
D	1									1	20
*No Response	<u>2</u>			<u>1</u>	<u>5</u>	<u>1</u>	<u>2</u>				
	99	15	100	20	100	54	100	5	100	5	100

The company which selected the "other" response indicated IR&D regulations tended to direct efforts toward only "sure thing" projects.

Question 23 addressed whether the IR&D regulations were having any impact on the type of effort being undertaken by the Government. The majority of the firms indicated that cost allowability and allocability regulations have no impact on the type of research conducted. Very few firms indicated these regulations directed research toward commercial application. The R&D and other sectors both were evenly divided in responses on whether the regulations had an impact or not. Overall the responses would tend to indicate these regulations did not seriously influence the type of research conducted.

1. Question 24

Question 24 asked, "What is the impact of Government regulations regarding allocability of IR&D costs on (specified areas)?" The impacts on two areas were examined. Responses could range from a major increase to a

major decrease. The responses received are listed below by the areas examined. Analysis is provided in paragraph k.

The following responses relate to the impact of Government regulations regarding allocability of IR&D costs on the amount of administrative effort and expense:

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Major Increase	13			1	5	9	16	1	20	2	40
Minor Increase	33	7	47	10	50	14	26	2	40		
No Impact	47	7	47	8	40	27	50	2	40	3	60
Minor Decrease	2					2	4				
Major Decrease	0										
*No Response	3			1	5	2	4				
*Not Applicable	<u>1</u>	<u>1</u>	<u>6</u>								
	99	15	100	20	100	54	100	5	100	5	100

The following responses pertain to the impact of Government regulations regarding allocability of IR&D costs on the amount of IR&D effort.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Major Increase	2					1	2			1	25
Minor Increase	16	2	13	5	25	8	15	1	20		
No Impact	62	11	74	10	50	36	67	3	60	2	40
Minor Decrease	14	2	13	3	15	6	11	1	20	2	40
Major Decrease	1			1	5						
*No Response	<u>4</u>			<u>1</u>	<u>5</u>	<u>3</u>	<u>5</u>				
	99	15	100	20	100	54	100	5	100	5	100

j. Question 25

Question 25 asked, "What is the impact of Government regulations regarding allowability of IR&D costs on (specified areas)?" The impacts on two areas were examined. Responses could range from a major increase to a major decrease. The responses received are listed below by the areas examined. Analysis is provided in paragraph k.

The following responses relate to the impact of Government regulations regarding the allowability of IR&D costs on the amount of administrative effort and expense.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Major Increase	14			1	5	10	18	1	20	2	40
Minor Increase	35	6	40	9	45	16	30	3	60	1	20
No Impact	43	7	46	8	40	25	46	1	20	2	40
Minor Decrease	2	1	7			1	2				
Major Decrease	0										
*No Response	4			2	10	2	4				
*Not Applicable	<u>1</u>	<u>1</u>	<u>7</u>								
	99	15	100	20	100	54	100	5	100	5	100

The following responses pertain to the impact of Government regulations regarding allowability of IR&D costs on the amount of IR&D effort.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Major Increase	3					2	4			1	20
Minor Increase	19	4	27	6	30	7	13	2	40		
No Impact	57	7	46	9	45	37	68	2	40	2	40
Minor Decrease	12	4	27	2	10	5	9	1	20		
Major Decrease	4			1	5	1	2			2	40
*No Response	<u>4</u>			<u>2</u>	<u>10</u>	<u>2</u>	<u>4</u>				
	99	15	100	20	100	54	100	5	100	5	100

k. Analysis of Questions 24 and 25

Questions 24 and 25 addressed the amount of administrative effort created by Government regulations on allocability and allowability and the impact each has on the amount of IR&D projects undertaken. The responses for both the allowability and allocability questions were essentially the same. Most companies felt the regulations caused minor or no increase in administrative effort and expense. Only 13 to 14% of the companies indicated a major

increase in administrative effort and expense, but almost half reported some increase. The majority of companies also indicated allowability and allocability regulations had no impact on the amount of IR&D efforts. Companies indicating the regulations did have an impact were evenly divided between whether the impact was an increase or decrease in the amount of IR&D effort.

