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A Personnel Study--The Role of the Program Manager in a Northern Utah Aerospace Company

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A PERSONNEL STUDY--THE ROLE OF THE PROGRAM MANAGER IN A NORTHERN UTAH AEROSPACE COMPANY

by

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of

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Thomas W. Enright

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ABSTRACT

A Personnel Study--The Role of the Project Manager in a Northern Utah Aerospace Company

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The prime interest of this study was to measure and analyze the authority/responsibility conceptions the program managers had of themselves as compared to that held by the line or functional personnel with whom the program managers were in day-to-day contact. A questionnaire consisting of 22 questions was distributed to 20 program managers and 73 line personnel. Of these 93 distributed questionnaires, 92 were returned and analyzed. The questionnaire asked to what degree, in the opinion of the respondent, did the program manager have the authority to perform 22 different functions. Categories of Always, Frequently, Seldom and Never were offered.

The hypothesis tested was that there was no difference between the conception the program manager held of his authority and responsibility as compared to what the line organization personnel held it to be. A

chi square test was applied using a significant level of five percent to accept or reject the hypothesis. The Program Management responses were considered as the theoretical frequency and the line personnel responses as the observed frequency. The null hypothesis was accepted 59 percent of the time.

Percentage relationships of the responses to each question were also computed. On a percentage basis the program managers typically viewed their authority to be greater than did the line personnel.

The basic conclusion was that no clear pattern of agreement emerged between the program managers and the line personnel as to the degree of authority held by the program manager and that the company involved in the study should improve the authority/responsibility relationships involving the Program Management and line organization personnel.

(138 pages)

CHAPTER I

INTRODUCTION

This paper will investigate the interrelationship of Program Management personnel with the functional or line personnel of a northern Utah aerospace company, which employs the program management concept of organization. The company that was studied employs approximately 1600 personnel who are principally engaged in supporting contracts issued by the Department of Defense. The firm hereafter will be referred to as the XYZ Company.

An attempt will be made to determine how the line or functional personnel perceive the project manager as compared to how he preceives himself in meeting the contract and company requirements of his assigned projects.

Throughout this paper the terms program management and project management will be used interchangeably. As Johnson, Kast, and Rosenzweig (9) discussed in their book The Theory of Management of Systems, this is a commonly accepted terminology among authors, and although there may be some differences in their meanings, they have a degree of commonality.

The essence of program management as a system of management is that it cuts across normal line or

functional management channels, and is interfunctional and generally in conflict with normal line-staff organizational structure. Utilizing this concept, it is often difficult to establish functional charters for the functional managers and program managers without introducing ambiguity in the relationships between these two managers. Because of this lack of a clear-cut definition of authority-responsibility relationship, the program manager has had to use influence as a substitute for formal authority to achieve his management responsibilities. As Johnson, Kast, and Rosenzweig (9) went on to say, the success of the program manager is more likely to depend upon his ability to influence other organizational members than it is upon his formal authority. These authors maintain that the trend toward Program Management will continue because of technological advances and associated technical and organizational complexities. They believe that the only efficient approach to managing these complex programs is through the use of systems concept. The pressures of technological innovation, the urgencies of compressed schedules, and customer recommendations had caused the XYZ Company to utilize this management concept.

Purpose

To determine how effective the program managers and the line or functional personnel of the XYZ Company have

communicated, an attitude study was conducted. This study compared the program manager's conception of his authority and responsibility to those conceptions held by line personnel with whom the program manager was in direct day-to-day contact at all levels in the organization.

Those areas where authority and responsibility conflicts occurred are isolated and identified by this investigation and subsequent analysis. A better understanding of the relationships existing between the project management and line personnel is sought. Through a better understanding of these relationships the benefits attributed to the traditional "one boss" system of management may also be synonymous with the program management system.

Need to Investigate

A Principle of Management. In 1916 Henry Fayol (7) listed fourteen principles of management in his book General and Industrial Management. One of these principles was "Unity of Command" where in Fayol said that "for any action whatsoever, an employee should receive orders from one superior only--should it be violated, authority is undermined, discipline is in jeopardy, order disturbed, and stability threatened". In a recent issue of the Academy of Management Journal, Richard

Goodman said:

> Of the many organizational problems studied in relation to various project management techniques, the one which appears the stickiest is the question of who should have authority between the project manager and various functional managers in the company. (8, p. 395)

The program management system at the XYZ Company tends to violate this "Unity of Command" principle by requiring line personnel to be responsible to their functional organization supervisors for merit and review but to the project manager for performance of project requirements. As J.M. Stewart (18) says in his AMA paper "Making Project Management Work," the essence of project management is that it cuts across, and in a sense conflicts with the normal organization structure.

Much literature has been produced taking issue with and agreeing with Mr. Fayol. An article in Machine Design entitled "A Case for Co-Existence" by A.E. Roden (16) stressed that there is a great deal of benefit to be achieved through this dual responsibility type of management. However, Roden pointed out that the first objection to this dual accountability problem is the universal apprehension of having to satisfy two bosses but that this should not be alarming unless their authorities are overlapped or insufficiently defined.

Cleland (5) in his article "Why Project Management?" says that the traditional theories of Fayol and Taylor are not suitable for managing large single projects with

high costs and coordinated involvement of several organizations.

Mr. R.L. Allen, Assistant to the Vice President of the Rocketdyne Division of North American Aviation, Inc., speaking to an American Management Association seminar in February 1967 said:

> The Program Management organizational concept is used throughout the Aerospace Industry and Department of Defense Agencies. It is the best concept available today for achieving objectives in the weapon system acquisition process--Those objectives being operational systems, on time, meeting performance requirement and characteristics, and at reasonable cost. (1, p. 10)

Captain W.G. Alkinson, USN, at the same seminar stated that:

> Our willingness to use project management simply means that we believe there are situations where an end-product, single-authority, full-responsibility, white-heat organization with a limited life span can help us be more effective and efficient over a limited time span, than can a structure which is sub-divided by functions and, in which the top authority has multiple responsibilities, in which his subordinates work only part-time on any given end-product and in which must be nurtured and preserved the technical know-how that may be applied to new problems and new situations as they develop over the years. So project management is not an admission of failure, but a heathly adaptability. (2, p. 2)

As John S. Baumgartner (3) says in his book Program Management, "The Project Manager will be limping along with some kind of an understanding and a smile as the main basis for getting functional areas' cooperation". Simon Ramo, Vice Chairman of the Board,

Thompson, Ramo, Wooldridge, Inc., states in his paper "The Program Manager - Substance or Symbol?":

> The rule today is that, whether the Program Managers are nearly perfect or far from it, on the average they have neither a substantial, well delegated, clearly defined responsibility, nor do they have authority commensurate with exercising the responsibility even when they appear to have it. (15, p. 3)

The need for this investigation, therefore, is to determine if the XYZ Company with the program management system has successfully accomplished the requirement of requiring line personel to respond to the authority of two bosses through a clear understanding between Program Management and line organization personnel of their authority/responsibility relationships. This study will reveal if a mutual understanding does or does not exist. It is hoped that the areas of conflict can be generally identified and corrective action taken where the XYZ Company management deems necessary.

Hypothesis

The hypothesis to be tested is: The program manager conceives his authority the same as it is conceived by those personnel with whom he is in continuous contact while performing his assigned functions. The null hypothesis is stated as follows: "The Program Manager's conception of his authority and responsibility is no different than what the line organization personnel

conceive the Program Manager's authority and responsibility to be".

Methodology

In conducting this personnel study three principal methods were utilized.

The XYZ Company Survey. A questionnaire containing 22 questions was developed and either mailed or personally delivered to 93 employees of the XYZ Company. Of these 93 questionnaires, 20 were distributed to program managers and the remaining 73 were distributed among the personnel within four of the XYZ Company line organizations.

The questionnaire (Appendix A) was devised so that the perception by each respondent could be measured and compared by tallying the frequency of the responses. The questions and the number of questions were a function of the writer's judgment as to what best constituted an appropriate range of the program manager's responsibilities. The list of questions does not necessarily include all of the program manager's assigned, implied, or assumed areas of responsibility and/or authority. The questions also are not intended to imply that the program manager should be limited to the activities listed nor is it intended that the program manager must at all times and at all levels be involved in the activities included.

The form of the questionnaire was developed by the writer with the intent of taxing a minimum of the respondent's time, thereby achieving a maximum number of responses. This goal was achieved since 92 of the 93 questionnaires were answered and returned. The non respondent submitted his questionnaire incomplete because of other pressing matters.

The personnel selected to respond to the questionnaire were limited to program managers and line personnel who either are currently or were very recently working directly on Program Management assigned tasks or were primarly engaged in direct support of the program managers by providing services required by the program managers such as budgeting, accounting, and proposal preparation. All selected line personnel were in professional job classification and were continually taking direction from the program managers while performing their every day job assignments. Although there were only approximately 40 program managers in the XYZ Company, in excess of 80 percent of the effort performed by the line personnel was under the cognizance of Program Management.

Personal Interviews. Interviews with both project and key line personnel were conducted to obtain the benefit of their varied experiences in formulating the material for this study. During the period that the survey was conducted, constant association was necessary with the respondents, not only to explain the purpose

and intent of the questionnaire, but also to note any verbal comments associated with the questionnaire.

Related Research. Prior to beginning this study and while preparing this thesis, extensive research was performed on XYZ Company organizational policies, procedures, handbooks, and organizational structures. Published and unpublished material on the subject of management and program management provided valuable information in gaining an insight into the history and current workings of this type of an organization in both commercial and defense industries as well as in governmental agencies. Unpublished speeches and Government publications also proved useful.

CHAPTER II

PROGRAM MANAGEMENT AND XYZ COMPANY BACKGROUND

A Brief History of Program Management

In 1954, General Bernard A. Schriever was assigned the responsibility of developing and producing an Intercontinental Ballistic Missile (ICBM) in the shortest time possible. A select group of highly qualified individuals who were fully aware of the project requirements were assembled to solve this problem in less than one-half of the normal time required to render operational a far less sophisticated system. (3)

To perform the management functions of planning, organizing, staffing, directing, and controlling as described by Koontz and O'Donnell (10) in their book Principles of Management, the program management organization concept was conceived.

What constituted a "project" has been defined by R.L. Martino in his book Project Management and Control as:

> A project is any task that has a definable beginning and a definable end and requires the expenditure of one or more resources in each of the separate but interrelated and interdependent activities which must be completed to achieve the objectives for which the task or project was instituted. In this sense, for example, the creation and development, tooling up, and introduction of a new

> product is a "project" (and each element can be considered a "sub-project"). The regular manufacture and rate of a product after introduction would be considered not a "project" but rather a cyclic process. (11, p. 17)

A more condensed definition given by the Government Prime Contracts and Subcontracts Service, produced by Procurement Associates (12), is "An organization unit dedicated to the attainment of a goal - generally the successful completion of a development project on time, within budget, and in conformance with pre-determined performance specifications."

According to Baumgartner, the criteria established by General Schriever and his staff to ascertain if a project management type of organizational structure was warranted were:

1. Projects requiring significant contributions by two or more functional organizations.
2. Projects of an advanced nature (advanced studies and development) even though only one functional organization is involved.
3. Projects of a systems nature, involving system analysis, development, production, and ancillary items, even though the major end item may be in production quantities. (3, p. 2)

General Schriever was not the first to use this system of management. During World War II the Manhattan Project, established by the Government, also utilized a project concept which is now recognized as the Project or Program Management organizational concept. However, General Schriever was instrumental in introducing it into

the aerospace industry.

The concept of program management organizations is used extensively in the aerospace industry and as stated in Chapter I the trend will continue.

Types of Program Management Organizations

The methods of managing a project through the use of program management organization are various as described in the Contract Management Section of the Government Prime Contracts and Subcontracts Service (12). For ease of discussion in this study, the divisions of a program management system used in the above reference will be followed here. The five basic divisions that were stated are:

1. Functional
2. Project
3. Matrix
4. Combination of Project and Matrix
5. Multiple Project Management

Because the XYZ Company is organized along the matrix lines, only that system will be presented in this paper. Should the reader be interested in a further analysis of the various program management systems, Mr. R.R. Bowman, in 1967, submitted a thesis to Utah State University entitled, "An Analysis of Project Management Concepts in the Missile/Space Industry" (4).

The ICBM program, of which the XYZ Company is the producer of one of the stages of a three stage missile,

meets all of the requirements established for a program management type of organization. To assure that the management success achieved by General Schriever's Atlas program was maintained, the Research and Development contracts released to the successful associate contractors bidding for this ICBM required that a program management organization be utilized (13).

The concept of a storeable ICBM which could lie dormant for several years and then be launched on a moments notice was conceived by the proponents of solid propellant and proven by a feasibility firing of a rocket motor in 1958. The first operational launch of this missile took place in 1961 and this was followed by the delivery of missiles on operational readiness status in 1962.

