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EVALUATION OF THE PRE-MILESTONE I
ACQUISITION LOGISTICS PROCESS AT THE
AERONAUTICAL SYSTEMS CENTER

THESIS

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Wright-Patterson Air Force Base, Ohio

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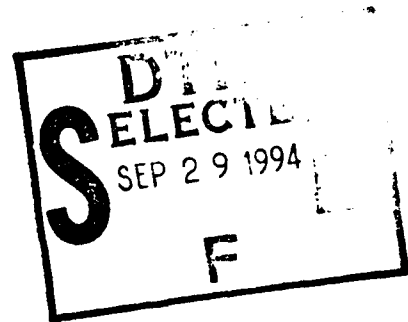
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and Acquisition Management of the Air Force Institute of Technology

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Charleen A. Szczepanski, B.S.

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Charleen A. Szczepanski

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## Abstract

The objective of this research effort was to determine if acquisition logistics managers have sufficient training and tools necessary to perform pre-Milestone I planning. Due to changes in the national security environment, the Department of Defense has revised its approach to acquisition. There will be greater emphasis on research, development, and advanced technologies. The Department of Defense will concentrate on upgrading current systems using rollover of new technologies from development programs that have advanced to a certain point but not into production. The people element of the acquisition system must obtain skills in planning and developing new technologies prior to pre-Milestone I. A major concern is the training, education, and professional development of the defense acquisition work force.

The data contained in this study was generated from six case studies of Acquisition Category (ACAT) ID program management offices at Wright Patterson AFB OH. Logistics considerations, training and education, and tools and aids were analyzed to determine a common logistics relationship that could be applied to the pre-Milestone I process.

The analysis of this data indicated that pre-Milestone I efforts are similar to tasks already performed by logistics managers in other acquisition phases. Logistics managers still depend upon Logistics Support Analysis (LSA) as the mechanism to define and collect supportability information. The logistics manager must work closely with the customer regardless of the acquisition phase. Senior management supervisors do consider their acquisition work force members highly qualified to do their jobs and believe adequate training is available through existing courses. Existing tools, although limited in application, can be applied in pre-Milestone I efforts,

Recommendations for improvements and future research were provided.

# EVALUATION OF THE PRE-MILESTONE I ACQUISITION LOGISTICS PROCESS

# AT THE AERONAUTICAL SYSTEMS CENTER

## I. Introduction

### Background

In order to meet the requirements inherent in providing our country with adequate defense, the Department of Defense (DoD) created an in-depth process to acquire the hardware and support material necessary for complex military systems. The current federal acquisition process can be traced directly from the World War II War Production Board recommendations to the 80th Congress in 1945 [1:2]. Since World War II the federal acquisition process has allowed the United States military forces to acquire the best weapon systems in the world such as the M-1A1 Abrams main battle tank, F-16 fighter aircraft, SR-71 reconnaissance aircraft, and Polaris missile [2:733, 747]. According to Major Nelson, "the acquisition process provides a logical means of progressively translating broadly stated mission needs into well defined, system specific requirements" [3:35]. Congress has alternatingly increased and relaxed the requirements for competition through the years and has periodically made provisions for broad authority to negotiate price and other contract terms when circumstances required it. However, the military procurement process has come under criticism lately for concerns relating to specific weapon systems such as the Sergeant York tank, P-7 aircraft, B-2 bomber, and A-12 medium attack stealth bomber [4:1-4]. In the past decades, these concerns have been addressed in a number of defense acquisition reviews [5:5]. In July 1985, President Reagan established the Blue Ribbon Commission on Defense Management to study the issues

Because public confidence in the effectiveness of the defense acquisition system has been shaken by a spate of 'horror stories' -- overpriced spare parts, test deficiencies, and cost and schedule overruns. [6:41]

The Blue Ribbon Commission's analysis unequivocally led to the conclusion that the defense acquisition system has basic problems that must be corrected [6:xxiii]. These problems have developed over several decades from an increasingly bureaucratic and perhaps over regulated process that resulted in too many weapon systems costing too much, taking too long to develop, and fielding systems with obsolescent technologies [6:44]. Peter Grier, a Washington DC correspondent states,

The Nation's acquisition system faces redesign for greater efficiency and effectiveness in the post-cold war environment. The basic structure likely will remain, but the way it is used will change. [7:48]

In short, the acquisition process must do more with less. Discretionary budgets such as the defense budget are prime targets for decreasing the nation's deficit [8:37].

The DoD budget has always been the focus for executive and legislative branches as a potential source for funding diversions [8:37, 9:28]. The United States no longer has the luxury of procuring major weapon systems via a production assembly line. There is not enough money to sustain a steady, predictable flow of modernized weapons. The nation must now concentrate on building or upgrading systems for greater efficiency and effectiveness [7:48]. The entire life cycle of a weapon system must be considered to ensure the best technologies are applied to meet acquisition strategies.

During the development phases of any project, decisions are made and implemented which directly influence approximately 85 percent of the life cycle cost of the weapon system [10:10.33]. Development decisions during pre-Milestone I activities determine system performance and cost drivers. Pre-Milestone I activities define and evaluate the feasibility of alternative concepts through studies and assess the

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affordability of a proposed new acquisition program. Thus ten percent invested in research and development can have critical leverage on the cost effectiveness of a system for its entire life cycle [10:10.34]. Cost effectiveness can be determined as a function of system effectiveness and system cost or life cycle costing [10:10.25]. The new acquisition approach places greater emphasis on research and development in order to achieve cost effectiveness [11:12]. Decisions made during the development phase of a weapon system dictate how the system will be produced, operated, and supported during its entire life and can significantly impact how logistics will be approached. Thus, acquisition logistics management specialists will find themselves getting more involved in logistics planning and analysis efforts. The acquisition logistics management specialist must develop managerial skills to incorporate technology effectively into advanced weapons systems to meet the mission in a changing world [11:24-64]. Highly qualified, experienced personnel are essential to perform such critical tasks.

## General Issue

A final report of the Blue Ribbon Commission was presented in June 1986. Among the many recommendations, two specific areas were identified in the acquisition organization and procedures section -- the recommendation to improve efficiency in the acquisition of major weapon systems and the recommendation to enhance the quality of acquisition personnel. The Commission stated:

> A better job of determining requirements and estimating costs has been needed at the outset of weapons development. More money and better engineering invested at the front end will get more reliability and better performing weapons into the field quickly and cheaply. [6:xxiii]

The Commission was convinced "that lasting progress in the performance of acquisition systems demands dramatic improvements in the management of acquisition personnel at all levels within DoD" [6:66]. DoD needs to enhance the quality of the

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defense acquisition work force by improving the training and motivation of personnel [12:6]. The strength and adaptability of an organization are linked to the talents of its personnel [13:6]. The DoD acquisition process is a complex system and an integral part of Air Force business that begins with the identification of an operational need, or perhaps a technological opportunity, and extends through the fielding of a system into the operational inventory. A general comprehension of the overall process of system acquisition is required to understand the importance of early planning and analysis. This process will be covered in greater detail under Chapter II - Literature Review. A thorough literature review substantiated the need for early logistics planning [14] and the necessity for well trained teams [15:2, 16:2-3, 17:174, 18:5-2]. The Air Force Acquisition Model (AFAM) and the Automated Lessons Learned Capture and Retrieval System (ALLCARS) were other sources used that indicated logistics considerations such as maintainability, reliability, and supportability are not as well documented prior to Milestone I.

## Problem Statement

The purpose of this research is to:

1. use the pre-Milestone I process to identify specific logistics tasks, often referred to as front-end analysis and decision making, performed by journeyman-level Aeronautical Systems Center's (ASC) acquisition logistics management specialists,

2. determine if acquisition logistics management specialists have sufficient training necessary to perform pre-Milestone I logistics planning, and

3. identify or recommend tools and aids to assist the logistics journeyman-level manager.

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An acquisition logistics management specialist is someone involved in acquisition systems and logistics support. Specifically, this research addresses whether acquisition logistics management specialists are adequately prepared to perform pre-Milestone I acquisition logistics planning.

## Research Objectives

This research is focused on the journeyman-level acquisition logistics support manager responsible for the pre-Milestone I phase of a project. A standardized pre-Milestone I process does not seem readily evident to assist the acquisition logistics manager. A standardized process is a substantially uniform and well-established process commonly used and widely recognized as acceptable. The research question is how are acquisition logistics management specialists being prepared to perform pre-Milestone I activities? The concern is whether the manager is aware of what that process consists of and the logistics tasks involved, what training is required to fulfill those tasks, and what existing aids or tools that could assist the individual. The research has three objectives.

1. Identify and verify the critical logistics elements required for pre-Milestone I planning and analysis. These objectives provide a guideline for the research and determine the scope of the work proposed.

2. Determine if Air Force Materiel Command's (AFMC) acquisition logistics template is adequate to prepare an acquisition logistics management specialist for pre-Milestone I planning and analysis. The primary purpose of a template is to identify training required to support specific job performance requirements at different entrance levels.

3. Recommend tools or aids to assist the logistics manager, if needed.

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## Scope and Limitations

The scope and limitations narrow the range of this research. Three distinctive areas of concern have been identified. These are location and selection of the case studies, job skills criteria, and an ASC application of the acquisition process.

The acquisition process encompasses all the services and follows the same overall DoD constraints. AFMC consists of several air logistics and product centers. Air logistics centers support and maintain fielded systems and product centers acquire new systems. AFMC has empowered each center to acquire its systems in a manner that best suits its particular requirements within DoD Directive 5000.2.

ASC is one of AFMC's product centers. This research addresses the pre-Milestone I acquisition process for ASC. Overall evaluation of other product centers' individual approaches is considered outside the scope of this research.

This research examined the job skills required of the journeyman-level acquisition logistics management specialist at ASC. Job performance requirements are by job level: entry, intermediate, journeyman, and advanced. A journeyman-level individual has already learned the tasks, duties, and processes required to perform a full spectrum of logistics duties. A person at the journeyman-level is required to possess detailed knowledge of the occupation, to have the ability to accomplish all job requirements independently, and to provide guidance to entry and intermediate-level personnel [19:23]. The acquisition logistics management specialist must be capable of performing pre-Milestone I activities such as defining and evaluating the feasibility of alternative concepts through additional studies and assessing the affordability of a proposed new acquisition program [20:3-7].

A generic ASC approach was used to identify critical logistics tasks and tools required for the pre-Milestone I acquisition phase and do not include unique situations for specific projects or program offices.

## Methodology

Qualitative research is considered exploratory in nature and generates an understanding of complex human interactions. Qualitative research is a rich means of exploring important issues in depth and breadth and involves contact with the people being studied in their surroundings; the aim is to explain what is happening in the focused community [21:595, 603]. Sullivan and Spilka of Purdue University state "case studies gather descriptive information about a phenomenon of interest" [21:604]. Descriptive means to focus on the type of interpretation rather than conclusions regarding causality. According to Robert Yin, case studies are particularly good strategies for situations where

> How or why questions are posed, when the investigator has little control
> over events, and when the focus is on a contemporary phenomenon
> within some real-life context. [22:13]

This research is considered exploratory in nature due to the contemporary phenomenon regarding pre-Milestone I logistics activities.

The methodology consists of:

1. Collecting data through on-site personal interviews, observational data, and a literature review;

2. Identifying common logistics links and the relationships among all the program offices interviewed to determine pre-Milestone I tasks;

3. Comparing results from the analysis against existing AFMC training criteria; and

4. Identifying existing tools and aids to see if they can support pre-Milestone I activities.

This research approach included in-depth case studies of major defense acquisition programs located within ASC at Wright Patterson Air Force Base OH. A major defense acquisition program is designated by the Secretary of Defense. An

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Acquisition Category (ACAT) 1D program is projected to result in eventual total expenditure for research, development, test and evaluation of more than $300 million and procurement costs of more than $1.8 billion (fiscal year 1990 constant dollars) [20:3].

AFMC has a total of 106 active acquisition programs. Out of this number ASC has ten ACAT 1D programs [23]. Six out of ten program offices were selected based upon recommendations by senior management personnel within the ASC acquisition logistics community. This research used personal interviews that were pre-tested prior to interview initiation. The purpose of the pre-test was to refine the interview protocol by using suggestions from experts to identify and change confusing, awkward, or offensive questions and techniques [22:74]. An interview protocol was developed and a pilot test was conducted to detect weaknesses in design and instrumentation and provide proxy data. A copy of the interview protocol was provided prior to the meeting to allow sufficient time for the respondent to become familiar with the interview subject area.

Results obtained from the interviews were used to develop a summary of critical logistics tasks and decisions necessary to manage pre-Milestone I projects. These summaries addressed the research objectives and generated guidelines for pre-Milestone I logistics planning and analysis efforts. Chapter II contains a more detailed description of the research methodology used.

## Terminology

*Acquisition Logistics:* The process of systematically identifying and assessing logistics alternatives, analyzing and resolving ILS deficiencies, and managing ILS throughout the acquisition process [24:1-1].

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*Acquisition Logistics Management Specialist*: An individual who considers support resource constraints identified in the mission need; analyzes support costs, manpower requirements, and readiness drivers; develops alternative operational and support concepts; assesses potential ILS program requirements; and identifies logistics technologies available for insertion [20:7-A-2-1].

*Aeronautical Systems Center (ASC)*: One of several centers within AFMC whose specific role is to apply advanced technology and management techniques to the development and acquisition of aerospace weapon systems to assure global power and reach for the Air Force [25:10].

*Affordability*: "A determination that the life cycle cost of an acquisition program is in consonance with the long-range investment and force structure plans of the DoD or individual DoD components" [20:15-2].

*Air Force Acquisition Model (AFAM)*: An AFMC acquisition tool to enhance the excellence of business practices. The model is designed to improve the timeliness and accessibility of expert process guidance and lessons learned to the acquisition work force [26:10].

*Air Force Materiel Command (AFMC)*: Command created to provide a seamless organization for cradle to grave management of acquisition programs within the Air Force [25:i].

*Automated Lessons Learned Capture and Retrieval System (ALLCARS)*: ALLCARS is a data base that provides a method to report deficiencies, desired enhancements, document problems, and potential data errors. ALLCARS ensures reliable and timely lessons learned are available quickly and accurately. The single point of contact for Air Force lessons learned is located at Wright Patterson Air Force Base OH. This program office collects, validates, and maintains lessons learned from the logistics community [27:44.2].

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*Concept Exploration and Definition Phase*: The initial phase of the system acquisition process where the acquisition strategy is developed, system alternatives are proposed and analyzed, and program requirement documents are expanded to support subsequent phases [25:24-13].

*Defense Acquisition*: The "planning, design, development, testing, contracting, production, introduction, acquisition logistics support, and disposal of systems, equipment, facilities, supplies, or services that are intended for use in, or support of, military missions" [28:vi-vii].

*Integrated Logistics Support (ILS)*: A disciplined, unified, and iterative management and technical approach necessary to integrate support consideration into the system and equipment design. ILS also identifies the most cost-effective support approach and ensures that the required support structure elements are developed and acquired [20:7-A-1]. ILS is an integral part of all other aspects of system acquisition and operations and is characterized by harmony and coherence among all the logistics elements. ILS consists of ten principle elements: maintenance planning; technical data; facilities; manpower and personnel; training and training support; support equipment; supply support; computer resources support; packaging, storage, and transportation; and design interface [28:24-14].

*Journeyman-Level*: One of four levels of job performance requirements that describe what people must do to execute their jobs. The journeyman possesses the knowledge to perform a full spectrum of tasks, duties, and processes. The person has detailed knowledge of the occupation and the ability to accomplish tasks and duties without being monitored [19:21].

*Life Cycle Cost (LCC)*: The total cost to the government of acquisition and ownership of a system over its useful life including development, acquisition, production, operation, maintenance, and termination [20:15-9].

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*Maintainability*: "The inherent characteristics of a design that determine the ease, economy, safety, and accuracy with which maintenance actions can be performed." The ability to restore a product to service or to perform preventive maintenance within required limits [25:21].

*Milestone I*: A critical decision point that constitutes program initiation if approved. This decision is commonly referred to as Concept Demonstration Approval. It is the decision point that signifies the end of the Concept Exploration and Definition phase and the beginning of the Concept Demonstration and Validation phase [25:38].

*Missionization*: The process by which any item of supply that is available in the commercial market place is modified to operate in a military environment to meet user's needs [29].

*Reliability*: The ability of a system and its parts to perform intended functions adequately without failure for a specified time period under specific conditions [20:15-15].

*Supportability*: The degree to which system design characteristics and planned logistics resources meet system peacetime and wartime readiness requirements [20:15-16].

*Template*: A comprehensive training management tool that identifies an occupation's training needs and corresponding training management information [19:19].

## Summary and Overview

Information is essential for managers to perform their role; however, the wealth of information available can be overwhelming [17:1]. The acquisition process is such a case. An individual can be easily confused and frustrated, not know what to do, where to go, and what to look for. This research study was pursued to assist the journeyman-

level acquisition logistics management specialist through the pre-Milestone I phase, a phase where few acquisition logisticians have much experience. The outcome of the President's Blue Ribbon Commission substantiated the importance of enhancing the quality of acquisition personnel. The specific problem of identifying logistics tasks and tools during the pre-Milestone I phase was defined by specific research objectives. The scope was limited to ASC since each of the product centers has a unique role that may not facilitate generalizations to another. Even though each center such as Space Missile and Electronic System Centers must comply with DoD acquisition directives, specific acquisition approaches in maintainability, supportability, and affordability for their systems may not directly correlate to how ASC procures weapon systems. A list of definitions was provided to ensure generalization of the results of this research was consistent. An extensive literature review (Chapter II) was conducted to determine if acquisition managers had sufficient training necessary to perform pre-Milestone I logistics planning. This review helped limit the specific problem, introduced new approaches in solving the problem, assisted in avoiding errors, and provided new ideas and data sources. The methodology used to define critical logistics tasks and tools is explained in Chapter III. The analysis and findings of this research study are provided in Chapter IV; conclusions and recommendations are included in Chapter V.

## II. Literature Review

### Introduction

Defense acquisition is the largest business enterprise in the world, with annual purchases by the Department of Defense (DoD) exceeding $170 billion and involving over 15 million separate contracting actions. DoD employs over 165,000 civilian and military personnel to manage the research and development, procurement, and logistics programs [1:43]. Many problems existed in the defense acquisition process and root causes needed to be identified. A special commission was established and concluded the defense acquisition process had problems [6]. Two specific areas of concern involved improving the efficiency of major weapon systems and enhancing the quality of the defense acquisition work force.

The purpose of this research is to determine if acquisition logistics management specialists located within Aeronautical Systems Center have sufficient training and tools necessary to perform pre-Milestone I logistics planning.

In order to fully comprehend the significance of the research effort, an understanding of certain existing processes is necessary to comprehend why the emphasis on up-front acquisition logistics skills and training is critical. These processes include the defense acquisition cycle, the new DoD acquisition approach, life cycle cost, integrated logistics support, and other related areas.

### Defense Acquisition Cycle

The defense acquisition process is technically complex, overflowing with acronyms, and constantly undergoing changes. This methodological process involving trade-offs between cost, schedule, and performance was developed to reduce risks and assure specified performances.

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All acquisition programs are based on identified needs generated as a direct result of current and projected capabilities to military threats and national defense policy. Acquisition programs are an integral part of Air Force business and begin with the identification of a new operational capability or technological opportunity that will improve the effectiveness of a system. This multi-stage acquisition process is used to conceive, design, develop, and procure major weapon systems for the DoD. This operation is generally thought of as a logical sequence of activities starting with need evaluation and system concept formulation and progressing sequentially to alternative concept evaluation and system concept formulation and then to demonstration, validation, engineering and manufacturing development, and production and deployment of the system. The defense acquisition process consists of five major milestones and five phases as depicted in Figure 1.

John M. Deutch, the Under Secretary of Defense for Acquisition, declared more emphasis will be placed on the requirements identification process (pre-Milestone I) [7:48]. The question of which weapon's concept is best suited to meet mission needs is still open. During this period the strategy for the weapon's system acquisition is identified through feasibility studies and whether DoD can find contractors able and willing to do the job [7:50]. Each alternative is reviewed based on cost, performance and operational requirements.

This new emphasis is essential if the nation is to have the forces and industrial base needed during times of declining budgets and changing military roles. More emphasis is now placed on using off-the-shelf commercially available products and systems [7:48].

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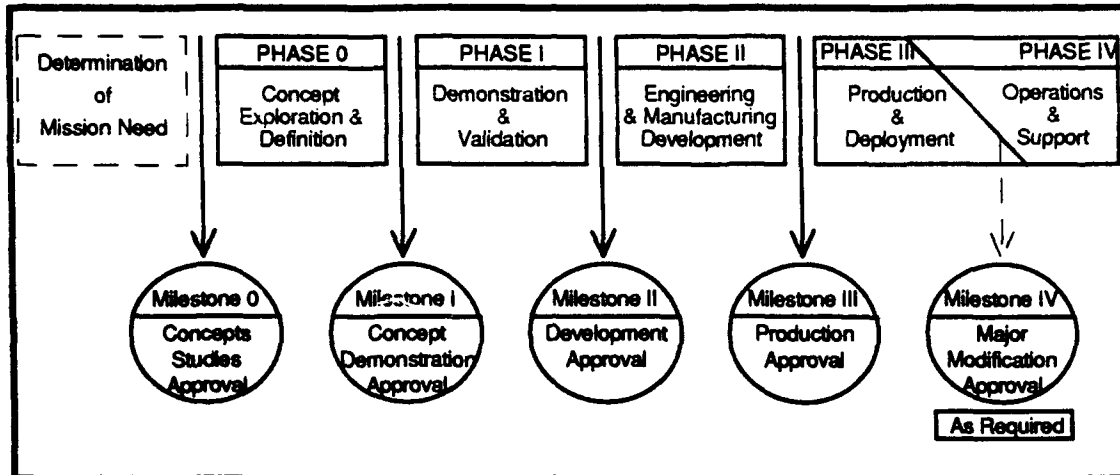
| Milestone or Phase | Title | Description |
|---|---|---|
| Milestone 0 | Concept Studies Approval | Starts formal interface between requirements and acquisition; results will initiate studies necessary to identify potential solutions to validated user needs. |
| Phase 0 | Concept Exploration and Definition | Defines and evaluates the feasibility of alternative concepts through short term studies. |
| Milestone I | Concept Demonstration Approval | Assesses affordability of a proposed new acquisition program; favorable decision establishes a new acquisition program |
| Phase I | Demonstration and Validation | Pursues multiple design approaches and parallel technologies within the system concept; critical design characteristics and expected capabilities are defined and technologies demonstrated |
| Milestone II | Development Approval | Assesses the affordability of the program; establishes a baseline. |
| Phase II | Engineering and Manufacturing Development | Emphasizes risk management; promising approach is translated into a stable, predicable, cost effective design. |
| Milestone III | Production Approval | Represents a commitment to build, deploy, and support the system. |
| Phase III | Production and Deployment | Monitors system performance and quality through test and evaluation; establishes efficient production and support base. |
| Milestone IV | Major Modification Approval | Ensures reasonable alternatives are examined prior to a major modification still in production. |
| Phase IV | Operations and Support | Ensures fielded system continues providing capabilities to meet the mission need or corrective action on any deficiencies. |

**Figure 1. Acquisition Milestones and Phases [20:3-4]**

A mission needs statement -- a broadly expressed assessment of offensive or defensive capability relating to, or countering, potential enemy capability -- usually comes from the warfighting military commands. The services set priorities on each mission needs statement. An oversight council reviews and validates the statements and decides which require production of new weapons or systems. Then a Defense Acquisition Board (DAB) reviews each program at key points referred to as *milestones*.

If a program is proceeding satisfactorily, the DAB recommends continuation. There are five key milestones as illustrated in Figure 1. Milestone I is the formal beginning of a program, but often decisions made even before this time are critical to the life cycle cost of the program. A number of defense acquisition reviews has taken place but the most recent reviews include the Carlucci Initiatives in 1991 [30:25, 75], the 1986 Blue Ribbon Commission recommendations [7:52, 3], and the new administration's *bottom-up review* [7:52].

The latest features of the new acquisition process include more low-rate production to stretch programs and keep the industrial base busy between new procurement programs; more system upgrades versus new systems; *silver bullets*, small targeted purchases of true breakthrough weapons and technology; and *rollover plus*, meaning that after a technology or weapon system is developed, it is not put into production. Rather, the technology is sent back to Milestone 0 to be *rolled over* into an even newer system before production takes place [7:52].

The critical first step is having well-defined requirements that include system operational needs, support characteristics, and deployment plans. Limited expertise and lack of in-depth front end analysis for training, logistics, manpower and personnel planning along with limited user participation have been identified as critical fault items in previous weapon system shortcomings or cost overruns [31:7-8].

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The acquisition process is an incremental development commitment phased so that the associated risk is continually addressed. Service and DoD leaders examine the progress of programs at each milestone and evaluate achievements prior to making any greater commitment of resources. As the program progresses through the acquisition life cycle, the cost associated with its development continually increases.

The purpose of pre-Milestone I effort is to determine if the mission needs warrant the initiation of study efforts and, if so, define a minimum set of alternative concepts to meet that need. The various alternatives are evaluated through competitive, parallel, short-term paper studies. The acquisition strategy is developed based on cost, schedule, technical performance, and supportability for the most viable alternative including risk management approaches. [20:3-7] Acquisition logistics managers need to understand critical logistics tasks involved during this phase to ensure a cost effective level of logistics planning and analysis. They must effectively identify and demand support requirements for the new weapon system to obtain life cycle benefits from early integrated logistics support efforts. The pre-Milestone I phase is where planning needs to start.

## New DoD Acquisition Approach

The rush for incorporating new technology into production has been reduced due to the changing national security environment. The United States' effort to counter the Soviet military power is not as critical and DoD has time to look at alternatives in reducing risk and cost. New technologies must show they work prior to being fielded in any weapon system through the use of modeling and simulation to demonstrate operational relevance [32].

Due to these changes in the national security environment, DoD has revised its approach to acquisition. The new approach will take advantage of the technological

revolution by ensuring a variety of technologies are pursued and incorporated into a formal acquisition program. The new acquisition approach has four basic tenets:

*Tenet 1*: There will be greater emphasis on research and development and advanced technologies. Secretary of Defense Perry stated that research and development funding "will take the heat" [33:12] as defense budgets decrease. The next generation of military systems will feature technological improvements and improve the effectiveness of the United States military forces

*Tenet 2*: There will be development and evaluation of technology demonstrators and prototypes that will ensure the pipeline will be full of new technologies required to maintain our military forces. "The next generation of military systems will feature important technological improvement" [33:12].

*Tenet 3*: There will be selected incorporation of advanced technology into existing weapon systems. To make the most of its modernization money, DoD will concentrate on upgrading current systems using *rollover* of new technologies from development programs that advanced to a certain point but not into production [33:14].

*Tenet 4*: Only a few selected weapon systems will go into production at reduced levels. Funding for the technology base will remain steady, but systems development funding will decrease [33:12]. The next generation of systems will become even more sophisticated.

The new acquisition approach emphasizes technological development versus actual production of systems. The defense acquisition process will stress pre-Milestone I activities to ensure the latest state-of-the-art technologies are available. This approach requires acquisition logistics managers to concentrate on determining viable alternatives for new weapon systems and comprehend this complex process.

## Life Cycle Cost (LCC)

LCC is defined as

> The total cost to the government of acquisition and ownership of that system over its useful life. It includes the cost of development, acquisition, support and, where applicable, disposal. [20:15-9]

LCC estimating begins early in acquisition and is performed for each alternative design proposal to identifying major operational and logistics costs impacts. The principal policy statement on cost in design is provided in DoD Directive 5000.2 and requires

> Designing to achieve life cycle cost goals based on credible acquisition and operations and support cost parameters that are consistent with program plans and budgets and that achieve the best balance among the cost, schedule, performance, reliability, and supportability characteristics. [34:3.6]

Supportability relates to the degree a system is effectively and efficiently supported throughout its life cycle [20:15-16]. When evaluating LCC the four basic program elements (schedule, cost, technical performance, and supportability) must be addressed. To obtain the optimal balance, these program elements need to be contemplated with integrated logistics support considerations that are based on ten logistics elements (Appendix A).

Figure 2 shows a typical weapon system distribution regarding life cycle costs. A weapon system might incur 60 percent of its life cycle cost in operations and support, 30 percent in production, and 10 percent in development. The design decisions that determine operational and support costs are made early in the program. Approximately 70 percent of the life cycle cost has been determined by design decisions made prior to Milestone I [34:3.6].

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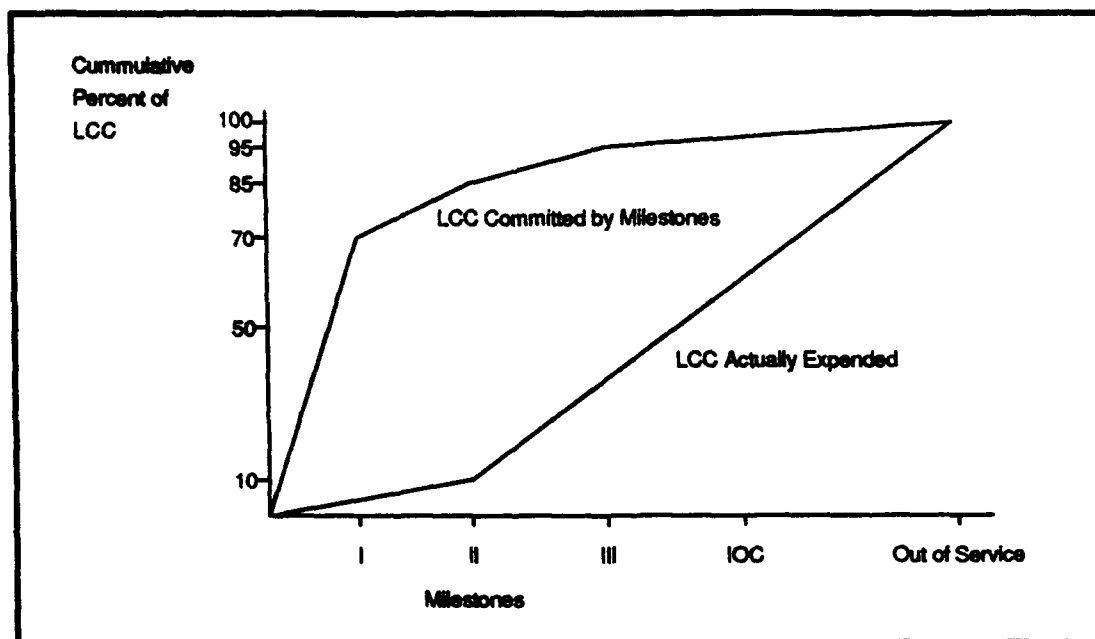
**Figure 2. LCC Influences Approximately 70 Percent of Early Design Decisions Prior to Milestone I. [10:1.22]**

A methodology for the estimate must be determined and is dependent upon budget, trade studies, or *what-if* analysis [8:3-6]. In order to derive such estimates, ground rules and assumptions must be developed. These ground rules and assumptions are based on operation, maintenance, and support criteria as well as mission descriptions, system characteristics, and logistics policies. A cost estimating technique must be determined and usually involves a selection of a cost model based on the acquisition phase of the project. Comparable system data is used in the analysis before system specific details are available. This data is adjusted as the system definition matures. A primary source of logistics data is the Logistics Support Analysis Record (LSAR).

