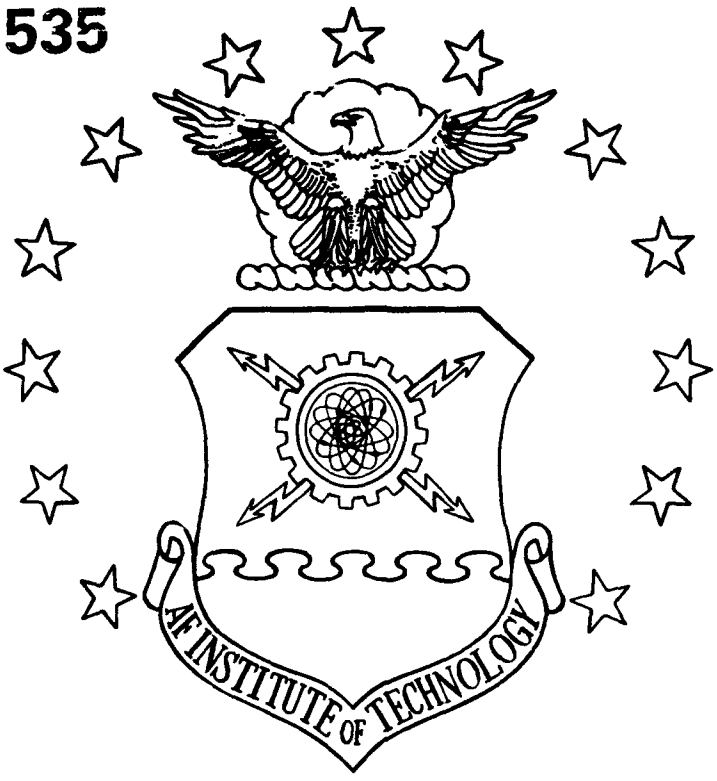
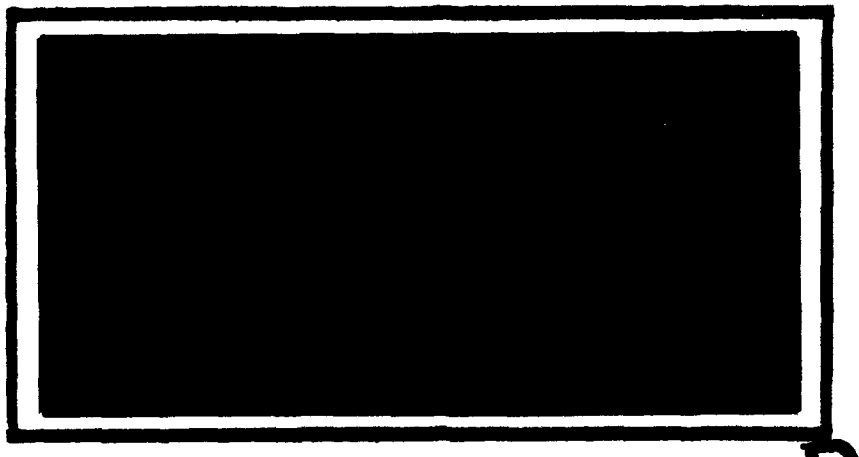
2

AD-A229 535





DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

2

AFIT/GLM/LSP/90S-27

MATRIXED PERSONNEL IN THE SPO

THESIS

Charlotte E. Hunter, Captain, USAF

AFIT/GLM/LSP/90S-27

The opinions and conclusions in this paper are those of the author and are not intended to represent the official position of the DOD, USAF, or any other government agency.

AFIT/GLM/LSP/90S-27

MATRIXED PERSONNEL IN THE SPO

THESIS

Presented to the Faculty of the School of Systems
and Logistics of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

Charlotte E. Hunter, B.A.
Captain, USAF

September 1990

Preface

This document is structured for two categories of readers: a) senior management personnel interested in key issues, findings, and recommendations, and b) acquisition personnel. Senior managers should read Chapter I Introduction, Chapter IV Findings, and Chapter V Recommendations. The rest of the acquisition work force should read all five chapters.

Chapter I identifies the problem. Chapter II reviews available literature on program management and three forms of organizing: functional, program, and matrix. Chapter III describes the research methodology used in this study. Chapter IV summaries the data obtained during the interviews. Chapter V proposes recommendations to improve the system program office personnel structure based on the data obtained during the literature review and interviews.

A number of individuals provided guidance and support to the researcher. These included: my thesis advisor, Mr Dyke McCarty; my thesis sponsor, the C-17 Program Office; Col Seiffert, who "set me straight" on what I was really trying to research; and all the System Program Office Directors and their deputies, who took time out of their very busy schedules to be interviewed.

This thesis is dedicated to my daughter, Charlotte Ann Hunter (29 March 1986 - present), and my great grandmother, Charlotte Markham (1877 - 1964).

Table of Contents

List of Figures

List of Tables

Abstract

The focus of this research effort was to determine, in general, what degree of matrix management should occur in an Air Force Systems Command System Program Office and, specifically, whether or not engineers should be matrixed into the system program office. First, a qualitative, in-depth literature review was done. Next, personal interviews were conducted with Program Directors and Deputy Program Directors at Aeronautical Systems Division and Space Systems Division. Then, after summarizing the results, the data was analyzed and recommendations made.

Recommendations include: building a team of experts at each division to prepare the technical portions of each request for proposal; having a cadre of directly assigned engineers in the system program office; decreasing the total amount of personnel matrixed to the system program office; ensuring newcomers receive entry level acquisition training before they report to the system program office; and, providing incentives for the experienced worker to stay in the Air Force. For both civilian and military workers matrixed into the system program office, the program director should be the evaluator and a controlled tour in the office should be established.

MATRIXED PERSONNEL IN THE SPO

I. Research Problem

Overview

The general issue of the thesis was to determine the degree of matrix management that should exist in an Air Force Systems Command Program Office. Today, nearly all Air Force Systems Command system program offices use some degree of matrixing in their organization. This research paper first documents results obtained from an intensive literature search of existing information available on program management and three organization structures used to develop a program: functional, program, and matrix. Note that the term "structure" is used instead of the term "management" to prevent confusing the reader by using the phrase "program management" to mean both a management technique and an organizational structure.

Next, inputs from extensive, open-ended interviews the researcher had with Program Directors and Deputy Program Directors at Aeronautical Systems Division and Space Systems Division are summarized and analyzed. This is followed by the researcher's conclusions and recommendations, based on the analysis.

Background

Not every major system acquisition should have the same organization structure. Instead the structure of each should be considered based on the program itself and what phase the program is in at the time (Bloomer, undated, entire; (Putnam, 1972:23) Rosenau, 1984:158; Youker, 1977:53). Yet for system program offices within Air Force Systems Command, it depends primarily on what division is responsible for the program.

Every Air Force Systems Command product division uses a matrix structure in the system program offices. It is the quantity and type of personnel matrixed into the system program office that differs at each division. For example, at Space Systems Division and Electronic Systems Division, it is primarily just the procurement and logistics personnel who are matrixed into the program office. Aeronautical Systems Division, which consumed 58 percent of Air Force Systems Command's share of the fiscal year 1990 investment and operating funds, has personnel from the following functional areas matrixed into the system program office: procurement and manufacturing, scientific and engineering, program control, logistics, avionics, communications and computers, safety, and security (ASD, 1988:1; Carr, 1989a; MAG, 1989:sec II-1; Meehan and Millet, 1968:58; Zambenini, 1977:40). In addition to providing the system program offices personnel support from functional offices, all the

Air Force Systems Command product divisions have advisory staffs, such as Judge Advocate, Travel, Environmental Health, Weather, and the Small Business Office that provide assistance to the system program office as needed.

Air Force Systems Command program directors, deputy directors, and many individual workers subject to the matrix environment have, for a number of years, argued against having the matrix structure imposed on the system program office (Carr, 1989a; Carr, 1989b; Hoene, 1989; Patterson, 1978:8,13). However, either their voices or their arguments have not been as strong as the advocates of matrix management. In addition, no written records of complaints about matrix management in Aeronautical Systems Division system program offices could be located and no one could verify that having functional personnel work for the program director while reporting to an individual outside the system program office and following two different sets of requirements is detrimental to the program (Carr, 1989a; Hoene, 1989).

There have been several research efforts previously on matrix management, or matrix structure, and a summary of each is presented below. However, as the descriptions show, none dealt with the subject of whether or not the technical personnel should be matrixed into the system program office and none were from the viewpoint of the program director and his deputy.

Steven L. Pearson's research did not initially focus on the matrix. Instead, he was reviewing different attitudes of the acquisition managers (27XX Air Force Specialty Code) and the engineers (28XX Air Force Specialty Code) at Aeronautical Systems Division and Space Systems Division. He concluded that the engineers at Aeronautical Systems Division were more satisfied than those at Space Systems Division because their tasks focused more on their education - engineering - and less on managing and believed this was due to the matrixing of engineers into the System Program Office at Aeronautical Systems Division (Pearson, 1989:42-46).

The research of Mack J. Thorn focused on determining what factors contributed to "decreased productivity within the matrixed configuration and data management functional office" (Thorn, 1989:5). His study determined that the program directors did not fully utilize their existing configuration and data managers with the existing organization structure. Thorn recommended that the configuration and data managers be collocated in the system program office to "increase their day-to-day contact with, and their availability to, the program and the program manager" (Thorn, 1989:85).

Richard Wojick, Junior, whose thesis won the 1989 Commandant's Award, looked at the power distribution that existed in three system program offices at Aeronautical Systems Division between the program manager and the

functional manager (Wojick, 1989:80). To ensure the results would be from the view point of the functional workers assigned to the program (Wojick, 1989:5), the surveys were only "sent to all matrixed personnel who were not Project or Functional Managers" (Wojick, 1989:80).

John Ewing's research examined the quality of work life, individual efficiency, and organizational adaptability of the procurement officer who worked totally within the Aeronautical Systems Division Deputy for Contracting and Manufacturing (ASD/PM), a functional organization, versus the procurement officers who were matrixed into system program offices. His study determined that "the effects of the matrix organization on its members, in comparison with those of the functional organization, were positive" (Ewing, 1986:sec 5-3).

Connie Peterson generated a survey instrument that would evaluate the "balance of power between project and functional managers in the matrixed organization" (Peterson, 1986:5). However, the organizations involved only helped Peterson develop the questions and no thesis could be located that ever used the survey she developed.

The objectives of the research effort by Bongarts and Taylor was to "trace the evolution of matrix . . . and develop matrix management evaluation criteria" (Bongarts and Taylor, 1981:6). This study did not focus on the system program office environment, but on the 2750th Civil

Engineering Squadron's Operations and Maintenance Branch and the 2046th Communications and Installation Group.

Connors and Maloney, in performing their research, used previous theses to form a model that would explain the relationship between nine variables, including the size of the system program office, the level of bureaucracy, and the role conflict played (Connors and Maloney, 1979:sec 2-8). Their model showed that "role conflict directly influences role stress" (Connors and Maloney, 1979:99).

Eric Nelson's study examined the matrix management policies of twenty large contractors who worked with Air Force Systems Command system program offices. He found that the contractor's equivalent of the Product Division Commander is the one who "determines how much relative power over functional support is to be allocated to the project and functional organizations" (Nelson, 1978:40).

The research of Karl Thurber, Junior focused on implementation of "a full-scale system of matrix management" (Thurber, 1978:iii) at Aeronautical Systems Division in 1976. Thurber determined that the "matrix approach creates many new problems and potentially undesirable side-effects" (Thurber, 1978:iii). However, his final conclusions were that a matrix organization can help the system program office "both meet the objectives and goals for which it was designed and enhance the professional development of its workforce" (Thurber, 1978:93).

This thesis will be done from the viewpoints of the program directors and deputy directors. Based on their extensive acquisition and managerial experience, the researcher considered these individuals to be the "experts" in knowing which specialties should be directly assigned to the system program office and which specialties can be matrixed on a part time or full time basis to the system program office without causing undue problems to the program.

Specific Problem

To what degree should the matrix structure occur in an Air Force Systems Command System Program Office? In the context of this paper, the terms matrix management and matrix structure both refer to when many of the individuals are assigned to a functional, or home office, and are working for a system program office, either full or part time.

At Aeronautical Systems Division, a matrix organization structure has been in existence since 1962 when the engineers were first removed from the system program offices and formed into the System Engineering Group (later renamed the Deputy for Engineering) and then matrixed back into the system program office (Meehan and Millet, 1968:58). In 1976, the procurement and manufacturing personnel, plus the program control personnel, were matrixed into the Aeronautical Systems Division program offices (Zambenini,

1977:40). Today, personnel are matrixed into the system program office from ASD/AC Comptroller, ASD/AL Acquisition Logistics, ASD/AX Avionics Control, ASD/DE Civil Engineering, ASD/EN Engineering, ASD/PM Contracting and Manufacturing, ASD/SC Communications and Computers, ASD/SE Safety, and ASD/SP Security (MAG, 1989:sec 1-2).

When the program director is forced to obtain the key technical personnel from functional organizations on a "loan" basis, he loses control of his personnel resources, but still maintains total responsibility for the program's outcome (AFSC, 1976:sec 2,10-11). As the matrix organization structure existed at Aeronautical Systems Division and Space Systems Division at the time of this research effort, the program director has no supervisory rights over the civil service technical personnel who are matrixed into the system program office except for the senior functional chief from each home office who is collocated in the system program office.

In addition, for both the military and civil service technical personnel who are collocated in his system program office, he has little or no control over the following areas: who will be assigned, when the matrixed personnel will be removed or replaced, what type of training is received (even though the system program office has to fund the training), and where the individual will be assigned within the system program office (Adams and Kirchof,

1984:20; ASD, 1988:entire; Carr, 1989a; Davis and Lawrence, 1978:134; Hoene, 1989).

Justification

Most Air Force Systems Command system program offices use some degree of matrix structure, with highly classified programs the few exceptions (Hoene, 1989). However, Aeronautical Systems Division is the only division that uses matrix to such an extent that even the government engineers are matrixed into the system program offices (Carr, 1989b; Hoene, 1989). At Aeronautical Systems Division, program directors have little choice in the degree of matrix structure that will be used for the multi-million and multi-billion dollar programs they have to manage, and are required to obtain most of their technical and non-technical system program office personnel on a loan basis from functional organizations (ASD, 1988:1; Carr, 1989a; Hoene, 1989). Also, they usually have minimal, if any, choice about the training and experience level of the personnel assigned to the system program office.

Today, because of the high cost, complexity, and long acquisition time for a new weapon system, both during the acquisition phase and operations phase, relatively few program starts occur in Air Force Systems Command each year (Carr, 1989b; Hoene, 1989; Rich, 1987:29). For example, during the 1940's and 1950's the Air Force developed six or more new fighter aircraft per decade and during the 1960's

and 1970's the Air Force developed two new fighter aircraft per decade (Rich, 1987:29). "But chances are good that during the 1980's and 1990's the Air Force will develop but one new fighter aircraft -- the advanced tactical fighter" (Rich, 1987:29).

From the initial studies and analyses during pre-Concept Exploration to deployment of the completed weapon system, a major weapon system is expected to take 10 to 15 years, according to John A. Betti, Undersecretary of Defense for Acquisition (Amouyal, 1990:26). If costs and schedules are to be decreased, it is imperative that Air Force Systems Command's program directors have some "voice" in the degree of matrix structure their system program office will use.

Based on the research and analysis, this paper will recommend the degree of matrix structure an Air Force Systems Command System Program Office should have.

Scope

This paper limited the issue to what degree of matrix structure should exist in an Air Force Systems Command System Program Office. This was done by first defining the differences in the organization structures in chapter II. Then, chapter IV determines whether there have been problems in existing system program offices when matrix structure was mandated to the extent it is at Aeronautical Systems Division.

First, a qualitative, in depth literature review was done. The literature review first determined what is meant by the all inclusive term of program management. Next, three of the organization structures, functional, program, and matrix, used by the program management method to develop a program are discussed. Then, personal interviews were conducted with Program Directors and Deputy Program Directors at Aeronautical Systems Division and Space Systems Division.

Once the literature review and interviews were completed, the results were thoroughly analyzed. The last section provides insight into the degree of matrix structure program directors and deputy directors believe will result in fewer cost, schedule, performance, and supportability problems.

Research Objective

The objective of this research was to establish, in general, what degree of matrix structure should be used in the system program office and, specifically, should engineers be matrixed into the system program office. The objective was accomplished by asking four research questions.

Research Questions

By performing the literature review and conducting the interviews, the researcher answered the following questions.

a. What does the matrix structure mean to a program director?

b. What specific problems does mandating a matrix structure on the system program office generate for the program director?

c. What degree of matrix structure should exist in an Air Force Systems Command system program office?

d. Should engineers be matrixed into the system program office?

Summary

This chapter presented the overall purpose of the research and what the research focused on. The end result of this effort determined to what degree matrix structure should be used in an Air Force Systems Command system program office. Chapter II presents the results of a literature review on program management. Then, Chapter III discusses the method used to conduct the research. Chapter IV summarizes the comments of the interviewees, then analyses the findings obtained from both the literature review and the interviews. Chapter V is the researcher's recommendations, based on the research findings.

II. Literature Review

Overview

This chapter summarizes the qualitative information available on program management and three organization structures: functional, program, and matrix management. First, a discussion about program management, program directors, and system program offices is presented, then each organization structure is viewed, along with the disadvantages and advantages of each.

Program Management

Overview. Program management applies "the systems approach to the management of technologically complex tasks or projects" (Gouse and Stickney, 1988:870). Throughout the discussion of program management in the literature, the terms product, program, and project are considered to be synonymous. All three terms refer to the item under development. This objective, or end product, has severe constraints imposed on the four key parameters of cost, schedule, performance, and supportability (AFSC, 1976:sec 20-1; USD(A), 1987a:5-6; USD(A), 1987b:2-4).

Managing research and development programs is considered difficult due to the constant changes that occur throughout each phase of the program (AU, 1983:sec 8-1). An organization for program management can take many forms.

> At one extreme is the pure project organization, where the project manager is given full authority to run his project as if it were a one-product company; at the other is the pure functional organization departmented on a traditional basis, reflecting the traditional hierarchy. In the middle lie an infinite variety of project-functional combinations -- the matrix organization. Each of these forms has certain advantages and disadvantages; no one form is best for all projects, or even best for one throughout its entire lifetime. The essence of project organization is versatility -- the project can be built around the task; as the task changes, so must the scope of the organization. (Cleland and King, 1983:274)

History of Department of Defense Program Management.

Today, the Department of Defense acquires weapon systems costing billions of dollars (Putnam, 1972:2). This is a vast increase from the initial purchase by the Continental Congress of a few hundred rifles for the Revolutionary Army (AU, 1983:sec 9-13). Over 60 years ago, civilian engineers first started assisting military personnel with designing and developing an engine or aircraft (Putnam, 1972:2), but it was not until the 1950's that program management evolved (Acker, 1980:9; Von Braun and Ordway, 1969:132-136; Easton and Day, 1982:15; Fox, 1988:151). In 1954, the Air Force began using the weapon system concept of military procurement and by 1959 it was the dominant method used by all the military services for development of advanced weapon systems (Baar, 1959:15).

General Bernard A. Schriever, USAF (Retired), a pioneer of military program management (DSMC, 1987:29), formed the first weapon system program office in 1954 to develop the

Atlas, Thor, and Titan ballistic weapon systems (Easton and Day, 1982:15; Schriever, 1958:53). As with the Manhattan project, it was found that having everyone work directly for a single individual decreased the time requirements to build a successful system (Von Braun and Ordway, 1969:132-136; Easton and Day, 1982:15). The weapon system concept of military procurement was "designed to combat one of the greatest evils of military procurement: failure to have all the pieces ready to put together at the right time" (Baar, 1959:15).

Today, even though every program is unique, with its own peculiarities and potential problem areas (AU, 1983:sec 9-2), each military weapon system program follows basic acquisition management principles and objectives (USD(A), 1987a:entire; USD(A), 1987b:entire; DSMC, 1986:sec 2-1). Headquarters Air Force and Headquarters Air Force Systems Command have, in turn, written a series of regulations and pamphlets that provide further guidance for the Air Force program manager (AFR 800 series, AFSC 800 series).

Program Director. The individual responsible for managing a program is known by various names, with System Program Director, Program Director, Program Manager, Project Manager, and Product Manager the ones primarily used. No matter what title is used, it refers to the one individual who has been assigned the overall responsibility for all the activities necessary to ensure the program is successful

(AFSC, 1976:sec 20-1, 20-10 to 11; AU, 1983:sec 9,12; Cleland, 1969:289; Foley, 1985:12; Fox, 1988:151,157; USC, 1990:120).

The program director "must be at home in the front office talking about budgets, time schedules, policies, and at home in the laboratory talking about technical research and development problems" (Wittner, 1962:41). He delegates specific tasks, but still maintains overall responsibility for the program (DAF, 1985:5-6; Foley, 1985:12) and successfully completing "a research and development product on time, within budget, and in conformance with predetermined performance specifications" (Gaddis, 1959: 89; Wittner, 1962:39).

Thus, the program director "plays a critical, instrumental 'catalyst' role in a project" (Doughty and Klien, 1987:18). And, he will have plenty of help from "advisers, delayers, debaters, inspectors, and coordinators" (Cleland, 1969:289) due to "the political system, the Pentagon's enormous bureaucracy, and [the] project" (McNaugher, 1989:133). Appendix A is a copy of the Program Manager's Oath, published in 1975, that is still applicable today.

System Program Office Personnel. The system program office combines individuals with a variety of backgrounds and experience levels who must coordinate various activities with the contractor(s), the participating(s) commands, and

numerous other agencies and outside influences (AU, 1983:sec 9-12; Doughty and Klien, 1987:18; Fox, 1988:157; McCarty, 1987:50; OP, 1976:11; Staples, 1985:71). It is the program director who is responsible for the actions of the system program office personnel (Moder, 1988:324; OCNR, 1987:sec 1-8). Personnel assigned to what is referred to as either a Program Office, Project Office, or System Program Office, serve "as the Air Force focal point for all matters pertaining to the acquisition of [the] weapon system" (Putnam, 1972:5).

If all do not work together as a team to design, develop, and produce the weapon system, the end result will be one or more of the following: the weapons system will fail to satisfy the stated need, will not meet the performance requirements, will cost far more than predicted, will not be delivered on schedule, and/or will not have an affordable life-cycle cost (AU, 1983:sec 9-15; Meehan and Millet, 1968:126).

A generic example of an Air Force system program office (SPO) organization is depicted in Figure 1 (AFSC, 1976:sec 20-5 to 9; Foley, 1985:11). Note that the typical system program office is arranged by functional lines. This occurs whether or not the system program office is self contained, whereby the personnel are reporting directly to the program director or if it is using a matrix organization structure,

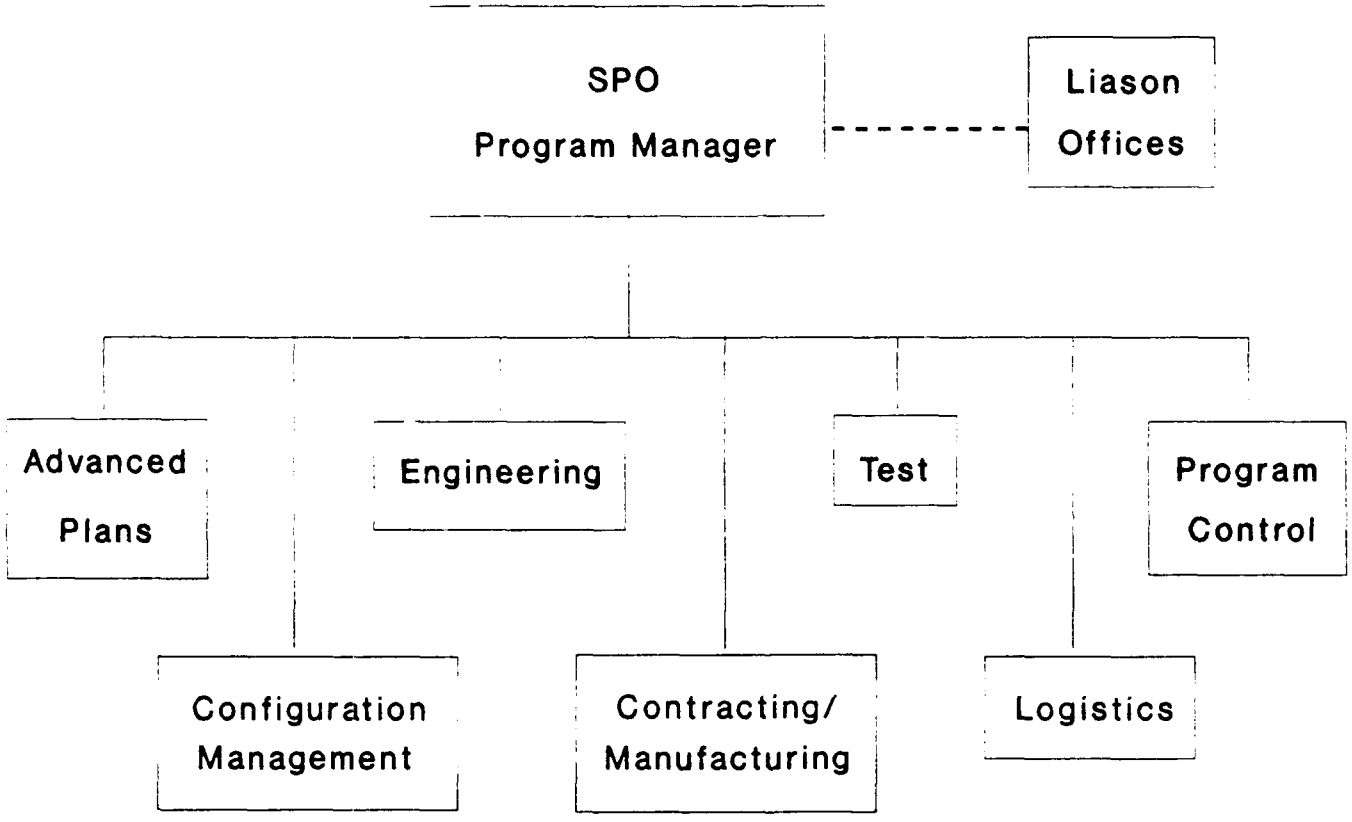


Figure 1. Simplified Program Organization Chart

with some or most of the personnel reporting to a functional manager outside the program office.

System program office personnel perform a multitude of tasks and activities needed to ensure the end result is an effective and supportable weapon system for the military force structure, that it is delivered on time, and it is within the resource constraints (Putnam, 1972:23). They are the ones who prepare the varied and numerous program-specific plans; coordinate activities both with other system program office personnel, the various contractors, and a multitude of military and civilian organizations or agencies; evaluate the contractors progress during each phase of the acquisition process; attempt to foresee potential problems and correct them before they occur; plus monitor existing problems and try to resolve them before they become insurmountable (DAF, 1985:5-7; AFSC, 1976:sec 20-10 to 11; Putnam, 1972:5).

If the program is to be successful, the program director must have "talented, experienced, and motivated personnel" (McNeil and Hartley, 1986:43). The staff in a system program office consists of individuals with a variety of skills and levels of experience (Signore, 1985:57). These individuals are functional specialists from areas such as engineering, logistics, testing, finance, procurement, and production (AU, 1983:sec 9-13). They may be either "permanently" assigned to a system program office, or

collocated in the system program office under a matrix structure (AFSC, 1976:Sec 20; AU, 1983:Sec 9-11; DAF, 1985:2). Some personnel may work for the system program office on a part time basis and not be collocated (ASD, 1988:2-3; DAF, 1985:2).

Research has shown that the success or failure of a program depends on having the best qualified personnel assigned to the system program office (Cleland, 1988:38; DoD, 1985:Sec 10-5; Wilemon and Baker, 1988:860). "An ideal project team is well-balanced and deep with experience and motivation" (Signore, 1985:57). Also, a program would be better off if "the same management team would stay with a program from the definition phase through production" (DSMC, 1989:sec 3-9). However, since most major Air Force programs last 10 to 15 years according to John A. Betti, the Undersecretary of Defense for Acquisition (Amouyal, 1990:26), this rarely occurs, except for a few instances when a civil servant or consultant will remain with one program. What actually happens is a multitude of personnel with a variety of experience levels will flow through a system program office over its lifetime (DSMC, 1989:sec 3-9).

Organizational Structure. In a system program office, either all, the vast majority, or none of the personnel assigned to a system program office will report directly to the program director. When all, or nearly all, of the

personnel report directly to the program director, this paper refers to it as having a program structure. When most report to someone back in a functional, or home, office, this paper refers to it as having a matrix structure. With both reporting methods, functional structure is used to some degree in the system program office. As depicted in Figure 1, a typical system program office has various directorates organized by function. This method of organizing will occur whether or not all the personnel are assigned directly to the program director. The rest of this chapter is a review of what occurs with functional, program, and matrix organizational structures.