This significant achievement occurred in the period of about four years; whereas, according to Baumgartner (3), the industry normally would require a dozen years to produce such a complex system. So significant were the advantages of the project concept of organization that Baumgartner went on to state:

> The importance of projects to national defense is reflected in such household names as Mercury, Minuteman, Polaris, and Apollo. (3, p. 7)

Even today the importance of a program management organization is stressed in the aerospace industry. The Department of Defense and the National Aeronautics and

Space Agency allocate from one-third to one-half of all contracts for exploratory development, advanced development, engineering development, or operational systems development. These contracts will usually include requirements similar to the following:

> Management, organization, and past performance show the position of the program manager or group in the overall company organization, and limits of authority and responsibility provided. If no project group is to be formed, the method of operation within the overall company structure should be described. Charts showing the relationship of the project manager in relation to the corporate and divisional management structure should also be provided. Show the direct vertical line authority available to the contractor's Program Director, management personnel assigned and the percent of time that each one will apply to the project, ability to assure integrated effort by various working units, extent top management has pledged support of the program, intra and corporate support available and pledged and how top management control of middle and lower echelon managers will be exercised to insure attention to design, simplicity and cost performance trade-offs. (12, p. 1)

The XYZ Company Organization

The XYZ Company is organized along the conventional functional organizational lines with six directors responsible to the General Manager as shown in Figure 2. The General Manager is in turn responsible to a Group Vice President (Figure 1). Although the Program Management directorship is graphically represented in Figure 2 as a line function, their functional charter states that "Program Management, a staff activity, reports to the

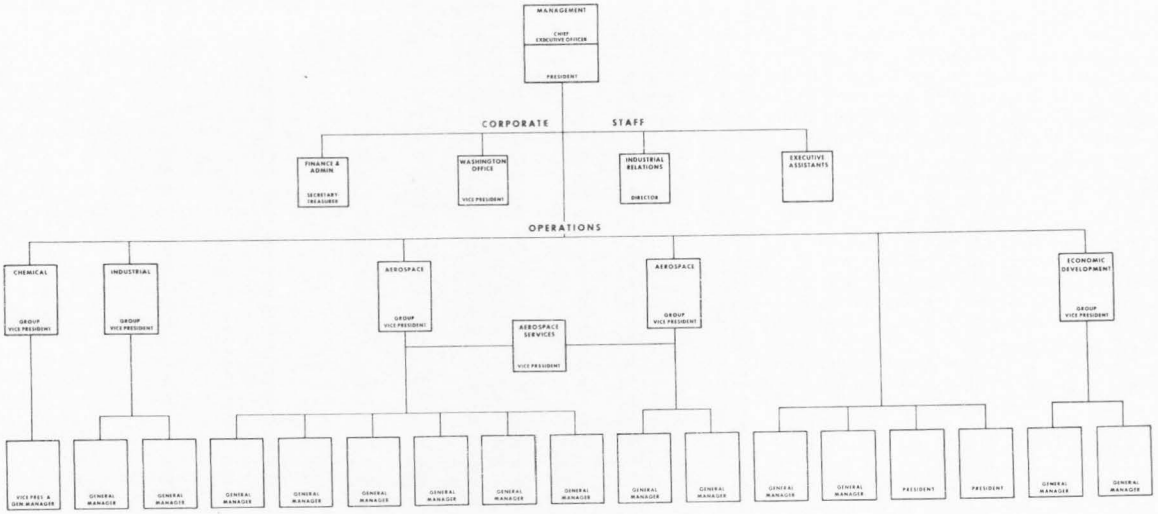

Figure 1. XYZ Corporation Organization

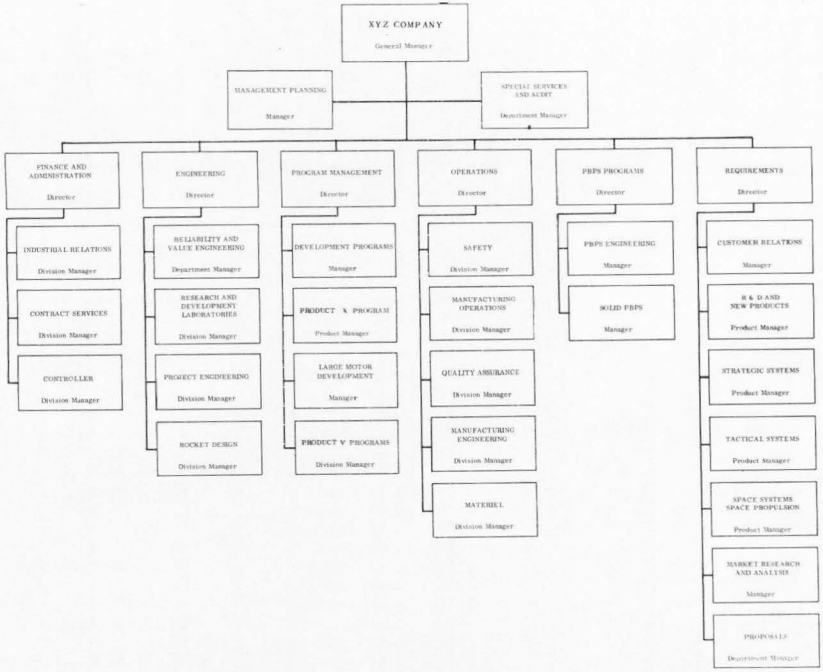

Figure 2. XYZ Company Organization

General Manager" (19). It is in practice a program management organization defined as a matrix system.

The XYZ Company Program Management. The Program Management organization in the XYZ Company is defined by the Government Prime Contracts and Subcontracts Services as a Matrix Project Management. This publication defines the Matrix Project Management in this manner:

> In a matrix type Project Management structure, the Program Manager is responsible for the project but the responsibility for performance of the individual phases of work remain with the functional manager. The Program Manager, in effect, says what to do while the functional manager states how to do it. (12, p. 5)

Baumgartner supports this same definition by graphically illustrating a superimposed horizontal project organization on vertical functional lines (3) as depicted in Figure 3.

Another method of graphically illustrating this same type of organization concept was presented by Bowman (4) as illustrated by Figure 4. The superimposed horizontal project organization on a vertical functional organization is identical in both illustrations.

Functional Description of Program Management at the XYZ Company

In the management volume of a recent major proposal submitted to the Air Force in response to a request to

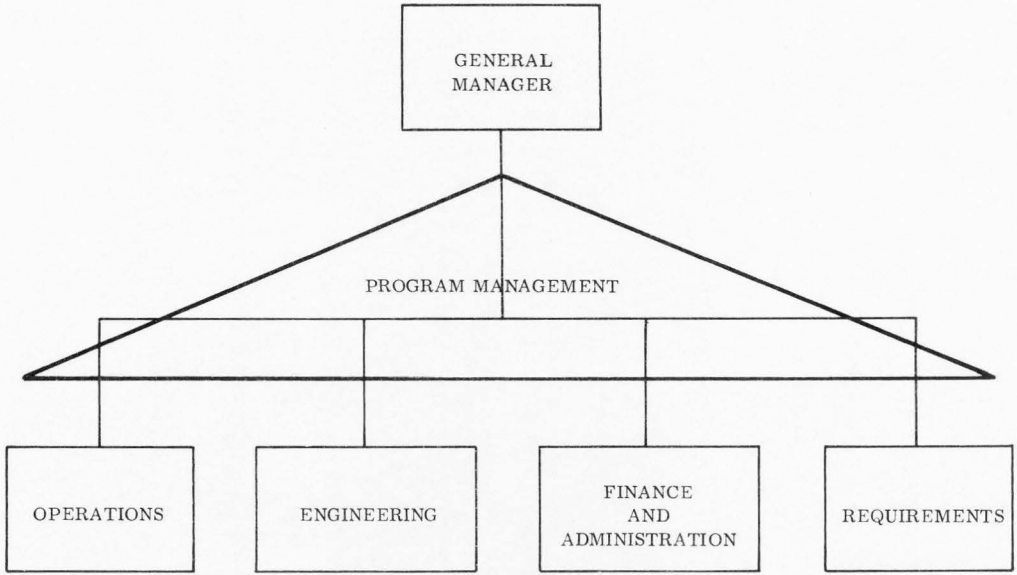

Figure 3. Baumgartner's Matrix Organization

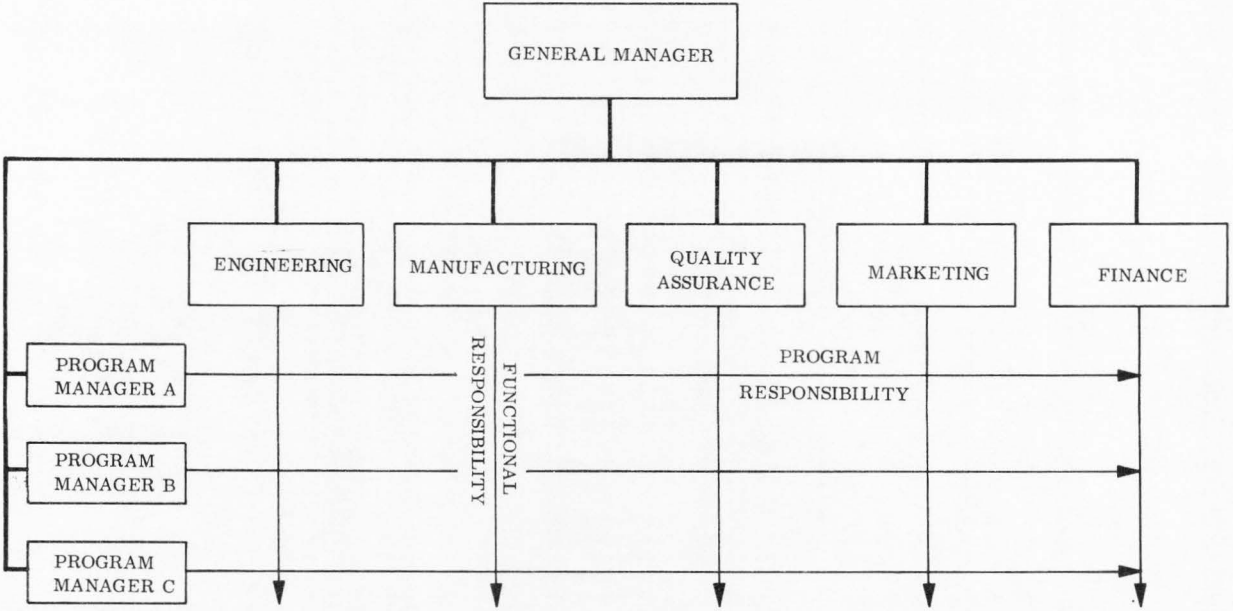

Figure 4. Bowman's Matrix Organization

bid on the Realigned ICBM Rocket Motor, the XYZ Company defined the responsibilities and authorities of the Program Director (Program Management Director) as follows:

> A Realigned ICBM Program Director will be created, with direct authority from the Division General Manager and with no responsibilities other than management of the Realigned ICBM Program. He will have total responsibility at the company for assuring that the ICBM Program meets all performance schedule, reliability, quality and cost requirements of the Air Force. He has the necessary authority to accomplish this responsibility delegated directly from the General Manager.
>
> The Program Director will have a Program Management staff reporting directly to him which will coordinate and direct all activities of the program within the company. Each of the functional elements within the plant organization responsible for actual conduct of the work will have an individual assigned solely to the ICBM Program. These individuals will be responsible to coordinate and control all activity in their respective areas of responsibility, they establish a direct communications link between the functional elements and the Program Director. . . Although the program representative's actions are reviewed by Program Management for consistency with program requirements and policies, they report directly to their functional elements for consistency of operation. (14, pp. 9-11)

This description of the program manager's responsibilities is parallel to the definition of a matrix system as described earlier.

The management volume of the proposal further defines the functions of the company's Program Management organization:

> The Realigned ICBM Program will be managed by the Program Management organization using

> the concepts and practices which have evolved during the eight year history of the ICBM Program at this company. This organization is structured to reflect the system management requirements of AFSCM 375 series documents. (14, p. 21)

AFSCM 375-4 explains that system program management is:

> A formalized structure of management efforts to establish and maintain positive management control of system program progress. The end objective is the timely delivery of systems embodying the required technology for mission performance while obtaining the maximum value for each dollar spent. (21, p. 6)

AFSCM 375-3 further explains the Air Force expectations of a project management organization by stating that:

> Although the degree of responsibility delegated to a project manager varies, the basic concern and activities of a project management operation are similar. In most cases a project manager is held responsible for project accomplishments in accordance with specified objectives.
>
> (1) The major functions within the Project Management office are: plans and programs, engineering, manufacturing, test, reliability, quality assurance, logistics, management of subcontracts, budget and cost control, contracts and customer relations.
>
> (2) A Project Management office is structured along the lines indicated above. A further breakdown of the total systems into subsystems or even components is normal. (20, p. 6)

Management Planning and Control

To achieve the program management responsibility of planning and control of this major project the proposal

goes on to define how the XYZ Company plans and controls their projects:

> The Program Director has the final authority at this company for all program decisions on the ICBM Program. This authority is exercised through a systematic series of management tools called the closed loop integrated management system. The Program Director and his Program Management staff control all work released to the plant. All designs, processing procedures, and manufacturing methods are approved by Program Management as the initial design baseline; the configuration and process changes are controlled by Program Management through the Configuration Control Board. As such, the Program Director has total control and visibility over the program and the operative elements of the plant respond to his direction.
>
> The status of the program is furnished to the Program Director through the control room charting which is continuously monitored and updated. This updating results from weekly formal meetings in which representatives of the various operating elements report on their status versus schedules and from the earned value reporting system.
>
> This basic management approach has been developed during earlier ICBM Research and Development and successfully utilized on other programs. (14, p. 24)

Closed Loop Integrated Management. This company's concept of a closed loop integrated management system under the cognizance of the Program Director is graphically illustrated in Figure 5. This system divides the program management activities into three phases; program planning, program conduct, and program control. The closed loop depicted in this figure shows that no portion of the loop is allowed to become dormant. This figure illustrates the techniques employed to continuously update program planning

