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A Definition and Investigation of Cooperative Acquisition Programs Using Multiple Case Studies

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A DEFINITION AND INVESTIGATION OF
COOPERATIVE ACQUISITION PROGRAMS
USING MULTIPLE CASE STUDIES

THESIS

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THESIS

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Robert T. Butz

Table of Contents

Page

Page

List of Figures

AFIT/GLM/LAL/98S-3

Abstract

This thesis is an exploratory study of the management of cooperative acquisition programs. The investigation focuses on defining the nature of a cooperative acquisition strategy, identifying potential problems associated with this approach, and evaluating the effectiveness of the current guidance and support structure for such programs. The desired outcome of this strategy is a common solution. The operational definition of cooperative acquisition builds on the Department of Defense definition of Joint Service Acquisition. A pilot study and literature review are used to develop a structured interview for three case studies. Analysis of these cases indicates that difficulty in resolving core requirements, and funding instability are the two major sources of problems on cooperative acquisition programs. Also, the guidance and support for cooperative acquisition programs has been slow to develop.

A DEFINITION AND INVESTIGATION OF COOPERATIVE ACQUISITION PROGRAMS USING MULTIPLE CASE STUDIES

I. Introduction

General Issue

For various reasons, cooperation in acquisition is encouraged at all levels within the Department of Defense (DoD). The scope of the cooperative effort ranges from new Acquisition Category (ACAT) I joint development programs to ACAT III programs with as few as two intra-service customers. The goal of the cooperative acquisition process is to meet as many requirements as possible with a common solution. The existing direction and support for cooperative acquisition, however, gives limited guidance. Processes for identifying opportunities, and implementing a cooperative strategy do not exist. DoD directives fail to include many important aspects of cooperative acquisition and common solutions by providing only a broad definition of joint acquisition. Finally, the management support structure in place is geared towards providing oversight and guidance to only major joint programs.

Purpose and Objectives

The purpose of this research is to explore the nature of cooperative acquisition and common solutions, and identify and evaluate the sources of, and gaps in, guidance and direction for managing this type of program. By furthering the awareness and understanding of the special management challenges of these types of programs, guidance that is more specific can be developed and incorporated into existing systems acquisition management tools. Additionally, processes can be developed and implemented which will support the identification, and implementation of common solutions. The primary objectives of this study are to:

1) capture the range of characteristics that programs can have within the scope of cooperative acquisition,
2) identify the potential problems that can be encountered on these programs,
3) evaluate the effectiveness of the current guidance and support structure associated with these programs, and
4) provide recommendations for improvement.

Cooperative acquisition can be operationally defined by building on the approved DoD definition of a joint acquisition program. From there, the study's objectives will be met using insights gained from the literature review, preliminary interviews, and three case studies. The goal of the program selection process is to select the programs for each case so that they will be different enough from each other to capture as many aspects of the definition as possible.

Justification for Research

The acquisition policy of the DoD mandates that cooperative efforts in the acquisition of material alternatives shall be preferred over single service, or single weapon system, development programs. Further, the modification of existing U.S. military systems shall take priority over new development programs to meet operational requirements. The responsible agency must also consider compatibility, interoperability, and integration with existing and future systems (DoDD 5000.1:D.2.b.).

The verbiage in the DoD directives implies that the policy of cooperation in the acquisition of material solutions extends beyond interservice cooperation. Separate parties within a particular service should also collaborate whenever such collaboration is practical. Adhering to this policy should result in significant monetary savings for the DoD in terms of economies of scale, interoperability, deployment footprint, and so forth.

The policy exists, but the guidance is lacking. The results of this research should present a case for the DoD to replace the definition of joint acquisition with that of cooperative acquisition. Additionally, this research can be used as a training aid to provide program managers with a better understanding of the nature and purpose of cooperative efforts, and an awareness of potential problems they can encounter. It will also serve as a starting point for further research.

Operational Definitions

Given that the DoD's policy of cooperative acquisition includes more than simply joint service programs, it is important to operationally define the different forms of cooperative acquisition for this study. The term *cooperative acquisition* implies a process of which the desired outcome is some degree of a common solution. The terms *multiple user* and *cross-platform integration* are used to characterize programs within the cooperative acquisition strategy. The operational definition of a multiple user program is any acquisition program that involves delivery of a new system, modification, or support equipment to more than one customer. Each customer represents a different system, or a different variation of the same system. A system, in this context, can be an aircraft, missile, or any other end item.

A cross-platform integration program is a modification or improvement that is integrated into more than one existing system. Integration is "[t]he arrangement of systems in an architecture so that they function together in an efficient and logical way" (CJCSI 6212.01A, 1996:Enclosure A, para l). The program can be a modification to a component of the system, an additional subsystem, or common support equipment integrated before or after the acquisition of the system is complete. The definition of cross-platform integration differs slightly from that of a multiple user program in that it does not necessarily include new system developments. A cross-platform integration program is always a multiple user program, but the opposite is not necessarily true. Both multiple user and cross-platform integration programs can be single service or joint.

A joint service acquisition program is defined as "[a]ny acquisition system, subsystem, component, or technology program that involves a strategy that includes funding by more than one DoD Component during any phase of a system's life cycle" (DoDD 5000.2-R, 1996:3.3.5.3). By definition, a joint program is a cooperative acquisition, and a multiple user program. If it involves existing systems, it is also cross-platform integration. Figure 1 shows the relationship between cross-platform integration, joint, and multiple user programs within the cooperative acquisition strategy.

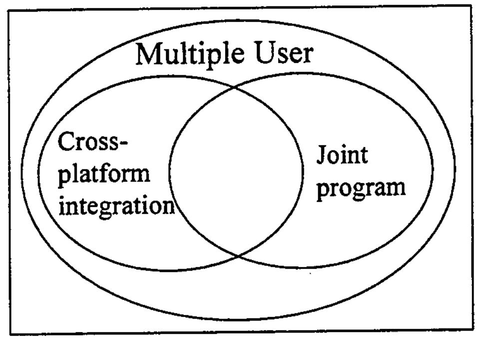

Figure 1. Program Classification Within Cooperative Acquisition

Scope and Limitations

This thesis focuses on less than major cooperative acquisition programs managed within the Subsystem Product Support Office (ASC/SM) at Wright-Patterson Air Force Base, Ohio. All of the programs within ASC/SM are joint programs with the Air Force as the lead service. In addition, each is considered a commodity, which is an item developed independent of the system that it will become part of. This is an important distinction because of the relatively short development cycle of a commodity (from two to four years). Time was the most significant factor in limiting the scope of this effort to these programs. Further research may be necessary in order to generalize the results across a greater range of programs.

The investigation of each program focuses on aspects of program management. Other issues relating to test and evaluation, logistics, configuration control, or other functional areas may require further inquiry.

Problem Statement

There is little organized information and guidance available to program managers for cooperative acquisition programs. The information available does not adequately capture the different aspects of various programs within the definition, and managers are left to discover and overcome cooperative acquisition related problems on their own. A better awareness and understanding of these types of programs is needed in order to tailor management strategy to a particular program, and assist in risk assessment and early planning.

Theoretical Framework

A wide variety of programs fall within the scope of cooperative acquisition strategy. The theoretical framework described below will be used to structure the data collection in this study. The intent is to support the hypothesis that all cooperative acquisition programs are prone to the same set of challenges, which are different from those of a non-cooperative program. This should be true regardless of the type of cooperative effort. The expectation is that the programs in this study will have experienced similar challenges despite being characteristically different from each other. The characteristics for evaluating each program are discussed later in this chapter.

Assumptions

Given that cooperation in acquisition is the preferred strategy within the DoD, there are three assumptions on which the theoretical framework is based. They are as follows:

A) Some cooperation is always better than no cooperation,

B) The resulting system, upgrade, or modification for one particular customer is never identical to that of any other customer, and

C) The characteristics of each program will determine where individual programs will branch off from the core program, and how unique each customer's product will be.

The assumption that no two solutions can be identical also implies that each customer has different cost, schedule, and performance requirements or constraints. Where possible, the data collection will be structured to test these assumptions.

Characterizing Dimensions

The dimensions to be used to characterize the cooperative acquisition programs in this study were adapted from the criteria used to evaluate joint acquisition programs in the *Joint Program Study* conducted in 1984. That study is described in more detail in the literature review (Chapter II). The adapted characterizing dimensions used for this study include:

a) ACAT
b) current acquisition phase
c) number of users/services
d) complexity of integration

The complexity of integration dimension is further broken down into the following:

e) software intensity
f) commodity versus major aircraft subsystem
g) disparity of requirements between users
    - different missions (speed and size)
    - different technology (aging aircraft versus newer system)

Collectively, the measures of complexity determine the extent that each customer's needs can be met by the core program. As previously stated, the goal of characterizing each program along these dimensions is to illustrate significant differences between programs.

Propositions/Research Questions

To capture and describe the different characteristics that a program can have within the scope of cooperative acquisition, it is necessary to collect information about the nature of the program for several different programs at different places along the cooperative acquisition continuum. This can be done using the literature review as well as the data collection. The characterizing dimensions or criteria described as a) through g) were used to guide the literature search, and the development of the interview questions.

To summarize, the following research questions will be used to guide the research design, data collection, and analysis for this thesis:

1) What problems are created by implementing a cooperative acquisition strategy? Where do they originate? Can these problems/challenges be generalized to all cooperative acquisitions? How can these challenges be overcome?
2) Is cooperative acquisition an effective strategy? How is success measured? What factors influence the degree of success on cooperative acquisition programs?
3) What is the extent of the current guidance and support for the initiation and conduct of cooperative acquisition programs? How have current programs been supported?

Preliminary interviews, the literature review, and case study interviews will be the primary avenues for answering these questions. Other exploratory questions will also be included in the case studies to explore areas needing further investigation.

Research Approach

A case study approach was chosen for this investigation because the researcher has no control over the events being investigated. Also, previous investigations of joint acquisition programs took this same approach.

II. Literature Review

Introduction

Not surprisingly, a preliminary review of the literature revealed an absence of information relevant to cooperative acquisition for other than joint service programs. For this reason, the literature review focuses on available joint acquisition documentation. The case studies and interviews were designed to show that the information can be generalized to cooperative acquisition.