Functional Structure

Overview. Functional structure refers to grouping employees together based on their having similar education, experience, and tasks (Daft and Steers, 1986:366; Hellriegel and others, 1983:324; Patterson, 1978:8-9). A functional organization structure centralizes decision making and combines similar resources (AFSC, 1976:sec 20-1; Youker, 1977:46). It should be used in a stable, certain environment with routine technology (Davis and Lawrence, 1978:367; Duncan, 1979:64-65; Hellriegel and others, 1983:329). Tables 1 and 2 list the most commonly cited advantages and disadvantages of the functional structure.

Table 1. Functional Structure

Advantages

Resources used efficiently

Skills developed in depth

Functional expertise determines career progress

Decisions and direction centralized

Responsibilities clearly identified

Less duplication of scarce skills and resources

Facilitates communication amongst specialists

People switched readily between projects

Technical continuity encouraged

Reservoir of skilled specialists

Less chance of "reinventing the wheel"

Manpower level relatively stable

Performance relatively insensitive to structure

(Daft and Steers, 1986:368; Duncan, 1979:64-66; Hellriegel and others, 1983:327; Klimstra and Potts, 1988:26; Patterson, 1978:8-9; Sayles and Chandler, 1971:185; Wright, 1979:60-61; Youker, 1977:46)

Table 2. Functional Structure

Disadvantages

Poor coordination across functions

Decisions centralized

Slow response, little innovation

Lack of initiative

Responsibility for performance difficult to pinpoint

Limited general management training

View of task limited

Routine tasks emphasized

Parochial perspectives fostered

Interdepartmental dependencies increased

Responsibility and accountability lines obscured

Priority conflicts when resources limited

Part-time attention to any one project

No single focal point

Poor task visibility

Diffused responsibility for a given job

Emphasis on technical specialty, not project goals

Lack of motivation and inertia

(Daft and Steers, 1986:368; Duncan, 1979:64-66; Hellriegel and others, 1983:327; Klimstra and Potts, 1988:26; Patterson, 1978:9; Sayles and Chandler, 1971:185; Wright, 1979:60-61; Youker, 1977:46-47)

Program Structure

Overview. Program structure should be used in an unstable, uncertain environment where there are technological inter-dependencies between functions (Daft and Steers, 1986:373). To prevent confusing the reader over the difference between the term program management, as both a way of managing a weapon system and an organization structure, the term project structure in this paper refers to having one individual manage all, or nearly all, aspects of a program, including all the required resources. For example, at Space Systems Division, in Los Angeles, California, it is primarily the procurement and logistics officers who report to someone outside the system program office, while everyone else reports to the program director.

The opposite reporting method exists at Aeronautical Systems Division, in Dayton, Ohio. There, the procurement and manufacturing, scientific and engineering, program control, avionics, logistics, communications and computers, safety, security, and some clerical are assigned from functional offices outside the system program office (ASD, 1988:entire; MAG, 1989:sec 1-2).

Since the early 1950's, aerospace companies, government agencies, hospitals, and a wide variety of service organizations have adopted the program structure form of organizing programs (Kolodny, 1981:17; Thurber, 1978:17). Today, the program structure "has achieved almost universal

recognition as the most effective way to ensure the success of large, complex, multi-disciplinary tasks" (Butler, 1973:85; Stuckenbruck, 1988:56). A few of the many organizations that changed to program structure include: NASA, Ramo-Wooldridge (now TRW), Citibank, Phillips, Ford Aerospace Corporation, Lockheed Aircraft Corporation, Avco Corporation, General Dynamics Corporation, The Boeing Company, and Douglas Aircraft Company (Easton and Day, 1982:15; Hellriegel and others, 1983:334; Hampton, 1969:73-74; Kolodny, 1981:17).

Advantages of Program Structure. The overwhelming advantage to having everyone report to the program director is that then there is only one individual responsible for planning, allocating resources, directing, controlling, and coordinating the multitude of program-related tasks and activities (Kuzman, 1989:12; Sayles and Chandler, 1971:184-185; Stuckenbruck, 1988:56; Youker, 1977:47). A system program office can then be "more responsive to schedule and budget demands, and it can react to unexpected demands without adversely affecting other parts of the organization" (Thurber, 1978:17) and without the conflicts and communication problems inherent with the matrix-oriented system program office. Table 3 illustrates the advantages most commonly cited about program structure as an organization form.

Table 3. Program Structure

Advantages

Rapid change capable in an unstable environment

Goal oriented

Rapid coordination between functional areas

Total responsibility for program

General managers developed

All workers accountable for outcome

Diversification and expansion of skills and training allowed

Emphasis focused on program

Accountability and traceability ensured

Delegation of authority and responsibility promoted

Allows cohesion and involvement between functional areas

Output oriented

Short communications lines

Highly motivated workers identify with single program

Unity of command

Simple to measure program-related expenditures

Single program focal point for government and contractor
Program cohesive unit from "cradle-to-grave"

Sustained, intensive, and integrated management of program

(Butler, 1973:85; Daft and Steers, 1986:375; Duncan, 1979:429; Hellriegel and others, 1983:330; Klimstra and Potts, 1988:30; Patterson, 1978:9-11; Sayles and Chandler, 1971:184-185)

Disadvantages of Program Structure. Having a single-point of authority and responsibility is a disadvantage of the program structure, since "The pressures for the completion of an often almost impossible task must of necessity be focused on how effectively the project manager carries out his job" (Stuckenbruck, 1988:56). Another problem is the "inadequate emphasis within the project office on the career development of the functional specialists" (Thurber, 1978:17). Table 4 illustrates the disadvantages most commonly cited about program structure.

Table 4. Program Structure

Disadvantages

Less technical specialization and expertise

Coordination between programs weak

Less top management control

Skills and resources not always used efficiently

Career progression of specialists limited

Specialist has limited exposure to others with same specialty

Workers have multiple role demands

Promotes program objectives versus organizational objectives

Duplicates people, skills, and equipment

Technology depth decreased

Policies and procedures inconsistent across programs

"We" versus "they" mentality

Destructive competition for resources

Uncertain future of workers after program completion

Personnel experience limited to single, or few, programs

Experienced personnel retained by mature program

Little interchange between programs creates tendency to "reinvent the wheel"

Fluctuating manpower levels and mix of skills

Difficulty in moving personnel as needed

Limits training

(Daft and Steers, 1986:375; Duncan, 1979:429; Hellriegel and others, 1983:330; Klimstra and Potts, 1988:30; Patterson, 1978:9-11; Sayles and Chandler, 1971:184-185; Zambenini, 1977:40)

Matrix Structure

Overview. The matrix structure combines the advantages and disadvantages of the functional structure and the program structure (Cleland and King, 1983:274; Daft and Steers, 1986:380; DSMC, undated(b):3; Galbraith, 1971:37; Patterson, 1978:11-13). Matrix organizations exist because limited resources can be shared and information can be readily exchanged and coordinated between functions (Davis and Lawrence, 1978:134; Hellriegel, 1983:333; Morris, 1988:30).

Matrix management in the aerospace industry evolved because military program directors wanted a single point of contact with each contractor, but the contractors did not want to form a permanent team for a project that would only last a few years (Wright, 1979:61).

With matrix management, individuals at the worker level report to both the program director and to the functional managers in a home office (ASD, 1988:2-4; Davis and Lawrence, 1978:134; Hellriegel and others, 1983:333; Morris, 1988:30). The program director is responsible for the project cost and schedule, while the functional manager back at the home office controls the people and provides for their training and career development (Adams and Kirchof, 1984:20; ASD, 1988:entire). This "open violation of the principle of unity of command is the trademark of a matrix management" (Larson and Gobeli, 1987:127) and contradicts a

key management principle stated by Henri Fayol, the father of modern management theory, in 1916. "For any action whatsoever, an employee should receive orders from one superior only" (Lasden, 1985:84).

When the program director uses the matrix structure, he has:

> no de jure authority to resolve interfunctional disagreements by issuing orders to functional groups outside his office . . . [but] may in practice have considerable de facto authority, depending upon his personal effectiveness in reconciling diverse viewpoints, his personal rapport with command level officers, and his military rank relative to the ranks of functional counterparts. (Peck and Scherer, 1962:82)

History. When the owner of the shop or factory was also the manager, he did not have to "share resources with any other manager, negotiate for priorities and budgets, or 'motivate' instead of simply 'commanding' others to act" (Souder, 1979:49). Matrix structure form of organizing to develop and produce products or programs developed because resources are limited (Westover, 1988:20). Today, "People-sharing and non-dedicated manpower are nearly a fact-of-life to a PM [program manager] of a small program" (Huffman, 1981:38). In the Air Force, this is also true for most large programs. So, in any Air Force system program office that uses matrix management, most of the personnel take direction from at least three bosses, a functional manager, or chief, within the program office, a functional manager, or deputy, at the home office, and the program

director. "The project manager usually represents the business aspects on a given program, while the functional managers each represent the technical aspects for the business as a whole" (Wittner, 1962:39).

Figure 2 represents a generic matrix grid (DSMC, undated(b):3; Patterson, 1978:12; Pywell, 1979:51; Wittner, 1962:40-41). In this example, there are four program managers who obtain personnel from various functional organizations. Each of the program managers and functional managers, known as the functional deputy at Aeronautical Systems Division, have the same level of authority and responsibility over the work (Adams and Kirchof, 1984:20; Davis and Lawrence, 1978:134; Morris, 1988:30-31). Essentially, "the functional manager is responsible for the 'what' and 'by whom,' [while] the project manager decides 'when' and 'for how much'" (Morris, 1988:31).

The concept of the matrix structure has grown far beyond the project management context first introduced by John Mee in 1964 (Cleland, 1988:971). Today, "Matrix organizations are . . . the most complex forms of organization structure" (Morris, 1988:30). According to organizational specialists, the key advantage of having the matrix structure to develop and produce a product or program is more flexibility and balanced decision making (Dinsmore, 1984:92-95; DSMC, 1989a:8; Gilbreath, 1986:73-74; Lasden, 1985:80; Roman, 1986:95-99).

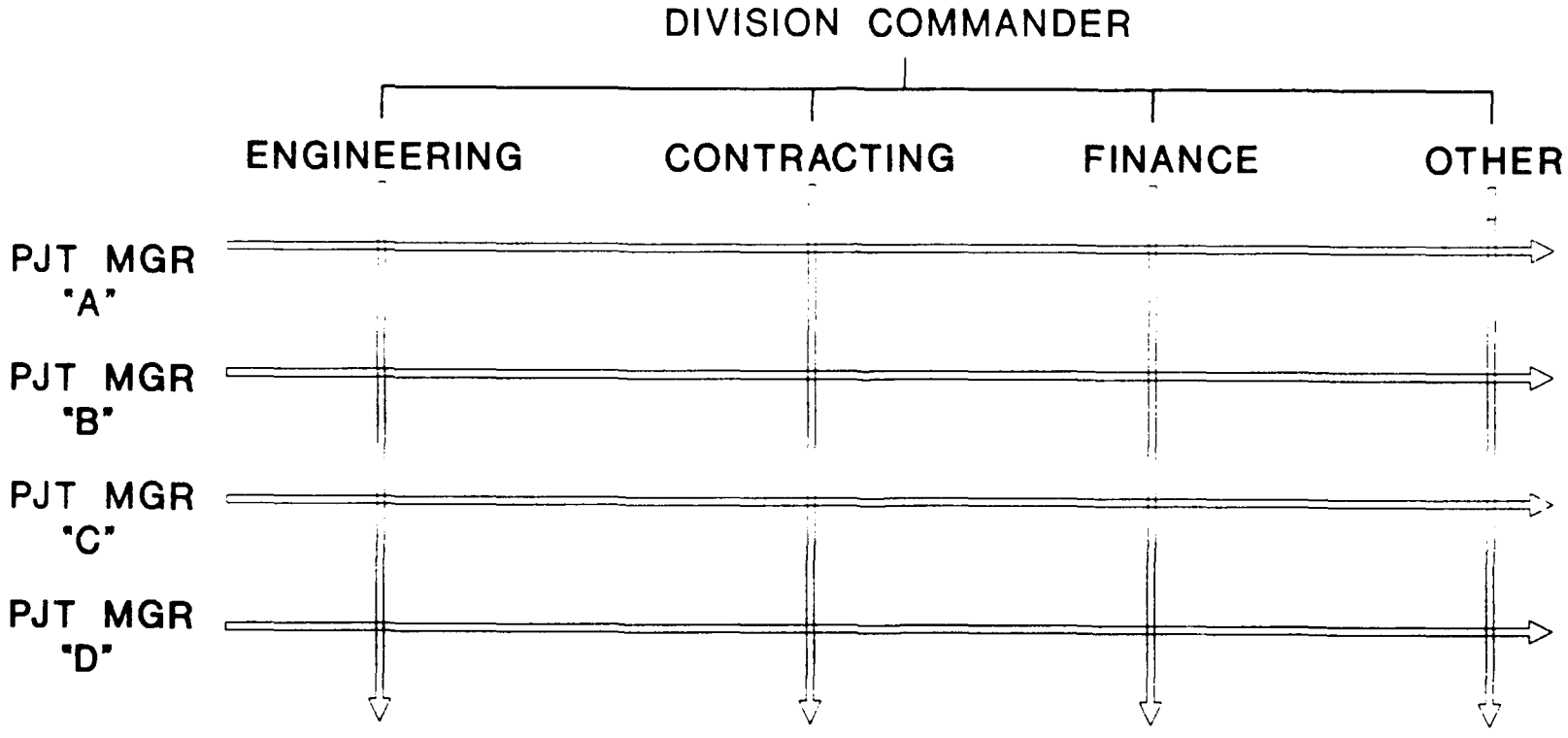


Figure 2. Simplified Matrix Organization Chart

Advantages of Matrix Structure. The most often cited advantage for having a program office use the matrix structure is that far less resources are required then if each program office had a full complement of personnel, some of which may not be fully utilized at times (Pywell, 1979:53-54; Wiederhold, 1984:5). Also, specialists can work the issues of many programs, instead of being assigned to just one program (Pywell, 1979:53-54). Even though the functional offices provide the personnel, it is still the program director who remains responsible for any program-related problems or failures (AFR, 1985:5-6; AFSC, 1976:sec 20-1,10 to 11).

Another advantage of the matrix structure is the capability to reassign the functional personnel as required since they are only on temporary loan to the system program offices (Roman, 1986:99). This rearranging of personnel based on system program office need "enables the cross feed of innovative techniques, new skills, and sharing of experience as the loaned personnel return to their functional areas and colleagues" (Wiederhold, 1984:5). Additional advantages frequently cited as reasons for having the matrix structure are listed in Table 5.

Table 5. Matrix Structure

Advantages

Capable of managing multiple demands

Uses scarce resources efficiently and effectively

Develops both functional and general management skills

Specialized, functional knowledge available to multiple programs

Ensures consistency between programs

Recognizes legitimate sources of power

Adapts to environmental changes

Communications between programs enhanced

Problems solved by functional specialists

Technical strength maintained

Technical and business specialties integrated

Increased responsiveness from functional areas

Decentralized decision making

Comprehensive and integrated planning

Uniform training opportunities

Ability and flexibility to change

Eliminates red tape and duplicate files

(Daft and Steers, 1986:383; Davis and Lawrence, 1978:134; Dinsmore, 1984:94-97; Duncan, 1979:69-71; Hellriegel and others, 1983:335; Klimstra and Potts, 1988:26; Patterson, 1978:11; Roman, 1986:99; Wright, 1979:60-61)

Disadvantages of Matrix Structure. The matrix concept is based on the theory that we gain the best of both worlds and does not consider the fact that we also inherit the worst of both worlds (Gilbreath, 1986:73-74). There are just as many, if not more, disadvantages than advantages with having a matrix structure in the system program office. The disadvantages are centered around the dual boss conflict (Roman, 1986:97).

The majority of the complaints about the matrix organization structure center about the empire building in the functional organizational and a lack of clear authority (Denis, 1986:54; Morris, 1988:31; Wiederhold, 1984:5).

This is primarily because "at least two bosses have to become involved -- the manager providing line resources and the manager held accountable for results" (Cleland, 1988:977). This "philosophy [of having two bosses] is contrary to the traditional military concept of the chain of command, whereby orders are taken only from one's immediate superior" (Thurber, 1978:17).

Figure 3 depicts a view of the relationship between the project manager and the functional manager (Galbraith, 1971;37; Stuckenbruck, 1988:69; Stuckenbruck, 1982:91). The matrix organization structure "establishes a balance of power between project managers and functional managers throughout the R&D [Research and Development] business" (Wittner, 1962:39). The figure illustrates the potential

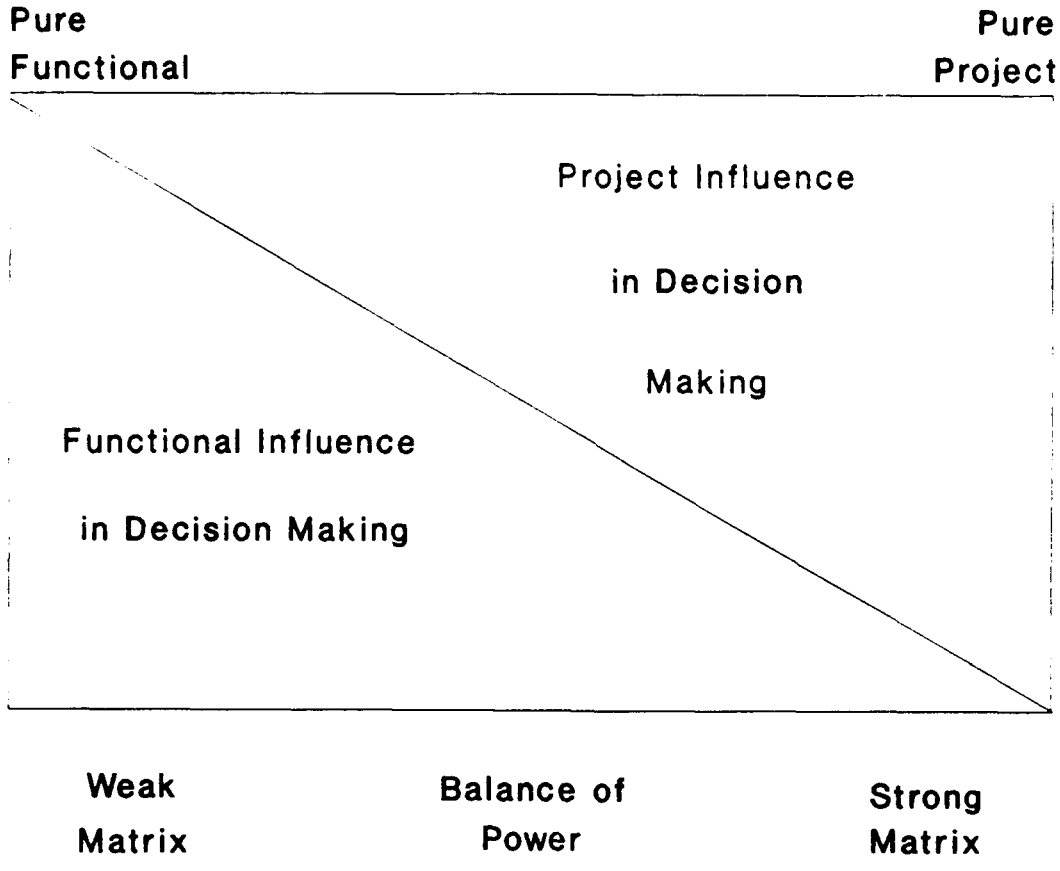


Figure 3. The Balance of Power in Weak & Strong Matrices

for conflict in the matrix organization, because the power is rarely balanced between any two managers (Stuckenbruck, 1988:66).

A key reason conflict can result is because "a matrix consists of people, and all people -- including managers -- are different from each other" (Stuckenbruck, 1988:66). One manager, almost inevitably, is always "stronger" and more powerful than the other (Roman, 1986:97; Stuckenbruck, 1988:66; Wiederhold, 1984:5). Many people believe that conflict can be beneficial because "establishing a deliberate conflict between functionally and project-oriented executives provides a mechanism for achieving good trade-offs" (Wittner, 1962:39).

Figure 4 shows the various interfaces involved in having a matrix structure. Most are "inevitably adversary since they involve a constantly shifting balance of power between two managers on essentially the same reporting level" (Stuckenbruck, 1988:64; Stuckenbruck, 1982:87). Figure 5 illustrates a balanced matrix. However, a balanced matrix only occurs on paper because in the real world people and their differences are involved (Adams and Kirchoff, 1984:20; Roman, 1986:97; Stuckenbruck, 1988:64; Stuckenbruck, 1982;70).

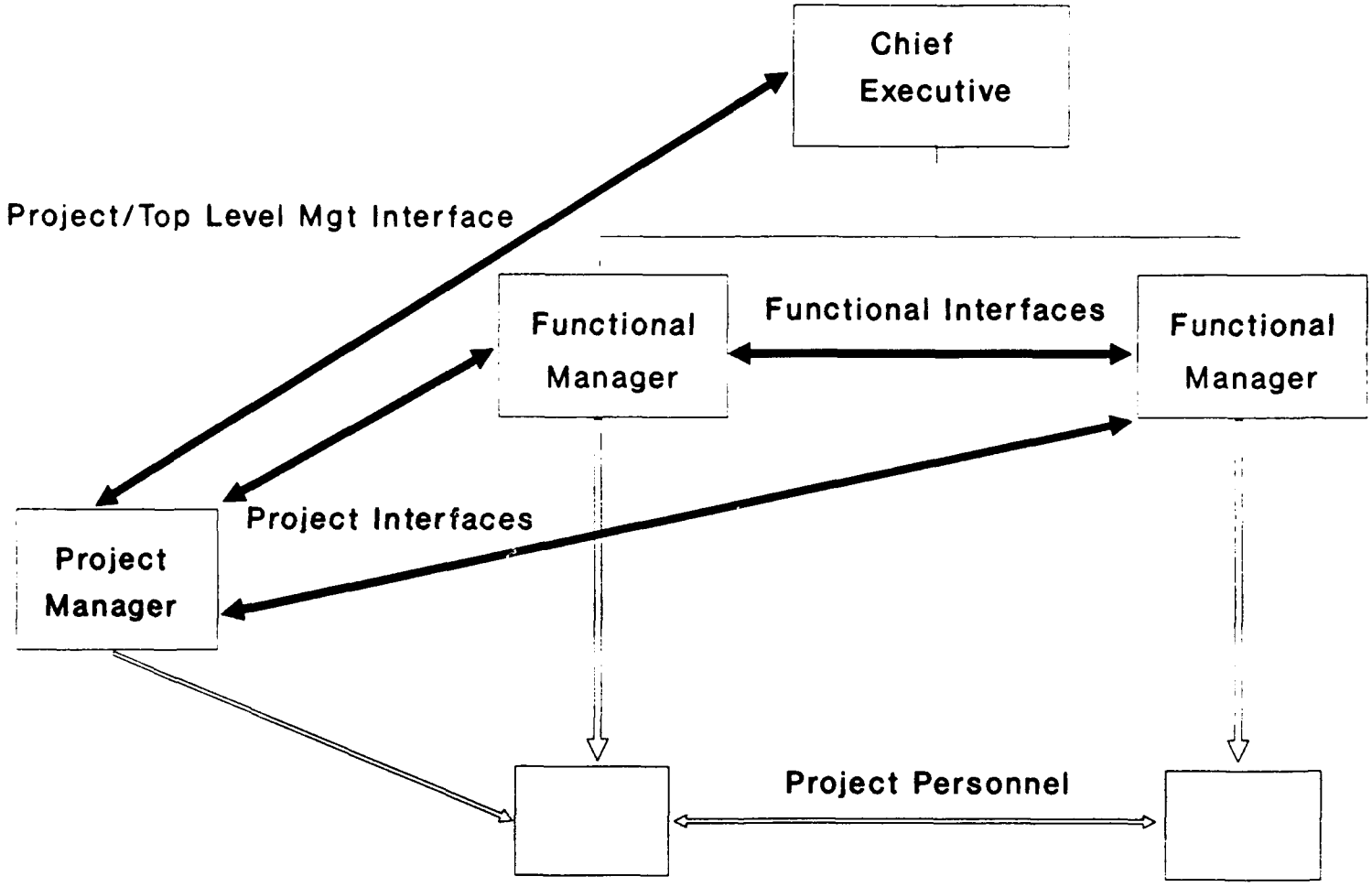


Figure 4. The Multiple Management Interfaces in a Matrix.

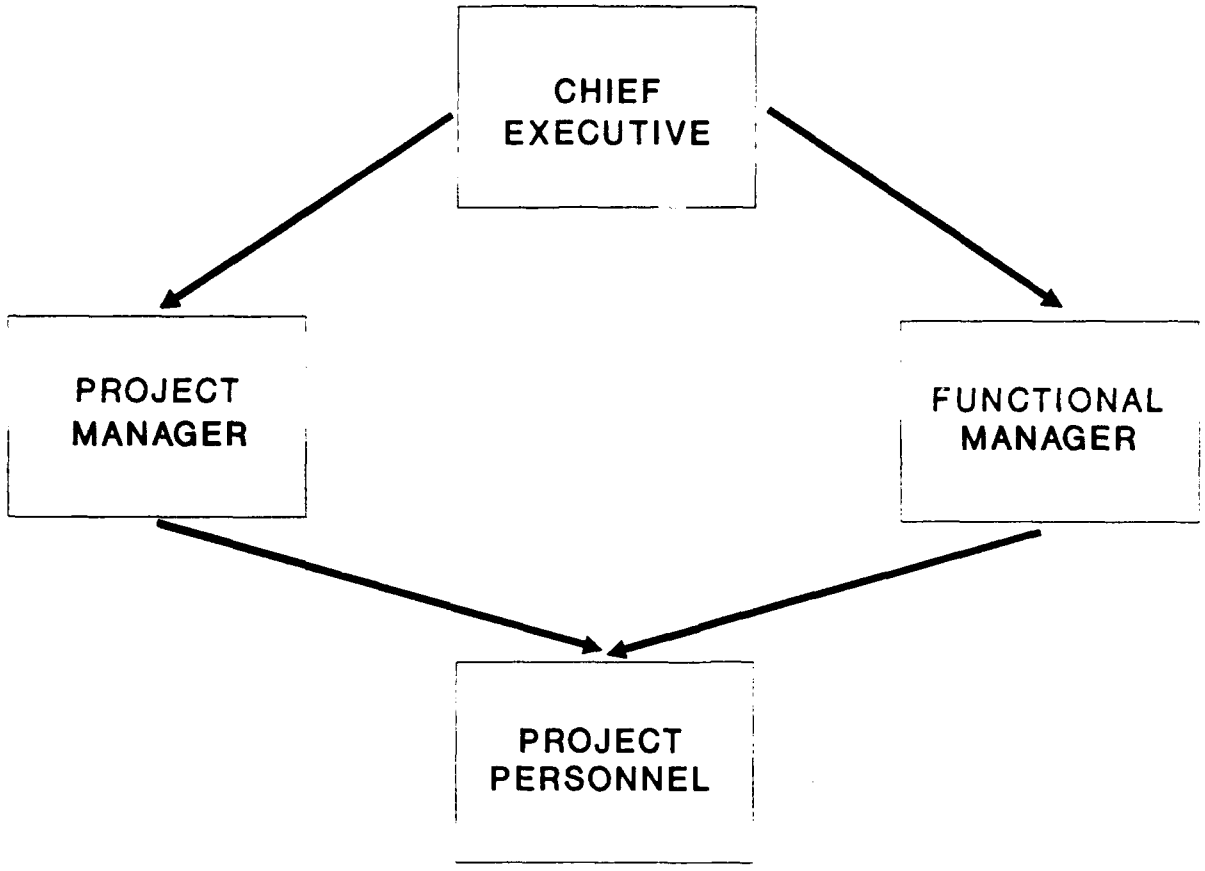


Figure 5. The Balanced Matrix

Figures 4 and 5 thus depict a successful matrix organization as being both a balance of power and "a function of the interface or interface relationships between the project [manager] and individual functional managers" (Stuckenbruck, 1988:66). Another problem with the matrix structure cited frequently by program directors is "they are still responsible for overall mission accomplishment, despite having been stripped of all authority over the functional personnel" (Thurber, 1978:18).

The program director is emphasizing the program's schedule and cost, while the functional manager is concentrating on the program's performance specifications (Wittner, 1962:39). This creates another area for potential conflict. And, even though a frequently quoted advantage of the matrix structure is the learning of new skills within the function, "we often fail to develop the expertise and continuity necessary to effectively manage specific programs" (Westover, 1988:23). Or, as one frustrated software programmer stated "Within the matrix, a Cobol programmer is a Cobol programmer is a Cobol programmer" (Lasden, 1985:80).

