

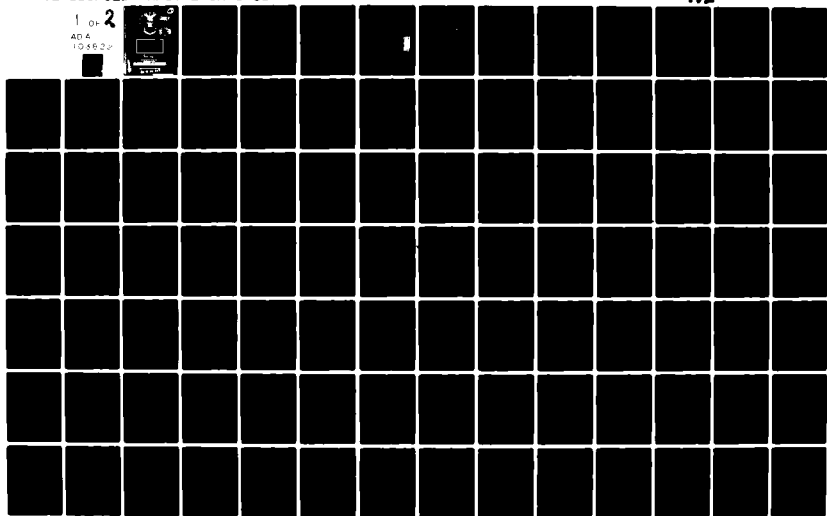
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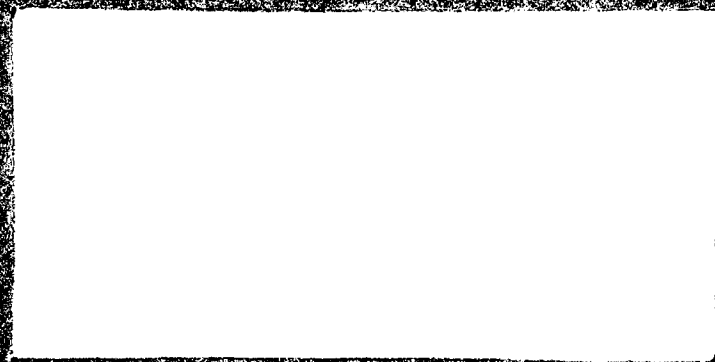
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AN ANALYSIS OF THE DRAFT REQUEST FOR
PROPOSAL CONCEPT WITHIN
AERONAUTICAL SYSTEMS DIVISION

James I. McBride, Captain, USAF
Wilma F. Slade, 1st Lieutenant, USAF

LSSR 1-81 ✓



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✓ Air Force Systems Command (AFSC) initiated the Draft Request for Proposal (DRFP) in 1977. With the advent of the DRFP, AFSC began a structured solicitation of industry feedback on planned acquisitions. The focus of this thesis is to provide a study of the DRFP concept and an assessment of its effectiveness. Research effort involved an analysis of contracts within Aeronautical Systems Division (ASD) with follow-on interviews with contracting officers. The results of this study, even though only statistically related to ASD, provide valuable considerations for AFSC.

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AN ANALYSIS OF THE DRAFT REQUEST FOR
PROPOSAL CONCEPT WITHIN
AERONAUTICAL SYSTEMS DIVISION

A Thesis

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Logistics Management

By

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June 1981

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of the requirements for the degree of

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CHAPTER I

INTRODUCTION

The Department of Defense systems acquisition process consists of a sequence of activities originating with an agency's identification of mission need and extending through the introduction of a system into operational use or the successful completion of program objectives (24:3). Incorporated within this framework is the contracting process, which is a subordinate function occurring within the overall acquisition process. An essential activity during the contracting process is communication with industry. Early exchange of information can enhance the actual formulation of acquisition needs. One important method of communicating with industry is the Draft Request for Proposal which solicits feedback on planned acquisitions. Such feedback has possessed the potential for significant cost savings and program improvements by eliminating unnecessary requirements and overly complex elements (21:1).

Statement of the Problem

Air Force Systems Command (AFSC) initiated the Draft Request for Proposal (DRFP) concept in 1977 upon completion of a six-month study which tested its use. AFSC had long appreciated the need for acquiring industry's assistance in solving

and defining acquisition needs. The Command had extended solicitation of industry feedback, which applied to major systems acquisition, to other programs not classified as major systems. AFSC had primarily solicited the technical expertise and knowledge of industry by requesting voluntary review of solicitations (7:1). With the initiation of DRFPs, AFSC began a structured solicitation of feedback on planned acquisitions.

Many AFSC acquisitions have demonstrated successful application of the DRFP concept; however, several problems in its use have been identified. The former commander of AFSC, General Alton Slay, has expressed concern over failure of contracting officers to coordinate DRFPs with the contract administration offices of prospective contractors when the DRFP is released to industry (26:1). Such failure prevents the opportunity to provide early assistance in eliminating proposal problems and can cause delays in the acquisition process. Additionally, during an interview in the Contract Review Division, Directorate of Research and Development Contracting, Mr. Carl Brigner observed that there are inconsistencies in present DRFP practices which deteriorate the effectiveness of the concept, such as different acknowledgments by contracting officers of industry responses (9). Finally, Major Robert Golden, Deputy Director of the Air Force Business Research Management Center, has expressed the need for a study of the DRFP concept to provide a thorough assessment of its effectiveness (13). Such a study is the focus of this research effort.

Background

The systems acquisition process consists of four milestone decisions and four phases of activity directed toward the acquisition of a system. Milestone 0 is distinguished by Secretary of Defense approval of the Mission Element Needs Statement (MENS). Department of Defense components prepare the MENS to document major deficiencies in ability to meet mission requirements. Approval of the MENS authorizes initiation of the first phase--Concept Exploration; this phase focuses upon alternative systems exploration. During Concept Exploration, a program manager is designated; this person is responsible for the management and development of strategy for the potential acquisition. The program manager's role and acquisition strategy encompass the entire acquisition process. Milestone I decision is marked by selection of alternative systems and authorization to proceed into the second phase, which is Demonstration and Validation. Activities during this phase are intended to verify that the chosen alternatives are sound and can perform in an operational environment. These activities establish the basis for selection of an alternative system(s) to be continued in full-scale development. Milestone II decision is the selection of the alternative(s) and authorization to proceed to the third phase, Full-Scale Development. This phase provides limited prototypes for evaluation in an operational environment. Milestone III decision authorizes progression into the final phase--Production and Deployment. The final three milestone decisions are documented by the

Decision Coordinating Paper (DCP). This document is reviewed by the Defense Systems Acquisition Review Council, which makes a recommendation to the Secretary of Defense for each milestone decision (18:10-16; 24:4-5).

The systems acquisition process presents the overall framework of the whole spectrum of acquisition activities from recognition of a need to fulfillment of that need. Closely related to this framework is the contracting process. The first phase of this process is the requirements generation phase, which is initiated by program approval. Formal identification of requirements is documented in the purchase request. The acquisition planning phase comprises activities conducted in response to the purchase request. Issuance of solicitation to prospective offerors marks the transition from acquisition planning to offer evaluation. Once proposals are evaluated, the decision is made on contract award. The award initiates the final phase of the process--contract management. Once the acquisition is complete, the contracting process is terminated with retirement of the contract file (15). The activities of the contracting process occur simultaneously as an integral part of the system acquisition process. Many of the activities of both processes may overlap, and several procurement processes may occur throughout the acquisition process (19:38).

The focus of this research effort is the acquisition planning phase of the contracting process. One of the important decision activities of the phase is the method of

acquisition. The basic choices are formal advertising and negotiation. The Armed Services Procurement Act of 1947 establishes formal advertising as the preferred method of acquisition in the DoD arena. Under formal advertising, contract award is made to the responsible bidder who offers the lowest price, provided that the bid is considered reasonable and most advantageous to the Government (10:554). In contrast to formal advertising, negotiation provides more freedom and flexibility to the contracting officer to award the contract to the offeror whose proposal appears most qualified. Even though Congress established formal advertising as the rule, approximately 90 percent of defense acquisitions in recent years have been accomplished by negotiation (10:554). The need for negotiation is frequently found in research and development of new weapon systems or production of highly complex systems where thorough communication of contract proposals is essential for clear understanding of requirements (8:92). Thus, Congress has recognized that in some instances it is not practical to accomplish government contracting through formal advertising. The rationale for choosing negotiation is contained in the Defense Acquisition Regulation by the following 17 exceptions to formal advertising:

1. A national emergency;
2. Public exigency;
3. Purchases not more than \$10,000;
4. Personal or professional services;
5. Services of educational institutions;
6. Purchases outside the United States;
7. Medicines or medical supplies;
8. Supplies purchased for authorized resale;
9. Perishable or nonperishable subsistence supplies;

10. Supplies or services for which it is impractical to secure competition by formal advertising;
11. Experimental, developmental, or research work;
12. Classified purchases;
13. Technical equipment requiring standardization and interchangeability of parts;
14. Technical or specialized supplies requiring substantial initial investment or extended period of preparation for manufacture;
15. Negotiation after advertising;
16. Purchases in the interest of national defense or industrial mobilization;
17. Procurement otherwise authorized by law, e.g. architectural or engineering services for preparing specifications for public works, utilities, naval vessels, or aircraft construction [23:3.5-3.17].

Under negotiation, the acquisition planning phase includes the preparation and issuance of a Request for Proposal (RFP). The RFP provides performance and design requirements of the system and lists specific information that the contractor must provide regarding schedules, costs, logistics, quality control, testing, management, past experience, and personnel (12:264). The RFP package consists of the following four parts:

Part I - the Schedule

- Section A - Contract Form
- Section B - Supplies/Services and Prices
- Section C - Description/Specifications
- Section D - Packaging and Marking
- Section E - Inspection and Acceptance
- Section F - Deliveries or Performance
- Section G - Contract Administration Data
- Section H - Special Provisions

Part II - General Provisions

- Section I - General Provisions

Part III - List of Documents, Exhibits, and Other Attachments

- Section J - List of Documents, Exhibits, and Other Attachments

Part IV - General Instructions

Section K - Representation, Certifications, and
 other Statements of Offeror
Section L - Instructions and Conditions, and
 Notices to Offerors
Section M - Evaluation Factors for Award [23:3.59].