The literature review serves two purposes. First, it provides a background of joint acquisition. The background includes discussions of why joint acquisition is important, and of the rationale used for creating a joint program. Also, the existing management and support structure for joint programs is explored.

The second main purpose of the literature review is to capture observations about the origins and nature of various joint acquisition programs, and review the problems experienced and lessons learned from these programs. This information was used to structure the data collection process for this study. The literature review and preliminary interviews provide the foundation for the development of case study questions.

Reasons for Jointness

Congress and the Executive Branch emphasize that joint acquisition is the preferred management approach to meeting U.S. defense goals whenever possible. *The Joint Program Study* cites congressional pressure as one factor to predict that the number of joint programs will continue to increase. Other factors leading to the expansion of joint programs include an increased focus on interoperability and joint warfighting doctrine, and emerging C^3I technologies (1984:ES-1).

Congressional interest in joint programs has mainly been because of the potential cost savings, but there are several other potential benefits. According to Eller, for any program, one or a combination of the following potential benefits can be the rationale for establishing a joint program (1996:2-3):

- Provide a new joint combat capability
- Improve component interoperability and reduce duplication among components
- Reduce development and production costs
- Meet similar multi-service requirements, and
- Reduce logistics requirements through standardization

A program can be designated as joint at any point in the life cycle. Therefore, all programs should be evaluated periodically for joint potential (Eller, 1996:2-3).

Nature of Joint Acquisition

Joint acquisition does not necessarily have to include full collaboration from the very beginning of a program. Instead, there is a continuum of collaborative opportunities. As stated by the GAO:

> Most military technologies and activities overlap or interrelate to one degree or another. A service may monitor another's system development, exchange ideas, or buy another service's finished product. These are good ways to conserve development costs and avoid duplication. (1983:2-3)

In general, a joint program should be established when technically feasible, and the commonality of subsystems or parts is high enough to give a reasonable expectation of economic benefit. The goal is not to eliminate all duplication of effort between the different services but "to insure that where such duplication or overlap exists, it is visible, controlled, and purposeful" (GAO, 1983:1). In other words, programs should strive for a common solution, or justify why they are not.

Establishing a Joint Program

For ACAT I programs, the Joint Requirements Oversight Council (JROC) is responsible for reviewing and validating the mission need statements (MNS) and operational requirements documents (ORD) for each of the military services. If the needs or requirements of two or more services overlap, or are duplicate, the JROC is likely to recommend the establishment of a joint program. The Principal Staff Assistant (PSA) performs the same function for ACAT IA programs. In addition to the JROC and PSA, the recommendation to establish a joint program can also come from the component heads (Eller, 1996:2).

The Milestone Decision Authority (MDA) typically makes the decision to establish a joint program, but direction can also come from the Under Secretary of Defense (A&T) or the Congress. A Memorandum of Agreement (MOA) between the services involved is the typical vehicle for establishing a joint program (Eller, 1996:2-3).

Joint Program Management Structure

Once a joint program is established, it is managed through the lead components' reporting chain. The joint program manager reports to the Program Executive Officer (PEO), the PEO to the Component Acquisition Executive (CAE), and finally the CAE to the Defense Acquisition Executive (DAE). The lead component funds the development efforts that will satisfy common requirements. Individual services are responsible for funding and integrating any of their unique requirements (Eller, 1996:14-17).

Joint Program Support Organizations

Various organizations have been created at different levels within the DoD to do strategic planning, establish policy, provide guidance, and identify opportunities for joint acquisition. Generally, at higher levels, the focus becomes broader and more applicable to major programs.

Joint Requirements Oversight Council (JROC)

As previously mentioned, the JROC is responsible for reviewing each service's MNSs and ORDs for joint potential. Its primary focus is on requirements. The JROC was created in 1984, and membership includes the Vice Chief of Staff or equivalent from each service, and the director of the Joint Staff. The position of chairman rotates among the services (Humphrey and Postak, 1987:2-2).

Joint Logistics Commanders (JLC)

The JLC was created to in an effort to improve working relationships between the services that have hindered jointness in the past. Primary membership includes:

1) Commander, Army Material Command,
2) Commander, Air Force Material Command,
3) Deputy Chief of Naval Operations (Logistics),
4) Deputy Chief of Staff (Installations and Logistics), USMC, and
5) Director, Defense Logistics Agency.

The intentions of the JLC are to meet at least three times annually to "improve military effectiveness by identifying and exploiting opportunities for Joint Service/Agency cooperative efforts in Logistics" (JLC Charter, 1996).

Joint Aeronautical Commanders Group (JACG)

The JACG focuses on joint aeronautical issues at the three-star level. Membership includes representatives from all four branches of the military plus the Coast Guard, DLA, FAA, and NASA. The military representatives are:

1) Commander, Aeronautical Systems Center, AFMC, USAF,
2) Commander, Naval Air Systems Command, USN,
3) Commander, Aviation and Troop Command, USA, and
4) Commander, Aviation Department, USMC.

As with the JLC, the responsibility of chairman rotates every two years (JACG Charter).

Joint Program Opportunities Board (JPOB)

The objectives of the JPOB are to conduct processes that promote joint acquisition, and facilitate the evaluation of subsystem programs for joint opportunities. Primary membership includes the Director, Subsystems Product Support Office, Aeronautical Systems Center (ASC/SM), AFMC, USAF; the Assistant Program Executive for Concurrent Engineering, Program Executive Office, Aviation, USA; and the Deputy Commander for Acquisition and Operations, Naval Air Systems Command, USN. Chairmanship rotates concurrent with that of the JACG (JPOB Charter).

Joint Program Management Focus Group

The joint focus area is intended to support joint program management efforts by bringing together expertise from several different home offices. Training personnel, maintaining points of contact, developing templates for joint programs, and documenting lessons learned are some of the focus group's goals (JPMFG Conops, 1998).

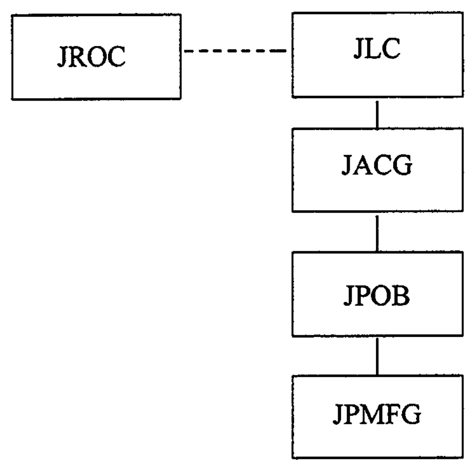

Figure 2. Relationship of Joint Program Support Organizations

Chronology of Studies

Much of the present body of knowledge on joint program management originates from three key studies between 1983 and 1984. The first two studies, one by the General Accounting Office (GAO), and one by the Defense Sciences Board (DSB), were published almost simultaneously. The third one, initiated by the Joint Logistics Commanders, builds on the findings from the first two. Each of these reports contributes to the formulation of the questions used in this study, and is discussed separately below.

The GAO Report

The GAO draft report, "Joint Major System Acquisition: An Elusive Strategy," was published in June of 1983. As the title indicates, the focus is on major acquisition programs. The drafters of this report define joint acquisition narrowly in relation to the other two studies by limiting it to "full collaboration from early development to deployment" (1983:2). The report also states, however, that collaboration to any extent makes sense (1983:2-3).

The statement that any collaboration makes good sense is based on the theory of joint acquisition presented in the GAO report. The theory of joint acquisition is to:

> combine the partly complimentary, partly substitutable, and the technically similar into fewer types, use common parts, simplify the acquisition, and save considerable money. Economies should come in development, logistics, support, operations, and production if large quantities are to be procured. (1983:12)

The purpose of the GAO report is to offer guidelines for developing criteria to identify programs with joint acquisition potential so that the theoretical benefits are realized. Unfortunately, at the time the report was published, the GAO was unable to find any documented savings achieved by joint acquisition of a major system (1983:29). Cost comparisons have not been done because the calculations based on the alternative not chosen will only be hypothetical, and no analysis methodology has been agreed upon.

The GAO report presents five criteria that a program should pass in order to be further considered for joint potential. These five criteria include the following (1983:34):

- Essential service doctrines will not be unduly compromised,
- The programs are still malleable, that is, not too far down the development road at merger time,

- Military effectiveness will not be unduly lessened,
- The potential economies are persuasive, and
- There is conspicuous support by the Congress, OSD, the top military officers, and JCS.

These criteria reflect the GAO's intentions that the program should be technically and economically worth while, and that the proper high level commitment exists to start and sustain the joint program. In most cases, one or more of these criteria may be subjective. This could work for or against the decision to go for a common solution. Also, the need for support from the Congress reflects the political dimension of these criteria.

Sources of Problems

In this report, as with the others, the lack of agreement on joint requirements is cited as the greatest sources of problems. It is critical to the success of the program that joint requirements be agreed upon and maintained from the earliest possible moment. Simply combining the unique requirements of all the parties involved is not the right solution. The GAO summarizes this problem by stating:

> Every joint system is a committee product, a compromise to one extent or another. To add on all the requirements of each participating service may simply "internalize" the duplication costs which the joint program was originally intended to forestall. Performance may be degraded too. (1983:27)

The GAO report also cautions against the pitfalls of negotiating requirements through trade-offs. Depending on the relative bargaining positions of the respective services, one may get more than it wants, while the other gets less. It is also possible that neither service is happy with the result (1983:17).

It is important that there is some level of inherent agreement between the requirements of each respective customer. Such agreement may stem from the nature of the mission needs, or how the requirements are written. The greater the inherent agreement, the more common the solution.

The second biggest source of problems cited by the GAO is program funding stability. This is a problem in joint programs because the program managers don't have control over the funds. Instead, the funding is controlled by each of the participating services in their respective budget program elements. Instability comes from "year-to-year budget changes, reprogramming, priority shifts, inflation, and so on" (1983:26). The GAO report also notes that the services may withhold funds if confidence in the program is low, or as a means of "steering" the program in a desired direction (1983:25-26).

Other sources of problems in joint acquisition programs are enumerated in the GAO report. These sources include weak service interest, service-unique procedures, and dissatisfaction with the emerging joint product. As stated above, the GAO report focuses on major systems, but admits that, in general, commodities experience the same problems as the major systems (1983:18).