Early cost estimates are often based on contractor databases. Acquisition logistics managers use contractor data bases and historical data systems such as the Requirements Computations Data System on comparable weapon systems in order to

ensure the most cost effective concept does not have excessive operational and support costs [36:150-153].

## Integrated Logistics Support (ILS)

ILS planning begins when the need for a system is known. The Air Force defines logistics as,

> The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, logistics pertains to those aspects of military operations which deal with (a) design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of material; (b) movement, evacuation, and hospitalization of personnel; (c) acquisition or construction, maintenance, operation disposition of facilities; and (d) acquisition or furnishing of services [35:401].

Logistics involves planning, analysis and design, testing, production, distribution, and sustained support of a system throughout its life [36:5]. The earlier the analysis, the greater the opportunity to influence the design [37:1.15].

There are numerous examples illustrating failure to integrate supportability early in the acquisition process [30:17]. Over the decades Air Force weapon systems have become more complex and maintainability has become more difficult. In the past, performance capability problems were often resolved by reallocating money from long range logistics support budgets [38:2]. Diversion of logistic support funds increases the LCC by driving inherent support costs higher [30:18]. Clearly, logistics support is a key consideration during the design and acquisition of new weapon systems.

A better balance between cost, performance, schedule, and supportability has gained senior management attention. The days where system designers favoring performance characteristics at the expense of logistics are gone [39:4]. The DoD finally realized the vital importance of logistics by taking stronger steps to include and control logistics characteristics. Documentation required by directives was created to

cover the entire spectrum from analysis of mission capability deficiency to production.

DoD Directive 5000.2 established policies and procedures for ensuring,

> (1) Support considerations are effectively integrated into the system design, and
>
> (2) Required support structure elements are acquired concurrently with the system so that the system will be both supportable and supported when fielded [20:7-A-1].

Logistics requirements can be ascertained at the same time the mission need is identified. Using commands have historically identified operational suitability requirements but were less specific in functional performance requirements. A Rand Study stated,

> In the past, definitions of weapon system performance have always stressed air vehicle characteristics (such as velocity, rate of climb, and acceleration) but have largely ignored basing and support innovations except to insure that weapon systems could operate within the existing structure. [40:vi]

Logistics needs were seldom included in a prioritization scheme [30:31]. Mission Need Statements now have a specific section that addresses key boundary conditions that may impact logistics support on satisfying the need [41:2-1-1].

The ILS planning effort is documented in an integrated logistics support plan that identifies management approaches, decisions, and approaches associated with this planning effort. The plan provides the direction for coordinating logistics planning to ensure all the ILS elements are addressed and integrated with other functional elements throughout the program [37:1.18].

How logistics data is obtained and retained for a weapon system is important since this information is used as a basis in forthcoming milestones and phases after program approval. Documentation on what alternatives were considered and the rationale in selecting a concept can prove invaluable to acquisition personnel not privy to the early efforts.

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The volumes of data acquired and processed for a program are documented through a tailored Logistics Support Analysis (LSA). LSA is an analytical process within system engineering and provides the design link to the acquisition process. It is the logistics source for data and directs logistics trade studies.

LSA is part of the system engineering. It is important to understand system engineering functions. System engineering identifies the best approach in meeting the mission needs by using an iterative process. System engineering begins with performance parameters, looking at various alternatives and concluding with the actual system configuration. The design engineers are continually feeding design and support data into a central data base called the Logistics Support Analysis Record (LSAR). LSAR is a data file with specific formatting that permits orderly inputting, storage, analysis, and retrieval of LSA information.

The LSA process uses the LSAR to:

1. Evaluate different alternative design proposals including logistics support and operational readiness impacts,

2. Evaluate the preferred system design to determine its adequacy, and

3. Identify and quantify logistics support resource requirements.

LSA begins early in the acquisition process and is conducted by performing various trade-off analyses similar to LCC estimating. The LSAR data is also used to perform trade-offs between the ILS elements to determine the most effective and economical mix.

MIL-STD-1388-1A, Logistics Support Analysis, defines the LSA analytical process and contains general LSA requirements. LSA task and subtask descriptions, trade-off analysis requirements, and tailoring information are needed to develop the LSA strategy.

LSA is a single logistics data base. Tailoring the LSA is controlled by several factors such as flexibility to change the design, availability of funds, scheduling constraints, and availability of data. The key word is tailoring. LSA can be expensive if it is not tailored to what is really necessary. Acquisition logistics management specialists must define support requirements to obtain benefits from early ILS efforts. The logistician must effectively identify and demand support requirements for new weapon systems. Again, the pre-Milestone I phase is where planning needs to start.

## Other Related Areas

Gricius and Herd, in a 1984 AFIT thesis, researched the communication difficulty between researchers and logisticians. They point out that the major cost of a weapon system does not occur during the weapon system acquisition process but rather during the operation and maintenance of the system throughout its life cycle and disposal, often a period of some 10 to 40 years [30]. These researchers provide voluminous evidence that the omission of supportability concerns early in the acquisition cycle has resulted in *designed-in* weapon system supportability characteristics that include suboptimal logistics support cost. The early efforts of these researchers concentrated on cost, schedule, performance, and quantities of new systems being fielded (put into service or operation) with little thought or planning in the support requirements. Relative to the early stages of the acquisition process, these support requirements were considered a *downstream* effort to be sorted out after the system was well defined.

Gricius and Herd point out that putting little emphasis on the logistics aspects early in the acquisition process results in fielding systems that are relatively unreliable and unmaintainable, as well as resulting in "skyrocketing life cycle costs due to continuous expenditures for correcting operational and support deficiencies" [30:2-3].

They cite several sources to support the claim that the great majority of a system's life cycle costs are predetermined by decisions made in the early stages of the systems acquisition process. During the life of a weapon system, some 50 to 60 percent of the operations and maintenance costs are related to logistics and 70 percent of the system's entire life cycle cost is locked in by decisions made before Milestone I -- 85 percent are locked in by Milestone II. However, because actual expenditure of funds is relatively small at these early stages in the acquisition process, decision makers often fail to see the potential life cycle savings from optimal front-end logistics planning [30:17-19]. The evaluation and planning of logistics issues at the same priority as functional performance, systems acquisition cost, and schedule must be (and is being) a system acquisition requirement.

Along with the commitment to increase the priority of logistics planning is the problem of how to identify, access, and use state-of-the-art technology and information. Gricius and Herd specifically concentrated their efforts on this part of the overall acquisition problem but left for future research the problem of providing the acquisition logistics specialist with a structured template for analyzing the developing logistics plan early (pre-Milestone I) in the acquisition process.

Britton Smeal, in a 1990 AFIT thesis, addressed some of the problems of early Air Force logistics planning by way of using an expert system software program originally developed for the Army. The particular software package (LOGPARS -- Logistics Planning And Requirements Simplification System) is an expert system designed to support the Integrated Logistics Support (ILS) program through logistical analyses, evaluations, and other technical and management services [42:25]. LOGPARS guides the acquisition logistics specialists through a series of interactive modules by guiding the initiator through the acquisition and ILS strategy, creating system life cycle milestones, charting life cycle ILS program management update

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prompts, and performing other features. Whereas this work is quite useful in determining the cross utilization of ILS support software between the services and will be of value in sharing and implementing logistics planning information, LOGPARS did not address the pre-Milestone I problem undertaken in the current effort.

## Summary

The DoD acquisition process provides a logical means of translating broadly stated mission needs into well-defined system requirements. Management of major weapon systems acquisitions requires efficient decision making and effective implementation. An overview of the DoD acquisition process and its associated life cycle cost was provided to reiterate the importance of identifying and influencing the design as early as possible in the development cycle. Life cycle costing decisions are considered critical to the logistics arena because of logistics support impacts downstream. Due to changes in the national security environment, DoD has revised its approach to acquisition. ILS begins prior to program initiation and has a greater opportunity to influence the design early in the development effort through logistics support analysis. Other areas of related research were investigated to justify this research effort.

Increased emphasis is being placed on research and development, and acquisition involves many processes in defining the best system for a perceived threat. These processes substantiate the importance of having qualified and trained acquisition logistics managers knowledgeable in pre-Milestone I planning and analysis activities. Processes, training, and tools must be available to ensure a qualified cadre of acquisition logisticians.

# III. Methodology

## Introduction

The purpose of research methodology is to develop and test theories, to discover principles, and to gain knowledge. Sharon Rogers defined research as

> A systematic process of expanding knowledge in a cumulative way within a discipline. Research consists of the facts or data and the tools or methodology employed to gather, analyze, and evaluate that data. [43:84]

The objective of this study was to identify pre-Milestone I logistics tasks for journeyman-level acquisition logistics management specialists, to determine if adequate training is available, and to identify the appropriate tools necessary to ensure integrated logistics support is addressed prior to pre-Milestone I in the defense acquisition process at ASC. Specifically, this research addressed whether acquisition logistics management specialists are adequately prepared to perform pre-Milestone I acquisition logistics planning. To achieve this research objective, a qualitative approach using a case study methodology was used. A detailed explanation is provided regarding the research design, population, data collection methods, instrument validation, interview protocol, and limitations of this effort.

## Research Design

The research design represents the approach in selecting the appropriate sources and types of information to obtain answers to research questions. The design is the framework for specifying relationships among specific variables and outlines all the procedures to analyze data [44:139]. Two basic types of research can be performed. Quantitative research emphasizes a scientific approach that consists of a formal hypothesis and statistical procedures. Quantitative methods test ideas in order to facilitate effective decisions and actions. Qualitative research is usually applied to

an exploratory or contemporary situation to gain better understanding and ideas. "Qualitative research is interested in the motives and aims, not just the behavior, of those who are studied" [45:4].

The most important condition for selecting a research strategy is to identify the type of research question being asked. In general, *how* and *why* questions favor the use of case study approach [22:19]. How are acquisition logistics management specialists being prepared to perform pre-Milestone I planning and analysis efforts? The qualitative design strategy was selected due to the contemporary nature of this research question. A thorough literature review documented the pre-Milestone I process but lacked identification of specific logistics tasks or training requirements to accomplish them. The qualitative approach allowed the researcher the flexibility to answer this question in the depth and detail necessary without being constrained by predetermined categories.

The case study approach is used in many settings and provides additional knowledge of individual, organizational, social, and political phenomena. This method is used to understand complex social phenomena and allows an investigative approach while retaining the holistic and meaningful characteristics of real-life events [22:14].

A case study is an empirical inquiry that:

- Investigates a contemporary phenomenon within its real-life context; when
- The boundaries between phenomenon and context are not clearly evident; and in which
- Multiple sources of evidence are used. [22:23]

An important aspect to remember is that case studies use analytic generalizations; when conducting this type of research, one should avoid thinking in such confusing terms as "the sample of cases" or the "small sample size of cases" [22:40].

Based on the following criteria, the case study approach was selected:

1. The program office was used as the unit of analysis. Each program office is considered unique in its approach to acquisition. The peculiarities of the system being acquired are based on such factors as the acquisition phase, type of contract, funding availability, politics, and management structure. Thus, the program office is an individual unit among all other programs at Aeronautical Systems Center (ASC). Based on the experiences of each senior-level logistics manager within the program office a logistics relationship was determined.

2. The strategies and techniques used in logistics management are highly interrelated and yet independent. Logistics considerations such as reliability and maintainability interface with other functions such as system engineering and yet logistics is an entity in itself.

3. Identifying the logistics tasks for pre-Milestone I logistics must be considered holistic in nature; the tasks can not be reduced to independent, isolated parts but are Gestalt as program office progressions and challenges are traced.

4. Front-end acquisition planning is process oriented. The case studies focused on the experiences identified from senior-level managers and their lessons learned.

5. Programs involved in extensive pre-Milestone I acquisition logistics activities are limited and definitive descriptions are not available. Program offices using front-end planning are evolving and the results of these efforts can not be seen today. Time must evolve to foresee any benefits.

Multiple cases have distinct advantages and disadvantages compared to single case designs. The evidence from multiple cases is often considered more compelling and robust. Single case designs cannot be satisfied by multiple cases due to their unusual or rare situations. The multiple case study does require more extensive

resources and time over that of the single case [22:52]. Multiple cases should be considered as one would consider multiple experiments -- a replication logic [22:53]. Multiple program offices were used to demonstrate lessons learned from various major acquisition systems and the results were analyzed to determine critical logistics tasks for front-end logistics analysis. The multiple case study offers a well-tested design and technique used to help guide inquiry and study a phenomenon systematically. Each case must be carefully selected so it predicts similar results (literal replication) or produces contrary results for predictable reasons (theoretical replication) [22:53].

The purpose of this research is to determine if acquisition logistics management specialists located within Aeronautical Systems Center have sufficient training and tools necessary to perform pre-Milestone I logistics planning. For this purpose, an acquisition logistics management specialist is someone involved in acquisition systems and logistics support.

The research for this thesis identified three specific objectives. First, critical logistics elements must be identified and verified for pre-Milestone I planning and analyses. Second, the acquisition logistics template must be reviewed to determine if adequate training is available to prepare a logistics manager for these tasks, and lastly, to identify existing tools or aids that could be applied to the pre-Milestone I effort.

## Population and Sample

The DoD uses ACATs for determining decision making and documentation requirements in acquisition management. ACAT 1D systems are designated by the Secretary of Defense (SECDEF) and must meet the following criteria,

- Systems with significant risk in development, urgently needed and those with specific SECDEF interest.
- Systems jointly acquired by two or more military services or Government agencies.

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- Systems with acquisition costs exceeding $200 million RDT&E or $1 billion in procurement funds (fiscal year 1980 constant dollars).
- Systems with high congressional interest. [46:33]

RDT&E stands for the research, development, test, and evaluation of a weapon system.

The population for this research consists of ASC ACAT 1D program offices at Wright-Patterson Air Force Base OH. There are over 22 formal acquisition programs within ASC and ten are ACAT 1D programs [23]. Candidates for the case studies were selected based on several criteria: acquisition category, location, and availability of source data. In-depth personal interviews were conducted with senior-level logistics managers involved in decision making and implementation processes.

The target group members were selected due to their duty positions and their inherent responsibilities for overall logistics within their program offices. To ensure validity of the respondent's expertise, detailed background information and description of responsibilities were requested as part of the interview protocol.

The lessons learned provided by these managers formed the basis in determining common links in logistics relationships needed to ensure supportability in a weapon system.

Because of the theoretical approach involved in case studies, the typical criteria used in quantitative approaches regarding sample size was considered irrelevant. Instead, the decision on how many case studies should be conducted was based on the number of case replications required -- a matter of discretionary and judgmental choice. If there is uncertainty on whether external conditions will produce different case study results, a larger number of case studies are recommended. The judgmental rationale was based upon the availability of funds, recommendation of senior management, and rank of the acquisition category. Three of the program management offices were physically located at Eglin AFB FL and were eliminated due to lack of

funds. The C-17 program management office was undergoing exhaustive Congressional oversight activities, and senior management advised the researcher not to interview this program office. One of the programs was classified as an ACAT 1D program, but further investigation indicated the program had an ACAT 2 classification. The pilot test was included to increase the number of cases. This was possible because the outcome of the pilot study did not result in any changes to the interview protocol. The researcher interviewed 83 per cent of eligible program management offices located at Wright Patterson AFB OH. This was considered an adequate number of cases studies for this research effort.

Purposeful sampling was used to define common links and relationships between the case studies regarding logistics tasks [47:101]. Purposeful sampling is a non-probability sampling technique that permitted the selection and examination of ACAT 1D program offices. Prior research efforts determined that decision makers and evaluators can identify which cases will provide the most knowledge [22:52]. Selection of those cases was the basis for that research effort. This research used purposeful sampling to identify what best practices and lessons learned could be used to identify pre-Milestone I logistics tasks. The selection was based upon the acquisition category, availability of historical data, and location.

## Data Collection Method

This research used of six exploratory case studies of major weapon system acquisitions in various stages of the acquisition process. The case studies used structured, in-depth personal interviews with Chiefs of Logistics or Integrated Logistics Support Managers.

This research followed the case study method. It best suited the situation because of the limited knowledge or previous research available; an in-depth

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investigation was required [48:89, 49:101]. The case study approach was appropriate due to limited attention being focused on the pre-Milestone I phase of the acquisition process. This type of approach also has the advantage of studying an entire organization in-depth and allowing follow-on questions to probe for additional depth or clarification. The highly focused attention of the case studies provided an opportunity to study the order of events and concentrate on identifying the relationships among functions, individuals, or other entities [48:88].

The case studies focused on the relationship of logistics tasks performed throughout a variety of weapon systems program offices. Program offices were selected based on the recommendations of knowledgeable acquisition logistics professionals at Wright Patterson Air Force Base. The research used the following criteria to determine suitability of an organization:

1. The program must have an ACAT 1D designation.

2. The organization must have historical information available for review and analysis.

3. The organization had to be located within the Aeronautical Systems Center at Wright Patterson AFB OH.

## Personal Interview

The case studies involved in-depth personal interviews with the Chiefs of Logistics from each system program office. Individuals identified for the interviews received an advance copy of the interview protocol. The advance copy enabled the individuals to prepare for the interview or obtain background material where appropriate. The cover letter contained the researcher's name and telephone number allowing the individual to contact the researcher to clarify any questions before the interview.

The interviews occurred on-site and consisted of an interview protocol. The questions explored several areas such as general background of the interviewee, the logistics process for planning and analysis, the training status, and logistics tools and aids available for planning and analysis. In order to conduct the personal interview the scope and development of this process needed to be addressed. The scope of the interview involved defining who to interview, probing interviewees for clarification, and limiting the interview to one hour sessions. All respondents were senior-level managers physically located within respective program offices. Senior-level managers consisted of individuals who were responsible for that program.

Interview responses supported an analysis of the effect of logistics planning and the logistics elements involved to ensure supportability, maintainability, reliability, and affordability. The researcher used the response data and subsequent analysis to describe a common logistics link among the program offices.

In an effort to narrow the scope, historical literature were reviewed to determine projected critical logistics tasks required prior to Milestone I activities. DoD Directive 5000.2 is the key document governing policies and procedures for managing all defense acquisition programs. This directive and its instruction was used to determine the generic roles and responsibilities for acquisition logistics managers during the pre-Milestone I phase. The DoDI 5000.2, Air Force Acquisition Model (AFAM), and the ASC Pre-Milestone I Program Development Process Guide were used in streamlining these efforts to specific ASC activities [28, 37, 50]. Table 1 lists the ten integrated logistics support elements and the key subtasks involved in each element. Key documents were searched using these logistics elements to define pre-Milestone I logistics tasks. The results formed the basis in identifying critical logistics tasks involved in the pre-Milestone I effort. The key tasks were defined as those elements that appeared in at least two of the three source documents listed in Table 1. Four ILS

elements were identified as containing key tasks: maintenance planning, manpower and personnel, training, and design interface. The key logistics tasks were cost estimating, system engineering, and acquisition strategy.

**Table 1. Defining a Logistics Baseline**

| Integrated Logistics Support Elements | DoDI 5000.2 | AFAM | ASC Pre-MS I Guide |
|---|:---:|:---:|:---:|
| **Maintenance Planning**<br>♦ Determine maintenance concepts<br>♦ Perform reliability and maintainability analyses | X | X | X |
| **Manpower and Personnel**<br>♦ Determine skills level<br>♦ Identify manpower constraints & requirements | X | X | X |
| **Supply Support**<br>♦ Determine spares concepts<br>♦ Assess resource impacts | | | |
| **Support Equipment**<br>♦ Determine support requirements<br>♦ Assess resource impacts | X | | |
| **Technical Data** | | | |
| **Training and Training Support**<br>♦ Identify training concepts<br>♦ Identify proposed training sources and equipment | X | . | X |
| **Computer Resources Support**<br>♦ Identify embedded computer systems concepts<br>♦ Assess risk and impacts | X | | |
| **Facilities**<br>♦ Identify gross facility requirements<br>♦ Perform facility-related analysis | X | | |
| **Packaging, Handling, Storage, and Transportation**<br>♦ Identify transportability constraints<br>♦ Identify design constraints | X | | |
| **Design Interface**<br>♦ Identify readiness & support resource requirements<br>♦ Perform logistics support analysis<br>♦ Assess logistic technologies<br>♦ Perform life cycle cost estimates | X | X | X |

These projected key logistics tasks formed the basis for determining a common link among the six case studies selected. The experiences previously encountered by senior-level logistics management personnel would provide insight into problems or best business practices encountered. From the outcome of the case studies a common

link is needed to ensure supportability in a weapon system was identified from pre-Milestone I logistics efforts. An interview protocol was conducted and the respondents were informed of the research purpose and objectives. The interview protocol was considered exploratory because the respondents were given considerable latitude in defining a given situation. The interview protocol lent structure but additional questions to explore other areas identified by the respondents were also pursued. The overall goal of the interview was obtaining information regarding *real world* situations that face the acquisition logistics management specialist.

## Instrument Validation

The research design represents a logical set of statements; the quality of a case study is judged on certain logical tests. Four tests are relevant -- construct validity, internal validity, external validity and reliability. These tests are considered more complex for the case study than the standard validity and reliability commonly used in quantitative analysis [22:41].

*Construct Validity*. To meet the test of construct validity two steps must be accomplished. One is to select the specific types of changes that are to be studied, and the second is to demonstrate that the selected measures of these changes do reflect the specific types of change anticipated [22:42]. Thus, this research study identified pre-Milestone I logistics activities and determined if adequate training is available to fulfill these activities. The use of multiple sources of evidence through data collection from ASC program offices encourages convergent lines of inquiry.

*Internal Validity*. Internal validity is a concern for causal or explanatory studies where a causal relationship between two variables exists. This logic is not applicable for descriptive or exploratory studies [22:43]. The concern over internal validity for case study research is extended to a broader problem of inferences. The researcher infers

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that a particular event resulted from some earlier occurrence based on interviews and documentation. This analytic tactic of pattern-matching is one way to address internal validity. Pattern-matching compares an empirical pattern with a predicted one. If the pattern coincides the results strengthen internal validity [22:10]. The proposed logistics tasks required for pre-Milestone I were determined prior to conducting the interview to develop a baseline. The outcome of the interviews determined that a pattern match existed.

External Validity. The external validity is a major barrier in doing case studies. Critics state case studies offer a poor basis for generalizing. Case studies are based on analytical generalization -- to generalize a particular set of results to some broader theory [22:44]. A theory must be tested through replication. Once such replication has been made the results may be accepted for a larger number of similar situations. The replication logic is the same logic used in experiments. The multiple cases used in this research addressed the replication logic.

Reliability. Reliability is the ability to use the same procedures in one investigation and to be able to duplicate it later by getting the same findings and conclusions. The goal is to minimize errors and biases. The general approach to reliability problems is to ensure all steps can be duplicated, are as operational as possible, and conducted as "if someone was looking over your shoulder" [22:45]. To maintain reliability, each step of this research effort was documented in operational terms so that someone else can repeat the procedure and arrive at the same results.

## Interview Protocol

The interview protocol was the mechanism used to obtain information. The purpose, scope, and objectives of the research effort were the basis used in developing the questions. The research had three objectives: identify logistics elements required

for pre-Milestone I activities, determine if journeyman-level logistics managers were adequately trained to accomplish those tasks, and identify any existing tools to assist the journeyman-level manager in performing those tasks. All questions contained within the interview protocol considered who needed the information, what decision would be made on this information, what facts would affect the decision, and who the audience would be. The interview protocol also contained questions to serve as checks on accuracy and consistency of answers as a whole in different parts of the questionnaire.

The questions were reviewed not only for content but also for structure  The actual formatting of the interview protocol was just as critical as the questions itself. The language was kept simple and short. Each question approached only one idea or concept to avoid any confusion. The interview protocol also contained enough white space to allow sufficient room for the interviewees to answer the questions. The number of questions was kept to a minimum to keep each session to a one hour session.

The questions were developed based on expert opinions using acquisition management personnel familiar with the pre-Milestone I process as well as other acquisition phases. The suggestions from the experts were obtained using an open-ended format to establish interview criteria. Other theses on related subjects were also reviewed to determine if their approach in developing the questionnaire could be applied to this research [15, 17, 18, 30].

The development of the interview protocol was approached in five parts. Part I was used to obtain background information about the interviewee and the program. The purpose for these questions was to determine the interviewee's experience, if the interviewee had actual experience in pre-Milestone I activities, and the overall responsibilities the individual had within the organization. If the logistics manager did

not experience pre-Milestone I efforts, the opinions about what transpired during this phase may not be as reliable. The overall experience was also requested because past positions and experiences could influence how the interviewee perceives a given situation. The program information was required to define what kind of weapon system it was and when a Milestone I decision was made.

Research objective 1 was to identify logistics tasks required for pre-Milestone I activities. Part II focused on obtaining information in defining these logistics tasks. The purpose of the questions in this section was to define what were considered the objectives and goals and whether logistics was included in these efforts. Understanding how logistics was considered and how program status was communicated within the program management office would help in determining how programmatic decisions impacted supportability. Asking what the impediments were and the lessons learned identified key logistics issues. For those interviewees who had not actually experienced the pre-Milestone I effort, their perception was also considered important. The pre-Milestone I effort is a paper concept study on proposed alternatives. Understanding how the program office used life cycle cost analysis and logistics support analysis in determining supportability concepts was contemplated in identifying logistics relationships among all the case studies.

Research objective 2 was to determine if journeyman-level logistics specialists were adequately trained to accomplish those tasks. Part III of the interview protocol was concerned with existing training and whether logistics managers considered this training adequate. The purpose of this section was to determine what training was necessary to perform pre-Milestone I tasks and if that training was available today.

Research objective 3 was to identify any existing tools to assist the journeyman-level manager in performing those tasks. The purpose of this section of

the interview was to define what tools the logistics manager was using and what areas in logistics would require additional tool development.

The last section was for any additional comments the logistics manager considered significant in this research effort. This gave the interviewee an opportunity to express ideas and concerns that were not anticipated by the researcher. The purpose of this section was to identify other perspectives from senior-level logistics managers in resolving the research questions. Often senior managers have insight into other similar areas that could be applied to the pre-Milestone I effort.

Pre-Test Interview Protocol. The purpose of a pre-test is to evaluate and refine the measuring instrument. A pre-test was conducted to detect weaknesses in the style and format of the interview protocol. Academic and acquisition logistics personnel reviewed the interview protocol for content and perception of what is being asked. A professor from the Air Force Institute of Technology was consulted regarding content, style and format of the questionnaire. The acquisition logistics personnel consisted of a journeyman-level civilian responsible for laboratory programs and a senior Air Force captain knowledgeable of pre-Milestone I activities. The individuals recommended minor wording changes and inclusion of questions 2, 4, 15, and 23 in Part II of the interview . An effort was also made to use simple sentence structure to avoid confusion and bias. Comments provided during these sessions were used to improve and clarify the interview protocol for the interviewing process. The pre-test also served as a means to ensure content validity.

Pilot Study. Pilot studies serve to familiarize the researcher with the research topic, to refine procedures, and to develop additional questions. A pilot study was also conducted to reinforce content validity. The selection of a pilot study was based on accessibility and location. A now unfunded project called the Multi-Role Fighter project was selected because of the up-front planning efforts conducted during its existence.

A structured personal interview was conducted. This interview was exploratory in nature and the intent was to verify already selected logistics tasks required for early planning efforts. The logistics manager was encouraged to provide additional comments. The pilot study did not identify any changes to the interview protocol.

Interview Process. Each respondent was personally contacted by the researcher, who explained the purpose of the research effort and determined the appropriate people to interview within each program office. A literature package regarding pertinent facts about the weapon system was requested, as well as a time to conduct the interview. In addition, an advance letter of introduction signed by ASC's Acquisition Logistics Deputy Director (AL) was provided to each (Appendix B). The letter identified the purpose of the research and introduced the researcher. A copy of the interview protocol (Appendix C) was provided to each respondent prior to the interview to allow each respondent adequate time to prepare for the interview. This effort would expedite the interviewing process and concentrate on clarification of the responses.

Observational data allows the researcher an opportunity to visualize the program office structure and how logistics management interfaces with other management functions [47:30]. The value of observational data can assist the researcher in understanding program activities and can be a valuable tool to supplement the interviewing process [44:400, 47:124].

In order to reduce data gathering error, the researcher developed interviewing techniques by reviewing available literature and consulting experienced people. Training centered around the need to be consistent, to avoid bias, to refine style, to stress non-attribution, and to record data. The pre-interview techniques allowed the researcher to practice and improve the interview process.

A professional image was maintained to ensure the credibility of the project at hand and to lend credence to the time invested during the interview. The researcher asked the questions and annotated the responses as well as the behavior of the respondent. A tape recording device was used to enhance the note taking effort. The researcher obtained permission to use the device prior to the start of each interview. Transcribing the notes into paragraphs was accomplished immediately after the interview to ensure consistency and reduce bias.

At the beginning of each interview the respondent was told the information provided could be used to identify any acquisition logistics tasks performed and compare these requirements with the training template. The respondent was kept actively involved by the use of open-ended questions and was encouraged to elaborate on significant points.

The researcher probed certain areas to clarify responses in order to fully understand their meaning. Follow-up questions were used to allow the respondents an opportunity to elaborate on secondary issues not directly related to initial questions.

## Limitations

As with all research efforts specific limitations are identified. Two areas of concern revolve around environmental peculiarities and research bias.

Due to the extensive time required to design and produce a weapon system, integrated logistics managers who originally initiated the program may no longer be with the program office. Respondents being interviewed may not have first-hand knowledge of what transpired and must depend on historical documentation and lessons experienced during their tenure on the program. Second-hand knowledge may not be as reliable as first-hand experience and the research must take this into consideration.

Research bias is inevitable. Interview techniques may inadvertently influence respondents by tone, reaction, or phrasing of any follow-up questions. Bias can also be introduced during the data synopsis where paraphrasing or summarizing an answer may not have captured the full intent of the interviewee. Bias could also have been introduced as a result in the selection of the case studies. The researcher restricted the selection of case study candidates to a certain location, a certain acquisition category, and the recommendation of senior management within the acquisition logistics community.

## Summary

Today, emphasis is being placed on the research and development efforts used in defining concepts and tech.iologies. Acquisition logistics tasks have not been documented to ensure personnel have the knowledge to perform pre-Milestone I tasks. The multiple case research strategy was selected due to the exploratory nature of the effort. Six program offices were selected to obtain information in identifying what tasks are needed to perform acquisition logistics tasks and lessons learned unique to each weapon system. The interviewing technique was refined using literature review of historical data, pre-tests and a pilot study to identify any weaknesses and ensure content validity. Multiple sources of evidence were used to minimize bias and stress validity and reliability in the case study analyses. The researcher did apply certain limitations in the selection of the case studies. This selection criteria can result in research bias.

# IV. Analysis and Findings

## Introduction

A favorable decision at Milestone I establishes a new acquisition program and a program management office is formed. The logistics manager becomes a part of the program management team to oversee supportability issues. The roles and responsibilities of the acquisition logistics manager have been documented and even taught in educational institutions like the Air Force Institute of Technology and Defense Systems Management College (DSMC). The logistics process that transpire prior to a Milestone I decision is not as well defined. Very few acquisition logisticians have much experience in this phase. Logistics managers must have defined roles and responsibilities to effectively and efficiently support their project team. This research addressed whether acquisition logistics management specialists are adequately prepared to perform pre-Milestone I logistics planning and was divided into two categories. First, the researcher analyzed three specific areas: logistics considerations; training and education; and tools and aids in order to develop a logistics baseline. Second, six program management offices were reviewed to establish common logistics relationships.