The RFP is considered one of the most important documents in the acquisition process; however, as demonstrated by the list of parts of the RFP package, the potential for numerous complexities and voluminous size is ever present. In 1969, the Air Force Requests for Proposal Study evaluated the use of RFPs and recommended limiting the number of pages and carefully screening the requirements placed on prospective contractors for data, certificates, and management reports (14:1).

Faced with the potential complexities and desire to make the RFP more effective, AFSC initiated the DRFP concept. Its purpose is solicitation of industry feedback that may provide significant cost savings and program improvements. Areas which may have potential for cost savings include:

- (i) Changes to requirements specifying manufacturing processes, facilities, tools, and test capabilities,
- (ii) Schedule or delivery changes that will result in cost reductions,
- (iii) Substitution of RFP-stated materials, and overly restrictive engineering and quality specifications and requirements,
- (iv) The use of common Government-furnished equipment or standard commercial components instead of system peculiar items,
- (v) Reduction, substitution, or deletion of military specifications and standards,
- (vi) Excessive reporting requirements,
- (vii) Modified contractual arrangements designed to financially incentivize contractors and subcontractors to pursue cost-reduction efforts during contract performance [3:3.5].

The DRFP package follows the same format of the formal RFP package; however, the contracting officer has the option

to issue only those portions of the package which are complete in order to provide sufficient time for contractor evaluation (1:3.5). The DRFP concept provides a significant tool for making solicitation much more effective; yet concern over its application has developed. It is this concern which has initiated the research effort to present an exploration of the DRFP concept and its effectiveness.

Literature Review

Various research has presented studies of the acquisitions process and the formal RFP which are related to the DRFP concept. Osburn, in 1973, completed a comprehensive model of the Department of Defense procurement process; the model showed the relationships between procurement management functions and the systems acquisition environment (19:6). His findings included the following observations:

- 1) The primary problem in preparing RFPs is determining the optimal balance between technical feasibility and contractual clarity in the statement of work, specifications, and other requirements. This process requires adequate time which is not always available in the acquisition process (19:220).

- 2) There are problems in defining requirements in the RFP for contractors to use the most cost-effective materials, techniques, and equipment. It appears to be extremely difficult to prepare clear and unambiguous specifications that are needed in the preparations of RFPs. In some cases, the

requirements are not known in enough detail to specify clearly (19:221).

3) Individuals with enough experience and expertise are not always available. This sometimes results in the preparation of an RFP which is not properly tailored to the system being acquired.

4) Inadequate lead time to prepare the RFP usually results in the preparation of a deficient RFP. The problem centers around the ability to estimate an adequate period of time to prepare the RFP, in addition to having enough time before the RFP must be released to contractors (19:222).

In 1975, Turner identified and compared policy and procedures concerning the source selection process within each DoD component. He identified problems of complexity and size of the RFPs and annotated Congressional concern over excessive requirements and requests for unnecessary data (22:22). Turner discussed the principle of "checks and balances" which the services instituted to insure that RFPs conform to the program objectives and solicit only minimum essential data. The services accomplished this principle through a system of review boards which offer an outside analysis by experienced senior persons who question requirements and transfuse RFP improvement among the services. After looking at the improvements to the system, Turner recommended giving attention to getting industry more involved in the requirements and RFP development process (22:35).

Hynes presented a study of the RFP from a communications

perspective. He surveyed contract administration officers of the 100 largest defense contractors of 1974 to gain knowledge of industry's perception of the RFP. Hynes attempted to convey industry views of the RFP to form a basis for a new look at the RFP from the standpoint of making it a better method of communication (14:5). As an effort for improving RFPs and the procurement process, Hynes suggested "soliciting" recommendations on contract terms and RFP instructions before official solicitation (14:27).

These research studies provide a description of the acquisition process and an evaluation of the RFP. An understanding of these concepts is necessary before attempting a study of the DRFP concept. Additionally, these studies presented some of the weaknesses of the solicitation process which the DRFP concept attempts to correct. In a study more closely related to the DRFP, Allen and Hubert explored ways to decrease contractors' reluctance to share data which the government considers necessary. They observed that the proper use of DRFPs increased the visibility for potential data problems prior to formal solicitation. Allen and Hubert concluded that this created the opportunity to solve disagreements before initiation of a lengthy and costly negotiation process (6:72). Their observations resulted from a research effort directed toward government ownership of source selection sensitive data; therefore, they did not attempt to describe the DRFP concept or assess its effectiveness. No other information was discovered which related research studies to the

DRFP concept; however, additional information is available in regulations and documents.

The Defense Acquisition Regulation (DAR) establishes the Department of Defense policies and procedures which relate to acquisition; this includes guidance for the solicitation process (23:1.1). Air Force Systems Command Supplement to the DAR contains the guidance for applying the DRFP concept. This document includes identification of programs which are applicable for DRFPs and emphasis of areas which have potential for cost reduction from use of DRFPs (3:3-5). AFSC Pamphlet 70-4, RFP Preparation Guide, provides guidelines for developing and tailoring the RFP; instructions for the DRFP are included in this document (5:8). Objectives of this document include:

- 1) identification of key steps to improve communication between Government and industry and to obtain more responsive proposals,
- 2) simplification of the acquisition process and reduction of paperwork,
- 3) reduction in the size of RFPs while expressing Government requirements to prospective contractors in clear terms, and
- 4) reduction in the need for RFP modification [5:2].

These objectives reflect the purpose of the DRFP.

In addition to the information contained in these documents, interviews provided a source of knowledge and guidance for the research effort. The interview with Major Golden confirmed the need for a research study of the DRFP concept. Additional discussion established the objectives of the

research effort (13).

The interview with Mr. Carl Brigner focused upon the feasibility of a research study of the DRFP concept (9). In addition, Mr. George Walter, of the Contract Review Division, Directorate of Research and Development Contracting, assisted in establishing an operational definition for the effectiveness of the DRFP concept. He suggested determining whether problem areas in the solicitation process are identified through the DRFP. He also prescribed researching how many revisions are proposed by offerors in response to the DRFP. Finally, Mr. Walter suggested determining how many recommended revisions are implemented in the formal RFP (15).

Research Objectives/
Research Questions

This research effort focuses upon the following objectives:

Objective 1.0 - Describe the Draft Request for Proposal concept. To accomplish this objective, the research effort addresses the following questions:

- 1.1 - What are the objectives of the Draft Request for Proposal concept?
- 1.2 - What are the procedures for implementing the Draft Request for Proposal concept?

Objective 2.0 - Assess the effectiveness of the Draft Request for Proposal concept. To accomplish this objective, the research effort addresses

the following questions:

2.1 - How effective is the Draft Request for Proposal concept in achieving its stated objectives?

2.1a - Does the Draft Request for Proposal result in identification of problem areas during solicitation?

2.1b - How many revisions do offerors recommend in response to the Draft Request for Proposal?

2.1c - How many recommended revisions are implemented in the formal Request for Proposal?

2.1d - Is there a relationship between the effectiveness of the Draft Request for Proposal and completeness of the Draft Request for Proposal package?

2.2 - Is there a difference in the procedures for using the Draft Request for Proposal and results of the Draft Request for Proposal in different phases of the acquisition process?

Objective 3.0 - Determine the factors that decrease or increase the effectiveness of the Draft Request for Proposal concept from the perspective of government contracting officers and buyers. To accomplish this objective, the research effort addresses the following questions:

- 3.1 - What factors decrease the effectiveness of the Draft Request for Proposal concept?
- 3.2 - What factors increase the effectiveness of the Draft Request for Proposal concept?

CHAPTER II

METHODOLOGY

This chapter describes the sources of data collected, the operational definition of effectiveness, the justification of the data source, the research structure used in analyzing the data, and the assumptions and limitations of the research effort.

Sources of Data

The sources of data were government regulations, policy letters, reports, contracts, and personal interviews. Contracts which included DRFPs during FY 1980 and 1981 provided data on the results of the DRFP. The personal interviews solicited knowledge from Principal Contracting Officers (PCO) and buyers who had actually used DRFPs.

Operational Definition of Effectiveness

An effective DRFP is one that results in implementations which address the areas of potential cost savings.

These areas include:

- 1) Changes to requirements specifying manufacturing processes, facilities, tools, and test capabilities,
- 2) Schedule or delivery changes that will result in

cost reductions,

- 3) Substitution of RFP-stated materials; and overly restrictive engineering and quality specifications and requirements,
- 4) The use of common government-furnished equipment or standard commercial components instead of system peculiar items,
- 5) Reduction, substitution, or deletion of military specifications and standards,
- 6) Excessive reporting documents,
- 7) Modified contractual arrangements designed to financially incentivize contractors and subcontractors to pursue cost-reduction efforts during contract performance.

The purpose of this definition is to distinguish significant contractor recommendations which facilitate the purpose of the DRFP concept--solicitation of industry feedback that may provide significant cost savings and program improvements.