So, "unfortunately, the person who often comes off the worst in the matrix is the poor soul who is actually doing the work" (Morris, 1988:31). In order to decrease the possibility of problems from occurring,

> A special effort must be made by the functional manager to prevent his people from feeling detached and consumed by a program which provides them with management and technical direction, but does not have the direct responsibility for their career progress, appraisals, and salary actions. (Pywell, 1979:54)

The program director and functional manager have a tradeoff in problems. When the functional personnel are collocated within the system program office, "the functional manager may not have all of the information he/she needs to write an effective performance evaluation on the loaned subordinate" (Wiederhold, 1984:6). The program director, in turn, may find it is difficult to have loyal workers when he does not control the performance ratings, can not hire experienced personnel, and can not fire poor performers (Morris, 1988:31; Thurber, 1978:19; Westover, 1988:24).

With all the disadvantages of matrix management, and the continuous atmosphere of unresolved conflicts, "very strong top management support for the project manager is necessary to get the matrix to work" (Stuckenbruck, 1988:66). Indeed, "management must foster a 'climate' that is secure enough" (Kuzman, 1989:12) so that problems, difficulties, and issues can be resolved. However, "even very strong support will not guarantee project success" (Stuckenbruck, 1988:66). Table 6 summarizes the key disadvantages of having the matrix structure.

Table 6. Matrix Structure

Disadvantages

Dual authority causes frustration and confusion

High conflict among personnel

Coordination between functional office and program time consuming and repetitive

Special training required to lower conflict levels

Power struggles between functional manager and program manager

Belief that all decisions made in a group

Blamed for poor results of program

Increased management structure required

Managers more involved with internal problems

Overall performance of individual lowered

Political skills, versus technical skills, rewarded

Conflict for resources between program managers

Complex division of authority and responsibility

Increases role ambiguity, stress, conflict, and anxiety at worker level

Lowers overall performance

Inconsistent demands result in unproductive conflicts

Short-term, crisis management may be the rule due to inconsistent demands

Rewards political skills, not technical skills

(Daft and Steers, 1986:383; Davis and Lawrence, 1978:132-140; Dinsmore, 1984:92-99; Duncan, 1979:70-72; French, 1985:18; Gilbreath, 1986:73-82; Hellriegel, 1983:335; Klimstra and Potts, 1988:25; Patterson, 1978:12-13; Roman, 1986:97; Wright, 1979:60-61)

Use Matrix Wisely. If matrix structure is used in a system program office, the quantity and skill levels of matrixed personnel should be based on the program and on the acquisition phase, not based on simply where the system program office is located (Bloomer, 1989:entire). This is because "the greater the technical complexity, budget, concurrency, and importance of a program, the greater the need for a self-contained PMO [program management office]" (Fox, 1988:159).

Summary

This chapter reviewed recent literature about program management and the basic methods of organizing a system program office could follow, functional, program, and matrix. Program management, from its initial beginnings over 30 years ago with the unregulated and unstructured Air Force Ballistic Missile Division's Thor, Titan, and Atlas ballistic weapon systems program offices has evolved to today's thoroughly regulated, documented, structured, and publicly scrutinized B-2, C-17, MILSTAR, Strategic Defense Initiative, and a multitude of other weapon systems program offices scattered across the United States. Each Air Force weapon system program office is headed by a Program Director, who is the single individual responsible for ensuring the weapon system is delivered on schedule, at cost, and with the performance requirements met. However, without an experienced staff from a variety of functional

areas, the program director will not succeed. It is the program director "who is responsible for directing his team concerning: What must be done, When it must be done, and Why it must stay within certain parameters" (Martin, 1962:5).

Today, most Air Force system program offices use some degree of matrix structure, with most of the personnel borrowed from, and still reporting to, functional managers. The function manager "is responsible for supervising the program in areas such as: Who is going to perform the work, Where activities will take place, How things are going to be done" (Martin, 1962:5). The dual-boss environment is the major disadvantage to the matrix structure because of the conflicts and power struggles that are generated. But, the matrix structure allows personnel to have a "home office" for when a program ends. Over the past twenty years, "The relative merits of the matrix organization vis-a-vis the full-fledged project organization is one of those hardy perennials of project management" (Morris, 1988:31).

The next section explains the steps taken to accomplish the research.

III. Research Methodology

Overview

The general method used for this research was the literature review and survey. To perform the literature review, the researcher conducted an exhaustive search of the written material available on matrix and program management. In addition, discussions were held with numerous individuals who were knowledgeable about the subjects and able to locate additional information. Before performing the survey, a decision had to be made as to what survey method would be used.

The basic ways to survey a population in order to collect data are personal interviews, telephone interviews, and mailed questionnaires. It has been determined through extensive research that personal and telephone interviews can provide more reliable data and avoid the potential misunderstanding of the questions. During the interview, the researcher has the ability to immediately improve question quality by modifying or clarifying the question as needed. Also, questions that do not pertain to one, or a group of individuals, can be passed over. However, they have the disadvantage of high cost, including travel time for personal interviews and the time required by both the interviewer and the interviewee. Because of the small population and the researcher's strong personal dislike of

the scaler method (For example, "Do you Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree?"), the personal interview method was chosen.

Surveys conducted at Aeronautical Systems Division used the face-to-face interview method, while telephone interviews were conducted with Space Systems Division program managers. Space Systems Division program managers would have been interviewed "face-to face" also, however time and budget limitations mandated the telephone interview process for them.

Each of the five Air Force Systems Command Product Divisions uses some degree of matrix management in their system program offices. The five Air Force Systems Command Product Divisions are Aeronautical Systems Division (ASD), Space Systems Division (SSD), Electronic Systems Division (ESD), Ballistic Missile Division (BMD), and Munitions Systems Division (MSD) (HQ AFSC, 1989:entire). The degree to which matrix management is used varies depending on the Product Division and the size of the program. Aeronautical Systems Division and Space Systems Division were chosen for the survey for several reasons.

Within the Air Force, Aeronautical Systems Division receives the 58 percent of the money Air Force System's Command receives to conduct research and development (MAG, 1989:sec II-1). Also, this product division is the only one that uses the matrix structure to such a large extent that

even its engineers are matrixed into the program office (Carr, 1989a; Hoene, 1989). Space Systems Division receives the second largest percentage of research and development money and matrixes primarily procurement and logistics officers into the system program office (Hoene, 1989; Wiesenger, 1989).

The author felt it was necessary to validate and verify reasons for and against the matrix structure from the viewpoint of the program director or his deputy, since they retain total responsibility for the program's success or failure.

This was important because, except for Thurber's 1978 article in the Defense Management Journal, no documentation of the pros and cons of having the matrix structure structure within Air Force Systems Command system program offices after the matrix structure was implemented could be located during the literature search (Carr, 1989b; Hoene, 1989). But, neither was any documentation found about the pros and cons of having the program structure.

Research Process

The research process was divided into four specific parts: reviewing existing literature, preparing the questions to be asked during the interview, conducting the interviews, and analyzing the data. Listed below is a summary of the steps that were needed to do each part.

First, an intensive literature review was conducted, using primarily data from the past five years. An initial review of the available literature showed that data from earlier years focused on why organizations should restructure and matrix their personnel from functional offices. Data from the past five years was more apt to tell the results, not just the potential benefits, of having the matrix structure in the organizations after the matrix structure had been imposed for a number of years.

Adapting many of the questions used by two previous studies (Talley and Patchett, 1971:entire; Peloquin and Roscoe, 1969:entire), the specific measurement questions to be used were then drafted and formed into an interview guide. The purpose of using an interview guide was to have a structured interview. This helped to ensure each interviewee would be asked the same questions and the end results could be compa d.

After several revisions, the questions were tested for clarity and validity. This was done in two ways. First, instructors and students previously assigned to program offices were asked to review the questions. Then, after further revisions were accomplished, individuals who had either recently been, or still were, program directors reviewed the questions. A final revision of the interview guide was then done.

Next, the actual interviews took place. The interviewees were determined by a combination of first compiling a list of current system program offices at Aeronautical Systems Division and Space Systems Division. This list was based on the latest available organization charts from each division (ASD, 1989:entire; SSD, 1989a/b:entire). The results were then verified in March 1990 with the commander's executive officer at each division.

The criterion for a potential interviewee was that the individual must currently be a System Program Director, or Deputy Director. It was felt that individuals in these positions were more likely to have been assigned to several system program offices spread over various divisions, and would thus give responses based on both their present and past experience.

Everyone on the list of potential interviewees received a cover letter (Appendix B) that was signed by the program director of the sponsoring organization and a copy of the interview guide (Appendix C). The cover letter explained the purpose of the interview, defined the key terms, and stated that the material to be covered in the interview was attached. In addition, the letter requested an interview date and time be established.

The researcher discovered that, overall, it took longer to establish a time and date for the interview then it did

to conduct the actual interview. Due primarily to short notice trips, no notice or extended meetings and a lack of clerical support, it was very difficult to schedule interviews without making multiple phone calls, especially for the Space Systems Division interviewees. Once the interview was actually in progress, they lasted about one hour, on average. In every case, the interviewee would expand on one or more questions and the researcher obtained enough information for several studies. The comments contained in Appendix D are limited to those applicable to the questions.

Partly to improve the interview guide and partly in attempt to decrease the amount of time each interviewee would have to spend away from program-related efforts, after the first two interviews many of the questions were deleted for the later interviews. During the first two interviews, the interviewer found that even with all the scrubbing and revisions that had taken place earlier there were some problems with the interview guide.

There were four main problems observed with the questionnaire. First, asking one question would elicit a response to several of the questions. Second, many of the questions could be deleted with no affect on the overall interview. Third, a few of the questions could be misinterpreted. Fourth, the unwritten or written policies and rules that existed at each division yielded a standard

answer from each interviewee at that division. As a result, the questionnaire was tailored considerably. From the third interview on, it was the exception, not the rule, for the researcher to specifically ask, and the interviewees to respond to questions 7, 8, 9, 13, 14, 18, 19, 21, 23, 33, 34, and 36.

Summary

After the interviews were conducted, the comments were compiled. Then the data obtained from both the literature review and the interviews was summarized and analyzed. Chapter IV is the result of that intensive effort, while Appendix D contains both all the responses.

IV. Findings

Overview

Between 23 April and 4 June, the researcher conducted 33 interviews with either program directors or their deputies. During one of the interviews, both the program director and deputy participated, so there were 34 interviewees. Twenty six of the interviewees were military officers and eight of the interviewees were civil servants.

All of the comments obtained during the interviews were very enlightening and showed several things. One, the interviewees tended to have similar viewpoints if they had spent their entire acquisition career in one product division. Two, most of the civilians seemed to accept the matrix concept as inevitable and a way of life for the system program office.

Three, not much has changed in the military and in the acquisition environment in the ten years this researcher has been working in system program offices. There is still a formidable amount of paperwork required to be performed by the technical workers. More time is spent on accomplishing clerical tasks, due to a lack of clerical support, then is spent performing technical tasks. Most new entrants to the program office lack any form of acquisition training. A large proportion of the people at both Aeronautical Systems Division and Space Systems Division are lieutenants.

There is still a high turnover in the acquisition specialties. According to the personnel specialists at each division, as of 31 May 1990, 27 percent of the military personnel assigned to Aeronautical Systems Division are lieutenants and 30 percent of those assigned to Space Systems Division are lieutenants. There is a seemingly constant flow into the system program office of untrained personnel from the matrixed offices and subsequent flow out of the program office of the matrixed personnel once they are knowledgeable about the program.

Four, the same problems, generated primarily by external factors, that were described in Talley and Patchett's thesis of 1971 were once again found in the program offices today. More training is needed. An excessive amount of time is spent on non-program related tasks, such as additional duties. It takes too long and too much paperwork to obtain new positions. There is little or no overlap between outgoing and incoming personnel. Both the military and civil service transfer and promotion policies and procedures can impact or impede the system program office staffing. The "priority" of the program can make a difference in the manning of the system program office and the quality or caliber of the personnel assigned. Loyalty, incentives, promotions, and individual well-being were enhanced for those who worked directly for the program director. (Talley and Patchett, 1971:76-82)

Five, the responses to questions based on Peloquin and Roscoe's 1969 research varied. In 1969, many of the interviewees had not attended any specialized training before assignment to their current position. In 1990, of the 34 program directors and deputy directors interviewed by this researcher, 17 of the 25 (68 percent) military officers interviewed had either attended the Program Management Course or Executive Refresher Course at Defense System Management College, while one of the eight (12.5 percent) civilians interviewed had attended one of the courses. Just as in 1969, over half of the interviewees felt it was desirable, but not feasible, for the key program personnel to be assigned to a program for its duration. (Peloquin and Roscoe, 1969:56-78)

Six, the program directors have the "responsibility" of developing and producing a weapon system, but not the "authority" required to control their resources.

Seven, it was readily apparent that the program directors and deputy directors seldom have the opportunity to provide advice, or asked their opinion, on anything other then activities concerning their program.

The rest of this chapter synthesizes the material from the interviews, then analyzes the data against the hypotheses made in chapter I. Unlike the other chapters, this chapter will not have any citations except for information obtained from published material due to the

sensitivity of the material. Two interviewees requested anonymity, so the researcher chose not to attribute any of the comments or summarizations made in both this chapter and in Appendix D, which contains the interviewees comments to each question, to either a particular division or to a particular person.

Demographic Information

Tables 7 through 12, plus the accompanying data summarize the information obtained during the interviews for questions one through nine. Table 7 shows the total number of system program offices (SPOs) at Aeronautical Systems Division (ASD) and Space Systems Division (SSD) as of 15 April 1990 versus the total number of interviews conducted at each division. The number of system program offices at each division was based on information obtained from the organization charts and discussions with the executive officers on who held the 0029 and 0002 specialty codes. Between the various tables, there may be slight differences in the percentages cited, due to rounding errors.

Table 7. System Program Offices

DIVISION	SYSTEM PROGRAM OFFICES		
	Number	Interviewed	Rate
ASD	17	16	94.1
SSD	18	17	94.4
Total SPOs	35	33	94.3

Of the 35 total system program offices, only one program director declined to be interviewed. His reason was "program classification." One interview guide from Aeronautical Systems Division was completed and returned by mail, but lost in the Base Inter Transmit System. The end result was a nearly equal number of interviews were conducted at each division, and the 94.3 percent rate of participation was higher then for any of the dozens of theses this researcher has reviewed.

Only one interviewee made the comment he was doing the interview because a general officer had signed the cover letter. The researcher believes the signature made a difference in the reception of the letter, but the interviewees were more willing to participate because of the subject matter. This premise is based on her review of multiple theses that had far lower response rates even though higher ranking general officers had signed the cover letters. Also, once an interview was in progress, all the interviewees, including the one referenced above, provided outstanding support and were willing to respond at great length. For example, during interviews that extended past the allotted hour, the interviewee would always continue the interview and postpone other appointments.

Table 8 depicts the position of the interviewees in the system program office at the time of the interview.

Table 8. Position of Interviewees

POSITION	NUMBER		PERCENT	
	ASD	SSD	ASD	SSD
Program Director	5	10	31.2	55.6
Deputy Director	11	7	68.8	38.9
Program Manager	0	1	0	5.5
Total Interviewees	16	18	100.0	100.0

Note that Table 7 shows 17 interviews were conducted at Space Systems Division, while Table 8 shows there were 18 interviewees at the division. As stated earlier, one interview was with both the Program Director and his Deputy. As Table 8 depicts, 15 of the interviewees were program directors and 18 were deputy program directors. The one program manager was from a basket system program office and represented the position of his program director.

Below, Table 9 shows how long each interviewee had been assigned to their current position.

Table 9. Number of Years in Current Position

YEARS	INTERVIEWEES			
	Number		Percent	
	ASD	SSD	ASD	SSD
over 4	1	1	6.2	5.6
3 < x < 4	2	1	12.5	5.6
2 < x < 3	2	3	12.5	16.7
1 < x < 2	6	6	37.5	33.3
less than 1	5	7	31.3	38.8
Total	16	18	100.0	100.0

As Table 9 depicts, 12 of the 34 interviewees had been in the position less then a year. Table 10 summarizes the length of time the interviewees had held program director and deputy director positions.

Table 10. Number of Years as Program Director and/or Deputy

YEARS	INTERVIEWEES Number		Percent	
	ASD	SSD	ASD	SSD
over 15	1	0	6.2	0
10 < x < 15	3	1	18.8	5.6
5 < x < 10	4	8	25.0	44.4
1 < x < 5	3	3	18.8	16.6
less than 1	5	6	31.2	29.4
Total	16	18	100.0	100.0

As Table 11 depicts, it was very rare to find an interviewee who, during his entire acquisition career, had been assigned to more than one product division. (Two interviewees had been assigned to programs outside of Air Force Systems Command (AFSC).)

Table 11. Experience at AFSC Product Divisions

EXPERIENCE	INTERVIEWEES Number		Percent	
	ASD	SSD	ASD	SSD
3 divisions	0	1	0	5.5
2 divisions	0	5	0	27.8
1 division	16	12	100.0	66.7
Total	16	18	100.0	100.0

Continuity and Learning Curve. The "continuity" within a product division that existed for the higher ranking individuals was not considered necessary for the program director and deputy director to manage a system program office. However, the interviewees did consider continuity within a product division very important for the junior officers who do the day-to-day program-related tasks and activities. As several interviewees stated, it is easy for a senior manager to manage, no matter where he is assigned.

For the junior officers, a learning curve exists when they move between product divisions. This is similar to the comments a general officer made last year about it being difficult for a Strategic Air Command pilot to climb into a Tactical Air Command plane and fly it right away. Even though the scientist, engineer, or acquisition manager knows how to acquire a weapon system, there are so many different requirements and regulations needed to develop and produce a satellite versus to develop and produce an aircraft that it can take many months for someone to become acclimated after transferring to a different product division.

Acquisition Experience. Before assuming their present position, twelve of the Aeronautical Systems Division interviewees had held the acquisition manager specialty code (27XX), or its civil service equivalent. Four had held the engineering specialty code or its equivalent (28XX military and 8XX civil service). Specialties were fairly evenly

split with the Space Systems Division interviewees. Five had held the 27XX specialty code and six had held the 28XX specialty code. Seven individuals had held both the 27XX and 28XX or 26XX (scientist) specialty codes. One interviewee had been a computer specialist before becoming a 2716. Table 12 depicts how long the interviewees have worked in system program offices.

Table 12. Total Time in the Acquisition Environment

YEARS	INTERVIEWEES			
	Number		Percent	
	ASD	SSD	ASD	SSD
over 15	5	4	31.3	22.2
10 < x < 15	4	4	25.0	22.2
5 < x < 10	5	7	31.2	38.9
1 < x < 5	2	3	12.5	16.7
Total Interviewees	16	18	100.0	100.0

The acquisition experience of the Aeronautical Systems Division program directors and deputies interviewed included time in the following areas: projects, program control, testing, configuration, deployment, engineering, logistics, planning, foreign military sales, and special assistant to the program director. One had been on a System Acquisition Management Information team.

The acquisition experience of the Space Systems Division program directors and deputies interviewed included time in the following areas: projects, testing, planning,

engineering, and integration. Two individuals had been a Program Element Monitor.

Of all the interviewees with previous system program office experience, only one had ever been matrixed into a system program office from a functional organization. All the remaining interviewees had always been directly assigned to the program office.

System Program Office Manning

During the time period the research was conducted, nearly every individual at Aeronautical Systems Division was matrixed into the system program office except those staff assigned directly to the "front office" (Program Director, the Deputy Director, the Executive Officer, clerical), and the project officers (27XXs). At Space Systems Division, with few exceptions, the system program office was "self contained" and nearly every individual except the contracting and logistics officers were directly assigned to the system program office. Due to the Program Executive Officer structure that was implemented due to the Defense Management Review decisions, Space Systems Division was considering undergoing a major modification to their matrix structure and imposing one similar to Aeronautical System Division's (Opel, 1990:entire; Wiesenger, 1989). As can be seen in Appendix D, many of the Space Systems Division interviewees commented on this potential change.

The following tables relate to how many people work on program-related tasks and are based on the responses to questions 10, 11, 12, 13, 14, and 26. Tables 13 and 14 refer to the number of directly assigned personnel and include personnel directly assigned from other services, both United States and foreign.

Table 13. Directly Assigned Personnel - Authorized

MANNING LEVEL	NUMBER SPOs ASD	SSD
450 < x < 500	1	0
250 < x < 450	0	0
200 < x < 250	3	0
150 < x < 200	1	0
100 < x < 150	6	2
50 < x < 100	1	14
less than 50	4	1
Total SPOs	16	17

Table 14. Directly Assigned Personnel - Assigned

MANNING LEVEL	NUMBER SPOs ASD	SSD
450 < x < 500	1	0
250 < x < 450	0	0
200 < x < 250	3	0
150 < x < 200	1	0
100 < x < 150	5	2
50 < x < 100	3	9
less than 50	3	6
Total SPOs	16	17

Collocated Personnel. Question 12 asked "If matrix management is followed, how many collocated personnel are assigned to the system program office?" and "To what functional areas are they assigned?" At Aeronautical Systems Division, every system program office had personnel matrixed from ASD/PM, ASD/PMD, ASD/EN, ASD/AL, and ASD/AC. Ten of the programs also had ASD/SE personnel assigned, six had ASD/SC people, and three had ASD/SP. One each had ASD/SD and ASD/CE support.

In order to obtain an ASD/SC person, the system program office would have to "give up" a program position to ASD/SC. Then, ASD/SC would provide the program with a "49XX" individual. At Aeronautical Systems Division, the system program offices are not permitted to request a program position be changed from any other specialty code to the 49XX specialty and still remain on the system program office's "directly assigned" positions listing, as can be done with other specialties.

At Space Systems Division, seven of the system program offices had both SSD/PM and SSD/AL personnel collocated. Three of the seven programs also had either SSD/AC and security personnel, or both. One of the seven programs also had an individual from SSD/PD. Four system program offices only had personnel matrixed in from SSD/PM. Three of the system program offices did not have any collocated people. Table 15 depicts the differing amounts of personnel matrixed

into the system program office. Combining the total amount of government personnel matrixed on a full time basis and directly assigned to the program director, then adding in the number of Scientic and Engineering Technical Assistance contractors that work within the system program office, it was readily apparent that the programs at Aeronautical System Division require a greater quantity of personnel.

Table 15. Personnel Matrixed into System Program Office

COLLOCATED PERSONNEL	NUMBER SPOs ASD	SSD
350 < x < 400	1	0
300 < x < 350	0	0
250 < x < 300	1	0
200 < x < 250	3	0
150 < x < 200	3	0
100 < x < 150	3	0
50 < x < 100	4	0
25 < x < 50	1	2
less than 25	0	15
Total SPOs	16	17

Non-collocated Personnel. Question 13 was in three parts. First, the interviewees were asked "About how many personnel at the division level work on program-related matters, but are not collocated within the system program office?" Then, "To what functional office(s) are they assigned?" and "Do you believe the program is receiving the full benefit of their work?" Four interviewees at Aeronautical Systems Division were aware that non-collocated

individuals within the functional offices worked on tasks or activities related to their program.

Only one interviewee from Aeronautical Systems Division knew how many of the non-collocated individuals were working on program-related tasks. For all four of the Aeronautical Systems Division programs, it was additional people from engineering working on a part time basis on the program back in the home office. One of the four programs also had the help of additional contracting officers on a part time basis. ASD/ENO prepares a listing that details what system program offices ASD/EN's non-collocated individuals supported (EN, 1990:entire). Only one interviewee from Aeronautical Systems Division was aware of the list and he stated the program did not receive the support of as many individuals as were listed.

At Space Systems Division, five interviewees were aware that non-collocated individuals in the functional offices worked on tasks or activities related to their program. Four of the five knew how many non-collocated people worked on the program, and who they were. The part time help for the Space Systems Division program offices was from a variety of functional areas. Four programs received part time help from contracting, one from weather, security, and safety, two from logistics, and one from both intelligence and finance.

Of the interviewees who knew of help provided by non-collocates, only two from Aeronautical Systems Division and two from Space Systems Division believed they were receiving the full benefits from those individuals. The reasons for why the interviewees believed help was lacking from the non-collocates was, in general, the same reason why many of the interviewees felt those individuals who were collocated could not give their full support to the program. If an individual was not assigned directly to the system program office, their loyalty was divided between the home, or functional, office, and tasks required by a multitude of programs and the system program office lacked any form of leverage, since evaluations are done by the home office.

One interviewee amplified with an example why the work of a non-collocated individual from one functional office could be beneficial to the system program office and why the work done by a non-collocated individual from another functional office could be negligible. When a specialist from Aerospace Corporation is requested on a temporary basis to solve a specific problem, the program receives outstanding support.

When one program director needed the graphics department to redo vugraphs scheduled to be presented to Secretary of the Defense Cheney four days later, they were told it would take two weeks minimum. When the request was elevated to the department head (Mr Albert), the program

director was told it could be done as a rush job, but would take at least a week. Yet, with rare exceptions the system program offices are not permitted to change any of the manning positions so they could have their own graphics specialist within the system program office. Also, SSD/CS has continued to refuse to allow the system program offices to purchase any quality vugraph software packages so they can produce their own vugraphs and slide shows.

Evaluations. Question 14 was "Not counting yourself, how many individuals collocated in the system program office have their evaluations signed by someone not collocated within the system program office?" The response to this question was the same from nearly everyone. At Aeronautical Systems Division, with only a few exceptions where program directors have been able to change the system, the program director endorses the functional chief's evaluation and the military evaluations are done within the system program office. Evaluations for the other matrixed civilians are done by the home office. The policy at Space Systems Division is that evaluations for the contracting and logistics personnel are prepared within the system program office, then endorsed by the home office.

Personnel Qualifications. Question 15 asked "Are the assigned personnel adequately qualified?" and referred to all the military and civil service personnel working on program related tasks and activities. The majority

responded in the affirmative. Twelve interviewees from Aeronautical Systems Division and 14 interviewees from Space Systems Division said yes. (Some of them said "yes and no.") Almost all of the interviewees had comments on this question.

There were several threads of similarity running through the comments. One, a high percentage of the personnel are directly assigned to the system program office after graduating from college or to serve in a rated position. Even though the new people are technically qualified, few arrive with any acquisition knowledge or experience. When the researcher became an acquisition manager (27XX) ten years ago, no pipeline training was received before reporting to the system program office and the entry level acquisition training was not received for many, many months. Based on the interviewees comments, there has been no improvement in this area.

Two, there is a shortage of mid-level experienced managers, so the lieutenants and junior captains are performing the work instead. This "old" researcher has witnessed how difficult and intimidating it can be for a 23 year old lieutenant, responsible for managing a project, to work with a 55 year old contractor.

Three, some of the system program offices are used by the functional offices as training "ground" for their new people. As a result, there is a higher than usual amount of

"handholding" and turnover of personnel for those programs.

Four, contracting has a high turnover of personnel, due to the high number of contracting officers and buyers leaving government service to work for contractors. As a result, there is no continuity and the experienced contracting officers tend to work for the high priority programs while the new, inexperienced contracting officers learn the acquisition requirements "on the job" in the system program office.

Five, at Space Systems Division there is a higher proportion of people, from both the technical and nontechnical skills, leaving the military and civil service for positions with the contractors. This is primarily due to the large job market in the Los Angeles area versus in the Dayton area where the major supplier of jobs is either Wright-Patterson Air Force Base or General Motors.

Job Continuity. There were varying responses to questions 16 and 17 "Do you believe it is desirable/feasible to have key civilian and military personnel assigned to the program for its duration or through a phase, and why, or why not?" Table 16 depicts how many felt it was desirable and feasible to have continuity of key personnel, which generally referred to the program director, deputy director, and key functional chiefs.

Table 16. Long Term Assignments

RESPONSE	CONTINUITY			
	Desirable		Feasible	
	ASD	SSD	ASD	SSD
YES	10	11	2	3
NO	4	3	7	10

As Table 16 illustrates, the majority felt it was desirable, but not feasible, to have key personnel assigned for at least a given phase. Continuity, stability, and historical perspective of the program were the three key reasons given why it was desirable to retain key personnel. Several factors were given to explain why it was not in the best interest of the individual to remain in one program for more than a phase. These included: promotion and career progression; long time span for an entire program and even one phase; input of new ideas is needed; to prevent personal growth from stagnating; the personnel system; and, it depends on the weapon system and product division.

Authority -- Formal and Informal. Questions 18 and 19 were a repeat of Peloquin and Roscoe's "What formal/informal authority do you have to obtain the required technical support?" Unlike the results of Peloquin and Roscoe, few interviewees believed they had any formal authority to obtain personnel and all the comments received explained how they used their informal powers of authority.

Apparently, there are still no written regulations or directives in existence on the manning requirements and specialty requirements for the system program offices and how additional personnel can be obtained, other than through the formal Program Objective Memorandum procedure. And, obtaining personnel through the Program Objective Memorandum process can be more a matter of luck, not need.

Informal authority used by the interviewees varied to fill vacancies or obtain specialties. Many negotiate or persuade the home offices to provide additional personnel, or convince the division commander not to cut the manning positions of their system program office the standard percent during manning cuts. Others continue to rely on the "by name" requests so personnel with both acquisition and the related technical experience can be obtained. The longevity of many at the particular division helped also, since knowing the individuals at the home office who make the decision can make a difference.