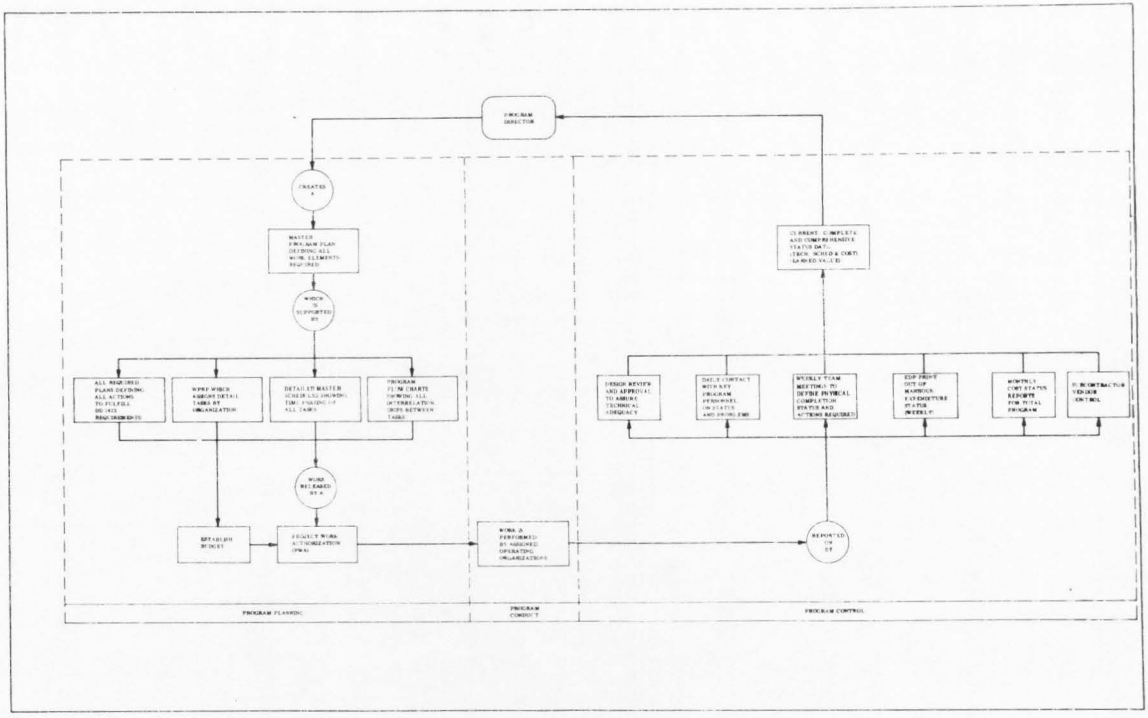

Figure 5. Closed Loop Integrated Management System

data and to maintain an awareness at the program management level of the status of all facets related to program performance.

XYZ Company Directorate Responsibilities

The XYZ Company is composed of six directorates. Each directorate is managed by a director who reports to the General Manager. This study excluded one of the directorates which had recently been created. It was not included because of a unique organizational feature. The Project Engineering and Program Management functions are self contained in this directorate and consequently they are not in direct contact with the Program Management directorate personnel. As a result, their response to the questionnaire would tend to distort the findings of this study.

The staff groups of Management Planning and Special Services and Auditing were also excluded from this study because they do not directly support or take direction from the program manager.

Of the next five directorates discussed, the first four are defined as the line or functional areas.

Finance and Administration Directorate. The Finance and Administration Director (Figure 6) is responsible for accurately reflecting the financial position of the company; ensuring timely payment of liabilities and collection of receivables; controlling commitments and

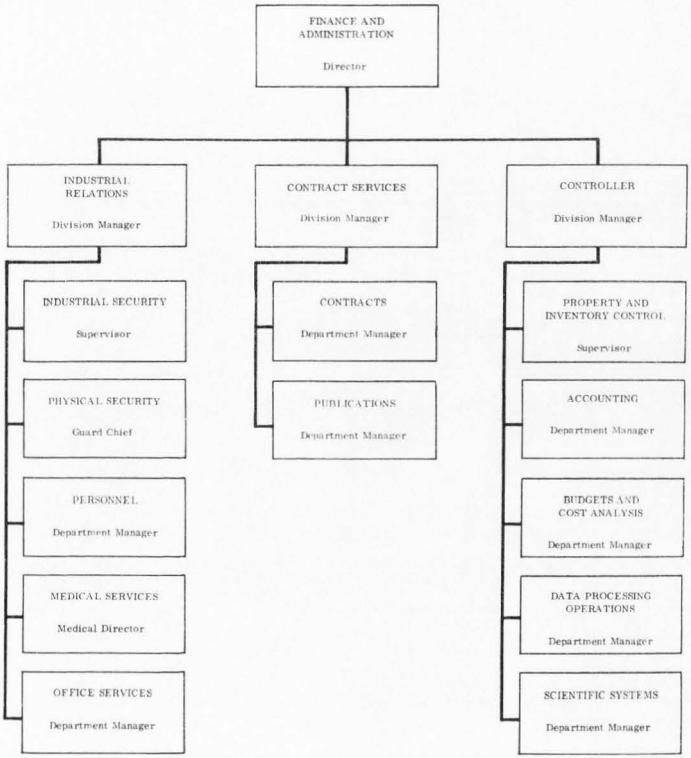

Figure 6. Finance and Administration Organization

expenditures; administrating time-keeping and accounting procedures; interpreting and reporting financial cost data reporting labor, material, and overhead costs; directing budgeting and cost analysis functions and development of funds and sales forecast; providing data processing, analog simulation and digital computer services in support of company's scientific and commercial operations; and controlling reports, management systems and documents development.

Other responsibilities include directing and controlling all Industrial and Community Relations, Security, Administration Services, Organization Planning, Property and Inventory Control, and executing or directing the accomplishment of special assignments for the General Manager.

In addition, he is charged with negotiating, executing and administrating all contracts and changes thereto, determining legality and acceptability of contract terms and conditions; approving proposals and contracts within authorized limits; interpreting and ensuring adherence to contract requirements and controlling customer contracts related to contracts.

Engineering Directorate. The Engineering Director (Figure 7) is charged with directing reliability and value engineering, project engineering, planning and directing engineering, efforts for programs, special projects, project plans and controls.

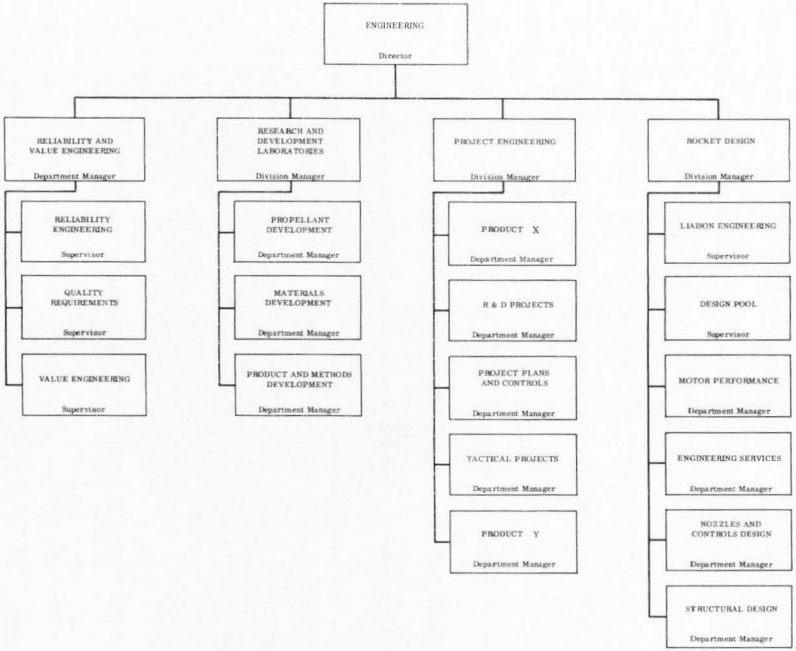

Figure 7. Engineering Organization

The Engineering Director is also charged with directing, monitoring and documenting engineering effort contributing to proposal and development of new and improved solid propellant rocket systems and concepts; conducting analytical performance studies of current systems and motors; directing activities of technical proposal preparation teams and special study groups; and supporting proposal efforts as required.

Additional responsibilities include providing engineering design of rocket motor nozzle and nozzle control systems, attitude control systems, ordnance systems, insulation systems, motor and missile systems integration, structural components, instrumentation, electro-mechanical devices, and ballistics; providing gas dynamic, thermodynamic, structural and system analyses; weight and balance data control, and motor performance evaluation; directing the design and development of aerospace ground equipment, airborne and non-airborne equipment; and providing engineering liaison services.

Operations Directorate. The Operations Director (Figure 8) is held responsible for directing fabrication, preparation, and assembly of motor components, tooling, and handling devices; directing propellant mixing and casting; directing final assembly and completion of rocket motors for customer acceptance in accordance with

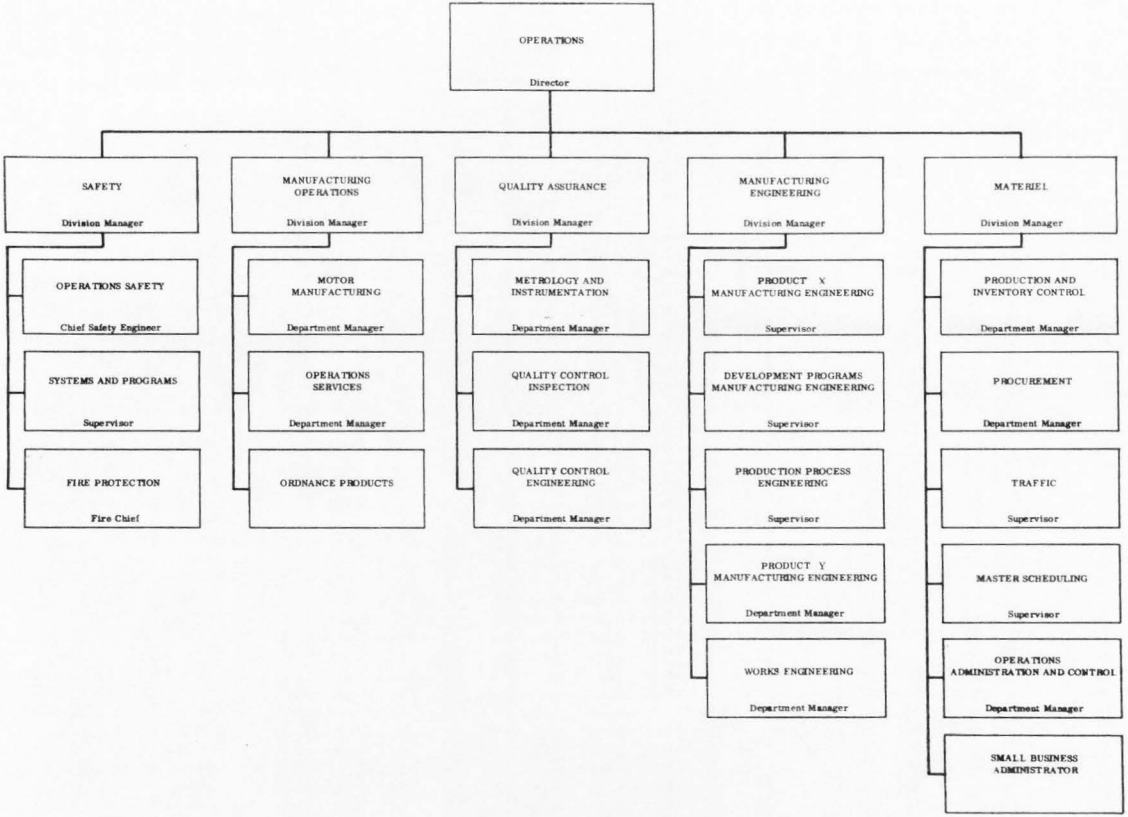

Figure 8. Operations Organization

planning and scheduling requirements and engineering documentation.

His responsibilities also include directing an effective and economical Quality Assurance and Test Program which complies with contractual and program requirements; providing adequate control of all materials and operations that may affect product quality; directing customer and company testing activities which includes developing and applying test procedures and techniques for testing the performance, reliability, and quality of rocket motors, components, and processes; processing documentation of test data; and providing photographic services.

This directorship is further charged with the engineering and design of tooling required for manufacturing and development programs and providing tooling engineering services to other organizations as required; developing process flow and design problems; initiating raw materials standardizations; developing, maintaining and issuing manufacturing technical instructions; designing, constructing, and controlling plant facilities; maintaining plant facilities, equipment, roads, grounds, and utilities; providing for the in-plant movement of materials; provide technical and cost data for operations in support of proposal efforts; directing operations change analysis; operating pilot plants and provides Industrial Engineering and Industrial

Safety services for the company.

Requirements Directorate. The Requirements Director (Figure 9) is responsible for the marketing activities for acquisition of new business, follow-on business involving competitive bidding, market research and planning and new business proposals. In addition, he is responsible for managing tactical Independent Research and Development Programs and organizing and directing the company sales and advertising activities.

Program Management Directorate. The Program Management Director (Figure 10) is charged with exercising overall control and direction of research, development and production programs; including technical approach, hardware requirements, planning, scheduling, and utilization of funds. More detailed descriptions of the Program Management Director's responsibilities were discussed earlier.