## Analysis

This research effort is concerned with answering several investigative questions regarding how acquisition logistics management specialists are being prepared to perform pre-Milestone I activities. The logistics manager must be aware of what the pre-Milestone I process consists of and the logistics tasks required to support this phase. The first step in the analysis is to look at all the logistics considerations and establish a baseline of pre-Milestone I tasks. The second step is to identify training and education requirements necessary to perform those tasks. Finally, the third step is to

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review existing tools and aids to see· if they can be applied to the pre-Milestone planning and analysis efforts.

Logistics Considerations.

Defining a Logistics Baseline. A general comprehension of the overall acquisition system process is required to understand the importance of early planning and analysis. Department of Defense Directive 5000.2 is the key document governing policies and procedures for managing all defense acquisition programs. Specific guidance in implementing and managing Air Force acquisition programs was written using this directive and formed Aeronautical System Center's acquisition management approach. Thus, an abundance of documentation and literature, from the general guidance directed by the Department of Defense (DoD) to specific implementation procedures at the product centers, is available. A pre-Milestone I logistics task baseline was needed in order to compare common logistics relationships identified from the case studies. A literature review was conducted using DoD, Air Force and ASC documentation that resulted in the creation of a pre-Milestone I logistics baseline [20, 28, 50].

Department of Defense Instruction 5000.2 established an integrated framework for translating broadly stated mission needs into stable, affordable programs through a rigorous, event-oriented management process [20]. Competitive, parallel, short term studies are conducted and focus on defining and evaluating the feasibility of alternatives. The most promising concept(s) will be defined in terms of initial objectives for cost, schedule, and performance and overall acquisition strategy. Cost estimates, system engineering, logistics support analysis, and acquisition strategy were observable areas that required logistics consideration. These critical logistics tasks were established in Chapter 3.

Cost Estimates. Early life cycle cost estimates of the competing alternatives will be analyzed during this pre-Milestone I phase. This analysis, generally referred to as a Cost and Operational Effectiveness Analysis (COEA) will facilitate comparison of the alternative concepts. The COEA is intended to document acquisition decisions by providing the analytical rationale for decisions on a program. Accordingly, the analysis also provides a historical record of the alternatives considered. The COEA draws on several sub-analyses and includes efforts such as mission needs, the threat and United States capabilities, the interrelationship of systems, the contribution of multi-role systems, measures of effectiveness, costs, and cost-effectiveness comparisons. The COEA assists decision makers in judging whether or not any of the proposed alternatives offer sufficient military benefit to be worth the cost [20].

The logistics task supporting COEA efforts is part of life cycle costs estimating. Table 1 identified life cycle cost estimating under the logistics element of design interface.

System Engineering. System engineering is an iterative technical management process that integrates all technical disciplines including manufacturing, test, and logistics. Critical system characteristics and operational constraints are defined interactively with the users. These characteristics and constraints are identified early and specifically address cost, schedule, and performance trade-offs that include survivability, transportability, interoperability, standardization, and compatibility [20]. ASC can also provide system-level concept studies, sensitivity analysis, and a central repository for the storage of LSA data. This data base includes requirements and flow downs; interface constraints and configuration alternatives; verifications; decision criteria; trade study assessments; and logistic support and readiness requirements.

These technical processes are usually identified through the logistics support analysis using MIL-STD-1388. Logistics support analysis and its strategy are critical

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during this pre-Milestone I phase in providing technical plans, concept studies, and engineering analyses [28]. LSA is an integral part of the system engineering process, and its strategy is the process used to ensure supportability of any system. Proper use of the LSA process provides an effective method of including requirements, concepts, and design to reduce support burdens and increase readiness. New support technologies provide an opportunity to define innovative support concepts, but new system technologies bring with them new support problems and risks. Because there is no formal program recognized, formal integrated logistics support programs are not normally applied in the pre-concept phase. However, the need for the application of integrated logistics support principles is greater due to the opportunity to include requirements statements.

During the pre-concept phase the effort is to identify major support drivers and to initiate action to reduce or eliminate them. Issues impacting decisions usually involve major differences in manpower, materiel, operational availability, or other performance attributes.

The concept exploration/definition system level analyses are continued at an increased level of detail for a narrower set of options or alternatives. Trade-offs focus on adjusting system level requirements for total system performance that can be supported by the logistic system. Detailed analysis on elements such as supply, maintenance, and transportation are deferred although trade-off analyses are conducted on these elements. Supportability related risks are identified, and plans for reducing risk are included in the test and evaluation management plan. The concept exploration/definition phase will produce the initial integrated logistics support plan. At the end of this phase, integrated logistics support element resource requirements are finalized and made part of the system concept paper [52].

The logistics task supporting system engineering is logistics support analysis. Table 1 identified logistics support analysis under the logistics element of design interface.

Acquisition Strategy. The acquisition strategy will identify resource requirements; evaluate alternative support concepts and techniques to minimize cost and risks; and identify test articles required to conduct reliability, maintainability, and logistics supportability test and evaluation. Support considerations must be considered concurrently with system design to ensure the system will be supportable when fielded. The integrated logistics support efforts encompass the ten elements of logistics [20]. A list of these elements and their definitions are provided as Appendix A.

The development of alternative operational and support concepts and evaluation of their potential implications on support resources must be considered. Integration of integrated logistics support is achieved by:

1. Defining system use in quantitative terms that are related to system design and integrated logistics support elements,

2. Establishing a baseline comparative system and identifying support problems that were encountered with previous systems of a similar nature,

3. Establishing or selecting a trade-off tool or set of trade-off tools for performing consistent analysis, and

4. Establishing a consistent record of analyses conducted and the rationale for discussions [51].

The acquisition logistics manager should possess the technological skills to understand and support the outcome of life cycle cost and/or logistics support analysis and be able to apply the results to support concept issues. Key logistics elements

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utilized during the pre-Milestone I efforts are design interface, maintenance planning, manpower and personnel, and training.

The logistics tasks supporting acquisition strategy are included in maintenance concepts, manpower and personnel constraints and requirements, and training concepts. Table 1 identified these concepts under the logistics elements of maintenance planning, manpower and personnel, and training and training support, respectively.

Training and Education. The President's Blue Ribbon Commission study indicated that dramatic improvements in managing acquisition personnel at all levels within DoD were required [6:65-69]. Maximum effort is being taken to efficiently and effectively educate and train the defense acquisition work force. DoD Manual 5000.52M, Department of Defense Career Development Program, established mandatory and desired training courses for acquisition career paths [41]. Acquisition logistics is one of the thirteen career paths identified and consists of three certification levels. AFMC devotes substantial time and expense in preparing individuals for careers in acquisition.

The Human Resources Development office (HQ AFMC/DPU) is the focal point for education and training of all civilian and military personnel.

> Its primary objective is the preparation of the AFMC work force for current and future requirements and opportunities by planning, programming, budgeting, and executing training and education. [52:1]

One of the mechanisms for implementation is through a macro-process called Occupational Analysis and Template Development. In accordance with AFMC Regulation 50-4, Human Resources Development,

> Templates are developed through occupational analysis conducted with functional subject matter experts. A template is a comprehensive training management tool that documents the result of a systematic approach to training requirements development and analysis. [52:1]

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AFMC Template. Templates (AFMC Form 53, Occupational Template) identify training that supports specific job performance requirements at entry, intermediate, journeyman, and advanced levels and is the output product of an Occupational Review Team [19:3]. Occupational Review Teams use appropriate sources of data and documentation to identify job performance requirements and serve as the basis for template development. The template is used for training purposes only and not for promotion or classification actions. This research effort was concerned with the occupational title Acquisition Logistics Management Specialist (346 series). Appendix D contains AFMC's occupational template for the Acquisition Logistics Management Specialist.

Acquisition Logistics Management Specialist, GS-346 Series. This occupational template contains three levels of entry – entry, journeyman, and advanced. This research project was concerned with the training and educational requirements for the journeyman level of entry. The pre-Milestone I baseline formulated from government documents was compared to the training requirements identified in the acquisition logistics management specialist occupational template. The criteria set forth in Appendix D was compared to the outcome of the case studies and the results indicate those journeyman-level acquisition logistics managers performing pre-Milestone I activities should stress certain logistics elements. Table 2 correlates the specific pre-Milestone tasks from the template with the ILS element.

Tools and Aids. Many organizations develop tools and aids to expedite and assist an individual in accomplishing certain tasks. Government organizations are highly structured and require compliance with numerous directives and regulations. In order to maintain continuity, the DoD mandates the use of certain procedures and formats to prepare various documents, periodic status reports, and statutory certifications. These standardized formats were intended to ensure all critical

Information was included and to expedite the review process. This is especially common in areas where the task is a familiar undertaking and considered routine. Often an organization will develop in-house tools and aids to assist managers in accomplishing a task. These tools can be used in other organizations with little or no modifications.

**Table 2. Acquisition Logistics Management Specialist, Journeyman-Level**

| Performance Requirements (Pre-Milestone I) | ILS Element |
|---|---|
| Know analytical concepts to include probability, statistics, and modeling | Design Interface Maintenance Planning |
| Perform maintenance planning functions such as contractor or organic support | Design Interface Maintenance Planning |
| Perform support equipment acquisition functions such as analyzing support equipment requirements and assessing logistics impacts | Support Equipment Design Interface |
| Manage the acquisition of training support and training systems | Manpower and Personnel |
| Ability to apply design interface principles to influence weapon system design | Design Interface |
| Understanding of the manpower process used in weapon system acquisition | Manpower and Personnel |
| Ability to integrate the LSA/LSAR process within system engineering and the ILS process | Design Interface Maintenance Planning Training & Training Support |
| Ability to apply life cycle cost principles | Design Interface |
| Understand the principles of combat logistics support | Design Interface Maintenance Planning |
| Perform operational requirements determinations | Design Interface Maintenance Planning |
| Perform financial management functions such as making financial recommendations regarding supportability issues | Design Interface |
| Understanding depot maintenance and distribution functions | Maintenance Planning |

Acquisition Logistics Tools. The Acquisition Logistics Directorate within ASC has taken an initiative to identify unique tools and training aids from ASC staff officers, Air Logistics Centers, and other product centers and publish an index. This index was published as a quality initiative to improve awareness and access to tools and training available in the acquisition logistics community [53]. This index was used

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as a baseline for existing tools and aids and compared to the pre-Milestone I logistics baseline. Table 3 lists ASC acquisition logistics tools and training [53].

Table 3. Acquisition Logistics Toolbox and Index

| TRAINING | |
|---|---|
| AFMC Logistics Support Analysis (LSA) Course | Statement of Work (SOW) Seminar |
| Lessons Learned Functional Expert Training | Support Equipment (SE) Acquisition Course |
| Lessons Learned General Training | Support Equipment Acquisition Management System (SEAMS) Demonstration |
| Project Management Computer Supported Network Analysis System (CSNAS) Class | Technical Order Computer Based Training Lesson |
| **TOOLS** | |
| Acquisition Logistics Guide (ALG) | HIDRIVER |
| Acquisition Packaging Booklet | Infobase Production Group (IPG) |
| Air Force Acquisition Model (AFAM) | Interim Contractor Support (ICS) Implementation Manual |
| Air Force Integrated Logistics Support Plan (AF ILSP) Advisor | Logistics Composite Model (LCOM) |
| Air Force Office of Support Equipment Management (AFOSEM) Bulletin Board System (BBS) | Logistics Support Analysis (LSA) Guide |
| Air Force Warranty Cost/Benefit Analysis Handbook | Logistics Support Analysis (LSA) Primer, AFALCP 800-17, AFMCP 800-35 |
| Army Logistics Planning and Requirements Simplification System (LOGPARS) · | Manpower, Personnel and Training (MPR) Checklists |
| Automated CDRL and Tracking System (ACTS) | Network Repair Level Analysis (NRLA) Model |
| Automated Lessons Learned Capture and Retrieval System (ALLCARS) | Project Management Computer Supported Network Analysis System (CSNAS)Tool |
| Blue Two Visit (BTV) | SA-ALC Acquisition Workbook |
| Budget/Readiness Analysis Technique (BRAT) Model | Support Equipment Acquisition Guide |
| Combined Automated Lessons Learned (CALL) | Support Equipment Acquisition Management System (SEAMS) Data Base |
| Commercial-Off-The-Shelf (COTS) Book | Systems and Logistics Integration Capability/2A (SLIC/2A) |
| Computer Assisted Methodology for Data Element Selection | Systems and Logistics Integration Capability/2B (SLIC/2B) |
| Depot Maintenance Activation Tracking System - PC (DMATS-PC) | Technology Information Enabling System (TIES) |
| Contractor Logistics Support (CLS) Guide | Techtips Program |

Pre-Milestone I Tools. Logistics managers will focus on defining and evaluating the feasibility of alternative concepts and determine readiness and support resource requirements. The interview protocol contained a section requesting logistics managers identify what existing tools they use to support their program, what tools they would have used during the pre-Milestone I phase, and what additional tools they would like to have, if any. A consolidation of the case study responses is listed in Appendix E.

## Findings

Six ACAT 1D program management offices within Aeronautical Systems Center (ASC) located at Wright-Patterson Air Force Base OH were selected. In-depth personal interviews were conducted with senior-level logistics managers involved in decision making and implementation processes. Target group members were selected due to their positions and their inherent responsibilities for overall logistics within that program office. The data provided by these managers forms the basis in determining logistics relationships during the pre-Milestone I phase. A consolidated matrix of the case studies based on the interview protocol is contained in Appendix E.

Case 1: Multi-Role Fighter (MRF). Appendix F contains a detailed description of the interview including interviewee's qualifications, observations, and paraphrased responses.

*Program.* The MRF was a lightweight, high-performance, tactical fighter with air-to-air and air-to-surface multi-role capabilities. The main objective of this project was to develop a fighter that could be deployed from the continental United States to any trouble spot in the world with minimum en-route support. Design considerations included high reliability and simplified maintenance procedures to ensure successful operation under austere conditions. The MRF was considered the replacement for Lockheed's aging F-16 Fighting Falcon.

*Acquisition Phase.* The MRF project was canceled prior to a Milestone 0 decision.

*Logistics Considerations.* The primary logistics goals and objectives were to integrate system engineering and logistics into one single technical information data base through the implementation of LSA. There was a tendency among the engineering community to view LSA as a logistics function due to its title. During the pre-Milestone I phase of a project, very broad views and approaches were considered from a system perspective. The project team had a tendency to define specific design requirements when only a support concept was required.

MRF used an integrated product team approach. Team building efforts identified the MRF goals and objectives as well as individual roles and responsibilities. This improved external and internal communication included the customer, Air Combat Command (ACC), laboratories, and industry.

The integrated logistics support manager was tasked to reduce deployment and maintenance manpower requirements. Seven out of the ten logistics elements were emphasized -- maintenance planning; supply support; packaging, handling, storage, and transportation; manpower and personnel; support equipment; technical data; and design interface. The majority of the design interface effort emphasized reliability, maintainability, supportability, and availability analyses using the LSA process. The outcome of these analyses was to assist ACC in developing a mission needs statement.

The logistics manager would recommend pre-Milestone I training if logistics could be done over again. Logisticians have not been involved that early in a project. Knowledge of what to do and knowledge of problems encountered on other projects were limited. The logistics manager's lack of knowledge affected the capability to effectively support team goals and objectives. The interviewee was also limited to

hiring acquisition personnel from a surplus list with many individuals who did not have necessary expertise on the pre-Milestone I processes. *Generalists* were needed; those who knew how to integrate all the integrated logistics support elements.

*Training and Education.* The logistics manager did not consider acquisition logisticians adequately trained for pre-Milestone I activities. The logistician needs to know what the process consists of and what needs to be done logistically. Historically, logistics is considered after a Milestone I decision where earlier design decisions can adversely impact supportability. The logistics manager recommends more emphasis be placed on early acquisition efforts in continuing education and professional development classes provided by the Wright Patterson Campus and DSMC. There are some courses such as life cycle costing, LSA, and acquisition strategy available that would enhance a logistician's knowledge for this phase.

*Tools and Aids.* The logistics manager used a variety of tools such as the Automated Lessons Learned Capture and Retrieval System (ALLCARS), Acquisition Logistics Guide (ALG), and Logistics Composite Model (LCOM) to assist in identifying logistics requirements. The interviewee recommends a guide be developed for pre-Milestone I activities that identifies all the sub-elements within that phase. This guidebook would contain a list tailorable to a project's unique requirements similar to the LSA checklist.

*Others.* This interview was originally the pilot study for this research effort. A pilot study reinforces content validity and helps to familiarize the researcher with the topic, refine procedures, and develop additional questions, if necessary. The pilot study did not identify any changes to the interview protocol.

Case 2: B-2 Bomber. Appendix G contains a detailed description of the interview including interviewee's qualifications, observations, and paraphrased responses.

*Program.* The B-2 is a four-engine, low-observable strategic penetrating bomber designed specifically to elude enemy air defenses. This bomber can deliver nuclear or conventional weapons. The B-2 is initially intended to strike time-critical targets, then shift to sustained operations in concert with other theater bomber forces. The B-2 program has been directed to procure 20 intercontinental-range aircraft which will be located at one base, Whiteman AFB MO. The first aircraft was delivered 17 December 1993 [54:64].

*Acquisition Phase.* This program is in the Engineering, Manufacturing and Development (EMD) phase and is preparing for initial production.

*Logistics Considerations.* The primary logistics goals and objectives were improved reliability and maintainability. The program has since undergone two fundamental changes -- reduced aircraft quantities and changed system's role from a strategic to tactical deterrent. These changes resulted in additional support concept analyses and their impacts. The program management office had to reassess all support concepts such as deployment, avionics repairs, software support, trainers, engine support, and depot maintenance. A considerable amount of time and effort was dedicated to research and economic analyses.

The B-2 program has recently undergone a reorganization into integrated product teams (IPTs). Each IPT reports to the system program director through monthly program reviews. A logistician is placed on each IPT to ensure logistics concerns are addressed and resolved. External communications are maintained through bi-monthly Integrated Logistics Working Groups. The Capability Assessment Requirements Data (CARD) is a data base that identifies issues and ranks them by priority. The CARD data base is the tool the program office uses to make sure the right amount of resources and emphasis is placed on ACC priorities. Laboratory interface for developing technologies is strictly informal through the engineering community. The

Defense Technical Information Center (DTIC) system and the Scientific, Engineering, and Technical Assistance (SETA) contract are other sources the program management office has for obtaining technological information.

Integrated logistic support managers are held accountable for the acquisition of all support resources. They are also responsible for sustainment support for the air vehicle, support equipment, technical data, and supply support including the budgeting information. The specific integrated logistics support element emphasized during pre-Milestone I was design interface; for example, reliability and maintainability analyses through the LSA process. The B-2 has done extremely well with supportability. Unfortunately this was due to the slippage in the EMD schedule that allowed technical data, spare parts, and support equipment to be available prior to first aircraft delivery. The original B-2 schedule challenged the availability of logistics requirements. A lesson learned is to embed enough time into the program schedule to meet logistics requirements.

The B-2 logistics manager had access to the Logistics Support Management Information System (LSMIS) which is a classified central logistics data base containing LSA, support equipment, technical data, and supply support information. The B-2 has a unique provisioning system that does not interface with the standard Air Force provisioning system (D220) and this resulted in a faster provisioning process. Security concerns were inherent since the inception of the program and were considered the program's number one priority even above cost, schedule, and performance.

If logistics could be implemented over again, the logistics manager would recommend IPTs from the start. The team concept integrates all functional areas to produce better products, better communications, and better control.

*Training and Education.* The logistics manager considered acquisition logisticians adequately trained. He also stated that under the new Integrated Weapon

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System Management and IPT concepts, the logistician is expected to perform more like a program manager. Because of these role changes, he recommends more emphasis be placed on cost, schedule, and control of the weapon systems. As for pre-Milestone I activities, he feels the typical integrated logistics support manager is not well rounded enough to review alternative concepts, determine life cycle costs, implement logistics support analysis and develop an acquisition strategy.

*Tools and Aids.* The B-2 logistics managers have used the ALLCARS, AFAM, and a modified version of the Network Repair Level Analysis (NRLA) model to support logistics requirements. The logistics manager did recommend a decision tree analysis process be developed to assist in calculating various cost estimates for depot support concepts. His office had to generate their own methodology and tools to perform economic analyses. A generic, tailorable system would expedite turnaround times.

*Others.* The B-2 program was a highly classified program during its early phases. The interviewee did not know if there was even a Milestone I decision. If so, it certainly was not a formal one. The pre-Milestone I efforts occurred in the early 1980s. Individuals who participated in that effort are no longer working within the program office and any documentation would be considered classified.

The opinions of the interviewee were still considered in this case study based upon his past positions and experiences. The logistics manager has held senior-level management positions responsible for the overall support of the weapon systems. He has over 25 years of logistics experience with 15 years in the acquisition logistics arena. The interviewee has a Level III certification in Acquisition Logistics and Program Management. The logistics manager has never participated in any pre-Milestone I efforts.

<u>Case 3: Joint Primary Aircraft Training System (JPATS)</u>. Appendix H contains a detailed description of the interview including interviewee's qualifications, observations, and paraphrased responses.

*Program.* The JPATS program was to acquire a missionized, non-developmental aircraft and associated ground-based components to replace the Air Force's T-37B and Navy's T-34C trainer systems [54:65]. Missionization refers to the concept where a non-developmental item is customized to fulfill specific user's requirements such as ejection seats and bird strike canopy. The commercial version would not have these features available and modifications would be required.

*Acquisition Phase.* The program is currently finalizing the acquisition strategy and preparing a request for proposal to enter into the production. A non-developmental item or commercial off-the-shelf program does not go through the typical acquisition phases. Non-developmental items go through an acquisition strategy phase (equivalent to the first four phases of the acquisition cycle) and then into production and deployment. For the purpose of the interview, pre-Milestone I efforts were comparable to the first four phases of the acquisition process.

*Logistics Considerations.* The primary logistics goals and objectives were to establish a support maintenance concept and determine the logistics impacts using the best commercial practices. The logistics manager had to determine the feasibility of full or partial contractor logistics support based on market analyses and cost comparison studies. The logistics manager lacked experience or training in managing a non-developmental item or commercial off-the-shelf acquisition. This determination was further complicated by the different Air Force and Navy approaches to maintenance. The Air Force's maintenance concept is typical full organic support whereas the Navy's concept is full contractor logistics support. The original acquisition direction was changed midstream when JPATS was selected to become a pilot

program for new acquisition streamlining efforts. The logistics manager had to look at the support concepts again and consider the impacts of streamlining.

The integrated product team concept was used to establish a solid, dedicated, and knowledgeable team. External and internal communication channels were maintained with the user and air logistics center using periodic mid and senior level working groups. JPATS is considered a low technology aircraft, but the latest state-of-the-art technologies in human factors engineering were stressed to laboratories and industry.

The integrated logistics support manager was tasked to review commercial business practices, analyze their suitability to the government, and identify the associated risks. The logistics manager was also expected to develop maintenance and support concepts, to conduct the studies to determine the best approach, and to analyze the results and provide a recommendation. Five out of ten logistics elements were emphasized -- maintenance planning, technical data, supply support, facilities, and support equipment. The acquisition streamlining effort allowed waivers to various military standards and specifications for commercial practices. The requirement for LSA was not incorporated into the request for proposal but offered as guidance.

If the logistics manager could do logistics over again, more up-front emphasis in commercial practices and cost studies would be recommended. The interviewee would also like to see more experienced personnel in non-developmental item and commercial off-the-shelf acquisitions.

*Training and Education.* The logistics manager thought the key activities involved in the pre-Milestone I phase was implementing LSA, conducting life cycle cost estimates, and developing acquisition strategies The logistics manager considers acquisition logisticians adequately trained, but they need to be better prepared in contractor logistics support efforts.

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*Tools and Aids.* In the course of identifying JPATS logistics requirements, the logistics manager used Air Force lessons learned, Integrated Logistics Support Plan Advisor, and Computer Assisted Methodology for Data Element Selection. He also used the Contractor Logistics Support Guide and the Commercial Off-The-Shelf Book. He suggested an additional tool or aid be developed for non-developmental items.

*Others.* Non-developmental items and commercial off-the-shelf programs do not go through the typical acquisition phases. Development activities are limited since the aircraft is already in commercial production. Only missionization requirements need to be investigated. Acquisition efforts start with a release of the request for proposal identifying program requirements. Once a source selection decision is made, the program begins production.

This program has also been selected as a pilot study on acquisition streamlining efforts. The senior management oversight is quite extensive especially where new procedures and practices are being implemented. The JPATS program office is experiencing *growing pains* as managers try to interpret what the new boundaries are.

Case 4: F-22 Advanced Tactical Fighter. Appendix I contains a detailed description of the interview including interviewee's qualifications, observations, and paraphrased responses.

*Program.* The F-22 is the Air Force's next-generation air-superiority fighter. Flight testing of the engineering, manufacturing, and development aircraft will begin in 1996 with operational service beginning in 2003. The F-22 includes advanced propulsion, flight and fire controls, significant avionics integration, advanced system survivability features, designed supportability characteristics, low-observable technologies, superior subsonic/supersonic maneuverability, supersonic persistence

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without use of afterburners, and greatly increased combat radius. The F-22 aircraft is powered by two advanced technology fighter engines [55:64].

*Acquisition Phase.* The program is currently in the Engineering, Manufacturing, and Development (EMD) phase.

*Logistics Considerations.* The F-22 is considered the premier world class fighter. The logistics goals and objectives were phenomenal improvements in reliability and maintainability by using life cycle costing analysis extensively. Fiscal constraints and baseline requirements identified by the users have resulted in changes to these original objectives. The advanced technologies incorporated on the aircraft have high risks associated with them. There have been massive changes in the logistics arena such as two-level maintenance, *purple suit* maintainers, and contractual constraints.

The F-22 program management office is organized into integrated product teams. The problem with these IPTs was each team functioned as a mini-system program office -- focusing on their individual missions and goals but sometimes losing sight of the program office's overall mission. No centralized logistics existed so the F-22 Logistics Division (YFL) was assigned the responsibility of integrating all logistics tasks. Communication is maintained by weekly meetings. External requirements are identified through formal documentation such as memorandums of agreement or program management directives. Research laboratory personnel are physically located within the program office to ensure latest technologies are considered. Other sources of technological information are obtained through trade and marketing studies, professional conferences, and the technology transfer office.

The logistics manager is expected to identify and resolve logistics problems and project any deficiencies in technical support issues. Again, the IPT structure is key to the success of the program office even with the problems encountered. This structure

is not limited to members in the program office but encompasses the contractors -- one team concept. The F-22 program office has invested money in procuring highly sophisticated video-conferencing equipment to maintain communications with all the team members.

If the logistics manager could implement logistics all over again, more production requirements in the EMD phase would be introduced. The F-22 program office has more integration of support requirements than any other and yet more long lead depot planning is still required.

A logistics process improvement that proved effective on the F-22 program is a paperless acquisition process. In a typical program management office, the contractor will deliver documents to the government for review and approval. The F-22 program promotes the paperless acquisition process. A paperless acquisition process involves computer access to programmatic data and on-line approval. This program relies heavily on a complex management information system that can communicate with the contractor, user, air logistics center, and ASC. The F-22 program office is in the process of implementing an integrated data base for all information generated by the program management office.

*Training and Education.* The logistics manager stated that acquisition logisticians are adequately trained and Acquisition Professional Development Program certification is actively being pursued. The F-22 has a very low turnover rate due to its premier status. Individuals are considered highly skilled and possess the abilities to perform their jobs. Training deficiencies are identified using the AFMC template as a guide. The logistics manager perceives that logistics training requirements are not available through existing courses. Individual courses on specific areas of concern are available but not get general requirements -- *integrators* or *generalists* are needed instead of specialists. As for pre-Milestone I requirements, the logistics manager

believes life cycle costing is minimally required, but operations research analysis is not because ASC has a plans and program office for new project efforts (ASC/XR).

*Tools and Aids.* The logistics office personnel have used CSNAS, LCOM, AFAM, NRLA, ALG and some Air Force lessons learned as tools to assist individuals in accomplishing their jobs. Creating an integrated management support and schedule plan was suggested as further improvements. The new program management offices need to incorporate management information systems. Implementing an integrated weapon system data base from the inception of the program would maintain sustainment by having a central location for historical and current information.

*Others.* The logistics manager has been recently assigned to the F-22 program management office. She has been in her current position for approximately five weeks and did not know what transpired prior the Milestone I decision.

The opinions of the interviewee were still considered in this case study based upon her past positions and experiences. The interviewee has held senior-level management supervisor positions and was responsible for the overall support major weapon systems within the Air Force. The logistics manager has over 17 years of logistics experience all of which were spent in the acquisition logistics arena. The interviewee has a Level III certification level in Acquisition Logistics and Program Management, a Level I certification in Financial Management, and is a Certified Professional Logistician with the Society of Logistics Engineers. The interviewee has personally had hands-on experience in all the acquisition phases and has held several positions within the Acquisition Logistics Directorate. The logistics manager is knowledgeable, highly respected, and often invited to participate in Air Force studies.

Case 5: Tri-Service Standoff Attack Missile (TSSAM). Appendix J contains a detailed description of the interview including interviewee's qualifications, observations, and paraphrased responses.

*Program.* This TSSAM program is to produce a low-observable, conventional, stand-off cruise missile capable of air and ground launch employments. The missile is designed for use by the Air Force's B-52, B-1, B-2, and F-16 weapons platforms, as well as the Navy's A-6 and F/A-18, and Army's Multiple-Launch Rocket Systems [54:66].

*Acquisition Phase.* This program is in the Engineering and Manufacturing Development phase of the acquisition cycle. Efforts are also underway to initiate contract efforts for the Production and Deployment phase.

*Logistics Considerations.* The primary logistics goals and objectives during pre-Milestone I are unavailable due to their high classification. The logistics manager's comments were still considered pertinent because of the philosophy behind the case study methodology. The case study is an exploratory situation to gain better understanding and uses analytic generalizations. The outcome of what the logistics manager perceived had occurred on the program could prove valuable in determining generalizations. Current program status is often the results of earlier planning efforts. Even though the goals and objectives were not known, a relationship could possibly determined. The program is coming out of the *black* status which has resulted in better communications between TSSAM team members. The implementation of IPTs has improved integration and eliminated service in-fighting. Originally, people would work in a vacuum handling their specific section and sharing information only when there was a need to know; the segmentation of the office structure locked out cross-flow of information. Other areas of concern are the tri-service requirements and the different

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missions and priorities this creates. In addition, no integrated logistics support plan was ever generated identifying the overall mission and objectives.

Internal and external communications are primarily achieved through ILS management teams, classified correspondence, and numerous TDY trips. Laboratory research efforts are identified through other *black* program technologies.

The logistics manager is responsible for identification of logistics needs and writing the appropriate contracting language for logistics requirements. The interviewee was also held responsible for impacts to reduced requirements and their funding status. The logistics manager is also responsible for identifying supportability impacts when quantities are reduced and program funds are decreased. The integrated logistics elements utilized most were design interface, facilities, and computer resources.

Implementing IPTs from the initiation of the program would be one effort the logistics manager would do if given another opportunity. The integration that resulted from the IPT structure identified a need for an integrated logistics support plan that included all the tri-service support concepts. The Air Force, Army, and Navy user's requirements needed to be identified earlier and LSA taskings should have been contractually deliverable. A lessons learned from the early effort in *cross-talk* is needed in order for logistics to be a success.

*Training and Education.* The logistics manager believes the logisticians within the TSSAM program management office are highly trained individuals. The interviewee also believes individuals should have experience in all logistics elements -- breadth of program office experience versus a specialist in one or two elements.