Measures of Success

The GAO report defines a successful joint program as one that "would achieve substantial commonality in fielded major systems, satisfied participating services, and actual documentable savings" (1983:2). Unfortunately, as this report was released, the

GAO had not identified a single successful program according to these measures (1983:12).

Role of the Program Manager

The GAO report identifies the program manager as an essential figure in determining the success of a joint program. The report summarizes the challenge of the program manager by saying:

> The program manager must get funds from the participating services when needed, settle continuing requirements conflicts, muster enthusiasm, keep the partnership intact, reconcile existing contracts, negotiate multiple chains of command, maintain the program on a reasonable schedule, and get a product produced that meets DoD's many standards and also satisfies varied service needs. Program viability depends greatly on the resourcefulness, powers of persuasion, and negotiating skill of the program manager. (1983:26)

The program manager's challenge of managing the program is complicated by differences among the members of the program team. "Representatives appointed to the joint program have divided loyalty--to their continuing service affiliation and to the ad hoc joint program. They are in the program first and foremost to protect their service's interests" (1983:25). The program manager does not control promotions and reassignment of the individuals on the program (1983:25).

An advantage of the joint program team is that individual service traditions are not as closely guarded at the program level as at higher levels. According to the GAO, "[s]ervice doctrine and requirements are not so rigidly guarded as in upper level service quarters, and much can be accomplished informally on the program office firing line by an enthusiastic team" (1983:25). In other words, service parochialism may not be as big a problem once the joint office is established, and it may be overcome by the program manager through effective team building.

Summary of GAO Recommendations

In addition to suggesting the five criteria to be used in selecting joint programs, the GAO provides seven recommendations to improve the conduct of joint programs. The recommendations include (1983:30):

- Stronger enforcement of regulations,
- Mandated interservice buying of each other's new systems,
- Stronger executives in key spots,
- Reserve a block of DoD funds to finance the development phases of joint major programs,
- Let USDRE manage all joint major programs,
- Empower the JCS to settle conflicting service requirements, and
- Ask the Congress to exert its "power of the purse."

Through its ultimate control over the funding, the Congress should foster cooperation between the services by withholding funds or penalizing the services that are reluctant to participate (1983:33).

The DSB Report

The DSB report, "1983 Summer Study, Joint Service Acquisition Programs," was released in August of that same year. The study examines 64 different programs, both major and less than major. Other than the fact that this study looks at less than major programs, the other key difference between this report and the GAO report is the criteria for success. The DSB defines a successful program as one that achieved greater than 50 percent commonality, the system was fielded in large numbers, and technical performance goals were achieved less than two years behind schedule. Using these criteria, the DSB concludes that approximately 66 percent of joint programs are successful (1983:64).

Further examination of the successful programs led the DSB to distinguish major programs from non-major programs. It is noted that "non-major programs and science and technology have less problems than major end item development programs" (1983:19). The sources of problems identified in this study were the same as those identified in the other two studies. Specifically, these problems include disagreement on requirements, funding instability, shifting service priorities, and the ad hoc environment of joint programs (1983:19).

Another important conclusion of the DSB report is that there is a general lack of guidance pertaining to the management of joint programs. The authors state that "little or no formal policy or direction exists. DoD directives 5000.1 and 5000.2...provide no specific guidance for joint program acquisitions" (1983:22).

The Joint Program Study

The *Joint Program Study*, published in 1984, is perhaps the largest contributor to the current body of knowledge of joint programs. It "grew out of a need to better understand the nature of joint programs and how to manage them effectively" (1984:1-6). The Joint Logistics Commanders (JLC) chartered the study in 1983 to assist them in improving their knowledge of how joint programs work, and to clarify their role in the joint acquisition process. An ad hoc group comprised of at least twenty representatives each from the Air Force, Army, and Navy conducted the study. A committee of four flag officers gave overall guidance with the Air Force acting as the lead service (1984:ES-2).

This yearlong study examines 80 different joint acquisition programs and 50 single-service programs to identify the challenges unique to the selection and management of joint programs. The programs include major and non-major programs from eleven different categories of systems. Some of the identified categories are subsystems, aircraft, munitions, and command and control systems. The study is broken down into three main parts: selection, initiation, and execution (1984:ES-2 to ES-3, B-2).

Joint Program Selection

To study joint program selection, data was collected on the origin and reasons for jointness of the 80 joint programs in the study. The two main findings in this phase of the study are 1) that the Congress and OSD originate 60 percent of all joint programs, and 2) no formal policy exists for selecting joint programs. The lack of formal policy leads to high incidences of service withdrawals from the program, and significantly higher cost and schedule growth as compared to single-service programs. The biggest contributing factors to the cost and schedule growth are identified as funding turbulence and inadequate requirements resolution. To correct these deficiencies, the investigators recommend the creation of JLC subordinate commander groups to perform JROC functions for less than major programs. They also propose criteria that must be met before a joint program can be selected. These criteria are 1) a clear multi-service need,

2) demonstration of a clear net benefit, and 3) successful resolution of all major requirements issues (1984:ES-3 to ES-6).

Joint Program Initiation

The initiation phase of the study looks at the processes for creating program charters, and organizing and staffing the program offices. The key findings are that the organization and manning levels are not adequate in many of the programs to handle the unique problems, and less than one-third of the programs have a joint charter to establish authority and outline responsibilities. The study recommends that it should be standard practice to create and appropriately staff joint program offices for all joint programs, and that each program should have an approved charter (1984:ES-7 to ES-8).

Joint Program Execution

Joint program execution is the third and final area investigated in the study. The findings in this part of the study are essentially a combination of the findings from the first two phases. Program instability as a result of the previously mentioned findings is identified as the most significant problem affecting joint program execution. Differences in the various business practices between services is recognized as the second most common source of problems. To overcome these problems, the study group recommends that high-level approval of the program baseline should be required at the beginning of full-scale development, and the JLC should strive to standardize the services' business practices (1984:ES-8 to ES-10).

Measures of Success

The study committee established criteria to evaluate the degree of success for the joint programs investigated in this study through a review of the literature and group discussions. As part of the literature review, they cite the 1983 study conducted by the GAO. This report views success of joint programs in terms of substantial commonality, service satisfaction, and documentable savings. After studying 15 major programs, the GAO concludes that there have been no successful joint programs (1983:2-5). The *Joint Program Study* does not use user satisfaction as a measure of success because the study group felt that it is too subjective to measure, and individual perceptions are too different to capture in a single measurement. Many other measures of success can not be used for young programs because not enough information is available to make an assessment. The study team finally settled on the following measures of success (1983:2-15 to 2-16):

1) minimal technical requirements compromise,
2) high degree of commonality,
3) low cost and schedule growth,
4) attainment of performance goals,
5) attainment of supportability goals, and
6) high harmony.

The success criteria as defined by the joint study group help structure the data collection for the study.

Characterizing Attributes

One goal of the study is to capture, as much as possible, the range of different characteristics that a joint program can have. The following seven attributes are used to characterize each program:

1) Current acquisition phase
2) Major vs. non-major system
3) System type
4) Organizational type
5) Phase when made joint
6) Organization directing jointness, and
7) Lead service

System type refers to the broad category of systems under which each program falls. From a list of eleven, the categories included subsystems, C^3I, aircraft, and munitions (1984:B-2).

The organizational type attribute refers to the organizational structure of the program. These structures reflect the level of cooperation between the services. It ranges from a fully integrated joint program office to a single service program with an additional service showing interest in the outcome (1984:B-2 - B-9).

Other Joint Acquisition Related Studies

Since 1984 when the *Joint Program Study* was published, several other documents about joint acquisition have been created. Most of them are case studies of individual programs and the problems they encountered. Two particular examples of these are described below. Several other case studies of joint programs have been conducted including the Joint Tactical Information Distribution System (JTIDS), and the V-22 Osprey program. All of the case studies report essentially the same problems and issues as previously identified.

In addition to the case studies, two joint program management handbooks have been produced. The information in each of these documents is based mostly on the findings of the three main studies previously discussed, and the authors' personal experience. Written by Humphrey and Postak, the *Joint Logistic Commanders' Guide for the Management of Joint Service Programs* was sponsored by the JLC, and was published in 1987. The other handbook, *Joint Program Management Handbook*, was completed in 1996 by Eller, and was intended to replace the one written by Humphrey and Postak.

Joint Acquisition Program Problems/Issues

In 1984, Mills and Parsons completed their thesis, *An Investigation of Joint Service Acquisition Logistics Issues/Problems and Automated Joint Program Support*. This study reiterates most of the sources of problems discovered by the three earlier studies described above, and cites a few additional relatively minor sources of problems. Specifically, Mills and Parsons report that for joint programs, reaching and maintaining agreement on program requirements has been the biggest source of problems because of the different missions for each service. Also, communication and coordination have typically been hindered by differences in interservice terminology, and geographically dispersed offices and other resources. Lack of planning early in the program, and management personnel turnover are other common sources of problems. In their study, Mills and Parsons propose the use of an automated information system to overcome some of the difficulties (1984:14-16).

Joint Unmanned Aerial Vehicles Program

Another thesis, *Management of Joint Service Acquisition: An Analysis of the Joint Unmanned Aerial Vehicle Program*, was completed by Hogan in 1992. This case study examines joint program related issues within the joint UAV program. Consistent with the previous studies' findings, the author cites establishment of requirements and funding stability as the two biggest issues. Hogan also cites management turnover, and the lack of good documentation as factors in complicating other problems. For example, because the Army and Marine Corps could not agree on specific system requirements, the program proceeded with a loosely written MNS, and no ORD. When it became necessary to further define the requirements, the original personnel were no longer on the program, and continuity was lost (1992:64-67).

Joint STARS Program

In 1997, a thesis by Hill, *Weapons Innovation and Joint System Development: A Case Study of the Joint STARS Program*, detailed the problems experienced on the Joint STARS program. Again, the biggest source of problems is requirements disagreement. The author also states that the program was directed to be made joint by USDRE long after the Air Force and Army had each started their own development effort. Combining the two development efforts without adequate early planning, and the unwillingness of the services to work together magnified the problems (1997:61-64).

Cross-Functional Teams

Many of the joint acquisition studies highlight problems on joint programs resulting from conflict and poor teamwork in the program office. The GAO report stresses the important role of the program manager in generating enthusiasm and keeping the program together. That report also states that managing the team is a challenge because the program manager typically does not control promotions and assignments of the individuals on the team. Each team member has different loyalties that may come before the program team (1983:25).