1. Question 26

Question 26 asked, "For your company which would provide the most equitable method for recovering IR&D costs from the Government?" The categories available for selection were as follows:

- A. Current IR&D regulation
- B. Increased profits (no direct IR&D reimbursement)
- C. Direct Government contracts or grants for IR&D efforts
- D. Other (specified response)

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	20	4	27	4	20	7	13	2	40	3	60
B	24	4	27	3	15	17	31				
C	33	3	20	7	35	21	39	1	20	1	20
D	12	3	20	3	15	4	7	1	20	1	20
*No Response	7			3	15	3	6	1	20		
*Not Applicable	3	1	6			2	4				
	99	15	100	20	100	54	100	5	100	5	100

Twelve companies selected the "other" response. Eight of these companies responded that the most equitable method of cost recovery would be to allow IR&D as an overhead cost, but with no or a substantially increased ceiling limitation. One firm recommended ceilings set on

the basis of industry averages, a second recommended averaging the IR&D/Sales ratio over a longer time period (i.e., five years instead of the three years presently used). Another firm responded by selecting both (B) and (C). One firm responded with, "Pay bills in timely manner".

Question 26 addressed the issue of which methods companies believed would provide the most equitable means for recovering IR&D. In general the responses were fairly evenly distributed between those available. A slight preference existed for direct contracts or grants for IR&D effort. The current IR&D regulations were favored least. This position changes if the eight additional companies, which selected current IR&D regulations with increased ceilings, are included. The responses tend to indicate that there is no clear alternative to the present method of IR&D reimbursement which would be preferred overwhelmingly.

m. Question 27

Question 27 asked, "What percentage of your company's IR&D efforts normally meet DOD's requirement of military relevance?" The responses received are listed below.

<u>Ranges</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. Less than 50%	35	2	13	10	50	22	41			1	20
B. 51 - 60%	6					4	7	2	40		
C. 61 - 70%	1					1	2				
D. 71 - 80%	5	1	7	1	5	3	6				
E. 81 - 90%	9	5	33	2	10	2	4				
F. 91 - 100%	36	7	47	5	25	17	31	3	60	4	80
*No Response	6			2	10	4	7				
*Not Applicable	1					1	2				
	99	15	100	20	100	54	100	5	100	5	100

Question 27 addressed the issue of what percentage of IR&D efforts meet the PMR requirement. The responses indicate a bi-modal distribution at the two extremes. It might have been expected that most companies would have been in the range over 90%, as the literature indicates that companies required to negotiate advanced agreement average PMR of over 90% [Ref. 26]. The R&D sector consisted of companies with primarily high levels of PMR. The services sector had a high concentration with low PMR. The manufacturing sector, while being bi-modal, had a higher concentration toward the low PMR. The large number of responses at the lower levels of PMR would tend to support a conclusion that the companies involved in smaller levels of IR&D (i.e., not required to negotiate advanced agreements) orient their IR&D efforts less toward potential JOD requirements.

n. Question 28

Question 28 asked, "Does Cost Accounting Standard 420 requiring identification and accumulation of IR&D and B&P costs by project, except where costs of

individual projects are not material, provide a reasonable allocation basis for your company's IR&D program?" The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. Strongly Agree	5	1	7			3	6			1	20
B. Agree	39	9	60	9	45	16	30	2	40	3	60
C. Neutral	42	5	33	8	40	26	48	2	40	1	20
D. Disagree	4					3	6	1	20		
E. Strong Disagree	5			2	10	3	5				
*No Response	4			1	5	3	5				
	99	15	100	20	100	54	100	5	100	5	100

Question 28 addressed whether companies believed CAS 420 provided a reasonable allocation basis for IR&D costs. Very few firms indicated that CAS 420 did not provide a reasonable basis for allocating IR&D costs. Most companies were neutral or felt the basis was reasonable. This would tend to indicate that CAS 420 was not an issue with these companies.

o. Question 29

Question 29 asked, "Do you feel IR&D policies are being uniformly applied by all Government agencies?" The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. Strongly Agree											
B. Agree	8	3	20	2	10	3	6				
C. Neutral	50	7	47	8	40	29	54	2	40	4	80
D. Disagree	22	4	26	4	20	11	20	3	60		
E. Strong Disagree	10	1	7	4	20	4	7			1	20
*No Response	8					6	11				
*Not Applicable	1					1	2				
	99	15	100	20	100	54	100	5	100	5	100

Question 29 addressed whether companies perceived that Government agencies (e.g., Army, Navy, Air Force, and DCAS) were applying IR&D policies uniformly. Most companies expressed a neutral opinion, but slightly over 30% expressed an opinion that the regulations were not uniformly applied.