*Tools and Aids.* Existing tools that were used to assist logisticians in this program office were CSNAS, Air Force lessons learned, LCOM, and NRLA. The logistics manager would like to know what other commercially available tools and aids are available for possible application to the TSSAM program. He knows of no central

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source a logistics manager could access that would identify commercial and government tools.

*Others.* TSSAM's pre-Milestone I documentation was limited due to its high classification rating. The opinions of the interviewee were still considered in this case study based upon his past positions and experiences The interviewee was a senior-level management supervisor responsible for the integration and readiness support of the TSSAM program and has held other positions with similar responsibilities. The logistics manager has over 14 years of logistics experience with all of them experienced in the acquisition logistics arena. The interviewee also had a Level III certification level in Acquisition Logistics and Program Management. The interviewee had participated in a pre-Milestone I effort.

Case 6: Non-Developmental Airlift Aircraft (NDAA). Appendix K contains a detailed description of the interview including interviewee's qualifications, observations, and paraphrased responses.

*Program.* The NDAA is a non-development airlifter to augment C-5, C-141, and C-130 fleet. This aircraft will be used for rapid deployment of Army and other units directly overseas, including airlift of outsize cargo over inter- and intratheater airfields.

*Acquisition Phase:* The program is currently initiating the acquisition strategy and preparing a request for proposal to enter into the production. A non-developmental item or commercial off-the-shelf program does not go through the typical acquisition phases. NDAA is through an acquisition strategy phase (equivalent to the first four phases of the acquisition cycle) and then directly into production and deployment. For the purpose of the interview, pre-Milestone I efforts were comparable to the first four phases of the acquisition process.

*Logistics Considerations.* The logistics goals and objectives of the NDAA program include defining a maintenance concept using commercial practices and fully considering user's requirements. The program has received a lot of Congressional interest causing the logistics manager considerable concern. There are negative misconceptions regarding this non-developmental program and the logistics manager is constantly taking action to refute them.

The logistics manager is in the process of identifying logistics requirements for the request for proposal. Since this is a non-developmental program there are no new technologies being pursued other than those that the contractor developed for commercial applications through market analysis.

The program management office expects the logistics manager to support development requirements, such as organic versus contractor logistics support. The logistics manager has applied six out of ten logistics elements to support the request for proposal process. These elements include maintenance planning, supply support, facilities, technical data, support equipment, and training.

*Training and Education.* All logisticians with the NDAA program are considered *generalists* and are considered adequately trained in acquisition logistics. An area that requires more emphasis is how to implement unique military requirements on commercial off-the-shelf acquisitions. Additional direction in complying with acquisition streamlining directives would also be helpful. Adequate training is available from existing courses. Logistics managers involved in pre-Milestone I activities should have training in acquisition strategy and life cycle costing. These specific training requirements are available through professional development courses. The interviewee also stated that a generalist is recommended for pre-Milestone I efforts. A logistics manager does not need the depth but breadth in acquisition logistics.

*Tools and Aids.* The logistics manager has used Air Force lessons learned, ALG and AFAM to assist in determining NDAA's support concept and acquisition strategy. The interviewee recommends an acquisition streamlining package be developed to assist logistics managers involved in non-developmental programs. This package would be a guide to help the manager comply with or waive regulations and statutory laws.

*Others.* The NDAA is a non-developmental aircraft in competition with the C-17 program and was designated an ACAT 1D program as of the January 1994. The C-17 program is experiencing cost and schedule overruns. The program has a considerable amount of OSD and Congressional oversight to monitor program status. If the program proves to be too costly to continue or aircraft quantities are decreased, the NDAA is a potential candidate to provide the DoD additional airlift capabilities. Like the JPATS program, non-developmental items and commercial off-the-shelf programs do not go through the typical acquisition phases. The release of a request for proposal identifying program requirements correlates to a Milestone I decision. Once a source selection decision is made the program goes directly into production. This program has also been selected as a candidate to implement acquisition streamlining efforts. Congressional oversight is extensive because streamlining procedures and practices have not been defined. The NDAA logistics manager is currently defining the acquisition strategy.

## Summary

Very few acquisition logisticians have experienced the pre-Milestone I phase and logistics tasks are not well defined. In order to effectively and efficiently support the program management office, logistics managers must have defined roles and responsibilities. The logistics manager must be aware of what the process involves and

.the tasks required to complete it. This research addressed whether acquisition logistics management specialists were adequately prepared to perform pre-Milestone I logistics planning. First the researcher analyzed available literature and then determined a common logistics relationship. The analysis portion consisted of a literature review used to identify a pre-Milestone I logistics baseline. This baseline was used to determine logistics tasks, training and education requirements, and available tools and aids to assist the acquisition logistics manager. The findings from the six case studies determined common logistics relationships among ASC program management offices. The results from the analysis and findings were used to answer the investigative questions. Chapter V provides conclusions of this study and recommends further studies and research efforts.

# V. Conclusions and Recommendations

## Introduction

This research effort had three objectives. The first objective was to define the logistics tasks required for pre-Milestone I. The second objective was to see if there was adequate training available to do those tasks. Finally, the researcher looked at existing tools and aids to see if they were applicable to support pre-Milestone I activities. This first section of this chapter addresses conclusions based on the outcome of the case study research. The second section provides recommendations for improvement or future research.

## Conclusions

Conclusions of the analysis and findings were approached by examining each problem statement identified in Chapter 1. The appendices provide additional information obtained from the interviews. The conclusions are based on the case study analyses.

### Problem Statement 1

Use the pre-Milestone I process to identify specific logistics tasks required for journeyman-level acquisition logistics management specialists.

A qualitative research approach was selected due to the contemporary nature of the problem -- how are acquisition logistics managers being prepared to perform pre-Milestone I planning and analysis efforts? The qualitative approach allowed the researcher the flexibility to answer the problem in the depth and detail necessary without being constrained by predetermined categories. Senior-level logistics managers were interviewed from six program management offices to identify critical logistics tasks required on their programs. The results of the interview protocol were consolidated and common links in logistics relationships across all the programs were

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formulated.    A literature review on defense acquisition policy was conducted to determine a logistics baseline for pre-Milestone I activities.    The baseline was compared to the consolidated case study results (Table 4).  The following conclusions were determined:

1. The logistics baseline tasks for pre-Milestone I efforts are similar to tasks performed by logistics managers whose programs are in a later acquisition phase.    Pre-Milestone I efforts are not unique to early planning efforts; the only difference is in the amount of detail.   Early programs deal with broadly stated requirements.   Air Force managers want to look at all options prior to making any commitments.   Approved acquisition programs may have a design, but they are constantly going through changes.  The DoD is facing great challenges -- a decreased defense budget, changing world political systems, and an unpredictable economy that has resulted in the Office of the Secretary of Defense (OSD) and Congressional redirection.  Assumptions, criteria, and constraints used to determine life cycle costing estimates are being compromised.  Logistics managers conduct numerous sensitivity analyses to determine what impacts the redirection will have on the supportability of the weapon system.

2. LSA and its strategy is the process used to ensure supportability of a weapon system.  LSA is the vehicle the logistics manager uses to obtain trade studies and reliability, maintainability, and supportability analyses from the contractor.  This is not really significant since OSD mandated LSA be applied to all weapon system procurements in the 1980s.  What is significant is an increase in Non-Development Items (NDI) and Commercial Off-The-Shelf (COTS) procurements.  Two out of the six programs were NDI or COTS.   The NDI and COTS programs usually obtain supportability through partial or full contractor logistics support (CLS).    Parts,

**Table 4. Comparative Analysis**

| Logistics Baseline | Case Study Results |
|---|---|
| <u>Cost Estimates</u><br>• Cost & Operational Effectiveness Analysis<br>   ✓ Identify alternative support concepts and still meet users requirements.<br>   ✓ Perform *what if* analysis to identify potential impacts.<br>   ✓ Identify critical logistics variables, assumptions, and/or constraints that are sensitive to changes.<br><br><u>Systems Engineering</u><br>• Identify and integrate technical logistics disciplines into the systems engineering process.<br>• LSA is an integral part of systems engineering and ensures supportability.<br>   ✓ Initiate plans, studies, and analyses to determine supportability requirements.<br>   ✓ Identify support requirements and support drivers.<br>   ✓ Ensure a central data base is available for logistics requirements, interface constraints, alternatives, criteria, and assessments.<br><br><u>Acquisition Strategy</u><br>• Identify logistics resource requirements; minimize support costs and risks.<br>• Ensure logistics support considerations are considered concurrently with design engineering.<br>• Identify the overall strategy in how to manage and track logistics.<br>• Consider all integrated logistics support elements when developing the acquisition strategy.<br>   ✓ Design Interface<br>   ✓ Maintenance Planning<br>   ✓ Manpower and Personnel<br>   ✓ Training | • Life cycle cost estimates were conducted on all programs to identify total logistics expenses associated with a particular weapon system.<br>• Sensitivity analyses were performed regarding impacts to OSD-directed program changes.<br><br>• Implemented LSA or its commercial equivalent on all programs.<br>• Initiated trade studies from contractors to obtain additional technological information.<br>• Ensured reliability, maintainability, supportability, and availability by conducting analyses from available Operations & Support data.<br><br><br>• Identify all support requirements based on formal documentation and direction.<br>   ✓ Mission Needs Statement<br>   ✓ Operational Requirements Document<br>   ✓ Program Management Directive<br>• Ensure logistics support considerations are integrated throughout the whole program.<br>   ✓ Integrated Product Teams<br>   ✓ ILS Management Team Meetings<br>   ✓ Management Information Systems<br>• Propose viable acquisition strategies based on user's requirements.<br>   ✓ Acquisition Streamlining<br>   ✓ Integrated Weapon System Management<br>   ✓ Contractor Logistics Support<br>• Identify key ILS elements:<br>   ✓ Maintenance Planning<br>   ✓ Design Interface<br>   ✓ Facilities<br>   ✓ Support Equipment<br>   ✓ Manpower and Personnel<br>   ✓ Technical Data<br>   ✓ Supply Support |

support equipment, commercial manuals, and training already available and available. NDI and COTS programs waive unnecessary military requirements. The LSA standard, MIL-STD-1388, is now used as a guide for contractors to follow for NDI and COTS programs. The contractor is given the flexibility to determine what logistics data will be collected. In most cases, the contractor already has an existing data based and can submit logistics data using the existing system and format. The rationale behind this seemingly drastic change is the data already exists. Why would the logistics center want provisioning data, support equipment information, technical orders, and other traditional logistics data if the items will be procured commercially? The purpose of LSA is to influence the design and ensure a supportable system. NDI and COTS already have the design determined. Decreasing mandatory military regulations and standards is one of the goals behind the acquisition streamlining concept.

3. Regardless of the acquisition phase, the logistics manager must work closely with the customer. The support concept is based on user requirements identified in formal documentation such as the Mission Needs Statement, Operational Requirements Document, and/or Program Management Directive. Many of the lessons learned and impediments experienced by the logistics managers deal with unclear or undefined support requirements. Good communication needs to be maintained with the user. Integrated Product Teams (IPTs) developed under the Integrated Weapon System Management (IWSM) concept improved coordination and integration among all the team players. IPTs had cross functional representation and the subsystem product was emphasized to achieve an effective total systems approach. Each IPT would have a logistician available to ensure supportability concerns were considered. IPTs work towards a common goal of providing the user a quality, highly reliable weapon system. The negative side of IPTs is the team would have a tendency to work towards the subsystem product instead of the total system goals. Logistics managers still need to

integrate all the IPTs to ensure system supportability is achieved. The F-22 program management office has a very sophisticated management information system that allows audio, video, and electronic communication and tracking systems. The other program offices do not have the this luxury of possessing latest state-of-the-art management systems and this limits the capability to process and share information.

4. All Integrated Logistics Support (ILS) elements need to be considered. The pre-Milestone I efforts concentrate on the design interface and maintenance planning elements. The majority of the effort is looking at identifying support drivers. Issues that impact support decisions usually involved manpower, materiel, training, and operational availability. The results from these case studies emphasize the same logistics elements but expand into other areas such as facilities, support equipment, technical data and supply support to field an actual weapon system.

In summary, the logistics baseline and outcome of the case studies have indicated that the logistics tasks in the pre-Milestone I phase are the same as in any other acquisition phase. The difference is in the level of detail. A pre-Milestone I logistics manager will deal with paper concepts and life cycle costing estimates. The only physical product that will be produced is a list of alternative support concepts based on user requirements. As a program moves into production, the logistics manager must concentrate on the details involving all the ILS elements. Overall, a *generalist*, a logistics manager who has experience in all the ILS elements is recommended for pre-Milestone I efforts.

Problem Statement 2

Determine if acquisition logistics management specialists have sufficient training necessary to perform pre-Milestone I logistics planning.

Results from the interviews have indicated that senior-level logistics managers do consider their acquisition logisticians highly trained. There will always be those

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occurrences when new concepts are introduced and no experience or lessons learned are available to assist logisticians. Examples of such situations were the introduction of IWSM, acquisition streamlining, and COTS concepts. IWSM required individuals become knowledgeable in team building procedures. AFMC has expended considerable amounts of money to develop these skills. The AFMC Acquisition Logistics Management Specialist template requires all journeyman-level individuals attend facilitator training and total quality management classes.

Senior logistics managers are stressing all logisticians meet Acquisition Professional Development Program (APDP) requirements for acquisition logistics. APDP standards emphasize the minimal criteria to meet different levels of acquisition professionalism. AFMC is maximizing efforts to efficiently and effectively improve the defense acquisition work force by providing the necessary training and education courses. APDP acquisition logistics requirements mandate a logistician acquire a variety of logistics expertise that covers all ten ILS areas. The result would be a well-rounded logistician. A senior logistics manager would rather have an individual who had experience managing all the ILS elements versus the individual who is an expert in provisioning or technical data only.

Life cycle cost estimates were used in all six case studies. In all incidents, the logistics manager depended upon the Acquisition Logistics Directorate, ASC/AL, to provide the expertise to perform the analysis. Cost estimating was considered critical but was not considered a full-time effort. The logistics manager wanted a generalist who understood the process and could explain the results instead of an individual who manipulated cost models and computed cost figures. If life cycle cost expertise was required, the senior manager would go to ASC/AL and request support on an as needed basis.

Overall, the majority of the senior logistics managers agree there is adequate training available within ASC. ASC is fortunate to have the Air Force Institute of Technology located on the same base, with professional training classes readily available. An individual can obtain specific training in all the ILS elements. The AFMC template indicated the journeyman-level logistician understands the defense systems acquisition process. The logistician needs to understand what the defense acquisition process is before logistics activities within that process can be identified. Most of the interviewees believed there was adequate training available to cover pre-Milestone I requirements. All elements need consideration.

In summary, senior-level management believes most acquisition logisticians are highly trained individuals, especially since the implementation of APDP certification requirements. Adequate training is available within ASC to cover not only pre-Milestone I requirements but all other phases of the acquisition process.

## Problem Statement 3

Identify or recommend tools and aids to assist the logistics manager.

ASC/AL has developed a catalog of available training and tools to assist the acquisition logistician. This research effort indicate that several of these tools are consistently used to support logistics efforts. The most frequently used tools were the Air Force Lessons Learned, Logistics Composite Model, Acquisition Logistics Guide, and Air Force Acquisition Model (AFAM). Most of these tools are applied after a program decision is reached. Air Force lessons learned and the AFAM are potential sources of information for pre-Milestone I efforts. The AFAM program office releases updates every 90 days to make sure the information reflects current business practices and the most recent corporate knowledge. According to Colonel Mike Ferrell, Director

of Acquisition Modeling at ASC, "Ultimately, the model will truly reflect our product management and sustainment business" [55:18].

There were several recommendations for developing additional tools. One manager would like to see an acquisition guide that defines the phases of the process and subdivides the phases into sub-tasks. These sub-tasks would define specific efforts and the office of responsibility. The guide's format could be similar to the LSA Guide. Acquisition streamlining is a new concept that Office of the Secretary of Defense is stressing. A pamphlet or guide documenting the procedures involved to waive regulations and statutory law was recommended. Finally, the F-22 program management office is taking steps to develop an integrated weapon system data base. All management information would be accessible through one source ensuring sustainment of historical records.

In summary, the existing tools have some limited application to the pre-Milestone I phase, but additional tools could further enhance acquisition logisticians' capabilities.

## Recommendations

Based on the analysis and findings outlined in Chapter IV and the appendices, several recommendations are posed by the researcher. The recommendations are divided into two categories. First, the researcher recommends specific ways to implement the findings, and second, several possibilities are recommended for future research.

### Recommendations for Implementation

This research effort has identified several areas of concern regarding the pre-Milestone I process.

1. The acquisition logistician should be a generalist rather than being a specialist in one or two ILS elements. One of the ways to achieve generalist abilities is to rotate individuals from one program management office to another. A rotational program with other customer positions would also enhance an individual's generalist experience, for example rotating an acquisition logistician to the air logistics center or operating command. ASC has several program management offices called *Basket SPOs* where the logistics manager performs all ILS elements. Assignments within *Basket SPOs* would be another good source to train individuals in becoming *generalists*.

2. The IWSM concept promotes team concepts; every team needs to interface to meet total weapon system goals. A sophisticated management information system would be invaluable in improving coordination and integration efforts within a program management office. A centralized program data base containing all technical and programmatic information would enhance the IPTs. The repository would ensure sustainment of historical and current information in making program decisions. The computer age has arrived. New projects should implement a weapon system data base repository to ensure sustainment of programmatic information as the project progresses through the defense acquisition cycle.

3. Additional tools to assist the logistics manager are also recommended especially in areas where the concept is considered relatively new. Some suggestions are developing a checklist or guide identifying the different phases and milestones. Within each phase, sub-tasks would be identified designating what needs to be done during that time frame. The checklist should be tailorable to allow the logistics manager the flexibility to apply unique program requirements. The pre-Milestone I effort, contractor logistics support, NDI and COTS, and acquisition streamlining are all candidates and require process improvements.

## Recommendations for Future Research

This research effort has identified some areas requiring future research. Research needs to be conducted in the acquisition of NDI and COTS products. Lessons learned on NDI/COTS are minimal yet more emphasis is being placed in this area. The logistics implications of using commercial versus military practices need to be identified. How are missionization requirements implemented? What kind of restrictions apply if missionization is used? These are questions that need to be answered.

Acquisition streamlining is another area of future research. Vice President Gore is pursing efforts to streamline the defense acquisition process. OSD and Congress have identified several programs as candidates for implementing this acquisition streamlining concept. What does acquisition streamlining encompass? What regulatory requirements should be waived? How do you implement waivers of regulatory and statutory requirements? What are the logistics impacts? What were the lessons learned from the pilot programs? The outcome of research to answer these questions may assist other acquisition logisticians on managing this new concept.

## Summary

A qualitative research approach was selected due to the contemporary nature of the problem. This chapter provides the conclusions and recommendations based upon the outcome of six case studies. The research was concerned with whether the logistics manager was aware of what the pre-Milestone I process consisted of and the logistics tasks involved, what training was required to fulfill those tasks, and what existing tools could assist the individual during this acquisition phase.

A literature research on defense acquisition policy was conducted to develop a logistics baseline for pre-Milestone I activities. The logistics baseline and outcome of

the case studies have indicated that the tasks are the same as any other acquisition phase; the difference is in the level of detail. During pre-Milestone I, the logistics manager must deal with competitive, parallel, short-term studies that focus on defining and evaluating the feasibility of alternative concepts. The logistics manager must overcome the paradigm that a design already exists. The outcome will be a recommendation of potential alternatives--paper concepts. User participation is also needed. The user must be made aware of the potential impacts on the user's future role in maintaining viable air vehicles by actively participating in the entire acquisition process. ASC acquisition logistics management specialists can perform pre-Milestone I activities, but the individual needs to be a generalist. A generalist is a logistics manager who has experience in all the ILS elements. The broad nature of the pre-Milestone I activities require a breadth of knowledge not the depth in a certain element.

True professionalism results from proper levels of training, education, and experience. Proper development of the professional occurs when there is a systematic and managed combination of training, education, and experience. Senior-level managers are pursuing APDP certification requirements among qualified logisticians to maintain a professional work force. Overall, senior-level management considered ASC acquisition logistics management specialists highly trained. AFMC had developed an occupational template defining acquisition logistics training requirements. Many of the courses such as maintenance planning, design interface, life cycle cost, and logistics support analysis can prepare the logistics manager for pre-Milestone I activities.

Several tools are available from the Acquisition Logistics Directorate to assist the logistics manager but have limited application to the pre-Milestone I activities. Additional tools are recommended where concepts are not as defined.

Recommendations for implementation and future research were also provided.

## Appendix A: Integrated Logistics Support Elements

The integrated logistics support effort consists of ten elements. Each of these ten elements address both hardware and software in both peacetime and wartime conditions. The following definitions come from Department of Defense Instruction 5000.2, Part 7, Section A, Attachment 1 [20].

*Maintenance Planning.* The process conducted to evolve and establish maintenance concepts and requirements for the lifetime of the system.

*Manpower and Personnel.* The identification and acquisition of military and civilian personnel with the skills and grades required to operate and support the system over its lifetime at peacetime and wartime rates.

*Supply Support.* All management actions, procedures, and techniques used to determine requirements to acquire, catalog, receive, store, transfer, issue, and dispose of secondary items. This includes provisioning for both initial support and replenishment supply support. It includes the acquisition of logistics support and test equipment.

*Support Equipment.* All equipment (mobile or fixed) required to support the operation and maintenance of the system. This includes associated multi-use end items, ground handling and maintenance equipment, tools, metrology and calibration equipment, test equipment, and automatic test equipment.

*Technical Data.* Scientific or technical information recorded in any form or medium (such as manuals and drawings). Computer programs and related software are not technical data; documentation of computer programs and related software are. Also excluded are financial data or other information related to contract administration.

*Training and Training Support.* The processes, procedures, techniques, training devices, and equipment used to train civilian and active duty and reserve military personnel to operate and support the system. This includes individual and crew training (both initial and continuation); new equipment training; initial, formal, and on-the-job training; and logistics support planning for training equipment and training device acquisitions and installations.

*Computer Resources Support.* The facilities, hardware, system software, software development and support tools, documentation, and people needed to operate and support embedded computer systems.

*Facilities.* The permanent, semi-permanent, or temporary real property assets required to support the system, including conducting studies to define facilities or facility improvements, locations, space needs, utilities, environmental requirements, real estate requirements, and equipment.

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*Packaging, Handling, Storage, and Transportation.* The resources, processes, procedures, design considerations, and methods to ensure that all system, equipment, and support items are preserved, packaged, handled, and transported properly, including environmental considerations, equipment preservation requirements for short and long term storage, and transportability.

*Design Interface.* The relationship of logistics related design parameters to readiness and support resource requirements. These logistics related design parameters are expressed in operational terms rather than as inherent values and specifically relate to system readiness objectives and support costs of the system.

# Appendix B: Letter of Introduction

11 May 1994

MEMORANDUM FOR ASC/VJL
                VLL
                YFL
                YSL
                YTL
                YWL

FROM: ASC/AL

SUBJECT: Case Study for AFIT Program - ACTION MEMORANDUM

1. Ms. Charleen Szczepanski is an AL asset currently attending the Air Force Institute of Technology graduate program and is conducting research activities sponsored by ASC/AL. She is undertaking a series of six case studies within the Aeronautical Systems Center.

2. Ultimately, these case studies will identify and document answers to such questions as: what is the pre-Milestone I acquisition process and what specific logistics tasks are required for journeyman-level logisticians; do acquisition logistics managers have sufficient training necessary to perform pre-Milestone I logistics planning; and what tools and aids are available to assist the logistics manager?

3. I am sending this letter to all Chiefs of Logistics for Acquisition Category 1D programs. Request you provide some of your time, experience, and patience to Ms. Szczepanski. Your cooperation is essential if the case studies are to successfully guide and support the final recommendations from this research.

4. Thanks for your help and assistance. Ms. Szczepanski will include your office on the final report and if you would like to have a copy of the completed report, tell her during the interview.

DAVID A. FRANKE
Assistant Director, Acquisition Logistics

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## Appendix C: Interview Protocol

### PART I - BACKGROUND INFORMATION

Organization: _____ Date: _____

Name: _____

Rank/Grade: _____

Title: _____

Responsibilities: _____

_____

_____

*Years of Logistics:* _____ *Years of Acquisition Experience:* _____

How long have you been in your current position: _____

APDP Certifications: _____

_____

Other Certifications: _____

1. What acquisition program phases have you personally (actual hands-on) experienced? Check all those that apply.

___ Pre-Concept Definition      ___ Engrg & Mfg Development

___ Concept Exploration      ___ Production & Deployment

___ Demonstration/Validation      ___ Operations & Support

2. What acquisition phase is your current program in?

___ Pre-Concept Definition      ___ Engrg & Mfg Development

___ Concept Exploration      ___ Production & Deployment

___ Demonstration/Validation      ___ Operations & Support

3. When was a Milestone I decision made? _____

4. How many people are in your program office?     ____

    a. How many are in logistics?     ____

    b. How many do you supervise?     ____

5. What type of system does your program office procure?

___ Bomber      ___ Tanker

___ Fighter      ___ Reconnaissance

___ Cargo      ___ Others (Explain)

___ Trainer      _____

6. How has your program office organized its logistics functions? Check all those that apply.

_____ Logistics Division      _____ Other (Explain)

_____ Integrated Product Teams      _____

_____ Matrix Organization

## PART II - LOGISTICS CONSIDERATIONS

1. What were the logistics goals and objective which the program office considered during pre-Milestone I?

2. Which of the goals and objectives changed and how?

3. Please identify the significant logistics impediments the program office had to overcome.

4. How were these impediments addressed?

5. How did the program office communicate logistics requirements internally?

6. How did the program office communicate logistics requirements with external customers?

7. How does logistics within the program office interface with research laboratories?

8. Besides labs, what other sources of technological information are available for logistics use?

___ Trade Studies            ___ Prime Contractors
___ Innovations in RFP       ___ Technology Transfer Office
___ Others (Explain)

9. What other sources of obtaining technology information do you have?

10. What does the program office expect logistics to provide regarding program requirements?

11. What process(es) does your program office have for identifying logistics requirements?

12. What information sources does your program office have for identifying logistics requirements?

13. What specific integrated logistics support elements do you feel your program office emphasized during pre-Milestone I? Check all those that applied.

| | |
|---|---|
| ___ Maintenance Planning | ___ Technical Data |
| ___ Supply Support | ___ Support Equipment |
| ___ PHS&T | ___ Training & Trng Support |
| ___ Design Interface | ___ Computer Resource Support |
| ___ Facilities | ___ Manpower & Personnel |
| ___ Others (Explain) | |

14. If you could implement logistics all over again, knowing what you know now, what would you do differently?

15. What information or authority were you lacking that kept you from accomplishing this the first time?

16. What are the most important lessons learned from the program regarding logistics?

17. What are some logistics process improvements that proved to be most effective on the program?

18. What system did you use to track acquisition logistics goals and status?

19. Who performs Logistics Support Analysis (LSA)?
___ Government                          ___ Prime Contractor
___ Other (Explain)                     ___ Support Service Contractor

20. What other logistics activities were conducted to insure logistics was accomplished?
___ Maintainability analysis            ___ Reliability analysis
___ Supportability analysis             ___ Other (Explain)

21. Which of the following were conducted prior to Milestone I?
___ LSA                                 ___ Reliability analysis
___ Maintainability analysis            ___ Supportability analysis
___ Other (Explain)

22. Were logistics elements included in life cycle cost estimates?

23. Were there any particular difficulties in accomplishing these logistics elements?

24. What documents were available to direct and establish pre-Milestone I logistics planning?
___ Maintenance Concept                 ___ Draft ILSP
___ ORD                                 ___ PMD
___ Others (Explain)                    ___ Mission Need Statement

## PART III - TRAINING AND EDUCATION

1. Are your acquisition logisticians adequately trained?

2. What specific areas should have been emphasized?

3. Do you conduct any internal logistics training?

4. Who conducts the training?
___ Wright-Patt Campus      ___ Contractor
___ Mentoring      ___ Other (Explain)
___ Computer-based Training

5. How do you identify training deficiencies?

6. Are logistics training requirements available from existing courses?

7. Does existing training adequately cover pre-Milestone I requirements? Check all those that apply.
___ Reviewing alternatives      ___ LSA
___ Determining LCC      ___ Acquisition strategy
___ Others (Explain)

## PART IV - TOOLS AND AIDS

1. Does your program office use the following tools for logistics management? Check all those that apply.

___ CSNAS                    ___ AF Acquisition Model
___ AF Lessons Learned       ___ LOGPARS
___ Acq Logistics Guide      ___ ILSP Advisor
___ LCOM                     ___ NRLA Model
___ Others (Explain)

2. What tools developed by your office or contractor will do similar things as those identified above?

3. Are there any specific areas in logistics for which you would recommend a tool or aid be developed?

## ADDITIONAL COMMENTS:

## Appendix D: Occupational Template

| 1. Occupation Title/Number: Acquisition Logistics Management Specialist(0346A) | Date: 15 April 1993  [X] Approved  [ ] Draft | 2. [X] Core  [ ] Annex  [ ] Overlay | 3. Page 1 of 28 Pages |
|---|---|---|---|

4. Affected Series/AFSC(s): 0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx

| 5. Job Performance Requirements  LEVEL/ENTRY (PR#13 should be met within the first 18 months on the job) | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| 1.0 Apply Effective Communications | | | | | | | |
| 1.1 Ability to effectively communicate both in writing and orally | M | C | AFMC Effective Writing MWEADM0000400SU | None | Organic | One time | |
| | | S | AFMC Basic of Business Writing MXXADM0002200IC | None | Organic | One time | |
| | | S | AFMC Forms of Business Writing MXXADM0002300IC | None | Organic | One time | |
| | | C | OPM Effective Briefing Techniques 45DF | None | $225 | One time | |
| 1.2 Ability to listen effectively | M | C | AFMC Effective Listening MXXADM0002100SU | None | Organic | One time | |
| 1.3 Ability to use personal computers/ applications | M | C | See Personal Computer User Overlay | None | Organic | One time | See Personal Computer User Overlay |
| 2.0 Know AP Organizational Environment | | | | | | | |
| 2.1 Know functional areas/organizational responsibilities | M | O | OJT | None | None | As Req'd | To include regs, org charts, mission statements, etc. |
| | M | C | AFMC Acquisition Mgmt Orientation Course MLUAC1000I200SU | None | Organic | One time | |

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| 4. Affected Series/AFSC(s) 0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx | | | | | | | |
| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| LEVEL: ENTRY (Continued) | | | | | | | |
| 2.2 Know local and MAJCOM policies and procedures as well as regulations | M | O | OJT | None | None | As Req'd | Check Local Libraries |
| 2.3 Know IWSM principles | M | O | OJT | None | None | As Req'd | AFMCP 800-60, Local IWSM Guides, IWSM Bulletin Board, Videos |
| 3.0 Apply Quality Concepts | | | | | | | |
| 3.1 Ability to participate in quality group dynamics and management principles | M | C | AFMC Quality Participation for Employees MHPQUA00000400SU | None | Organic | One time | |
| 3.2 Ability to participate in the process action team process | M | C | AFMC Process Action Team Member MKHQUA00003400SU | None | Organic | One time | |
| 4.0 Know planning/programming management techniques | M | C | AFMC Project Management MXXXLOG00002200XX | None | Organic | One time | Motivational Systems Offers "Basic Project Management" Phone (201)669-3777 |
| | | S | AFMC Project Management Concepts MWELOG00002200CI | None | Organic | One time | |
| 5.0 Know Maintenance Planning and Requirements Establishment Process | M | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| | | C | AFIT Depot Maintenance Operations WLOG 131 | None | Bogey | One time | |
| 13. Lead Center/Organization/OTM 645 MSSQ/MSU/Danny Carlce | | | | 14. Local Contact/Phone Number DSN 787-0180 | | | |