Denison, Hart, and Kahn in their article, "From Chimneys to Cross-Functional Teams: Developing and Validating a Diagnostic Model," report the development of their framework for measuring cross-functional team performance. The authors list three main distinctions between conventional and cross-functional teams. These differences are as follows (1996:1005-1006):

1. Individual members of cross-functional teams usually have a competing social identity, and an obligation to another subunit or organization,
2. Cross-functional teams are usually formed on a temporary basis to complete a specific task or assignment, and
3. The organization typically has different performance expectations for cross-functional teams than traditional work teams.

Expectations may include reducing cycle time, creating knowledge, and disseminating organizational learning (1996:1006).

Using a literature review and anecdotal stories, Denison, Hart, and Kahn developed an instrument for measuring cross-functional team performance within three domains. The first domain includes the organizational context of teams. The *Organizational Context* is defined as "the overarching structures and systems external to a team that facilitate or inhibit its work" (1996:1006). External control of resources and rewards is one example of how the structure can inhibit the teams work. The authors list six dimensions within this domain including *coordination with other teams*, *autonomy and power*, *linkage to functions*, *resources*, *mission and direction*, and *reward for team performance* (1996:1012).

Internal Team Processes is the second domain. Cross-functional team processes must be broad and flexible in order for members to be creative problem solvers while representing the interests of their respective functional areas at the same time. The authors reveal six factors in this domain. These factors are *norms*, *importance of the team's work*, *effort*, *efficiency*, *creative strategy*, and *breadth* (1996:1012).

The final domain identified by the authors is *Outcomes*. This domain focuses on the expectations and results of the team's efforts. There are seven factors associated with this domain. They include *information creation*, *time compression*, *image expansion*, *learning*, *growth satisfaction*, *overall effectiveness*, and *capability development* (1996:1015).

The resulting instrument from this study is a questionnaire that can be used to evaluate the performance and effectiveness of cross-functional teams. The instrument was developed through a survey of 364 members of 43 different product teams within a single multinational organization. Although the instrument was developed using cross-functional teams in the private sector, there is enough similarity between the private sector and cross-functional teams in the DoD that the instrument can reasonably be expected to provide at least a rough measure of team performance within the DoD.

Along with the information obtained from the other studies addressed in this literature review, this research on the performance of cross-functional teams is used to structure the data collection for this thesis.

Summary

Although no information was found addressing cooperative acquisition in general, potential sources of problems associated with a joint acquisition program are amply identified in the literature. The subsequent studies to the JLC, DSB, and GAO reports of the early 1980s simply reiterate the findings of those reports, and provide specific examples. Requirements resolution and funding stability are the two sources of problems most frequently cited.

Other important insights from the literature relate to the characterization of programs, and the distinction between joint program selection, initiation, and execution. Finally, possible measures of success for joint programs, and the issues related to the use of such measures are identified.

The information provided by the literature review is used to develop the interview questions used for this thesis. The next chapter describes this process.

III. Methodology

Introduction

This thesis is a qualitative, exploratory study of the nature and characteristics of less than major cooperative acquisition programs, the problems and disfunctions which characterize them, and the processes and guidance that exists to initiate and support such programs. Investigation into this topic area was motivated by the author's personal experiences and interactions with several individuals within the acquisition community at Wright-Patterson AFB who found themselves directly or indirectly involved in various cooperative acquisition efforts. The overall impression was that these individuals received little, if any, training, guidance, or forewarning of the management peculiarities of these types of programs. A review of the Professional Continuing Education (PCE) course descriptions available through multiple sources revealed no cooperative or joint program training opportunities. There is a general lack of awareness of the existing joint program support structure and literature, which forces many program managers to reinvent effective management practices for their own program.

Because the research questions drive the methodology for this study, they are restated here.

1) What problems are created by a cooperative acquisition strategy? Where do they originate? Can these problems/challenges be generalized to all cooperative acquisitions? How can these challenges be overcome?
2) Is cooperative acquisition an effective strategy? How is success measured? What factors influence the degree of success on cooperative acquisition programs?

3) What is the extent of the current guidance and support for the initiation and conduct of cooperative acquisition programs? How have current programs been supported?

This study uses a review of the literature, case studies, and informal interviews of subject matter experts as the primary avenues for investigating these questions.

Outcome of the Literature Review

The literature review was used to identify the quantity and scope of the available information on cooperative acquisition and joint programs. No documentation specifically addressing cooperative acquisition was found. As discussed in chapter II, the literature focused on various aspects of joint service acquisition programs.

The literature review, combined with various interviews, was also used to identify and describe the existing management support structure for joint service acquisition programs. The available documentation traces the reasons for the creation and evolution of the various joint organizations. Interviews and charters were used to capture the roles and responsibilities of these organizations, and their interrelationships with each other.

Finally, the literature review was a valuable source of information for formulating the questions used in the case study interviews. Previous studies provide much of the framework for characterizing joint programs, and highlight many of the problems that can be encountered in a joint program environment. Other sources provide the approach for assessing the effectiveness of the integrated product teams, or cross-functional teams, within the programs investigated in the case studies.

Research Design

A multiple-case study design was used to capture the aspects of cooperative acquisition relevant to the stated research questions. Each case was selected to serve a specific purpose within the scope of this research. The case study strategy was chosen in order to maintain the real-life context of the phenomenon being investigated (Yin, 1984:23).

A pilot study was conducted at the very early stages of this research to help define the research questions, and to serve as a foundation for the structured interviews of the other three programs. Brief descriptions of all four programs are provided below. Each program is discussed in greater detail in chapter IV.

Pilot Study

The Air Force Mission Support System (AFMSS) was used as a pilot study for this report. This program was chosen as the pilot study simply because the author was somewhat familiar with the program and its characteristics.

AFMSS is a squadron-level mission planning system designed to support the Air Force, Army, and Special Operations. It aids mission planners in selecting optimal routes through enemy territory by providing many different tools and decision aids. The tools include such things as threat envelope projections, maps, charts, flight logs, turn points, target imagery, weapons delivery calculations, and radar predictions (AFMSS, 1998:1).

Research Program Selection

Three programs were selected for this study. Time was the most important factor restricting the number of programs investigated. Another factor influencing the selection of programs was the ready access to the programs in the Subsystem Product Support Group.

The preliminary criteria for characterizing joint acquisition programs were identified through the literature review. These criteria were adapted for characterizing the cross-platform integration programs targeted in this study. Restated from chapter 1, these criteria include the following:

1) ACAT,
2) current acquisition phase,
3) number of users/services, and
4) complexity of integration.

The goal of the program selection process was to identify three programs within the given definition that collectively capture as many different characteristics of cross-platform integration as possible. Upon being briefed of this goal, the Subsystem Product Support Group Director, Colonel Richard Hayes, identified five particular programs he felt would be good candidates for the study.

Based on Colonel Hayes' recommendation, appointments were set up with each of the branch managers responsible for the identified programs. Each of the branch managers, in turn, gave their recommendation or concurrence, and introduced the program manager for each particular program. A brief description of, and the rationale for the selection of each program is provided below. CMBRE was the first program selected, and hence served as the baseline for selecting the other two programs.

Common Munitions BIT Reprogramming Equipment (CMBRE). CMBRE is an organizational level tester designed to support many of the next generation smart weapons currently under development. These weapons and CMBRE itself are designed around the MIL-STD-1760 common electrical interface. "[The tester] is used to initiate the BIT of various MIL-STD-1760 weapons, to reprogram the weapons OFP via the MIL-STD-1760 interface, and to load mission planning data and Global Positioning System (GPS) crypto keys to the weapon" (Preiss & Mirabile, 1997:1). The tester is portable, and suitable for shipboard use. CMBRE is an ACAT III program currently in production. There are currently 10 customers, with more pending (Evoniuk, 1998).

Joint Service Electronic Combat System Tester (JSECST) Like CMBRE, JSECST is a mobile flight line tester. It is designed to provide end-to-end functional testing of the electronic combat systems installed on Air Force and Navy aircraft. The essential requirements of the system include a 90 percent critical fault detection rate, and fault isolation of 90 percent to a single Line Replaceable Unit (LRU). The test must be able to be completed in one hour or less, be two person portable, and be compatible with shipboard applications.

JSECST is an ACAT III program currently in the engineering and manufacturing development (EMD) phase. There were no previous phases. The maturity of the technology, and the use of COTS/NDI in the contractors' proposals eliminated the need for demonstration/validation.

Advanced Strategic and Tactical Infrared Expendables (ASTE) ASTE is an advanced system of aircraft-deployed flares and decoys designed to protect Air Force and Navy aircraft against advanced infrared missile threats. The system is used in conjunction with the ALE-4X dispenser system, and consists of two types of flares—the kinematic flare and the companion decoy.

ASTE is divided into three smaller programs based on the mission of the aircraft. The divisions include the fighter program, the covert program, and the transport program. Each program involves a different configuration of flares and decoys.

Development of Case Study Interview Questions

The interview questions used in this study were formulated in the framework of the research questions using information gained from the literature review, and through interviews in the pilot study. Approximately 60 questions were formulated to guide the interviews of the program managers. The first 12 questions are general questions about the background of the program. The purpose of these questions is to identify how the program was selected and initiated as a joint program. These questions also identify whether or not the Joint Logistics Commanders, or any of the subordinate commanders' groups were involved with the selection process.

The second set of questions addresses the number and types of customers for each of the programs, and how the differences between customers influence the program. The goal is to identify any significant differences in the needs or requirements of each of the customers that impacts the complexity of the design, or the attainable level of interoperability and commonality. Such differences may include different missions, different operating environments or conditions, larger aircraft versus smaller aircraft, and older systems versus newer systems. This set of questions also outlines the general cooperative atmosphere of the program by answering whether all of the customers are participating by choice, or were directed to do so by a higher authority.

The third set of questions for the interviews addresses the sources of problems for joint acquisition programs. The list of potential sources of problems was obtained through the literature review. The interviewees are also asked if they have encountered any other problems relating to the cooperative acquisition that is not already accounted for. These questions will also identify if any innovative practices or processes have been implemented on the program to overcome the problems.