6. Nature of IR&D Costs

Questions 30 through 35 were designed to provide information on the nature of IR&D costs and how they were incurred and also to judge the impact of several current issues on costs incurred and effort undertaken.

a. Question 30

Question 30 asked, "What is the approximate percentage of the type of costs incurred in the IR&D effort?" Five categories of costs were provided for companies to indicate the percentages of costs involved. One of these five categories was "other," so the company could specify its own category. The data for the responses follow and are listed by category.

Percent of IR&D costs going toward direct labor:

	<u>Pop</u>	<u>R&D</u>	<u>SVCS</u>	<u>MFG</u>	<u>ASSY</u>	<u>OTHER</u>
Range	10-100%	41- 95%	25- 95%	10-100%	60- 81%	50- 95%
Mean	68%	72%	71%	66%	67%	81%
S.D.	18%	15%	20%	18%	12%	21%
Median	75%	78%	80%	70%	60%	90%
Mode	80%	80%	80%	50%	60%	90%

Percent of IR&D costs going toward equipment:

	<u>Pop</u>	<u>R&D</u>	<u>SVCS</u>	<u>MFG</u>	<u>ASSY</u>	<u>OTHER</u>
Range	0- 70%	0- 20%	0- 40%	0- 70%	12- 20%	0- 40%
Mean	11%	9%	12%	12%	17%	12%
S.D.	12%	8%	11%	13%	5%	19%
Median	10%	10%	10%	10%	20%	4%
Mode	10%	0%	0/10%	10%	20%	N/A

Percent of IR&D costs spent on services:

	<u>Pop</u>	<u>R&D</u>	<u>SVCS</u>	<u>MFG</u>	<u>ASSY</u>	<u>OTHER</u>
Range	0- 50%	0- 25%	0- 50%	0- 90%	0- 7%	0- 10%
Mean	6%	5%	6%	8%	3%	5%
S.D.	8%	8%	13%	14%	4%	6%
Median	4%	0%	0%	5%	2%	0%
Mode	5%	0%	0%	0%	N/A	0%

Percent of IR&D costs spent on supplies and expendables:

	<u>Pop</u>	<u>R&D</u>	<u>SVCS</u>	<u>MFG</u>	<u>ASSY</u>	<u>OTHER</u>
Range	0- 46%	0- 30%	0- 20%	0- 46%	0- 20%	0- 5%
Mean	10%	9%	8%	11%	13%	2%
S.D.	9%	10%	6%	9%	11%	2%
Median	10%	5%	10%	10%	18%	1%
Mode	5%	5%	10%	10%	N/A	1%

Percent of IR&D costs spent on other items:

	<u>Pop</u>	<u>R&D</u>	<u>SVCS</u>	<u>MFG</u>	<u>ASSY</u>	<u>OTHER</u>
Range	0- 54%	0- 54%	0- 50%	0- 50%	N/A	N/A
Mean	3%	5%	3%	3%		
S.D.	11%	15%	12%	10%		
Median	0%	0%	0%	0%		
Mode	0%	0%	0%	0%		

The responses to question 30 showed a wide range of spending on various elements of IR&D costs. However, the means in industry sectors are roughly similar. Direct personnel costs account for the majority of the IR&D effort (approximately 68%). Equipment and supplies & expendables each account for approximately 10%. The items mentioned in the "other" category include burdens, fringes, overhead, G&A, and computer time. The responses would tend to

indicate that any efforts to influence the costs incurred under IR&D efforts would have the greatest impact if they focused on direct personnel costs.

b. Question 31

Question 31 asked, "How are IR&D efforts planned?" The categories available for selection were as follows:

- A. Specific programs are planned in advance of the fiscal year they are undertaken
- B. No specific programs are planned until the start of a fiscal year
- C. Programs are planned at the discretion of functional or program managers
- D. Other

The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A	56	7	47	10	50	32	59	4	80	3	60
B	2					2	4				
C	28	6	40	7	35	15	28				
D	9	2	13	1	5	3	5	1	20	2	40
*No Response	3			1	5	2	4				
*Not Applicable	<u>1</u>			<u>1</u>	<u>5</u>						
	99	15	100	20	100	54	100	5	100	5	100

Nine companies selected the "other" category. Seven of these companies selected both response (A) and (C). One company described the process as ongoing, with no set period. Another company responded that "Industry Directives establish IR&D" (i.e., electric energy industry).