Data Source

Research for this study was conducted within Aeronautical Systems Division (ASD), Wright-Patterson AFB (WPAFB) Ohio. ASD responsibilities include managing "the acquisition of aeronautical systems, subsystems, and related equipment programs and projects. . . [4:1]." During FY 1980, ASD was responsible for negotiating 44 percent of AFSC contractual

actions,¹ or 7,866 of 17,979. This involved \$8.38 billion of \$12.948 billion of obligations in AFSC, or 65 percent (1). Three organizations within ASD provided data for the research: Directorate of Research and Development Contracting (PMR), Deputy for Reconnaissance and Electronic Warfare Systems (RW), and Deputy for Aeronautical Equipment (AE). PMR is oriented toward the acquisition of research and development, support services, and specialized equipment for Air Force laboratories at WPAFB, Aerospace Medical Division at Brooks AFB, Air Force Human Resources Laboratory at Brooks AFB, and the Air Force Business Research Management Center (2). PMR completed 53 percent of ASD contracts in FY 1980; this accounted for \$361 million in obligations (1). RW is responsible for reconnaissance and electronic warfare systems in support of Department of Defense missions. During FY 1980, RW negotiated 8 percent of ASD contracts which represented 6 percent of total obligations. AE accomplishes the acquisition of avionics and aircraft accessories, life support, and support equipment. AE completed 8 percent of ASD contracts in FY 1980 for 2 percent of obligations (1).

Research Structure

Research Questions 1.1/1.2

What are the objectives of the DRFP concept?

What are the procedures for implementing the DRFP concept?

¹For purposes of this discussion, contractual actions are considered to include new contracts, supplemental agreements, and modifications.

An extensive review of defense documents provided data to determine the objectives and procedures of the DRFP concept. Documents which address the DRFP include:

AFSC Defense Acquisition Regulation Supplement

AFSC Pamphlet 70-4: RFP Preparation Guide

AFSC and ASD policy letters

A subjective evaluation of the data from these sources furnished the objectives and procedures of the DRFP concept.

Research Question 2.1

How effective is the DRFP concept in achieving its stated objective?

Data collected from contracts which incorporated the DRFP were used to describe the effectiveness of the DRFP.

Criteria for selecting a sample of contracts included:

- 1) contracts which have used the DRFP,
- 2) contracts which have completed the procurement planning phase of the contracting process, such that a RFP has been developed which incorporates responses to the DRFP,
- 3) contracts which have not changed in scope or objective during the contracting process, such that a revised DRFP was not issued to industry, and
- 4) contracts which represent a wide spectrum of dollar amounts based upon the government estimate of contract cost.

Initial planning included a random sample of the contracts for data collection. Preliminary inquiries resulted

in an expected population of about 40 contracts in PMR and between 12 to 15 contracts in AE and RW. To allow sufficient time for incorporation of recommendations in the formal RFP, a cutoff date of 30 September 1980 was used for issuance of the DRFPs. The cutoff date limited the number of DRFPs to a population of 31 in PMR. From this source, a random selection provided 12 contracts for analysis of the DRFPs. The number of the sample DRFPs was not determined statistically due to the nature of the research and an undefined standard deviation. However, the random selection, in the judgment of the researchers, provided a cross-section of contracts in PMR.

Verification of the population in AE and RW resulted in a decrease to 10 contracts. The reason for the reduction was program cancellation prior to issuance of a formal RFP. Thus, the methodology consisted of a census of these contracts due to the low number. Thereafter, the data collection yielded only five contracts for analysis of the DRFP. The other five contracts were disqualified due to either the contracting process having not progressed to incorporation of recommendations into the formal RFP or the DRFP being issued concurrently as the formal RFP. The small data source provided excellent examples of the DRFP application, but it has limited the ability to generalize the subsequent findings.

A structured research guide controlled the data collection to insure a systematic evaluation of each DRFP (see Appendix A). Specific collection efforts included:

- 1) delineating DRFP in terms of forecasted dollar

amount and suggested contract type,

- 2) documenting contractor responses which address general problem areas and do not provide specific recommendations,
- 3) identify number of recommendations from contractors and number of revisions incorporated in RFP according to section of DRFP which changes are applicable to, and
- 4) differentiating between recommendations which meet the operational definition of effectiveness and those which do not meet the definition.

Contracting officers of PMR, AE, and RW validated the research guide by reviewing it and offering suggestions for improvement. This validation provided the opportunity to evaluate the feasibility of the guide for analyzing DRFPs. As a result of the review, two additional elements were added to the operational definition of effectiveness for the data collection. These elements were: 1) identification, simplification, or reduction of special clauses, and 2) compatibility of contract type with statement of work.

Analysis of data provided a description of the effectiveness of the DRFP according to the number of changes which meet the criteria of the operational definition of effectiveness. Additionally, the analysis attempted to describe the relationship between effectiveness and the degree of completeness of the DRFP package, based upon the number of completed sections of the DRFP. The statistical tool, regression

analysis, was used to analyze the relationship between the number of changes and the number of sections completed.

Regression analysis provides a method to examine the relation between a variable of interest and one or more independent or predictor variables (16:434). The equation

$$Y = \beta_0 + \beta_1 X$$

represents the estimated regression function of the simple linear regression model. The variable, Y , represents the number of changes and the variable, X , corresponds to the number of completed sections of the DRFP package. The point estimator of β_1 , b_1 , represents the relative importance of the independent variable. For example, as the number of completed sections increases, the number of changes are expected to increase by the value of b_1 . The Statistical Package for Social Sciences (SPSS) provides a computer program for deriving estimates of b_1 . Another output of the SPSS computer program is the coefficient of simple correlation, r , which is a measure of the degree of linear relationship between the independent and dependent variables (17:276). The closer that the absolute value of r is to the value of one, the greater the degree of relationship between the variables.

In addition to using the coefficient of simple correlation to describe the strength of the relationship, the research also tested whether $\beta_1 = 0$. If $\beta_1 = 0$, then the expected value of Y would equal $\beta_0 + \beta_1 X = \beta_0$ for all values of X . Thus, all values of Y would have the same mean and, by

implication, all distributions would be identical and there would be no significant relationship between X and Y. The appropriate hypotheses for this test are:

$$H_0: \beta_1 = 0$$

$$H_1: \beta_1 \neq 0$$

The first test of these hypotheses involved constructing a confidence interval for β_1 based upon the theorem:

$$\frac{b_1 - \beta_1}{s(b_1)} = t(n-2)$$

In accordance with this theorem, the confidence interval takes the form of $L \leq \beta_1 \leq U$ where:

$$L = b_1 - t(1-\alpha/2; n-2)s(b_1)$$

$$U = b_1 + t(1-\alpha/2; n-2)s(b_1)$$

A 90 percent confidence level was established for testing the hypotheses since, even if it were possible to obtain all available information, the decision cannot be made with absolute certainty but, rather, must be based on probabilities (16:474; 17:268).

A second test to confirm that $\beta_1 = 0$ involved the standardized test statistic, t^* , where:

$$t^* = \frac{b_1 - 0}{s(b_1)} = \frac{b_1}{s(b_1)}$$

The appropriate decision rule for t^* is:

If $|t^*| \leq t(1-\alpha/2; n-2)$, conclude H_0

If $|t^*| > t(1-\alpha/2; n-2)$, conclude H_1

The final test of β_1 involved a comparison of b_1 with action limits. The formulae for the action limits are:

$$A_1 = 0 + t(\alpha/2; n-2)s(b_1)$$

$$A_2 = 0 + t(1-\alpha/2; n-2)s(b_1)$$

The appropriate decision rule for the comparison of b_1 with action limits is:

If $A_1 \leq b_1 \leq A_2$, conclude H_0

If $b_1 < A_1$ or $b_1 > A_2$, conclude H_1

After analyzing the relationship between the number of changes and the number of sections, the proposed dollar amount was substituted as the independent variable. This substitution was accomplished to evaluate the relationship between the number of changes and the dollar amount of the contracts. The analysis consisted of the same tests which were conducted for the variable, number of sections.

Research Question 2.2

Is there a difference in the procedures for using the DRFP and the results of the DRFP in the different phases of the acquisition process?

The research effort analyzed data from personal interviews to compare procedures and actual practices in PMR against AE and RW. This provided a subjective appraisal of differences in procedures for using the DRFP in different phases of the acquisition process since the efforts of PMR focus upon the initial phases and the efforts of AE and RW concentrate upon the Full-Scale Development through Production and Deployment phases.

To distinguish results of the DRFP, the mean number of revisions in PMR contracts was compared against the mean number of revisions in AE and RW contracts. The T-Test provided the statistical tool for testing the difference between means. The first step in using the T-Test was establishing a null and alternative hypothesis. For this study, the hypotheses were:

$$H_0: \mu_1 - \mu_2 = 0 \text{ (no difference in results)}$$

$$H_1: \mu_1 - \mu_2 \neq 0 \text{ (difference exists)}$$

Again, a 90 percent confidence level was used for testing the hypotheses. Since a 90 percent confidence level was established, an α value of .10 was used.

The SPSS subprogram, T-Test, computed the test statistics. Formulae required for manual calculations are presented in Appendix B for reference. The variables of interest for the T-Test were the source of the DRFP and the number of changes which met the operational definition of effectiveness.

The first test of the hypotheses consisted of establishing a confidence interval for $\mu_2 - \mu_1$ (16:313). The form used was $L \leq \mu_2 - \mu_1 \leq U$ where:

$$L = \bar{D} - t(1-\alpha/2; n_1+n_2-2)s(\bar{D})$$

$$U = \bar{D} + t(1-\alpha/2; n_1+n_2-2)s(\bar{D})$$

The second test was a comparison of the probability value with the α value of .10. This test involves the decision rule:

If the probability value is greater than α ,
conclude H_0

If the probability value is less than α ,
conclude H_1

The next test involved the calculation of action limits for comparison with the value of $\mu_2 - \mu_1$. The action limits are based upon the t distribution for $\alpha/2$ and $1-\alpha/2$. The formulae for the action limits are:

$$A_1 = 0 - t(1-\alpha/2; n_1+n_2-2)s(\bar{D})$$

$$A_2 = 0 + t(1-\alpha/2; n_1+n_2-2)s(\bar{D})$$

The decision rule was:

If $A_1 \leq \bar{D} \leq A_2$, conclude H_0

If $\bar{D} < A_1$ or $\bar{D} > A_2$, conclude H_1

The fourth test compared the computed value of the test statistic with the critical value of t. The critical value of t was determined from the statistical table of the t distribution where:

$$t_{\text{critical}} = t(1-\alpha/2; n_1+n_2-2)$$

The appropriate decision rule was:

If $t_{\text{compute}} \leq t_{\text{critical}}$, conclude H_0

If $t_{\text{compute}} > t_{\text{critical}}$, conclude H_1

Research Questions 3.1/3.2

What factors decrease the effectiveness of the DRFP concept?