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**4. Affected Series/AFSC(s):** 0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx

**5. Job Performance Requirements**
**LEVEL I: ENTRY (Continued)**

| | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| | | C | AFMC Munitions Requirements and Maintenance MXXACQ0004500XX | None | Organic | One time | |
| 5.1 Know contractor support concepts | M | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| | | O | OJT | None | None | As Req'd | ICS/CLS Guide; ASC/AL (WPAFB) |
| | | C | AFMC Munitions Requirements and Maintenance MXXACQ0004500XX | None | Organic | One time | |
| 5.2 Familiar with the source of repair selection process, decision tree analysis, depot maintenance interservicing, etc. | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| | | O | OJT | None | None | As Req'd | APR 66-7; AFMCRs 66-48 and 800-30 |
| | | C | AFMC Munitions Requirements and Maintenance MXXACQ0004500XX | None | Organic | One time | |
| 5.3 Know levels/categories of maintenance | M | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |

| 13. Lead Center/Organization/OTM 645 MSSQ/MSU/Danny Carlee | 14. Local Contact/Phone Number DSN 787-0180 |
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4. Affected Series/AFSC(s)
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| 5. Job Performance Requirements LEVEL 1: ENTRY (Continued) | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| | | C | APMC Munitions Requirements and Maintenance MXXACQ0004500XX | None | Organic | One time | |
| 5.4 Familiar with base/depot planning/ activation process | M | O | OTT | None | None | As Req'd | ILSP Advisor; ASC/ALLB (WPAFB) |
| | | O | OTT | None | None | As Req'd | DMATS Users Guide and Software. ASC/AL (WPAFB) |
| | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| | | C | APMC Munitions Requirements and Maintenance MXXACQ0004500XX | None | Organic | One time | |
| 6.0 Know Supply Support Acquisition Process | | | | | | | |
| 6.1 Familiar with basic supply support management principles | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| 6.2 Familiar with item management principles | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |

| 13. Lead Center/Organization/OTM | 14. Local Contact/Phone Number |
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| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| LEVEL 1 ENTRY (Continued) | | | | | | | |
| 6.3 Know the provisioning process | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| 7.0 Know Support Equipment Acquisition Process | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| | | S | AFMC SE Acquisition Planning MXXACQ0004700XX | None | Organic | One time | |
| 8.0 Know the Technical Order/Engineering Data Acquisition Process | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | AFIT Technical Order Acquisition Mgmt WSYS 230 | None | Bogey | One time | |
| | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |

13. Lead Center/Organization/OTM
645 MSSQ/MSU/Danny Carlee

14. Local Contact/Phone Number
DSN 787-0180

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| 4. Affected Series/AFSC(s): 0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx | | | | | | |
| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| **LEVEL: ENTRY (Continued)** | | C | AFMC Technical Order Familiarization MRXAIR0004800SU | None | Organic | One time | |
| 8.1 Know Computer Aided Logistic Support (CALS) philosophy | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| 9.0 Know Training and Training Support Acquisition Process | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| 10.0 Know Computer Resources Support Function and Acquisition Process | M | C | AFIT Introduction to Acquisition Mgmt WSYS 100 or | None | Bogey | One time | |
| | | S | ECI Introduction to Acquisition Mgmt 6611 | None | None | One time | Correspondence version of WSYS 100. Available through Base Education Office |
| | | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| 11.0 Know the Facilities Acquisition Process | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |

| 13. Lead Center/Organization/OTM 645 MSSQ/MSU/Danny Carlee | 14. Local Contact/Phone Number DSN 787-0180 |
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**4. Affected Series/AFSC(s)**

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**5. Job Performance Requirements**

| DEVELOPMENT/ENTRY (Continued) | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| | | C | ARTT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| 12.0 Know the Packaging, Handling, Storage, Transportability Acquisition Process | M | C | ARTT Introduction to Logistics WLOG 196 | None | Bogey | One time | |
| | | C | ARTT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| 13.0 Know the Design Interface Process and Parameters | M | C | ARTT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | ARTT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| 14.0 Know the Manpower/Personnel Process as it Relates to Acquisition of Weapons Systems | M | C | ARTT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | ARTT Acquisition Logistics WSYS 225 | None | Organic | One time | USAF/MOR & ASC/ALLM are OPRs |
| 15.0 Know the Logistics Support Analysis (LSA) Process/Products | M | C | APMC IMPACTS Familiarization ? | None | | | |
| | | | ALMC LSA Modeling 8A-F35(TT) | None | Bogey | One time | |

**13. Lead Center/Organization/OTM**

645 MSSQ/MSU/Danny Carlee

**14. Local Contact/Phone Number**

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| 1. Occupation Title/Number: Acquisition Logistics Management Specialist(0346A) | | Date: 15 April 1993 | 2. [X] Core [ ] Annex [ ] Overlay | | | 3. Page 8 of 23 Pages |
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| 4. Affected Series/AFSC(s) 0346, 1670, 2003, 2010, 0046,027xx, 028xx, 031xx, 040xx, 049xx, 066xx | | | [X] Approved [ ] Draft | | | |
| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |

| 5. Job Performance Requirements DEVELOPMENT/ENTRY (Continued) | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
|  |  | C | AFMC LSA Course MWELOG000090OSU | None | Organic | One time |  |
| 16.0 Know Life Cycle Costing (LCC) | M | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time |  |
|  |  | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time |  |
|  |  | C | AFIT Introduction to Life Cycle Costing WQMT 353 | BA or BS Degree | Bogey | One time |  |
| 17.0 Familiar with Combat Logistics Support | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time |  |
| 18.0 Familiar with Operational Requirements Determination (SON, ORD, PMD, AP, ASP) | M | C | AFIT: Air Force Operational Requirements Process WSYS 111 | None | Bogey | One time |  |
|  |  | C | AFIT Introduction to Acquisition Mgmt WSYS 100 or | None | Bogey | One time |  |
|  |  | S | BCI Introduction to Acquisition Mgmt 6611 | None | None | One time |  |

| 13. Lead Center/Organization/OTM 645 MSSQ/MSU/Danny Carlee | 14. Local Contact/Phone Number DSN 787-0180 |
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| 4. Affected Series/AFSC(s) 0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx | | | | | | | |
| 5. Job Performance Requirements LEVEL 1 ENTRY 2 (Continued) | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| | | C | APMC Principles of Acquisition Mgmt MHPACQ0000200SU | None | Organic | One time | |
| 19.0 Know the Financial Process Including BPPBS, Appropriation Process, POM Submittal | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | APMC Financial Management in AFMC MHPLOG0000500SU | None | Organic | One time | |
| 20.0 Know Contracting and Warranty Principles (to include EPRs and CBAs) | M | C | AFIT Introduction to Acquisition Mgmt WSYS 100 or | None | Bogey | One time | |
| | | S | BCI Introduction to Acquisition Mgmt 6611 | None | None | One time | |
| | | O | OJT | None | None | As Req'd | DSMC's Warranty Handbook |
| | | C | GSA Federal Acquisition Process 212 | None | $190 | One time | |
| | | C | GSA Contracting for Contracting Officer Representatives 242 | None | $320 | One time | |
| 13. Lead Center/Organization/OTM 645 MSSQ/MSU/Danny Carlee | | | | 14. Local Contact/Phone Number DSN 787-0180 | | | |

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| 4. Affected Series/AFSC(s): 0346, 1670, 2003, 2010, 0046G027xx, 028xx, 031xx, 040xx, 049xx, 066xx | | | | | | | |
| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| LEVEL 5/ENTRY V (Continued) | | | | | | | |
| 21.0 Familiar with Foreign Military Sales Processes Applicable to DoD Log Mgt | M | C | DISAM Introduction to Security Assistance SAM-OS | None | Bogey | One time | |
| 22.0 Familiar with Defense Reutilization and Marketing Processes/Procedures | M | C | AFIT Introduction to Logistics WLOG 199 | None | Bogey | One time | |
| | | C | ALMC Defense Reutilization and Marketing 8B-P21 | Defense Reutilization and Marketing Operations Course - Advanced | Bogey | One time | |
| 23.0 Familiar with Depot Maintenance/Distribution Functions in Relation to Other Logistics Functions | M | C | AFMC Depot Maintenance and Distribution MXXACQ0004600XX | None | Organic | One time | |
| 24.0 Familiar with the Defense Systems Acquisition Process Phases and IWSM Concepts | M | C | AFIT Introduction to Acquisition Mgmt WSYS 100 | None | Bogey | One time | |
| | | C | or ECI Introduction to Acquisition Mgmt 6611 | | None | One time | |
| | | O | OJT | None | None | As Req'd | Integrated Weapon Systems Mgt (IWSM) Implementation Guide (AFMCP 800-60), IWSM Videos and IWSM Bulletin Board. See IWSM Trainer POC |
| 13. Lead Center/Organization/OTM 645 MSSQ/MSU/Danny Carlee | | | | 14. Local Contact/Phone Number DSN 787-0180 | | | |

| 1. Occupation Title/Number<br>Acquisition Logistics Management Specialist(0346A)<br>4. Affected Series/AFSC(s)<br>0346, 1670, 2003, 2010, 0046/0027xx, 028xx, 031xx, 040xx, 049xx, 066xx | Date: 15 April 1993<br>[X] Approved [ ] Draft | | | 2. [X] Core [ ] Annex [ ] Overlay | | | |
|---|---|---|---|---|---|---|---|
| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| **LEVEL: ENTRY (Continued)** | | | | | | | |
| | R | O | OJT | None | None | As Req'd | Air Force Acquisition Model ASC/CYM (WPAFB) |
| **LEVEL: JOURNEYMAN** | | | | | | | |
| 1.0 Write, Interpret, Review, Policies, Procedures, Regulations and Operating Instructions | R | O | OJT | None | None | As Req'd | Reference AFRs 5-8 and 10-1 as well as Local References |
| 2.0 Know Analytical Concepts to Include: Probability, Statistics, Modeling | M | C | APTT Statistical Process Control Methods WQMT 090 | None | Bogey | One time | |
| 3.0 Apply Total Quality Management Principles to Include: PAT Leadership/Facilitation | M | C | AFMC Facilitator Training MMUQUA0003100SU | AFMC Quality Participation for Employees MHPQUA0000400SU | Organic | One time | |
| 4.0 Conduct on The Job Training as Required to Satisfy Individual Training Needs | M | O | OJT | None | None | As Req'd | |
| 5.0 Perform Maintenance Planning Functions | M | C | AFMC Maintenance Planning Seminar MWEACQ0001900SU | None | Organic | One time | |
| 5.1 Ability to Plan, Acquire Contractor Support (ICS, CLS, Pre-op) | | O | OJT | None | None | As Req'd | ICS Guide and CLS Guide |
| | | C | AFMC Munitions Requirements and Maintenance MXXACQ0004500XX | None | Organic | One time | |

| 13. Lead Center/Organization/OTM<br>645 MSSQ/MSU/Danny Carlee | 14. Local Contact/Phone Number<br>DSN 787-0180 |
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| 5. Job Performance Requirement | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| LEVEL: JOURNEYMAN (Continued) | | | | | | | |
| 5.2 Ability to Manage Site (SATAF) and Depot Activation Process (DMAP, GFE, CFE) | | O | OJT | None | None | As Req'd | DMATS Users Guide and DMATS Software ASC/AL (WPAFB) |
| | | C | APMC Munitions Requirements and Maintenance MXXACQ0004500XX | None | Organic | One time | |
| 5.3 Ability to Perform SORs and DTAs and Support the DMI Process as Required | | O | OJT | None | None | As Req'd | AFR 66-7; APMCRs 66-48 and 800-30 |
| | | C | JDMAG Depot Maintenance Support Agreement (DMISA) Course No Crs# Available | None | ? | One time | AFMC POC: HQ AFMC/LGPW, Mr Eddie Robinson DSN 787-4361 |
| | | C | APMC Munitions Requirements and Maintenance MXXACQ0004500XX | None | Organic | One time | |
| 6.0 Perform Supply Support Activities | M | | | | | | |
| 6.1 Ability to analyze, integrate, and develop supply support management policies, procedures and techniques | | C | APIT Provisioning Mgmt WLOG 260 | None | Bogey | One time | |
| 6.2 Understand the Provisioning Process | | C | APMC Provisioning for Provisioning Specialists MRXCIM0002300SU | None | Organic | One time | |
| 13. Lead Center/Organization/OTM<br>645 MSSQ/MSU/Danny Carlee | | | | 14. Local Contact/Phone Number<br>DSN 787-0180 | | | |

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| 5. Job Performance Requirements LEVEL (4) JOURNEYMAN (Continued) | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| 7.0 Perform Support Equipment Acquisition Functions | M | C | APMC Provisioning for Inventory Mgmt Specialists MMVCIM0000400SU | None | Organic | One time | |
| 7.1 Ability to analyze SE requirements, plan support equipment activities and assess logistics impacts | | S | AFMC Support Equipment Planning MXXACQ0004700XX | None | Organic | One time | |
| | | O | OJT | None | None | As Req'd | Support Equipment Acquisition Management System (SEAMS) ASC/ALLB (WPAFB) |
| | | O | OJT | None | None | As Req'd | SB Manager Handbook ASC/ALX (WPAFB) |
| 7.2 Ability to manage the acquisition of support equipment | | S | AFMC SE Acquisition Planning MXXACQ0004700XX | None | Organic | One time | |
| 8.0 Perform Tech Order/Engineering Data Mgt Functions | M | C | AFIT Air Force Technical Order Acquisition/ Management Course WSYS 230 | None | Bogey | One time | |
| 8.1 Ability to plan/manage the tech order/ engineering data management acquisition activities and processes | | | | | | | |

| 13. Lead Center/Organization/OTM 645 MSSQ/MSU/Danny Carlee | 14. Local Contact/Phone Number DSN 787-0180 |
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| 4. Affected Series/AFSC(s): 0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx | | | | | | | |
| 5. Job Performance Requirements  LEVEL: JOURNEYMAN (Continued) | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| | | C | AFIT Engineering Data Management Course WSYS 150 | None | Bogey | One time | |
| 8.2 Ability to Apply Computer Aided Logistics Support (CALS) | | C | AFMC CALS for Logisticians MXXACQ0004800XX | None | Organic | One time | |
| 9.0 Ability to Manage the Acquisition of Training Support and Training Systems | M | C | AFMC IMPACTS Familiarization Course MWBCON000230OSU | None | Organic | One time | |
| | | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| 10.0 Perform Computer Resources Support Acquisition Functions | M | | | | | | |
| 10.1 Ability to plan computer resources support requirements | | C | AFMC Mission Critical Computer Resources MTEACQ000010SU | None | Organic | One time | |
| | | C | AFIT Mission Critical Computer Software WSYS 212 | None | Bogey | One time | |
| 10.2 Ability to manage acquisition of computer resources | | C | AFIT Acquisition Planning and Analysis WSYS 200 | AFIT Introduction to Acquisition Mgmt WSYS 100 | Bogey | One time | |
| 13. Lead Center/Organization/OTM  645 MSSQ/MSU/Danny Carlee | | | | 14. Local Contact/Phone Number  DSN 787-0180 | | | |

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| 5. Job Performance Requirements DEVELOP/JOURNEYMAN (Continue) | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | C | AFIT Mission Critical Computer Software WSYS 212 | None | Bogey | One time | |
| 11.0 Ability to Manage Activities to Identify and Acquire Facilities for New/Modified Equipment | M | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| | | C | AFIT Acquisition Planning and Analysis WSYS 200 | AFIT Introduction to Acquisition Mgmt WSYS 100 | Bogey | One time | |
| 11.1 Ability to identify and manage facilities requirements through the civil engineering process | M | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |
| | | C | AFIT Acquisition Planning and Analysis WSYS 200 | AFIT Introduction to Acquisition Mgmt WSYS 100 | Bogey | One time | |
| 12.0 Perform Packaging, Handling, Storage and Transportation Acquisition Functions | M | C | AFMC PHS&T Acquisition Management MXXACQ0004900XX | None | Organic | One time | |
| 13.0 Ability to Apply Design Interface Principles to Influence Weapon System Design | M | C | AFMC Systems Engineering for Logistics MXXACQ0005000XX | None | Organic | One time | |
| 14.0 Understand the Manpower Process used in Weapon System Acquisition | M | C | AFIT Acquisition Logistics WSYS 225 | None | Bogey | One time | |

| 13. Lead Center/Organization/OTM 645 MSSQ/MSU/Danny Carlee | 14. Local Contact/Phone Number DSN 787-0180 |
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**LEVEL III/JOURNEYMAN (Continued)**

| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| | | C | APMC IMPACTS Familiarization Course MWBCON0002300SU | None | Organic | One time | |
| 15.0 Ability to Integrate the LSA/LSAR Process Within Systems Engineering and the ILS Process | M | C | AFMC LSA for Managers MXXACQ0005100XX | None | Organic | One time | |
| 15.1 Ability to identify and tailor LSA/LSAR tasks/records | M | C | AFIT Logistics Support Analysis Course WLOG 202 | None | Bogey | One time | Formerly "Defense Basic Logistics Support Analysis" (ALMC-LR) |
| 15.2 Ability to use LSA/LSAR Products | M | C | ALMC LSA Modeling Course 8A-F35(JT) | None | Bogey | One time | |
| 16.0 Ability to Apply Life Cycle Cost Principles | M | C | AFIT Introduction to Life Cycle Costing WQMT 353 | BA or BS Degree | Bogey | One time | |
| 17.0 Understand the Principles of Combat Logistics Support and Analyze Wartime Commodities and Support Systems | M | C | AFIT Combat Logistics WLOG 299 | None | Bogey | One time | |
| 18.0 Perform Operational Requirements Determinations (SON, ORD, PMD, AP, ASP) | M | | AFIT Acquisition Planning and Analysis WSYS 200 | AFIT Introduction to Acquisition Mgmt WSYS 100 | Bogey | One time | |
| 18.1 Ability to evaluate requirements documents | | C | AFIT Operational Requirements Process WSYS 111 | None | Bogey | One time | |

13. Lead Center/Organization/OTM
645 MSSQ/MSU/Danny Carlee

14. Local Contact/Phone Number
DSN 787-0180

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| 1. Occupation Title/Number: Acquisition Logistics Management Specialist(0346A) | Date: 15 April 1993 | 2. [X] Core [ ] Annex [ ] Overlay [X] Approved [ ] Draft | | | | |
|---|---|---|---|---|---|---|
| 4. Affected Series/AFSC(s): 0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx | | | | | | |
| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| LEVEL: JOURNEYMAN (Continued) | | | | | | |
| 18.2 Ability to translate operational requirements into logistics requirements | | C | AFIT Operational Requirements Process WSYS 111 | None | Bogey | One time | |
| 19.0 Perform Financial Management Functions | M | | | | | | |
| 19.1 Ability to program/budget, and make financial recommendations/proposals | | C | AFIT Acquisition Planning and Analysis WSYS 200 | AFIT Introduction to Acquisition Mgmt WSYS 100 | Bogey | One time | |
| | | C | AFIT Financial Management in Weapon Systems Acquisition WSYS 227 | None | Bogey | One time | |
| | | C | AFMC Financial Aspects of Systems Acquisition MXXACQ0005200XX | None | Organic | One time | |
| 19.2 Ability to interpret cost data | | C | AFIT Financial Management in Weapon Systems Acquisition WSYS 227 | None | Bogey | One time | |
| | | C | AFMC Financial Aspects of Systems Acquisition MXXACQ0005200XX | None | Organic | One time | |
| | | C | AFMC Contracting Requirements MXXACQ0005300XX | None | Organic | One time | |
| 20.0 Ability to Translate Logistics Requirements into Contract Form and Initiate the Contract | M | | | | | | |
| 13. Lead Center/Organization/OTM: 645 MSSQ/MSU/Danny Carlee | | | | 14. Local Contact/Phone Number: DSN 787-0180 | | | |

| 1. Occupation Title/Number | Date: 15 April 1993 | 2. [X] Core [ ] Annex [ ] Overlay | | 3. Page 18 of 26 Pages |
| --- | --- | --- | --- | --- |
| Acquisition Logistics Management Specialist(0346A) | [X] Approved [ ] Draft | | | |

**4. Affected Series/AFSC(s):**
0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx

| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **LEVEL IV JOURNEYMAN (Continued)** | | C | AFMC Statement of Work Seminar MWEACQ0002200SU | None | Organic | One time | ASC/AL (WPAFB) |
| 20.1 Ability to manage the logistics portion of contractor performance | | C | AFMC Managing Contractor Performance MXXACQ0005400XX | None | Organic | One time | |
| | | C | AFIT Acquisition Planning and Analysis WSYS 200 | AFIT Introduction to Acquisition Mgmt WSYS 100 | Bogey | One time | |
| 20.2 Ability to manage warranty programs including: EPRs/CBAs | | O | OJT | None | None | As Req'd | DSMC's Warranty Handbook |
| 21.0 Understand Depot Maintenance and Distribution Functions and Integrate Management Plans and Support Elements | M | C | AFMC Management of AFMC Industrial Operations MXXINP0022200XX | None | Organic | One time | |
| | | C | AFMC Depot Maintenance and Distribution MXXACQ0004600XX | None | Organic | One time | |
| 22.0 Understand the Defense Systems Acquisition Process and IWSM Implementation (Including the AFAM) | M | C | AFIT Acquisition Planning and Analysis WSYS 200 | AFIT Introduction to Acquisition Mgmt WSYS 100 | Bogey | One time | |
| | | O | OJT | None | None | As Req'd | IWSM Videos, Bulletin Board AFMCP 800-60 |
| | | O | OJT | None | None | As Req'd | The AF Acquisition Model (AFAM) |

| 13. Lead Center/Organization/OTM | 14. Local Contact/Phone Number |
| --- | --- |
| 645 MSSQ/MSU/Danny Carlee | DSN 787-0180 |

| 1. Occupation Title/Number | Date: 15 April 1993 | 2. [X] Core [ ] Annex [ ] Overlay |
|---|---|---|
| Acquisition Logistics Management Specialist(0346A) | [X] Approved [ ] Draft | |

4. Affected Series/AFSC(s)
0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx

| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| **LEVEL: ADVANCED** | | | | | | | |
| 1.0 Analyze, Prioritize, Allocate, Advocate Resources | M | | | | | | |
| 1.1 Ability to identify alternate ideas and make appropriate decisions | | C | AFIT Alternative Problem Solving Methods WQMT 089 | None | Bogey | One time | |
| 2.0 Implement Total Quality Mgt Techniques | M | | | | | | |
| 2.1 Ability to develop/implement an organizational quality plan | | C | AFMC Quality Leadership for Managers MHPQUA0001000SU | None | Organic | One time | |
| 2.2 Ability to make decisions based upon analytical tools and data | | C | AFMC Quality Leadership for Managers MHPQUA0001000SU | None | Organic | One time | |
| 3.0 Integrate and Implement Logistics Mgt Concepts in Wartime Scenario | M | | | | | | |
| 3.1 Ability to integrate logistics policies/ processes/programs/plans from service components through national level | | C | AFIT Strategic Logistics Management WLOG 399 | WLOG 199; WLOG 299 | Bogey | One time | |
| 3.2 Understand logistics command and control | | C | AFIT Logistics Executive Development WLOG 499 | BA or BS Degree; WLOG 199; WLOG 299; WLOG 399 | Bogey | One time | |
| | | C | AFIT Strategic Logistics Management WLOG 399 | LOG 199; LOG 299 | Bogey | One time | |

| 13. Lead Center/Organization/OTM | 14. Local Contact/Phone Number |
|---|---|
| 645 MSSQ/MSU/Danny Carlee | DSN 787-0180 |

| 1. Occupation Title/Number | Date: 15 April 1993 | 2. [X] Core [ ] Annex [ ] Overlay | |
|---|---|---|---|
| Acquisition Logistics Management Specialist(0346A) | [X] Approved [ ] Draft | | |

**4. Affected Series/AFSC(s)**
0346, 1670, 2003, 2010, 0046/027xx, 028xx, 031xx, 040xx, 049xx, 066xx

| 5. Job Performance Requirements | 6. Rqmt | 7. Method | 8. Source | 9. Prerequisite | 10. Cost | 11. Freq | 12. Comments |
|---|---|---|---|---|---|---|---|
| LEVEL: ADVANCED (Continued) | | | | | | | |
| 4.0 Direct Contracting Actions | M | | | | | | |
| 4.1 Ability to develop and implement acquisition strategies | O | OJT | None | None | As Req'd | | |
| 4.2 Ability to manage contractual activities | C | AFIT Intermediate Program Management WSYS 400 | WSYS 100; WSYS 200 | Bogey | One time | | |

| 13. Lead Center/Organization/OTM | 14. Local Contact/Phone Number |
|---|---|
| 645 MSSQ/MSU/Danny Carlee | DSN 787-0160 |

# Appendix E: Consolidated Listing of Case Studies

| PART II Logistics Considerations | Multi-Role Fighter (MRF) | B-2 Bomber | Joint Primary Aircraft Training System (JPATS) | F-22 Advanced Tactical Fighter | Tri-Service Standoff Attack Missile (TSSAM) | Non-Developmental Airlift Aircraft (NDAA) |
|---|---|---|---|---|---|---|
| 1. What were the logistics goals and objectives which the program office considered during pre-Milestone I? | Integrating engineering with logistics | Reliability and maintainability | • Maintenance concept<br>• Non-developmental and commercial off-the-shelf requirements<br>• Operational requirements<br>• Market analyses<br>• Best commercial practices | • Reliability and maintainability<br>• Life cycle costing | Unknown due to security classification | • Maintenance concept<br>• Commercial practices<br>• Operational requirements |
| 2. Which of the goals and objectives changed and how? | No change due to program cancellation | Consistent reliability and maintainability | • Maintenance concept (full or partial support)<br>• Lessons learned from T-1A program<br>• Resource environment<br>• Pilot program<br>• Commercial practices | • Fiscal constraints<br>• Baseline requirements | Unknown due to security classification | • New designated program<br>• Defining acquisition strategy |
| 3. Please identify the significant logistics impediments the program office had to overcome? | • Perception that logistics support analysis was strictly a logistics functions<br>• XR community stressing designing an aircraft versus conceptual views | • Support concept<br>• OSD & Congressional interventions - aircraft numbers reduced<br>• Fundamental changes within using command structure (ACC) | • Training and experience of personnel<br>• Maintenance concept<br>• Air Logistics Center support<br>• Reliability, maintainability, and availability goals<br>• OSD intervention-- pilot program for acquisition streamlining | • Technical problems increased risk<br>• Changes in logistics arena -2-level maintenance<br>• Contracting constraints | • Classified program<br>• Tri-service requirements<br>• Numerous requirements with different missions<br>• Different priorities<br>• No Integrated Logistics Support Plan | • Congressional interest<br>• Preconception regarding non-developmental program and efforts taken to refute them |

| | | Integrated Logistics... | B-2 Review | Joint Primary Aircraft Training System (JPATS) | ...Fighter... | Integrated... | ...ASC... |
|---|---|---|---|---|---|---|---|
| | • Changing the database from LSA to a different name<br>• Communication with XR management on data requirements<br>• Program manager backed concept-type philosophy | • Perform support concept study and economic analyses | • Present issues to senior management working group<br>• Redo existing efforts to comply with new acquisition streamlining approach | • Greater political risk due to premiere program status<br>• Technical transition issues | • Declassification<br>• Move to integrated product teams eliminated service in-fighting | • Position paper identifying issues |
| | • Generated from user community<br>• Help developed draft mission need statement with user<br>• Daily interface meeting | • Key program documents using operational requirements document and program management directives<br>• Electronic mail communications<br>• Integrated product team concept established for integration<br>• Periodic weekly meetings<br>• Monthly reviews with system program director | • Logistics requirement established from operational requirements document based on lessons learned from T-1 and T-3 programs<br>• Operational requirements document very specific. Three staff meetings a week<br>• Integrated product team concept<br>• Management techniques such as brainstorming, point papers, briefings, table top review, staff meetings, and program status meetings to identify and resolve problems | • No centralized logistics<br>• Integrated product team functioned as mini-system program offices<br>• YFL function is to integrated logistics<br>• Weekly information exchange<br>• Requirements identified via operational requirements document and contract | • Data calls, internal program reviews<br>• Segmented office structure locked out crossflow of information<br>• Director's calls | • Small team structure<br>• Information exchange through meetings and discussions<br>• Program briefing participation |