Question 31 addressed the planning horizon involved in IR&D efforts. The responses show that, for the majority of companies, IR&D efforts were planned in advance of the fiscal year. A significant proportion also indicated

that the programs were planned at the discretion of functional or program managers. These responses would tend to indicate that most IR&D programs are planned well in advance of cost incurrence. It would also indicate that many IR&D projects are planned at a level closely associated with the need and potential for such efforts (i.e., functional or program level).

c. Question 32

Question 32 asked, "At what level are IR&D program expenditures controlled?" The responses received are listed below.

<u>Levels</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
A. President	41	8	54	9	45	21	39	2	40	1	20
B. Vice President	46	5	33	10	50	25	46	3	60	3	60
C. Middle Management	5			1	5	3	6			1	20
D. Lower Management	0										
E. Other (specify)	1					1	2				
*No Response	6	2	13			4	7				
	99	15	100	20	100	54	100	5	100	5	100

The one company selecting the "other" response indicated expenditures were controlled at "all levels".

These results indicate that a clear majority of the companies have top management involvement in the control of IR&D expenditures. Thus, these costs are managed and expended with a high level of planning and control.

d. Question 33

Question 33 asked, "Has the Government's desire to obtain data rights for programs involving reimbursement

with Government funds had an impact on your level of IR&D effort?" The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Yes	20	1	7	4	20	12	22	2	40	1	20
No	73	12	80	15	75	39	72	3	60	4	80
*No Response	6	2	13	1	5	3	6				
	99	15	100	20	100	54	100	5	100	5	100

An explanation of the impact of the Government's desire to obtain data rights was requested from all companies responding "yes". Of the 20 companies responding "yes", nine companies expressed the opinion that sharing data rights would result in a loss of competitiveness. Some of these same companies also indicated that the Government's share of reimbursement did not equal the amount of potential profits being lost because of sharing data rights and that the loss of competitiveness also prevented them from recovering all their R&D expenses. Four companies indicated the potential for loss of data rights resulted in certain critical projects being totally funded out of company profits at no cost to the Government. Two companies indicated that requiring sharing of data rights decreased incentives to direct IR&D efforts toward the Government, and two other companies indicated they would not enter contracts which require that data rights be given to the Government. Three companies responding "yes" did not provide any explanation of the impact.

Question 33 addressed the impact past Government efforts to obtain data rights have had on IR&D efforts. It also provided an indication whether data rights were still perceived as an issue. A majority of the companies felt the Government's desire for data rights has not impacted IR&D efforts. Most of the companies indicating data rights were impacting IR&D efforts stated the impact as a loss of competitiveness. The data rights issue may no longer be of importance with regards to IR&D, since DOD has proposed a policy allowing contractors to retain data rights developed under IR&D. [Ref. 44]

e. Question 34

Question 34 asked, "Has the Government's new profit policy had an impact on your level of IR&D effort?" The new profit policy of the Government is not to include IR&D costs in the Weighted Guidelines method of determining profit. The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Yes	17	1	7	6	30	7	13	1	20	2	40
No	76	11	73	14	70	44	81	4	80	3	60
*No Response	6	3	20			3	6				
	99	15	100	20	100	54	100	5	100	5	100

An explanation of the impact from the new profit policy was requested from all companies responding "yes". Of the 17 companies responding "yes", 11 companies indicated that reduced profits resulted in reduced funds available for IR&D investment. This limited their ability to absorb the

unallowable portion of IR&D expenses. Two firms indicated that it reduced incentives to invest in IR&D, and one firm indicated that it "narrowed the margin for risk taking". Three firms responding "yes" did not provide an explanation of the impact.

The majority of the companies felt this policy was not impacting the level of IR&D effort undertaken. A majority of the companies indicating it did have an impact stated the impact as that of reducing the funds available for IR&D investment.

f. Question 35

Question 35 asked, "What, if any, difficulties exist in separating IR&D costs from any R&D costs resulting from a direct Government contract?" The responses received are listed below.