What factors increase the effectiveness of the DRFP concept?

A structured interview directed to PCOs and buyers provided data for determining factors which decrease and increase the effectiveness of the DRFP concept. Data from literature review and analysis of DRFPs provided questions for the interview. General areas of questions addressed the preparation of the DRFP and the factors which influence results. The greatest advantages of the interview are the depth and detail of information which can be obtained. Also, the interviewer has more control over the process than other methods (11:294). With this method, information of factors which influence the DRFP concept can be obtained which, otherwise, might be undetected by literature review and analysis of contracts.

One major limitation of personal interviews is bias. An interview schedule which consisted of a set of structured questions provided a method to control bias (see Appendix C). Evaluation by contracting and acquisition management instructors from the Air Force Institute of Technology (AFIT) provided a method to validate the interview schedule. This process identified weaknesses in the interview schedule and provided suggestions for improvement. The main result of the evaluation was a rewording of several questions to avoid any impression of negative bias during the interviews. The AFIT faculty comprised a valid testing source since all were former contracting officers or had experience and knowledge of contracting procedures in the acquisition environment.

Twelve interviews were conducted with Principal

Contracting Officers and buyers from PMR, AE and RW. Interviewees selected were the individuals responsible for the issuance of the DRFPs included in the data source. Five individuals were not available for the interviews due to their relocation or retirement. All interviews were recorded on tape and afterwards transcribed in their entirety. This method allowed full attention to the interviewees and also insured a complete record of the responses.

Assumptions

1. The responses expressed in interviews were true perceptions based upon specific experience with DRFPs.

2. The sample of contracts was representative of contracts in ASD which incorporated DRFPs.

3. The populations from which the sample of contracts were selected were normal or the departures were not too significant, and the populations had the same variance. These assumptions were required for the application of the T-Test.

4. In the application of regression analysis, the error terms were independent and normally distributed with an expected value of zero and constant variance.

Limitations

1. Research effort was confined to ASD due to limited time and available funds.

2. Due to the time constraint, the research effort was limited to the PMR, AE, and RW directorates of ASD.

3. Results of this research were not generalizable beyond ASD since this organization is responsible for a mission unique to the rest of AFSC.

4. Some subjectivity was exercised by the research team in evaluating and categorizing contractor responses to DRFPs.

The following chapter presents the summary and analysis of data which have been collected under the research methodology presented in this chapter.

CHAPTER III

DATA SUMMARY AND ANALYSIS

This chapter presents the data collected from review of defense documents, analysis of contracts, and interviews with contracting officers and buyers. AFSC supplement to DAR, AFSC Pamphlet 70-4, and policy letters provided the stated objectives and procedures for the DRFP concept. The analysis of contract files afforded knowledge of the actual effectiveness and procedures for using the DRFP. Finally, the personal interviews furnished insight into the factors which decrease or increase the effectiveness of the DRFP concept.

Review of Defense Documents

Objectives. In answering Research Questions 1.1/1.2, the review of defense documents provided the objectives and procedures for implementing the DRFP concept. The purpose of the DRFP concept is to provide significant cost savings and improvements in planned acquisitions through industry feedback. In support of this purpose, the DRFP attempts to provide industry with greater insight and appreciation of requirements, opportunity to offer comments and suggestions for refining requirements, and consequently result in more defined and realistic proposals. Since the Air Force does not always know exactly how to specify needs, the specific objectives of

the DRFP are to identify:

- 1) Changes to requirements specifying manufacturing processes, facilities, tools, and test capabilities,
- 2) Schedule or delivery changes that will result in cost reductions,
- 3) Substitution of RFP-stated materials; and overly restrictive engineering and quality specifications and requirements,
- 4) The use of common government-furnished equipment or standard commercial components instead of system peculiar items,
- 5) Reduction, substitution, or deletion of military specifications and standards,
- 6) Excessive reporting requirements (to include data requirements),
- 7) Modified contractual arrangements designed to financially incentivize contractors and subcontractors to pursue cost-reduction efforts during contract performance.

Procedures. DRFPs are required for all R&D contracts estimated to exceed \$500,000 and all other contracts over \$1 million, except contracts for sole source which are follow-on contracts for the same item from the same source. The activities for issuing DRFPs begin with early planning in the contracting process. For acquisitions requiring a Secretarial Determination and Finding (D&F), the DRFP can be a parallel

activity to the processing of the D&F. Additionally, the DRFP can be issued prior to approval of the D&F, but negotiations will not be conducted until approval of the D&F and issuance of a formal RFP. The Air Force will synopsise the DRFP in the Commerce Business Daily unless exempted by DAR. Contracting personnel will expedite or reduce internal reviews to permit maximum time for contractor review and then issue the DRFP to all sources which are furnished by the project engineer. Additionally, the contracting officer will issue a copy of the DRFP to the cognizant contract administration office of a potential offeror when the DRFP is issued to industry. This requirement provides the opportunity for the contract administration offices to give early assistance in identifying and eliminating potential problems in proposals.

Requirements for the content of the DRFP allow for issuance of either a complete package or selected sections of the RFP package. Minimum inputs include instructions, evaluation factors, special and general provisions, description or specifications, and data lists. Contracting officers must also include an executive summary letter which accomplishes at least the following tasks:

- 1) description of the DRFP objectives and applicable procedures,
- 2) encouragement to evaluate and challenge any elements of the DRFP package,
- 3) emphasis that responses are voluntary and will remain anonymous and that the actions do not call

- for negotiation or offers during the DRFP process,
- 4) identification of high cost drivers and improvements for program accomplishment, and
 - 5) identification of a general funding estimate, when appropriate, if competition is involved.

For major acquisitions, a panel will both review the DRFP and assess the offerors' responses for implementation into the formal RFP. For less-than-major programs, the project engineer will review the responses. Contracting officers will acknowledge contractor recommendations either by correspondence or through a non-attribution conference.

Analysis of Contract Files

Presentation of data from the contract files follows the format of the Research Guide and Worksheet (Appendix A). The collected data provided the information necessary to describe the effectiveness of the DRFP in response to Research Question 2.1. The contracts also provided the necessary data to compare results of the DRFP during different phases of the acquisition process to answer Research Question 2.2. Specifically, the data provided the necessary information to describe the relationship between the DRFP's effectiveness and degree of completion of the DRFP package. Finally, the collection provided data to compare the results of the DRFP in PMR vis-a-vis AE and RW.

Estimated Dollar Amount. Table 1 presents the distribution of contracts in terms of estimated dollar amount.

TABLE 1

Estimated Dollar Amounts of Contracts

Dollar Amount		Number of Contracts
PMR		
0	- 500,000	1
500,000	- 1,000,000	5
1,000,000	- 1,500,000	3
1,500,000	- 3,500,000	3
AE/RW		
0	- 1,000,000	0
1,000,000	- 1,500,000	2
1,500,000	- 3,500,000	0
3,500,000	-10,000,000	1
10,000,000	-20,000,000	1
over	20,000,000	1*
*Estimated dollar amount was \$155,000,000		

This data was extracted from the Determination and Findings for each contract. In PMR, the values ranged from \$390,000 to \$3,500,000, with the largest number of contracts falling between \$500,000 to \$1,000,000. In AE and RW, the dollar amounts varied from \$1,400,000 to \$155,000,000; there was approximately a uniform distribution of these contracts across the dollar values. The distributions of contracts in terms of dollar amounts describes the DRFPs which provided the data base for the research.

Type of Contract. This data also describes the source of the data base. As illustrated in Table 2, the contracts were both fixed price and cost reimbursement types. In PMR, 58 percent were Cost Plus Fixed Fee contracts. No one type

TABLE 2

Type of Contracts

Type of Contract	Number
PMR	
Fixed Price (Level of Effort)	1
Cost Plus Fixed Fee	7
Firm Fixed Price	4
AE/RW	
Cost Plus Incentive Fee	2
Fixed Price Incentive	1
Firm Fixed Price	2

dominated in AE and RW as the contracts ranged from Cost Plus Incentive Fee to Firm Fixed Price.

Number of Responses Solicited. This section describes the scope of the industry contractors who received DRFPs from the data base. Of the twelve contracts, PMR issued DRFPs to twenty or fewer contractors in eleven cases. Solicitations per contract ranged from three to a maximum of 73. Three of the five AE/RW contracts involved DRFPs being sent to ten or fewer contractors; the number of contractors solicited ranged from six to 59 for the five contracts. Table 3 illustrates the distribution of contracts in terms of number of responses solicited.

Number of Responses Received. In comparison with the number of contractors solicited, this section describes the responsiveness of contractors in terms of the number who responded to the DRFPs. The values represent contractors who actually provided feedback to the DRFP and does not include

TABLE 3

Number of Responses Solicited

Number of Responses	Number of Contracts
PMR	
1 - 10	5
11 - 20	6
21 - 30	0
⋮	⋮
71 - 80	1
AE/RW	
1 - 10	3
11 - 20	0
21 - 30	1
⋮	⋮
51 - 60	1

TABLE 4

Number of Responses Received

Number of Responses	Number of Contracts
PMR	
1 - 3	6
4 - 6	4
7 - 9	2
AE/RW	
1 - 3	1
4 - 6	3
7 - 9	1

those who only acknowledged its receipt. Table 4 presents the distribution of contracts in this section. Of the twelve PMR contracts, one-third resulted in only one response to the

DRFP; the maximum number of responses was eight. The number of responses for AE and RW contracts ranged from three to eight.