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## PART II Logistics Considerations (continued)

| | Battlelab Force (BF) | B-2 Bomber | Joint Primary Aircraft Training System (JPATS) | F-22 Advanced Tactical Fighter | Tri-Service Standoff Attack Missile (TSSAM) | Non-Developmental Airlift Aircraft (NDAA) |
|---|---|---|---|---|---|---|
| 6. How do the program office personnel communicate and interact with system customer? | • Weekly meetings with user<br>• Defined requirements to improve sorties through logistics support (RM&A)<br>• ACC/LG participation | • Bi-monthly integrated logistics working group meetings at Whiteman AFB MO<br>• CARD database identified issues and prioritized them | • Point papers<br>• Joint integrated logistics support meetings<br>• Senior-level management working groups<br>• Daily communications and video telecommunications conferencing | • Memorandums of agreements<br>• Program management directives | • Integrated logistics support management teams<br>• Classified correspondences<br>• Numerous TDY meetings | • Program management directives<br>• Draft operational requirements document<br>• Information exchange through meetings, documents, TDY and government industries |
| 7. How does logistics enter the program office interface with research laboratories? | • Part-time laboratory personnel located within organization<br>• Personnel looked at proven technologies through 2005<br>• Used F-16 and F-22 as a baseline and extrapolated | • Used laboratory technologies in low observable supportability<br>• Informal engineering process<br>• Combination of AL/EN talking to laboratories for design and support efforts | • Low technology aircraft<br>• Technical challenges in human factors<br>• Informal meetings | • ARPA initiative<br>• Integrated database<br>• Co-locate laboratory personnel within system program office<br>• Integrated product team structure ensured integration | • Prime contractor initiatives<br>• Experience from other black programs | • No interface<br>• Lessons learned program identified new technologies<br>• Contractor development efforts |
| 8. Besides the various other sources of technical information are sources for logistics used? | • Primary contractor<br>• Trade studies<br>• Weekly Brown Bag meetings with user | • DTIC system (organic versus contractor support)<br>• SETA contracts augmented staff with specialized skills<br>• Prime contractor through independent R&D | • Use latest state-of-the-art technologies such as ejection seat, bird strike and human factors<br>• Trade studies<br>• Prime contractor<br>• Professional conferences | • Trade studies<br>• Prime contractor<br>• Technology transfer office | • Trade studies<br>• Prime contractor | • Trade studies<br>• Innovations identified in the request for proposal<br>• Prime contractor<br>• Technology transfer office<br>• DTIC reports |

| PART II Logistics Considerations (continued) | [weapons system] | B-2 Bomber | Joint Primary Aircraft Training System (JPATS) | F-22 Advanced Tactical Fighter | T-1 Streamlined Acquisition (TSSA) | Next Generation Attack Aircraft (NGAA) |
|---|---|---|---|---|---|---|
| | Laboratory personnel attend symposiums and seminars bringing back latest information | None | Inputs from Navy logistics personnel | • Professional conferences<br>• Marketing studies | None | • AFIT theses<br>• Market studies with established companies |
| | • Maximize sortie generations<br>• Identify manpower requirements<br>• Reduce deployment requirements | • Acquisition of all support resources<br>• Responsible for sustainment<br>• Report on operational metrics<br>• Budget requirements<br>• Respond to OSD/Congressional inquiries<br>• Warranty planning and administration | • Commercial practices suitable for government<br>• Recognize risks associated with commercial logistics<br>• Concepts, analysis and contract language for long-term support | • Execution and identification of logistics problems and holes<br>• Fully operational at activation | • Identification of logistics needs and put them into the contract<br>• Keeping track of reduced requirements and funding | • Support development requirements (contractor logistics support)<br>• Production contract requirements and metrics associated with them |
| | • Logistics support analysis<br>• System engineering<br>• Various acquisition management and logistics regulations. Some regulations may be out of date or rescinded but they are a good source of information<br>• Guidance and planning for manpower | • Requirements identified in the contract<br>• CARD database identifies user requirements and evaluates priorities<br>• The Forum reviews CARD for closure plans and metrics<br>• Electronic mail allow communications<br>• Video conferencing capability<br>• Classified data transfer embedded into existing capabilities | • Normal requirements identified through operational requirements document<br>• Normal commercial practices<br>• Logistics support analysis<br>• Cost studies | • One team concept--Includes system program office personnel and contractor as one team<br>• Advance change study notices<br>• Engineering change proposals<br>• Integrated product team process | • Logistics support analysis<br>• Joint operational requirements document<br>• User interface reviews<br>• Pre-support equipment requirements documents<br>• Technical interchange meetings | • Request for proposal process<br>• Operational requirements document<br>• Tailoring logistics support analysis<br>• Configuration changes |

| PART 6 Logistics Considerations (continued) | Research Issue Areas | F3 Boeing | Advanced Artillery System (5 DAYS) | Engineering Design Model | Engineering Design Model (5 DAYS) | M1 Pre-planned Product Improvement (5 DAY) |
|---|---|---|---|---|---|---|
| | Acquisition logistics home office personnel used IMPACTS, life cycle costing and logistics composite model | Logistics Support Management Information System (LSMIS) contains the logistics support analysis database, support equipment requirements documents, reliability and maintainability factors, etc. A unique provisioning system | • Acquisition logistics expertise from home office<br>• Other services inputs<br>• Lessons learned<br>• Friday's issues review<br>• Commercial off-the-shelf software (On Time) for internal usage | • Video conferencing capability<br>• Pigtail conferencing<br>• TDY<br>• Support system integrated product team | • Experienced personnel<br>• Lessons learned | • Local area networks and electronic mail<br>• Pushing electronic transfer of data |
| | • Maintenance planning<br>• Packaging, handling, storage and transportation<br>• Design interface<br>• Facilities<br>• Support equipment<br>• Manpower and personnel<br>• Technical data especially in the area of digitized data | Design interface | • Maintenance planning<br>• Technical data<br>• Supply support<br>• Facilities<br>• Support equipment | Unknown | • Design interface<br>• Facilities<br>• Computer resources | • Maintenance planning<br>• Supply support<br>• Facilities<br>• Technical data<br>• Support equipment<br>• Training |

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| PART II Logistics Considerations (continued) | Mobile Force (MF) | E-2 Reprise | Joint PRIMES Aircraft Training System (JPATS) | Reconfigured Tactical Fighter | Theater Standoff Aircraft (TSA) | Non-Developmental Anti-Aircraft (NDAA) |
|---|---|---|---|---|---|---|
| 14. If you could change logistics support at an early stage, looking back now, what would you do differently? | • Training personnel on early acquisition requirements • Some data, information, and training for early acquisition requirements • Limitations in hiring qualified individuals | Integrated product teams from the start. Integration enhanced through teams resulting in a better product, better communications, and better control | • Work harder on user requirements • Up-front cost study analysis • Experienced personnel in non-developmental and commercial off-the-shelf acquisitions • Recognize up-front commercial emphasis | • Introduce more production requirements in the EMD phase • Depot planning | • Start with integrated product teams • Mandate an integrated logistics support plan • Accomplish early requirements identification • Having deliverable logistics support analysis tasks | Unknown—program still developing acquisition strategy and maintenance concept |
| 15. What lessons are you learning and what are you doing that may help future acquisition reform accomplishing this the first time? | • Pamphlet or training guide identifying early acquisition logistics efforts • Limitations in selecting personnel • Requirement for generalists | • Organizational structure • Change in senior management | • Did not know the user and understand why certain requirements were being identified • Decision to use the program as a pilot effort in acquisition streamlining • Change in administration (Bush to Clinton) | • Political realities and risk • Integrate logistics everywhere | • Black program • No oversight • Contract turnkey effort | • Acquisition streamlining • Little missionization • Commercial acquisition problems |
| 16. What are the most important issues learned from the program regarding logistics? | • Homework on processes • Training on early acquisition efforts not available • On-the-job training | Supportability—slippage in EMD phase allowed support to be there such as technical data, spares, and support equipment Need to embed enough time to ensure availability of logistics requirements | • Trained and qualified logisticians • Better defined commercial off-the-shelf and non-development requirements | Integrating product teams and contractor work efforts | Need crosstalk for logistics to succeed | Not applicable—too new of a program |

| PART II Logistics Considerations (continued) | Milestone Fighter (IMF) | B-2 Bomber | Joint Primary Aircraft Training System (JPATS) | F-22 Advanced Tactical Fighter | In-Service Engine Support (ISE) | Non-Developmental Item Aircraft (NDAA) |
|---|---|---|---|---|---|---|
| 17. What are some logistics process improvements that helped to be most effective on the program? | IMPACTS was an important issue on this system. IMPACTS personnel knew where we had to go to get there. | • Change process • Support equipment and technical data processes • Reorganization created a process management team. • Northrop's LINC system—system built schedules per end item and identified critical paths | IWSM included Aeronautical System Center and Air Logistics Center in all processes—from source selection to contractor logistics support award | • Paperless acquisition • Integrated database • Provisionary Relational Integrated Distributed Electronics (PRIDE) System • Logistics Composite Model analysis | • Move to integrated product teams • Declassification of the program | Not applicable—program too new and phase considered too early |
| 18. Does this system did it use to track logistics information logistics plans and status? | • None • Everything was tracked by individuals • No metrics | • Team metrics presented at program reviews • Internal program reviews to system program director on problem areas only | • Acquisition logistics management information system (ALMIS) • System program manager has problem in identifying meaningful metrics | • Integrated Management Program Schedule (IMPS) identifies contractual requirements against specific milestones • Integrated Master Schedule identifies contract data requirements list and tracks it schedule | • Program management reviews • Internal management reviews • Integrated logistics support management team meetings • Integrated logistics support plan • Contractor deliverables | • Reliability, maintainability and availability drive overall system requirements • Extensive avionics sweep • Master schedules setting baselines |
| 19. Who performs logistics support analysis? | Government early on then eventually the contractor | Prime contractor | Prime contractor—used as guidance only | Prime contractor with engineering overseeing the effort | Prime contractor | Program is too new but project prime contractor |
| 20. What other logistics activities were conducted to insure logistics was accomplished? | Reliability, maintainability, supportability, and affordability analyses | • Reliability and supportability analyses • Maintainability analysis—included maintainability demonstrations | • Reliability, maintainability, and supportability analyses • Facilities reviews • Training requirements | Unknown | Unknown | • Logistics support analysis • Life cycle costing • Integrated support plan • Support concepts |

| PART II Logistics Considerations (continued) | Multi-Mission Fighter (MRF) | B-2 Bomber | Joint Primary Aircraft Training System (JPATS) | F-22 Advanced Tactical Fighter | The Single Manager for Conventional Ammunition (SMCA) | Non Developmental Airlift Aircraft (NDAA) |
|---|---|---|---|---|---|---|
| 21. Which of the following were considered prior to milestone I? | Same as #20 above. Program was in the pre-Milestone 0 phase | Unknown | Unknown—logistics support analysis language was included in the contract | Unknown | Unknown | • Maintainability<br>• Reliability |
| 22. Were logistics elements included in life cycle cost estimates? | Yes—acquisition logistics expertise in operations and support life cycle costing data | Yes | Yes—supply support considerations | Yes—affordability estimating; decision tree analysis to life cycle costing | Yes | Yes—fuel consumption highest consideration, manpower second with .5 person required from acquisition logistics home office |
| 23. Were there any particular difficulties in conducting cost tradeoff analysis? | No problems—took F-16 data and information from F-22 to extrapolate costs | • Required acquisition logistics expertise from home office<br>• Typically a GS-346 does not have the background | Yes—some difficulties Lacked central database, pricing engineering data and technical order costs. CAIG good source for data | Unknown | Yes—each air logistics center has their own way to produce composite rates | • Determining what data is required to evaluate operation and support during source selection<br>• Model, data, and format needs to be standardized |
| 24. What documents were available to direct and establish pre-Milestone I logistics planning? | Mission needs analysis through mission needs statement | Unknown due to classification | • Maintenance concept<br>• Operational requirements document<br>• Program management directive | Mission needs statement | • Integrated support plan<br>• Program management directive | • Operational requirements document (draft)<br>• Program management directive (draft)<br>• Mission needs statement |

| PART III Training and Education | Multirole Fighter (MRF) | C-4 Service | Joint Primary Aircraft Training System (JPATS) | F-22 Advanced Tactical Fighter | Theater Air Support Aircraft Missile (TSAM) | Non-Developmental Airlift Aircraft (NDAA) |
|---|---|---|---|---|---|---|
| 1. Are your organization logisticians adequately trained? | No | Yes—in general. Under integrated weapon system management and integrated product teams logisticians are expected to perform like program managers | Yes—need better contractor logistics support efforts | • Yes—APDP certification pursued • Turnover low • High skills and abilities available | Yes—highly trained individuals | Yes—all individuals considered generalists |
| 2. What specific areas should have been emphasized? | • Define what pre-Concept was • Identify logistics requirements needed to support this phase | Cost Schedule and Control System accounting | • Non-developmental and commercial off-the-shelf acquisition • Lack of contractor logistics support training | • Certification requirements • Sustainment between acquisition and air logistics center communities | • SPO experience (breadth) • External contacts | • Commercial off-the-shelf with missionization • Pilot program efforts |
| 3. Do you conduct any formal logistics training? | No | No | • Yes • Training monitor tracks APDP certification efforts • Identifies class availability | • Starting with issues review • Critical action team training | No | Seminars with commercial acquisition through Federal Aviation Agency |
| 4. Who conducts the training? | • Wright-Patt Campus • Mentoring | Unknown | • Wright-Patt Campus • Mentoring • Experienced logisticians | Unknown | • Wright-Patt Campus • Mentoring • Computer base training | • Contractor • Best value contracting for commercial off-the-shelf |
| 5. How do you identify training deficiencies? | • No deficiencies because training wasn't available • Address early acquisition in PME classes and DSMC | • APDP a metric • Advertise courses by electronic mail through the training monitor • Review individual development plans | Training monitor | Individual review against AFMC templates | Observations | • Deficiency identified and procured through traditional training methods • None available send to seminars |

| | | | | | |
|---|---|---|---|---|---|
| • Do not really know what is being offered • Do not know what a course would consist of | Yes | Yes but contractor logistics support management is missing | • No • Individual course on specific areas are • Need integrations or generalists | Yes | • Defense Air University in fluctuation • Basically yes through AFIT PME course |
| • Life cycle costing expertise is available through acquisition logistics home office • Logistics support analysis is available • Acquisition strategy is also available but from a higher level | • Need experienced logisticians in all those areas • Typically a GS-346 is not well-rounded but training is available | • Logistics support analysis • Acquisition strategy • Life cycle costing | • Life cycle costing minimally required • Operations research analyst not required but available within XR | • Living program changes in-house | • Acquisition strategy • Life cycle costing • On-the-job training for Milestone I • Generalist recommended--do not need the depth but breadth |

| Question / Tasks and Areas | | | Joint Primary Aircraft Training System (JPATS) | | New Dynamic Area Alternate (NDAA) |
|---|---|---|---|---|---|
| 1. What tools/models were employed to support your development? | • Lessons learned<br>• Acquisition logistics guide | • Logistics composite model<br>• Life cycle analysis<br>• COCOMO estimating<br>• Software support requirements | • Lessons learned<br>• Integrated logistics support plan advisor<br>• CAMDES 2B<br>• Project management<br>• Air Force acquisition model<br>• LOGPARS | • CSNAS<br>• LCOM<br>• AFAM<br>• NRLA<br>• Some lessons learned<br>• ALG | • CSNAS<br>• Lessons learned<br>• Logistics composite model<br>• NRLA |
| 2. What tools would you want developed now that the program has been started? | Change logistics support analysis to take out logistics | • Excel spreadsheet<br>• DSR to do cost comparisons<br>• CARD database | Commercial software packages to determine schedule, supply support and risk factors | • Integrated management support plan<br>• Integrated management schedule | Unknown |
| 3. Are there any tools already in existence that you could use/have used? | • Identify subphases within acquisition phase<br>• Develop a checklist or guide<br>• Make effort tailorable like logistics support analysis | • Decision tree analysis process for cost analysis<br>• Organic versus contractor support<br>• Generate own methodology and tools to perform economic analysis<br>• Nice to have generic, tailorable mode available | Non-development and commercial off-the-shelf training | • Integrated weapon system database concept<br>• Sustainment due to lack of data and records | Know what is commercially out there |

Additional column — New Dynamic Area Alternate (NDAA):
- Row 1: • Lessons learned • Acquisition logistics guide • Air Force acquisition model
- Row 2: None—too early in the program
- Row 3: • Acquisition streamlining packaging • Guide to help waive regulations and statutory laws

## Appendix F: Case 1 - Multi-Role Fighter

### Interviewee Qualifications

The interviewee was a senior-level management supervisor responsible for the overall support of the Multi-Role Fighter program and held this position for approximately six months prior to the program cancellation. Multi-Role Fighter did not advance to a Milestone I decision, thus never becoming an official program. The program was canceled in Fall 1993. He has over 25 years of logistics experience with 10 years in the acquisition logistics arena. The interviewee has a Level III certification in Acquisition Logistics, Program Management, and Communications and Computers. He has personally had hands-on experience with the pre-concept definition; engineering, manufacturing, and development; and production and deployment acquisition phases.

### Observations

The interview was conducted at the interviewee's facility. The office was spacious and partitioned allowing privacy and minimal amounts of disturbances. The interviewee understood the purpose of the interview and prepared for the session. He had filled out the interview protocol prior to the interview. The session lasted approximately one hour. He personally experienced the pre-Milestone I efforts since the program was preparing for a Milestone 0 decision. He appeared to be relaxed and eager to share his opinions about what occurred on the program.

### Interview Protocol

#### Logistics Considerations

1. *What were the logistics goals and objectives which the program office considered during pre-Milestone I?*

The goal was to totally integrate the systems engineering with logistics through LSA. In other words, the engineers would take the lead implementing system engineering using the LSA process with support from the logistics community. We would have done this as a team. That was the goal -- to develop a totally, integrated effort.

2. *Which of the goals and objectives changed and how?*

Since the program was only in existence for six months, the goals and objectives did not change because the program was canceled. The reason it was canceled was Secretary of Defense Chaney questioned Air Force's requirement for another fighter. You have an F-22, a Multi-Role Fighter, and a Navy AX program. The Air Force did not want to jeopardize the F-22 program so they canceled this program. This program is the one that got the ax.

3. *Please identify the significant logistics impediments the program office had to overcome.*

The engineers refused to use the LSA data base as a nucleus for identifying all the engineering data. The goal was to develop one integrated data base for the Multi-Role Fighter. The engineers thought LSA was a logistics requirement and did not want anything to do with it. They were more or less stovepipe in their approach to system engineering. The lead engineer and logistics manager were going to change the name of LSA and call it something else. We did not have any problems with the other functional areas.

Another impediment we had was with the XR community. They were off designing an airplane while we were still in pre-Milestone 0. Their concept was we had an F-16 aircraft as a baseline and incorporate new technologies for improved reliability and maintainability. People tended to think physical while we were still in the paper stage of development.

4. *How were these impediments addressed?*

It took a lot of work to convince the engineers LSA was not a logistics data base. We were going to change the name, if necessary. We were still going to use MIL-STD-1388 but not call it LSA because of the perception it was a logistics system.

With regard to the XR community, the program manager used program data instead of XR. He supported our results for sortie data generations. He used our data because it was developed from the logistics community instead of the XR community who are strategic thinkers. The program manager backed conceptual-type philosophies and supported the team versus what XR was feeding him because they were off designing airplanes.

5. *How did the program office communicate logistics requirements internally?*

That is difficult to answer. Logistics requirements were generated from the user. There was no Operational Requirements Document. We were still working on a draft Mission Needs Statement. The internal communications at that point in time were basically verbal through weekly meetings. We would sit down and talk about program requirements and how to insert logistics into this system.

6. *How did the program office communicate logistics requirements with external customers?*

The user was Air Combat Command (ACC) -- Tactical Air Command back then. We would have weekly meetings with the user. ACC was interested in increasing sortie generations over a 30 day period through improved reliability, maintainability, and availability of the airplane. ACC/LG and XP representatives were involved.

7. *How does logistics within the program office interface with research laboratories?*

We had part-time people from the laboratory assigned to the project. We were not going to develop any new technologies for this system; the technology had to have already by proven or available by the year 2005. They provided a lot of assistance and suggested several new concepts such as the all electric airplane and currently available composites. The propulsion system would use a current system already developed. We were not going to develop a new engine strictly for the Multi-Role Fighter application. The engineers looked at different engines and their performance specifications.

F-16 data was used as the baseline. F-22 improvements were extrapolated and applied to this baseline. Then we incorporated other existing technologies from the labs that the F-22 was not doing and extrapolated reliability data for different components on the system. We did not just look at avionics, but every system on the airplane including support equipment. We had some problems accessing data from the F-22. Basically, the F-22 was stovepipe even though they were organized under the IPT concept. The IPT teams were not talking to each other. The F-22 program was using unproven technologies and experienced a lot of technical risks.

8. *Besides labs, what other sources of technological information are available for logistics use?*

_X_ *Trade Studies*　　　　　　　_X_ *Prime Contractors*
___ *Innovations in RFP*　　　　　___ *Technology Transfer Office*
___ *Others (Explain)*

We had a little bit of money. We were going to throw the money out to eight prime contractors at that time. In the past, you could direct what research you wanted the contractor to perform. The law changed and we no longer could tell them or give them any direction.

9. *What other sources of obtaining technology information do you have?*

The technology information was basically obtained through the laboratories. Laboratory personnel were going out to symposiums and national seminars to keep apprised of new technologies.

10. *What does the program office expect logistics to provide regarding program requirements?*

Increase sortie generations. We were going to fight a 30 day war. How many sortie rates can ACC generate if you increase reliability? What impacts does RIVET WORK FORCE have on manpower requirements? How many C-141 equivalents do I need in order to deploy? How many pieces of support equipment can be eliminated? We looked at deployment and technology improvements in support equipment. Instead of taking 16 C-141s to deploy a wing of 20 F-16s, we were going to reduce that requirement down to eight with an ultimate goal of five C-141s.

The program manager wanted to reduce deployment requirements and reduce manpower. We were showing manpower utilization rates in some Air Force Specialty Codes (AFSCs) of less than 20 per cent. We recommended eliminating or combining several AFSCs to maximize the work force.

11. *What process(es) does your program office have for identifying logistics requirements?*

I was dependent on processes like logistics support analysis, system engineering, and acquisition logistics regulations (AFR 800-34). I understand a lot of those regulations are canceled, but they still have a lot of good information in them. These were some of the things I used to determine what I was going to have to do. These processes also determined what my manpower requirements was going to be.

12. *What information sources does your program office have for identifying logistics requirements?*

I relied heavily the on the home office, AL, the IMPACTS people, to perform life cycle costing and Logistics Composite Model (LCOM). The Multi-Role Fighter Program was a very small office consisting of ten people.

13. *What specific integrated logistics support elements do you feel your program office emphasized during pre-Milestone I? Check all those that applied.*

| | |
|---|---|
| _X_ *Maintenance Planning* | ___ *Technical Data* |
| _X_ *Supply Support* | _X_ *Support Equipment* |
| _X_ *PHS&T* | ___ *Training & Trng Support* |
| _X_ *Design Interface* | ___ *Computer Resource Support* |
| ___ *Facilities* | _X_ *Manpower & Personnel* |
| ___ *Others (Explain)* | |

14. *If you could implement logistics all over again, knowing what you know now, what would you do differently?*

I really do not know; the program was canceled after six months. What would I do differently is probably provide training or background in what you should do during the pre-Milestone I phase of a program. We did not know what we were doing. Nobody had been logistically involved that early before. I went out and talked with people involved in the early phases of the F-22 program. I asked questions on what they did and the problems they encountered. There should be some information, training or something that identifies early requirements.

Instead of being able to select qualified individuals, I was limited to people on the surplus list. If we are involved with a program like the Multi-Role Fighter, I think logistics should be a number one priority. I just did not get the right resources I thought was needed.

15. *What information or authority were you lacking that kept you from accomplishing this the first time?*

Some sort of training or guide on what you should do that early in the program. I think it would be very helpful to develop a guide or pamphlet for anybody else who ever becomes involved.

You must have the support from the home office to go out and pick the people that are qualified instead of picking individuals off the surplus list. You need generalists not people who are knowledgeable in one or two specific areas of the ILS elements. Overall, someone familiar with what you want to put in the RFP contract. Generalists are the type of people you need, and I needed the flexibility to go out and find those people.

16. *What are the most important lessons learned from the program regarding logistics?*

Do a lot more homework on the processes. I was trying to do everything and not having enough time. I tried to talk to everybody I could and keep up with routine management functions. I think this comes back to training again. There was no guide on what had to be done, what was required at Milestone I, and what was needed to get there. Basically, I had to learn what my job consisted of and how to do it.

17. *What are some logistics process improvements that proved to be most effective on the program?*

The manpower was an important issue on this system. I thought the IMPACTS personnel were very good. Nobody was really knowledgeable in this early acquisition period, but we knew where we had to end up and back track from there.

18. *What system did you use to track acquisition logistics goals and status?*

None. Logistically we did not have any metrics other than the goal to take an F-16 and incorporate all technology improvements available to provide a highly reliable, easily maintainable airplane. That was the goal.

19. *Who performs Logistics Support Analysis (LSA)?*

_X_ *Government*         ___ *Prime Contractor*
___ *Other (Explain)*       ___ *Support Service Contractor*

The government would initially and once a Milestone I decision was made the contractor would assume that role. Initially the air logistics center was to perform LSA in-house. The intent was to provide the LSA data base as government furnished property to all competing contractors.

20. *What other logistics activities were conducted to insure logistics was accomplished?*

_x_ *Maintainability analysis*          _x_ *Reliability analysis*
_x_ *Supportability analysis*          ___ *Other (Explain)*

The majority of the logistics effort concentrated on a reliable aircraft; one that would not break down as often. In addition, supportability included minimizing support equipment and support of support equipment. Supportability also included efforts to minimize deployment requirements.

21. *Which of the following were conducted prior to Milestone I?*

_x_ *LSA*                              _x_ *Reliability analysis*
_x_ *Maintainability analysis*         _x_ *Supportability analysis*
___ *Other (Explain)*

The program was preparing for a Milestone 0 decision.

22. *Were logistics elements included in life cycle cost estimates?*

Yes, AL provided the program with really good operations and support life cycle cost data.

23. *Were there any particular difficulties in accomplishing these logistics elements?*

There were no problems in getting historical data. F-16 and F-22 data was used to extrapolate logistics costing information.

24. *What documents were available to direct and establish pre-Milestone I logistics planning?*

___ *Maintenance Concept*             ___ *Draft ILSP*
___ *ORD*                             ___ *PMD*
_x_ *Others (Explain)*                ___ *Mission Need Statement*

What we were doing was putting together a Mission Needs Analysis. The user wanted to include ASC early in the project. ASC was involved up-front with the user in developing the mission needs analysis and ensuring logistics concerns were addressed.

Training and Education

1. *Are your acquisition logisticians adequately trained?*

No, they were not adequately trained.

2. *What specific areas should have been emphasized?*

The pre-concept phase and what it consists of. Understanding the process, as well as, the logistics activities involved. There is no training out there to educate people in how logistics is involved that early and on what needs to be done. Historically, logistics becomes involved after Milestone I where design decisions have been made that adversely impact supportability. The XR community is the link; they were very knowledgeable but not readily available.

3. *Do you conduct any internal logistics training?*

No, the office was too small.

4. *Who should conduct the training?*

_X_ Wright-Patt Campus        ___ Contractor
_X_ Mentoring        ___ Other (Explain)
___ Computer-based Training

Mentoring -- if you had a telephone list or a list of people involved in pre-Milestone I activities. Knowing what happened, what do you do, what the problems were would be beneficial.

5. *How do you identify training deficiencies?*

We did not identify any training deficiencies because where were we going to go for it. There was no training available. There is a deficiency in the overall training program, because it does not address logistics in the early acquisition phases. This is even prevalent at DSMC.

6. *Are logistics training requirements available from existing courses?*

I can not answer this question because I do not know what courses are available. Based on my experience there was none.

7. *Does existing training adequately cover pre-Milestone I requirements? Check all those that apply.*

___ Reviewing alternatives        _X_ LSA
_X_ Determining LCC        _X_ Acquisition strategy
___ Others (Explain)

## Tools and Aids

1. *Does your program office use the following tools for logistics management?  Check all those that apply.*

___ CSNAS                    ___ AF Acquisition Model
_x_ AF Lessons Learned       ___ LOGPARS
_x_ Acq Logistics Guide      ___ ILSP Advisor
_x_ LCOM                     ___ NRLA Model
___ Others (Explain)

2. *What tools developed by your office or contractor will do similar things as those identified above?*

None.  We were going to rename LSA because of its logistics implications.

3. *Are there any specific areas in logistics for which you would recommend a tool or aid be developed?*

For that early in the program, a checklist or guide identifying what tasks should be accomplished.  I would like something to tell me what should I be doing similar to the way LSA is broken out.  LSA lists each task and recommends when it should be applied.  LSA has a matrix that identifies what tasks should be reviewed for each acquisition phase -- something tailorable.  A checklist of what I need to do before a Milestone I decision.  Logistics manager basically knows what has to be accomplished, but if you forget one or two efforts, you can be in trouble.

## Additional Comments

This case study was originally used as the pilot study.  The pilot study was to familiarize the researcher with the research topic, to refine procedures, and to develop additional questions.  This case study was included as part of the research effort since no changes resulted from the initial interview session.

# Appendix G: Case 2 - B-2 Bomber

## Interviewee Qualifications

The interviewee was a senior-level management supervisor responsible for the overall support of the B-2 Bomber program and held this position for two years. He has over 25 years of logistics experience with 15 years in the acquisition logistics arena. The interviewee has a Level III certification in Acquisition Logistics and Program Management. He has personally had hands-on experience with engineering, manufacturing, and development; and production and deployment acquisition phases.

## Observations

The interview was conducted at the interviewee's facility. The B-2 is a classified program and the interview was conducted in a reception area. The area was small and did not allow for any privacy. There was a continuous flow of incoming and outgoing personnel and at times was considered very distracting. The interviewee was explained the purpose of the interview. The logistics manager did not fill out the interview protocol prior to the interview. The session lasted approximately one hour. He did not personally experience the pre-Milestone I efforts. The program has been in existence since early 1980s. He was asked to perceive what occurred on the program during that time based on his program knowledge and personal experiences. He first appeared to be apprehensive and unenthusiastic in sharing his opinions about what occurred on the program. As the interview progressed, he became more relaxed and candid. The interviewee did indicate he was running late for another, very important meeting.

## Interview Protocol

### Logistics Considerations

1. *What were the logistics goals and objectives which the program office considered during pre-Milestone I?*

Reliability and maintainability were significantly emphasized on the B-2 Bomber.

2. *Which of the goals and objectives changed and how?*

The goals and objectives did not really change. I think reliability and maintainability has been consistently emphasized.

3. *Please identify the significant logistics impediments the program office had to overcome.*

When the program was reduced to 20 aircraft, the support concept had to be completely reviewed. Both OSD and Congress have taken an active role in reviewing our support concept. It has been a very difficult challenge for everyone. Two fundamental changes have occurred due to the reduction of aircraft: the B-2 will be located at one base, and the weapon system's role has changed from a strategic to a tactical deterrent. Strategic Air Command has gone away, and we now have to deal with Air Combat Command.

4. *How were these impediments addressed?*

We had to do a full blown study on our support concept that included all aspects of the weapon system -- deployment repairs, avionics repairs, software support, aircraft depot maintenance, trainers, and engine support. All these areas had to be studied and an economic analysis performed.

5. *How did the program office communicate logistics requirements internally?*

Key program documents such as the Operational Requirements Document and the Program Management Directive formed the baseline for logistics requirements. In addition to our IPT structure, the B-2 organization has a division in charge of integration (YSI). They have the responsibility of integrating the IPTs by initiating weekly meetings. We also have monthly program reviews where each IPT briefs our System Program Director and senior management.

6. *How did the program office communicate logistics requirements with external customers?*

We have bi-monthly Integrated Logistics Support Working Groups (ILSWG) with our customer at Whiteman AFB MO. ILSWGs cover the total logistics program and usually last two or three days.

The B-2 program has a unique system called the Capability Assessment Requirements Data (CARD) data base. This management information system identifies all issues and prioritizes them. The CARD data base is the tool we use to make sure the right amount of emphasizes is being placed on the appropriate issue. The CARD data base allows the user to become involved and keep in touch with the program office.

7. *How does logistics within the program office interface with research laboratories?*

There is a communication flow of research ideas, but I do not really know what the mechanism is. I know it is happening because of the technical challenges that still remain on the program such as low observable supportability. I think it is an informal system of B-2 engineers knowing who to contact at the laboratories.

Low observable supportability is our biggest challenge. Laboratory interface is really a combined effort between engineering and logistics where design and support are addressed in the same forum.

8. *Besides labs, what other sources of technological information are available for logistics use?*

| | |
|---|---|
| ___ *Trade Studies* | _x_ *Prime Contractors* |
| ___ *Innovations in RFP* | ___ *Technology Transfer Office* |
| _x_ *Others (Explain)* | |

Recently we used the Defense Technical and Information Center to obtain information on organic maintenance support. Additional information was needed to investigate an assumption that organic and contractor support were equivalent in terms of productivity efficiencies. No one had done any research in this area.

We do have some Scientific & Technical Agency (SETA) contracting vehicles; a vehicle to draw in some special expertise to help with a special study effort.

The contractor, Northrop, has used Independent Research and Development funds to support B-2 maintenance.

9. *What other sources of obtaining technology information do you have?*

I can not think of anything else.

10. *What does the program office expect logistics to provide regarding program requirements?*

The logistics personnel are held accountable for the acquisition of all the support resources needed on the B-2 Bomber. We are also responsible for the sustainment support of the air vehicles, support equipment, technical orders, and spares. Logistics is responsible for reporting operational metrics. We are responsible for budgeting our requirements to ensure they are obligated in accordance to OSD standards.