<u>Response</u>	<u>Pop</u>	<u>R&D</u>		<u>SVCS</u>		<u>MFG</u>		<u>ASSY</u>		<u>OTHER</u>	
		N	%	N	%	N	%	N	%	N	%
Difficulties cited	16	4	27	1	5	10	19	1	20		
None cited	77	9	60	19	95	40	74	4	80	5	100
*No Response	6	2	13			4	7				
	99	15	100	20	100	54	100	5	100	5	100

Sixteen companies indicated that some difficulties existed. Of these, nine stated the difficulties arose out of the administrative burden and costs incurred in segregating R&D costs. These costs included setting up separate cost centers and the continuing education to obtain employee understanding of the difference and the need for proper accounting. Two companies cited a

lack of clear guidance in establishing when one effort stops and the other starts. Two firms cited ownership of data as a problem, when knowledge gained from IR&D is directly applicable to R&D. One firm indicated that problems could arise when products or technologies developed for DOD also had commercial application. Another indicated "overlapping objectives" as a problem. One mentioned the burden of convincing the Government's auditors that the segregation of costs was valid and accurate.

Question 35 addressed the extent to which companies experienced problems in segregating costs of IR&D projects from Government R&D projects. This could be a potential problem when the IR&D project closely parallels the Government project. In this instance there could be costs incurred which might benefit or be required for both projects. The majority of the companies indicated that they experienced no difficulty in segregating IR&D costs from other Government R&D projects. A majority of the companies indicating there were difficulties stated these were due to administrative and accounting burdens associated with segregating the costs.

IV. SUMMARY AND CONCLUSIONS

A. Summary of Findings

The primary objective of this study was to determine if the current federal regulations regarding payment of IR&D costs cause cost allowability or allocability problems for companies not required to negotiate advanced IR&D agreements. Secondary objectives were to develop background information on the characteristics of these companies, their IR&D efforts and any perceived problems caused by the Government's regulations.

1. Applicable Industries

Thirty percent of the companies returning questionnaires indicated they did not conduct any IR&D efforts. Therefore, these companies were not included in the analyses reported in the preceding chapter. The companies which indicated involvement with IR&D were spread over a wide range of different industries. The type of effort the majority of these firms were engaged in could be classified primarily as Manufacturing (54%), Services (20%) or Research and Development (15%) efforts.

2. Principal Contract Characteristics

Most companies had a large percentage of their total sales being made to the Government, but a notable number of companies was on the opposite extreme with a very

small percentage of Government business. These Government contracts were primarily fixed price and competitively awarded.

3. Nature of IR&D Costs and Cost Incurrence

No clear consensus existed on how companies view IR&D expenditures, but a slightly higher percentage of the companies viewed it as required for survival in the industry. Companies were divided on the levels of IR&D investment undertaken, the largest percentage indicating a moderate level of investment. The amount of IR&D investment involved was primarily in the range of 0 to 2 percent of sales.

The most common basis for the planned level of IR&D investment was the expected level of sales. This was not universally used, however. An almost equal number of companies used other bases. The type of IR&D effort undertaken was primarily near-term in nature, with a notable number of companies undertaking applied R&D. Most companies initiated the majority (81 to 100%) of their IR&D efforts with the Government in mind as the principal potential customer. A large concentration, however, initiated only a minimal amount (0 to 20%) with the Government in mind. For about one half of the companies, IR&D efforts resulted in the submission of unsolicited proposals; and, for about one quarter of the companies, they resulted in submission of ECPs.

The primary component of IR&D efforts for most companies is direct personnel costs (68%). These IR&D efforts are for the most part planned in advance of the fiscal year in which they are undertaken, but a significant proportion are planned at the discretion of the functional or program manager. The expenditures are controlled at a top management level for an overwhelming majority of the companies.

4. Cost Allowability and Allocability

a. Cost allowability and allocability rules

The impact of cost allowability and allocability rules on most companies' IR&D investment decisions were generally neutral. However, about 30 percent of the respondents are adversely impacted. Likewise, Government regulations regarding the allowability and allocability of IR&D costs had a generally neutral impact on the amount of administrative effort and expense, the amount of IR&D efforts and the type of IR&D effort conducted. Over 85 percent of the companies were neutral or agreed that CAS 420 provided a reasonable allocation basis.

b. IR&D Cost Recovery Policies

The survey evidence suggests that, for most companies, DOD policies on IR&D cost recovery have some impact on the investment decision. Further, a much larger portion of the companies viewed the policies as not providing an equitable method of cost recovery. Responses

did not provide a clear consensus on whether these policies provided incentives to pursue IR&D. The majority of the companies did not indicate any significant problems with the uniformity with which these policies were applied by different Government agencies. However, a large minority felt they were not being applied uniformly.