The next set of interview questions addresses the measurements of success on the program. The primary objective of these questions is to identify whether or not the program has any measures of success that quantify the benefits of having a joint acquisition. The list of success factors for these questions is taken from the literature review. Interviewees are also asked if there are any other measures they use that are not on the list.

The background and qualifications of program management personnel is the subject of the next set of questions. The purpose of these questions is to evaluate the amount of experience and training that each program manager has dealing specifically with joint acquisition program issues. These questions also explore what resources the program manager utilizes for help on the program, including the Joint Logistics Commanders and subordinate groups.

The final set of questions addresses the performance of the cross-functional program team. The questions are adapted from the study by Denison, Hart, and Kahn discussed in the literature review. The objective is to get a general idea of the quality of the teamwork on the program.

The questions serve as a general guide for conducting the interview. All of the questions are addressed in each of the interviews, and other discussions, or input from the program manager, stemming from these questions is encouraged. A complete listing of the interview questions is contained in appendix E.

IV. Analysis and Findings

Introduction

This chapter presents the analysis and findings of the cooperative acquisition programs investigated in this thesis. The focus is on the similarities and differences between the programs, and the factors that influence the success and outcomes of the cooperative acquisition strategy. Detailed descriptions of each of the programs are contained in Appendix A through D.

Limitations of the Pilot Study

The pilot study is also included in the analysis, although certain factors limit the comparisons that can be made between AFMSS and the other three programs. Because AFMSS was the pilot program, and the data was collected very early relative to the other programs, some important information was not obtained. Lessons learned from the AFMSS interviews helped structure and refine the interview questions for the remaining programs.

Another limitation of the data collected on the AFMSS program is a result of the interviewee's perspective. The program manager represented a single customer, the F-117A, rather than the entire AFMSS program. Therefore, much of the information is based on perception rather than fact. The F-117A AFMSS program was selected as the pilot study because of its location at Wright-Patterson AFB.

Despite these limitations, general information about the nature and characteristics of the AFMSS program provides a good contrast to the other programs. All of the programs investigated in this thesis are cross-platform integration efforts, but AFMSS is the only one that involves a single service. The other three programs are joint. Additionally, these programs are all ACAT III programs managed within the Subsystem Product Support Group. AFMSS is a major acquisition program managed at Electronic Systems Center (ESC), Hanscom AFB MA.

Program Similarities and Differences

The intent of the selection process of choosing programs for this study was to select programs that differed from each other as much as possible within the definition of cooperative acquisition. The differences are not as pronounced as was hoped, but they are sufficient for some meaningful observations. The findings are consistent with the expectations formed by the literature review.

Measures of Success

All of the programs in this study have had at least some degree of success. Each of them employs traditional acquisition program metrics to track cost, schedule, and performance. None of the programs, however, have formal metrics to quantify the benefits of a cooperative strategy. Informally, the CMBRE program uses customer satisfaction as a measure of success. The program has a good reputation, and the list of customers is growing. Despite this example, success in terms of the cooperative acquisition strategy, and the resulting common solution, is largely based on subjective measures or perception alone. Based on perceptions, there are significant differences in the level of success between the programs. The following analysis describes these differences, and offers possible explanations for the disparity. The analysis uses the matrix presented in figure 3 as a guide.

	Experienced Program Manager	Good Requirements Baseline	High Level Commitment	Low Technical Risk	Good Communication &Teamwork	Stable Funding
AFMSS	X		X			
CMBRE		X	X	X	X	
JSECST	X	X	X	X	X	
ASTE		X	X	X	X	

Figure 3. Summary of Findings Matrix

Program Management

Although it was not a criterion for the selection of the programs for this study, the backgrounds of the program managers of the selected programs vary significantly from each other. As the literature illustrates, the qualifications of the program manager can play a vital role in the success of the cooperative acquisition program. It is difficult to tell exactly how significant the skill of the program manager can influence the success, but at least one example stands out.

The current JSECST program manager has been with the program since its inception. A former flightline maintenance technician, the program manager has over 23 years of military experience, and is certified in the Acquisition Professional Development Program (APDP) at level 3 in program management, manufacturing, and contracting. JSECST is the third program that he has managed. He also has a background in test engineering.

There are many contributing factors to the success of the JSECST program, but the program certainly benefits from the vast experience of the program manager. It is because of this experience that communication on the program is absolutely superior. Lotus Notes information management software is used to make the program completely paperless. All program documentation can be accessed via the World Wide Web by anyone given access by the program manager. All interested parties are well informed of the program's progress. The open communication has also improved the trust between the Air Force and Navy.

In contrast to JSECST, there have been four program managers on the CMBRE program since 1995. The current program manager was previously the logistics manager for the same program, so there has been some continuity. The CMBRE program is widely regarded as a successful program, so it cannot be said that the program manager is doing a bad job.

ASTE provides another example of a program with a relatively inexperienced program manager. There have also been several different managers in the last two years. The acting program manager is a first lieutenant with prior service experience. He has an undergraduate degree in business administration, and is currently working on a master's degree.

Requirements Baseline

Requirements resolution as a source of problems is one particular area where the programs in this study differ. The three programs in the Subsystem Product Support Group have not been significantly affected by requirements related problems. CMBRE provides the best example of requirements agreement. AFMSS, on the other hand, is a good example of how requirements problems can negatively affect a program.

Reaching and maintaining agreement on requirements has been a significant source of problems on the AFMSS program. Combining the needs of several airframes with different missions has led to an enormous growth of requirements. Most of the requirements have come from the stealth platforms like the F-117A , B-2, and F-22. ACC originally envisioned an easy to use, point-and-click laptop system. The end result, however, is a large workstation with over 1.5 million lines of computer code (Berrett, and Collins, 1998).

As a result of the requirements creep, most of AFMSS' intended users are getting much more than they needed or wanted from the core AFMSS. For simplicity, many of the non-stealthy platforms are using the Portable Flight Planning System (PFPS), which has been adopted by the AFMSS program. The PFPS is an unclassified laptop system, which resolves another problem resulting from the unique requirements of the stealth platforms. AFMSS is classified *secret* but the non-stealthy platforms wanted to keep the system unclassified (Berrett and Collins, 1998).

As previously stated, reaching and maintaining agreement on requirements is not currently a significant source of problems for the CMBRE program. The reason for this is that the requirements were well defined within each of the munitions programs before CMBRE was initiated. This is also the reason why there was no demonstration/validation phase before EMD. In addition, at least for the current list of customers, user involvement in the program has been high since its inception (Evoniuk and Marks, 1998).

Another contributing factor to CMBRE's success, and requirements resolution, is that a high degree of standardization had already been established between the different weapons in terms of the aircraft interface. Although there were many requirements issues that had to be resolved between the parties, much of the groundwork had already been done by the weapons and aircraft program offices.

JSECST and ASTE provide two more examples of cross-platform integration efforts where much of the groundwork has already been done. The integration is being done following the acquisition of the supported systems, and neither program is a completely new system. JSECST is a replacement for an existing system operated by the Navy, and ASTE is a replacement flare system.

High Level Commitment

High level commitment for cooperative acquisition programs (as well as other programs) is usually represented in the form of an approved MOA, and Acquisition Program Baseline (APB). It is standard policy in the Subsystem Product Support Group that every program will have both an MOA, and an APB. AFMSS also has both.

MOAs and APBs are a method of formalizing the commitment from upper level management. CMBRE, for example, is the result a recognized need by the using commands to control the proliferation of support equipment, and to reduce acquisition and logistics costs. Participation in the program is self-initiated, and the participants each have a genuine interest in the program. The commitment from both the Air Force and Navy has been present from the start, and it has been formalized in an MOA.

Technical Risk

Technical risk is greater when relatively new technology will be used to meet a program's requirements. It is also related to the software intensity of the program, and the disparity of the requirements between the prospective customers. The acquisition strategy for any acquisition program must be tailored based on the level of technical risk.

CMBRE and JSECST are two programs that benefit from relatively low technical risk. The systems that they will support have already accomplished most of the requirements resolution, and the technology is mature. For CMBRE, MIL-STD-1760 provides the interface standard that the customers are already using. Combined with the fact that the employment of CMBRE does not drive changes to the supported system, this greatly simplified the requirements resolution effort.

Technical risk on the JSECST program is low mainly because of the maturity of the technology. The mature technology facilitates the extensive use of COTS/NDI, which lowers costs significantly. This is also true for CMBRE.

A potential source of problems for the JSECST program is the integration of the system with the aircraft. Although the electronic combat hardware on the aircraft has not changed in the last ten years, any change to the hardware on the aircraft will drive a software change to the JSECST system. Planned aircraft changes have been analyzed to minimize impacts to the program (Brookshire, 1998).

Related to system integration, verticality of testing issues are also expected. This may result when the JSECST is used to test older systems on the aircraft that have tested good for many years. Faults detected by JSECST may not be detectable by even the depot test equipment used to troubleshoot these older systems. This is not really a problem, but it may have an impact on user perceptions (Brookshire, 1998).

Communication and Teamwork

Communication and teamwork are critical on any acquisition program. Cooperative acquisitions, however, typically involve many more players, and several different chains of command. For joint programs, there are also the issues of parochialism, and service unique procedures. JSECST has already provided an excellent example of how these problems can be managed. Because of the program's relatively small size, there is only a single IPT, with one Navy representative residing in the same office. Each of the team members is expected to be multi-skilled regardless of their primary functional background.

Communication and teamwork on the CMBRE program has also been excellent. The home office for the CMBRE program is located at Wright-Patterson AFB, OH. This IPT coordinates the activities of all the team members, and is responsible for the procurement of the CMBRE system for the Navy as well as the Air Force. The Navy IPT is responsible for ensuring that Navy unique requirements are satisfied. Most of the unique requirements are related to the demands of aircraft carrier flight deck operations, including electromagnetic interference. Most of the members of the Navy IPT are located at the Naval Air Warfare Center (NAWC), Point Mugu, CA. The IPT also includes representatives from the JDAM and JSOW programs (Preiss and Mirabile, 12997:5).

The Interface Control Working Group (ICWG) is another integral part of the CMBRE program management structure. Included in the working group are members of the IPTs, representatives from each of the munitions programs, and representatives from the prime contractors for those munitions. The ICWG is responsible for managing the CMBRE Interface Control Plan (ICP), which defines the roles and responsibilities of the members, and documents the policies and procedures for ensuring compatibility between CMBRE and each of the munitions it supports. "The ICD specifies the functional and performance requirements for the electrical, logical, physical, and environmental interface between CMBRE, the munitions unique application program, facility power, and the MIL-STD-1760 munitions under test" (1997:2-3).