Space Systems Division has a unique way of soliciting personnel --through the local area network. As one interviewee described it, messages can be sent from the system program office that describe the type of experience needed, and people wanting to transfer within the division can send messages detailing the type of experience they have.

Manning Adequacy. Question 20 was "Currently, is the system program office adequately manned to do the required tasks?" and "If no, why not?" As Table 17 depicts, the majority of the interviewees considered manning to be "adequate."

Table 17. Adequacy of System Program Office Manning

RESPONSE	ASD	SSD
YES	13	10
NO	5	6

However, this may be a misnomer based on the large numbers of contractors collocated in the system program offices. The reasons for the responses varied. Overall there is a shortage of configuration and data managers, test and evaluation officers, software managers, and contracting officers.

There were many comments about the high percentage of lieutenants assigned to the system program office. According to the personnel offices at each division, they no longer keep track of the percent of lieutenants in each system program office. However, based on the comments, many of the system program offices are assigned more lieutenants than the division "average." Several interviewees said the low priority of their program netted the system program office a high number of inexperienced personnel.

As one interviewee succinctly stated "We have enough quantity, but not enough quality. We are lacking experience -- both acquisition and program." Based on the researcher's tenure in two system program offices that had a high proportion of young and acquisition-inexperienced personnel, it can take far longer, more rewrites, and more "handholding" when the system program office lacks experienced personnel. In the first system program office the researcher was assigned, 37 percent of us were lieutenants -- all fresh from college. And this system program office consistently had the lowest percentage of lieutenants due to the program's priority. All of us learned acquisition "on the job." The researcher was extremely fortunate in her first job. She had a supervisor who firmly believed on-the-job training was necessary for the new acquisition accessions. Major Russell spent far more time walking the researcher through each new task then the it would have taken him to simply done the job himself. Other new accessions at her division complained frequently of the "You figure it out yourself." method of training they were receiving and the costly mistakes they had made as a result.

Several interviewees said even with the high number of inexperienced personnel, the job was getting done by the experienced ones working long hours and weekends. Interviewees working under AFR 800-29 Application of

Specialized Management all stated that if they had to follow the usual regulations, they would need far more people. Many interviewees discussed future manning shortages that will be incurred due to the Defense Management Review decisions. For example, military positions are scheduled to be deleted or converted to unfunded civilian positions.

Question 21 was "What are the key problems in obtaining personnel?" The interviewees attributed the problems experienced in obtaining personnel due to: the personnel system, manning cutbacks, shortage of skills, experience, rank, the budget, and the program's priority.

Manning Criticality. There were 27 respondents to question 22 "During what phase will the personnel problem/issue be most critical during the acquisition cycle of this program?" Sixteen of them said having sufficient personnel to accomplish tasks during the Full Scale Development phase or just before the phase started was critical to the program's success. The rationale was that if experienced people were available during this time period, less changes would be needed later to correct mistakes made by the inexperienced people in, for example, preparing the Full Scale Development's Request for Proposal, determining the weapon systems requirements, and performing the Development Test and Evaluation.

Five of the interviewees believe the early phases of the program should have a small, highly experienced cadre of

personnel. During these phases, the program strategy is determined and the initial planning documents are prepared. Several of the interviewees felt it was important for program continuity to keep portions of the staff during the transition period between phases.

Program Priority. Question 23 was "How does the priority of your program affect personnel manning?" Some of the interviewees assigned to major programs stated the priority of the program affected the system program office manning level and quality of personnel and the program's priority enabled them to obtain personnel with the experience and rank needed. Others said the program's high priority had no effect on the manning and they were still losing personnel, the personnel system was still unhelpful, and the program was still undermanned in areas such as configuration managers, test and evaluation personnel, and engineers.

Interviewees from small programs perceived the larger, high priority, programs as the reason why the small programs received a higher percentage of inexperienced personnel and why their small programs had trouble filling vacancies.

Personnel System. Question 24 "How does the civilian and military personnel system affect the overall performance of the system program office?" evoked strong reactions. Overall, more problems were perceived with the civilian personnel system then the military personnel system.

Several stated if you knew the military and civilian personnel system (and had the time), you could obtain the required personnel. A major complaint was the length of time it took to fill a vacant civilian position. As one interviewee explained, military positions can be double billeted. If a civilian position is forecast to be vacated due to a transfer or retirement, the system program office can not begin a search for a replacement until the position is vacant.

As a response to both this question and others, many of the interviewees commented on the short time people remained in the system program office, especially those matrixed from a functional office. Several suggested a minimum three year tour to a system program office for the military and an attempt should be made to maintain the civilians unless a change is needed due to promotion or retirement.

Apparently, several of the functional offices have an unwritten policy of revolving their personnel at least every 24 months, regardless of requests made by the individual, functional chief, or program director to keep a person in the same position.

Phasing Down. Based on the responses to questions 20 and 22, few were asked Question 25 "Will your program require fewer personnel once systems begin deploying?" and "If no, why not?" Of those asked at Aeronautical Systems Division, six said their program manning would decrease and

five said it would not for various reasons. The program manning of seven Space Systems Division programs will decrease and one will not. Most of those who responded "no" felt about the same number of people would be needed, but the skills would change. Also, after the system deployed, activities such as modifications or block changes, foreign military sales, and support to users would increase, thus necessitating a need for the same level of manpower.

Nonpersonal Services Contracts. Question 26 was in two parts. First, "Does your system program office have any nonpersonal services contracts because of insufficient numbers of government technical personnel?" Then, "If yes, approximately how many total contractors are assigned to the nonpersonal services contracts and approximately how many of those contractors are collocated within system program office facilities?" The researcher had expected this to be a simple question, based on her seeing two organization charts that listed the Scientific and Engineering Technical Assistance contractors working within the system program office. The question was simple for most, but several of the Aeronautical Systems Division interviewees had to approximate the amount working in their office space and how many total nonpersonal service contractors were working on the program. All of the Space Systems Division interviewees knew how many Aerospace Corporation MTS hours their program was allocated and how many of the Aerospace Corporation and

other nonpersonal service contractors were working within their system program office.

Fourteen of the Aeronautical Systems Division programs and twelve of the Space Systems Division programs had nonpersonal services contracts because of insufficient numbers of government technical or nontechnical personnel. The number of contractors collocated within Aeronautical Systems Division system program offices ranged from a low of three to a high of 50. Twelve of the programs had fewer than 25 contractors collocated within the system program office and the other two had between 25 and 50 contractors.

The number of Aerospace Corporation MTS hours the Space Systems Division programs paid for varied from none to about 125, with the percentage collocated varying between one fourth and one half, with the average being one third. Six of the programs had one third of the MTS hours fulfilled with collocated people. One half or more of the MTS hours were fulfilled with collocated personnel in seven of the programs. At least seven of the Space Systems Division programs paid for MTS hours from Aerospace Corporation and also had other nonpersonal service contracts to enable them to have enough people working within the program office. However, none of these programs had more than five non-Aerospace contractors collocated in the program office.

Matrixing versus Directly Assigned

The next few questions centered on matrixing versus directly assigning personnel to the system program office.

Management Structure. Both question 27 "Are you satisfied with the management structure used?" and Why, or why not?" plus question 28 "Which management structure should this program have right now?" could be answered several ways. For example, the phrase "management structure" could be referring to what existed within the system program office, within the division, within Air Force Systems Command, within the United States Air Force, or anywhere in between. Most of the responses centered on the division's management structure or the new Program Executive Officer structure recently imposed as a result of the Defense Management Review decisions.

Many of the respondents used this question to comment on the negative aspects of matrixing and why it would be more beneficial to have the personnel assigned directly to the system program office. The general consensus was that they would prefer everyone to be directly assigned to the system program office.

However, if matrixing had to continue at the product divisions, then several changes should be made to the current system. Five specific changes were echoed by many of the interviewees. One, the home office should assign personnel to the system program office for a known period,

for example, two to three years. Two, the home office should consult the system program office's key personnel (for example, the program director, deputy director, and responsible functional chief) before removing an individual from the system program office. Three, the program director should be given the evaluation authority for all collocated personnel. Four, the program director should be allowed to move the collocated personnel within the system program office to where they are needed when tasks change. Five, the management structure at the product division should be less centralized and more decentralized.

Question 29 asked "Should the management structure change, depending on the program's phase?" Half of those responding to this question agreed that the structure should change. Explaining why the types of people should change over the life of the program, one expressed it the best with his statement:

> You need high quality theoretical engineers and scientists, plus test and evaluation planners early in the program. Then, you need high quality technical engineers and scientists, plus test and evaluation executioners later in the program.

It was also stressed that program control was the one area in the system program office that should "be strong from the beginning to the end of the program." The program director of one major system program office said when he was first assigned to the program, the program control directorate was the smallest and weakest office. Since he could not obtain

any additional positions, he pulled people from throughout the system program office in order to build up the program control directorate.

Functional Specialists. Question 30 was "What functional specialists should be assigned directly to the system program office, not a functional home office. The response to this was generally "all of them." When asked to rank the specialties in priority order, the responses varied. Many of the Space Systems Division interviewees said they have always had everyone except for the contracting and logistics officers directly assigned to the program. They have also been told that the new matrixing system at Space Systems Division will not make any difference in their day to day management and control of the collocated personnel.

There were several that preferred the matrixing because then the system program office did not have to worry about training. However, in comments to other questions several interviewees discussed the fact that the home office requires program monies to be used to train the matrixed personnel. Then, shortly after both the formal and on the job training is finished, the home office will transfer the individual to another system program office.

Benefits of Directly Assigning Engineers. Question 31 was "What benefit would it be to the program if engineers were always assigned directly to the system program office?"

One interviewee who had been assigned to both divisions summarized it best "Basically, everything gets done earlier." Many interviewees responded that by having the personnel directly assigned, the program director could control his assets easier and the people would be loyal to the program, not to the home office. When people are matrixed and have their evaluations written by the home office, they are more concerned about what the home office tells them to do, versus what the system program office needs to have done.

Receiving Short Term Help. Question 32 asked the interviewees "If engineers were always assigned directly to the system program office, would additional engineers be needed to participate in source selections and other manpower intensive efforts?" and "If yes, during what efforts would additional technical help be needed?" Of the twenty respondents to this question, two thirds of them most believed additional help would be needed. However, even these programs are also relying on support from the users, the laboratories, and Aerospace Corporation. Several commented on the fact that they had asked for additional help from the functional offices and been turned down.

Directly Assigned - Advantages and Disadvantages. Question 33 was in three parts. One, "If all full time technical personnel are currently assigned directly to the system program office, what benefits does the program have?"

Two, "Are there any disadvantages?" and three, "If yes, what are they?" Many of the interviewees said their response to this question is the same as their responses to questions 16 and 31. A few added additional information, such as it provides continuity, loyalty, and cohesiveness to the system program office and control to the assignments. One of those who cited disadvantages felt it could result in a "resource allocation problem."

Matrix Management - Advantages and Disadvantages. Question 34 was in three parts also. The basic question was, "If matrix management is followed, what benefits does your program have with some technical positions collocated within the system program office and with the ability to ask for additional help from the home office?" They were then queried, "Are there any disadvantages?" and three, "If yes, what are they?" This question was skipped for most of the interviewees, since they answered this question while answering others. Five of the eight respondents to this portion said there were disadvantages to matrix management. Those who believed the existing matrix management was a disadvantage cited the lack of accountability the matrixed personnel had for the program's success, the high turnover of personnel, the inability to control movements and evaluations, and the lack of loyalty to the program. Benefits to matrix management included having the ability to

ask for additional help from the home office and for corporate expertise.

Management Structure of Prime Contractor. Question 35 asked "How is your primary contractor(s) program office structured?" Based on the responses, the prime contractor's are fairly evenly divided in their use of matrixing or directly assigning personnel. It was more a question of the program's dollar value and number of people needed, versus the way the company was managed overall. For example, AIL and Lockheed used matrix management on some programs and directly assigned everyone on other programs.

Question 36 was "Would it improve government-contractor relations on the program if both followed the same management structure?" and "Why, or why not?" Seven interviewees said yes and two said no. The primary reasons cited for the benefits of following the same structure were: then both the government and contractor would have similar counterparts and communications would be enhanced. One disadvantage of having the same structure was visualized by one interviewee who gave the example of one contractor working with more then one service and trying to accommodate the management structures of both services.

Matrix Management's Effect on the System Program Office

Intended as a "catch all" to cover any questions that should have been asked, but were not, Question 37 "What additional information about matrix management and its

effect on the system program office can you provide?" elicited an overwhelming response.

27XX Versus 28XX. Both to this question and others there were several comments about the different way 27XXs and 28XXs are used at each division and the fact that the military personnel system does not recognize the difference. At Aeronautical Systems Division, it is the 27XXs who are the project managers, in charge of a particular contractual effort. At Space Systems Division, it is the 28XXs who perform this function and the 27XXs are the "catchalls." There, 27XXs are assigned to a myriad of tasks and are usually found in nearly every directorate within the system program office. At Aeronautical Systems Division, 28XXs are used as engineers only, for specific tasks, and with no changes in tasks or position within the system program office unless the functional office authorizes it. At Space Systems Division, the 28XXs are both engineers and project officers and can be assigned a multitude of tasks within the system program office.

Below is as an illustrative example of how both the 27XXs and 28XXs are used at Space Systems Division, based on when the researcher was assigned there. According to the interviewee's comments, similar assignments occur today. Within the researcher's system program office, 27XXs were assigned to the following directorates: engineering (Air Force Academy graduates only), test and operations,

logistics, and program control. The 28XXs were assigned to engineering, test and operations, and advanced plans.

Accountability and Traceability. Many interviewees discussed the general lack of accountability and traceability for assigned tasks that existed with the matrixed personnel. There were several factors contributing to this problem. One, matrixed workers can be pulled without notice. Two, they can ask for, and receive, transfers to other system program offices or back to the home office. THree, except for the functional chiefs, who are referred to as "senior collocates" (ASD, 1988:2) at Aeronautical Systems Division, the home office evaluates all the civilian personnel. Four, even though the program director evaluates the functional chiefs, the rating can be changed by the functional office without discussions between the program director and the functional director.

The statements made above are what actually occurs at Aeronautical Systems Division and are contrary to Aeronautical Systems Division Regulation 30-2, dated 16 June 1988. For example, the regulation states that for civilian collocates other then the senior collocate and his assistant, "the rater will be the immediate supervisor as determined by the senior collocate" (ASD, 1988:8). Therefore, theoretically, the evaluations can all be accomplished within the system program office. In reality, all the immediate supervisors are back at the home office.

Nearly everyone had words similar to one interviewee "I strongly feel the system program office should rate the people working for it." They felt this was a necessary part of achieving loyalty to the program and ensuring the evaluators really knew what the individuals had accomplished during the previous year.

The Aeronautical Systems Division regulation also states letters coordinated by the home office and user organization will be sent to personnel within ten working days of the move (ASD, 1988:8-9). In reality, moves occur and even the senior collocatee does not always know about it ahead of time, with the paperwork not arriving at personnel for weeks or months after the move. One interviewee described a recent move of a key individual and said it was typical of the way the home offices work.

> I was at the airport on the way to brief the Secretary of Defense and asked if anyone had seen "xxxx" yet. The response was that the home office had notified "xxxx" the day before that he was to be transferred to another system program office, effective immediately. This individual was the one who knew the subject thoroughly, had prepared the briefing charts, had attended every briefing given on the way up the chain to brief the Secretary of Defense, and was the one I called on to answer the highly technical questions. Yet, neither the functional chief nor I had been informed of the transfer.

Resource Management. Even some of the individuals who were against matrix management agreed that the matrix structure permitted a reallocation of personnel when necessary that could not be done with the directly assigned

method. Also, critical skills could not be "hoarded" within one or two system program offices. Many of the interviewees said that the management structure itself was not important. As one individual stated "it is the personalities and backgrounds of the people that can make any management structure succeed or fail."

Analysis

This is an analysis of both the literature review and the interviews. The analysis is only made of the data as it relates to the initial objective of the research, which is restated below.

The objective of this research was to establish, in general, to what degree matrix management should be used in the system program office and, specifically, should engineers be matrixed into the system program office. The objective was accomplished by asking four research questions. Below, each research question is analyzed from the viewpoint of the interviewees.

Analysis of First Question. What does matrix management mean to a program director? To the system program office director, matrix management means not having control of the people who are working on program related tasks. The home office is the one responsible for assigning personnel to specific tasks and have control over who will work for the program, when, and for how long.

Analysis of Second Question. What specific problems does mandating a matrix matrix structure on the system program office generate for the program director? Based on their experience, the interviewees have noted several problems when the people are not directly assigned to the program office. These include: a lack of loyalty to the program, a lack of accountability and traceability, a lack of continuity, a high turnover rate.

One major point was the fact that the non major programs are used as "training ground" by the home office for their new people. Then, once the new people have been trained and can do the job proficiently by themselves, they are transferred to other system program offices. Another issue was that whether or not the matrixed personnel are collocated in the program office, their evaluations are usually determined by the home office.

Conflict between what the home office requires and what the system program office needs is another concern. Conflict can have both positive and negative aspects. If, due to the personalities involved, the same set of individuals consistently override the viewpoints and decisions of another set of individuals, then the conflict can generate problems for the program. If the conflict results in a willingness to try out new ideas or tasks instead of continuing to do the same thing because "it has

always been done that way," then the conflict can be advantageous for the program.

Analysis of Third Question. What degree of matrix management should exist in an Air Force Systems Command system program office? Limited, if any, matrix management was the general view. If it is necessary, due to manning shortfalls in critical areas, then the program director should have the authority to evaluate the individuals collocated in the system program office.

Analysis of Fourth Question. Should engineers be matrixed into the system program office? Yes. Comparing the total number of personnel assigned to the system program offices at Space Systems Division and Aeronautical Systems Division, Space Systems Division appears to have smaller manning levels because of the fact more of the work force are directly assigned to the system program office. This includes the military personnel, the civil service personnel, the Aerospace Corporation personnel, and the other non personal services contractors. The matrixed structure used at Aeronautical Systems Division appears to require a large overhead of personnel to manage the efforts of the matrixed personnel. Based on the chart ASD/EN prepares semiannually, of the 1160 individuals allocated for support to the system program office, 209 of them, or 18 percent, work in the home office (EN, 1990:2). Another 536 work just on home office related efforts (EN, 1990:3).

Summary

Chapter IV primarily summarized, synthesized, and analyzed the multitude of comments made by the 34 program directors and deputies who were interviewed. (Appendix D contains the "raw" comments.) Then, the original research questions were analyzed against the information obtained during the interviews and the literature review.

V. Recommendations

Overview

After reviewing existing literature and interviewing 34 program directors and deputies from Aeronautical Systems Division and Space Systems Division, this researcher believes it would be better for the system program office if the matrix organization structure was abolished at the product divisions. However, since that will not happen due to the manning constraints, empires, and the Program Executive Officer structure, this researcher has a number of recommendations that would improve the current and pending matrix management structure at each division. These recommendations are intended to be constructive and readily implementable. They address the shortcomings of the matrix organization structure identified both in Chapter IV and previous research efforts on matrixing. One hopes the consistent weight of evidence may precipitate remedial action and the recommendations are implemented.

Request for Proposal Team

This suggestion was made by one of the program directors and is similar to what government contractors do when they are preparing a Proposal. Create a Request for Proposal Team at each division, comprised of the most experienced acquisition personnel. With the help of two or

three people from the system program office, this team would be responsible for writing the technical portions of the Request for Proposal, including the Statement of Work and Contract Data Requirements List, then assisting with the Source Selection. As the program director stated:

> If we had a trained team to write Request for Proposals, then do the Source Selection, the Request for Proposals would be written right the first time . . . Now, we spend time and people correcting and modifying problems from earlier phases. I believe if we could put together a team of the "best" people from each functional area into one organization that would then be able to react when it was time to write a Request for Proposal, it would be the best investment of man hours, given the decrease of personnel. Then, the size of a system program office would only need to increase [by adding in the team members] during the Request for Proposal writing and Source Selection period. Putting people in afterwards to manage and execute the contract would then be easier and require less people. Contractors do the same thing. They do not worry about the niceties of rank and neither should we. Have this organization also act as consultants. They know what does not work.
>
> The same principle could be applied to a data call. The engineer wants everything, but usually glances at a particular report the first time and rarely looks at future issues. He really just wanted it to see what it looked like. For our program, we have the contractor keep the data and we go there when we want to review it. This saves time and money that would otherwise be consumed on paying for and receiving useless documents.

Cadre of Engineers

Each system program office should have a certain percentage of the engineers directly assigned. Also, the program director should be given the freedom to move the matrixed engineers within the system program office and

assign tasks as needed. The Space Systems Division interviewees believed one of the reasons for the smaller size of their system program offices was because most of their personnel were directly assigned. Since having all of the personnel directly assigned is not feasible, as stated earlier, then compromise by having a cadre of engineers directly assigned to the program director. Then, he can task them and move them within the system program office as the situation warrants.

Pipeline Training

Implement pipeline acquisition training for new personnel, both military and civil service. If it will take even one year for Headquarters Air Training Command to implement the training, then initially have the training conducted at each product division by a team of experienced acquisition personnel. The course could be similar to the Introduction to Systems Acquisition Management course that is taught at Brooks Air Force Base, but with more attention focused on the overall elements of acquisition and less time spent on "exercises."

The rudiments could be taught at the division level in an initial two week class that is scheduled once a month from about October to May, then twice a month from about May to October. The instructors could teach "advanced" classes on subjects such as "Writing a Statement of Work," "Preparing the Contract Data Requirements List," and

"Participating in Source Selection." (This method is similar to what the researcher received at the base level in her first year of assignment at Space Systems Division. During that time period, Mr Ron Verba was responsible for training the hundreds of new lieutenants who arrived at the division in 1980 and 1981.) As part of an individual's in-processing at his first assignment, the date he is scheduled to attend the initial course would be assigned, similar to the way he is assigned the human factors and safety courses.

There are two key benefits to implementing and keeping a course at the division level. One, the course could be tailored to each division. (All the courses the researcher ever took or audited at Brooks Air Force Base and Wright-Patterson Air Force Base only focused on aircraft. For example, the only thing the researcher learned from taking the SYS 229 Test and Evaluation course was the difference between development, initial, and follow-on test and evaluation for the hardware components of an aircraft. Little was translatable back in the system program office to testing software.)

Two, the new accessions could be trained faster and at less cost, since the number of slots available would not be determined two years before the requirements were known and no temporary duty funds would be required.

Incentives for Matrix to Work

If matrixing must continue, and in Space Systems Division it is expected to expand to cover more personnel, then certain changes must be made from how it is now implemented. One, even if "rice bowls" are broken, the program director must be given complete authority for all the resources assigned to the system program office. When the functional manager has more authority then the program director, then the prime emphasis is on job knowledge. When the program director has more authority then the functional manager, then the prime emphasis is on job performance. The success of a program is dependent on the performance of its personnel.

Two, the program directors should have some input into reviewing and coordinating the regulations that govern how matrix management will be applied.

Three, once coordinated by the program directors and the functional directors, then the regulation should be followed. Many of the problems the program directors have with matrixing are a result of the current regulation not being followed. The bottom line is that throughout the life of any program, it is "Project managers who are responsible for results" (Cleland, 1988:975) and it is the "Functional managers who are responsible for providing resources to attain results" (Cleland, 1988:975). The key question to answer is "How much influence should the program director

have in obtaining experienced acquisition personnel?" The researcher believes that if the divisions made the changes discussed below, much of the potential for conflict between the personnel directly assigned to the system program office and those collocated in the system program office would be eliminated.

First, coordinate transfers with the program director and functional chief before the change is made. As stated by all the interviewees except for those whose programs follow Air Force Regulation 800-29, their matrixed personnel are continuously being transferred without the program director's knowledge until after the fact.

Second, if an individual is collocated within the system program office, his evaluation should be done by someone who is also working within the system program office. The current regulation does not state all civilian evaluations, except for the senior collocatee and deputy, will be done by the home office. Instead, it states "The rater will be the immediate supervisor as determined by the senior collocate" (ASD, 1988:8). Yet, except in two Aeronautical Systems Division system program offices, the civilian evaluations are done by home office personnel. Maybe the sentence should be replaced by the one in the 1977 regulation "The designated 'Rater' will be the immediate operational supervisor" (ASD, 1977:12), who was in the user organization.

Third, assign a matrixed individual to a system program office for a given period of time and, except for promotions or laterals, do not transfer him to another system program office during the stated time period. None of the reasons given for transferring individuals were because they had very limited technical specialties that were now needed on another program. Instead, the transferring appeared to be because one program was able to justify a higher priority for having an experienced person or because the inexperienced people had been trained by a "low priority" program and could now be transferred to a "high priority" program or because the individual had been assigned to the system program office for 24 months, therefore it was time to move.

Fourth, when the system program office funds training for a matrixed individual, the home office and the individual should sign a division-level "commitment" to remain in the system program office for a given period, similar to what is done at the personnel level for remaining in the military and civil service.

Fifth, consider restructuring the civil service grade structure for the acquisition specialties to increase the grades allowable for a given college degree. Expecting a college graduate with a bachelor of science in engineering to take a GS-7 position means either the position will remain unfilled, or it will be filled by someone who could

not find a job anywhere else. The same situation applies in the area of contracting. The new education requirements state that if an individual has a bachelors degree, he can fill a GS-5 position. If the individual has a master's degree, he can fill a GS-7 position and earning a Ph.D. will only yield a GS-11 position. (Hunter, 1990:7)

Air Force Systems Command Study

Form a team comprised of one to two individuals from each product division who would perform a thorough, command wide study focused on ways to improve the use of the matrix concept. This effort would determine the extent of matrixing that should be done in the system program office and determine how to resolve potential conflicts that will be incurred due to the planned expansion of matrixing at the product divisions. This study should be done and completed before matrixing is expanded at any of the divisions. The amount of time needed to perform an exhaustive study is not sufficient for one individual working on it part time over a 15 month period. A team with command oversight could accomplish the required tasks in a few months and they would have both the time and opportunity to conduct a thorough research at each of the divisions.

Summary

Matrixing has few advantages, when seen from the program director's viewpoint. However, it will remain in

place at the product divisions due to the current manning constraints and the Program Executive Officer structure imposed while this research was in progress. This chapter discussed ways to ease the burden on the program director that the matrix structure imposes.

Appendix A: Program Manager's Oath

OATH OF A PROGRAM MANAGER

I do not choose to be an ordinary officer in the Armed Forces of the United States.

It is my right to be unique . . . if I can seek opportunity and challenge . . . not security and status quo.

I do not wish to be an ordinary officer, I prefer to take the calculated risk; to dream and to build and to succeed.

I refuse to barter incentive and innovation for the routine and the regulation.

I prefer the challenges of a job which lets me take my career into my hands while at the same time offering me both the unparalleled opportunity and high honor of serving my branch of the Armed Forces and my country.

I will not trade the frustrations and long hours for the routine and placid life of those who are not fortunate enough to feel neither the awesome burden of complete responsibility nor the effervescent and ecstatic feeling of accomplishment when a job is done well.

I will never cower before those who would challenge what I do, rather I will stand erect, proud, and unafraid; to think and to act for myself; to enjoy the benefits of my efforts; and to face the world boldly so that I can say when my tour of duty is over:

I DID MY BEST!

(DSMC, 1975:28)

Appendix B: Cover Letter

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AERONAUTICAL SYSTEMS DIVISION (AFSC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433-6503

16 APR 1990

REPLY TO ATTN OF: YC

SUBJECT: Request for Interview

TO: See Distribution

1. Request either you or your deputy participate in an interview conducted by Capt Charlotte E. Hunter, a graduate student from the Air Force Institute of Technology (AFIT). This interview will generate material for an AFIT research effort concerning the degree of matrix management that should be used in a program office and whether engineers should be assigned directly to the program office or matrixed into it.

2. Attachment 1 is a copy of the interview guide Capt Hunter will use to conduct the interview. She will call your office the week of 30 April to schedule the interview. Due to time and budget limitations, Space Systems Division interviews need to be conducted via the telephone. Aeronautical Systems Division interviews can be conducted either in person or via the telephone. If your schedule precludes a formal interview, you also have the option of completing the interview guide and returning it to Capt Hunter at AFIT/LSG by 1 June.

3. Your cooperation and assistance with this effort is appreciated. The information obtained will provide data for use in Capt Hunter's AFIT student thesis project. The data is not intended to assess organization or individual performance. All responses will be held in the strictest confidence. Neither individuals nor program offices will be associated with any of the data, unless expressly desired by the System Program Office Director or Program Manager.

MICHAEL J. BUTCHKO, Jr.
Brigadier General, USAF
Program Director for C-17 SPO

2 Atch
1. Interview Guide
2. Distribution List

Appendix C: Interview Guide

INTERVIEW GUIDE

Interview Date: _____

Program Office: _____

Program Address: _____

_____

System Program Office Director: _____

Deputy Director: _____

Interviewee: _____

Interviewee's specialty code
(eg 0002 or 0029): _____

Request Anonymity: _____

INTERVIEW QUESTIONS

PROGRAM DIRECTOR INFORMATION

(This section is to determine your system program office background.)