Sections Included in the DRFP. This area presents the number of sections of the RFP package which were included in the DRFP. The data not only describes the completeness of the DRFP package, but also distinguishes the sections which were most common. Table 5 presents the distributions of PMR and AE/RW contracts. The description/specifications, or statement of work (SOW), appeared in 100 percent of all DRFPs. The Contract Data Requirements List (CDRL) was another dominant item, common in 16 of the DRFPs. The two sections, "Instructions and Conditions, and Notices to Offerors," and "Evaluation Factors for Award" appeared in 50 percent of the PMR DRFPs. Other sections of the PMR DRFPs were "General Provisions" and "Special Provisions," which appeared once. In addition to the SOW and CDRL, other sections and number of applications in AE/RW contracts were "Contract Form"--1, "Deliveries or Performance"--1, and "Evaluation Factors for Award"--2.

Contractor Responses to General Problem Areas. The primary interest in researching contractor responses was to evaluate the effectiveness of DRFPs in terms of contractor-suggested changes to the formal RFP. The operational definition of effectiveness captured these recommendations into one category; however, the research also documented responses which addressed general problem areas other than the specific

TABLE 5
Number of Sections in DRFP

Number of Sections		Number of Contracts
PMR		
	1	0
	2	3
	3	5
	4	3
	5	1
AE/RW		
	1	1
	2	1
	3	2
	4	1

areas of the operational definition. Finally, the research annotated recommendations of an editorial nature.

This section presents the data collected in the category of responses to general problem areas. Table 6 lists the DRFPs with the number of contractor recommendations and the number of recommendations which were incorporated in the RFP. Approximately 32 percent of the contractors' recommendations to the 12 PMR DRFPs resulted in changes. Isolating the AE/RW DRFPs, the percent of recommendations which resulted in changes to the RFP was 23 percent. Overall, more than 50 percent of these changes focused upon the need to clarify or define terms and requirements. Other responses highlighted missing data items, identified additional factors which merited consideration, and revised percentages of effort required in

TABLE 6

Responses to General Problem Areas

DRFP	Recommendations	Changes
PMR		
1	4	4
2	4	0
3	13	3
4	1	0
5	3	0
6	3	1
7	3	0
8	16	8
9	3	0
10	1	1
11	0	0
12	9	2
	<u>60</u>	<u>19</u>
AE/RW		
1	28	5
2	6	0
3	17	5
4	2	1
5	7	3
	<u>60</u>	<u>14</u>
	<u>120</u>	<u>33</u>

different phases of work. Typical responses in this category included:

- data missing from Figure 2; leads to confusion over requirements,
- define and price Depot SE for equitable comparison of Life Cycle Cost,
- specify aircraft application,
- Figure 6 conflicts with paragraph 4.2.3.2,
- CDRL missing for . . . ,
- clarify whether one-place or two-place system to be tested,

- clarify requirements for monitoring, and
- indicate modes of operation in paragraph 3.2.

Contractor Recommendations Which Meet the Operational Definition. As discussed in the previous section, this category was the primary interest of the research. The responses grouped in this section met one of the requirements of the operational definition in Appendix A. The most common elements which the total of 48 recommendations addressed were: 1) changes to requirements specifying manufacturing processes, facilities, tools, and test capabilities; 2) schedule or delivery changes that will result in cost reductions; and 3) substitution of RFP stated materials and overly restrictive engineering and quality specifications and requirements. Elements which the recommendations did not address were: 1) the use of common government-furnished equipment or standard commercial components instead of system peculiar items; 2) modified contractual arrangements designed to financially incentivize contractors and subcontractors to pursue cost-reduction efforts during contract performance; and 3) identification, simplification, or reduction of special clauses. Table 7 presents the data applicable to this section. Thirty-five percent of the contractors' recommendations resulted in changes to the PMR drafts; the percentage for AE/RW drafts was 18 percent. The following are examples of recommendations which were implemented:

- recommend use of 1.75 inch width versus 2.25 inches,
- increasing to 750 p.s.i. will affect design,

TABLE 7
Contractor Recommendations Which Meet
Operational Definition

DRFP	Recommendations	Changes
PMR		
1	10	10
2	0	0
3	4	0
4	2	0
5	8	1
6	1	1
7	17	6
8	15	4
9	5	0
10	0	0
11	2	0
12	5	2
	<u>69</u>	<u>24</u>
AE/RW		
1	44	5
2	6	1
3	18	3
4	45	12
5	21	3
	<u>134</u>	<u>24</u>
	<u>203</u>	<u>48</u>

- relax mandatory height to maximum of 7.875 inches,
- defer manufacturing/production management system to
Phase III,
- delete present thickness criteria (adds to complexity),
- reduce engineering data requirements,
- delete Military Standard . . . ,
- change from Firm Fixed Price contract to cost-type
to make arrangement commensurate with work (this

- recommendation appeared in six of eight responses),
- restrict computer software to that originated during contract,
 - develop two programs and allow proposals to either since present program addresses parallel development of two different technologies (recommended by five of six responses),
 - delete requirement for metallic thermostructure, and
 - reduce requirement from 100 to 25 samples.

Contractor Recommendations of an Editorial Nature.

The final category captured recommendations which addressed such items as typographical errors and incorrect references. The purpose of collecting data in this area was to assess how much effort is devoted by contractors on insignificant elements of the DRFP, and thus resulting in ineffective feedback. In other words, it was felt that the buying organization has the capability to identify and correct such errors. Table 8 depicts the number of recommendations and changes for each DRFP. This area resulted in the fewest recommendations and changes for both PMR and AE/RW. The percentage implemented by PMR was 25 percent, compared to a 48 percent implementation rate by AE and RW. Additionally, one-third of the PMR drafts and 40 percent of the AE/RW drafts resulted in no recommendations. Examples of editorial recommendations included:

- change year from "1900" to "1990,"
- renumber paragraphs from "4.1.1, 4.1.2, 4.1.2, 4.1.3" to "4.1.1, 4.1.2, 4.1.3, 4.1.4,"

TABLE 8
Editorial Recommendations

DRFP	Recommendations	Changes
PMR		
1	2	2
2	0	0
3	0	0
4	0	0
5	3	0
6	3	1
7	1	0
8	8	4
9	2	0
10	10	1
11	0	0
12	7	1
	<u>36</u>	<u>9</u>
AE/RW		
1	33	11
2	0	0
3	9	4
4	0	0
5	27	18
	<u>69</u>	<u>33</u>
	<u>105</u>	<u>42</u>

- merge paragraph 4.1.5 with 4.2,
- incorrect title to paragraph,
- Table II - "x" in wrong column,
- change Roman numerals to Arabic, and
- change verb usage to future tense.

Personal Interviews

Personal interviews were conducted in support of Research Questions 3.1 and 3.2 to explore which factors decrease

and which factors increase the effectiveness of the DRFP concept. Additionally, the questions provided data to distinguish procedural differences in support of Research Question 2.2. As discussed in Chapter II, PCOs and buyers provided the responses to questions. The data collected provide insight into factors which affect the effectiveness of DRFPs from individuals who have actual experience with the DRFP process. Interview questions are included in the interview schedule (Appendix C). The questions and responses are presented in the order in which they appear in the schedule.

Question #1. What is the length of your R&D Contracting/SPO experience?

The purpose of this question was to establish the level of experience of the interviewees. The experience level ranged from three to 30 years. As indicated in Table 9, the majority of the interviewees have 10 or more years of contracting experience.

Question #2. How many DRFPs have you issued?

This question was designed to ascertain the interviewees' experience with the DRFP process. Forty-two percent of the interviewees issued from one to four DRFPs and another 42 percent issued from five to nine drafts. Table 10 matches the number of individuals with the number of DRFPs issued.

Question #3. Do you feel the requirement for DRFPs should be based on dollar threshold, nature of the acquisition, or some combination of the two? Why?

In their responses, 100 percent of the interviewees

TABLE 9

Level of Experience

Number of Years	Number of Individuals
1 - 4	2
5 - 9	2
10 - 19	6
20 - 30	2

TABLE 10

DRFPs Issued

Number Issued	Number of Individuals
1 - 4	5
5 - 9	5
10 - 19	1
20 - 30	1

remarked that the requirement for the submittal of DRFPs should not be based strictly on dollar threshold. All responses specified that the nature of the acquisition should be a major consideration in determining the need for a DRFP. In addition, they expressed the need for consideration of the potential benefit to be received from industry's comments. The following is a sample of the responses given:

- prioritize and allow the technical nature of the program
- the authority to dictate the requirement for a DRFP
- since dollars merely represent the levels of difficulties

in technology,

- DRFPs should be used for competitive type acquisitions versus sole source,
- the requirement for a DRFP should be determined by the PCO,
- the requirement for a DRFP should be based on a combination of the nature of the acquisition and whether or not the project engineer feels that there is benefit to be received from industry's comments,
- the requirement should be based on a combination of the two because some acquisitions are low in dollar threshold; however, there is a great deal to be gained from industry's comments, and
- some DRFPs are issued only because they meet the dollar threshold; in some cases the engineers are firm about their requirements, and there are no clear benefits to be gained from industry's comments.

Question #4. Do you feel the DRFP process affects the length of the acquisition cycle? What is the impact?

This question delved into the interviewees' perceptions of the DRFP's impact upon the length of the acquisition cycle. One-half of the responses indicated that the DRFP increases the length of the cycle. Another one-third responded that the DRFP can add to the length depending upon the procedures. Finally, two respondents perceived no impact upon the acquisition cycle. Those who felt that the DRFP increased the length estimated that it added from 15 to 60 days. The

dominant factor in not increasing the length was advance planning and the submission of the DRFP package to contracting personnel prior to forwarding the purchase request. However, numerous respondents noted that engineers fail to do this in many instances. Another significant impression of the DRFP recognized a balancing-out of the DRFP's impact in the long-run. The following are comments which reflect the main perceptions:

- the DRFP would not affect the length if personnel have accomplished advanced planning,
- the impact depends upon procedures; some engineers send the DRFP package early, and others send formal purchase requests without a DRFP,
- the initial time required for issuance results in needing less time for technical fact-finding, and
- it is a fact of life that if you did not have to issue a DRFP, you could start the formal solicitation sooner.