Communication on the AFMSS program occurs in the form of quarterly Avionics/Weapon/Electronics (A/W/E) Working Group meetings. These meetings provide the forum where all of the users and platforms get together to talk about the issues. There is also a good cross-flow of ideas. Many of the lessons learned on the F-117A program are transferred to the other stealth platforms such as the Joint Strike Fighter (JSF), and the F-22 (Berrett and Collins, 1998).

Funding Stability

Funding for the AFMSS program is spread across several commands. Air Combat Command (ACC) is the lead command, and controls a majority of the funding. The F-117A integration effort has been hurt by schedule slips and budget overruns in other areas of the program. The overall program is approximately two years behind schedule, and 50 percent over budget (Berrett and Collins, 1998).

Funding stability, at times, has been the most serious problem encountered on the CMBRE program. Funds for the program come from each customer's program office—

which in this case, is nearly twenty different sources within two different services. When budgets are tight within the munitions programs, they tend to get stingy. Because of CMBRE's relatively small size, small funding cuts can seriously impact the program (Evoniuk and Marks, 1998).

Funding stability has been the most common problem for the JSECST program. The Navy never provided development funds for the program, so all of the instability has originated from the various funding sources within the Air Force. On several occasions, funds have been taken from the program. For a small program like JSECST, losing even $1,000 causes problems (Brookshire, 1998).

Funding stability on the ASTE program has been the main source of problems. Program funding comes from many different sources within the Air Force and Navy. Additionally, ASTE has been subjected to the same funding cuts as the other programs within the Product Support Group.

Another funding related problem for the ASTE program is a result of a requirement by the Navy to redesign flare end caps. This requirement has led to failure to achieve some technical performance specifications, which in turn, has resulted in a 25 percent cost overrun on the program. This overrun, however, is a result of an unexpected technical risk rather than the cooperative acquisition strategy. The cost to the Air Force has increased as a result of the overrun, but it is still less expensive overall than having two single service programs.

Program Identification and Selection

The analysis to this point has focused on the management of cooperative programs once the program has been made a joint program. Although there is no formal process for identifying and selecting programs for joint or cooperative potential, it is useful to note who initiated the action, and what rationale was used.

Despite the lack of a process, DoD policy has driven some programs toward a common solution. It is DoD policy to control the proliferation of new, or unique, support equipment. Both CMBRE and JSECST fall in the category of common support equipment. The potential for CMBRE's selection as a joint program was obvious because the original weapons programs to be supported by CMBRE were already joint programs. JSECST and ASTE were rational choices for jointness because of the similarities in the operation of the supported system.

Summary

Although there are no formal measures of the benefits of the cooperative acquisition strategy, all of the programs investigated in this study were relatively successful. In general, many of the recommendations from the various studies mentioned in the literature review were incorporated in these programs. For example, all of the programs had approved MOAs and APBs. Communication on the programs, and support and cooperation from the chain of command and other agencies was also good.

Despite the success of these programs, they are not without their problems. The relatively small size of the programs makes the problems less pronounced, and easier to manage. In general, the program managers have not been given the training and tools to assist them in identifying and overcoming the potential problems of a cooperative acquisition program.

The next chapter uses the analysis from chapter IV, and the information from the literature review to answer the research questions. The conclusions and recommendations of this thesis are presented. Finally, suggestions for further research are given.

V. Conclusions and Recommendations

Introduction

This chapter presents the results of the analysis of the information obtained through the literature review, and the investigation of the acquisition programs selected for this study. The results are presented in terms of the research questions posed in chapter I, and repeated in chapter III. Additionally, recommendations and suggestions for further research are offered.

Research Question #1

What problems are created by a cooperative acquisition strategy? Where do they originate? Can these problems/challenges be generalized to all cooperative acquisitions? How can these challenges be overcome?

Ideally, the answer to this question should be restricted to those problems or challenges that are unique to, and are a direct result of the cooperative acquisition strategy. Analysis of the literature and programs in this study suggests that there may be at least two major sources of problems that fit these criteria, but the evidence is not conclusive. Comparing strictly single-agency procurements with varying degrees of cooperative acquisition programs would be one way to strengthen this argument.

At least one previous study takes a similar approach. The *Joint Program Study* of 1984 examines 80 joint and 50 single-service programs to identify the unique characteristics of joint programs. An important assertion of this thesis, however, is that using a joint/single-service dichotomy to analyze acquisition programs is overly restrictive. In other words, the sources of problems identified as unique to joint programs may also occur on a non-joint program as long as the program is a cooperative acquisition. The findings in this study support that assertion.

Although no information was found addressing cooperative acquisition in general, potential sources of problems associated with a joint acquisition program are amply identified in the literature. Several studies subsequent to the JLC, DSB, and GAO reports of the early 1980s simply reiterate the findings of those reports, and provide specific examples. Requirements resolution, and funding stability are the two sources of problems most frequently cited. These same two sources were also prevalent in the four programs investigated in this thesis.

Although three of the four programs in this study are joint, the incidences of requirements resolution difficulties and funding instability indicate that they may be a result of the cooperative strategy, rather than the more narrow joint classification. There are at least two examples where funding instability is a source of problems, yet all of the funding comes from multiple sources within a single service—the Air Force. These programs include JSECST which is a joint program receiving all development funding through Air Force customers, and AFMSS which is a multiple user, cross-platform integration, non-joint program. AFMSS also provides an excellent example of how difficulties in establishing requirements can impact a non-joint program.

Requirements resolution was the most significant source of problems identified in the literature. Related problems were present on the programs in this study, but with the possible exception of AFMSS, were not significant. This may be attributable to the nature of the programs. All three of the programs are ACAT III, commodity programs. The small size and independent development may mean that there are fewer conflicting requirements. Also, many of the requirements issues may have already been worked out by the customers who will use the system. Such is the case for the CMBRE program. Finally, all three of the programs have established MOAs and APBs, which indicate that a certain level of agreement and commitment was attained in the beginning. In general, the low incidence of requirements related problems on these programs suggests a relationship between the nature of the program and the potential for problems.

This investigation indicates that funding instability is a result of multiple sources of funding. As the GAO reports, instability comes from "year-to-year budget changes, reprogramming, priority shifts, inflation, and so on" (GAO,1983:26). The severity of the problems is a function of the size and relative priority of the program, the number of funding sources, and the program manager's capabilities. Money is always an issue, whether it is in acquisition, sustainment, or deployment. The following suggestions are offered as means of avoiding, or minimizing the impact of funding instability:

- Consolidate funding sources, at least for core requirements, within major commands or branch of service,
- Strive for high level commitment for the program through APBs and MOAs, and
- Train the program managers to deal with multiple interests.

Other sources of problems identified in the literature also exist on the programs in this study. The resulting problems, however, were not serious, or could not be directly attributable to the cooperative status of the program. This does not suggest, however, that they should be ignored. In addition to requirements resolution and funding stability, the literature identifies the following potential sources of problems for joint programs:

- Weak interest,
- Service unique procedures and terminology,
- General lack of guidance and formal policy,
- Geographically dispersed offices and other resources,
- Lack of early planning, and
- Management personnel turnover.

No new sources of problems were uncovered during the investigation of the four programs.

Research Question #2

Is cooperative acquisition an effective strategy? How is success measured? What factors influence the degree of success on cooperative acquisition programs?

In theory, cooperative acquisition is an effective strategy. In reality, it is usually difficult to determine its effectiveness. Problems encountered on such programs either erode the benefits of cooperation, or at least give that perception. There is rarely a quantifiable measure of the benefits brought about by using a cooperative strategy versus a single-agency procurement. Direct comparisons are impossible. Perhaps the real question is: are the cost advantages, and operational benefits of commonality worth the effort to force or incentivize major weapon systems to use them, even if they are sub-optimal for the system, or require more effort and create risk?

Many measures of success for joint programs are identified in the literature. The list includes low cost and schedule growth, attainment of technical performance and supportability goals, and customer satisfaction. These measures, however, are common to any acquisition program. Additional measures for joint programs include minimal requirements compromise, documentable savings, and commonality. The relative weight of each one depends on the overall goals of the program.

All of the programs investigated in this thesis use the typical cost, schedule, and performance metrics. Customer satisfaction, and commonality were other common measures. The degree of requirements compromise, and documentable savings, on the other hand, were not used by any of the programs. A possible explanation for the absence of a cost savings metric is that it is difficult and time-consuming to determine, and it is largely seen as an academic exercise once the decision has been made to make the program joint.

All of the above measures of success can be used to evaluate the overall effectiveness of the program. There are, however, some factors that potentially influence how successful a cooperative acquisition program can be. The implication of this is that these factors should be evaluated as part of the process for identifying and selecting programs for a cooperative strategy. The most important factors are how well the program is suited for a cooperative strategy, and how the requirements are determined. These two factors are interrelated.

Research Question #3

What is the extent of the current guidance and support for cooperative acquisition programs? How have current programs been supported?

The Defense Science Board reported in 1983 that there was a general lack of information and guidance for the management of joint acquisition programs. This seems to be true today. None of the program managers in this study have ever received training specific to joint acquisition. A review of professional military education course offerings and descriptions indicates an absence of such training.

In 1984, The *Joint Program Study* recommended the creation of the JLC subordinate commander groups to perform JROC functions for less than major programs. The JACG, and JPOB have since been created. Progress, however, has been slow mainly because membership on these groups is an additional duty. None of the programs in this study reported any interaction with the JLC or subordinate groups.

Recommendations

Because this thesis is qualitative, and exploratory in nature, the recommendations may require further study. The following recommendations are offered as possible improvements to the cooperative acquisition management. In general, the recommendations apply to increasing the availability of information and support, and developing processes for selecting and managing cooperative acquisition programs.

To increase the availability of information, operational definitions of cooperative acquisition programs should be incorporated into DoD acquisition directives. These directives should also include descriptions of the nature and characteristics that a cooperative acquisition program can have. This information should also be incorporated into program manager training programs, and other sources of reference. DoD guidance needs to address both the establishment and conduct of cooperative acquisition programs, which are two different issues.