01. When were you assigned to your current position?

_____

02. Have you been a System Program Office Director or Deputy Director on any other program(s)?

YES _____ NO _____

If yes, for which program(s), in which position(s), and for how long?

_____

_____

_____

IF YOU HAVE ONLY WORKED IN A PROGRAM OFFICE AS A SYSTEM PROGRAM OFFICE DIRECTOR OR DEPUTY DIRECTOR, SKIP TO QUESTION 9.

03. What is the total time you were assigned to system program offices as other than a Program Director or Deputy Director before assuming your current position?

_____

04. What specialty code(s) were you assigned?

_____

05. What system program office directorate(s) or divisions did you work for previously? (For example, engineering, logistics, procurement, program control, operations, test.)

_____

_____

06. Were you assigned directly to the system program office, or were you matrixed from a functional organization? (For example, engineering, logistics, procurement, program control, test.)

ASSIGNED DIRECTLY _____

MATRIXED FROM _____

_____

If matrixed, were your evaluations signed by an individual assigned collocated within the system program office?

YES _____ NO _____

07. Of the programs you were assigned to previously, how many used a matrix management structure (ie. one or more full time individuals reported to a functional manager outside the system program office) for its technical personnel?

_____

IF NONE, SKIP TO QUESTION 08.

(a) What Air Force System Command (AFSC) divisions had responsibility for the program(s)?

_____

_____

(b) What functional organizations assigned personnel on a full time basis to the system program office? (For example, engineering, logistics, procurement, program control, test.)

_____

_____

(c) What functional organizations assigned personnel on a part time basis to the system program office? (For example, engineering, logistics, procurement, program control, test.)

_____

_____

(d) What problems were you aware of with the program, if any, that could be associated with using matrix management?

_____

_____

_____

_____

_____

08. Of the programs you were assigned to previously, in how many did all the full time technical personnel (with the exception of the 0002 and 0029 positions) report directly to someone within the system program office (referred to as program management)?

_____

IF NONE, SKIP TO QUESTION 09.

(a) What Air Force System Command (AFSC) divisions had responsibility for the program(s)?

_____

_____

(b) What functional organizations assigned personnel on a full time basis to the system program office? (For example, engineering, logistics, procurement, program control, test.)

_____

_____

(c) What functional organizations assigned personnel on a part time basis to the system program office? (For example, engineering, logistics, procurement, program control, test.)

_____

_____

(d) What problems were you aware of with the program, if any, that could be associated with using program management?

_____

_____

_____

_____

_____

09. What functional organizations have you been assigned to previously where the majority of the personnel were routinely assigned to system program office-related work? (For example, engineering, logistics, procurement, program control, test.)

_____

_____

MANNING

(This section is to determine both the actual program manning and your viewpoints on how the program should be manned.)

10. How many personnel positions is the program authorized?

_____

11. How many personnel are currently assigned to the system program office against those positions?

_____

12. If matrix management is followed, how many collocated personnel are assigned to the system program office?

_____

What functional areas are they assigned to?

_____

_____

13. About how many personnel at the division level work on program-related matters, but are not collocated within the system program office?

_____

What functional office(s) are they assigned to?

_____

_____

Do you believe the program is receiving the full benefit of their work?

YES _____ NO _____

If no, why not?

_____

_____

_____

_____

_____

_____

14. Not counting yourself, how many individuals collocated in the system program office have their evaluations signed by someone not collocated within the system program office?

_____

15. Are the assigned personnel adequately qualified? (For example, is training, rank commensurate with job requirements?)

YES _____ NO _____

If no, in what areas are they deficient?

_____

_____

_____

16. Do you believe it is **desirable** to have key civilian and military personnel assigned to the program for its duration?

YES _____ NO _____

Why, or why not?

_____

_____

_____

_____

17. Is it **feasible** for key civilian and military personnel to be assigned to the program for its duration?

YES _____ NO _____

Why, or why not?

_____

_____

_____

_____

18. What formal authority do you have to obtain the required technical support?

_____

_____

19. What informal authority do you use to obtain the required technical support?

_____

_____

20. Currently, is the system program office adequately manned to do the required tasks?

YES _____ NO _____

If no, why not? (For example, additional personnel, different rank structure, additional skills, additional training.)

_____

_____

_____

_____

21. What are the key problems in obtaining personnel?

_____

_____

_____

_____

22. During what phase will the personnel problem/issue be most critical during the acquisition cycle of this program?

_____

_____

23. How does the priority of your program affect personnel manning?

_____

_____

24. How does the civilian and military personnel system affect the overall performance of the system program office?

_____

_____

_____

_____

_____

_____

25. Will your program require fewer personnel once systems begin deploying?

YES _____ NO _____

If no, why not?

_____

_____

_____

_____

_____

26. Does your system program office have any nonpersonal services contracts because of insufficient numbers of government technical personnel? (One example at HQ SSD would be Aerospace Corporation. An example at HQ ASD includes firms such as ARINC, BDM, RJO, and TASC.)

YES _____ NO _____

If yes, approximately how many total contractors are assigned to the nonpersonal services contracts and approximately how many of those contractors are collocated within system program office facilities?

NUMBER ASSIGNED _____ NUMBER COLLOCATED _____

Management Structure

(This section is to determine your viewpoints on the management structure used.)

27. Are you satisfied with the management structure used?

YES _____ NO _____

Why, or why not?

_____

_____

_____

_____

28. Which management structure should this program have right now?

_____

_____

Why?

_____

_____

_____

_____

29. Should the management structure change, depending on the phase of the program?

YES _____ NO _____

Why?

_____

_____

_____

_____

30. What functional specialists should be assigned directly to the system program office, not a functional home office?

_____

_____

31. What benefit would it be to the program if engineers were always assigned directly to the system program office?

_____

_____

_____

_____

32. If engineers were always assigned directly to the system program office, would additional engineers be needed to participate in source selections and other manpower intensive efforts?

YES _____ NO _____

If yes, during what efforts would additional technical help be needed?

_____

_____

33. If all full time technical personnel are currently assigned directly to the system program office, what benefits does the program have?

_____

_____

_____

_____

Are there any disadvantages?

YES _____ NO _____

If yes, what are they?

_____

_____

_____

_____

34. If matrix management is followed, what benefits does your program have with some technical positions collocated within the system program office and with the ability to ask for additional help from the home office?

_____

_____

_____

_____

Are there any disadvantages?

YES _____ NO _____

If yes, what are they?

_____

_____

_____

_____

35. How is your primary contractor(s) program office structured?

_____

_____

36. Would it improve government-contractor relations on the program if both followed the same management structure?

YES _____ NO _____

Why, or why not?

_____

_____

_____

37. What additional information about matrix management and its effect on the system program office can you provide?

_____

_____

_____

_____

_____

_____

_____

_____

Appendix D: Interviewee Comments

NOTE 1: Since the interviews were not recorded, the responses are not exact quotes. The comments are compiled from the note taking done by the researcher during each interview. The comments in Appendix D have been tailored to include only the material pertinent to this research effort. Additional editing was done to delete comments extraneous to the question, change acronyms to words, and, where necessary, to modify any references to actual programs or the particular division. The comments are not listed in any order. To separate comments made by different interviewees, the "a, b, c" method is used.

NOTE 2: When there is a "Yes or No" question, the first number after each refers to how many from Aeronautical Systems Division responded with that answer and the second number is how many from Space Systems Division had the same response. Sometimes the numbers do not add up because an interviewee would say "Yes and No." Based on answers at the beginning of the interview, many questions were skipped. There were two basic reasons for passing over a question. One, because it had already been answered in the process of answering an earlier question. Two, the question did not apply to the particular program or interviewee.

INTERVIEW QUESTIONS AND RESPONSES

PROGRAM MANAGER INFORMATION

01. When were you assigned to your current position?

Table 9. Number of Years in Current Position

YEARS	INTERVIEWEES			
	Number		Percent	
	ASD	SSD	ASD	SSD
over 4	1	1	6.2	5.6
3 < x < 4	2	1	12.5	5.6
2 < x < 3	2	3	12.5	16.7
1 < x < 2	6	6	37.5	33.3
less than 1	5	7	31.3	38.8
Total	16	18	100.0	100.0

02. Have you been a System Program Office Director, Program Manager, or Deputy on any other program(s)?

YES 11 / 11 **NO** 5 / 7

If yes, for which program(s), in which position(s), and for how long?

Table 10. Number of Years as Program Director and/or Deputy

YEARS	INTERVIEWEES			
	Number		Percent	
	ASD	SSD	ASD	SSD
over 15	1	0	6.2	0
10 < x < 15	3	1	18.8	5.6
5 < x < 10	4	8	25.0	44.4
1 < x < 5	3	3	18.8	16.6
less than 1	5	6	31.2	29.4
Total	16	18	100.0	100.0

03. What is the total time you were assigned to system program offices as other than a System Program Office Director, Program Manager, or Deputy before assuming your current position?

Table 11. Experience at AFSC Product Divisions

EXPERIENCE	INTERVIEWEES			
	Number		Percent	
	ASD	SSD	ASD	SSD
3 divisions	0	1	0	5.5
2 divisions	0	5	0	27.8
1 division	16	12	100.0	66.7
Total	16	18	100.0	100.0

Table 12. Total Time in the Acquisition Environment

YEARS	INTERVIEWEES			
	Number		Percent	
	ASD	SSD	ASD	SSD
over 15	5	4	31.3	22.2
10 < x < 15	4	4	25.0	22.2
5 < x < 10	5	7	31.2	38.9
1 < x < 5	2	3	12.5	16.7
Total Interviewees	16	18	100.0	100.0

04. What specialty code(s) were you assigned?

The vast majority of the Aeronautical Systems Division interviewees had held the 27XX specialty code, or its equivalent. Four had held the engineering specialty code equivalents (801, 855, and 861).

Specialties were fairly evenly split with the Space Systems Division interviewees. Five had held the 27XX and/or 29XX specialty and seven had held the 28XX specialty. (One had held both specialty codes.) One interviewee had been a computer specialist before becoming a 2716.

05. What system program office directorate(s) or divisions did you work for previously? (For example, engineering, logistics, procurement, program control, operations, test.)

The experience of the Aeronautical Systems Division program directors and deputies interviewed included time in the following areas: projects, program control, configuration, testing, deployment, engineering, logistics, planning, foreign military sales, special assistant to the program director. One had been on a Systems Acquisition Management Inspection team.

The experience of the Space Systems Division program directors and deputies interviewed included time in the following areas: projects, engineering, testing, planning, and integration. Two had been a Program Element Monitor.

06. Were you assigned directly to the system program office, or were you matrixed from a functional organization? (For example, engineering, logistics, procurement, program control, test.)

Of all the interviews with previous program office experience, only one had ever been matrixed from a functional office. All the rest had always been assigned directly.

07. Of the programs you were assigned to previously, how many used a matrix management structure (ie. one or more full time individuals reported to a functional manager outside the program office) for its technical personnel?

08. Of the programs you were assigned to previously, in how many did all the full time technical personnel (with the exception of the 0002 and 0029 positions) report directly to someone within the program office?

There was no difference in responses to numbers seven and eight. At Aeronautical Systems Division, nearly every individual was matrixed into the system program office except those staff assigned directly to the "front office" (Program Director, the Deputy Director, the Executive Officer, clerical), and the project officers (27XXs). At Space Systems Division, with few exceptions everyone except the contracting and logistics officers were directly assigned.

09. What functional organizations have you been assigned to previously where the majority of the personnel were routinely assigned to program office-related work? (For example, engineering, logistics, procurement, program control, test.)

Only one of the individuals interviewed had ever been matrixed into a program office from a functional organization. All the remaining have always been directly assigned to the program office.

MANNING

10. How many personnel positions is the program authorized?

Table 13. Directly Assigned Personnel - Authorized

MANNING LEVEL	NUMBER SPOs ASD	SSD
450 < x < 500	1	0
250 < x < 450	0	0
200 < x < 250	3	0
150 < x < 200	1	0
100 < x < 150	6	2
50 < x < 100	1	14
less than 50	4	1
Total SPOs	16	17

11. How many personnel are currently assigned to the system program office against those positions?

Table 14. Directly Assigned Personnel - Assigned

MANNING LEVEL	NUMBER SPOs ASD	SSD
450 < x < 500	1	0
250 < x < 450	0	0
200 < x < 250	3	0
150 < x < 200	1	0
100 < x < 150	5	2
50 < x < 100	3	9
less than 50	3	6
Total SPOs	16	17

12. If matrix management is followed, how many collocated personnel are assigned to the system program office?

Table 15. Personnel Matrixed into System Program Office

COLLOCATED PERSONNEL	NUMBER SPOs ASD	SSD
350 < x < 400	1	0
300 < x < 350	0	0
250 < x < 300	1	0
200 < x < 250	3	0
150 < x < 200	3	0
100 < x < 150	3	0
50 < x < 100	4	0
25 < x < 50	1	2
less than 25	0	15
Total SPOs	16	17

To what functional areas are they assigned?

At Aeronautical Systems Division, every system program office had personnel matrixed from ASD/PM, ASD/PMD, ASD/EN, ASD/AL, and ASD/AC. Ten of the programs also had ASD/SE personnel assigned, six had ASD/SC people, three had ASD/SP. One each had ASD/SD and ASD/CE support.

At Space Systems Division, seven of the system program offices had both SSD/PM and SSD/AL personnel collocated. Three of the seven programs also had either SSD/AC and security personnel, or both. One of the seven programs also had an individual from SSD/PD. Three system program offices only had personnel matrixed in from SSD/PM. One system program office had people matrixed in from program control and contracting. One system program office did not have any collocated people.

13. About how many personnel at the division level work on program-related matters, but are not collocated within the system program office?

Four interviewees at Aeronautical Systems Division and six at Space Systems Division said others outside the program office worked on program-related matters. Only one from Aeronautical Systems Division knew about how many worked on the program. At Space Systems Division, four knew how many worked on the program.

To what functional office(s) are they assigned?

All four of the Aeronautical Systems Division programs had additional people from engineering working on a part time basis on the program back in the home office and one also had the help of additional contracting officers on a part time basis.

The part time help for the Space Systems Division program offices was varied. Four received help from contracting, one from weather, security, and safety, two from logistics, and one from intelligence and finance.

Do you believe the program is receiving the full benefit of their work?

YES 2 / 4 **NO** 1 / 1

If no, why not?

a. If you are not here, your loyalty is split and your effectiveness is decreased.

b. There are not enough people to handle the workload. It is very, very difficult to get good horizontal communication. So much is happening that it is difficult to keep the boss informed.

c. Their efforts are basically part time and specialized. Also, the numbers are low so it is easier to keep track of them.

d. We do not have any leverage to get support when we need it. There are some matrix communities that, if we need some one full time on a temporary basis, we can do it. For example, Aerospace Corporation has a battery specialist and guidance control expert that many of the system program offices get help from. For other functional areas, like program control and graphics, it is extremely difficult to get extra support.

For example, the Program Executive Officer recently changed over 50 vugraphs that were going to be presented three days later to the Secretary of Defense. The graphics shop said it would take two weeks to prepare new vugraphs. We went to the head of audio visual, their boss, who said he could have it done in one week. To me, that is unacceptable support. And, the same individual has refused to allow the programs to have their own, internal graphics support. So, my engineers had to spend long days and evenings preparing the vugraphs when they should have been working on other tasks.

14. Not counting yourself, how many individuals collocated in the program office have their evaluations signed by someone not collocated within the system program office?

At Aeronautical Systems Division, with only a few exceptions where program directors have been able to change the system, the functional chief's evaluation and the military evaluations are done within the system program office. Evaluations for the other matrixed civilians are done by the home office.

The "rule" at Space Systems Division is that evaluations for the contracting and logistics personnel are prepared within the program office, then endorsed by the home office.

15. Are the assigned personnel adequately qualified? (For example, is training, rank commensurate with job requirements?)

YES 12 / 14 **NO** 5 / 2

If no, in what areas are they deficient?

a. They are less qualified than personnel in my last system program office at this division and at Electronic System Division. Generally, they are new people. There is a real time problem in trying to get people trained. Many are not qualified, especially contracting and engineering.

b. They are qualified, in general. Some are qualified, some are not due to lack of job experience. It is an issue of lack of experience and lack of training.

c. Configuration managers are a critical shortage at Aeronautical Systems Division.

d. I had a major in charge of the entire integration effort and his four lower ranking people, all lieutenants, had an average experience level of four months. He was pulled to write a Request for Proposal and perform source selection for another program. After being gone for ten months, he will finally be returning - only because the funding never came through for the other program to do the intended effort!

Most do not have any experience in program management when they first arrive. The experience curve of the lieutenants is about three years and that of the majors about two months, lieutenant colonels about 12 years. Our directorate chiefs have a high turnover each year.

In response to a customer survey (total quality requirement), our contractor said the major problem with the system program office was that we lacked trained people and we had a problem with continual turnover of personnel.

e. This system program office is very fortunate. The acquisition experience of our people averages about 2 1/2 years, therefore they are basically well qualified. Many are on their second tour. Only three are rated, and one of them is on his second acquisition tour.

f. They become that way. We get new, inexperienced individuals initially, then we train them. About 20 percent of our people currently have no direct experience and no system program office experience.

g. Sometimes they are and sometimes they are not. Our manufacturing personnel are low in terms of experience, as well as the configuration personnel, who also need training.

h. We are lacking software management personnel.

i. New lieutenants are lacking in acquisition training. Second lieutenants are assigned directly without any pipeline training.

j. We are a basket system program office that provides components to other programs. People in the straight line reporting are qualified.

The matrixed people keep getting rotated through the program by the home offices. The home offices have no perception of the need to have good basic acquisition and technical knowledge. People stay about 18 months and then leave for another program, right when they are finally able to work on their own.

k. It varies. Generally, the engineers are well trained, as are the program control and contracting personnel. The logistics experience level varies.

Everyone, from all the specialties, needs more training than they are getting. The biggest problem in Air Force Systems Command is training their people. All the operational commands train their people. There is no undergraduate acquisition training program like the space operations and engineering program. Also, there is no division level acquisition training.

The Air Force Systems Command entry level acquisition training does not occur until after the individual arrives and is assigned to the program. Some strides have been made in acquisition training, but it is still in its embryonic stage. Pipeline training should be implemented as with other officer career fields.

l. In general, we sometimes have a problem because our new lieutenants lack experience.

m. In general, yes, as much as any other place I have been.

n. We get too many lieutenants fresh out of school. Our staff level officers are young and inexperienced. Our senior captains are coming in from missile jobs and space operations jobs and do not have any acquisition experience or training. We have young civil engineers that also lack experience and training.

o. Young singles predominate in the system program office. They are not technically skilled since we get them right out of school. They lack experience and knowledge to be project officers and need to learn basic project officer skills.

p. Adequate, yes. Contracting is a constant problem because of the high turnover. Contracting has a major problem keeping the civil servants once they are trained because the grass is greener on the outside. It hurts all the programs because the contracting force is mainly civilians.

The same situation applies to the clerical support. Once they are trained, especially those with clearances, they go to work for the contractors.

q. For the military, we have the normal problems of having very young people. Over 40 percent of our personnel are now lieutenants. They are motivated and work hard, but it would be nice to have senior, experienced people.

Many of the military get out after their first assignment and go to work in the Los Angeles area. They are more motivated to leave the service than those at Aeronautical Systems Division because of the multiple job opportunities in the civilian market here.

For the civilian, because the job market here is so good, it is rare to have civilians stay in for long.

Secretaries and contracting officers are the most in demand. It is very difficult to hold on to these specialties because of the pay differential here.

r. There is a general lack of experience in all the specialties. It is not too bad, but there should be about two more majors and two or three more captains in this system program office.

s. This program is lacking mid level experienced management.

t. With matrixed people, the tasks they can do are relatively narrow. We are locked into giving them only certain tasks and activities.

In the broader context, the program director should be able to move around his people. He is responsible for providing leadership and pointing them in the right direction. The technical issues are decided by specialists.

u. We are lacking field grade officers with both technical and acquisition experience. We have plenty of space cadets that know the space environment and the military standards.

The new ones are smart and hard working, but they do not have any experience. They also do not know the science of acquisition and how to do.

The heart of the issue is the Air Force premise that people can be moved around at will because the jobs and tasks are interchangeable, no matter what division it is.

It is one thing to expect a senior officer or senior NCO to be capable of managing people no matter what the job is. It is something quite different to expect junior officers to be able to transition rapidly from a satellite acquisition environment to an aircraft acquisition environment to an electronic equipment acquisition environment.

v. The lieutenants generally have little understanding of acquisition. For the most part, they are well educated technically and come up to speed fairly rapidly in terms of the functional requirements.

They are behind the power curve acquisitionally though and there is a fierce competition for the basic acquisition courses. Above the lieutenant level the people are well qualified.

There is always a learning curve when people are transferred to a new product division. At the senior level, management versus technical skills are required. Any experienced program director worth his salt should be able to manage any program. At the lower level, it is a different story and it is more difficult to make the transition from one technical knowledge base to another.

w. About four years ago, most of the systems program office personnel consisted of second lieutenants. Last year, as new captains, many either got assignments or were separated. As a result, we had over a 60 percent turnover of people.

Most of our new people had acquisition experience from either Aeronautical Systems Division or the laboratories. However, zero had any space experience. It took a while to get the new people acclimated and to fill most of the vacancies, but we are doing okay now.

x. In general, yes they are qualified.

16. Do you believe it is desirable to have key civilian and military personnel assigned to the program for its duration or through a phase?

YES 10 / 11 **NO** 4 / 3

Why, or why not?

a. It may be desirable for them to stay at least through a given phase or milestone.

Different people have different philosophies on how something should be done. This can cause a delay in the program, it can upset the schedule and it can upset the contractor.

If an influential person leaves, it is usually bad for the program, if one comes in, then it is usually good for the program.

b. At least to defined milestones. This will help to ensure (1) continuity of leadership, strategy, priorities, (2) accountability for decisions, (3) promotions based on results, not whether the squares were filled.

c. Keep the key people from early in program through Full Scale Development.

d. Yes, but only for specific phases since a program can last 10 to 30 years.

e. The acquisition cycle is too long for program duration, but it would be desirable/feasible to keep them in place at least through a major decision/milestone. Keeping the key people in place through the entire program may be feasible for small projects, such as the ASD/AE programs.

f. Do not say we can not do it. The way it is now, we do not understand the user requirements since the Production and Deployment phase is when the design is supposed to be stable.

g. There should be an attempt made to try and stabilize management for each phase. The earliest phases are the most critical, because about 80 percent of the design and costs are determined then.

h. It would help continuity of the program to keep them in place at least through a particular phase. Continuous changes of personnel hurts a program most because the people are always trying to get up to speed.

i. It is necessary to bring in new ideas. The navy approach of "cradle to grave" is not healthy. The tours need to be controlled so the length of time spent on any one program is not excessive.

Maj Gen Schofield has been on the B-2 program since 1983 and the Stealth Fighter before that, so it is possible. But, the program could be hamstrung by old knowledge.

At a high level military meeting, part of the discussion was that we will not see civilians in charge of a System Program Office unless the military goof up. The Army was told the same thing. Civilians believe our programs would be better off if they ran the programs because they would be dealing with civilian counterparts [contractors].

It may be feasible to split up the program tasks, with the military running Full Scale Development where there is still flexible requirements and the civilian running production and deployment, where you apply business management principles. There should be some kind of system that would allow civilians to manage the business requirements.

j. It would be useful to ensure continuity and to develop integrity so the system program office personnel know what the contractors and others are dealing with.

By switching the people so often, everyone needs to stick to the regulations, and manuals, thus becoming very rule oriented.

k. Large programs last 10 to 20 years. It is not practical to assign someone to a program for that long. It does makes sense to stabilize key positions between major program milestones.

l. Keep them in place at least for a program phase or stay between major milestones. Key civilians could be extended to provide continuity.

m. Maj Gen Schofield has been the director of the B-2 System Program Office since about 1984. As a whole, staying in one position is not the way to higher rank.

n. The system program office needs corporate knowledge, but it also needs growth and fresh ideas versus the "we have always done it that way" mentality.

Instability of the general work force is one thing, but it should not carry over to the program management area.

o. A small percentage would be useful to ensure continuity. This would work best for civilians. Given the current military broadening requirements, it would not work well for the military. A controlled three to four year tour would be best.

p. The program director should be kept for a phase or between milestones. The functional chiefs are not as important to keep for the long term, but should be kept a minimum of three years. We need to keep certain key positions from milestone to milestone.

q. Stability is good. It provides an overlap of people. There are quite a few people with long tenure here. Both the person and the program can stagnate if someone stays in one position too long.

r. There is no need for overlap in our program since each project lasts only about two to three years and the project manager handles the entire project.

s. If you have key people remain, at least from one milestone to another, it helps build teamwork. In other offices I have worked in, there has been an adversarial relationship between the contracting officers and the rest of the system program office when the contracting officers were not collocated.

The longer the system program office has a person assigned, the better the corporate memory.

t. To ensure technical familiarity with the program. Program directors are left hanging without support. To provide rapport with new personnel and aid in team building.

I only knew of one major program at Space Systems Division where the program director stayed for very long. He stayed in the position five years, then retired.

u. Absolutely, not only the key personnel, but all those who work full time on the program should be assigned full time.

v. It is impossible to maintain continuity and historical perspective with continual military turnover.

w. The duration a person remains is relative. It is difficult to keep people for the length of a program, but it may be practical to keep them for a phase.

x. Yes, with a caveat. It is unrealistic to have military assigned for the duration of the program. It is definitely possible and desirable to have them assigned for a phase or a critical milestone, for example when the production contract is complete. Keeping civilians in place would be beneficial to the program.

y. Different skills are required during the different acquisitions phases. Both psychologically and acquisition experience, people differ. Some are better suited for one phase versus another.

For example, the testing and engineering skills needed during one phase differ from the skills needed during another phase.

New blood is needed through out the program. One can get aged by staying on one program indefinitely and lost perspective. Change in personnel at regular intervals is a key factor to ensure program success.

z. Absolutely.

aa. Do not desire based on my experience in this program. We have people move in and out on a continuous basis and rarely keep a team for its program life -- and our programs all have very short life spans of only two to three years. A program needs new thoughts and new ideas.

bb. Absolutely.

cc. Corporate memory is very useful in areas like logistics and program control. But it is much less useful in program management and engineering. Here, fresh ideas are essential.

17. Is it feasible for key civilian and military personnel to be assigned to the program for its duration?

YES 2 / 3 **NO** 7 / 10

Why, or why not?

Note, question 16 contains the combined response of many of the interviewees to both questions 16 and 17.

a. If an individual is moved for the purpose of promotion, it is one thing, but usually people move due to laterals and transfers. If someone in the home office likes individual "x" they are apt to take him and put him on a "hot" project and end up sacrificing the program process. For example, they will move a very qualified person out and an unqualified one in.

b. Yes, but it requires a philosophy change in civilian promotions to something like the military. Civilians are now promoted based on the squares they have filled. They need to be promoted for the results they have attained and for the responsibility they are assigned.

c. No, because programs are so long - keeping limited numbers tied up for a long length of time may be feasible.

d. No, because programs last 10 to 30 years and the promotion opportunities would eventually suffer.

e. No, because it is not fair to the individual. It limits their experience and forces them to know only one system program office. They need a change in jobs to learn about other programs.

f. Yes, but it just does not happen. We tried it in the F-16 program office in the logistics area. The logistics functional chief was supposed to stay, then he moved to Ogden.

At least the program directors could and should remain with the program during certain phases. But, there is no incentive to stay. For example, the chances of being promoted from within the system program office is minimal.

g. It would not be feasible for the military since it would interfere with their promotion potential and growth in career broadening.

h. No, because the program needs transition of new blood. They may see an old problem in a new light. If you stay in the same program, or even the same division, you tend to work the same old problems over and over.

i. Yes, but it is difficult to do if they want to get promoted. They can not stay in the same job, especially if they see higher positions elsewhere and you can not get a grade change approved within the program.

j. Yes and no. It depends on the program and the division.

k. Yes. Other than moves due to transferring to another base, I think it can work best this way. Given the right emphasis, job growth, and training, the program and people are both accommodated.

l. Yes, it is probably possible. But, it would take special actions on the part of the personnel system and high level authority support.

m. No, due to the current system for career progression. It is very difficult to make colonel if you stay in Air Force Systems Command your entire career. For those who stay at one division most of their career, it is even harder.

Unless the individual gets burned out due to problems with the program, there should be a minimum time a person should stay on a program. The maximum time anyone should be assigned to one program is four years. With program management, the program director sees who has the potential and can move people around within the system program office. In this way, the individual can get a better feel about the various facets involved and more rounded experience in different areas. This is not possible with matrix management.

n. No, because the program length makes it impractical.

o. No, because military breadth is very important. Good leadership is important. Civilians are more flexible, but can get over aged and lose their perspective.

p. No, because change is a positive factor. The promotion system is an up and out system. The military service could not allow its people to stay in one job their entire career.