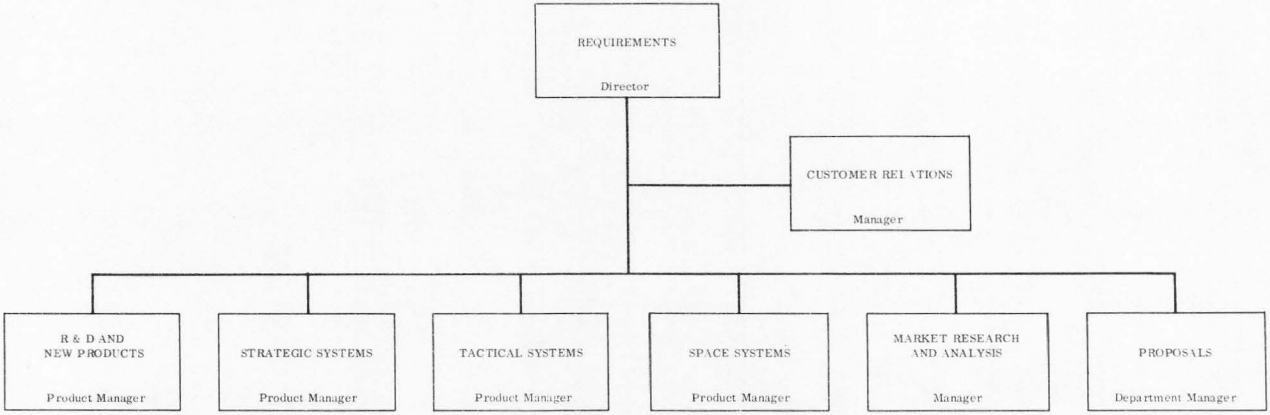

Figure 9. Requirements Organization

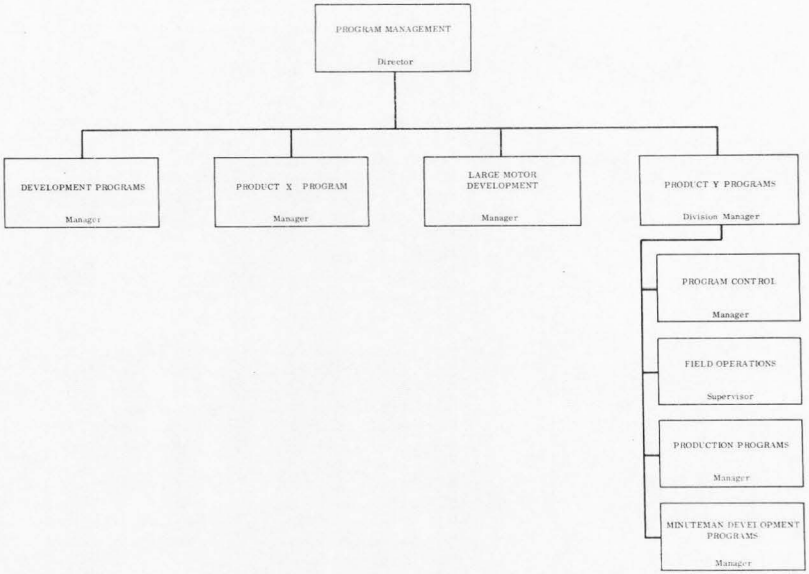

Figure 10. Program Management Organization

CHAPTER III

ANALYSIS OF QUESTIONNAIRE

Analysis Technique

Two arithmetical calculations were performed on the responses to the questionnaire, percentage relationship and a chi square test. The percentage relationship was computed by determining the total number of responses per question of the Always, Frequently, Seldom, and Never categories and calculating what percentage existed in each category. For example, Table 27 in Appendix B indicates that the Requirements personnel responded to question number three as follows:

Always	4
Frequently	5
Seldom	2
Never	1

The percentage calculations resulted in:

Always	4/12 or 33 Percent
Frequently	5/12 or 42 Percent
Seldom	2/12 or 17 Percent
Never	1/12 or 8 Percent

These percentages were calculated for each directorship and for the average of all line organization responses.

All numbers were rounded off, which accounts for the totals being different than 100 percent.

The chi square test was conducted by designating the responses to each question from the line organizations individually and collectively as the observed frequency and by designating the responses from program managers as the theoretical frequency. In those cells where the theoretical frequency was zero and the observed frequency was greater than zero, it was necessary to combine the responses into the adjacent cell. When this occurred the number of degrees of freedom were reduced.

A critical or significance level of five percent was chosen. The five percent level is generally an accepted level of significance among statisticians and the author felt that five percent would suffice in accepting or rejecting the null hypothesis. The null hypothesis being that the program manager's conception of his authority and responsibility is no different than what the line organization personnel perceive it to be. If a relationship is significant at the five percent level it means that the distribution of responses could not occur by chance in a particular distribution more than 5 out of 100 times. At the one percent level it could not happen by chance more than 1 out of 100 times.

From a probability point of view, at a calculated

chi square value of 4.00 with two degrees of freedom, the probability of obtaining purely by chance, a chi square value as great or greater than the tabulated value is 0.135 or 13.5 percent; there is about one chance in seven that a chi square as large as 4.00 could be obtained by chance alone if the a priori hypothesis of even distribution of choice is true. (30)

The chi square test was selected as one method of analyzing the responses. This is acceptable where the researcher is interested in the number of subjects, objectives or responses which fall in various categories. (31)

An example of the chi square test calculation using the data for question number three is as follows:

Program Management Responses (See Appendix B)

Always	11
Frequently	2
Seldom	4
Never	3

Finance and Administration (See Appendix B)

Always	6
Frequently	9
Seldom	2
Never	3

Observed Frequency (O_f)	Theoretical Frequency (T_f)	$O_f - T_f$	$(O_f - T_f)^2$	$\frac{(O_f - T_f)^2}{T_f}$
6	11	5	25	2.273
9	2	7	49	24.500
2	4	2	4	1.000
3	3	0	0	0.000
				$X^2 = 27.773$

The critical value from X^2 tables (35) indicate that for three degrees of freedom the null hypothesis is significant at a X^2 value of 7.82. Because the calculated X^2 value of 27.773 is larger than the tabular value of 7.82, the null hypothesis is rejected at the .05 level. This indicates that there is a difference between the conception the program manager has of himself as compared to how the Finance and Administration personnel perceive him in relation to the question.

As stated earlier, an average value for each frequency of response was calculated for the line organizations. It should be noted, however, that averages can be misleading. For example, an average of 10 percent was calculated for one response to a question, one line organization could have responded "never" 40 percent

of the time and the remaining three organizations could have responded "never" 0 percent of the time. As shown in Table 48, the Finance and Administration personnel were the only line organizations that selected the category of "never". They exhibited a 15 percent response to this question; however, the average was 4 percent even though three line organizations exhibited a zero response to this category. In a sense then, the line organization averages are subject to this shortcoming.

One additional caution to the reader is in order. The results contained in this survey do not represent a census of the organizations involved. Instead all conclusions are based on a sample which is presumed by the writer to be representative of the total population as a result of the selection process described in Chapter I.

Through the tables in this chapter the following definitions apply:

PM - Program Management

F&A - Finance and Administration

Eng. - Engineering

Opr. - Operations

Rqmts. - Requirements

Line Avg. - The average of F&A, Engr., Oper., and Rqmts.

NS - Not Significant (accept the null hypothesis)

.05 - Reject the null hypothesis at the five percent critical level

.01 - Reject the null hypothesis at the one percent critical level

Results of Responses to Each Question

Question Number 1. In your opinion, to what extent can the Program Manager perform the following? Authorize cost overruns in excess of negotiated amounts.

Table 1. Chi-square tests of question one

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	5.342	NS
PM to Engr.	7.82	1.986	NS
PM to Opr.	7.82	2.843	NS
PM to Rqmts.	7.82	8.736	.05
PM to Line Avg.	7.82	1.651	NS

The sample indicated three organizations individually and all organizations collectively conceived the program manager's authority and responsibility the same as the program managers did.

The Requirements personnel were not in agreement at the .05 significant level. No written qualifications

were made to this question by the respondents; however, a few verbal comments were made to the extent that their reply was based on the assumption that the General Manager had previously given the Director of Program Management such authority.

A small number of other respondents stated that they replied as they did because they felt that because a negotiated contract was presumed, and specific effort was required, there was nothing else that could be done by the program manager but to recognize that an overrun of costs was required. Therefore, in order to meet the contract requirements he either had to authorize the overrun himself or seek such authorization.

Question Number 2. In your opinion, to what extent can the Program Manager perform the following? Authorize design changes.

Table 2. Chi-square tests of question two

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	11.225	.05
PM to Engr.	5.99	28.025	.01
PM to Opr.	5.99	45.225	.01
PM to Rqmts.	7.82	13.651	.01
PM to Line Avg.	5.99	23.166	.01

Individually and collectively the sample indicated that all line organizations caused the null hypothesis to be rejected. Although 85 percent did agree that the program manager could authorize design changes to some extent, 100 percent of the program managers said they could authorize these changes.

No written qualification or comments were received; however, some verbal comments were made. Their reply was based on the belief that only the customer can approve changes to customer controlled designs. This reply is interesting because in the XYZ Company the chairman of the Configuration Control Board is a project manager and all customer controlled changes to designs require his approval. This is not true, however, for original design releases, and it is quite probable that the respondents had this in mind when answering the questionnaire.

Question Number 3. In your opinion, to what extent can the Program Manager perform the following? Authorize direct or indirect (overhead) charging.

Table 3. Chi-square tests of question three

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	27.773	.01
PM to Engr.	7.82	19.773	.01
PM to Opr.	7.82	1.833	NS
PM to Rqmts.	7.82	22.772	.01
PM to Line Avg.	7.82	13.438	.01

The sample indicated that only Operations understood the program manager's authority and responsibility the same as the program managers understood it. There was a wide divergence within the replies by all organizations both individually and collectively. Collectively about 82 percent of the line organizations agree that this could be done to some degree; whereas, 85 percent of the program managers agreed that this was within their authority. The dispersion of the responses was wide enough to cause the null hypothesis to be rejected.

The only written qualification was that the program manager could authorize only direct charges, and numerous verbal qualifications were received that the department manager is responsible for indirect (overhead) costs and that the program manager was responsible for direct costs only.

Many program managers responded to this question from the point of view that they had the authority to accept or reject charges against their assigned projects which were clearly direct or indirect charges according to Government regulation and company procedures. That is to say, should an item of cost be billed to their project which is in fact an overhead item, they have the authority to cause it to be properly billed. Were the question reworded to this extent, the replies may well have been different.

Question Number 4. In your opinion, to what extent can the Program Manager perform the following? Respond to technical direction from the customer.

Table 4. Chi-square tests of question four

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	6.667	.05
PM to Engr.	3.84	0.600	NS
PM to Opr.	5.99	2.400	NS
PM to Rqmts.	3.84	5.400	.01
PM to Line Avg.	3.84	2.562	NS

Although the sample indicated that Finance and Administration and Requirements personnel individually did not agree with the program managers, the remaining

organizations as well as all organizations collectively did agree as shown by the chi square tests. The percentage relationship of responses show that 87 percent of the sample of line organizations agreed that this could be done at least "frequently", whereas 13 percent of that sample answered "seldom or less". The Program Management sample indicated they could respond at least "frequently" 100 percent of the time.

Question Number 5. In your opinion, to what extent can the Program Manager perform the following? Bind the company to requirements not "expressly" defined by contract.

Table 5. Chi-square tests of question five

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	15.723	.01
PM to Engr.	7.82	5.073	NS
PM to Opr.	5.99	3.068	NS
PM to Rqmts.	5.99	1.456	NS
PM to Line Avg.	5.99	4.871	NS

According to the samples taken, the Finance and Administration organization which includes the Contract Administration division were not in agreement with the program managers conception of his authority to bind

the company to requirements not specified by contract; however, all line organizations collectively did agree with the program managers on this question.

Question Number 6. In your opinion, to what extent can the Program Manager perform the following? Direct changes to budgets of organizations other than Program Management.

Table 6. Chi-square tests of question six

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	7.270	NS
PM to Engr.	7.82	7.286	NS
PM to Opr.	7.82	6.071	NS
PM to Rqmts.	5.99	17.756	.01
PM to Line Avg.	7.82	5.278	NS

The sample indicated that the line organizations collectively were of the same opinion as that of the program managers. The Requirements Directorate personnel were of the opposite opinion. The divergence was primarily variations between "always", "frequently", and "seldom". Written comments included: "Unless a change in work scope was involved the budget could not be changed".

Question Number 7. In your opinion, to what extent

can the Program Manager perform the following? Determine beginning and completion dates of tasks other than those dictated by contract.

Table 7. Chi-square tests of question seven

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	9.273	.05
PM to Engr.	7.82	17.454	.01
PM to Opr.	5.99	9.818	.01
PM to Rqmts.	7.82	0.554	NS
PM to Line Avg.	5.99	8.253	.05

The sample indicated as a result of the chi square test that the line organizations as a composite were not in agreement with the program managers conception of their authority. The Requirements Directorate was the only line organization that did allow the null hypothesis to be accepted. Only Operations answered the question with a "seldom". No written or verbal comments were received.

Question Number 8. In your opinion, to what extent can the Program Manager perform the following Direct subcontractor performance.

Table 8. Chi-square tests of question eight

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	11.600	.01
PM to Engr.	7.82	1.900	NS
PM to Opr.	7.82	6.933	NS
PM to Rqmts.	7.82	3.354	NS
PM to Line Avg.	7.82	2.536	NS

The chi square test of the sample indicated that all organizations collectively were in agreement on this question. The Finance and Administration personnel conceived the program managers authority differently than the program managers. No verbal comments were received. The only written comment was that the program manager should direct subcontractor performance through the buyer.

Question Number 9. In your opinion, to what extent can the Program Manager perform the following? Direct the utilization of manpower, money, machinery, or materials to meet cost and schedule requirements.

Table 9. Chi-square tests of question nine

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	1.108	NS
PM to Engr.	5.99	0.700	NS
PM to Opr.	5.99	7.223	.05
PM to Rqmts.	7.82	2.135	NS
PM to Line Avg.	5.99	1.530	NS

Collectively all line organizations agree with Program Management; however, Operations personnel exhibited a divergence from the program manager's conception of their authority as indicated by the chi square test. No written or verbal comments were received on this question.

Question Number 10. In your opinion, to what extent can the Program Manager perform the following? Approve or disapprove organizational input for proposals prior to submitting to customer.