The JLC and subordinate commanders' groups are chartered with exploring joint opportunities, and developing processes for the selection and management of those programs. As part of the process development, a model or decision tree based on the technical characteristics, goals, and requirements of the programs should be developed. The model can then be used to evaluate the suitability of using a cooperative strategy, and to assess the risks and potential benefits of this strategy.

Additionally, as part of the identification and selection process, a model or method for quantifying the benefits of using a cooperative strategy should be developed. Expected savings could then serve as a baseline for the program. A comparison of expected benefits to realized benefits should be used as a primary metric on cooperative acquisition programs.

To accelerate the development of processes, and advancement of cooperative acquisition practices, the benefits of creating a full-time cooperative acquisition support office should be explored. This office would be responsible for developing cooperative acquisition policy and procedure, providing guidance and assistance to existing programs, and coordinating the efforts of the services, academic institutions, commanders' groups, and other government and non-government organizations.

Suggestions for Further Research

Further research should focus on the implementation of the above recommendations. The existing literature identifies the sources of problems associated with cooperative acquisition programs. What is needed now, is the development of policies and procedures for overcoming these problems. Further investigation of the nature of cooperative acquisition programs may provide the basis for developing a decision tree, or model, for assessing the risk and suitability of a cooperative strategy.

Appendix A. AFMSS Program Description

Air Force Mission Support System (AFMSS)

AFMSS is a squadron-level mission planning system designed to support the Air Force, Army, and Special Operations. It aids mission planners in selecting optimal routes through enemy territory by providing many different tools and decision aids. The tools include such things as threat envelope projections, maps, charts, flight logs, turn points, target imagery, weapons delivery calculations, and radar predictions (AMFSS).

AFMSS is not a joint acquisition program, but every aircraft in the Air Force inventory will use the system. There are 40+ different platforms. The next generation mission planning system and successor to AFMSS, the Joint Mission Planning System (JMPS), will be a joint program.

The basic hardware of the AFMSS system consists of a commercial UNIX workstation, and portable laptop computers. "AFMSS is designed around a core of software programs and a number of plug-in, system-specific modules for avionics, weapons, and electronics (A/W/E) modules" (AFMSS).

AFMSS is designed to be capable of performing all mission planning tasks for any aircraft, or multiple aircraft mission. "Mission plans may be printed as customized full color combat mission folders, and may also be transferred to a data transfer device to be uploaded to the aircraft on board computer" (AFMSS).

Each platform is responsible for developing the A/W/E software unique to that platform to meet the requirements that are not met by the core system. Interface notices and design criteria are provided by the AFMSS System Program Office (SPO) at Hanscom AFB, MA. Each platform is then responsible for developing their own software to interface with the core system. In the case of the F-117A, over 100,000 lines of code have been developed. This is one of the largest individual developments (Berrett and Collins, 1998).

Appendix B. CMBRE Program Description

Common Munitions BIT Reprogramming Equipment (CMBRE)

CMBRE is an organizational level tester designed to support many of the next generation smart weapons currently under development. These weapons and CMBRE itself are designed around the MIL-STD-1760 common electrical interface. "[The tester] is used to initiate the BIT of various MIL-STD-1760 weapons, to reprogram the weapons OFP via the MIL-STD-1760 interface, and to load mission planning data and Global Positioning System (GPS) crypto keys to the weapon" (Preiss and Mirabile, 1997:1).

The main components of the CMBRE system include a controller assembly, a Test Adapter Unit (TAU), and an accessory kit. The controller assembly contains the CPU, system software, and user interfaces. The TAU connects to facility power to provide the electrical resources required by the controller assembly and the munition under test (1997:6-7).

The common software for the system includes approximately 4,500 lines of code. This common executive software "contains self-test, systems drivers, main menu, and utility library" (1997:7). There is another 1,500 lines of code for the firmware resident in the TAU to perform such tasks as monitoring power. Finally, the munitions application software provides the interface between CMBRE software and the different munitions. This software is stored on removable cards, and is unique to each type of munition (1997:7).

Background

CMBRE is a joint ACAT III program between the Air Force and Navy, with the Air Force being the lead service. It began as a request from Air Combat Command (ACC) for the acquisition community to develop "a standard tester for a minimum of three separate weapon acquisition programs" (1997:2). The development of a common tester complies with OSD's policy to control the proliferation of support equipment (1997:2).

CMBRE is currently in production. There was no demonstration/validation phase. On 26 April 1995, a Memorandum of Agreement (MOA) between the various Air Force and Navy weapons programs, and the Automatic Test Systems (ATS) Product Group at San Antonio Air Logistics Center (SA-ALC) established CMBRE as a joint program (1997:2).

Customers

At the time the MOA was signed, and when the original contract was awarded, there were only three identified customers. Since that time, however, seven more users have been added to the list with others pending. The customers are the various weapons programs represented by respective program offices. In most cases, each munition has separate offices for the Air Force and Navy. This means that there are nearly twenty separate offices representing the users for this program. Currently, the munitions to be supported by CMBRE include the following (Evoniuk and Marks, 1998; Preiss and Mirabile:3-4):

- Joint Standoff Weapon (JSOW),
- Joint Direct Attack Munitions (JDAM),

- Wind Corrected Munitions Dispenser (WCMD),
- AGM-142,
- Miniature Air Launched Decoy (MALD),
- Hard Target Smart Fuse (HTSF),
- Standoff Land Attack Missile (SLAM),
- Joint Air-to-Surface Standoff Missile (JASSM),
- Paveway, and
- AIM-9X.

The mixture of older and newer technology among the different munitions has not complicated the program (Evoniuk and Marks, 1998).

With one exception, all of the customers are participating in the program voluntarily. The reluctant participation of the one exception is politically driven. They are biased because the prime contractor for this munition is also the prime contractor for a competing tester used on the AMRAAM missile. In most cases, the customers have initiated the relationship with the CMBRE office once they've become familiar with CMBRE's capabilities (Evoniuk and Marks, 1998).

Appendix C. JSECST Program Description

Joint Service Electronic Combat Systems Tester (JSECST)

Like CMBRE, JSECST is a mobile flight line tester. It is designed to provide end-to-end functional testing of the electronic combat systems installed on Air Force and Navy aircraft. The essential requirements of the system include a 90 percent critical fault detection rate, and fault isolation of 90 percent to a single Line Replaceable Unit (LRU). The test must be able to be completed in one hour or less, be two person portable, and be compatible with shipboard applications.

JSECST is a relatively high priority program within Air Combat Command (ACC). The 90 percent fault detection rate is a vast improvement over existing aircraft electronic combat systems built-in-test (BIT) capabilities. In fact, JSECST has eliminated an entire squadron at Eglin AFB, FL tasked with evaluating the status of electronic combat systems installed on the aircraft (Brookshire, 1998).

The core test set is comprised of a single electronics case and an accessory case. The accessory case contains a hand held control unit, and various cables and adapters. The core test set is uniquely configured to test a specific aircraft using test program sets (TPS). The parameters for each TPS are defined by organizational maintenance test requirements documents (TRD), operational flight programs (OFP), and technical orders (TO). Each TPS consists of interface hardware, the test program software, and instructions. The interface hardware are simply the "hoods" that cover the EW antennae on the aircraft. The test program software in each TPS is developed using COTS software development tools on a standard IBM compatible PC.

Background

JSECST is a joint ACAT III program between the Air Force and Navy, with the Air Force being the lead service. It was designated as a joint program by the Secretary of the Air Force for Acquisition (SAF/AQ) as a model program for acquisition reform. The most important rationale for making it a joint program was cost savings.

JSECST program is approximately two years old, and is currently in the Engineering and Manufacturing Development (EMD) phase. Because all of the proposals were mature, using COTS technology, there were no other phases prior to EMD. The tester is a new system for the Air Force, and a replacement for an existing system for the Navy. For this reason, the Navy has not provided any development funding to the Air Force.

The joint status of the JSECST program was formalized by an MOA, which was updated last year. The program also has an approved acquisition program baseline (APB). Both the MOA and the APB were reviewed at the PGM level.

Customers

There are several platforms targeted as users of the JSECST system. To meet all of the customers' collective requirements, the core system was developed around the single type of aircraft from each service that represented the worst case EW performance, or greatest need for system test capability. An aircraft from each service was used to ensure 100 percent compatibility between the services. The F-15C MSIP is the core platform for the Air Force, and the F-18C/D is the core platform for the Navy. Other platforms that will use JSECST include the following:

Air Force	Navy
F-15A-D	F-18 Recce
F-15E	F-14A/B
F-16A-D	F-14D
A-10A	AV-8B
C-130E/H	EA-6B
HC-130P/N	E-2C

All of the above customers are participating in the JSECST program by choice. ACC represents the Air Force and Air National Guard platforms, and Navy Command Atlantic (NAVCOMLANT) and Navy Command Pacific (NAVCOMPAC) represent the Navy platforms.

Appendix D. ASTE Program Description

Advanced Strategic and Tactical Infrared Expendables (ASTE)

ASTE is an advanced system of aircraft-deployed flares and decoys designed to protect Air Force and Navy aircraft against advanced infrared missile threats. The system is used in conjunction with the ALE-4X dispenser system, and consists of two types of flares—the kinematic flare and the companion decoy.

The kinematic flare is designed to fly along side the aircraft once it has been deployed. It has a molded composite body and fixed fins. The propellant fuel provides a certain heat signature as well as thrust. The companion decoy is similar to the traditional flare, except that it employs two materials to deliver two different heat signatures. The kinematic flare, and the companion decoy work in concert with each other to defeat the IR threat.

ASTE is divided into three smaller programs based on the mission of the aircraft. The divisions include the fighter program, the covert program, and the transport program. Each program involves a different configuration of flares and decoys.

Background

ASTE is a joint ACAT III program between the Air Force and Navy, initiated by the OSD. The rationale for making it a joint program were cost savings and commonality. The joint relationship was established by an MOA in 1991.

The ASTE program is currently in the EMD phase. The contract for this phase was awarded in 1995 following a two-year demonstration/validation phase. The demonstration/validation phase was necessary to prove the kinematic flare technology, and concluded with a fly-off between different flare manufacturers.