Maybe if we compensated the military moves by having civilians with longer tenure it could provide some stability.

q. Yes, but it would require a major change in Air Force policy.

r. No, because the length of time for the program and the need for different backgrounds over time makes this nearly impossible.

18. What formal authority do you have to obtain the required technical support?

The interviewees said they did not have any formal authority and had never seen anything in writing on how they could obtain technical support, other then the program objective memorandum method of obtaining new positions. Few had additional comments. Several said when they need additional help they "negotiate" with the functional chiefs. (Both questions 18 and 19 elicited a wealth of information for Peloquin and Roscoe in 1969.)

a. We usually get good support from the functional offices. If we are trying to establish a new office and say we need "x" number of people with "y" experience and by "z" date, they are usually cooperative, but not always swift.

b. Sufficient technical support currently resides within the System Program Office.

c. Beg, borrow, steal from other programs. We send a letter to the division's personnel office if we are below 80 percent, then wait for them to fill the requirements. The program is losing one with an electro optical background this fall with no replacement forecast.

d. We work directly with the functional office. The Program Executive Officer will not be responsible for the resources, except for eventually the budget maybe.

e. I request technical support from personnel through the division's personnel office, basically to fill vacant slots.

f. None, no memorandum of agreement with the functionals, no written agreements of any kind.

g. It is a matter of priority. Usually, we get the needed technical support.

h. Program director status.

i. Funding, tasking, and hiring of needed expertise. Quite often, this is accomplished through SETA and FCRC support.

19. What informal authority do you use to obtain the required technical support?

a. If there is no response from the functional office, we send a note to the command section that basically explains what we tried to do.

b. First, we try negotiations with the functional office, then appeals to the Program Executive Officer, vice commander or commander of the division.

c. Persuasion.

d. Call the home office chief and ask.

e. In practice, I go to the functional chief. If he fails, then I go talk to the functional baron.

f. We advertise on base through email or hard copy and specify the qualifications desired.

g. We, as a system program office, work replacements on a "by name request" and the local personnel office honors the requests.

h. Both the Program Executive Officer and division commander said if we needed people, we would be given them.

i. The system program office has a good reputation in Air Force Systems Command, so it has helped us establish a good working relationship. We have people constantly wanting into the program office and we do not have places to put all of them.

Even if we were a small program, by having good leadership, a healthy network, "cultivating" people, and working hard, we would still be able to get good people. The bottom line is that you have to work the system. The personnel office does not know the program's exact mission.

j. With the new matrix structure, we are afraid the little flexibility the program office and personnel has now will be lost. For example, now we have the capability to change a vacant 2825 to a 2845 position. Under the new structure, we will not be able to. To me, that is the wrong total quality management orientation.

k. Working relationships with the other organizations.

l. Cooperative requests and cosponsorship.

20. Currently, is the program office adequately manned to do the required tasks?

YES 13 / 10 **NO** 5 / 6

If no, why not? (For example, additional personnel, different rank structure, additional skills, additional training.)

a. We never really have enough people. We are always short in the clerical areas. The functional office's formula of providing clerical support for their matrixed personnel is inadequate. Experience level of the personnel is lacking.

b. Manning is okay, but the skill level in the areas of configuration and data management is very, very low. There seems to be no opportunity for promotion, thus the good people get out of the field as soon as possible.

c. We have enough quantity, but not enough quality. We are lacking experience - both acquisition and program. We need more operational, technical, and business skills. We need more training and more understanding of the acquisition environment. We have a lot of lieutenants. Many of our captains are in charge of projects because we are lacking field grade officers.

d. Given the current circumstances, if the program's streamlined authority (AFR 800-29) is given up, the system program office would need about a 50 percent increase in people.

The home offices do not move around our people. About all of our people transfer to another base, rarely do any change program offices while at this base, (except for the civilians).

e. We have unfilled major positions and many of our lieutenant positions are double billeted. Right now, we have three rated major positions unfilled and have no assistance in filling them. With the change to rated staff requirements, we have even more limitations imposed. For example, we can now put only a pilot or navigator on a rated position.

Also, if you gave Air Force Military Personnel Center requirements for a pilot with a specific background, they will not tell you about a navigator with similar experience that could fill the position.

The vacant rated positions have been the hardest to fill since about August 1988.

f. In most of the functional areas we are doing adequately.

The division as a whole has a shortage of configuration managers, so we created configuration specialists from resources within the system program office. First, we upgraded secretaries (318) to configuration clerk (303), then upgraded them to a configuration specialist (301). While I was in another program office, we tried to hire a CM-13 chief and found that "anyone" can qualify for the 301 job series. Just because they have the 301 code does not mean they can perform the job of configuration management in a program office.

I am all for matrixing configuration management due to the fights the system program offices I have been in have had over the years trying to get experienced personnel from personnel.

The command section is not willing to get involved in the changing of personnel between programs. Our resources are fixed - both the specialty codes and numbers.

Now, the Program Executive Officers are beating on Program Executive Officers since all are one stars. There is no methodology for managing straight line resources. The division has not implemented a new method of assessing the manpower needed in each system program office since the last vice commander cancelled the old program. Straight line resources are harder to get and allocate. Using the matrix concept gets people in on time and as required. But, there is a lot of proactive work involved.

g. We have difficulty in filling jobs when they go vacant - both military and civilian. The military positions are worse to fill because can not work lead time and can not by name any one else until the person has orders. The rated positions are very difficult to fill because we have to match them 100 percent. They can not be double or triple billeted as we can do with the non rated. For example, the system program office needs a rated lieutenant colonel with both acquisition experience and C-130 time. Air Force Military Personnel Center could not "code" for that and we did not want to tie up a vacant position for over four months.

h. The program's tasks are expanding, but we have to modify the tasks to fit the assigned people.

i. The system program office is under AFR 800-29. If we had to follow all the various rules and regulations the program would need additional people. Even with the decrease in personnel due to the Defense Management Review cuts, we should hold even with our manning numbers.

j. Yes in program control and contracting, but we are short in configuration, manufacturing, and quality assurance.

k. We have temporary shortages, but can usually work around them.

l. We do not have any problems right now. However, due to the Defense Management Review cutbacks, we will have a serious decrease of personnel in the future. We have already had a ten percent cut. A 25 percent cut over the next five years is forecast, just when we should be building up We do not have enough configuration managers or test personnel.

m. A manpower scrub throughout the division is currently in progress. We have been told we will need to decrease by 20 percent over the next three years due to the Defense Management Review. This system program office is programmed to lose eight slots this year, all in engineering. The cuts will be spread over the various directorates, but we are also scheduled to take on new programs this year. I am on record with the program director that we need to keep the existing people and need to add on additional people.

n. We are phasing down and planning to merge two of our basket programs next year.

o. We are adequately manned now, but are scheduled to lose four engineers shortly. One will be retiring and three are getting out after their first tour, including our electro optical specialist.

p. The system program office has plenty of people now, but we have many military positions expiring this year and still need the people due to a schedule slip. Also, there are some civilian positions that can not be filled. For example, trying to fill a GS-7 engineer position with a college graduate as required is just not possible.

q. We have two technical positions [civil service] vacant that can not be filled due to the low grade and corresponding pay. We have a shortage of engineers and secretaries. We are also lacking administrative military support.

r. We are not adequately manned, but we are getting the job done. Our contracting and engineering officers work long hours during the week and on weekends. On some of the programs nearly every skill is in heavy demand. The biggest shortest is in experienced contracting officers. Manning will get worse with the reductions in personnel.

s. We need a ten percent increase in manning. We have a special need for increased buyers in contracting. All of the people need better training before arriving at the system program office. It would help their productivity.

t. There is always a level of hurt due to a lack of personnel or skills. Because we were already small, we were not reduced the same amount as the larger programs on the last go around of cuts. But, we are losing six people this summer, with no replacements forecast.

u. More experience is needed.

v. We will be losing engineering slots and some of our functional slots from the unit manning document. Some positions are coded indefinite, but others are coded to be deleted soon, because the deletions were predicated on how the program schedule stood before the Challenger tragedy. Now, we are two years behind the original schedule. For example, the user non destructive inspection contracts were not in the original plan.

Every system program office has been asked to civilianize "x" military slots. No numbers have been given to us yet, just a heads up. However, we have been told that there will be no money for any of the additional civilians.

Next summer we will start losing additional people and will have six production contracts ongoing.

w. We are lacking middle management experience.

x. We need additional test and evaluation positions. Now, we need to rob Peter to pay Paul. When I first arrived, there were only six people in program control and we moved positions and people from within the program office into program control. The program control function is critical in any program office, especially today with funding cutbacks.

21. What are the key problems in obtaining personnel?

a. The functional offices take the experienced ones, especially contracting, and move them to newer programs. We have a higher ratio of inexperienced personnel then most of the other system program offices since the home offices use this program as a training ground. As a result, we have to handhold many of our people.

b. The home offices and the personnel offices manage people by numbers, not skills. Our people are not promoted from within for results they have accomplished.

The people are not rotated when they are available, for example when their code 51 is up. Once the people are rotated, they are not replaced in a timely manner.

We can not shift the matrixed people quickly between needed activities.

c. There are not enough experienced personnel out there. We have problems due to a lack of supply division-wide in some skills. For example, test and evaluation experts and configuration managers are in short supply. The military and civilian personnel systems are very inflexible. We can usually find someone to do the job eventually, but the experience and training is usually lacking.

d. There are not enough of some skills to go around to all the system program offices at this division.

e. Experienced folks are difficult to get. We get predominantly lieutenants versus field grade due to the system program office priority. In order to obtain field grade officers, we requested experienced lieutenant colonels who had been "passed over" and are very pleased with their work.

There is a shortage of configuration managers at this division, so we are trying to build an organic configuration management team.

f. When people are allocated to come to this division, regardless of by names, et cetera, the personnel office will do what ever they want to with them. The personnel office is trying to control where the people go based on the manning percentage of the individual system program office. They are "trying" to do critical fills, but there is no guarantee of a fill, even if the system program office needs the particular skill and training if the program's manning is over a certain percentage. Also, if your program shows a high percentage level, it does not seem to matter to the personnel office that many of the people are out bound and not very many people are in bound to replace them.

g. None. For example, when we needed a good reliability engineer, we asked for and received one.

h. We do not have any problems in obtaining military personnel if they are available, but the hiring freeze makes it difficult to obtain civilians.
This division has a shortage of configuration and manufacturing personnel.

i. We have a shortage of personnel and positions can not be filled due to fiscal shortfalls in the military permanent change of station accounts and to hiring freezes in the civilian sector.

j. The personnel system. According to them, we are 100 percent manned, even if we have a 20 percent vacancy. They keep giving us lieutenants, so we need to double billet our lieutenants in order to keep our field grade positions available for fill. With the civil service, double billets are not allowed. We need to show a vacancy before we can get a back fill. We have a shortage of 454XX non-commissioned officers (propulsion) in this program and even though the test wing is over manned with them, the wing will not release the people.

k. None now, but a lack of permanent change of station funds will catch up as people retire or leave active duty after their first tour.

l. The program is nearing completion, so the people will be moving to other programs. Proper management of remaining personnel is hard. Also, I am reluctant to fill vacant slots that will be going away within a year.

m. There are not enough people to go around. We are significantly double billeted in the system program office and still ten percent under our minimum need.

n. We get inexperienced contracting officers and junior folks in all specialties, but the mission can still get done. It just takes longer.

o. Due to the pending personnel draw down, the system program office is losing about one fourth of its slots over the next three years. This cut will hurt our ability to do the job.

p. Cutbacks, attrition, and phasing down due to the unit manning document codes. The cuts will begin impacting us next year. Civilian shortfalls will begin affecting us soon, including a system safety slot that we have not been able to fill. We are filling gaps with SETA contractors.

q. None at the current time, but budget is a constant problem.

r. Obtaining innovative, yet sufficiently experienced personnel.

22. During what phase will the personnel problem/issue be most critical during the acquisition cycle of this program?

a. Full Scale Development is the most risky phase and needs the most people.

b. All phases are important, but I believe most people focus on Full Scale Development. Those people batting clean up have to know what they are doing, otherwise the user is never satisfied and we never get off ICS.

c. Preparing the Request for Proposal for Full Scale Development and Production at the end of Demonstration/Validation. In other words just before milestone 2.

d. Full Scale Development, after milestone 2.

e. The early phases. The most critical problem at this division is that big programs do not phase down very quickly, so small new ones struggle for people. We have to drive our people and work them long hours and weekends to make up for the lack of manpower requirements.

It is hard to break up empires.

When a personnel cut is required, the personnel office tends to do a flat "across the board" in general, versus looking at the program and the phase it is in. On the last cut, the commander looked at each program and varied the percentage of manpower that was cut.

f. Full Scale Development. The earlier the better in deciding what the program is going to be. We tend to put minimal people with minimal experience on the job. We never unload or phase down a system program office, for example, the B-1B is 150 percent manned because the personnel office is waiting for personnel to transition based on transfers, promotions, and laterals. In the meantime, other programs could be using those people.

g. I have been in system program offices during every phase. The most difficult time is when finishing up Full Scale Development and beginning to field the aircraft. The service reports from the users increase, the user interfaces increase, and you are usually fielding to multiple users. One of the hardest areas to work during this time period is in the Foreign Military Sales. There is so much new data to assimilate.

h. Pre Full Scale Development when we take the design and nail it down. Writing the Request for Proposal for Full Scale Development is very important. If we had a trained team to write the Request for Proposals, then do the Source Selection, the Request for Proposals would be written right the first time and we could do Full Scale Development and then the Production and Deployment phase with less people. Now, we spend time and people correcting and modifying problems from earlier phases.

I believe if we could put together a team of the "best" people from each functional area into one organization that would then be able to react when it was time to write a request for proposal it would be the best investment of man hours given the decrease of personnel. Then, the size of a system program office would only need to increase during the Request for Proposal writing and source selection period. Putting people in afterwards to manage and execute the contract would then be easier and require less people. Contractors do the same thing. They do not worry about the niceties of rank and neither should we. Have this organization also act as consultants. They know what does not work.

The same principle could be applied to a data call. The engineer wants everything, but usually glances at a particular report the first time and rarely looks at future issues. He really just wanted it to see what it looked like. For our program, we have the contractor keep the data and we go there when we want to review it. This saves time and money that would otherwise be consumed on paying for and receiving useless documents.

i. Pre Full Scale Development, when we were preparing the Full Scale Development package. Right now, we are now in production.

j. Just prior to and during Full Scale Development.

k. Full Scale Development.

l. Every phase is important. Early in the design phase, the engineers are very important. Loggies are needed all through the program. Test is needed up front. The technical parts are the drivers. Otherwise, a small cadre of personnel takes up the balance of the work during every phase.

m. At the end of Full Scale Development, when we are transitioning from flight test to production. It is critical that we have configuration, manufacturing, and quality assurance personnel, but they are the least ones available.

There are two types of manufacturing personnel, technical (design producability) and manager (processing).

n. At program initiation.

o. At the beginning when the strategy is decided. When the program is first being put together and working through the throes to meet the early schedules.

p. During Full Scale Development. By then, the design is "frozen." Before then, it is a "rubber" design. This program requires a lot of testing and many specialties to take theoretical ideas and turn them into workable reality.

q. Essentially, this system program office does not go through all the formal phases. This program is upgrading an existing vehicle so it will have a higher level of performance. So, we will have a short development program then go right into the production program.

There is a strong need to have experienced people when putting the acquisition strategy together.

During the Production and Deployment phase, the program office needs a larger number of people. If the buildup does not happen, it hurts the program because various tasks and activities do not get the degree of attention they need. The contractor ends up making decisions we would not have made and when we learn about them later the turn around is costly.

r. We have been in the Demonstration and Validation phase since March 1987 and are very busy. We have competition going right now between two major contractors. We have another source selection scheduled to start in January. Full Scale Development is next, but the division commander said all the system program offices need to downsize their manning level by 20 percent.

s. If the program ever gets out of the study phase and into the design phase (past the design reviews), there may be a manning problem because we will be running several programs at once.

t. At the end of the development phase [pre Full Scale Development].

u. During the Concept Exploration and the Demonstration and Validation phase. This is where you need the most experienced people because the design and requirements are established then. It is the most sensitive part of the program and the program needs people with background and history in the type of project. If you did not do good work in this phase, the program will need more people to manage the contractors later. If you did do good work up front, you can have a big program and still basically turn the work to the contractor.

v. It is a continuing program and always in all of the acquisition cycles.

w. During Development Test and Evaluation [Full Scale Development] and Initial Operational Test and Evaluation. Also during potential block changes when additional test and evaluation personnel are needed.

x. The same group of people should carry over for at least a while when the program transitions from the Full Scale Development phase to the Production phase. Then, once production has begun the people can begin transferring. With our program, most of the people left just before the Production phase began. As a result, we had little corporate knowledge in critical areas.

y. Full Scale Development.

z. During the Concept Exploration phase and early in the Demonstration and Validation phase.

23. How does the priority of your program affect personnel manning?

a. Since we are a basket system program office that handles small contracts, the home offices consider us a good place to start their new people. We receive a lot of younger, inexperienced people from all the home offices.

b. When it was a "sexy" program we got full support. The less glamorous work. such as logistics engineering and technical order maintenance, is not recognized, even though it is of equal value.

c. It helps. Mostly, it is the perception of priority that helps.

d. It helps us to justify manning.

e. The larger the program politically, the more apt it is to get some help.

f. A lot. The higher priority programs get the top people and have better manning support.

g. This program has a larger number of civilians due to the fact it came about due to the Strategic Defense Initiative Organization. When the system program offices developing systems for the Strategic Defense Initiative were first being formed, only civilian positions were being given out.

h. So far, it has not.

i. We are high priority, but still losing the personnel.

j. Being a major program makes it easier to get the authorizations and to fill vacant positions.

k. To date, it has not. We have never had to use the system to get someone we want. But, once we tried to get someone in earlier because we needed him in place and we could not persuade personnel to do it.

l. None problems. We are a 1-1.

m. I have top priority, the same as the other Strategic Defense Initiative programs.

24. How does the civilian and military personnel system affect the overall performance of the program office?

a. Only a few civilians, the division directors, are accountable to me or our program priorities. The others perform to standards set by their home office. Often, the standards are not compatible.

The military system is working okay.

b. Most think big or priority programs help promotion opportunities. Therefore, if your program is low priority, you have a tougher time getting people.

c. It would be nice if we could identify positions where we can put civilians into high positions and if the personnel system would allow us to swap military and civilian positions as needed. In the past, this method has been used as a major exercise to trade military for civilian, or vice versa.

d. It allows us to categorize, for example, by specialty code. We can get what we need out of both systems <u>if</u> we know how they work. The systems provides structure. The people in the program office determine your future career, therefore it is important to get the right people - those who can do the job. Most of my time is spent on people-related issues.

e. Too slow in filling positions. The system program office depends almost totally on name requests for the military. The civilians are in and out changing programs. Hiring freezes, laterals, and retirements also occur frequently. Can delay the laterals, but can not stop promotions. With the civilians, can not start looking for a replacement until the position is empty. There is no operative system.

f. The civil service rules, including leave policy, flex time, and promotions, especially in the lower GS levels, can be negative factors.

Changing key military officers on less than a three year cycle can be disturbing as well.

g. There is no system in Air Force Systems Command for its military. We fill 27XX slots with name requests that we expend a great deal of time and energy working. If Tactical Air Command or Strategic Air Command had a personnel system like Air Force Systems Command, no airplanes would be flown.

h. The manpower authorization program does not work with the current Program Objective Memorandum process. Slots can be validated through the Program Objective Memorandum proces, but not approved or funded. Then, we still get the additional program or work and have to beg, borrow, and steal from other two letters or programs that are decreasing in tasks and activities. If we cry loud enough, we can pick up enough clout to scrape some people from here and there.

i. Civilians are looking for career advancement. When military get promoted, they need a new position. At one point in 1987, except for the program director and deputy, this system program office had no field grade officers for several months. Through promotions and program growth, we now have a few lieutenant colonels and high ranking civilians.

j. The personnel office perceives us as being over manned, since we have over 100 percent of the number we are authorized. The program director controls the manning and reallocates it between the basket programs occasionally.

k. Since we have just recently gone to the Program Executive Officer structure, we have not really seen the effects of the functionals interfering.

One system program office lost their primary contracting officer to industry last week and wanted one of ours. Our primary contracting officer said okay to the move, but we have three new efforts in the works right now. The judgement from the home office was that the other program needed her more, so they moved her. This issue will be elevated to the command section.

l. The system has not given us many field grade officers. Training and acquisition experience are also an issue.

m. The military system is acceptable. At least they make an effort to be responsive. The civilian system is very, very slow. The pay scale is so low that it is very difficult to get top notch people.

n. It does fairly well, except for the projected 20 percent draw down.

o. The very non-responsive nature of civilian personnel and the military personnel center makes it difficult to hire young and talented people. More senior people are easier to obtain.

p. There has been no real impact. Some problems at this division are unique to the area. Overall, the Air Force Military Personnel Center does not help or hinder us. The personnel office here seems to work fairly well in getting people in to fill military vacancies. We receive many of our people straight from college or officers training school though.

No pipeline technical training exists and should. For example, it would be beneficial to require System Acquisition School course 001, or a testing course or another equivalent before reporting to the program office so at least they know the processes. Then, you would not have to use so much program management time to train the new people and have so many slots filled with inexperienced people.

q. All the system program offices here have great difficulty in getting qualified secretaries and clerical personnel. The hiring freeze is very capricious in terms of hiring. For example, we currently have 50 percent of our secretaries and clerical help. Officers, both junior and field grade, are doing the administrative work instead.

The civilian personnel system is insensitive to what motivates people. Rating is tied to bonuses. Some want money and no promotion, while some only want to get promoted. By names are tougher than in the past.

r. There is no problem with the military. However, once you get a bad apple in the civilian program, you can not get rid of it.

25. Will your program require fewer personnel once systems begin deploying?

YES 6 / 4 **NO** 6 / 1

If no, why not?

a. We are currently transitioning to production for one effort, but entering Full Scale Development for another and just signed a second source. As a particular system deploys, we will need less people on that effort, but we will transition the excess to the new effort. We were scheduled to get a ten percent increase in personnel due to the new contracts, but due to the Defense Management Review, we ended up decreasing by one position.

b. We will need different people with different skills, but about the same number overall. For example, we will decrease the number of project managers, acquisition logistics, and test personnel, but we will need to increase the number of logistics and manufacturing personnel who make the data systems work.

c. The system has already been deploying and the Air Force line positions will decrease by about 50 percent over the next three years. During the same time period, the Foreign Military Sales positions will increase a corresponding amount. We will need people for the user interface and contractor interface. Major modifications programs are already in the works and we will need people on those efforts.

d. No, because significant development and integration of major subsystems is still ongoing. Also, system Initial Operational Test and Evaluation and Follow-on Operational Test and Evaluation is not complete. The program will need fewer people about five years after deliveries begin of the aircraft currently in production.

e. Yes, both the people will decrease and a shifting of skills will occur after the functional and physical configuration audits. For example, the engineering and test people will decrease, but logistics and manufacturing managers will increase. All the service reports start in when deploying begins.

f. It depends, based on ongoing modifications and support activities that can require substantial levels of manning.

g. No, because we always have new small programs coming on line, so there is a continuous flow of personnel between the programs. As one program finishes and dies, people are transferred to new programs.

h. Yes, because we will be turning over parts of the system and can decrease slightly.

i. Yes. The phase down of personnel is already scheduled and taking place.

j. Once integration is complete, about a 20 percent manpower cut would be acceptable.

k. We are a continuing program, so do not ever expect to phase down.

26. Does your program office have any nonpersonal services contracts because of insufficient numbers of government technical personnel? (One example at HQ Space Systems Division would be AEROSPACE. An example at HQ Aeronautical Systems Division includes firms such as ARINC, BDM, RJO, and TASC.)

YES 14 / 12 **NO** 2 / 3

If yes, approximately how many total contractors are assigned to the nonpersonal services contracts and approximately how many of those contractors are collocated within program office facilities?

See Chapter IV for a summary to this question.

Management Structure

27. Are you satisfied with the management structure used?

YES 7 / 8 **NO** 5 / 0

Both questions 27 and 28 could be answered several ways, with "management structure" referring to either within the system program office, within the division, within Air Force Systems Command, within the United States Air Force, or anywhere in between. Most of the interviewees responses centered on the division or the new Program Executive Officer structure imposed as a result of the Defense Management Review decisions.

Why, or why not?

a. It could be changed. For example, (1) if personnel were assigned directly to us or assigned from a home office for "x" period, (2) if we could have a say in when a person leaves.

Now, we are continuously having the following situation. For example, next week a person may leave and two weeks later we will be told the person left. The regulation says notification will be made by letter, but in reality there is little or no advance notice, even to the division chiefs. Now, we only know about potential changes if the division chiefs are told ahead of time. The division chief can try to fight to keep a person, but does not succeed very often.

b. Everyone assigned here should be responsible and accountable to the program's mission statement. Functional people below the division director's level are itinerate workers responsible to the home office's mission statement.

c. The division commander needs to assign a strong Program Director to the home office (ASD/CY) who would be mainly responsible for getting experienced program managers into the system program offices. Personnel specialists are not really smart enough to pick experienced ones.

Need to weaken ASD/EN. Put people directly into the System Program Office except for home office people and put them into the labs.

d. This division used to use "Manpower Perspective" to determine annual manning changes. A series of briefings would be presented to the vice commander each year and manning was reallocated based on the change in requirements. It was not done this year because the new vice commander believed it was cumbersome to listen to two weeks of briefings. To date, no new method has been implemented.

The two letters are supposed to have quarterly Program Management Reviews to the division commander or vice commander, but we only do one about every six or nine months.

When the vice commander was the boss, I had a "sitdown" with him about once a month. Now, with the Program Executive Officer, we send a biweekly written activity report and a monthly management report. To date, no formal review is required with him, the division commander, or the vice commander. The DAES goes up to air staff through HQ USAF/AQ, who comment based on their viewpoint. We rarely receive a copy of their comments on the DAES, then it is only through the back door.

e. Based on my experience at this division, the home office functions are not clearly defined and they do not always support accomplishing the mission. Also, the home office does not have a product, so it makes it difficult for them to focus.

I write the functional chief's evaluation, but it can be changed by the home office. I prefer to have straight line management, but we are getting our fair share of matrixed people.

f. We have a problem getting people assigned and distributed.

g. I do not know whether the Program Executive Officer structure is going to work. The "one stars" have to fight it out [manning requirements] with the three star division commander, who will take care of his program first.

The Program Executive Officer structure has not tested many areas yet, for example, who will sign the security guides [and thus be the security classifier], and finding resources. The C-17, B-2, and the other major programs are the smallest programs in terms of manning. Now, when they need additional resources, the Program Executive Officer will need to go to the command section and ask for reallocation. The non major programs, ASD/SD, ASD/AE, et cetera will have the most flexibility in moving resources with their boss being the three star.

h. The system program office management should have more control over the functional people. The home office should only be responsible for the "care and feeding" of the matrixed people, such as training them and accomplishing the quarterly and annual requirements.

i. We do okay except for engineering. For example electronics people are in short supply. The personnel office sends the RIPs to the home office, not to the functional chiefs.

j. There are basic management principles the commander would like you to follow, but there is no firm guidance. Every organization is not unique, there are many similarities.

We will not reorganize to follow the Integrated Product Development concept. Instead, we will closely align the Integrated Product Development team with our lead engineer so he will be the technical expert and the Integrated Product Development team will work within our current management structure.

k. The amount of bureaucracy and impediments placed in the way of the program director. Headquarters Air Force Systems Command should not even exist. They are simply a mailbox on the way to the Pentagon.

l. Due to the program priority, we have a very, very streamlined reporting chain.

m. Flatten out the organization so more people report to the director and deputy. It was implemented in my last program and the communication flow was much better.

n. Satisfied because we do not have anyone matrixed into the program.

o. In my perspective, having your personnel directly assigned as we do is the best way to respond to a big work load with too few people and still maintain control of the program.

p. The Program Executive Officer structure is now in place, but it is still too undefined.

The direct assignment of System Program Office personnel is much preferred to matrix management.

q. Any system used can be made to work, some easier than others.

r. The Program Executive Officer structure is aching for failure and is going to be a nightmare. We will end up taking care of the bureaucratics (paperwork), but fail in the science of the acquisition. For example, a program will have a failed missile.

Our engineers are becoming very proficient in the art of moving paper. Their level of knowledge about what we are doing and their technology level is decreasing. We are losing direct access to our experience base.

s. It works reasonably well. I have never liked the fact that the contracting officers report first through the home office chain before filling us in and the home office is the evaluator.

We have had very positive interactions with the Deputy Program Manager for Logistics structure. The Deputy Program Manager for Logistics provides the connection that is necessary with Air Force Logistics Command.