Question #5. What sections of the RFP package do you feel provide the most benefit, in terms of responses, if included in the DRFP package?

This question solicited details on the amount of information included in DRFP packages and how the sections included affect the responses. One hundred percent of the interviewees include the statement of work in their DRFP packages. Ninety-one percent include the Contract Data Requirements List.

These two sections represent the major sections

included in DRFPs. The following sample of responses represent the variety of views expressed with reference to the inclusion of sections of the RFP:

- it is impractical to include the terms and conditions and standard provisions because most of the contractors are aware of them from previous experience with the government. However, inclusion may be useful when dealing with a contractor who is new to government contracting,
- the SOW is the most important item to include,
- no comments were received on the evaluation criteria and standard clauses when they were included,
- the CDRL indicating the schedule requirements should be included, however, it is not likely that it will be changed as a result of industry comments,
- only the sections pertaining to the SOW and CDRL are meaningful. Miscellaneous information such as type of contract contemplated and estimated manyears can be included in the executive summary letter. In my experience, all responses have come from the contractors' engineers and have not been coordinated through their contracts office, and
- in order to make the DRFP beneficial, as much information as possible should be included.

Question #6. Have you discovered reluctance on the part of the contractor to submit responses to DRFPs containing their state-of-the-art technology? If so, why?

Contractors' reluctance to submit responses could possibly limit the effectiveness of the DRFP. Thus, this question sought to determine the degree to which contracting personnel detect such a reluctance. Eighty-three percent of the respondents acknowledged that they had detected a reluctance by contractors to include this information in their responses. Two individuals stated that they had not actually seen any reluctance or could not prove it. Of those who responded affirmatively to experiencing the contractors' reluctance, supporting remarks included:

- contractors will always be reluctant to submit anything with state-of-the-art technology; manufacturing secrets are the key to their survival,
- with a DRFP, the government is asking contractors to put their cards on the table before the RFP, but contractors do not want to expose their information before the formal RFP for fear of compromising their position and losing a competitive advantage,
- responsiveness appears to be based upon the individual contractors, not the nature of the program,
- there are certain contractors who always respond, but they tailor the responses to meet their specific capabilities in an attempt to gain a competitive advantage, and
- in sole source situations, the contractor is more likely to withhold state-of-the-art technology until contract award and afterwards submit it under value engineering

provisions.

Question #7. What methods do you use to protect the contractors' recommendations when acknowledging receipt of their responses?

This question was designed to provide information on the methods used to protect data provided by industry in their responses to DRFPs. In addition, we sought to find out if industry responses are being acknowledged, and if so, how detailed are the letters of acknowledgment. Data showed that 33 percent use no method to acknowledge receipt of industry responses. Fifty percent acknowledge receipt by sending a standard letter to all respondents which simply thanks them for responding to the DRFP and indicates the expected time frame for the release of the formal RFP. The following is a sample of the methods used to protect data submitted in response to a DRFP:

- if the data is stamped proprietary, it is treated as proprietary. No technical information is included in the letter acknowledging receipt,
- the executive summary letter generally includes a statement which assures that data submitted in response to a DRFP will be protected as warranted,
- responses submitted are safeguarded in the same manner as responses to formal RFPs, and
- recommendations from responses which are to be implemented in the formal RFP are not included in the letters acknowledging receipt.

Seventeen percent of the interviewees included information of a general or technical nature in their letters of acknowledgment. However, precautions were taken to guard against the release of proprietary data. The following represents their comments on acknowledgment of receipt:

- general information on the changes to be made to the formal RFP as a result of responses received is included in the letter of acknowledgment; however, no specific or proprietary data are included, and
- individual letters identifying changes to be made to the formal RFP as a result of their responses are forwarded only to the firm suggesting the change.

Question #8. What strengths or weaknesses can you identify in the current DRFP process?

The purpose of this question was to gain some insight into the strengths and weaknesses relative to the DRFP process from individuals who have actual experience. Sixty-five percent of the responses were expressed in terms of weaknesses of the current DRFP process. The most common responses are included below:

- the requirement for a DRFP over a certain dollar threshold is a weakness; its use is not automatically beneficial in every case over a certain dollar amount,
- issuance of a DRFP results in a major undertaking for both the buyers and clerks if you have to develop a model RFP and send it through the committees for review,
- it is a time-consuming process and, in most cases, no

- feedback or responses are received,
- the requirement is too generally applied,
 - the major weakness is the dollar threshold criteria,
 - contractor and laboratory personnel do not understand what we are trying to accomplish with the DRFP concept,
 - individuals in management positions fail to recognize that the DRFP is a draft document which merely communicates the future requirements of the government to industry,
 - it is impractical to issue a DRFP in sole source situations solely because it meets the dollar threshold requirement,
 - contractors feel that once the DRFP is issued, the door is closed on discussions between government and industry engineers,
 - if contractors have proprietary data, they are not going to reveal it in any depth in their responses, and
 - the DRFP process has become too complex.

Thirty-five percent of the responses, some of which are included below, expressed strengths associated with the DRFP process:

- in cases when the project engineer generally knows his requirements but does not have insight as to what the problem areas are, industry's comments can be helpful,
- engineers with limited expertise in specific areas can solicit information from industry experts,
- industry's comments can result in an improved SOW, cost

- estimate, and overall formal RFP package,
- contractors can identify unnecessary requirements, especially concerning data submissions since this is an area where the government has tendencies to overstate their requirements,
 - industry engineers may be aware of technical innovations that government engineers are not aware of, and
 - the number of responses received is a good indicator of the level of interest to be expected when the formal RFP is issued.

Question #9. What recommendations do you have for improving the current DRFP process?

When asked for recommendations, eleven of the twelve responded with suggestions. Two major areas were the subject of the recommendations--applicability of the DRFP and formality of the procedures. The central theme in determining the requirements for issuing a DRFP was delegating authority to the engineer and basing the decision upon the nature of the program. Many respondents recalled several programs which involved technical questions and unfamiliar requirements where the engineers expected and received valuable feedback. However, they also identified numerous programs where the requirements and specifications were well defined, but DRFPs were issued anyway because of the dollar threshold.

Major suggestions concerning the formality called for eliminating administrative reviews and limiting responsibility for issuance at the level of the contracting officer.

Individuals emphasized that the DRFP is an informal method of communicating with contractors and that it is not contractually binding. They stated that the review process has evolved to the point where the DRFP is treated like a formal solicitation.

Further recommendations included:

- emphasize importance of advance planning and submission of necessary data by engineers,
- educate personnel so that everyone understands the purpose and procedures of the DRFP, and
- facilitate more communication between government and industry during the DRFP process.

Question #10. Do you have any additional comments on the DRFP process?

This question attempted to capture any additional information which the preceding questions may have failed to solicit. One-third of the closing remarks reflected negative perceptions of the existing DRFP procedures. These responses indicated that the DRFP concept was not a very valuable contracting tool. Reasons for this attitude were that the DRFP is used in many acquisitions where the required effort and resources exceed the resulting benefits. Some respondents attributed the negative perception to the types of programs for which they had issued the DRFPs. Other reasons included the excessive review procedures and makeshift rules in the contracting offices.

Some expressed neither negative nor positive comments but emphasized suggestions and responses from previous

questions. Also, another one-third did not have any additional comments.

Data Analysis

Appendix D contains a listing of the data file for computer analysis, the computer program, and the computer output. The data file contained four columns with the following variables:

- 1) source of DRFP (a value of one indicated PMR and a value of two indicated AE and RW),
- 2) the number of sections in the DRFP package,
- 3) the number of changes which met the operational definition of effectiveness, and
- 4) the estimated dollar amount of the contract.

As discussed in Chapter II, regression analysis enabled the research of the relationship between the number of changes and the number of sections in the DRFP package in support of Research Question 2.1. The SPSS subprogram, REGRESSION, supplied the computer capability to perform this test. The required variables were the independent variable, number of sections, and the dependent variable, number of changes implemented. A computer output lists the values of the constant and the variable for the regression model:

$$Y = 2.82 + (.568 \times 10^{-13})X$$

With such a negligible value for b_1 , one can surmise an insignificant relationship between the number of sections and number of changes. This was confirmed by the value of

the coefficient of simple correlation which, annotated as Multiple R on the computer output, was zero. This value indicated the lack of a relationship; however, the results of the additional tests explained in Chapter II are also presented.

The first test to determine whether $\beta_1 = 0$ involved the confidence interval with lower and upper bounds of:

$$L = b_1 - t(1-\alpha/2; n-2)s(b_1)$$

$$U = b_1 + t(1-\alpha/2; n-2)s(b_1)$$

The critical value of t , extracted from the statistical table in Appendix E, was 1.753 for an $\alpha/2$ of .05 and 15 degrees of freedom. Using the values of b_1 and $s(b_1)$ from the computer output, the resultant confidence interval was $-1.640808 \leq \beta_1 \leq 1.640808$. Thus one can state with 90 percent confidence that β_1 lies between ± 1.640808 , and H_0 cannot be rejected.

The second test involved the standardized test statistic. The computed value of t^* was 6.07×10^{-13} ; since $|t^*|$ is less than 1.753, one cannot reject H_0 .

The final test of β_1 involved a comparison of b_1 with the action limits which were computed as:

$$A_1 = -1.640808$$

$$A_2 = 1.640808$$

The computed value of b_1 , $.568 \times 10^{-13}$, falls within the action limits. Therefore the correct conclusion is H_0 .