Customers

ASTE will replace existing flares on the Air Force's F-16, F-15, C-17, C-130, B-1B, and the Navy's F-18, and AV-8B. In order to standardize the system, the flare dispenser used on the Navy platforms had to be redesigned. Each platform requires a different variation of flares based on the potential threats, and the speed and heat signatures of the aircraft. The individual platforms are not required to do their own tailoring (Spudic, 1998).

Appendix E. Interview Questions

Program Background

1. Is this a joint program?
2. Was there a formal review process to determine joint potential?
3. What is the most important rationale for making it a joint program?
4. Who made the decision to make it a joint program?
5. Was the Joint Logistics Commanders (JLC), or any of the subordinate commander groups involved in the process?
6. At what phase in the acquisition cycle was the program made joint?
7. What ACAT is this program?
8. What is the current acquisition phase?
9. Can you describe the evolution of the program?
10. Do you have a formal charter and/or MOA?
11. What is the highest level of approval for the joint charter?
12. Is there an approved program baseline?

Customers

1. How many customers are there?
2. Who are the customers?
3. Are all of the customers participating by choice?
4. How involved have the customers been in managing the program?

5. Are there any significant differences between customers that have complicated integration and/or requirements resolution?

- Different missions
- Different operating environments/conditions
- Large versus small platform (weight and cube restrictions)
- Older versus newer system (different generations of technology)
- Other

6. Is there a minimum degree of interoperability between customers required on this program?

7. Are unique solutions for individual customers being developed simultaneously or staggered?

8. What factors influenced this approach? (funding, customer's schedule constraints)

9. How much technical risk is associated with the integration effort?

10. Is any modification to the supported system necessary?

11. To what degree are all of the customers' requirements being met?

12. Have any of the customers been forced to sacrifice some of their requirements?

13. Do you have a process for prioritizing requirements?

Sources of Problems

1. Please indicate on a scale of 1 to 3 how significant these sources of problems have been on your program (1 = not a problem, 2 = minor problem, 3 = relatively serious problem).

- Reaching and maintaining agreement on requirements
- Funding stability
- Communication (differences in terminology, business practices, parochialism)
- Insufficient early planning
- Geographically dispersed resources (physical separation of personnel and offices)
- Management personnel turnover
- Cooperation/support from other organizations

2. In your opinion, which of these problems are attributable to it being a joint program?

3. What innovative processes/procedures, if any, have you or your team devised to overcome management problems?

4. Are there any other issues you can think of relating to engineering, finance, logistics, configuration control, or any other functional area?

5. Is open architecture or spiral development used in this program?

Measures of Success

1. Please indicate on a scale of 1 to 3 how these measures of success are used on your program (1 = primary, 2 = secondary, 3 = not used).

   - Cost performance
   - Schedule performance
   - Technical performance
   - User satisfaction/perceptions
   - Level of commonality
   - Level of harmony within the team
   - Other

2. Are there quantifiable measures of the benefits of having a joint program?

Program Management

1. What are your special qualifications for managing a joint program?

2. What training have you received regarding joint programs?

3. Do you know where to go for assistance on issues related to joint program management?

4. Are you familiar with the roles and responsibilities of the various joint support organizations such as the JLC, JACG, JPOB, and the Joint Focus Group?

5. Have any of these organizations ever been involved in any way with your program? If so, how?

6. What are your attitudes towards joint programs in general?
   - Is it a good idea?
   - Under what circumstances would it not be a good idea?

Teamwork

1. How is your coordination with other IPTs within the program?
2. As the team leader, do you feel that you have the autonomy and power to get what the program needs?
3. Do the team members have the authority to make decisions for their home offices?
4. Have you been able to resolve problems between different home offices?
5. Do home organizations provide necessary funding and resources?
6. Do team members have a clear understanding of the program's mission and direction?
7. Are individual team members rewarded for their performance as a team member?
8. Are individual team members recognized for the performance of the team?
9. Are there clear standards of behavior for team members?
10. Do team members feel that the team's work is important to their own careers?
11. Do team members feel that the team's work is important to their respective service?
12. Does each team member do his/her fair share of the work?
13. Are team meetings well organized and efficient?
14. Is the team highly imaginative and innovative?
15. Is every effort made to get everyone's input or opinion?
16. Has the team made some innovations, and produced knowledge or information that did not exist before the group was formed?
17. Have team members gained valuable experience and knowledge from working on this team?

Appendix F. List of Interviewees

Mr. Dave Barrett	F-117A AFMSS Program Manager	22 April 1998
Mr. Larry Collins	F-117A AFMSS Engineer	22 April 1998
Col. Richard Hayes	Director, Subsystems Product Support Group	29 April 1998
Col. Richard Hayes		12 May 1998
Mr. Bill Taylor	ATS/CSE Development Systems Manager	1 June 1998
Mr. Bill Yri	EW/ECM Development Systems Manager	5 June 1998
Ms. Cynthia Evoniuk	CMBRE Program Manager	5 June 1998
Mr. Jim Marks	CMBRE Contracted Support	5 June 1998
Maj. Alan Brookshire	JSECST Program Manager	11 June 1998
1 Lt. Keith Spudic	ASTE Program Manager	2 July 1998

Appendix G. List of Acronyms

ACAT	Acquisition Category
ACC	Air Combat Command
AFMSS	Air Force Mission Support System
APB	Acquisition Program Baseline
APDP	Acquisition Professional Development Program
ASTE	Advanced Strategic and Tactical Infrared Expendables
ATS	Automatic Test Systems
A/W/E	Aircraft/Weapons/Electronics
BIT	Built-in Test
CAE	Component Acquisition Executive
CMBRE	Common Munitions BIT Reprogramming Equipment
COTS	Commercial Off-the-Shelf
CPU	Central Processing Unit
C^3I	Command, Control, Communication, and Intelligence
DAC	Designated Acquisition Commander
DAE	Defense Acquisition Executive
DoD	Department of Defense
DSB	Defense Science Board
EMD	Engineering and Manufacturing Development
ESC	Electronic Systems Center
EW	Electronic Warfare

GAO	Government Accounting Office
GPS	Global Positioning System
HTSF	Hard Target Smart Fuse
ICP	Interface Control Plan
ICWG	Interface Control Working Group
IPT	Integrated Product Team
JACG	Joint Aeronautical Commanders Group
JASSM	Joint Air to Surface Standoff Missile
JCS	Joint Chiefs of Staff
JDAM	Joint Direct Attack Munition
JLC	Joint Logistics Commanders
JMPS	Joint Mission Planning System
JPMFG	Joint Program Management Focus Group
JPOB	Joint Programs Opportunities Board
JROC	Joint Requirements Oversight Council
JSECST	Joint Service Electronic Combat System Tester
JSF	Joint Strike Fighter
JSOW	Joint Standoff Weapon
JTIDS	Joint Tactical Information Distribution System
LRU	Line Replaceable Unit
MALD	Miniature Air Launched Decoy
MDA	Milestone Decision Authority
MNS	Mission Need Statement

MOA	Memorandum of Agreement
NAWC	Naval Air Warfare Center
NDI	Non-developmental Item
OFP	Operational Flight Program
ORD	Operational Requirements Document
OSD	Office of the Secretary of Defense
PEO	Program Executive Officer
PFPS	Portable Flight Planning System
PGM	Product Group Manager
PSA	Principal Staff Assistant
SA-ALC	San Antonio Air Logistics Center
SAF/AQ	Secretary of the Air Force for Acquisition
SLAM	Standoff Land Attack Missile
SPO	System Program Office
TAU	Test Adapter Unit
TO	Technical Order
TPS	Test Program Set
TRD	Test Requirements Document
UAV	Unmanned Aerial Vehicle
WCMD	Wind Corrected Munitions Dispenser

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Vita

Captain Robert T. Butz was born on [redacted]

Upon graduating from Maconaquah High School, Bunker Hill, IN in 1987, he accepted an appointment to the U.S. Air Force Academy, CO. He graduated from the Academy in 1991 with a Bachelor of Science degree in Human Factors Engineering, and was commissioned a 2nd Lieutenant.

His first assignment was at Holloman AFB, NM as an aircraft maintenance officer. While at Holloman AFB, he gained intermediate and flight line maintenance experience on the F-15A and F-117A aircraft.

In November, 1994, Captain Butz moved to his next assignment in the F-117A Developmental Systems Program Office (DSPO) at Wright-Patterson AFB, OH. He performed as an Integrated Logistics Support Manager before becoming the F-117A Consolidated Automatic Test Equipment (CATE) program manager. From January to June 1997, Captain Butz was the Executive Officer to the Director of the Aerospace Control and Strike Mission Area Group, Wright-Patterson AFB, OH. He entered the Graduate Logistics Management program at the School of Logistics and Acquisition Management, Air Force Institute of Technology in June 1997. After graduation in September 1998, he was assigned to Headquarters, Air Mobility Command (AMC).

Captain Butz is married to the former Heather L. Wise of Peru, IN. They have a daughter named Carlyann.

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This thesis is an exploratory study of the management of cooperative acquisition programs. The investigation focuses on defining the nature of a cooperative acquisition strategy, identifying potential problems associated with this approach, and evaluating the effectiveness of the current guidance and support structure for such programs. The desired outcome of this strategy is a common solution. The operational definition of cooperative acquisition builds on the Department of Defense definition of Joint Service Acquisition. A pilot study and literature review are used to develop a structured interview for three case studies. Analysis of these cases indicates that difficulty in resolving core requirements, and funding instability are the two major sources of problems on cooperative acquisition programs. Also, the guidance and support for cooperative acquisition programs has been slow to develop.

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AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT thesis research. **Please return completed questionnaire** to: AIR FORCE INSTITUTE OF TECHNOLOGY/LAC, 2950 P STREET, WRIGHT-PATTERSON AFB OH 45433-7765. Your response is **important.** Thank you.

1. Did this research contribute to a current research project? a. Yes b. No

2. Do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it?
a. Yes b. No

3. **Please estimate** what this research would have cost in terms of manpower and dollars if it had been accomplished under contract or if it had been done in-house.

Man Years__________ $__________

4. Whether or not you were able to establish an equivalent value for this research (in Question 3), what is your estimate of its significance?

a. Highly Significant b. Significant c. Slightly Significant d. Of No Significance

5. Comments (Please feel free to use a separate sheet for more detailed answers and include it with this form):

Name and Grade

Organization

Position or Title

Address