11. *What process(es) does your program office have for identifying logistics requirements?*

Our logistics requirements are identified in the Northrop contract. I think this goes back to the CARD data base. The CARD data base is a process where requirements are surfaced by the user and evaluated by the program management office in terms of achievability and affordability. This data base is relative new -- less than a year old. Since the delivery of our first aircraft in December 1993, more emphasis is being placed on support and operational requirements. The CARD data base is not accessible to our contractors.

We have the *Forum* which is basically our biggest meeting with HQ ACC. At this meeting everyone reviews the CARD data base and makes sure it is current and accurate. Every CARD item must have a closure plan that is tracked. We use metrics like crazy.

We also have a state-of-the-art video telecc nferencing capability that allows us to hook up with the user, contractor, air logistics center, and other subcontracting sites. This system can handle multiple sites and is cleared for classified data.

The classified status of the program has never been a problem because we have had classified lines since the beginning of this effort. Security was always a part of the program. In fact, during the initial phases of the program it was considered the number one priority even above cost, performance, and schedule.

12. *What information sources does your program office have for identifying logistics requirements?*

The B-2 program office has another system called the Logistics Support Management Information System (LSMIS). It is our logistics data base and contains our LSA data, SERDs, CFAE notices, reliability and maintainability data, and so on. There are LSMIS terminals throughout the program office and Tinker AFB OK. LSMIS is the system the contractor maintains.

In our earlier days, the B-2 had a lot of carte blanc in terms of being able to do things without going there an extensive approval process. Some things were delegated to the System Program Director that were traditionally held at higher levels. This enabled the program to move forward faster. That is all changing now, and we are becoming more and more like the typical program management office in terms of our reporting requirements to the ASC commander.

13. *What specific integrated logistics support elements do you feel your program office emphasized during pre-Milestone I? Check all those that applied.*

| | | | |
|---|---|---|---|
| ___ | *Maintenance Planning* | ___ | *Technical Data* |
| ___ | *Supply Support* | ___ | *Support Equipment* |
| ___ | *PHS&T* | ___ | *Training & Trng Support* |
| _X_ | *Design Interface* | ___ | *Computer Resource Support* |
| ___ | *Facilities* | ___ | *Manpower & Personnel* |
| ___ | *Others (Explain)* | | |

14. *If you could implement logistics all over again, knowing what you know now, what would you do differently?*

Well, I guess I have become a believer in IPTs. Originally, we had a typical matrix-type organization. We had problems because no one knew what our budget was. It was always a challenge. Under the IPT concept the financial manager is a part of the team. We have integrated and enhanced our management capability using the IPT structure. The results are better products, better communications, and better control.

**15. What information or authority were you lacking that kept you from accomplishing this the first time?**

The ASC commander is an avid supporter of the IPT concept. The arrival of the new System Program Director was the ideal time to implement this effort.

**16. What are the most important lessons learned from the program regarding logistics?**

I think we have done extremely well in supportability. Unfortunately, one of the reasons is that our Engineering, Manufacturing, and Development (EMD) program has slipped quite a bit allowing more than adequate time to execute our support resources. All organizational-level technical orders have been validated and verified prior to first aircraft delivery. We have all organizational-level support equipment approved by the user. All the spares have been provisioned. We were afforded some additional time because of EMD problems and this helped us meet our commitments. The original B-2 schedule was very challenging. Basically, we had a tremendous amount of workarounds and contractor support at the base. To adequately cover logistics requirements, you need to embed enough time to do it correctly.

**17. What are some logistics process improvements that proved to be most effective on the program?**

We are working on a lot of process improvements but do not have a lot of glowing reports right now. Our whole change process is being revisited; we are trying to cut the number of days involved. We finally apportioned it out into segments and measured each segment, but we are not doing all that well in terms of our goals. This is a joint process improvement team with our contractor. We have barely scratched the surface.

Northrop integrated logistics support team has not revised their organizational structure to match our IPT structure. We no longer have a support equipment or technical order group. We have subsystem managers who are accountable for all aspect in support of that subsystem. Under the IPT/IWSM concept we have gone that last step, but Northrop still has a matrix structure. This creates a problem in accountability.

One thing positive that Northrop did do is develop the Logistics Integrated Network Control (LINC) system. This system takes an end item like a line replaceable unit and builds schedules for all the support resource requirements. This allows the logistics manager insight into projecting organic support dates. This is a pretty impressive system. LINC allows you to have some flexibility in determining where the impact areas are and where to place the emphasis. LINC is a tool that Northrop developed to help manage the whole process of combining the acquisition and interim contractor support into to organic capability.

**18. What system did you use to track acquisition logistics goals and status?**

Our team metrics are presented at the monthly program reviews. Each team has to report on certain key issues such as obligation expenditures, appropriations status, and CARD closure plans. Each team has to brief on how they are doing in terms of meeting

the user's request for information. The system support team is starting to brief on operational metrics.

Internal Program Reviews are the forum for informing the System Program Director on the program status. All the teams have been *baselined* so only the exceptions are reported. Each team is responsible for their own tracking.

19. *Who performs Logistics Support Analysis (LSA)?*

___ Government                        _X_ Prime Contractor
___ Other (Explain)                   ___ Support Service Contractor

20. *What other logistics activities were conducted to insure logistics was accomplished?*

_X_ Maintainability analysis           _X_ Reliability analysis
_X_ Supportability analysis            _X_ Other (Explain)

The B-2 program office conducted several maintainability demonstrations. We also had a number of Non-Commissioned Officers actually working on the Palmdale production line so they could thoroughly understanding how the aircraft was assembled.

21. *Which of the following were conducted prior to Milestone I?*

___ LSA                               ___ Reliability analysis
___ Maintainability analysis          ___ Supportability analysis
___ Other (Explain)

I do not know. I do not even know if the B-2 even had a Milestone I decision. It certainly was not a formal one. That was an extremely long time ago.

22. *Were logistics elements included in life cycle cost estimates?*

Yes.

23. *Were there any particular difficulties in accomplishing these logistics elements?*

The logistics manager requested support from the home office, AL, to do life cycle costing. I think it would be ideal to have the experts within the program office but there just are not that many available. A typical acquisition logistics management specialist (346-series) just does not have the background. This worked out pretty good; we were given more than adequate support from AL.

**24. What documents were available to direct and establish pre-Milestone I logistics planning?**

___ Maintenance Concept       ___ Draft ILSP
___ ORD       ___ PMD
___ Others (Explain)       ___ Mission Need Statement

If there were any documents, which I doubt if anyone has, they would all be considered classified

Training and Education

**1. Are your acquisition logisticians adequately trained?**

Yes. Under Integrated Weapons Systems Management and Integrated Product Teams concepts, the logisticians are expected to perform like program managers. That can be difficult at times.

**2. What specific areas should have been emphasized?**

Cost, schedule, and accounting is considered a challenging area. The logistics managers are responsible for tracking all the budgetary efforts associated with the support of the aircraft.

**3. Do you conduct any internal logistics training?**

No.

**4. Who should conduct the training?**

___ Wright-Patt Campus       ___ Contractor
___ Mentoring       ___ Other (Explain)
___ Computer-based Training

Not applicable.

**5. How do you identify training deficiencies?**

We have a very thorough Acquisition Profession Development Program (APDP) process, and the requirements to obtain certification is a good start in the right direction. We are placing emphasis in terms of identifying training requirements in the individual's development plan.

**6. Are logistics training requirements available from existing courses?**

I think so. In fact, there is a full spectrum of courses available.

7. *Does existing training adequately cover pre-Milestone I requirements? Check all those that apply.*

_x_ Reviewing alternatives         _x_ LSA
_x_ Determining LCC               _x_ Acquisition strategy
___ Others (Explain)

I would say you would need a pretty experienced logistician; trained logistician to do those functions well. Our typical GS-12-346 is probably not well-rounded enough to do all these functions, but I think there is adequate training available. You may have to go to Fort Belvoir, but there are courses on everything.

## Tools and Aids

1. *Does your program office use the following tools for logistics management? Check all those that apply.*

___ CSNAS                     ___ AF Acquisition Model
___ AF Lessons Learned      ___ LOGPARS
___ Acq Logistics Guide       ___ ILSP Advisor
_x_ LCOM                      ___ NRLA Model
_x_ Others (Explain)

The B-2 support requirements were estimated using a model called COCOMO.

2. *What tools developed by your office or contractor will do similar things as those identified above?*

Most of our internal tools are difficult to apply generically because they really address a specific problem such as the depot support review. There was just a whole gambit of spreadsheets that were developed that compared the cost between organic and contractor support. I think commercial off-the-shelf software packages can provide a means for the logistics manager to perform a unique tasking. One can master these programs without too much trouble and really become productive.

3. *Are there any specific areas in logistics for which you would recommend a tool or aid be developed?*

The whole Decision Tree Analysis process for estimating cost associated with organic versus contractor support is nebulous. The guidance is vague in terms of how one interprets the analysis. HQ AFMC has one perspective, and HQ USAF & OSD has a completely different viewpoint. HQ AFMC does not view the economic analysis to be all that important. OSD thinks cost is absolutely crucial and everything else is just augmentative. They want to see the numbers and how they were derived. The B-2 managers have to come up with their own algorithms. The C-17 program management office is going through this same exercise. A generic, tailorable logistics cost estimating model would be helpful. A lot of cost estimating relationships are now well defined.

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## Additional Comments

Thank God for spreadsheets! What we end up doing is tailoring spreadsheets or developing a spreadsheet to address a specific issue. We had a lot of studies recently on three versus two levels of maintenance. We had to develop spreadsheets to compare these two alternatives.

This case study consisted of two interviewees. The senior-level logistics management supervisor requested JPATS programmatic information be directed to the integrated logistics support manager. The interview protocol incorporates the opinions of both interviewees.

## Interviewee Qualifications

The first interviewee was a senior-level management supervisor responsible for the overall support of the JPATS program and held this position for less than one year. He has over eight years of logistics experience with six years in the acquisition logistics arena. The interviewee has a Level III certification in Acquisition Logistics and Program Management. He has personally had hands-on experience in all the acquisition phases.

The second interviewee was a journeyman-level manager responsible for the overall support of the JPATS program and has held this position for over four years. He has over 19 years of logistics experience with six years in the acquisition logistics arena. The interviewee has a Level III certification in Acquisition Logistics and Program Management and a Level II certification in Quality Assurance. He also holds a DLA certification in Quality Assurance Systems, Aircraft, and Mechanical Systems. He has personally had hands-on experience with all the acquisition phases except Engineering, Manufacturing, and Development.

## Observations

The first interview was conducted at the interviewee's facility. The interviewee was in the process of moving to another location and the temporary office area was small and did not allow for any privacy. The administrative support area was right across the aisle. The telephone was constantly ringing and proved to be quite a distraction. There was a mix-up in the interview date, and the interviewee had the meeting scheduled for a time later that week but agreed to continue with the interview. The interviewee was explained the purpose of the interview and did not fill out the interview protocol prior to the interview. The session lasted approximately one hour. A non-developmental item or commercial off-the-shelf program does not go through the typical acquisition phases. Non-developmental items go through an analysis phase (equivalent to the first four phases of the acquisition cycle) and then into production and deployment. For the purpose of the interview, pre-Milestone I efforts were comparable to the analysis phase. He did personally experience the pre-Milestone I efforts but did not consider himself a resident expert since he has only been involved for less than one year. He was asked to perceive what occurred on the program during that time based on the his program knowledge and personal experiences. He first appeared to be flustered and unorganized because of the mix up in the schedule. As the interview progressed, he became more relaxed and candid. The interviewee was

eager to provide any additional support in assisting the researcher in accurately completing this case study.

The second interview was also conducted at the interviewee's facility. The office area was small and did allow for some privacy. The interview was constantly interrupted with telephone calls and proved to be somewhat of a distraction. The interviewee was explained the purpose of the interview and did fill out the interview protocol prior to the interview. The session lasted approximately one hour. For the purpose of this interview, pre-Milestone I efforts were comparable to the analysis phase of a non-developmental program. He did personally experience the pre-Milestone I efforts. He appeared relaxed and eager to share his opinions about what occurred on the JPATS program.

## Interview Protocol

### Logistics Considerations

1. *What were the logistics goals and objectives which the program office considered during pre-Milestone I?*

JPATS was designed to be a commercial off-the-shelf program with some missionization. Most of the logistics goals were to implement the best commercial practices. The goal was to take an existing commercial aircraft with minimal modification, if require, to fulfill the user's requirements. This would reduce and possibly eliminate any developmental time and expense. The support concepts were based upon the user's requirements identified in the Operational Requirements Document (ORD) where best commercial practices were considered and applied.

One of the first things we had to do was sit down with our user and establish realistic goals. The ORD was very specific and had a tendency to tell us how to do our job instead of what the requirements were. The maintenance concept was full organic support for the Air Force; the Navy wanted full contractor logistics support. We had to work at resolving this maintenance dilemma.

2. *Which of the goals and objectives changed and how?*

All along we wanted to use the best commercial practices, but many of our external customers still had a traditional knowledge base. The traditional way to approach an acquisition was to implement military standards, specifications, and data collection systems. In the past six months, JPATS was designated as a pilot program for acquisition streamlining. This program has allowed us the flexibility to eliminate a loft of our traditional logistics activities. For example, instead of requiring MIL-STD-1388 be a part of the Request for Proposal (RFP), the contract language allows the contractor to use MIL-STD-1388 as a guide. This allows the commercial contractor the flexibility of submitting support information in their own format.

We have deleted a lot of the acquisition logistics military standards and instructions for quality and decided to go with the commercial practice using ISO 9000. The technical orders are also going to be commercial manuals. The only technical data requiring military compliance are the flight manuals. This effort has reduced the page count from 80 pages to 8 pages of requirements. All this due to acquisition streamlining.

We went from full organic to partial contractor logistics support based upon the outcome of a cost comparison study. We also had a lot of changes in resources – decreased dollars and personnel slots. The equipment strategy also changed. Originally, we were going to supply some pieces of support equipment, but lessons learned from the T1 program has identified significant problems in providing contractors with support equipment. Item managers could not guarantee the availability or reliability of the equipment.

3. *Please identify the significant logistics impediments the program office had to overcome.*

Most of the impediments were OSD and Congressional interventions. OSD's perception of acquisition streamlining was to cut the number of pages in the RFP. Our office had to revise the RFP several times before approval was obtained from higher authorities. Acquisition streamlining efforts were concerned more with reducing page count than reducing the acquisition time. In fact, the new acquisition streamlining activity has delayed the JPATS program by two months. Acquisition streamlining is suppose to eliminate the regulatory boundaries between the military and the contractor, but the briefing trail still remains the same. The JPATS program is receiving more senior management oversight than thought possible.

Another impediment was the lack of experienced personnel. They had acquisition training, but they just did not have any experience in commercial off-the-shelf programs. We went out and looked for training that dealt with the commercial off-the-shelf and non-development item issues and found only one course conducted by OSD.

The decision tree analysis selection was also considered an impediment. The original selection designated SM-ALC as our air logistics center. The center of excellence for contractor logistics support was OC-ALC. It took a lot of convincing to the user and HQ AFMC to change our air logistics center to Oklahoma City.

4. *How were these impediments addressed?*

Being designated a pilot program for acquisition streamlining at this stage of the program has doubled our efforts. Numerous hours are spent redoing the RFP to meet the expectations of higher authorities. The results are another round of pre-solicitation conferences with potential contractors. We owe it to them to go back out and answer all their questions. Remember, this is a non-development program. There is no EMD; the RFP is for production. When the contractors submit their proposal they will bring their aircraft with them and demonstrate its capabilities. This is a fly before you buy activity. We are using proven technologies.

Acquisition streamlining should result in a shorter procurement time through reduction in regulatory and statutory requirements. Being classified a pilot program has brought about a lot of frustrations and actual delays in the original program schedule.

The other issues were resolved at the Joint Integrated Logistics Support Management Teams (JILSMTs). The JILSMTs consist of senior management personnel representing the user, air logistics center, and ASC.

5. *How did the program office communicate logistics requirements internally?*

Most of our logistics requirements came from the ORD. The JPATS was extremely detailed. The language contained a lot of *how to* instead of allowing ASC the flexibility to pursue alternatives. I believe this is in part to lessons learned from previous programs such as the T1 and T3 trainers.

Senior management depends heavily on the IPT concept. Whenever there is a logistics problem, the IPT lead is approached on the available of the logistician. The JPATS program works as a team. The JPATS IPTs are a little non-traditional because they were based on products. These products consist of RFP, source selection preparation, and source selection evaluation. All the JPATS personnel are expected to support the source selection effort. After source selection the IPTs need to be redefined. At that point in time, we may choose the traditional approach and create teams for each subsystem, or we may line ourselves up to match the organizational structure of the winning contractor. This would promote a *one team concept* where the contractor and government are working as one team.

One of the requirements we left out of the RFP was the need to have working groups. The theory behind this effort was there would be no need to officially designate these meetings because the contractor would be already a part of the team. This interface would happen naturally. If this does not happen, the JPATS RFP has a clause that reverts to traditional practices. The JPATS program office has no problem accepting the *one team concept,* but there are some growing pains and paradigms to overcome.

Internally we wrote management papers and assigned tasks to logistician using a task matrix. We broke out all the tasks by logistics elements then assigned a person to work them. Point papers were developed to circulate among the users and other customers. A logistics file was maintained to keep historical records, backup analysis and rationale.

6. *How did the program office communicate logistics requirements with external customers?*

Reference question number five above.

7. *How does logistics within the program office interface with research laboratories?*

The JPATS is considered a low technology aircraft. The JPATS has no weapon system capabilities. The only technological challenge is in the area of anthroprometrics. The human factors side of design. That would be one of the biggest

challenge we would have to meet with this aircraft. We are depending on the contractor to do that.

8. *Besides labs, what other sources of technological information are available for logistics use?*

___ *Trade Studies*　　　　　　　　___ *Prime Contractors*
___ *Innovations in RFP*　　　　　　___ *Technology Transfer Office*
_x_ *Others (Explain)*

The JPATS is mostly a commercial effort. Being a commercial off-the-shelf product means basically taking what is already in existence. This aircraft is flying somewhere in the world right now. There will be a portion that will require some missionization such as ejection seats and bird strike capability. There are some technological challenges, but no *new* technology. Other sources of technological information were conferences. I learned more of what was going on while attending conferences.

9. *What other sources of obtaining technology information do you have?*

Other sources of obtained technology information is through other services such as the Navy and Army. The Navy had a software program that would automatically chose the data elements corresponding to selected LSA reports and data item descriptions. We also attended an Army conference in conducting source selections. You can learn a lot working with other services.

10. *What does the program office expect logistics to provide regarding program requirements?*

The program office expects logistics to know the commercial aspects of logistics, but not necessarily know commercial logistics. We are to assess these commercial practices and recognize any risks associated with them.

11. *What process(es) does your program office have for identifying logistics requirements?*

Most of our logistics requirements were dictated to us through the customer. I would say the ORD defined our logistics process which are normal commercial practices.

12. *What information sources does your program office have for identifying logistics requirements?*

Every Friday we have an Issues Review where all the functional chiefs present issues that could not be resolved within the individual IPTs. An internal communication package is available to all program management personnel.

13. *What specific integrated logistics support elements do you feel your program office emphasized during pre-Milestone I? Check all those that applied.*

_x_ Maintenance Planning           _x_ Technical Data
___ Supply Support               ___ Support Equipment
___ PHS&T                       ___ Training & Trng Support
___ Design Interface             ___ Computer Resource Support
___ Facilities                      ___ Manpower & Personnel
___ Others (Explain)

14. *If you could implement logistics all over again, knowing what you know now, what would you do differently?*

I probably would have worked a little harder in identifying user requirements. Even as late as today we found one of their requirements was unrealistic. If a closer working relationship was established earlier we probably would have already conducted a cost analysis and trade-off study. The effort would have started earlier and given more management emphasis. We also need to recognize the commercial aspects of the system earlier.

15. *What information or authority were you lacking that kept you from accomplishing this the first time?*

The change in administration has brought about the emphasis on reforming the government. Acquisition streamlining is an outcrop of this effort. The decision to designate JPATS as a pilot program delayed the original schedules.

Due to lack of experience I did not really know the overall goals and objectives behind user requirements. Many times requirements were politically motivated versus real needs. You not only need to know your users, but you also need to know all your customers.

16. *What are the most important lessons learned from the program regarding logistics?*

That is hard to say at this point in time. It would be interesting to see what lessons we do learn. We have made the decisions, but we do not know the consequences of those decisions. Commercial off-the-shelf products and procedures need to be better defined. Often we call a product commercial off-the-shelf and then apply missionization. A lot of development can occur to missionize a commercial product. I think the definition confuses a lot of people at different management levels. Many people at the OSD level think you can just go out and buy the product. Yes, the basic derivative is flying somewhere but you just can not go out and buy a JPATS. So in reality, commercial off-the-shelf is not truly a commercial product.

17. *What are some logistics process improvements that proved to be most effective on the program?*

One of the biggest processes we are living with right now is with the Integrated Weapon System Management (IWSM) concept. Right now I am having my logisticians flow chart their processes starting with ASC and ending with the air logistics center. Flow charts identify the steps in the process. We need to understand what the process is before we can effectively and efficiently manage logistics.

Again, the JPATS program is unusual. Normally under IWSM you have a system program director with a system program manager working directly with him. OC-ALC is our Center of Excellence for contractor logistics support aircraft. The JPATS system program manager is only concerned with JPATS and contractor logistics support. So what we have is a contractor logistics support manager who reports directly to the center's commander. There sometimes are some *turf battles* which puts OC-ALC between a rock and a hard spot. Overall, the process is working. One way to overcome these obstacles is to define the process, to identify what needs to be done, and to define roles and responsibilities.

OC-ALC drafted the contractor logistics support contract, statement of work, and portions of the RFP. We fully expect to have OC-ALC involved during source selection. We also have Navy and AETC representatives on the source selection team.

18. *What system did you use to track acquisition logistics goals and status?*

We are not really there with JPATS. It is hard to define useful metrics that would enhance a manager's decision. I know the command is pushing for a supportability metric that would track logistics events, how we are meeting our schedule, and potential impacts if we do not. I have a problem using this metric on the JPATS program. As I have mentioned before, many of the events that are being tracked are not applicable to a non-development program. That is one of the tasks I have for my logisticians -- come up with some useful metrics.

19. *Who performs Logistics Support Analysis (LSA)?*

___ *Government*                          ___ *Prime Contractor*
_X_ *Other (Explain)*                      ___ *Support Service Contractor*

If we had required LSA to be on contract, the contractor would have performed LSA efforts. The contractor will be using MIL-STD-1388 as a guidance. It very well may be LSA because five of the seven competitors already build military aircraft.

20. *What other logistics activities were conducted to insure logistics was accomplished?*

_X_ *Maintainability analysis*             _X_ *Reliability analysis*
_X_ *Supportability analysis*              ___ *Other (Explain)*

21. *Which of the following were conducted prior to Milestone I?*

___ *LSA*                          ___ *Reliability analysis*
___ *Maintainability analysis*     ___ *Supportability analysis*
___ *Other (Explain)*

Not applicable.

22. *Were logistics elements included in life cycle cost estimates?*

Yes, life cycle costing was applied in supply support considerations. We also did a life cycle cost estimate and trade-off study on different maintenance concepts. All logistics elements were included.

23. *Were there any particular difficulties in accomplishing these logistics elements?*

All of this was considered difficult because it was hard to get the appropriate data. The CAIG was a good source for manpower and cost information. Engineering data was very hard. How does one cost engineering data efforts? There does not seem to be a central data base to access. Another one was technical data. Only recently was there a figure for a price per page.

24. *What documents were available to direct and establish pre-Milestone I logistics planning?*

___ *Maintenance Concept*    ___ *Draft ILSP*
_x_ *ORD*                     ___ *PMD*
___ *Others (Explain)*        ___ *Mission Need Statement*

Not applicable. Non-developmental programs do not go through a pre-Milestone I planning effort, but an ORD was provided.

Training and Education

1. *Are your acquisition logisticians adequately trained?*

Yes, my acquisition logisticians are considered adequately trained, but we need a better contractor logistics support effort.

2. *What specific areas should have been emphasized?*

There is a lack of contractor logistics support training.

3. *Do you conduct any internal logistics training?*

Training monitor tracks Acquisition Professional Development Program certification efforts. Training requirements are submitted to the home office. The training monitor will notify the appropriate people of available class dates.

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4. *Who should conduct the training?*

___ *Wright-Patt Campus*　　　___ *Contractor*
___ *Mentoring*　　　　　　　　___ *Other (Explain)*
___ *Computer-based Training*

Not applicable.

5. *How do you identify training deficiencies?*

Individual development plans are periodically reviewed. Training requirements are identified through the training monitor.

6. *Are logistics training requirements available from existing courses?*

Contractor logistics support management is missing.

7. *Does existing training adequately cover pre-Milestone I requirements? Check all those that apply.*

___ *Reviewing alternatives*　　　_x_ *LSA*
_x_ *Determining LCC*　　　　　　_x_ *Acquisition strategy*
___ *Others (Explain)*

## Tools and Aids

1. *Does your program office use the following tools for logistics management? Check all those that apply.*

_x_ *CSNAS*　　　　　　　　　　_x_ *AF Acquisition Model*
___ *AF Lessons Learned*　　　　_x_ *LOGPARS*
___ *Acq Logistics Guide*　　　　_x_ *ILSP Advisor*
_x_ *LCOM*　　　　　　　　　　___ *NRLA Model*
_x_ *Others (Explain)*

I have used other acquisition logistics tools such as Computer Assisted Methodology for Data Element Selection (CAMDES), Contractor Logistics Support (CLS) Guide, Commercial-Off-The-Shelf (COTS) Book in support of JPATS activities.

2. *What tools developed by your office or contractor will do similar things as those identified above?*

The JPATS program office uses a lot of commercial software packages to assist the manager in developing schedules and in determining supply support and risk factors

**3.** *Are there any specific areas in logistics for which you would recommend a tool or aid be developed?*

I would stress additional training be made available for non-development items and commercial off-the-shelf programs.

<u>Additional Comments</u>

I suggest an acquisition logistician have knowledge in interpreting cost analysis information. The typical logistician needs to have the appropriate experience in order to be effective on the job. The program management office needs to retain personnel long enough to foresee the benefits of their expertise but then they should rotate them after a period of time to prevent them from stagnating.

## Interviewee Qualifications

The interviewee was a senior-level management supervisor responsible for the overall support of the F-22 Advanced Tactical Fighter program and held this position for less than five weeks. She has over 17 years of logistics experience all of which were spent in the acquisition logistics arena. The interviewee has a Level III certification level in Acquisition Logistics and Program Management and a Level I certification in Financial Management. She possesses a Certified Profession Logistician certificate. She has personally had hands-on experience in all the acquisition phases.

## Observations

The interview was conducted at the interviewee's facility. The office area was open and did allow for any privacy. The interviewee was explained the purpose of the interview and did fill out the interview protocol prior to the interview. The session lasted approximately one hour. She did not personally experience the pre-Milestone I efforts since she just transitioned into the position. She was asked to perceive what occurred on the program during that time based on the her program knowledge and personal experiences. She appeared to be relaxed and eager to share her opinions about what occurred on the program.

## Interview Protocol

### Logistics Considerations

1. *What were the logistics goals and objectives which the program office considered during pre-Milestone I?*

The F-22 is considered the premiere world-class fighter. The logistics goals and objectives were to have phenomenal improvements in reliability and maintainability. The efforts put forth on this program has changed the traditional way we approach life cycle costing.

2. *Which of the goals and objectives changed and how?*

Fiscal constraints and baseline requirements identified in the Operational Requirements Document (ORD) changed these goals.

3. *Please identify the significant logistics impediments the program office had to overcome.*

The first impediment was the new technologies used on the aircraft. These new technologies have a high degree of risk associated with them. The new technologies

create new problems in how to support them. Repair procedures and environmental impacts are going to be very challenging.

The second impediment is the massive changes occurring in the logistics arena. Upper management has directed two levels of maintenance supported by a *purple suit* maintenance team. Purple suit indicates the joint program requirements for Air Force and Navy maintenance concepts.

The third area is the contractual constraints that are placed upon the program. This is not unique to our program and considered normal acquisition business, but they still are an impediment.

## 4. *How were these impediments addressed?*

The F-22 program is the number one priority program within the Air Force. It has the luxury of receiving a lot of positive political attention. Everyone and everybody wants to be involved with this premiere program. The attention is great and assures success. There are some technical transition issues that need to be addressed, but overall the program's impediments are not an issue.

## 5. *How did the program office communicate logistics requirements internally?*

Well, when I came on the program there was no centralized logistics. The F-22 program is organized into integrated product teams that had a tendency to act as mini program management offices. I found it very difficult grasping the overall logistics program. That is the function of YFL. A monthly logistics review will be conducted to provide a forum for exchanging logistics information. This includes the System Program Manager located at the air logistics center. This review is an attempt to standardize logistics functions within each IPT and split logistics responsibilities throughout each team. There is no doubt in my mind that the F-22 program has the *cream of the crop* and has created a highly motivated environment. You can not get that type of a working environment in other program management offices.

The ORD and contract define our logistics requirements. This is not any different then other program in that respect.

## 6. *How did the program office communicate logistics requirements with external customers?*

The same way as other program management offices. In other words, Memorandum of Agreements (MOA) with environmental, civil engineering or testing communities. The words contained in the program management directives and other traditional documents flow down requirements from the user to us or from us to other Air Force agencies. We formally document all agreements. The F-22 program has never had a problem in a MOA being signed because we are the only game in town. The biggest problem we have is the division of authority to truly implement the Integrated Weapon System Management IPT concept. IWSM requires maintaining a line of authority and control and presently statutory laws prevent this from happening. For example, we

have a MOA with Engineering (EN). EN co-locates people in the program management office. The program management office wants to rate them. This is still an issue with outside functionals.

7. *How does logistics within the program office interface with research laboratories?*

Actually the best example I can give will be the initiative with ARPA where we have actually gotten funding from them to help us in laying the ground work for an integrated data base for management efforts in logistics.

We use to have laboratory personnel co-located within the program office to ensure the latest technologies from the laboratory were considered. Engineering is still responsible for the technical side for design. Engineering and logistics concerns are approached concurrently because of IPTs. There is a logistician on every IPT. Of course, IPTs are predicated upon a highly qualified, highly motivated work force or the process breaks down. Motivation and skills are working here.

8. *Besides labs, what other sources of technological information are available for logistics use?*

_X_ *Trade Studies*          _X_ *Prime Contractors*
___ *Innovations in RFP*      _X_ *Technology Transfer Office*
___ *Others (Explain)*

9. *What other sources of obtaining technology information do you have?*

Other sources include professional conferences. Often other services will attend a professional conference where the F-22 program or its technologies are being presented. The Navy may express some interest and make arrangements to visit the program office for additional information or an exchange of ideas. Being the number one program does have its advantages.

10. *What does the program office expect logistics to provide regarding program requirements?*

There is no document that states logistics requirements, but we are organized into IPTs. I expect every logistician to cover the execution of logistics requirement that are on contract. I expect them to identify problems and holes and work those issues with the goal of having a fully supportable weapon system prior to delivery of the first production aircraft.

11. *What process(es) does your program office have for identifying logistics requirements?*

The IPT structure provides a front-to-back process. The IPTs are not just for members within the program office but encompass three or more contractors. We consider ourselves one team. The vehicle to identify requirements within each IPT are through advanced change notice studies and engineering change proposals.

12. *What information sources does your program office have for identifying logistics requirements?*

We use a lot of TDY dollars and have a rather sophisticated video teleconferencing system at all our locations.