No clear consensus existed regarding the most equitable method of cost recovery for IR&D. Company responses regarding the amount of efforts meeting DOD's requirement of military relevance were bimodal at the two extremes of high relevance (over 90%) and low relevance (below 50%). The responses regarding the percentage of costs determined unallowable were likewise bimodal, but not to the extent that would be expected based on responses pertaining to military relevance. This difference may be due to the wording of the question on unallowable costs. It addressed costs already allocable to Government contracts. The requirement for military relevance limits the amount of IR&D costs which are allocable and does not directly impact cost allowability.

The responses regarding the amount of IR&D costs recovered through allocation to Government contracts was concentrated at the two extremes. Thirty-six percent of the companies recovered 15 percent or less of their IR&D costs from the Government, while 21 percent recovered over 90 percent of their IR&D costs. Only 17 percent of the

companies indicated that the lack of profit on IR&D costs was impacting their level of IR&D effort. Most companies also indicated that they experienced no difficulty in separating IR&D costs from any R&D costs resulting from a direct Government contract.

c. IR&D Ceiling Formula

Most companies did not express a strong opinion regarding the impact of the IR&D ceiling formula on their IR&D programs. A large minority, however, said that the ceiling formula had a negative impact. Almost no companies indicated a favorable impact. No clear consensus existed as to whether the IR&D ceiling formula provided an acceptable level of reimbursement or which part of the formula created the greatest inequity. Most companies indicated that IR&D efforts proceed at the same spending level even after the IR&D ceiling is reached; very few indicated all IR&D efforts would be discontinued. In most companies, the unreimbursed IR&D cost is absorbed out of profits.

C. CONCLUSIONS

The evidence available from the survey suggests that the current IR&D regulations, including cost allowability and allocability rules, do not cause significant difficulties for the companies not required to negotiate advanced IR&D agreements. Overall, the results of the survey tend to indicate that many companies have some dissatisfaction with

the IR&D regulations, but that for most companies the present system is acceptable. Further, in many areas no clear consensus exists on the impacts of the regulations.

APPENDIX

DEPARTMENT OF THE NAVY
NAVAL POSTGRADUATE SCHOOL
MONTEREY, CA 93943-5100

17 AUGUST 1987

DEAR SIRs,

Your assistance is requested in obtaining data for a Masters Thesis study being conducted by LT C.C. DREW USN, SC. This study is investigating the impact to commercial firms of Federal and Department of Defense regulations regarding recovery of Independent Research and Development (IR&D) costs.

Enclosed is a survey designed to gather information from Industry on the impact of these regulations. The survey can be completed rapidly and should take no more than 30 minutes. Individual responses to this survey will be maintained in the strictest of confidence. Also company names are not required on the responses. It would be greatly appreciated if you would take a few moments to complete this survey and return it in the enclosed envelope.

Thank you for your cooperation. Any questions concerning this survey may be addressed to LT C.C. DREW, NPS, SMC 1440, Monterey, CA 93943.

J.E. JACKSON
CDR, USN, SC
Curricular Officer
Administrative Sciences

Independent Research & Development Costs Survey

The following survey was designed to solicit information regarding the impact of Federal and Defense regulations on the recovery of Independent Research and Development (IR&D) costs. The survey is focused toward firms not required to negotiate advanced agreements for IR&D costs. If you work within a separable reporting division of a corporation, please use your division's data.

1. What is your primary Standard Industrial Classification (SIC) code?

2. Within your Industry, which best describes the primary effort of your company:

- A. Research & Development
- B. Services
- C. Hardware Manufacturing
- D. Assembly
- E. Other (specify) _____

3. What percentage of your company's sales are made to the Government (either directly or indirectly through another contractor):