With the new management structure, there are pluses and minuses. You can get to the Program Executive Officer easier than you could get to the division commander or vice commander. But, now it is the program director who is spread out thinner. For example, now we do two briefings each time. One to the Program Executive Officer, then one to the division commander with the Program Executive Officer in attendance. Once the Program Executive Officer moves to Washington, D.C., it will make it more difficult.

Even companies keep the presidents of their various divisions at the division's location, not at the corporate location.

t. We have a loose, yet integrated structure which allows individual freedom, but a single direction.

28. Which management structure should this program have right now?

a. Functionally assign resources to the program, then give the program directors and their deputies the authority to control the workers and their assignments. This method provides unity of command, flexibility, responsibility for decisions, accountable actions.

b. The organization structure of the program office is well thought out and works fine, so no changes seen there.
The power of the home offices should be weakened. Overall, the home offices provide good benefits. For example, training, recruiting, pooling of resources, long term growth, even though they have the tendency for empire building.

c. We can reject a person, but do not have much control. Give the program director the people he needs. We may need to minimize the size of the program.

d. The decentralized team approach to program management due to the wide diversity of multi-disciplinary programs.

e. What it has now. I am able to optimize across all areas, and with a decreasing budget, this is essential.

f. I believe the "projectized" approach with full manning control in the System Program Office is best.
Matrixing is not well understood here and would take away control from the program director.

g. Direct system program office assignment of all personnel. This is necessary in order to instill "pride of ownership" and build coherent teamwork among System Program Office personnel. A single boss, a single chain of command.

h. Test and evaluation within the program is intermixed instead of a separate directorate due to a shortage of positions and clerical support. If we could obtain extra positions, we would make them a separate directorate.

29. Should the management structure change, depending on the program's phase? (For example, Concept Exploration, Demonstration and Validation, Full Scale Deployment, Production and Deployment.)

YES 5 / 4 **NO** 2 / 2

Why?

a. If set up in the right manner, a flexible approach could work.

b. The Program Director should be allowed to change his organization to meet his changing program needs and priorities. The leader should be allowed to organize for success. He is accountable!

c. Assign the people directly, beginning with the Full Scale Development phase.

d. The number of people in a given discipline should change.

e. The management structure of the product division should not change, but the program office should be flexible. For example, the mini project offices one program office has would make no sense in another program office.

A program office needs to change its management structure as needed over the life of the program to match the various needs and requirements.

f. It should change during each of the phases, but maintain a small dedicated team throughout.

g. The concept development phase clearly requires a different structure than the pr duction phase.

h. If assigned for the duration, the particular management structure used would not be a problem. I have a problem when individuals are not assigned to a program office for any length of time.

Aerospace Corporation is no problem because they are specialists. For example, if you need a focal plane expert, it does not matter which one you get.

i. The people for each function and phase is different. For instance, now the logistics and testing people are the key to the program's success. The engineering design phase is over.

j. After development is complete would be a good time to change. The program would be more stable and the workload should decrease.

k. The management principles remain the same.

l. It varies, because the emphasis is on the changes that take place in each phase. For example, you need high quality theoretical engineers and scientists, plus test and evaluation planners early in the program. Then, you need high quality technical engineers and scientists, plus test and evaluation executioners later in the program.

Program control should be strong from the beginning to the end of the program. The emphasis should never change.

m. As the program moves toward Full Scale Development and Production, the structure needs to be more centralized with more integration.

30. What functional specialists should be assigned directly to the program office, not a functional home office?

a. In priority order, the engineers, contracting, and program control (Aeronautical Systems Division has an excellent program control office, at Electronic Systems Division they were not).

b. All those who spend over 50 percent of their time on the program.

c. The engineers.

d. All of them.

e. I do not mind having the home office because of the training and care/feeding function they perform.

The system program office manning level and quality of the people assigned is totally dependent on the functional chiefs skills in working the home office. For example, my engineer chief is very strong. The worst hurt and most undermanned is the contracting office.

We evaluate the chiefs, but the home office changes the evaluation, depending on what they decided. We do not have any real say in the evaluations and need to make the system more workable.

Below the functional chiefs level, the home office is supposed to let the functional chiefs know about the movement in and out of their people. In reality, the home office does not talk to the functional chief or coordinate personnel changes in the system program office.

When I was the director of another program at this division, all the home offices used the system program office (and still do) as a training ground, as soon as an individual becomes proficient, he gets pulled.

f. It does not matter. I do not have to own everyone to make the system work. What does not work is moving around the project managers.

g. Most of the personnel have always been matrixed into the system program office during my acquisition career, so I can not visualize how it would work if the program office owned the people.

If given a choice, in order of priority, would have configuration management, contracting, program control, engineering, manufacturing, and logistics personnel assigned directly.

h. All of them.

i. Either all, or do not move the matrixed personnel back and forth between programs for no apparent reason.

j. All of them. At least a minimum cadre of personnel needs to be assigned that would work for the program director 100 percent.

k. The program managers.

l. Everybody, if could only have one specialty, would want it to be the engineers.

m. It is a question of semantics. All should be assigned to the program. It is essential that, as a minimum, the division chiefs are assigned directly.

n. All of them.

o. All of them, as now.

p. At Aeronautical Systems Division the program director needs at least the special projects office people assigned to him and the alliance of the functional chiefs. It makes it difficult when the program director has to fight with the functional chiefs over the priorities and reasons for doing things.

q. All of them.

r. All of them.

s. All of them. If I ranked them in priority order, it would be program control (includes the nontechnical 27XXs), engineering (includes test and evaluation and the technical 27XXs), logistics, and contracting. Contracting is at the bottom because I have never had any directly assigned anyway.

t. Program control and engineering.

u. Engineering, cost, contracts, logistics. In other words, "all."

31. What benefit would it be to the program if engineers were always assigned directly to the program office?

a. Basically everything gets done earlier. Need to have accountability and loyalty.

b. Control of assigned director. Quick responsiveness to changing in priorities. Avoid bureaucracy to get things done. Identity and ownership.

c. The only place we are hurt by matrix is not having enough experienced engineers. We have about a one to one ratio of engineers to project managers and in a recent study it was determined that there should be about a three to one ratio.

d. We would be more able to control assets. Personnel would not be moved helter skelter. The program office would be more product oriented since an individual's career would be tied to the program's success.

We could organize the way we want. For example, now we can not reorganize the engineering section since the engineers are not our own people.

e. They would be product oriented and product motivated. Their loyalty would be to the program and the program director, not to the home office. Now, their loyalty is to the home office, since those are the ones who write their evaluations, give the bonuses, and promote.

f. Matrix works okay, as long as they are collocated in the system program office.

g. We would be able to control their education and training and get rid of rotation. The home office may be better at managing training, but the system program office does not get the benefit. The system program office pays for the training, but as soon as the individual is trained the home office pulls him from the program.

h. Control of tasking and optimization of effort is the key.

i. It would increase control and effectiveness.

j. It is nebulous, since I believe any system would work. It would give the program director more control if the people were all assigned directly to the system program office. We would be able to set priorities so the program would not fall behind cost, schedule, et cetera. The people would not have a mixed allegiance. There would be more continuity with the program.

k. When the people are assigned directly, their decision making is then more sensitive and likely to be program balanced versus engineering balanced. We have been told that with the new matrix structure at this division, the senior rater of the 28XXs and 27XXs will still be the program director.

l. Rule 1: The boss is always right. Rule 2: If in doubt, refer to rule 1. You just have to know who the boss is!

m. The feeling of belonging and ownership, plus the elimination of uncertainties about the job.

32. If engineers were always assigned directly to the program office, would additional engineers be needed to participate in source selections and other manpower intensive efforts?

YES 8 / 4 **NO** 4 / 4

If yes, during what efforts would additional technical help be needed?

Several of the interviewees said their response to this question is the same as to question 15.

a. We would need a few during source selection, but ASD/EN pulls people not just from the home office but from the program offices without any notice and gives them to other programs.

b. We would need additional help for the Statements of Work, specifications, technical evaluations, IRTs, program plans, and training.

c. We would need additional help during short term efforts, for example during source selection.

d. We would need help in specific narrow-specialty areas.

e. We can get people with additional depth to act as advisors. If we did not have the additional help available, the system program office would not be able to man up to the level required for manpower intensive tasks.
As a joint service program, last year we were able to request about 20 to 30 people from the Army and some extra from the Navy and ASD/EN for a surge team.

f. We would need additional people for short term efforts, as we do now.

g. We would need additional help during design reviews, audits, source selections, and crisis teams (people to work a crisis problem - for example, we lose an aircraft due to "x" and have to ground 500 aircraft. A crisis team would, for example, put a new modification together fast.)

h. Additional technical people would come from the laboratories, as they do now. The users have provided help in the early stages, during the requirements process, and will also provide assistance during surge periods.

i. We pull specialists from both the home office and laboratories.

j. My programs have never pulled people from ASD/EN to help in surges, but they frequently pull people from our program office to help other program offices.

k. There still needs to be a pool of engineers.

l. We pull people in as advisors when we need them. For example, for source selection we ask for help from program control, Aerospace Corporation, and producability because from the receipt of the proposals we have 63 days to make a decision.

m. I do not think additional people are necessary, but the "faces" need to change as the program evolves.

n. We would probably need additional help for special projects and new efforts.

o. We may need help on a very limited time basis to work specific problems for short time periods.

p. Right now, actions for four major source selections are going on. All the work is being done in house and we have people come in on temporary duty orders from the user organizations to help. We asked for help from the functional organizations on base, but were told no.

q. Outside expertise is always useful on a special task or problem, not just at source selection time. For example, we tap Aerospace Corporation personnel when ever we believe they can help us do or solve a task that we can not manage on our own.

33. If all full time technical personnel are currently assigned directly to the program office, what benefits does the program have?

Many of the interviewees said their response to this question is the same as to questions 16 and 31.

a. It gives the people identity and ownership.

b. We could organize how we want. Control the assets and could vary the assignments. For example, we could put a propulsion person temporarily to work on another engineering problem.

c. The people have loyalty to the program. It contributes to the team aspect. The program office is one happy, integrated family. We can send the "deadbeats" back to the functional office.

d. Better continuity, better unit allegiance.

e. Cohesiveness, the people can focus on mission. It gives them the best chance of getting the job done. The people can take care of getting the mission done and not worry about what the home office is doing or going to do.

f. It would give our people higher morale.

g. A dedicated, knowledgeable, and involved close knit team.

Are there any disadvantages?

YES 2 / 2 **NO** 3 / 2

If yes, what are they?

a. Forced grade structure sometimes causes premature promotions.

b. It would generate more work load, in terms of personnel. We would need increased overhead. There could be a resource allocation problem. For example, one program office could "trap" all the people with a specialty in Electro Magnetic Interference.

c. Other organizations would not be able to use these assets.

d. Surge is much more difficult.

34. If matrix management is followed, what benefits does your program have with some technical positions collocated within the program office and with the ability to ask for additional help from the home office?

a. Now, when we run into situations that we can not solve, the engineers can go ask home office experts. We have new efforts ongoing where we need additional help. From that perspective, it works to our advantage to get a person on short term, for example as a consultant.

b. During surge issues. For the corporate expertise.

c. If there is an imbalance on certain programs, the home office can move the people. The flexibility to move helps certain programs, but can hurt others since the home office can pull without notice. The functional chief can call a buddy for a specialist and get one as soon as possible during a critical period (surge stand point). It is a way to standardize training.

d. We ask and receive help for special projects. We do not have to handle personnel problems such as training and mobility.

e. If we need one time additional support, we can request help from the engineers.

f. We can obtain more technical depth from the home office and obtain additional personnel on a short term basis that have a broader range of expertise to solve the most difficult problems.

g. We may be able to apply more manpower to problem areas. It works <u>if</u> it is done at the right time.

h. To help during surges.

Are there any disadvantages?

YES 2 / 1 **NO** 3 / 2

If yes, what are they?

a. The functional chiefs who are not accountable for program success control the program's destiny. When we have a turnover of approximately 50 percent of our people, I get concerned. If people are assigned directly, the program director could control their movement. Moving for the sake of moving (that is what it looks like) is bad for the program.

b. Matrixing gives us no team concept or spirit. With direct assignment, we are interfaced well with each other and the contractor. There is one objective, one goal. Everyone works better and it creates a more positive relationship. The constant fluctuations and movements of personnel do not develop trust and confidence. In my last program office, the people were matrixed, but we had a say in personnel movements due to the program director's influence.

c. I do not have to control who I get. For example, it may not be who I want, but I can only influence the decision indirectly. We are locked into the home office organization and overhead. We pay by having duplication of such things as commander's calls, training, et cetera.

d. None, the home office takes on very limited tasks. If we have a major task that requires manpower, may get one person - and we usually have to give up a billet to get him. Only ASD/SC can hold 49XX billets at this division. Every program office that needs a 49XX person has to give a billet to SC. Then, they provide you a body temporarily. When they take back the body, they do not always give the position back.

e. The training and indoctrination time usually outweighs the benefits.

35. How is your primary contractor(s) program office structured?

Contractors who used the system program office method included Smith Industries, Litton, Lorreta, Teledyn, AIL, RI, McDonald Douglas, and Lockheed. Ones who used primarily the matrix method included BAC, AIL, General Dynamics, Lockheed, Boeing.

a. The major ones have all their people assigned directly to the program. It generates real loyalty to the program.

b. Two are straight line and one is matrix.

c. Both ways. One is heavily matrixed. The larger programs form project teams where the program manager owns the people. The smaller programs are heavily matrixed.

d. It is usually similar to the system program office.

e. Matrixed.

f. Matrixed and direct line.

g. Matrixed.

h. The prime contractor is moving to direct line and is implementing an integrated product development team program wide like ASD/EN is planning. The other major contractor also has some elements of matrixing, for example, his contracting officers are matrixed.

i. The contractor has program offices structured both ways. For our particular program, he has formed an entire division.

j. The contractor has gone from a functional organization to a full time product organization. The program director writes the tickets for all his people, pays them, et cetera.

k. They are matrixed under a small program management team.

l. It varies by the size of the programs. The smaller ones are matrixed and the larger ones are direct line.

m. Matrixed.

n. Same as ours.

o. Dedicated.

m. The contractor is organized by group and within each group by functional. Then, the program director is given a certain number of people and given money to negotiate with the functional offices for the rest of the people.

n. As a basket system program office with program managers for each program.

o. The key personnel are assigned directly and the program manager can pull in additional people as needed. Our contractor has a work force of about 600 people for a $300 to $400 million effort.

p. The people are directly assigned to a program manager.

q. It is a mix. One contractor extensively matrixizes the "ilities" but usually assigns the engineers directly. The contracting and administrative personnel are also matrixed.

r. Not matrixed, but direct management.

s. Similar to the system program office. They are mostly "projectized" with some matrixing.

t. The prime contractor is set up so the program director has a more direct relationship with the management above him - who is also above all the functional chiefs. The people have been on our program for a long time at our contractor's. Right now, the company is being reorganized and getting "leaner and meaner" by decreasing over 2,400 positions.

When I was at my last division, our contractor's functionals were much stronger (for example, the manufacturing division). The contractor's program director was "sitting outside" trying to get the people to do something and he had little control over their work.

u. There are several contractors for this program and a variety of methods are used.

Perhaps they are about fifty-fifty now, but the trend is to go away from matrixing and toward project assignment.

v. He is project structured and organized, with some support from other divisions. For example, additional engineering, testing, and quality personnel are assigned as needed.

w. Not like us. They are structured somewhat differently, with a separate contracting, subcontracting and management offices.

They have two different program managers on our program, one for the first three satellites and another one for the second two satellites.

36. Would it improve government-contractor relations on the program if both followed the same management structure?

YES 4 / 3 **NO** 1 / 1

Why, or why not?

a. It would help the continuity and corporate knowledge. When we question a contractor about why he does not have continuity, his response is "you don't have it."

b. The corporate Program Director should be allowed to structure for his successful management. There is no right or wrong leadership style.

c. It would not change - if both are heavily matrixed in the same manner, I could see engineering team and logistics team on both sides effectively separating themselves from the program office.

d. If both agree, neither should take on an unnatural structure to the parent organization.

e. Would have full time dedicated counterparts.

f. Can not really say. As the program director, I would not like the functional managers of contractors to directly access the functional managers of the air force. I could not afford it.

g. Would give better communication between the government and the contractor.

h. Some tailoring could be done, but trying to force fit the same structure on both the government's and contractor's program office could generate problems and cause turmoil amongst the workers. For example, when a contractor deals with two services and tries to line up the program offices with each service the same when each service operates differently.

i. It provides a focal point for the contractors to work with.

j. Both the government and contractors would have direct counterparts and it would improve communications.

37. What additional information about matrix management and its effect on the program office can you provide?

a. Pure matrix can have a functional assigned that is higher than the Program Director. For example, at Aeronautical Systems Division it is not unusual to have an Senior Executive Service individual matrixed into the program office.

I have discovered that what is more important than the management structure is the people -- their skills, ability to get along with others. If there was a choice between matrix management and program management, program management is preferred. With program management, there is more esprit d' corps. Everyone is working toward a common goal. The program director has more control over resources, et cetera. I have worked both ways.

b. It can work. Most people want to work in programs they read about in the newspapers, not non-newsworthy ones, so it is difficult to attract experienced people at times.

This system program office can give a lieutenant colonel a great training program of managing a large program, since our three letter directorates are as big, or bigger, than most two letter system program offices.

c. The system will not recognize the fact that a 28XX and a 27XX at Space Systems Division have different tasks and responsibilities than a 28XX and a 27XX at Aeronautical Systems Division.

We no longer by name 28XXs, since when we by name a 28XX from, for example, Space Systems Division to manage a specific project ASD/EN will usually pull him for engineering work or gives him to another system program office.

d. ASD/CY has no power to assign people, he acts as an ombudsman who puts all the data on all the tables.

The program management function in the acquisition corps is higher than the functional chief, yet here at Aeronautical Systems Division each functional chief is backed by an individual from the senior executive service.

e. Continuity is not a real problem. Our people are turned over more than I would like, but it is not unhealthy for the program, except for the supervisors.

You can have any good worker come in and get the job done if have a good, experienced middle manager.

Due to clerical shortage and lieutenants lack of experience, have my lieutenant colonels performing work they [clericals and lieutenants] should be doing.

f. Do not understand yet how the system program offices will be managed, since ASD/EN now "owns" everyone. For example, will we still have a contracting office, technical office, projects office?

Integration product development - select best person for each job and assign him, regardless of his functional background. What will the project manager do, since the person in charge will be the specialist?

The Financial Management Reviews compare apples to oranges. It is difficult to compare the average grade, strength, et cetera at each division. Manpower assumes each specialty at each division uses it's personnel the same way, thus it hurts 28XXs here and hurts the 27XXs at Space Systems Division.

With the team project concept (of integrating all the different disciplines) at Aeronautical Systems Division, we will be going more to the way Electronic Systems Division and Space Systems Division work.

g. Matrix management has not been a hindrance to this program. The home offices respond to the program director's requests. We have a pool of people to support us back in the home office if we need them. If we were not matrixed, we would need to convince another program director to give up a body.

The program director does not have total control over the ratings. He was disappointed with the rating given the senior chief. The home office has a set quota for each rating, so if the program director rates one way, the home office can decrease the rating. In other words, even though the program director is the rater for the functional chief, the home office has the final say so if the chief is a civilian.

h. The main thing matrix management allows is the easy movement of people. The basic problems with matrix management is that the program director can not influence the rating except for his senior collocates.

There are split priorities between the home office and the program office. Matrix management makes it easier to get people. You are more likely to have positions filled with matrix management. It is a question of priorities and responsiveness.

I hope the integrated product development concept, which is primarily for ASD/EN and ASD/PMD, will fill positions with better qualified personnel and set priorities.

i. The integrated product development concept should get the engineers and manufacturing personnel working together. It is an advantage to both [matrix management and program management], but the advantages are sometimes conflicting. With matrix management it is easier to move people.

The program director is not responsible for the hiring and firing. It is decided at a high level where people are to go. The program director does not decide where any one is going to work. It is easier to fill positions and builds in overhead.

The cost is in conflicting priorities and lack control over the people. We have to rely on somebody else to support the program.

j. The problems with matrix management observed especially at this division are due to a lack of accountability and traceability. People are pulled from an assignment before the project can be fixed. The home offices can pull people at any time, since there are no time limits on how long someone is to be assigned to a particular position.

k. What everybody wants is a team, but in my 17 years of acquisition experience I have only been on two teams. The rest were committees, projects, meetings, and "I have done it "x" times already, so let me go off and do it this time."

I would have liked to have been part of the management decision [to implement the Integrated Product Development team concept], but was not asked to participate.

With matrix management, it is difficult to try to increase the number of people or change their specialties when the program is increasing in tasks or the scope is changing.

ASD/EN has a unique technical capability no other organization in the Department of Defense has. Matrix management provides more education overall for the people.

l. Quality people are more important than the organizational structure, especially the leaders. The term leaders, in addition to the program director and deputy director, includes the functional chiefs.

When people are assigned directly, it assumes one has a relatively stable organization, which product divisions are not.

Better training for new entrants is needed, both the lieutenants and the rated who come in cold with no acquisition background.

If we coordinate evaluation ratings for the functional chiefs with the home office, there are usually no major surprises.

m. There needs to be some give and take [with the ratings] because the home office controls the numbers and money for bonuses.

n. The program office is a reasonable size and we have enough people to do the job. When we need specialists, the laboratories provide them. The home offices are mired in bureaucracy.

The matrix management structure decreases loyalty to the program office because the worker has two masters. Acquisition field should be a long term career. Since the home office controls the final rating, it is impossible to control the award fees and promotions of your people.

The home office should be responsible for formal training. If a master training plan was laid out for each functional specialty we could delegate the training responsibility. It depends on how strong the functional chief is as to whether or not he can control his resources. There are very strong loyalties and allegiances in place with the matrix structure.

o. I strongly feel the program office should rate the people working for it. The home office changes ratings of the functional chiefs. There are very strong functionals at ASD, all Senior Executive Service level.

p. The matrix theoretically allows people to be spread out and more work done. However, industry has found it does not work and is going more and more to product oriented.

q. The current system means there is continual negotiation between the functional baron and the program director. The program director does not ask for more than he needs when he has people directly assigned. There is a high degree of candor in the program.

r. I do not have a problem with matrix management, but do have one with people coming in to an assigned job and not having the required experience.

I do have a problem with the home office writing the evaluations. The way it is now, the civilians are not competing within the organization, but across all the different programs. This can be equated to having the chief engineer of one company competing with the chief engineer of another company. He is not recognized from within the company for his mission accomplishments. Instead, he is being rated on his acquisition excellence.

Give the program director the allocation for civilian rating quotas just like we have the military ones. Have the reward pool controlled by the home office.

s. The matrix system at this division evolved over a number of years of experience. It seems to be an efficient one which apparently works well.

t. One functional chief has just been pulled by the home office with no advance warning.

Conflict in the program office works well. Having multiple interests vying for the same resources is good. My office has prepared a briefing that is given to all newcomers to the program. It explains why some competition and conflict is necessary and why things work at this division the way they do. For example, the engineers want to test and retest everything, but the program office has limited funds.

Chief engineer Fred Ralls was very decisive and very autocratic. It was due to him that this division did not get an Aerospace Corporation or MITRE equivalent. The new ASD/EN organization has made a commitment to the Integrated Product Development team concept. The chief engineer will still report to the program director.

The award pool money should be divided and given to the program offices. The present method does have one good point, since it has each group competing within their own group, not across the spectrum of specialists within the program office.

u. Matrix management allows the minimum amount of manpower resources and allows Air Force Systems Command to retain ownership of all the people assigned to the program office. The thing that is driving the change to full matrix at Space Systems Division is the Program Executive Officer organization.

Before that General Randolph was supporting a strong program director. For example, he was considering making them the equivalent of wing commander's and giving them all the needed resources. Now if the division stayed as it is, with the current Program Executive Officer structure Space Systems Division would no longer own the personnel. So, the structure has to change.

I endorse the matrix management change so long as the program director is still the senior rater. Later, the home office may change the rules and only allow the senior rater to make inputs. Until about two years ago, all the program control, configuration management, and data management personnel were matrixed into the program offices. Then, it changed back to the direct line.

v. I strongly disagree with the new organization Space Systems Division is going to. When you have people assigned to the program director, but he does not write their evaluations and PFR, it is difficult. The young people are concerned about the effects on their career and believe they will not be visible enough back at the home office. Will the new system work? Yes, but there will be a lot of rough edges. Any organization structure can work, even with problem areas. The job will still get done.

w. I am not a favorite of matrix management. It may be necessary, but an integrated program office is the best way with everyone buying in on the program. The matrixed support we have from the staff do not give the people that are assigned any feeling of ownership. If the matrixed people are full time and there is some stability, it is not too bad. Then, it is just a question of good manpower management.

As a personnel management philosophy that allows you to move people as needed, matrix management is okay. But, when people move around it generates morale problems and creates difficulties for the program director. Some of the people just wait around until they are moved again.

The biggest concern with the new move to matrix management at Space Systems Division is the integration of 27XXs into SSD/AC. It is being looked at as a flexible manpower organization, but will it be?

w. The program director believes matrix management is a terrific idea, but I do not. The Manpower Evaluation Team chief gave us on briefing about the military to civilian conversion program. So many conversions will take place over an "x" time frame. However, if you can hire someone for the position, which in most cases will be the lower GS pay grades, you will not be able to pay them since the positions have not been approved and validated through the Program Objective Memorandum process.

If you are serving two different masters, it is difficult. For example, the home office says you are going to follow these standards and rules and the program director says you are going to follow the program office's set of standards and rules. If the home office writes your evaluation, you follow their rules. If the program director writes your evaluation, you follow the program's rules.

y. Would rather have a small core team of personnel that is directly assigned. I would then know how many I have and can train them. Then, they could be lined up with the mission of the organization and I would not have to worry about the functional areas. The home offices's rules and regulations slow the program down.

z. I do not understand the matrix management concepts and its implementation.

aa. General Yates is very open minded and there may still be changes [regarding the change to full matrix]. When the plan for the new matrix structure was announced, all of the program directors were very vocal about it. Every program director I know would prefer not having to go to the matrix system. The whole idea and promise that was part of the announcement about the move to the matrix system was that, theoretically, nothing was really going to change. Instead, the administrative things like training and evaluations would be taken care of by the home office and the people would still be dedicated to the program. Now, it is a fait accompli, but the verdict is still out on who is going to do the definitely promote recommendations.

bb. Matrix management will work, but it is not an optimal way to organize.

cc. It is the personalities and backgrounds of the people that can make any management structure succeed or fail. The Program Executive Officer structure is trying to forestall the Barbara Boxer "inevitability" of going to a civilian acquisition force. But, it is a "stew made with too many cooks." The program director and the workers have a lot of high anxiety right now due to the reduction in force, the changes being imposed due to the Defense Management Review decisions. There are a lot of changes and a lot of confusion. The people chemistry is ragged. There is a high level of anxiety amongst the junior officers and we do not know how to help and advise them, since we have not been told any more than they have.

Our good engineers are being made into clerks due to the shortage of clerical support. They spend far more time on administrative work then working on engineering matters.

dd. General Creech's famous statement on matrix management compared matrixing to being like a dead mackerel on the beach.

I do not believe the Program Executive Officer structure will result in the division commanders giving any less support to the major programs then they already do [in response to a remark made by another interviewee].

ee. Our program would never work if we operated the same way as the Navy program offices do. A Navy program simply would not have the wherewithal to get the job done with out more people and more contractors.

ff. Space Systems Division's organization works fairly well. We are more contractor integrated than other divisions. Our workers are doing most of the work.

The home office pulled two of our primary contracting officers because another program had a bigger need (according to the home office). We could not get any action taken to stop the moves even though we were right in the middle of source selection. Few people are matrixed here, so overall it is not a big problem. Sometimes when the home office pulls one individual and gives us someone else, it is a good change. Sometimes, it is a change for the worse.

Now, we are responsible for paying for everything any of our matrixed people do. For example, the logistics home office just gave us last minute notice that we have to pay for all the training our new Deputy Program Manager for Logistics is receiving. We asked if we could receive notice sooner in the future and were told no.