Table 10. Chi-square tests of question ten

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	14.590	.01
PM to Engr.	7.82	4.859	NS
PM to Opr.	7.82	8.769	.05
PM to Rqmts.	7.82	17.917	.01
PM to Line Avg.	5.99	12.095	.01

Although three of the four line organizations as well as the company as a composit did not agree with the program managers as indicated by the chi square test, all but four percent of the average agreed that this could be done to some degree. The organization which was in agreement with Program Management conception was Engineering. Written comments were that this was the program manager's responsibility only if the proposal is for changes to the basic contract. No verbal comments were received.

Question Number 11. In your opinion, to what extent can the Program Manager perform the following? Selection of subcontractor.

Table 11. Chi-square tests of question eleven

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	5.943	NS
PM to Engr.	5.99	15.771	.01
PM to Opr.	7.82	21.985	.01
PM to Rqmts.	7.82	12.160	.01
PM to Line Avg.	5.99	9.339	.05

The chi square test of the sample indicated that only one line organization agreed with Program Management. When the question was asked concerning controlling the sub-contractor, the same organization caused the null hypothesis to be rejected. In each case, five percent of the program managers selected "never". Also, in each case the line organization average for this question and question eight was 11 and 12 percent respectively. Therefore, the major divergence was in the extent this could be done by the project managers. The program managers selected "frequently" and "always" the majority of the time, and the line organizations selected "seldom" and "frequently" a majority of the time.

No written or verbal comments were received on this question.

Question Number 12. In your opinion, to what extent can the Program Manager perform the following? Selection of design alternatives.

Table 12. Chi-square tests of question twelve

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	27.321	.01
PM to Engr.	5.99	67.286	.01
PM to Opr.	5.99	15.036	.01
PM to Rqmts.	7.82	19.490	.01
PM to Line Avg.	5.99	31.310	.01

Even though 90 percent of the line organizations agreed that this could be done by the program managers at least "seldom", the chi square test of the sample indicated that there was no agreement on this question and the null hypothesis was rejected in all cases.

No written or verbal comments were received on this question.

Question Number 13. In your opinion, to what extent can the Program Manager perform the following? Determine whether a bid or no-bid will be made.

Table 13. Chi-square tests of question thirteen

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	26.416	.01
PM to Engr.	7.82	5.333	NS
PM to Opr.	7.82	11.416	.01
PM to Rqmts.	7.82	25.441	.01
PM to Line Avg.	7.82	13.076	.01

The composit of all line organizations did not agree with the program manager's conception of his authority concerning this question. The divergence percentage wise was primarily a difference of opinion in the "frequently" and "seldom" categories. The chi square test of the sample indicated that only one line organization, Engineering, allowed the null hypothesis to be accepted.

The written and verbal comments were that the Program Management participated in this decision as a committee member but did not necessarily have the deciding vote.

Question Number 14. In your opinion, to what extent can the Program Manager perform the following? Determine internal organizational procedures for performing contract directed effort.

Table 14. Chi-square tests of question fourteen

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	3.125	NS
PM to Engr.	7.82	13.200	.01
PM to Opr.	7.82	17.625	.01
PM to Rqmts.	7.82	21.123	.01
PM to Line Avg.	7.82	11.129	.05

The chi square test of the sample indicated that only one line organization, Finance and Administration, agreed with the Program Management's conception on this question.

Written and verbal comments indicated that program managers may act in a reviewing and advisory capacity, but do not necessarily "determine" the procedures.

Question Number 15. In your opinion, to what extent can the Program Manager perform the following? Cause changes to be made to the basic contract.

Table 15. Chi-square tests of question fifteen

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	2.492	NS
PM to Engr.	5.99	0.577	NS
PM to Opr.	5.99	1.008	NS
PM to Rqmts.	5.99	2.642	NS
PM to Line Avg.	5.99	1.920	NS

Percentage wise, seven percent of the line organizations indicated "never" but Program Management said that this could be done at least "seldom" 100 percent of the time. The null hypothesis was accepted in all tests because the chi square test of the sample indicated that all organizations individually and collectively agreed with the program managers.

No written or verbal comments were received concerning this question.

Question Number 16. In your opinion, to what extent can the Program Manager perform the following? Authorize initiation of and cessation of work authorization.

Table 16. Chi-square tests of question sixteen

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	38.000	.01
PM to Engr.	7.82	6.222	NS
PM to Opr.	7.82	5.055	NS
PM to Rqmts.	7.82	6.527	NS
PM to Line Avg.	7.82	10.175	.05

The chi square test of the sample indicated that the organizations as a composit were not in agreement with the Program Management conception of their authority. The Finance and Administration Directorate personnel did not agree even though percentage wise they agreed with Program Management that this could be done 95 percent of the time at least "frequently". The line organization as an average replied that this could be done at least "frequently" about 97 percent of the time. The major difference between Finance and Administration and Program Management was within the categories of "always" and "frequently".

Extensive written and verbal comments were received stating that the selected answer presumed prior authorization from Contract Administration.

Question Number 17. In your opinion, to what extent can the Program Manager perform the following?

Engage in marketing function for follow-on products.

Table 17. Chi-square tests of question seventeen

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	14.476	.01
PM to Engr.	7.82	8.404	.05
PM to Opr.	5.99	3.643	NS
PM to Rqmts.	7.82	5.668	NS
PM to Line Avg.	5.99	5.377	NS

The chi square test of the sample indicated that the company as a composit conceived Program Management's authority and responsibility the same as the program managers. The two dissenting organizations were Finance and Administration and Engineering.

No written or verbal comments were received on this question.

Question Number 18. In your opinion, to what extent can the Program Manager perform the following? Determine acceptability of reports and documentation to be delivered to the customer.

Table 18. Chi-square tests of question eighteen

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	15.313	.01
PM to Engr.	7.82	1.250	NS
PM to Opr.	7.82	1.250	NS
PM to Rqmts.	7.82	0.312	NS
PM to Line Avg.	5.99	3.200	NS

The only disagreeing organization was Finance and Administration. Here again the divergence was in the number of responses to "always" and "frequently" with Program Management personnel selecting these two 100 percent of the time and Finance and Administration selecting them 95 percent of the time. However, Program Management indicated that this could be accomplished 80 percent of the time whereas Finance and Administration felt this could always be done 45 percent of the time. The chi square test of the sample indicated that collectively the line personnel agreed with Program Management.

Verbal comments were offered by Finance and Administration personnel who stated that they selected "frequently" as opposed to "always" because they felt that there were several reports of a financial nature only and many project managers below the Directorate and/or

Division level were not cognizant of the report's existance.

Question Number 19. In your opinion, to what extent can the Program Manager perform the following? Reject unauthorized charges to projects.

Table 19. Chi-square tests of question nineteen

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	1.476	NS
PM to Engr.	5.99	0.904	NS
PM to Opr.	5.99	1.571	NS
PM to Rqmts.	7.82	5.134	NS
PM to Line Avg.	5.99	0.170	NS

The chi square test of the sample indicated that all organizations collectively and individually agreed on this question and no written or verbal comments were received.

Question Number 20. In your opinion, to what extent can the Program Manager perform the following? Determine what constitutes an acceptable negotiation with the customer.

Table 20. Chi-square tests of question twenty

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	15.273	.01
PM to Engr.	5.99	6.924	.05
PM to Opr.	5.99	0.500	NS
PM to Rqmts.	7.82	8.667	.05
PM to Line Avg.	5.99	2.031	NS

The chi square test of the sample indicated that three of the four line organizations did not conceive the progam managers authority as the program manager did; however, collectively all line organizations did.

Verbal and written comments from Finance and Administration personnel were that they felt that the program manager, to some degree, certainly had the authority to determine the acceptability from a technical and a dollar aspect. However, they went on to say that the negotiation involves much more than just that. The negotiation from the Contract Administration's point of view involves terms, conditions, Armed Service Procurement Regulations, Air Force Procurement Instructions and other clauses which most program managers, in their opinions, were not concerned with.

Question Number 21. In your opinion, to what extent can the Program Manager perform the following? Determine present and future organizational manpower requirements.

Table 21. Chi-square tests of question twenty-one

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	7.82	3.450	NS
PM to Engr.	7.82	14.500	.01
PM to Opr.	7.82	3.258	NS
PM to Rqmts.	7.82	5.344	NS
PM to Line Avg.	7.82	2.399	NS

There was complete agreement on this question by the line organizations collectively. However, the null hypothesis was rejected when comparing Engineering responses to Program Management responses.

No written comments were received; however, a few verbal comments indicated that the respondents were not sure if the question concerned the manpower requirements for Program Management or for the line organizations. The respondents stated that they answered with the latter in mind which was the writer's intent.

Question Number 22. In your opinion, to what extent can the Program Manager perform the following?

Determine attendees for contractor/customer meetings.

Table 22. Chi-square tests of question twenty-two

Comparison	Critical X^2	Computed X^2	Significant
PM to F&A	5.99	7.500	.05
PM to Engr.	5.99	0.208	NS
PM to Opr.	5.99	0.208	NS
PM to Rqmts.	7.82	0.833	NS
PM to Line Avg.	5.99	0.833	NS

Finance and Administration again exhibited the widest divergence, but again the divergence existed primarily in the frequency of responses to whether this was "always" or "frequently" a program manager's perogative. The chi square test indicated that the remaining organizations as well as all organizations collectively agree with Program Management.

Verbal and written comments stated that program managers should only determine attendance by organization and not by individuals.

Comparison of Results by Organization

All results are summarized in Appendix E.

Finance and Administration--Program Management. The personnel sampled in this organization showed by the chi

square test that the conceptions were in agreement on eight of the questions or approximately 36 percent of the time. This agreement existed on questions 1,6, 9,11,14,15,19, and 21. Finance and Administration exhibited the widest divergence among those sampled and was 23 percent below the average of the line organizations.

Engineering--Program Management. In Engineering, the chi square test of the sample indicated that 59 percent of those sampled conceived the program manager as he conceived himself. This agreement existed on 13 questions, these questions were 1,4,5,6,8,9,10,13,15, 16,18,19, and 22. This organization exhibited agreement at the same percentage, collectively, as the line organizations.

Operations--Program Management. The study indicated by the chi square test that 64 percent of the personnel that were sampled in the Operations Directorate were in agreement with the sample of program managers. The 14 questions where agreement was exhibited were question numbers 1,3,4,5,6,8,15,16,17,18,19,20,21, and 22. Operations was four percent above the average exhibited by the line organizations collectively and exhibited the highest level of agreement with the program managers.

Requirements--Program Management. The sample of the personnel in the Requirements Directorate conceived

the program manager function the same as the program manager conceived himself 50 percent of the time as shown by the chi square test. The two directorship personnel were in agreement on 11 questions. These questions were 5,7,8,9,15,16,17,18,19,21, and 22. This organization was nine percent below the average of the line organizations collectively.

Line Organizations--Program Management. The chi square tests revealed that the total of all line personnel that were included in the sample were in agreement with the sample of program managers 59 percent of the time. This agreement was exhibited on 13 questions; these were 1,4,5,6,8,9,15,17,18,19,20,21, and 22.

As shown in Appendix G, Program Management personnel typically conceived themselves to have more authority and responsibility than did the line organizations. The program managers selected "always" and "frequently" 73.6 percent of the time compared to the line organizations average of 66.2 percent. The program managers selected "never" only 5.1 percent of the time whereas the line organizations selected "never" more than 11 percent of the time.

CHAPTER IV

SUMMARY

Review of Purpose

As stated in Chapter I, the purpose of this paper is to compare the conception that the program manager has of his authority and responsibilities to the conception that the line personnel have of the manager's authority and responsibility. The hypothesis to be tested was: "that the program manager's conception of his authority and responsibility is no different than what the line organization personnel perceived the program managers authority and responsibility to be." A questionnaire consisting of 22 questions was distributed to 20 Program Management, 20 Engineering, 20 Operations, 20 Finance and Administration, and 12 Requirements personnel.

This survey shows that although program managers have no line authority over functional organizational personnel, working relationships were established even though uniform understanding cannot be reached concerning the role of the program manager.

Observation and Opinion

As Richard Goodman said:

> Of the many organizational problems studied in relation to Program Management, the one which appears the stickiest is the question of who should have what authority between the project manager and the various functional managers in the company. (8, p. 395)

The observation appears to be quite applicable to the company organizations which were studied and evaluated in this thesis. Not only is it applicable, but the results of this survey tend to indicate that the question has not been fully and satisfactorily answered in the XYZ Company. To expect finite definition of complete authority lines between project and line personnel may be expecting too much. It is the writer's opinion that if continual progress toward this goal is sought, little more could be asked. A professor of mine once asked his business management students "Should we have 100 percent efficiency?" The consensus was no!, but we should always strive for it.

When 59 percent of the line organization personnel within a company agree with their program managers then one would tend to be optimistic about the future of such a management system.

One Hundred Percent Agreement. Of the 22 questions asked, there was 100 percent agreement on 9 percent or 2 of the questions (see Appendix H). A relative degree of importance was not assigned to the questions contained in the questionnaire but a review of the questions involved indicate that these are of a gross

or general program nature, i.e., they involve activities concerning contract changes and rejecting unauthorized dollars which have been billed or charged to a contract. These areas are within the Program Management Functional Charter of responsibilities which states that the program manager has the responsibility, within the limits of company policies and procedures, of directing the requirements necessary to achieve program objectives by monitoring overall program performance and recommending corrective action. From the survey results it is apparent that no conflict existed concerning these questions between the line organizations responsibilities and that assigned to the project managers. Table 64 in the appendix summarizes where agreement or disagreement existed.

Seventy Five Percent Agreement. There were 9 questions or 41 percent of the total where all line organizations and program managers were in agreement 75 percent of the time (see Appendix H). That is to say, these were the questions where only one organization was not in agreement with Program Management. Of these questions, Requirements Directorate personnel were in disagreement twice, Finance and Administration personnel were in disagreement five times, and Engineering and Operations once.