- | | |
|-------------|--------------|
| A. 0 - 20% | D. 61 - 80% |
| B. 21 - 40% | E. 81 - 100% |
| C. 41 - 60% | |

4. What percentage of these Government contracts are Fixed Price contracts:

- | | |
|-------------|--------------|
| A. 0 - 20% | D. 61 - 80% |
| B. 21 - 40% | E. 81 - 100% |
| C. 41 - 60% | |

5. What percentage of your Government related contracts are awarded competitively (vice sole source):

- | | |
|-------------|--------------|
| A. 0 - 20% | D. 61 - 80% |
| B. 21 - 40% | E. 81 - 100% |
| C. 41 - 60% | |

6. Is your company required to negotiate advanced agreements regarding IR&D costs:

_____ Yes

_____ No

7. Does effort expended under IR&D result in either unsolicited proposals or Engineering Change Proposals (ECP) being submitted:

Unsolicited Proposals _____ Yes _____ No

ECP _____ Yes _____ No

If yes, approximately how many were submitted in the last year:

Unsolicited Proposals _____

ECP _____

8. Which statement best characterizes how your company views IR&D expenditures:

- A. Not essential to company's survival in Industry
- B. Required for Industry leadership, but not Industry survival
- C. Required for company's survival in Industry

9. How would you characterize the degree of investment in IR&D required to carry out your company's goals:

- A. No significant investment
- B. Slight investment
- C. Moderate investment
- D. Major investment

10. What is the approximate percent of sales normally committed to the IR&D effort:

- | | |
|-----------|-------------|
| A. 0 - 2% | D. 7 - 8% |
| B. 3 - 4% | E. 9 - 10% |
| C. 5 - 6% | F. Over 10% |

11. Is the planned level of IR&D investment primarily related to the expected level of sales:

_____ Yes

_____ No

If No, what is basis for budgeting IR&D?

12. Which best classifies the type of IR&D effort undertaken by your company:

- A Long range exploratory R&D - no immediate sales foreseen
- B. Near term R&D - refinement of existing opportunities with near term sales potential
- C. Applied R&D - Directly applicable to items manufactured/sold

13. What percentage of IR&D effort is initiated with the Government in mind as the principal potential customer:

- | | |
|-------------|--------------|
| A. 0 - 20% | D. 61 - 80% |
| B. 21 - 40% | E. 81 - 100% |
| C. 41 - 60% | |

14. What percentage of your total IR&D expenditures are recovered through allocations to Government contracts (either as prime or subcontractor):

- | | |
|-------------|--------------|
| A. 0 - 15% | E. 61 - 75% |
| B. 16 - 30% | F. 76 - 90% |
| C. 31 - 45% | G. 91 - 100% |
| D. 46 - 60% | |

15. What percentage of IR&D costs (allocable to Government contracts) are usually determined unallowable for reimbursement under Government contracts:

- | | |
|-------------|-------------|
| A. 0 - 5% | D. 16 - 20% |
| B. 6 - 10% | E. 21 - 25% |
| C. 11 - 15% | F. Over 25% |

16. What is the impact of the following areas on your company's IR&D programs (Place an "X" under the heading most accurately reflecting the impact of the areas indicated):

	Strongly Adverse	Adverse	Neutral	Favor- able	Strong Favor
A. IR&D Cost Allow- ability rules	_____	_____	_____	_____	_____
B. IR&D Cost Alloca- bility rules	_____	_____	_____	_____	_____
C. IR&D Ceiling Formula	_____	_____	_____	_____	_____

17. Does the current formula for computing ceilings on the amount of IR&D cost the Government will reimburse provide an acceptable level of reimbursement:

_____ Yes

_____ No

If No:

What percentage of your IR&D costs exceed these ceilings:

18. Which aspect of the IR&D ceiling computation formula creates the greatest inequity:

- A. Use of a historical ratio (average of 2 highest IR&D/Sales ratios during the past 3 years) to determine the current ceiling
- B. Limiting the current ceiling as determined by the historical ratio to between 80 - 120% of the "average" IR&D costs
- C. Computing the "average" IR&D costs as the average of the 2 highest yearly IR&D costs during the past 3 years
- D. Other, (specify): _____

19. The formula for computing ceilings on allowable IR&D costs prevents wide fluctuations by limiting the range to between 80% and 120% of the "average" IR&D expenditures for the past 3 years. Do you feel this range allows:

- A. A reasonable range of fluctuation
- B. Too great a range of fluctuation
- C. Too small a range of fluctuation
- D. Other, specify: _____

20. Which best describes your company's actions when the maximum amount of IR&D costs reimbursable by the Government has been reached:

- A. IR&D efforts continued at the same spending level for the remaining company year
- B. All IR&D efforts decreased for the remaining company year
- C. DOD related IR&D decreased for the remaining company year
- D. All IR&D efforts discontinued for the remaining company year

21. If IR&D efforts are continued after the maximum amount of IR&D costs have been recovered from the Government, how is this cost handled?