After analysis of the relationship between the number of changes and the number of sections, the SPSS program

was again executed with the contract dollar amount as the independent variable to explore the relationship between the number of changes and contract dollar amount. This research exceeded the intended scope of the methodology; however, it followed the same design as the evaluation of the relationship between number of changes and sections. As given in Appendix D, the values of the constant and variable for the regression model were:

$$Y = 2.61 + .000018X$$

Once more there was an insignificant value for b_1 , but the value for the coefficient of simple correlation was .188, which signified an existing but weak relationship.

The test of whether $\beta_1 = 0$ began with the confidence interval discussed in Chapter II. The lower and upper bounds were:

$$L = -.00002$$

$$U = .00006$$

Therefore, the resulting interval is $-.00002 \leq \beta_1 \leq .00006$, and H_0 cannot be rejected.

The computed value of the standardized test statistic was .743, which was less than 1.753; thus one must conclude H_0 .

The action limits, calculated according to the formulae of Chapter II, were:

$$A_1 = 0 - (1.753)(.2468424 \times 10^{-4}) = -.00004$$

$$A_2 = 0 + (1.753)(.2468424 \times 10^{-4}) = .00004$$

As shown in Appendix D, the value of b_1 was .000018; thus the results support H_0 .

In analyzing the data for Research Question 2.2, the T-Test provided the statistical method of evaluating whether there exists a difference in the results of the DRFP process between PMR vis-a-vis AE and RW. As presented in Chapter II, the hypotheses were:

$$H_0: \mu_2 - \mu_1 = 0 \text{ (no difference exists)}$$

$$H_1: \mu_2 - \mu_1 \neq 0 \text{ (difference exists)}$$

The first test involved a confidence interval based upon an $\alpha/2$ of .05 and 15 degrees of freedom. The critical value of t , extracted from the statistical table in Appendix E, was 1.753 and the resultant confidence interval was $-6.0572 \leq \mu_2 - \mu_1 \leq .4572$. Since this captured the value of zero, the null hypothesis could not be rejected.

The probability value was extracted from the pooled variance estimate since equal variances were initially assumed. This value of .153 was greater than the α value of .10; therefore, the appropriate conclusion is H_0 .

The action limits for comparison with $\mu_2 - \mu_1$ were:

$$A_1 = -3.26$$

$$A_2 = 3.26$$

Since $\bar{D} = -2.8$, the proper conclusion was H_0 .

The last test involved a comparison of the t value from the computer output and the critical value of t . Again, H_0 was the correct conclusion since 1.51, the computed value,

is less than 1.753.

The next chapter presents the findings and recommendations which have resulted from the research effort.

CHAPTER IV

FINDINGS AND RECOMMENDATIONS

This chapter presents the findings of the research questions listed in Chapter I. Along with the findings, conclusions are given concerning the efforts of the research. Additionally, recommendations for application of the research findings and suggestions for further research are given.

Findings

The research findings are presented in the order of the research questions. As discussed in earlier chapters, specific objectives included:

- describing the objectives and procedures of the DRFP concept,
- describing the effectiveness of the DRFP concept,
- evaluating differences in the procedures and results of the DRFP in different phases of the acquisition process, and
- determining factors which decrease or increase the effectiveness of the DRFP concept.

Research Questions 1.1/1.2

What are the objectives of the DRFP concept? What are the procedures for implementing the DRFP concept?

As discussed in Chapter III, the review of defense documents provided the objectives and procedures for

implementing the DRFP concept. The major sources of guidance are AFSC DAR Supplement 3-550 and AFSC Pamphlet 70-4, which specify procedures that are generally applicable to AFSC. As presented earlier, the purpose of the DRFP concept is to provide significant cost savings and improvements in planned acquisitions through industry feedback. The general procedures utilized to accomplish the objectives of the DRFP concept call for advance planning and early interaction. The research recognized this requirement to be the key to effectiveness. Overall, the research revealed that the stated procedures for implementing the DRFP concept are general in nature and exist at AFSC level.

Research Question 2.1

How effective is the DRFP concept in achieving its stated objective?

The contract data, presented in Chapter III, were collected by using the operational definition of effectiveness to identify contractor recommendations which achieved the stated objective of the DRFP concept. As mentioned earlier, 35 percent of the contractors' recommendations in PMR DRFPs resulted in changes which satisfied the operational definition, and 18 percent of the recommendations met the definition in AE/RW DRFPs. The research also annotated two categories of responses which did not fall within the operational definition. The first category grouped responses which addressed general problem areas in an attempt to capture elements of effectiveness

which are not formally recognized. A valuable function of the DRFP was identified with more than 50 percent of the changes addressing the need to clarify or define terms and requirements. The second category identified responses which serve an editorial function in the DRFP; this area revealed some contractor attention to areas which do not contribute to effectiveness. Although two additional elements were added to the operational definition of effectiveness for data collection, the researchers did not find that these added to effectiveness.

In analyzing the effectiveness of the DRFP, the research evaluated the relationship between the effectiveness of the DRFP and the number of sections in the DRFP package. As inferred by the results of the statistical tests in Chapter III, no relationship was discovered. This conclusion was substantiated by responses to question five of the personal interview which indicated that the most productive sections are the description/specifications and CDRL.

In summary, the research did not attempt to yield a final evaluation of whether the DRFP is effective or not. However, the findings resulted in a description of the effectiveness which result primarily from inclusion of the description/specifications and CDRL. Additionally, the effectiveness has been enhanced by recommendations which identify terms and requirements needing clarification or definition.

Research Question 2.2

Is there a difference in the procedures for using the DRFP and the results of the DRFP in the different phases of the acquisition process?

The research did not result in a distinction between procedures in PMR vis-a-vis AE and RW. However, responses to questions in the personal interview and efforts to identify contracts for analysis revealed that there are differences in procedures among contracting officers in each organization. One of the primary differences was the lack or presence of advance planning and the submission of the DRFP package by engineers. This was a significant factor in the DRFP's impact on the length of the acquisition cycle. Another area with prominent differences was the acknowledgment of contractor recommendations. As discussed in Chapter III, one-third made no form of acknowledgment, 50 percent addressed standard letters to all respondents which acknowledged receipt and provided the general time frame for issuance of the formal RFP, and 17 percent included information of a general or technical nature.

The analysis of the research data also revealed that there were not any significant differences in the results of the DRFP concept between PMR and AE/RW. This conclusion was derived from the test results shown in Chapter III at a 90 percent confidence level. Thus, the DRFP concept results in comparable levels of effectiveness among the different phases of the acquisition process.

Research Questions 3.1/3.2

What factors decrease the effectiveness of the DRFP concept? What factors increase the effectiveness of the DRFP concept?

The purpose of the DRFP concept is to solicit industry feedback on those areas of planned acquisitions that may provide significant cost savings and program improvement; however, there are factors which affect the achievement of this purpose.

A significant majority of contracting officers detect reluctance by contractors to include state-of-the-art information in their responses. In addition, the majority of contracting personnel perceive important weaknesses in the current DRFP process. The most commonly stated weaknesses related to the additional time required to accomplish a DRFP, the failure to clearly understand the objectives of the DRFP concept, and the general applicability of the DRFP due to the dollar threshold criteria.

However, there are also strengths associated with the DRFP process which include 1) the submission of expert information from industry personnel in areas where government personnel have limited knowledge, 2) the identification of unnecessary requirements, 3) an indication of the potential level of interest, and 4) identification and coordination of technical innovations.

The negative perceptions which have been attributed to the excessive review procedures, lack of standardization of procedures, and general applicability of the DRFP all

contribute to a decrease in the effectiveness of the DRFP concept. On the other hand, strengths expressed by the interviewees are factors that contribute to increasing the effectiveness of the DRFP concept and provide support for the overall achievement of its objectives.

Corollary Findings

As discussed under Research Question 2.1, the research revealed that no relationship existed between the effectiveness of the DRFP and the completeness of the DRFP package. Anticipating that some may hypothesize a relationship between the effectiveness and proposed dollar amount, we also tested this relationship. Again, the research revealed the absence of a relationship. However, the responses to the personal interviews indicated that the success or effectiveness of the DRFP in achieving its objectives is based upon the nature of the acquisition. The use of DRFPs in programs which involve a high degree of complexity or lack sufficient definitude result in higher levels of effectiveness.

Another area of concern identified by the research is an insufficient understanding of the objectives and procedures of the DRFP concept. The major sources of misunderstanding are evidenced first by failure of engineers to submit necessary information early in the process. Additionally, many of the responses by industry fail to fulfill the objectives of the DRFP concept; rather, it appears that in some cases contractors use the DRFP to advertise their unique capabilities.

The third finding involved the formality of the DRFP process which has evolved since its inception. The present process includes numerous reviews which treat the DRFP as a formal document rather than as an informal method of communicating with industry.

Recommendations for Application

The following are recommendations derived from the research effort:

1) ASD should establish guidelines which simplify and provide flexibility for accomplishing the objectives of the DRFP concept. The level of complexity involved in preparing DRFPs, numerous reviews, and formal treatment of the DRFP are factors which decrease the overall effectiveness of the DRFP concept.

2) Criteria for the requirement of DRFPs should be re-evaluated. The nature of the acquisition with reference to level of complexity and the definition of requirements may be a better indicator of programs which are prime candidates for DRFPs.

3) Contracting officers should not include specific contractor recommendations in letters acknowledging receipt of responses. This change will prevent early disclosure of the contractor's state-of-the-art technology.

4) The objectives of the DRFP should include the identification of terms and requirements which require greater clarification.

5) A current orientation of the objectives and procedures of the DRFP concept should be provided to engineers and defense contractors.

6) Engineers should play a greater role in determining the need for a DRFP. They are aware of the level of expertise available, the in-house capabilities, and the flexibility of requirements. This knowledge places them in a better position to determine the need for industry's input.