The Requirements Directorate personnel disagreed

with Program Management on question No. 1 in that they perceived the program manager's authority to authorize cost overruns to be of a lesser degree than did the program managers. The program manager's charter holds them responsible for costs expended on their assigned projects whereas the Requirements personnel are only concerned with the costs associated with their proposals. The widest divergence had to do with whether the program manager could always authorize cost overruns. In no case did the Requirements personnel select "always" whereas the program managers selected "always" 20 percent of the time. There is no obvious reason as to why the distribution of responses from Requirements did not include any responses in the "always" category.

Question No. 5 was disagreed with by Finance and Administration personnel. Because this question concerned binding the company to requirements which were not specifically defined in the contract, Finance and Administration personnel were generally of the opinion this could never be done by the program manager. Their functional charter charges them with the responsibility of administering awarded contracts to ensure compliance with contractual requirements and commitments and to interpret questionable contract language and renegotiate changes to initial agreements. The program managers appeared to apply the assignment of overall program

responsibility as including this area as part of their responsibility to a greater degree than did Finance and Administration personnel.

Question No. 6 was disagreed with by the Requirements personnel. The program managers are charged with participating in establishing project budgets and reviewing and approving final budgets. Whereas the Requirements Directorate is primarily an overhead organization and are not affected by project budgets or changes. This different point of view logically explains the divergence.

On question No. 8, Finance and Administration personnel disagreed with the Program Management personnel as to what degree they could direct subcontractor performance. The Program Management charter includes the responsibility of providing technical direction and coordination of major subcontractors. The reason for these differences in conception are not readily explainable.

The disagreement on question No. 16 by Finance and Administration personnel is probably attributed to a conflict in charter responsibilities. The responsibility of Program Management as stated above could readily be interpreted to conflict with the Finance and Administration responsibility of releasing funds and work authorizations to the extent authorized by contract

and direct contract closure proceedings. Here again the major divergence was only within the categories of "always" and "frequently".

Disagreement on question No. 18 appears to be a matter of interpretation of the responsibility assignments. Finance and Administration is charged with developing and implementing necessary controls for contractual required documents and correspondence with the customer, except those areas of a purely technical nature. Program Management is charged with reviewing and approving or concurring with all contract required reports and all incoming and outgoing correspondence related to managerial and technical aspects of a program.

Question No. 21 was concerned with determining present and future organizational manpower requirements. The Engineering Directorate personnel did not agree with Program Management personnel primarily in the categories of "always" and "frequently". The charters of these two directorships do not expressly define the responsibility of manpower requirements. It appears as though the difference in responses is not necessarily due to a conflict in assigned responsibilities, but merely due to a difference in opinions.

The divergence exhibited by Finance and Administration personnel over question No. 22 can also be attri-

buted to the point of view of the respondent. Customer and contract attendees for meetings of a technical nature are clearly a responsibility by charter of Program Management. By the same token, the attendees for meetings of a contractual nature is a chartered responsibility of Finance and Administration. Clear definitions do not exist as to where the two terms "technical" and "contractual" do or do not coincide.

Less Than Seventy Five Percent Agreement. There were 50 percent or 11 questions where one or more line organizations disagreed with Program Management (see Appendix H). Of these 11 questions, there was disagreement by all organizations on two questions. Both questions (No. 2 and 12) delt with engineering design changes and the selection of engineering design alternatives. Although Program Management is charged with reviewing, approving and monitoring major engineering designs and design changes and directing the chairman of configuration control and process change control activities, all organizations disagreed with the Program Management as to his perceived authority in this area. The Engineering charter directs the responsibility of engineering designs to Engineering within the limits of the company policies and procedures. Even though the responsibilities have been assigned as indicated, the respondents either felt that this was beyond the

capabilities of Program Management or that it was not being performed by them.

There were seven questions on which three organizations disagreed with Program Management. All line organizations but Operations disagreed on question No. 3. The Program Management charter requires that the program manager authorize and control all direct charges against their programs but it does not refer to indirect charges in any manner. The functional charters of the line organizations does not make any direct reference to indirect charge control except for Finance and Administration who may establish such procedures as are required to control and account for indirect charges. No explanation for this disagreement is available except that if the question where divided into two separate questions concerning only "direct" and only "indirect" then perhaps different responses would have been obtained.

The responsibility for responding to technical direction from the customer (question No. 4) is covered in the Program Management charter by the following terminology: "Act as controlling contract point with the customer to review program progress and problems and to obtain customer decisions. Also, establish or approve general content of company position at meetings with or presentations to the customer". The Requirements Directorate and Finance and Administration personnel

disagreed with Program Management on this question. The most logical explanation for the divergence between Requirements and Program Management is that the program managers viewed this with respect to their contracted projects which they were assigned. Whereas the Requirements personnel, who are engaged in marketing and proposal functions, view their customer or potential customer as their responsible area. And, perhaps rightly so because company procedures specify that unless it is a currently contracted effort or follow-on effort, the Requirements Directorate is responsible. Therefore, this divergence can be explained as a matter of a difference in viewpoint as to just who the customer is. The disagreement between Finance and Administration and Program Management is almost exclusively between the categories of "always" and "frequently" There is no apparent conflict in chartered responsibilities.

Question No. 7, as explained earlier, exhibited disagreement primarily in the categories of "always" and "frequently". Program Management selected "always" a majority of the time. Although Program Management is charged with establishing and distributing master plans and delivery schedules, three organizations, Finance and Administration, Engineering, and Operations apparently did not feel that Program Management frequently accomplish these tasks.

Question No. 10 was disagreed to by all organizations except Engineering. The charter of each line organization requires line organizations support for proposal preparation and the Program Management charter requires that program managers: "review and approve all new proposals, supervise the preparation of and approve all change proposals and concur with acceptance of contract changes". Both Requirements and Finance and Administration are required to act as proposal directors or recommend preparation and submisstion of proposals. It appears as though the differences in conceptions are due to conflicts in interpretation of assigned responsibilities.

Question No. 11 was disagreed to by all organizations except Finance and Administration. The Program Management charter requires its managers to provide technical direction and coordination of major subcontractors but it does not specify that program managers select subcontractors. The Operations Directorate is charged with selecting suppliers, which explains the divergence.

Question No. 13 was disagreed to by Finance and Administration, Engineering, and Operations, although the procedure for determining whether a bid or no bid will be made includes Program Management as a committee member. No explanation is readily available as to why

this wide difference in conception exists.

Question No. 14 was disagreed to by all but Finance and Administration. The organizational charters generally specify that Program Management will establish what has to be done, whereas the line organizations are charged with the "how" phase. Program managers do review and comment on procedures, but there was no agreement among the respondents as to the frequency that the internal procedures were determined by Program Management.

The disagreement on question No. 17 by Finance and Administration and Engineering does not appear to be a function of conflicting chartered responsibilities because neither charter specifically covers this area. No explanation is offered for the divergence.

The disagreement on question No. 20 appears to be due to the reference points established by the respondents in all but the Operations organization. The Finance and Administration Directorate is clearly charged with selecting and/or chairing the negotiation team for all contracts and contract changes. Program Management is by charter directed to participate in these negotiations. The program managers are generally concerned and charged with accomplishing the technical requirements of the negotiation within the negotiated amounts. As stated in Chapter III, the interests and responsibilities of the

negotiator extend beyond those limits. It is assumed that the disagreeing organizations considered this to be primarily a Contracts function.

Recommendations

The literature researched, generally, summarized the problems inherent to companies employing the program management system as being the result of a lack of sufficient authority definition. What I recommend is that the XYZ Company undertake a study to determine what the reasons are for the 41 percent divergence of opinion, and then take action to correct the causes.

A company sponsored training program for program managers in personnel relations, communication, and personnel management would enable the program managers to cope with the divergent areas measured in this survey. Through a regulated program, the program manager would be exposed to the methodologies and techniques of dealing with the people upon whom he depends to achieve his assigned responsibilities.

The XYZ Company cannot be expected to provide all the training and assistance the project manager may require; therefore, it is further recommended that the individual project manager take it upon himself to enroll in educational courses which pertain to the management and human relations functions.

Finally, for the XYZ Company, it is recommended that any ambiguous or conflicting organizational responsibility charters be screened and clarified to the maximum extent practical. I am not of the opinion that the program manager's authority should or even could be clearly defined, but where possible, needless conflicting authority/responsibility functions should be concentrated on and removed. It should be recognized that as long as the program management system is used there will be some overlapping of authority/responsibility relationships.

The academic field could be of invaluable assistance through concentrating more on the problems peculiar to aerospace production, research, and development programs. Text books, seminars, courses, and related research are obviously lacking in this area of management.

Conclusions

From the results of the survey, no clear cut patterns emerged. A 59 percent agreement among the line and project personnel is not truly significantly good or bad. Some consistant observations did appear and are summarized as follows:

- A greater percentage of agreement existed between Operations and Program Management personnel than with any other line organization.

- The lowest percentage of agreement existed between Finance and Administration and Program Management, and primarily in questions relating to areas where the two groups interface.
- The program manager typically perceives himself to be in a stronger decision making position than the line organizational personnel do.
- The respondents generally considered that this type of questionnaire was difficult to complete because of two reasons. First to consider all program managers collectively was difficult due to their varying personalities and capabilities. What was a demonstrated capability in one area by a program manager was his shortcoming in another. Second, numerous mental, written, or verbal reservations were required by the respondents to render a fair appraisal.
- The scope of this paper was limited to a conception measurement. Detailed and intensive study, analysis, interviews, and research is required to arrive at satisfactory reasons for why agreement and disagreement existed between Program Management and the line or functional organizations on these and other decision areas.

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APPENDIXES

APPENDIX A

Letter and Questionnaire

APPENDIX A

LETTER

15 January 1968

Dear Mr.

As part of my Master's thesis, I am conducting a survey of the role of the Program Manager. In order to accomplish this survey, I am seeking your assistance by requesting that you complete the attached questionnaire. After completion, please return it to me using the enclosed self addressed envelope.

As a result of this survey, it is hoped that a better understanding of the interrelationships between Program Management and the functional organizations can be achieved.

I would like to point out that the analysis of the completed questionnaire will not involve individuals, but rather will be analyzed from an organizational point of view. Your response is important and would be greatly appreciated.

T.W. Enright

APPENDIX A

QUESTIONNAIRE

In your opinion, to what extent can the Program Manager perform the following?

		Check one block			
		Always	Frequently	Seldom	Never
1.	Authorize cost overruns in excess of negotiated amounts.	☐	☐	☐	☐
2.	Authorize design changes.	☐	☐	☐	☐
3.	Authorize direct or indirect (overhead) charging.	☐	☐	☐	☐
4.	Respond to technical direction from customer.	☐	☐	☐	☐
5.	Bind the company to requirements not "expressly" defined by contract.	☐	☐	☐	☐
6.	Direct changes to budgets of organizations other than Program Management.	☐	☐	☐	☐
7.	Determine beginning and completion dates of tasks other than those dictated by contract.	☐	☐	☐	☐
8.	Direct subcontractor performance.	☐	☐	☐	☐

APPENDIX A

QUESTIONNAIRE (CONT.)

		Check one block			
		Always	Frequently	Seldom	Never
9.	Direct the utilization of manpower, money, machinery, or materials to meet cost and schedule requirements.	☐	☐	☐	☐
10.	Approve or disapprove organizational input for proposals prior to submitting to customer.	☐	☐	☐	☐
11.	Selection of subcontractor.	☐	☐	☐	☐
12.	Selection of design alternatives.	☐	☐	☐	☐
13.	Determine whether a bid or no-bid will be made.	☐	☐	☐	☐
14.	Determine internal organizational procedures for performing contract directed effort.	☐	☐	☐	☐
15.	Cause changes to be made to the basic contract.	☐	☐	☐	☐
16.	Authorize initiation of and cessation of work authorization.	☐	☐	☐	☐
17.	Engage in marketing function for follow-on products.	☐	☐	☐	☐
18.	Determine acceptability of reports and documentation to be delivered to the customer.	☐	☐	☐	☐
19.	Reject unauthorized charges to projects.	☐	☐	☐	☐
20.	Determine what constitutes an acceptable negotiation with the customer.	☐	☐	☐	☐

APPENDIX A

QUESTIONNAIRE (CONT.)