- A. From an increased share of IR&D costs allocated to the commercial sales
- B. Out of the profit of Government sales (no increase to commercial sales price)
- C. Other (specify) _____

22. DOD policies on IR&D cost recovery (place an "x" under the heading most accurately reflecting your opinion):

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
A. Significantly effect our company IR&D in- vestment decisions _____	_____	_____	_____	_____	_____
B. Provide incentives to pursue IR&D _____	_____	_____	_____	_____	_____
C. Provide an equitable method of recovery _____	_____	_____	_____	_____	_____

23. What impact do Government regulations regarding cost allowability and allocability have on the type of IR&D conducted:

- A. No significant impact on type of research
- B. Tends to direct research toward military application
- C. Tends to direct research toward commercial application
- D. Other, specify: _____

24. What is the impact of Government regulations regarding allocability of IR&D costs on:

	Major Increase	Minor Increase	No Impact	Minor Decrease	Major Decrease
--	-------------------	-------------------	--------------	-------------------	-------------------

- | | | | | | |
|--|-------|-------|-------|-------|-------|
| A. Amount of Administrative effort and expense | _____ | _____ | _____ | _____ | _____ |
| B. Amount of IR&D effort | _____ | _____ | _____ | _____ | _____ |

25. What is the impact of Government regulations regarding allowability of IR&D costs on:

	Major Increase	Minor Increase	No Impact	Minor Decrease	Major Decrease
--	-------------------	-------------------	--------------	-------------------	-------------------

- | | | | | | |
|--|-------|-------|-------|-------|-------|
| A. Amount of Administrative effort and expense | _____ | _____ | _____ | _____ | _____ |
| B. Amount of IR&D effort | _____ | _____ | _____ | _____ | _____ |

26. For your company which would provide the most equitable method for recovering IR&D costs from the Government:

- A. Current IR&D regulation
- B. Increased Profits (no direct IR&D reimbursement)
- C. Direct Government contracts or grants for IR&D efforts
- D. Other, specify: _____

27. What percentage of your company's IR&D efforts normally meet DOD's requirement of military relevance:

- | | |
|------------------|--------------|
| A. Less than 50% | D. 71 - 80% |
| B. 51 - 60% | E. 81 - 90% |
| C. 61 - 70% | F. 91 - 100% |

28. Does Cost Accounting Standard 420 requiring identification and accumulation of IR&D and B&P costs by project, except where costs of individual projects are not material, provide a reasonable allocation basis for your company's IR&D program:

- | | |
|-------------------|----------------------|
| A. Strongly Agree | D. Disagree |
| B. Agree | E. Strongly Disagree |
| C. Neutral | |

29. Do you feel IR&D policies are being uniformly applied by all Government agencies:

- | | |
|-------------------|----------------------|
| A. Strongly Agree | D. Disagree |
| B. Agree | E. Strongly Disagree |
| C. Neutral | |

30. What is the approximate percentage of the type of costs incurred in the IR&D effort?

Personnel (DIRECT)	_____ %
Equipment	_____ %
Services	_____ %
Supplies & Expendables	_____ %
(Other)	_____ %
	_____ %
	<u>100 %</u>

31. How are IR&D efforts planned?

- A. Specific programs are planned in advance of the Fiscal year they are undertaken
- B. No specific programs are planned until the start of a Fiscal year
- C. Programs are planned at the discretion of Functional or Program Managers
- D. Other (specify) _____

32. At what level are IR&D program expenditures controlled?

- | | |
|----------------------|---------------------|
| A. President | D. Lower Management |
| B. Vice President | E. Other (specify) |
| C. Middle Management | |

33. Has the Government's desire to obtain data rights for programs involving reimbursement with Government funds had an impact on your level of IR&D effort?

_____ Yes

_____ No

If Yes, why _____

34. Has the Government's New profit policy had an impact on your level of IR&D effort?

_____ Yes

_____ No

If Yes, why _____

35. What, if any, difficulties exist in separating IR&D costs from any R&D costs resulting from a direct Government contract?

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