It is interesting to find out where the project office is at each division and in each program. Some have a separate project office. Some have the engineers do the projects. We still call them 28XXs, but they are really project officers. Whereas at other places the 28XXs are only used to perform the engineering and technical tasks. Here at Space Systems Division the 27XXs do the general day to day business and the 28XXs do the projects, and control the business managers. The personnel system wants people with technical smarts to be acquisition managers, but the new people only want to be engineers. Who is really in charge of the program's direction? In some programs I was on that were matrixed, the engineers that supported us had control of everything and had to drag along the rest of the functionals, such as PM and AL. There is no functional reliability person and the interaction between the functional offices and the program office is weak. Aeronautical Systems Division did a strategic move about five years ago and created a lot of 27XXs with engineering degrees to serve as technical managers. At about the same time, the Air Force Military Personnel Center was bringing in new engineers directly into the 27XX career field. Space Systems Division engineers do more project work than those assigned to Aeronautical Systems Division. Matrix management tends to work okay if the home office lets the people do the job.

gg. I have never operated under matrix management except for the procurement and logistics personnel. I would prefer no matrixing. All personnel should be assigned directly to the System Program Office, including contracting and logistics personnel. Division staff could and should supplement the System Program Offices on an as needed basis.

hh. I "hear" [regarding the change to full matrix management at Space Systems Division] that each program director has stood up and said they do not believe that the change to matrix management will work because the program directors will not be able to fight fires and the people will no longer be loyal to the program. However, we will still get the job done, no matter how we are structured and the critics will say "see, matrix management works." The problem will be exacerbated by the manpower cuts and the scheduled decreases we already have programmed into the unit manning document. I can not fault the home office for pulling on priorities.

ii. The problem with matrix management is when you start assuming, for example, that one communication officer can be removed and replaced with any other communication officer. You are not only taking away the communication officer, but the technical manager who was in charge of a contract and very knowledgeable about the project. In return, we get someone new who has little or no training and experience in acquisition, let alone our particular program.

While I was at the Pentagon, HQ USAF/AQ tried to build a model of what the program office should like during each phase, in terms of numbers and type of personnel. It just did not succeed because Headquarters Air Force Systems Command would not give any input as to when and how many people were needed, when people decreased, et cetera. There was no clear criteria to use for the model.

The sustem program office should have more flexibility with the 28XXs. For example, electrical engineers in one area can and does do more than engineers residing in program control.

The Air Force Military Personnel Center and Headquarters Air Force Systems Command never set out to determine what they really want the 28XXs and 27XXs to do and build a model. As a result, each division uses them differently and when an individual transfers to a new location, it is like walking in as a second lieutenant. The personnel system is not flexible enough. General Randolph said he wanted new people at the divisions and did not want people to stay in one area too long.

The program office has been able to control the training of its people pretty well, but moving around at will because another program has a higher priority makes it difficult.

Theoretically, the program director has the right of arbitration if he does not agree with a home office reassignment, but in reality it does not occur.

jj. Under the new system, the Program Executive Officer and the program director are responsible for the mission and the division commander is responsible for the resources. Aeronautical Systems Division has a pool of talented people because Wright-Patterson Air Force Base is a major job source for most of the area. Whereas, Space Systems Division has to compete with all the contractors in the area.

When I was at Aeronautical Systems Division, the people did not always get the ratings the program director would give them because the home office did the ratings. So, people would receive lower or higher ratings then the program director felt they should receive.

The functional division chiefs at Aeronautical Systems Division had mixed emotions. They were still working for both the home office and the program director, even when the regulation changed and the program director started grading them. The program director had more say then about the worker, but there was still at point about the program director where home office input would be received. Also, the home office was still the sponsor of everyone.

At decision time, the Chief of Staff has the responsibility for choosing the percentages of definitely promote. Then, there is an internal board run by SSD/CV with the program directors in attendance.

This program is very people oriented. We are trying constantly to figure out a better way to communicate and get team spirit. For example, the program director will have breakfast one day with all the lieutenants and another time with all the branch chiefs. More esprit d' corps and teamwork has resulted from these sessions that have benefited the entire program office. The program office personnel need to have a mission oriented attitude versus a functional oriented one.

kk. Matrix management works well for the program office with short term duration projects. One could assign specialists to work the program who would then move on to the next short program.

For long term efforts, on going programs should have people directly assigned. Logistics and contracting say they have to matrix because of the high turnover, low experience, and the need to move their people around.

ll. I do not believe a program can be suboptimized like a matrix imposes. The program manager needs to be able to make trades without functional area managers fighting him.

oo. I like control over my own resources. I have a tough time with the matrix concept in a program office. You can not directly control the tasks and activities of your people. For example, now I have my engineers directly assigned and can change them around to different areas as needed. With the matrixed contracting and logistics personnel, I can not.

With matrixed personnel, you do not have any control over their assignment actions, their ratings, and their allocations of tasks. There are some benefits from matrixing. We do not have to worry about the training (even though we have to pay for it), about filling the slots, about reassigning people when the program is winding down. It is better to have control of my own assets though so I can allocate tasks as needed. With matrix, I can not say "Capt Jones, do this task." since that is what the home office does.

Space Systems Division is strongly bending towards the Aeronautical Systems Division model of matrixing. We have been told the program director will be responsible for rating all the military. Right now, there is still a question mark over who will rate the civilians. The program director should be responsible for rating everybody. I find it difficult for a person to work in the program office and be rated fairly by someone else who does not see him on a regular basis or review his work. The functional baron does not see the people every day. He could give them a lower or higher rating then the one that the individual they actually work with every day would have given them. We have already seen how it works with contracting and we do not need more of the same.

pp. The program director does not "do" anything. It is the worker bees who do all the work. The program director has to develop a team and then go lead it.

The matrix concept makes it difficult to develop and improve. For example, it is very difficult to have a staff meeting when the functional chiefs have to leave and go to theirs. The matrixed people are less mission oriented and more regulation oriented.

Need people that can tell you how to get something done, not just told no. How do you reward your people if the evaluations and promotion recommendation forms are done outside the program office. Matrix management breaks up the program director's ability to improve the team. There is a different perspective on getting the work done between the home office and the program office.

In one program at Aeronautical Systems Division, the manufacturing personnel were key to the program's success and had to keep a focus on all the various tasks and activities everyone else was doing. The home office took away all the good people and stuck them on a "bad" program. As a result, the program got in trouble. The program director lives and dies on how your people do.

Appendix E: Creech's Laws

Below is a list of General Bill Creech's organizational principles, as published in October 1984, shortly before his retirement from commanding the United States Air Force's Tactical Air Command. In addition to being distributed throughout Tactical Air Command, Tom Peters paraphrased the "laws" in his book Passion for Excellence. This year, the management guidelines were published by Air University Press in Concepts for Air Force Leadership, AU-24.

Organizational Principles

1. **Have a set of overarching principles and philosophies. Have an overall theme and purpose.**

    * Insure they are well understood.
    * Stress integrity and ommitment.

2. **Use goals throughout.**

    * Make them straight forward, understandable, and meaningful.
    * Make it immportant to achieve them. Reward and praise success.

3. **Measure productivity and efficiency at several levels.**

* Devise adequate analytical tools -- but don't strangle in paper.

* Compare to: (1) history, (2) goals, (3) like organizations.

* Don't use availability of micro-information to micro-manage.

* Look for trends, failure nodes, areas for improvement.

* Orient to the product. Keep in clear focus for all.

4. **Create leaders at many levels, not just a few.**

* Provide wide autonomy and flexibility to achieve goals while preserving overall coherence and overarching principles.

* Get the leaders where the action is.

* Streamline staff procedures. Staff supports the line, not vice versa.

5. **Integrate authority and responsibility -- not separate them. Know the difference.**

* Create a sense of responsibility throughout.

* Recognize that few accept responsibility without accompanying authority. Create **ownership.**

* Invest principal authority in horizontal mission/product leaders -- not in vertical functional "czars."

* In "matrixing" establish clear lines of authority -- tied to the product. Make it clear **who is in charge.**

* Link **authority to accountability.**

6. **Set up internal competition and comparison where feasible.**

* Reward success. Provide incentives and motivatiors. Praise the winners.

* Address failure in balance with the circumstances.

7. **Create a climate of pride.**

* Quality treatment begets quality performance.

* Never forget the organization begins and ends, sinks or swims, with its people. Treat them well and consider them first.

* Instill individual dignity. Provide challenge and opportunity.

* **Invest in people**, facilities, upkeep. Payback is enormous.

8. **Create a climate of professionalism.**

* Insist on high standards. Don't settle for less.

* Provide the supporting mechanisms and aids.

* You reap what you sow. Invest accordingly.

* Spirit and enthusiasm are the critical measures.

9. **Educate, educate, educate.**

* Make it specific. Establish feedback on results.

* The organization is as strong as its weakest links.

10. **Communicate, communicate, communicate.**

* Create the mechnaisms. Up/down, down/up -- and laterally.

* Make it clear and concise. Work to eliminate ambiguity and misinformation.

* Don't depend on strictly hierarchial communication. Augment it. On key issues, communicate several layers deep.

11. **Create organizational discipline and loyalty.**

* Without stifling initiative. Reward it.

12. **Provide everyone a stake in the outcome.**

* And "humanize" wherever possible -- make each job meaningful.

13. **Make it better.**

* In measurable, identifiable ways. Instill that philosophy.

* Work to create a sense of individual and organizational worth. Foster team identification.

* A proud, confident, and optimistic organizational "chemistry" is the key to success -- leaders must create it.

* Provide the climate and impetus for evolutionary organizational change. Instill a philosophy of creative adoption and adaption.

* Stay out in front of problems, changing circumstances -- and the competition.

14. **Make it happen.**

* Active, vigorous leadership throughout is the magic ingredient.

* Be informed, involved. Provide the dynamic spark.

* Work the details -- the whole is the sum of the parts.

15. **Make it last.**

* Codify, educate, and perpetuate.

(Creech, 1984:entire)

Bibliography

Acker, David D. "The Maturing of the DoD Acquisition Process," Defense Systems Management Review, 3 (A Reprint): 7-77 (Summer 1980).

Adams, John R. and Nicki S. Kirchof. "The Practice of Matrix Management," Chapter 2 (pp 13-30) in David I. Cleland (editor), Matrix Management Systems Handbook. New York: Van Nostrand Reinhold Company, 1984.

Aeronautical Systems Division (ASD). ASD VA 23-1 Aeronautical Systems Division (Organizational Diagram). Wright-Patterson AFB OH: Det 30, 6592 MES, October 1989.

Aeronautical Systems Division (ASD). ASDR 30-2, Matrix Management of Personnel. Wright-Patterson AFB OH: Headquarters Aeronautical Systems Division, 16 June 1988.

Aeronautical Systems Division (ASD). ASDR 30-2, Management of Collocated/Dedicated Personnel. Wright-Patterson AFB OH: Headquarters Aeronautical Systems Division, 3 June 1977.

Air Force Systems Command (AFSC). AFSCP 800-3 A Guide for Program Management. Andrews AFB DC: Headquarters Air Force Systems Command, 1976.

Air University (AU). Managing the Air Force (Fourth Edition). Maxwell AFB AL: Air War College, 1983.

Amouyal, Barbara. "Streamlined Management Said Key to F-117A," Air Force Times, 37: 26 (23 April 1990).

Baar, Jim. "Weapon System Concept Faces Trial," missiles and rockets, 5: 15 (6 April 1959).

Bloomer, Ted. "Why a Matrix Rather Than a SPO Configuration." Unpublished White Paper for Naval Air Systems Command. Undated, but written sometime in 1989.

Bongarts, Capt Monty D. and Capt Marilyn M. Taylor. Evaluation Criteria for the Use of Matrix Concepts Within the Air Force. MS thesis, LSSR 36-81. School of Systems and Logistics, Air Force Institute of Technology (AU), June 1981 (AD-A105133).

Butler, Arthur G., Jr. "Project Management: A Study in Organizational Conflict," Academy of Management Journal, 16: 84-101 (March 1973).

Carr, Merle, Deputy for C-17 System Program Office (SPO). Personal Interview. C-17 SPO, Wright-Patterson AFB OH, 27 December 1989.

-----. Telephone Interviews. C-17 SPO, Wright-Patterson AFB OH, 4 and 7 August 1989.

Cleland, David I. "The Cultural Ambience of the Matrix Organization," Chapter 38 (pp 971-989) in David I. Cleland and William R. King (editors), Project Management Handbook (Second Edition). New York: Van Nostrand Reinhold Company, 1988.

Cleland, David I. and William R. King. Systems Analysis and Project Management. New York: McGraw-Hill Book Company, 1983.

Cleland, David I. and William R. King. Systems, Organizations, Analysis, Management: A book of readings. New York: McGraw-Hill Book Company, 1969.

Connors, Maj Daniel V. and Capt Dennis M. Maloney. Organizational Change Patterns in the Air Force System Program Office. MS thesis, LSSR 3-79A. School of Systems and Logistics, Air Force Institute of Technology (AU), June 1979 (AD-A074374).

Creech, Gen W.L (USAF retired). "Organizational and Leadership Principles for Senior Leaders," Pages 143-148 in Richard Lester (editor), Concepts for Air Force Leadership, AU-24 Maxwell AFB AL: Air University Press, 1990.

Creech, Gen William L. Organizational Principles. Langley AFB VA: Tactical Air Command, 1984.

Daft, Richard L. and Richard M. Steers. Organizations: A Micro/Macro Approach. Glenview IL: Scott, Foresman and Company, 1986.

Danner, James E. and Charles D. Evans. An Analysis of Advance Procurement Planning at Aeronautical Systems Division. MS thesis, SLSR 44-68. School of Systems and Logistics, Air Force Institute of Technology (AU), August 1968 (AD-847727).

Davis, Stanley M. and Paul R. Lawrence. "Problems of matrix organizations," Harvard Business Review, 56: 131-142 (May - June 1978).

Denis, Helene. "Is the Matrix Organization a Cumbersome Structure for Engineering Projects?" Project Management Journal, XVII: 49-55 (March 1986).

Defense Systems Management College (DSMC). Risk Management: Concepts and Guidance. Fort Belvoir VA: Defense Systems Management College, March 1989 (Contract No. MDA903-87-C-0781).

-----. "James Forrestal Memorial Award to Gen. Bernard A. Schriever, USAF (Ret.)," Program Manager, XVI: 29 (July - August 1987).

-----. Systems Engineering Management Guide (Second Edition). Fort Belvoir VA: Defense Systems Management College, December 1986.

-----. "Oath of a Program Manager," Program Managers Newsletter, IV: 28 (December 1975).

-----. "Conflict Mangagement Notes," Class handout distributed in Program Management Course 85-1 through 89-2. Fort Belvoir VA: Defense Systems Management College, undated(a).

-----. "Traditional, Product, and Matrix Organizations," Class handout distributed in Program Management Course 85-1 through 89-2. Fort Belvoir VA: Defense Systems Management College, undated(b).

Department of the Air Force (DAF). AFR 800-2 Acquisition Program Management. Washington DC: Headquarters United States Air Force, September 1985.

Dinsmore, Paul C. Human Factors in Project Management. New York: American Management Associations, 1984.

Doughty, Rick and Ralph Klien. "Making Software Engineering Project Managers Successful," Journal of Systems Management, 38: 18-22 (September 1987).

Duncan, Robert. "What is the Right Organization Structure?: Decision Tree Analysis Provides the Answer," Organizational Dynamics, 7: 59-80 (Winter 1979).

Easton, James L. and Robert L. Day. "The Need for Project Management," Chapter 2 (pp 13-23) in Linn C. Stuckenbruck (editor), The Implementation of Project Management: The Professional's Handbook. Reading MA: Addison-Wesley Publishing Company, 1982.

Ewing, Capt John E. A Comparison of the Matrix and Functional Forms of Organizational Structure. MS Thesis, AFIT/GLM/LSY/86S-17. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1986 (AD-B106953).

Foley, Maj Richard P. A Handbook for Entry-Level System Buyers: The Role/Relationship of the Contracting Officer and Program Manager and the SPO's Interfaces. Maxwell AFB AL: Air Command and Staff College (AU), April 1985 (AD-A156313).

Fox, Ronald J. with James L. Field. The Defense Management Challenge. Boston MA: Harvard Business School Press, 1988.

French, J. E. "Navy Program Management Office (PMO) Organization," Program Management Course 85-1 Program Manager's Notebook. Fort Belvoir VA: Defense Systems Management College, June 1985.

Gaddis, Paul O. "The Project Manager," Harvard Business Review, 37: 89-97 (May - June 1959).

Galbraith, Jay R. "Matrix Organization Designs: How to Combine Functional and Project Forms," Business Horizons, XIV: 29-40 (February 1971).

Gilbreath, Robert D. Winning at Project Management: What Works, What Fails, and Why. New York: John Wiley & Sons, 1986.

Gouse, Michael K. and Frank A. Stickney. "Overview of Project Management Applications," Chapter 34 (pp 869 - 901) in David I. Cleland and William R. King (editors), Project Management Handbook (Second Edition). New York: Van Nostrand Reinhold, 1988.

Hampton, David R. Modern Management: Issues and ideas. Belmont CA: Dickenson Publishing Company, Incorporated, 1969.

Hellriegel, Don and others. Organizational Behavior (Third Edition). St Paul: West Publishing Company, 1983.

Hoene, Peter, Aide to Lt Gen Low. Telephone Interview. HQ ASD, Wright-Patterson AFB OH, 2 August 1989.

Huffman, Maj James W. and others. Weapon Systems Acquisition Guide. Maxwell AFB AL: Air Command & Staff College (AU), May 1981.

Hunter, William N. "OPM Loosens Contracting Staff Standard," Government Computer News, 9: 7 (9 July 1990).

Klimstra, Paul D. and Joseph Potts. "What We've Learned Managing R & D Projects," Research * Technology Management, 31: 23-39 (May - June 1988).

Kolodny, Harvey F. "Managing in a Matrix," Business Horizons, 24: 17-24 (March - April 1981).

Kuzman, Richard J. "Managing Very Large System Development Efforts," Journal of Systems Management, 4: 10-14 (January 1989).

Larson, Erik W. and David H. Gobeli. "Matrix Management: Contradictions and Insights," California Management Review, XXIX: 126-139 (Summer 1987).

Lasden, M. "Management Fads: The Matrix," Computer Decisions, 17: 80+ (21 May 1985).

Management Analysis Group (MAG). Aeronautical Systems Division Statiscal Digest. Management Analysis Group Aeronautical Systems Division, Wright-Patterson AFB OH, 30 September 1989.

Martin Company. A Working Tool for Management, A Quick Glance at the Martin-Orlando Chartroom. Martin Company, Orlando FL, November 1962.

McCarty, Dyke. "The Acquisition of Major Systems," Readings for Contracting and Acquisition Management. CMGT 523, Volume I: 47-74. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, August 1987.

McNaugher, Thomas L. New Weapons Old Politics. Washington, DC: The Brookings Institution, 1989.

McNeil, Harold J. and Kenneth O. Hartley. "Project Planning and Performance," Project Management Journal, XVII: 36-44 (March 1986).

Meehan, Maj John D. and Maj Thomas O. Millett. Major Weapon System Acquisition - An Analysis of DoD Management Arrangements. MS thesis, GSM/SM/68-10,11. School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1968 (AD-845295).

Moder, Joseph J. "Network Techniques in Project Management," Chapter 15 (pp 324-373) in David I. Cleland and William R. King (editors), Project Management Handbook (Second Edition). New York: Van Nostrand Reinhold, 1988.

Morris, Peter W. G. "Managing Project Interfaces -- Key Points for Project Success," Chapter 2 (pp 16-56) in David I. Cleland and William R. King (editors), Project Management Handbook (Second Edition). Van Nostrand Reinhold, 1988.

Nelson, Col Eric. Matrix Management Techniques in USAF R&D Programs. Research Report 431. Air War College, Maxwell AFB AL, April 1978 (AD-B027756L).

Office of the Chief of Naval Research (OCNR). NAVSO P-2457 RDT&E/Acquisition Management Guide (10th Edition). Arlington VA: Office of the Chief of Naval Research, January 1987.

Office of the President (OP). OFPPP No. 1 Major System Acquisitions. A Discussion of the Application of OMB Circular No. A-109. Washington DC: Office of Federal Procurement Policy, August 1976.

Opel, Maj Stephen, Chief Systems Engineering. SSD/SD Approach to Matrix Management. Vugraphs presented to SSD/CC and Program Directors in March 1990.

Patterson, Michael B. "Matrix Management: Is it Right for Weapons Acquisition?" Program Managers Newsletter, VII: 8-13 (September - October 1978).

Pearson, Steven L. A Study of the Attitudes of Acquisition Managers and Engineers at Aeronautical Systems Division and Space Systems Division. MS thesis, AFIT/GSM/LSY/89S-31. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1989 (AD-A215548).

Peck, Merton J. and Frederic M. Scherer. The Weapons Acquisition Process: An Economic Analysis. Boston: Division of Research Graduate School of Business Administration Harvard University, 1962.

Peloquin, Maj Dale B. and Maj Arthur J. Roscoe. Systems Management in the United States Air Force - A Review and Critical Analysis. MS thesis, GSM/SM/69-17,18. School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1969 (not in DTIC).

Peters, Tom and Nancy Austin. A Passion for Excellence The Leadership Difference. New York: Random House, 1985.

Peterson, Connie F. Project Effectiveness and the Balance of Power in Matrix Organizations: An Exploratory Study. MS thesis, AFIT/GLM/LSY/86S-56. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1986 (AD-A174469).

Pitts, Robert A. and John D. Daniels. "Aftermath of the Matrix Mania," Columbia Journal of World Business, 19: 48-54 (Summer 1984).

Putnam, W. D. The Evolution of Air Force System Acquisition Management. Santa Monica CA: Rand, August 1972. (Contract F44620-67-C-0045) (RAND No R-868-PR) (AD-754239).

Pywell, Harry E. "Engineering Management in a Multiple-(Second- and Third-Level) Matrix Organization," IEEE Transactions on Engineering Management, EM-26: 51-55 (August 1979).

Rich, Michael D. and Edmund Dews. "Improving defense acquisition: a strategy to meet the challenge," Defense Management Journal, 23: 24-38 (First Quarter 1987).

Roman, Daniel D. Managing Projects: A Systems Approach. New York: Elsevier, 1986.

Rosenau, Milton D., Jr. Project Management for Engineers. Belmont CA: Lifetime Learning Publications, 1984.

Sayles, Leonard R. and Margaret K. Chandler. Managing Large Systems - Organizations for the Future. New York: Harper & Row, 1971.

Schriever, Maj Gen Bernard A. "Progress Report -- AFBMD: Catching Up With the Soviets," missiles and rockets, 4: 53-54 (28 July 1958).

Signore, Andrew A. Conceptual Project Planning From an Owner's Perspective," Project Management Journal, XVI: 52-58 (September 1985).

Souder, William E. "Project Management: Past, Present, and Future -- An Editorial Summary," IEEE Transactions on Engineering Management, EM-26: 49-50 (August 1979).

Space Systems Division (SSD). SSD VA 23-5 Space Systems Division Direct Reporting Units (Organizational Diagram). Los Angeles AFB CA: Space Systems Division, 1 November 1989.

Space Systems Division (SSD). SSD VA 23-5 Space Systems Division Headquarters Staff (Organizational Diagram). Los Angeles AFB CA: Space Systems Division, 1 November 1989.

Staples, Edward. "Manager's Workshop: Project Scheduling, A Step-By-Step Approach," Office Administration and Automation, XLVI: 71 (February 1985).

Stuckenbruck, Linn C. "Integration: The Essential Function of Project Management," Chapter 3 (pp 56-81) in David I. Cleland and William R. King (editors), Project Management Handbook (Second Edition). New York: Van Nostrand Reinhold, 1988.

-----. "The Matrix Organization," Chapter 6 (pp 69-93) in Linn C. Stuckenbruck (editor), The Implementation of Project Management: The Professional's Handbook. Reading MA: Addison-Wesley Publishing Company, 1982.

Talley, Maj Dorsey J. and Maj Ronald D. Patchett. An Analysis of Possible Improvements in the Staffing of System Program Offices. MS thesis, SLSR-7-71A. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, February 1971 (AD-887498).

Thorn, Mack J. Importance and Utilization of Specialized Competence Within a Matrix Organizational Environment. MS Thesis, AFIT/GSM/LSY/89S-42. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1989 (AD-A215625).

Thurber, Maj Karl T. Matrix Management: Theory and Application in the AFSC Product Division. Research Report 2520-78. Air Command and Staff College (AU), Maxwell AFB AL, May 1978 (AD-B028403).

Thurber, Maj Karl T. "The Air Force's Experience With Matrix Management," Defense Management Journal, 14: 16-21 (November 1978).

Under Secretary of Defense for Acquisition (USD(A)). DODD 5000.1 Major and Non-Major Defense Acquisition Programs. Washington DC: Under Secretary of Defense for Acquisition, 1 September 1987.

Under Secretary of Defense for Acquisition (USD(A)). DODD 5000.2 Defense Acquisition Program Procedures. Washington DC: Under Secretary of Defense for Acquisition, 1 September 1987.

United States Code (USC) Annotated Title 10 Armed Forces, Sections 1121 to 3000, 1990 Supplementary Pamphlet Covering Years 1984 to 1989. St Paul: West Publishing Company, 1990.

Von Braun, Wernher and Frederick I. Ordway, III. History of Rocketry and Space Travel. New York: Thomas Y. Crowell Company, 1969.

Wiesinger, Col. Chief Systems Engineer. Telephone Interview. Los Angeles AFB CA, 28 December 1989.

Westover, Lt Col Frederick L. Acquisition Management of Electronic Warfare Systems. Maxwell AFB AL: Air War College (AU), May 1988 (AD-A202754).

Wiederhold, Maj David A. Matrix Management in DoD: An Annotated Bibliography. Maxwell AFB AL: Air Command and Staff College (AU), April 1984 (AD-A143316).

Wilemon, David L. and Bruce N. Baker. "Some Major Research Findings Regarding the Human Element in Project Management," Chapter 33 (pp 847-866) in David I. Cleland and William R. King (editors), Project Management Handbook (Second Edition). New York: Van Nostrand Reinhold, 1988.

Wittner, Howard M. "R & D Project Managers: What and Who Are They?" Armed Forces Management 8: 39-41 (March 1962).

Wojick, Jr., Richard L. An Investigation of the Distribution of Power and Leader Effectiveness in Matrix Organizations. MS thesis, AFIT/GSM/LSR/89S-45. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, September 1989 (AD-A215631).

Wright, Norman H., Jr. "Matrix management - A primer for the administrative manager," Management Review, 68: 58-61 (April 1979).

Youker, Robert. "Organization alternatives for project managers," Management Review, 66: 46-53 (November 1977).

Zambenini, Col Robert L. "ASD Implements Matrix Concept," The Air Force Comptroller, 11: 40-41 (July 1977).

VITA

Captain Charlotte E. Hunter [redacted] graduated from East Syracuse Minoa High School in May 1970 and then from San Francisco State University in May 1980 with a Bachelor of Arts in Economics. On active duty from June 1973 until January 1978, she served at Tinker AFB, Oklahoma as a rawinsonde operator and at Hickam AFB, Hawaii as a weather observer. As a "weekend warrior" from January 1978 until June 1980, she served as a management analyst at Mather AFB, California and a maintenance analyst at Hayward ANG, California. Her first assignment after returning to active duty was at Headquarters Space Systems Division in the Defense Dissemination Program Office. Next, she was graduated from the Defense Systems Management College's Program Management Course in June 1985. From June 1985 to March 1989 she was assigned to the CONSTANT WEB Program Office at Headquarters Electronic Security Command, Kelly AFB, Texas. In May 1989, she entered the AFIT School of Systems and Logistics.

[redacted]

REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704 0188

1 AGENCY USE ONLY (Leave blank)	2 REPORT DATE	3 REPORT TYPE AND DATES COVERED
	September 1990	Master's Thesis

4 TITLE AND SUBTITLE
Matrixed Personnel in the SPO

5 FUNDING NUMBERS

6 AUTHOR(S)
Charlotte E. Hunter, Captain, USAF

7 PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Air Force Institute of Technology
WPAFB OH 45433-6583

8 PERFORMING ORGANIZATION REPORT NUMBER
AFIT/GLM/LSP/90S-27

9 SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10 SPONSORING/MONITORING AGENCY REPORT NUMBER

11 SUPPLEMENTARY NOTES

12a DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

12b DISTRIBUTION CODE

13 ABSTRACT (Maximum 200 words)

The focus of this research effort was to determine, in general, what degree of matrix management should occur in an Air Force Systems Command System Program Office and, specifically, whether or not engineers should be matrixed into the system program office. First, a qualitative, in-depth literature review was done. Next, personal interviews were conducted with Program Directors and Deputy Program Directors at Aeronautical Systems Division and Space Systems Division. Then, after summarizing the results, the data was analyzed and recommendations made.

Recommendations include: building a team of experts at each division to prepare the technical portions of each request for proposal; having a cadre of directly assigned engineers in the system program office; decreasing the total amount of personnel matrixed to the system program office; ensuring newcomers receive entry level acquisition training before they report to the system program office; and, providing incentives for the experienced worker to stay in the Air Force. For both civilian and military workers matrixed into the system program office, the program director should be the evaluator and a controlled tour in the office should be established.

14 SUBJECT TERMS	15 NUMBER OF PAGES
Acquisition Management, Program Management Matrix Management	214
	16 PRICE CODE

17 SECURITY CLASSIFICATION OF REPORT	18 SECURITY CLASSIFICATION OF THIS PAGE	19 SECURITY CLASSIFICATION OF ABSTRACT	20 LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UL