	Check one block			
	Always	Frequently	Seldom	Never
21. Determine present and future organizational manpower requirements.	☐	☐	☐	☐
22. Determine attendees for contractor/customer meetings.	☐	☐	☐	☐

APPENDIX B

Tabulated Responses by Directorate

APPENDIX B

TABLE 23

TABULATED RESPONSES FROM
PROGRAM MANAGEMENT

QUESTION NUMBER	RESPONSE (N=20)																			
1	N	A	F	A	F	S	S	S	S	A	F	S	F	S	N	F	A	N	S	N
2	F	A	A	A	F	S	F	S	A	A	F	A	F	A	F	F	F	F	A	F
3	A	A	A	A	A	F	S	S	A	A	A	N	S	A	N	N	F	A	A	S
4	A	F	A	F	A	F	A	F	A	A	A	A	A	A	F	A	A	A	A	A
5	F	F	S	F	F	F	N	S	S	F	F	N	F	N	S	F	S	F	N	F
6	S	F	F	N	F	S	S	F	S	F	F	S	S	A	F	A	S	A	A	F
7	A	A	A	F	F	F	A	F	F	A	F	F	F	A	A	A	A	A	A	S
8	A	F	F	S	A	F	F	F	F	F	F	N	F	A	F	S	A	A	A	S
9	F	A	F	S	A	F	A	A	S	A	A	A	F	A	A	A	F	A	A	A
10	F	A	A	F	A	S	F	A	A	F	A	A	A	A	F	A	F	A	A	A
11	F	F	F	F	F	F	S	F	F	F	F	S	S	F	F	S	F	F	S	N
12	F	A	A	F	F	F	F	F	A	F	F	S	F	A	F	F	S	F	F	F
13	N	F	F	N	F	F	F	F	S	F	F	F	A	N	S	F	F	S	F	N
14	F	F	A	S	F	F	F	F	S	F	F	N	S	A	A	S	A	A	S	N
15	F	A	F	S	F	F	S	S	F	F	F	F	F	F	F	F	F	A	S	S
16	A	A	A	F	A	A	S	A	A	A	A	A	A	A	A	A	A	A	A	A
17	F	F	F	F	F	F	F	F	A	F	S	F	S	F	F	F	S	A	A	F
18	A	A	A	A	A	F	F	A	A	A	A	F	F	A	A	A	A	A	A	A
19	F	A	A	S	A	F	A	F	A	A	A	F	F	F	A	F	A	A	A	A
20	F	S	A	S	F	F	F	F	S	F	F	S	S	F	A	S	F	A	F	F
21	S	A	F	N	F	S	S	S	S	S	F	N	S	F	A	F	A	A	S	N
22	F	A	A	F	A	F	F	A	F	A	A	F	F	A	A	A	F	A	A	A

Key for Tables 23 through 27

A=Always
F=Frequently
S=Seldom
N=Never

APPENDIX B

TABLE 24

TABULATED RESPONSES FROM
FINANCE AND ADMINISTRATION

QUESTION NUMBER	RESPONSE (N=20)
1	N F S S A N S A N S N F F F N S S N N N
2	F F F F A A N A F F F N S S F S F F F S
3	S F S A A A F A N F F F A A F F F N F N
4	A A F F A A F A F A A F A S F F A F F A
5	F N N S N A N N N F F N S F N N S N S N
6	F A N F N N N F F F F S F A S F S S F F
7	F F F F F A S A F A F F F A S F F F S A
8	F N A S A A S N F F S S N S S F F A S F
9	A A F F A A S A F F N A A A F F F A A A
10	F S S A A A N F F N N F S A F F F S A F
11	F S F S A S N F F F N N S S F S S F F F
12	S F F F A A N F F F S N S S F S F S A S
13	F S S S N N S S S S N S S S F S F N F F
14	S A F S N A F S N S N F S N F F S A F F
15	S A S S F A S F F S S F S F F F F F F S
16	A F A A A A F A F S A F A A F F A A F A
17	F S F S F A S F F F S S N S F S F S F F
18	F A A A F A F F F F S F A A F F A A F A
19	A A F F A A F F F A F F S A A S A A F A
20	S N N S S A N S F N N N F S F S F N F S
21	S F S S N F S S N S N N N N F S S F F F
22	F A A F A A S F F F F F A F F F F F F A

APPENDIX B

TABLE 25

TABULATED RESPONSES FROM ENGINEERING

QUESTION NUMBER	RESPONSE (N=20)																			
1	A	F	F	A	F	S	A	N	A	S	F	N	N	F	N	A	F	S	S	N
2	F	S	F	A	F	F	N	N	S	F	N	S	A	F	F	N	N	A	F	N
3	A	F	F	A	N	F	N	F	F	F	A	N	A	A	N	N	F	S	N	S
4	S	A	A	A	A	A	A	A	N	A	F	S	A	A	A	A	A	S	F	S
5	S	F	S	S	F	N	N	F	F	S	F	S	S	S	N	N	N	N	F	S
6	F	F	S	A	A	F	A	S	F	N	S	N	A	A	F	N	A	F	F	F
7	F	F	F	S	A	S	A	S	S	A	F	F	A	A	A	N	F	F	S	A
8	F	F	S	A	A	A	N	S	F	A	A	F	S	A	F	A	A	F	F	S
9	F	A	A	A	A	F	A	A	A	A	A	A	A	A	N	A	N	A	F	F	S
10	A	F	F	A	A	F	A	F	S	A	A	F	A	A	A	S	F	A	S	F
11	F	S	S	A	N	F	N	S	F	S	A	S	S	F	S	S	S	N	S	S
12	N	S	S	F	A	S	F	S	S	F	S	F	A	F	S	N	N	S	S	S
13	F	F	F	S	S	N	F	S	F	S	A	S	N	F	F	N	A	N	S	F
14	S	S	S	S	N	S	N	F	F	F	F	F	N	N	S	S	F	S	S	N
15	F	F	A	F	A	F	N	F	F	S	F	F	A	F	F	S	N	F	F	S
16	A	A	A	A	A	A	A	A	F	A	A	A	A	A	A	A	A	F	A	F	S
17	F	F	F	F	S	S	F	F	F	F	F	S	S	F	F	S	S	F	F	S
18	A	F	F	A	A	F	A	A	A	A	A	A	A	A	A	F	F	A	F	A
19	A	F	A	A	A	F	A	F	A	A	A	A	A	A	A	A	A	F	S	F
20	F	F	A	A	F	F	A	F	F	F	A	F	A	A	N	N	A	N	F	F
21	F	S	F	F	N	F	N	F	S	F	F	S	A	F	F	N	F	S	S	S
22	F	F	A	A	F	A	A	A	F	A	A	A	A	A	F	A	F	A	A	S

APPENDIX B

TABLE 26

TABULATED RESPONSES FROM OPERATIONS

QUESTION NUMBER	RESPONSE (N=20)																			
1	S	F	N	S	A	F	F	S	S	S	S	S	S	F	F	N	N	N	N	F
2	N	S	F	S	N	S	S	S	F	A	F	S	F	N	A	A	N	S	F	F
3	N	F	A	F	A	A	A	A	A	A	S	A	F	N	N	A	A	A	N	S
4	A	A	F	F	F	F	A	A	A	F	F	S	A	A	A	A	A	A	F	A
5	S	F	N	S	A	A	F	N	N	N	S	F	F	F	S	F	N	S	N	N
6	A	A	F	F	S	A	F	N	F	F	F	A	F	F	F	A	N	A	F	S
7	A	F	F	F	N	F	F	A	S	A	S	A	F	S	A	A	F	A	F	A
8	F	A	N	S	F	N	F	S	F	S	F	F	S	S	F	A	N	F	F	A
9	F	S	F	F	N	N	F	F	A	A	F	A	S	N	A	F	A	A	A	A
10	A	F	A	F	F	F	S	F	A	F	F	A	F	F	A	F	A	F	A	F
11	F	S	N	S	F	N	S	S	S	S	S	F	F	N	F	S	N	S	S	S
12	F	S	F	F	N	N	F	F	F	S	F	F	S	F	F	A	F	S	N	F
13	N	S	N	S	S	F	F	F	S	S	N	N	S	F	S	A	F	F	F	S
14	N	S	N	S	N	N	F	F	S	F	N	S	S	N	F	S	N	A	S	F
15	F	F	F	F	N	F	F	F	F	F	S	N	A	F	F	F	S	F	F	F
16	A	A	A	F	A	A	A	F	A	A	F	A	A	A	A	A	A	A	A	A
17	F	F	N	F	A	F	F	N	F	F	N	F	A	S	F	F	A	S	F	S
18	A	A	A	F	F	F	A	A	A	A	F	A	F	A	A	A	A	F	A	A
19	A	F	A	F	A	S	A	A	A	A	S	F	F	N	A	A	A	A	A	F
20	F	S	N	S	S	F	F	F	A	F	S	F	F	F	F	A	N	F	F	S
21	S	N	S	S	N	S	F	F	S	F	S	S	S	N	A	S	N	A	S	S
22	A	S	A	F	A	A	F	S	F	A	F	F	A	F	A	A	F	A	A	A

APPENDIX B

TABLE 27

TABULATED RESPONSES FROM REQUIREMENTS

QUESTION NUMBER	RESPONSE (N=12)											
1	N	S	F	F	N	N	F	S	S	S	S	S
2	S	F	S	S	A	F	F	S	F	F	F	A
3	F	F	F	A	N	A	A	F	S	F	S	A
4	N	A	F	F	A	A	A	A	S	F	F	A
5	S	S	S	N	A	N	F	F	S	F	N	F
6	F	F	F	A	A	A	A	A	S	A	S	A
7	A	F	F	F	A	A	A	A	F	F	S	A
8	A	F	F	F	N	A	A	F	F	F	F	A
9	A	S	F	F	A	A	A	S	F	F	A	A
10	A	F	F	F	A	F	F	S	F	F	S	F
11	F	F	S	S	A	F	F	S	F	S	F	A
12	S	F	S	F	A	F	F	S	F	S	S	F
13	F	S	S	F	A	F	A	S	S	S	S	F
14	S	N	S	S	N	N	S	F	S	S	F	S
15	F	F	F	F	N	F	F	S	F	S	S	F
16	A	F	A	A	A	A	A	A	A	A	F	A
17	F	F	S	A	A	F	F	A	A	F	S	F
18	A	F	F	A	A	A	A	F	A	A	A	A
19	A	F	F	F	A	A	A	F	F	A	F	F
20	A	S	S	S	A	F	F	S	S	S	S	F
21	A	S	S	F	A	F	F	F	S	F	S	S
22	A	F	F	F	A	A	A	F	A	F	F	A

APPENDIX C

Tabulated Number of Replies to Each Question by Directorate

APPENDIX C

TABLE 28

NUMBER OF REPLIES TO EACH QUESTION
FROM PROGRAM MANAGEMENT

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	4	5	7	4
2	8	10	2	0
3	11	2	4	3
4	15	5	0	0
5	0	11	5	4
6	4	8	7	1
7	11	8	1	0
8	6	10	3	1
9	13	5	2	0
10	13	6	1	0
11	0	14	5	1
12	4	14	2	0
13	1	12	3	4
14	5	8	5	2
15	2	13	5	0
16	18	1	1	0
17	3	14	3	0
18	16	4	0	0
19	12	7	1	0
20	3	11	6	0
21	4	5	8	3
22	12	8	0	0

APPENDIX C

TABLE 29

NUMBER OF REPLIES TO EACH QUESTION FROM FINANCE AND ADMINISTRATION

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	2	4	6	8
2	3	11	4	2
3	6	9	2	3
4	10	9	1	0
5	1	4	4	11
6	2	10	4	4
7	5	12	3	0
8	4	6	7	3
9	11	7	1	1
10	5	8	4	3
11	1	9	7	3
12	3	8	7	2
13	0	5	11	4
14	3	7	6	4
15	2	10	8	0
16	12	7	1	0
17	1	10	8	1
18	9	10	1	0
19	10	8	2	0
20	1	5	7	7
21	0	6	8	6
22	6	13	1	0

APPENDIX C

TABLE 30

NUMBER OF REPLIES TO EACH QUESTION FROM ENGINEERING

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	5	6	4	5
2	3	8	3	6
3	5	7	2	6
4	13	2	4	1
5	0	6	8	6
6	6	8	3	3
7	7	8	5	0
8	8	7	4	1
9	13	4	1	2
10	10	7	3	0
11	2	4	11	3
12	2	5	10	3
13	2	8	6	4
14	0	6	9	5
15	3	12	3	2
16	16	3	1	0
17	0	13	7	0
18	14	6	0	0
19	14	5	1	0
20	7	10	0	3
21	1	10	6	3
22	13	6	1	0

APPENDIX C

TABLE 31

NUMBER OF REPLIES TO EACH QUESTION FROM OPERATIONS

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	1	6	8	5
2	3	6	7	4
3	11	3	2	4
4	12	7	1	0
5	2	6	5	7
6	6	10	2	2
7	8	8	3	1
8	3	9	5	3
9	8	7	2	3
10	7	12	1	0
11	0	5	11	4
12	1	12	4	3
13	1	7	8	4
14	1	5	7	7
15	1	15	2	2
16	17	3	0	0
17	3	11	3	3
18	14	6	0	0
19	12	5	2	1
20	2	11	5	2
21	2	3	11	4
22	11	7	2	0

APPENDIX C

TABLE 32

NUMBER OF REPLIES TO EACH QUESTION
FROM REQUIREMENTS

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	0	3	6	3
2	2	6	4	0
3	4	5	2	1
4	6	4	1	1
5	1	4	4	3
6	7	3	2	0
7	6	5	1	0
8	4	7	0	1
9	6	4	2	0
10	2	8	2	0
11	2	6	4	0
12	1	6	5	0
13	2	4	6	0
14	0	2	7	3
15	0	8	3	1
16	10	2	0	0
17	4	6	2	0
18	9	3	0	0
19	5	7	0	0
20	2	3	7	0
21	2	5	5	0
22	6	6	0	0

APPENDIX D

Tabulated Percent of Replies to Each Question by Directorate

APPENDIX D

TABLE 33

PERCENTAGE OF REPLIES TO EACH QUESTION FROM PROGRAM MANAGEMENT

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	20	25	35	20
2	40	50	10	0
3	55	10	20	15
4	75	25	0	0
5	0	55	25	20
6	20	40	35	5
7	55	40	5	0
8	30	50	15	5
9	65	25	10	0
10	65	30	5	0
11	0	70	25	5
12	20	70	10	0
13	5	60	15	20
14	25	40	25	10
15	10	65	25	0
16	90	5	5	0
17	15	70	15	0
18	80	20	0	0
19	60	35	5	0
20	15	55	30	0
21	20	25	40	15
22	60	40	0	0