Recommendations for Further Study

This research was accomplished to provide an initial study of the DRFP concept and its results have provided a descriptive level of analysis. In order to validate the findings and generalize beyond ASD, it is recommended that the same methodology be used for research in other organizations of AFSC. This research would provide a description of the DRFP's scope of application in AFSC and describe factors affecting its effectiveness.

Another area of future research involves a comparative analysis of contracts using DRFPs from a data source, identified by engineers, which comprise programs of a well-defined nature versus complex and undefined programs. Such research would evaluate the effectiveness of the DRFP concept in terms of the nature of the program.

Finally, research using questionnaires and interviews of government engineers and industry representatives would provide, from another perspective, factors which decrease or

increase the effectiveness of the DRFP and also provide recommendations for improvement.

APPENDIX A
RESEARCH GUIDE AND WORKSHEET FOR
DRFP DATA EXTRACTION

RESEARCH GUIDE

I. Operational Definition of Effectiveness

An effective DRFP is one that results in implementations which address the areas of potential cost savings.

These areas include:

- 1) Changes to requirements specifying manufacturing processes, facilities, tools, and test capabilities,
- 2) Schedule or delivery changes that will result in cost reductions,
- 3) Substitution of RFP-stated materials; and overly restrictive engineering and quality specifications and requirements,
- 4) The use of common government-furnished equipment or standard commercial components instead of system peculiar items,
- 5) Reduction, substitution, or deletion of military specifications and standards,
- 6) Excessive reporting requirements (to include data requirements),
- 7) Modified contractual arrangements designed to financially incentivize contractors and subcontractors to pursue cost-reduction efforts during contract performance,
- 8) Identification, simplification, or reduction of special

clauses,

9) Compatibility of contract type with statement of work.

II. For each contract, document. . .

A. DRFP number/buyer

B. Estimated dollar amount

C. Type of contract

D. Number of responses solicited

E. Number of responses received

F. Sections included in DRFP

G. Contractor responses which address general problem areas other than specific areas of operational definition of effectiveness

H. Contractor recommendations which address one or more of the nine areas in the operational definition of effectiveness (Document recommendation and applicable section)

I. Additional contractor recommendations which are of an editorial nature (Document recommendation and applicable section)

A. DRFP NUMBER/BUYER	B. DOLLAR AMOUNT	C. CONTRACT TYPE
D. NUMBER OF RESPONSES SOLICITED		E. NUMBER OF RESPONSES RECD
F. SECTIONS INCLUDED IN DRFP		
	Yes	No Remarks
A. <u>Contract Form</u>		
B. <u>Supplies/Services and Prices</u>		
C. <u>Description/Specifications</u>		
D. <u>Packaging and Marking</u>		
E. <u>Inspection and Acceptance</u>		
F. <u>Deliveries or Performance</u>		
G. <u>Contract Administration Data</u>		
H. <u>Special Provisions</u>		
I. <u>General Provisions</u>		
J. <u>List of Documents, Exhibits, and Other Attachments</u>		
K. <u>Representations, Certifications, and Other Statements of Offeror</u>		
L. <u>Instructions and Conditions, and Notices to Offerors</u>		
M. <u>Evaluation Factors for Award</u>		
G. CONTRACTOR RESPONSES TO GENERAL PROBLEM AREAS		

H. CONTRACTOR RECOMMENDATIONS WHICH MEET OPERATIONAL
DEFINITION (DOCUMENT APPLICABLE SECTION AND * THOSE
INCORPORATED IN RFP)

I. ADDITIONAL RECOMMENDATIONS WHICH ARE OF AN EDITORIAL
NATURE (DOCUMENT APPLICABLE SECTION AND * THOSE
INCORPORATED IN RFP)

APPENDIX B
FORMULAE FOR T-TEST

1. Determine the mean of the sampling distribution where:

$$E(\bar{D}) = \mu_2 - \mu_1$$

2. Determine the estimate of the common population variance where:

$$s_c^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{(n_1-1) + (n_2-1)}$$

3. Calculate the unbiased estimator of $\sigma^2(D)$ where:

$$s^2(\bar{D}) = s_c^2 \left(\frac{1}{n_2} + \frac{1}{n_1} \right)$$

μ_1 = the mean of changes in AE/RW DRFPs

μ_2 = the mean of changes in PMR DRFPs

n_1 = the sample size of AE/RW DRFPs

n_2 = the sample size of PMR DRFPs (16:313)

APPENDIX C
INTERVIEW SCHEDULE

This is the final phase of research for an Air Force Institute of Technology thesis on the effectiveness of the Draft Request for Proposal (DRFP). We have reviewed solicitation packages of contracts which included a DRFP to determine the scope of the DRFP package and the number of industry responses implemented in the formal RFP. However, much of our effort requires insight into the knowledge and experience of persons, like yourself, involved in the acquisition process. Therefore, we appreciate the time you are allowing us for this interview.

Date _____

Individual interviewed _____

Current title/office _____

1. What is the length of your R&D Contracting/SPO experience?
2. How many DRFPs have you issued?
3. Do you feel the requirement for DRFPs should be based on dollar threshold, nature of the acquisition, or some combination of the two? Why?
4. Do you feel the DRFP process affects the length of the acquisition cycle? What is the impact?
5. What sections of the RFP package do you feel provide the most benefit, in terms of responses, if included in the DRFP package?

6. Have you discovered reluctance on the part of the contractor to submit responses to DRFPs containing their state-of-the-art technology? If so, why?
7. What methods do you use to protect the contractors' recommendations when acknowledging receipt of their responses?
8. What strengths or weaknesses can you identify in the current DRFP process?
9. What recommendations do you have for improving the current DRFP process?
10. Do you have any additional comments on the DRFP process?

APPENDIX D
COMPUTER DATA

```

RUN NAME      THESIS ANALYSIS
VARIABLE LIST GROUP, SEC, IMP, DOL
INPUT FORMAT  FREEFIELD
INPUT MEDIUM CARD
N OF CASES    17
VAR LABEL     GROUP, CONTRACT SOURCE/SEC, NUMBER OF SECTIONS/
              DOL, CONTRACT AMOUNT IN THOUSANDS DOLLARS
              IMP, NUMBER IMPLEMENTED/
VALUE LABELS  GROUP (1) R10 CONTRACTS (2) SPJ CONTRACTS
LIST CASES    CASES=17/VARIABLES=ALL
T-TEST        GROUPS=GROUP (2)/VARIABLES=IMP
READ INPUT DATA

```

1.	3.	10.	1650.
1.	3.	0	1705.
1.	4.	0	750.
1.	4.	0	600.
1.	3.	1.	900.
1.	3.	1.	350.
1.	3.	6.	1090.
1.	4.	4.	665.
1.	5.	0	390.
1.	2.	0	1280.
1.	2.	0	776.
1.	2.	2.	1182.
2.	1.	1.	1400.
2.	3.	5.	155000.
2.	3.	12.	7800.
2.	4.	3.	19480.
2.	2.	3.	1500.

```

REGRESSION    VARIABLES=SEC, DOL, IMP/
              REGRESSION=IMP WITH SEC/
              REGRESSION=IMP WITH DOL

```

```

FINISH

```

DEPENDENT VARIABLE.. I4P

MEAN RESPONSE 2.92353 STD. DEV. 3.52690

VARIABLE(S) ENTERED ON STEP NUMBER 1.. SEC

MULTIPLE R	.7	F	SIGNIFICANCE
R SQUARE	.5		
ADJUSTED R SQUARE	.3		1.000
STD DEVIATION	3.74535		

ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1.	.0	.0
RESIDUAL	15.	210.47059	14.03137
COEFF OF VARIABILITY	132.7 PCT		

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE
SEC	.56843419E-13	.93646184	.36845141E-25	1.000
(CONSTANT)	2.9235294	2.9526297	.91446413	.354

ALL VARIABLES ARE IN THE EQUATION.

DEPENDENT VARIABLE.. IMP

MEAN RESPONSE 2.92353 STD. DEV. 3.62693

VARIABLE(S) ENTERED ON STEP NUMBER 1.. DOL

MULTIPLE R	.13842	F	SIGNIFICANCE
R SQUARE	.03513	.55212	.469
ADJUSTED R SQUARE	.0		
STD DEVIATION	3.57976		

ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE
REGRESSION	1.	7.47199	7.47199
RESIDUAL	15.	202.99860	13.53324
COEFF OF VARIABILITY	130.3 PCT		

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE
DOL	.13341594E-04	.24684240E-04	.55212147	.469
(CONSTANT)	2.6115027	.93674745	7.7720562	.014

ALL VARIABLES ARE IN THE EQUATION.

----- T - T E S T -----

GROUP 1 - GROUP GE 2.
GROUP 2 - GROUP LT 2.

VARIABLE	NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.
IMP						
GROUP 1	5	4.0000	4.266	1.908		
GROUP 2	12	2.0000	3.162	.913	1.32	.731

----- POOLED VARIANCE ESTIMATE * SEPARATE VARIANCE ESTIMATE -----

T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.	T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.
1.51	15	.153	1.32	5.93	.234

AD-A103 822 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL--ETC F/G 5/1
AN ANALYSIS OF THE DRAFT REQUEST FOR PROPOSAL CONCEPT WITHIN AE--ETC(U)
JUN 81 J I MCBRIDE, W F SLADE
UNCLASSIFIED AFIT-LSSR-1-81

2 of 2

AD-A
10-8-81



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DATE

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DTIC

APPENDIX E
STATISTICAL TABLES

v	1 - α					
	.90	.95	.975	.99	.995	.9995
1	3.078	6.314	12.706	31.821	63.657	636.619
2	1.886	2.920	4.303	6.965	9.925	31.598
3	1.638	2.353	3.182	4.541	5.841	12.924
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.869
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.408
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4.587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	1.345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2.831	3.819
22	1.321	1.717	2.074	2.508	2.819	3.792
23	1.319	1.714	2.069	2.500	2.807	3.767
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.291

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