APPENDIX D

TABLE 34

PERCENTAGE OF REPLIES TO EACH QUESTION FROM FINANCE AND ADMINISTRATION

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	10	20	30	40
2	15	55	20	10
3	30	45	10	15
4	50	45	5	0
5	5	20	20	55
6	10	50	20	20
7	25	60	15	0
8	20	30	35	15
9	55	35	5	5
10	25	40	20	15
11	5	45	35	15
12	15	40	35	10
13	0	25	55	20
14	15	35	30	20
15	10	50	40	0
16	60	35	5	0
17	5	50	40	5
18	45	50	5	0
19	50	40	10	0
20	5	25	35	35
21	0	30	40	30
22	30	65	5	0

APPENDIX D

TABLE 35

PERCENTAGE OF REPLIES TO EACH QUESTION FROM ENGINEERING

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	25	30	20	25
2	15	40	15	30
3	25	35	10	30
4	65	10	20	5
5	0	30	40	30
6	30	40	15	15
7	35	40	25	0
8	40	35	20	5
9	65	20	5	10
10	50	35	15	0
11	10	20	55	15
12	10	25	50	15
13	10	40	30	20
14	0	30	45	25
15	15	60	15	10
16	80	15	5	0
17	0	65	35	0
18	70	30	0	0
19	70	25	5	0
20	35	50	0	15
21	5	50	30	15
22	65	30	5	0

APPENDIX D

TABLE 36

PERCENTAGE OF REPLIES TO EACH QUESTION FROM OPERATIONS

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	5	30	40	25
2	15	30	35	20
3	55	15	10	20
4	60	35	5	0
5	10	30	25	35
6	30	50	10	10
7	40	40	15	5
8	15	45	25	15
9	40	35	10	15
10	35	60	5	0
11	0	25	55	20
12	5	60	20	15
13	5	35	40	20
14	5	25	35	35
15	5	75	10	10
16	85	15	0	0
17	15	55	15	15
18	70	30	0	0
19	60	25	10	5
20	10	55	25	10
21	10	15	55	20
22	55	35	10	0

APPENDIX D

TABLE 37

PERCENTAGE OF REPLIES TO EACH QUESTION
FROM REQUIREMENTS
(DIFFERENCE IN TOTALS IS DUE TO ROUNDING)

QUESTION NUMBER	ALWAYS	FREQUENTLY	SELDOM	NEVER
1	0	25	50	25
2	17	50	33	0
3	33	42	17	8
4	50	33	8	8
5	8	33	33	25
6	58	25	17	0
7	50	42	8	0
8	33	58	0	8
9	50	33	17	0
10	17	67	17	0
11	17	50	33	0
12	8	50	42	0
13	17	33	50	0
14	0	17	58	25
15	0	67	25	8
16	83	17	0	0
17	33	50	17	0
18	75	25	0	0
19	42	58	0	0
20	17	25	58	0
21	17	42	42	0
22	50	50	0	0

APPENDIX E

Tabulated Summary of Agreement and Disagreement by Directorate and Question

APPENDIX E

TABLE 38

TABULATED SUMMARY OF AGREEMENT AND DISAGREEMENT

PERCEIVED PROGRAM MANAGERS AS THE PROGRAM MANAGERS PERCEIVED THEMSELVES AT A SIGNIFICANT LEVEL OF 0.05

Y=AGREEMENT N=DISAGREEMENT

QUESTION NUMBER	COMPANY AS A TOTAL	FIN. & ADM.	ENGR.	OPER.	RQMTS.
1	Y	Y	Y	Y	N
2	N	N	N	N	N
3	N	N	N	Y	N
4	Y	N	Y	Y	N
5	Y	N	Y	Y	Y
6	Y	Y	Y	Y	N
7	N	N	N	N	Y
8	Y	N	Y	Y	Y
9	Y	Y	Y	N	Y
10	N	N	Y	N	N
11	N	Y	N	N	N
12	N	N	N	N	N
13	N	N	Y	N	N
14	N	Y	N	N	N
15	Y	Y	Y	Y	Y
16	N	N	Y	Y	Y
17	Y	N	N	Y	Y
18	Y	N	Y	Y	Y
19	Y	Y	Y	Y	Y
20	Y	N	N	Y	N
21	Y	Y	N	Y	Y
22	Y	N	Y	Y	Y
TOTAL	N=40.9% Y=59.1%	N=63.6% Y=36.4%	N=40.9% Y=59.1%	N=36.4% Y=63.6%	N=50% Y=50%

APPENDIX F

Tabulated Percentage of Responses by Question by Directorate

APPENDIX F

TABLE 39

PERCENTAGE OF RESPONSES
TO QUESTION ONE

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	20	10	25	5	0	10
FREQUENTLY	25	20	30	30	25	26
SELDOM	35	30	20	40	50	35
NEVER	20	40	25	25	25	29

TABLE 40

PERCENTAGE OF RESPONSES
TO QUESTION TWO

RESPONSE	PROG.	FIN. &	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	40	15	15	15	17	15
FREQUENTLY	50	55	40	30	50	44
SELDOM	10	20	15	35	33	26
NEVER	0	10	30	20	0	15

APPENDIX F

TABLE 41

PERCENTAGE OF RESPONSES
TO QUESTION THREE

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	55	30	25	55	33	36
FREQUENTLY	10	45	35	15	42	34
SELDOM	20	10	10	10	17	12
NEVER	15	15	30	20	8	18

TABLE 42

PERCENTAGE OF RESPONSES
TO QUESTION FOUR

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	75	50	65	60	50	56
FREQUENTLY	25	45	10	35	33	31
SELDOM	0	5	20	5	8	10
NEVER	0	0	5	0	8	3

APPENDIX F

TABLE 43

PERCENTAGE OF RESPONSES
TO QUESTION FIVE

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	0	5	0	10	8	6
FREQUENTLY	55	20	30	30	33	28
SELDOM	25	20	40	25	33	30
NEVER	20	55	30	35	25	36

TABLE 44

PERCENTAGE OF RESPONSES
TO QUESTION SIX

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	20	10	30	30	58	32
FREQUENTLY	40	50	40	50	25	41
SELDOM	35	20	15	10	17	16
NEVER	5	20	15	10	0	11

APPENDIX F

TABLE 45

PERCENTAGE OF RESPONSES
TO QUESTION SEVEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	55	25	35	40	50	38
FREQUENTLY	40	60	40	40	42	45
SELDOM	5	15	25	15	8	16
NEVER	0	0	0	5	0	1

TABLE 46

PERCENTAGE OF RESPONSES
TO QUESTION EIGHT

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	30	20	40	15	33	27
FREQUENTLY	50	30	35	45	58	42
SELDOM	15	35	20	25	0	20
NEVER	5	15	5	15	8	11

APPENDIX F

TABLE 47

PERCENTAGE OF RESPONSES
TO QUESTION NINE

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	65	55	65	40	50	53
FREQUENTLY	25	35	20	35	33	31
SELDOM	10	5	5	10	17	9
NEVER	0	5	10	15	0	8

TABLE 48

PERCENTAGE OF RESPONSES
TO QUESTION TEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	65	25	50	35	17	32
FREQUENTLY	30	40	35	60	67	50
SELDOM	5	20	15	5	17	14
NEVER	0	15	0	0	0	4

APPENDIX F

TABLE 49

PERCENTAGE OF RESPONSES
TO QUESTION ELEVEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	0	5	10	0	17	8
FREQUENTLY	70	45	20	25	50	35
SELDOM	25	35	55	55	33	45
NEVER	5	15	15	20	0	12

TABLE 50

PERCENTAGE OF RESPONSES
TO QUESTION TWELVE

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	20	15	10	5	8	10
FREQUENTLY	70	40	25	60	50	44
SELDOM	10	35	50	20	42	37
NEVER	0	10	15	15	0	10

APPENDIX F

TABLE 51

PERCENTAGE OF RESPONSES
TO QUESTION THIRTEEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	5	0	10	5	17	8
FREQUENTLY	60	25	40	35	33	33
SELDOM	15	55	30	40	50	44
NEVER	20	20	20	20	0	15

TABLE 52

PERCENTAGE OF RESPONSES
TO QUESTION FOURTEEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	25	15	0	5	0	5
FREQUENTLY	40	35	30	25	17	27
SELDOM	25	30	45	35	58	42
NEVER	10	20	25	35	25	26

APPENDIX F

TABLE 53

PERCENTAGE OF RESPONSES
TO QUESTION FIFTEEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	10	10	15	5	0	8
FREQUENTLY	65	50	60	75	67	63
SELDOM	25	40	15	10	25	23
NEVER	0	0	10	10	8	7

TABLE 54

PERCENTAGE OF RESPONSES
TO QUESTION SIXTEEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	90	60	80	85	83	77
FREQUENTLY	5	35	15	15	17	20
SELDOM	5	5	5	0	0	3
NEVER	0	0	0	0	0	0

APPENDIX F

TABLE 55

PERCENTAGE OF RESPONSES
TO QUESTION SEVENTEEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	15	5	0	15	33	13
FREQUENTLY	70	50	65	55	50	55
SELDOM	15	40	35	15	17	27
NEVER	0	5	0	15	0	5

TABLE 56

PERCENTAGE OF RESPONSES
TO QUESTION EIGHTEEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	80	45	70	70	75	65
FREQUENTLY	20	50	30	30	25	34
SELDOM	0	5	0	0	0	1
NEVER	0	0	0	0	0	0

APPENDIX F

TABLE 57

PERCENTAGE OF RESPONSES
TO QUESTION NINETEEN

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	60	50	70	60	42	55
FREQUENTLY	35	40	25	25	58	37
SELDOM	5	10	5	10	0	6
NEVER	0	0	0	5	0	1

TABLE 58

PERCENTAGE OF RESPONSES
TO QUESTION TWENTY

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	15	5	35	10	17	17
FREQUENTLY	55	25	50	55	25	39
SELDOM	30	35	0	25	58	30
NEVER	0	35	15	10	0	15

APPENDIX F

TABLE 59

PERCENTAGE OF RESPONSES
TO QUESTION TWENTY-ONE

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	20	0	5	10	17	8
FREQUENTLY	25	30	50	15	42	34
SELDOM	40	40	30	55	42	42
NEVER	15	30	15	20	0	16

TABLE 60

PERCENTAGE OF RESPONSES
TO QUESTION TWENTY-TWO

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	60	30	65	55	50	50
FREQUENTLY	40	65	30	35	50	45
SELDOM	0	5	5	10	0	5
NEVER	0	0	0	0	0	0

APPENDIX G

Tabulated Total Responses, Percentage, and Chi Square Test

APPENDIX G

TABLE 61

TOTAL NUMBER OF RESPONSES TO THE CATEGORIES ALWAYS, FREQUENTLY, SELDOM OR NEVER BY DIRECTORATE

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	165	97	144	126	81	448
FREQUENTLY	181	178	151	164	107	600
SELDOM	71	103	92	91	63	349
NEVER	23	62	53	59	13	187

TABLE 62

PERCENT OF RESPONSES TO THE CATEGORIES ALWAYS, FREQUENTLY, SELDOM OR NEVER BY DIRECTORATE

RESPONSE	PROG. MGT.	FIN. & ADM.	ENGR.	OPER.	RQMTS.	LINE ORG. AVG.
ALWAYS	32.5	22.0	32.7	28.6	30.7	28.3
FREQUENTLY	41.1	40.5	34.3	37.3	40.5	37.9
SELDOM	16.1	23.4	20.9	20.7	23.9	22.0
NEVER	5.2	14.1	12.0	13.4	4.9	11.8

APPENDIX G

TABLE 63

CHI SQUARE TEST RESULTS BASED ON
DATA OF TABLE 61

COMPARISON	CRITICAL X^2	COMPUTED X^2	SIGNIFICANT
PM TO F&A	7.82	108.62	.01
PM TO ENGR.	7.82	52.98	.01
PM TO OPR.	7.82	72.84	.01
PM TO RQMTS.	7.82	21.82	.01
PM TO LINE AVG.	7.82	24.44	.01

Refer to Chapter III for definition of abbreviations.

APPENDIX H

Tables of Questions Where 100, 75 and Less Than 75 Percent Agreement Existed

APPENDIX H

TABLE 64

QUESTIONS WHEREIN 100 PERCENT AGREEMENT EXISTED

QUESTION NUMBER	DECISION AREA
15	Cause changes to be made to the basic contract.
19	Reject unauthorized charges to projects.

TABLE 65

QUESTIONS WHEREIN 75 PERCENT AGREEMENT EXISTED

QUESTION NUMBER	DECISION AREA
1	Authorize cost overruns in excess of negotiated amounts.
5	Bind the company to requirements not "expressly" defined by contract.
6	Direct changes to budgets of organizations other than Program Management.
8	Direct subcontractor performance.
9	Direct the utilization of manpower, money, machinery, or materials to meet cost and schedule requirements.
16	Authorize initiation of and cessation of work authorization.
18	Determine acceptability of reports and documentation to be delivered to the customer.
21	Determine present and future organizational manpower requirements.
22	Determine attendees for contractor/customer meetings.

APPENDIX H

TABLE 66

QUESTIONS WHEREIN LESS THAN 75 PERCENT AGREEMENT EXISTED

QUESTION NUMBER	DECISION AREA
2	Authorize design changes.
3	Authorize direct or indirect (overhead) charging.
4	Respond to technical direction from the customer.
7	Determine beginning and completion dates of tasks other than those dictated by contract.
10	Approve or disapprove organizational input for proposals prior to submitting to customer.
11	Selection of subcontractor.
12	Selection of design alternatives.
13	Determine whether a bid or no-bid will be made.
14	Determine internal organizational procedures for performing contract directed effort.
17	Engage in marketing function for follow-on products.
20	Determine what constitutes an acceptable negotiation with the customer.

VITA

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1958 to 1962, The Boeing Company, Wichita Division, Wichita, Kansas; Senior Field Service Representative. Organized and directed joint flight test program for B52H aircraft at Edwards AFB. Supervised 15 Technical

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