13. *What specific integrated logistics support elements do you feel your program office emphasized during pre-Milestone I?  Check all those that applied.*

___ *Maintenance Planning*       ___ *Technical Data*
___ *Supply Support*            ___ *Support Equipment*
___ *PHS&T*                      ___ *Training & Trng Support*
___ *Design Interface*          ___ *Computer Resource Support*
___ *Facilities*                   ___ *Manpower & Personnel*
___ *Others (Explain)*

I have no idea what transpired during the early acquisition efforts.

14. *If you could implement logistics all over again, knowing what you know now, what would you do differently?*

I would try to put more production logistics requirements in the Engineering, Manufacturing, and Development contract.  What logisticians always have said is we want to be there earlier with more up-front support.  We need more integration in this environment then any other program.  I would like to have seen more depot long lead planning requirements -- long lead in terms of the support structure itself.

15. *What information or authority were you lacking that kept you from accomplishing this the first time?*

Political realities and the risk associated with them.  The best job we can do is to integrate logistics everywhere.  That way we would be ensured of having support requirements.

16. *What are the most important lessons learned from the program regarding logistics?*

Integrated IPTs and contracting vehicles do work.

17. *What are some logistics process improvements that proved to be most effective on the program?*

The F-22 is a paperless acquisition program.  It has an integrated data base and contains Provisionary Relational Integrated Distributed Electronics (PRIDE) system, our provisioning system, and LCOM.

18. *What system did you use to track acquisition logistics goals and status?*

We have two tracking systems -- the Integrated Master Planning System (IMPS) and the Integrated Master Schedule (IMS). The IMPS tracks our contractual requirements. The IMS tracks CDRL deliveries and traces its status. Both of these systems are automated and have software built in to report deviations from the schedule.

19. *Who performs Logistics Support Analysis (LSA)?*

___ *Government*                         _x_ *Prime Contractor*
___ *Other (Explain)*                   ___ *Support Service Contractor*

LSA is part of the system engineering process and located within that group. Logistics support this effort but the lead is engineering. I was very pleased to see that.

20. *What other logistics activities were conducted to insure logistics was accomplished?*

___ *Maintainability analysis*          ___ *Reliability analysis*
___ *Supportability analysis*           ___ *Other (Explain)*

I do not know.

21. *Which of the following were conducted prior to Milestone I?*

___ *LSA*                               ___ *Reliability analysis*
___ *Maintainability analysis*          ___ *Supportability analysis*
___ *Other (Explain)*

I do not know.

22. *Were logistics elements included in life cycle cost estimates?*

Yes, the F-22 conducted an affordability estimate. IPT managers are also responsible for cost, schedule, performance, and tracks their cost growths.

23. *Were there any particular difficulties in accomplishing these logistics elements?*

I do not really know.

**24. What documents were available to direct and establish pre-Milestone I logistics planning?**

| | |
|---|---|
| ___ Maintenance Concept | ___ Draft ILSP |
| ___ ORD | ___ PMD |
| ___ Others (Explain) | _x_ Mission Need Statement |

I do not really know what was available. I do know there was a mission need statement.

Training and Education .

**1. Are your acquisition logisticians adequately trained?**

All of our logisticians have Acquisition Professional Development Program (APDP) certification. This infers they have all the formal training required to fill their position. The F-22 program office has very low turnover and has high-level skills and abilities. Our acquisition logisticians are very experienced because they have the depth of knowledge. Most logisticians want to stay and basically homestead. We do not have a rotational requirement around here. How would I handle managing acquisition logisticians at ASC? I feel it is management's responsibility to posture their work force.

**2. What specific areas should have been emphasized?**

I emphasize APDP certification requirements. I also would like to see more sustainment between the our center and SM-ALC.

**3. Do you conduct any internal logistics training?**

To start, we conduct monthly issues reviews to discuss training problems. The F-22 program management office does conduct internal critical action team training. .

**4. Who should conduct the training?**

| | |
|---|---|
| ___ Wright-Patt Campus | ___ Contractor |
| ___ Mentoring | _x_ Other (Explain) |
| ___ Computer-based Training | |

We do conduct internal program management training.

**5. How do you identify training deficiencies?**

I conduct individual reviews with all my logisticians and compare their training to the AFMC template.

6. *Are logistics training requirements available from existing courses?*

Yes. We have a lot of courses being offered that address specific requirements. What we do not have are training courses that teach an individual to become integrators. We need integrators -- generalists.

7. *Does existing training adequately cover pre-Milestone I requirements? Check all those that apply.*

| | |
|---|---|
| ___ *Reviewing alternatives* | ___ *LSA* |
| _x_ *Determining LCC* | ___ *Acquisition strategy* |
| ___ *Others (Explain)* | |

Life cycle cost training does exist but not really required. The acquisition logistics manager should have a basic understanding of what is going on but the details can be performed by specialist within AL. This is true with trade-off studies. There are operations research analyst available within XR to perform studies thus an expertise on the project is not required.

## Tools and Aids

1. *Does your program office use the following tools for logistics management? Check all those that apply.*

| | |
|---|---|
| _x_ *CSNAS* | _x_ *AF Acquisition Model* |
| _x_ *AF Lessons Learned* | ___ *LOGPARS* |
| _x_ *Acq Logistics Guide* | ___ *ILSP Advisor* |
| _x_ *LCOM* | _x_ *NRLA Model* |
| ___ *Others (Explain* | |

2. *What tools developed by your office or contractor will do similar things as those identified above?*

The F-22 program has a very sophisticated management information system. This system provides Integrated Master Planning Schedules (IMPS) and Integrated Master Schedules (IMS). The ILSP comes from these data bases.

3. *Are there any specific areas in logistics for which you would recommend a tool or aid be developed?*

I would recommend an Integrated Weapon System Data Base Concept. This data base would contain all the technical and programmatic data for the weapon system. The problem we have today is sustainment. We do not have accessibility to records or we lack the historical data required to be *forward looking.*

## Additional Comments

I recommend a mobilized logistics work force. The AFMC template does not take into consideration the benefits of rotating our acquisition logisticians. One way to improve our work force is to expose them to different environments. We need to have multi-disciplined requirements. We need more generalists.

## Interviewee Qualifications

The interviewee was a senior-level management supervisor responsible for the integration and readiness support of the TSSAM program and held this position for approximately three years. He has over 14 years of logistics experience with all of them experienced in the acquisition logistics arena. The interviewee has a Level III certification level in Acquisition Logistics and Program Management. He has personally had hands-on experience with the engineering, manufacturing, and development; and production and deployment; and operations and support acquisition phases.

## Observations

The interview was conducted at the interviewee's facility. The TSSAM program is located in a highly secured area with limited access. TSSAM was a highly classified *black* program and has recently started to declassify some portions of the system. The interview was conducted at the local canteen. The seating arrangement allowed for easy conversation and some privacy. Due to the early morning hour, the canteen was not crowded, and the interview was conducted with no outside disturbances. The interviewee understood the purpose of the interview and filled out the interview protocol prior to the interview. The session lasted approximately one hour. He did not personally experience the pre-Milestone I efforts since he has been on the program for only three years. He was asked to perceive what occurred on the program during that time based on his program knowledge and personal experiences. He appeared to be relaxed and eager to share his opinions about what occurred on the program.

### Interview Protocol

## Logistics Considerations

1. *What were the logistics goals and objectives which the program office considered during pre-Milestone I?*

I do not know what the goals and objectives were. The program started in 1985, and I do not know of any survivors.

2. *Which of the goals and objectives changed and how?*

Unknown.

3. *Please identify the significant logistics impediments the program office had to overcome.*

The TSSAM program is a highly classified program and this was an impediment in itself. The program was a joint effort between three services -- Air Force, Navy, and Army. Each service had their own standards and regulations. Each service had different fielding concepts, different missions, and different program priorities. No one ever developed an Integrated Logistics Support Plan (ILSP). We relied extensively on the contractor's integrated support plan. This is not a good idea. Individuals had to constantly go TDY to interface with the customer on highly classified material.

4. *How were these impediments addressed?*

The program has recently been declassified to a *gray* program. A tri-service program manager was designated to oversee and manage the *purple* requirements on this program. The TSSAM program is now organized into product-oriented integrated product teams (IPTs) which eliminated the service in-fighting.

5. *How did the program office communicate logistics requirements internally?*

The program office conducted several meetings. First, there were the data calls where we had to identified all our logistics data requirements. The quarterly internal program reviews are where missile subsystem status briefings are presented. In a *black* program you have segmented offices (separate vaults) which prevented any horizontal crossflow of information. Everyone had a tendency to work in a vacuum. The internal program reviews were one way to share programmatic information. We also had periodic Director's Calls.

6. *How did the program office communicate logistics requirements with external customers?*

We communicated logistics requirements through numerous TDYs. There was also the quarterly integrated logistics support management team meetings. All the players would get together in one forum to prioritize the issues. We also had interface working group meetings. These meetings identified the unique interface problems with each weapon system platform.

7. *How does logistics within the program office interface with research laboratories?*

Mainly through the prime contractor, but I do not know of a direct interface between our office and government research laboratories. Many of the people have worked highly classified programs before and brought with them lessons learned. Again, we primarily rely upon our contractor to go out to the private laboratories and identify any new technologies.

8. *Besides labs, what other sources of technological information are available for logistics use?*

_x_ *Trade Studies*        _x_ *Prime Contractors*
___ *Innovations in RFP*     ___ *Technology Transfer Office*
___ *Others (Explain)*

9. *What other sources of obtaining technology information do you have?*

As I have mentioned before, we depend upon the prime contractor to obtain the technology information. The contractor is a better judge of what is out there. The very nature of private industry makes this a reality. Contractors are always looking for ways to drum up more business.

10. *What does the program office expect logistics to provide regarding program requirements?*

The program office expects logistics to identify their requirements and put it on contract. Logistics requirements are identified in the Program Management Directive (PMD) and Joint Operational Requirements Document (JORD). We were fortunate to be involved in the development of the JORD. I thought it was a good team effort. Our contract is the means to flow down users' requirements to the contractor. We have logistics represented on every IPT. We also can go to our Chief of Logistics for core logistics items such as Logistics Support Analysis (LSA), ILSP, and JORD support. VJL is the integrator and interfaces all logistics requirements within the TSSAM program. Program slippages and reduced dollars have only complicated an already difficult job.

11. *What process(es) does your program office have for identifying logistics requirements?*

Our office uses LSA. We are under contract for MIL-STD-1388-1A and going to 2A. The problem we have is we can not read the data. The contractor is not using software that allows transfer of data into government format. The air logistics center is involved in an IPT to correct this problem.

Another process we use is the Technical Interface Meetings (TIMs). This review brings together all the customers including the platforms the missile will be installed on. We are also conducting pre-SERD reviews. The program is in the process of declassifying this portion of the program.

12. *What information sources does your program office have for identifying logistics requirements?*

We depend on highly, skilled people located within the program. The logisticians have a lot of program management office and actual weapon systems experiences. They can stand alone and I consider them self motivators. Most of these people have been involved in other *black* programs and can bring in some valuable lessons learned. *Black* programs do not have the luxury of having a central data bank of lessons

learned. Many lessons learned that were applied to this program came from the Advanced Cruise Missile program. We also have the option to contact AL and ask for expertise, but we have not used this option yet.

The classification status on this program has also taken the program out of the normal acquisition review cycle. This can work for and against you. Sometimes a little management oversight can be helpful.

13. *What specific integrated logistics support elements do you feel your program office emphasized during pre-Milestone I? Check all those that applied.*

| | |
|---|---|
| ___ *Maintenance Planning* | ___ *Technical Data* |
| ___ *Supply Support* | ___ *Support Equipment* |
| ___ *PHS&T* | ___ *Training & Trng Support* |
| _X_ *Design Interface* | _X_ *Computer Resource Support* |
| _X_ *Facilities* | ___ *Manpower & Personnel* |
| ___ *Others (Explain)* | |

Design interface was required because of the different platforms. The facilities were a concern due to the high level of security. An unmanned vehicle like a missile is dependent on computer signals, telemetry, and frequencies. Computer resource support is critical for this program to be successful.

14. *If you could implement logistics all over again, knowing what you know now, what would you do differently?*

I would start with IPTs. IPTs have improved integration within the program. I am a believer in IPTs. I would also mandate an ILSP be developed for the program. We need one document that consolidates all the logistics support efforts. I would also put MIL-STD-1388-2A on contract as a deliverable. We needed deliverable LSA data to be able to accomplish our jobs. I am not sure what the philosophy was behind non-deliverable LSA. It may have something to do with the classification of the program and the sensitivity of the data. I would request the JORD be accomplished earlier. The JORD is the source documentation that identifies our maintenance plan, decision tree analysis, repair level analysis, etc.

Concurrent air vehicle development needs to also be identified early. We are a missile that is applied to many different platforms among three services. Air vehicle development can impact our program. Most of all I would have liked to have seen logistics considered earlier.

15. *What information or authority were you lacking that kept you from accomplishing this the first time?*

I believe the primary cause was the program's *black* status which mandated a lot of turnkey contracting efforts. It also allowed a bad decision to stay on the books because no one else had any oversight. Normally the ILSP contains the baseline charts required to support a weapon system. We did not have one on this program.

16. *What are the most important lessons learned from the program regarding logistics?*

Logistics can not succeed in a locked vault without any cross-talk.

Another lesson is rotation. We have a draft Operating Instruction that states you can not stay in a position anywhere in the program office for over 72 months. The normal turn time is 48 months. The rotation concept is to move people around so they will become *well-rounded.*

17. *What are some logistics process improvements that proved to be most effective on the program?*

The most effective process was the movement to IPTs. It also helped when the program was declassified.

18. *What system did you use to track acquisition logistics goals and status?*

We used the contractor's integrated support plan and charts. We also presented logistics status at program management reviews, internal program reviews, and integrated logistics support management teams. I am also developing ILSP that tracks contractual deliverables.

19. *Who performs Logistics Support Analysis (LSA)?*

_X_ *Government*                          _X_ *Prime Contractor*
___ *Other (Explain)*                     ___ *Support Service Contractor*

20. *What other logistics activities were conducted to insure logistics was accomplished?*

_X_ *Maintainability analysis*           _X_ *Reliability analysis*
_X_ *Supportability analysis*            ___ *Other (Explain)*

21. *Which of the following were conducted prior to Milestone I?*

___ *LSA*                                ___ *Reliability analysis*
___ *Maintainability analysis·*          ___ *Supportability analysis*
___ *Other (Explain)*

Unknown.

22. *Were logistics elements included in life cycle cost estimates?*

Yes, the decision tree analysis did include all the logistics elements.

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**23.** *Were there any particular difficulties in accomplishing these logistics elements?*

Yes, each air logistics center had their own way of determining composite rates.

**24.** *What documents were available to direct and establish pre-Milestone I logistics planning?*

| | |
|---|---|
| ___ *Maintenance Concept* | ___ *Draft ILSP* |
| ___ *ORD* | _x_ *PMD* |
| _x_ *Others (Explain)* | ___ *Mission Need Statement* |

We had a contractor's integrated support plan.

Training and Education

**1.** *Are your acquisition logisticians adequately trained?*

Yes, the TSSAM program has highly trained acquisition logisticians. The AL staff was very good at providing us with the expertise required for a highly classified, tri-service program.

**2.** *What specific areas should have been emphasized?*

I would emphasize acquisition logisticians have more program management office experience. I would like to see logisticians with experience in all integrated logistics support elements. I believe breadth is more important than depth.

**3.** *Do you conduct any internal logistics training?*

No, we do not conduct any internal logistics training.

**4.** *Who should conduct the training?*

| | |
|---|---|
| _x_ *Wright-Patt Campus* | ___ *Contractor* |
| _x_ *Mentoring* | ___ *Other (Explain)* |
| _x_ *Computer-based Training* | |

Wright Patt Campus is the center for providing Acquisition Professional Development Plan core courses.

**5.** *How do you identify training deficiencies?*

Training deficiencies are identified through observation and the career training plan interviews.

6. *Are logistics training requirements available from existing courses?*

Yes, it definitely is.

7. *Does existing training adequately cover pre-Milestone I requirements? Check all those that apply.*

___ *Reviewing alternatives*          ___ *LSA*
___ *Determining LCC*                 ___ *Acquisition strategy*
___ *Others (Explain)*

It is probably not. I would say probably because I have never been involved with a program that was in the pre-Milestone I phase. I think you could identify the requirements but there are so many *turbulences* trying to get there. By the time we get to production, any early decisions we made would have been changed anyway including LCC and the acquisition strategy. Maybe the LSA data base would have stayed good enough if you kept updating it. Things are constantly changing; more so than a manned weapon system. You are relying totally on computer signals, telemetry, and the Global Positioning System.

<u>Tools and Aids</u>

1. *Does your program office use the following tools for logistics management? Check all those that apply.*

_x_ *CSNAS*                    ___ *AF Acquisition Model*
_x_ *AF Lessons Learned*       ___ *LOGPARS*
___ *Acq Logistics Guide*      ___ *ILSP Advisor*
_x_ *LCOM*                     _x_ *NRLA Model*
___ *Others (Explain)*

2. *What tools developed by your office or contractor will do similar things as those identified above?*

I guess I do not know.

3. *Are there any specific areas in logistics for which you would recommend a tool or aid be developed?*

No. I think there are enough tools out there to do logistics. Communicating what is out there is probably a better avenue to pursue.

## Appendix K: Case 6 - Non-Developmental Airlift Aircraft (NDAA)

### Interviewee Qualifications

The interviewee was a journeyman-level manager responsible for the overall support of the Non-Developmental Airlift Aircraft program and held this position for approximately three months. NDAA is a new ASC ACAT 1D program to acquire a commercial cargo aircraft. He has over 19 years of logistics experience with 17 years in the acquisition logistics arena. The interviewee has a Level III certification in Acquisition Logistics and Program Management. He has personally had hands-on experience with the engineering, manufacturing, and development; and production and deployment acquisition phases.

### Observations

The interview was conducted at the interviewee's facility. The office was spacious and partitioned allowing privacy and minimal amounts of disturbances. The interviewee understood the purpose of the interview and had filled out the interview protocol prior to the interview. The session lasted approximately one hour. A non-developmental item or commercial off-the-shelf program does not go through the typical acquisition phases. Non-developmental items go through an analysis phase (equivalent to the first four phases of the acquisition cycle) and then into production and deployment. For the purpose of the interview, pre-Milestone I efforts were comparable to the analysis phase. He personally experienced the pre-Milestone I efforts since the project was recently designated a program in March 1994. He appeared to be relaxed and eager to share his opinions about what is occurring on the program.

### Interview Protocol

### Logistics Considerations

1. *What were the logistics goals and objectives which the program office considered during pre-Milestone I?*

Trying to determine the user's maintenance requirements, the maintenance concept, and how to translate those requirements into contractual language for incorporation into the RFP. We had an idea but were unclear in how to apply our experience to commercial practices. Maintenance concepts come from user input. We spend a lot of time with our users to try to refine their requirements. ASC did assist the user in developing the Operational Requirements Document (ORD). One of the user's major concern was maintaining and supporting the aircraft. There is more logistics in the ORD than you would expect.

2. *Which of the goals and objectives changed and how?*

The NDAA program has only been in existence since January of this year. We have made some changes such as defining our acquisition strategy. We have quite a bit of conceptual ideas regarding how to approach logistics, but we have not turned them into inputs for the Request for Proposal (RFP). We are not working in a vacuum but working with other government people and even industry. We have not specifically gone to AL to request any additional support except for some life cycle cost efforts. We get cost support from ASC/ALT.

3. *Please identify the significant logistics impediments the program office had to overcome.*

This program has a lot of interest at the Congressional level and also from the Office of the Secretary of Defense. These people have preconceived ideas about non-developmental programs. We are trying to utilize commercial practices in a system oriented to defense practices. We have to spend a lot of time these misconceptions. We are often doing lot of activity that I consider counterproductive. Our program goal is to develop a RFP.

4. *How were these impediments addressed?*

Most of the time I put together a position paper that documents the inquiry and the rationale behind a position. Position papers are placed in a central file and easily accessible to all team members. That way if the issue comes up again we can take out the original paper and resubmit the response. We have to educate every person we deal with on how we plan to utilize commercial practices. A major issue we need to consider is leasing potential candidates to perform a prototype flyover. This can be quite costly but may prove well worth the effort.

5. *How did the program office communicate logistics requirements internally?*

We are presently a very small office. The program office has a total of 15 people -- communications are not a problem. The program manager will conduct meetings and discuss basic program strategies and support concepts. Logistics is often called upon to present informative briefings on support concepts.

6. *How did the program office communicate logistics requirements with external customers?*

Logistics requirements are communicated through a program management directive and a draft ORD. The requirements identified in these formal documents are the basis for follow-on meetings. We hold government industry meetings to keep open the line of communications and develop logistics strategies. The expertise for Contractor Logistics Support (CLS) is Oklahoma City. We are depending on them to provide the CLS contract but the final decision comes from the System Program Director. I am starting to write an ILSP. The program office's goal is to develop a RFP. The RFP is

our vehicle for identifying requirements to industry. The assumption is NDAA will require CLS. External communications are usually through meetings and TDY.

7. *How does logistics within the program office interface with research laboratories?*

We do not have any overt interface to date. Non-developmental programs do not have a lot of new technology applications. The Air Force lessons learned program did identify some potential candidates. Basically, NDAA is a commercial off-the-shelf product, and we are depending on the contractor to have already identified and incorporate what technology they need to produce the aircraft.

8. *Besides labs, what other sources of technological information are available for logistics use?*

_X_ *Trade Studies*    _X_ *Prime Contractors*
_X_ *Innovations in RFP*   _X_ *Technology Transfer Office*
_X_ *Others (Explain)*

Technological information is available through the contractors. DTIC and DLSIE reports are what we have access to and are readily available. I am especially interested in acquisition streamlining efforts and how they are applied to management practices.

9. *What other sources of obtaining technology information do you have?*

One very important source is the AFIT thesis. There was a very interesting thesis on benchmarking practices of air cargo carriers. This case study provided an industry's perspective of transporting cargo. Thesis research provides a source for up-to-date information in logistics. Another source of obtaining technology information is through market studies. A company will send a representative to the program office a present and *sales pitch*. The market studies are usually very general in nature. We are having a pre-solicitation conference later this month and project over 16 companies sending representatives.

10. *What does the program office expect logistics to provide regarding program requirements?*

The program office expects logistics to identify alternative support concepts including a CLS environment. Along with that, the program manager expects our office to provide the contractual language that goes into the RFP. Our production contract will contain a support development section. The ORD stated the support equipment will be a combination of government furnished and contractor furnished equipment. Another approach is to have a contractor operator maintenance service similar to the way commercial supply planes operate today. The program manager expects the logistics manager to develop some meaningful metrics regarding the mission capability rates.

11. *What process(es) does your program office have for identifying logistics requirements?*

We have worked to refine the ORD. There is a lot of logistics support and the requirements are very detailed. We are having numerous discussions with the users in clarifying ORD requirements. We are also going to other government personnel who have experience in this area. We have already requested a waiver to eliminate the LSA requirement and rely upon industry to come up with providing logistics data. The contractor will not be mandated to do traditional LSA. We are also having meetings with industry to develop a draft RFP.

12. *What information sources does your program office have for identifying logistics requirements?*

As I have mentioned before, the NDAA program is very small. Local area network and electronic mail are available but not used very efficiently. We are going through your typical growing pains in establishing management information system requirements. We plan to use electronic transfer of data whenever it is possible.

13. *What specific integrated logistics support elements do you feel your program office emphasized during pre-Milestone I? Check all those that applied.*

_x_ Maintenance Planning        _x_ Technical Data
_x_ Supply Support             _x_ Support Equipment
___ PHS&T                        _x_ Training & Trng Support
___ Design Interface           ___ Computer Resource Support
_x_ Facilities                   ___ Manpower & Personnel
___ Others (Explain)

We foresee a problem in facilities. This will probably become a show stopper. The user has not decided where to base the aircraft. If there is a facility problem, this would involve military construction funds -- a long lead time requirement.

14. *If you could implement logistics all over again, knowing what you know now, what would you do differently?*

I can not really answer this question since we are still developing our acquisition strategy and maintenance concepts. We should know more by the end of the summer.

15. *What information or authority were you lacking that kept you from accomplishing this the first time?*

We were directed by OSD to implement acquisition streamlining. There will be little missionization, if any. The NDAA program was destined to become a pilot program in acquisition streamlining efforts. This new direction is causing problems because the program has not been defined. Waivers for defense regulatory requirements will be reviewed, and we foresee no problems getting what we want. The statutory requirements are another story. Statutory laws require Congressional approval. This

may cause some problems with commercial acquisition because of commercial payments and truth in negotiations. DoD wants to be able to review the contractors cost and pricing data. Contractors are a little leery about sharing corporate practices and pricing information.

**16. What are the most important lessons learned from the program regarding logistics?**

The program is too new to have seen any repercussions from our decisions.

**17. What are some logistics process improvements that proved to be most effective on the program?**

Not applicable.

**18. What system did you use to track acquisition logistics goals and status?**

We plan to integrate our tracking requirements with the contractors. We are preparing contractual language for incorporation into the RFP. We have developed a Program Master Schedule because it is an ASC policy. There are a lot of commercial software packages that will schedule and track program requirements. We plan to develop an integrated master schedule. We are just at the point in setting the baseline. Each functional group has identified their sub-tasks and responsible for their support schedules. We need to talk to the commercial cargo carriers to understand how they buy and support aircraft.

**19. Who performs Logistics Support Analysis (LSA)?**

___ Government                 ___ Prime Contractor
___ Other (Explain)           ___ Support Service Contractor

LSA is going to be done by the prime contractor.

**20. What other logistics activities were conducted to insure logistics was accomplished?**

___ Maintainability analysis        ___ Reliability analysis
_X_ Supportability analysis          ___ Other (Explain)

The RFP will require an integrated support plan which should define how life cycle cost and logistics support analysis will be used on the program.

21. *Which of the following were conducted prior to Milestone I?*

___ *LSA*                               _x_ *Reliability analysis*
_x_ *Maintainability analysis*       _x_ *Supportability analysis*
___ *Other (Explain)*

We do have a mission capable rate, and it is not going to be extremely challenging. We would require some analysis regarding reliability and maintainability, but I am not sure to what extent.

22. *Were logistics elements included in life cycle cost estimates?*

We feel that the operations and support costs are going to represent an extremely large portion of the total program. There is no research and development monies. The aircraft's life cycle costs are based on 25 years of useful life. Therefore, fuel consumption will be extremely high. The other cost driver would be manpower.

23. *Were there any particular difficulties in accomplishing these logistics elements?*

Right now we are in the process of determining what data is required to do a supply support life cycle cost analysis. This information needs to be included in the operations and support (O&S) figure. We need to define our requirements before we select a life cycle cost model. We need to think about the what kind of data we want, and the format required to support source selection.

24. *What documents were available to direct and establish pre-Milestone I logistics planning?*

___ *Maintenance Concept*             ___ *Draft ILSP*
_x_ *ORD*                                _x_ *PMD*
___ *Others (Explain)*               ·      _x_ *Mission Need Statement*

We have a draft PMD and ORD available. The ORD is very detailed and contains a lot *how to* requirements. There is more detail than is actually necessary for ASC to provide the users with what they want. The ORD did contain the maintenance concept.

Training and Education

1. *Are your acquisition logisticians adequately trained?*

Yes, we have three logisticians who have a generalist background.

2. *What specific areas should have been emphasized?*

The NDAA program is a commercial off-the-shelf aircraft with some missionization. Since OSD is emphasizing acquisition streamlining, we need additional training on how to do commercial-type acquisitions. I would like to see a guide or pamphlet on how to put together non-developmental packages. Other program offices have procured

commercial systems but mandated DoD practices. If you buy a commercial product you need commercial practices. Due to DoD's downsizing efforts, we are losing a lot of our seasoned, competent personnel. People have different expertise, and I am not sure what specific areas we need to be an expert in. Commercial off-the-shelf program do not follow traditional support equipment or provisioning practices. Right now I could use people with technical manual experience. I need someone who can review commercial manuals and evaluate whether they meet DoD requirements. I also need someone with a little LSA expertise. The ORD stated the user did not require a simulator. The users are willing to send military personnel to commercial training schools.

3. *Do you conduct any internal logistics training?*

The program office did contract for some seminars such as commercial acquisition (FAA-type) training. The seminar centered on how to get the best value from a commercial off-the-shelf product.

4. *Who should conduct the training?*

___ *Wright-Patt Campus*      _x_ *Contractor*
___ *Mentoring*     ___ *Other (Explain)*
___ *Computer-based Training*

5. *How do you identify training deficiencies?*

First, we would try to see how responsive Wright Patt Campus is with providing the traditional courses. If not, we would send someone to a seminar. You can apply for all the required courses to enhance your job performance, but you get no insight into the availability of a slot.

6. *Are logistics training requirements available from existing courses?*

Right now existing government training is in a state of fluctuation since the creation of the Defense Air University. All training is under this university. I believe it will take several years before all the dust settles. Training is now another level away from where it used to be. They even canceled the LSA class. In general, existing courses are available.

7. *Does existing training adequately cover pre-Milestone I requirements? Check all those that apply.*

_x_ *Reviewing alternatives*     _x_ *LSA*
_x_ *Determining LCC*     _x_ *Acquisition strategy*
_x_ *Others (Explain)*

I believe training is adequate for pre-Milestone I efforts. I would assume you would be doing more on-the-job training then anything else. The training should be very general. Generalists are more useful than specialists.

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<u>Tools and Aids</u>

1. *Does your program office use the following tools for logistics management? Check all those that apply.*

___ *CSNAS*                ___ *AF Acquisition Model*
___ *AF Lessons Learned*     ___ *LOGPARS*
___ *Acq Logistics Guide*      _x_ *ILSP Advisor*
___ *LCOM*                 ___ *NRLA Model*
___ *Others (Explain)*

I have the software for the ILSP advisor but we have not developed an ILSP yet. I am not sure the advisor will help since this is a non-developmental program.

2. *What tools developed by your office or contractor will do similar things as those identified above?*

It a little to early to be asking this question since we have not gone through source selection to select a contractor

3. *Are there any specific areas in logistics for which you would recommend a tool or aid be developed?*

I believe we need to be educated on acquisition streamlining activities. We have put together a package on how to request regulatory waivers. I think a standardized process of how to process these waivers would be useful to other logisticians. There is no sense in having other logisticians go through what we did.

<u>Additional Comments</u>

ASC/ALD is developing tools to assist the program management offices in accomplishing their goals and objectives. Many times the program office do not want these tools. We must be very careful in going out and developing additional tools. There may not be enough customers out there who are willing to use them. Buy-in is key.

## Bibliography

1. Cochrane, C.B. *Authority for DoD Systems Acquisition.* School of Systems and Logistics, Air Force Institute of Technology (AU), Wright Patterson AFB OH, Summer Quarter 1993.

2. Thompson, Fred. "Deregulating Defense Acquisition," *Political Science Quarterly* 107: 727-750 (Winter 1992).

3. Nelson, Charles R. "Keeping the Edge," *Program Manager XXI*: 32-41 (January-February 1992).

4. Warner, John W. "Legislative Perspective," in *Military Project Management Handbook*, New York: McGraw-Hill, Inc., 1993.

5. Clay, John L. "What's Wrong with Acquisition?" *Program Manager XIX*: 4-1 (September-October 1990).

6. Packard, David. *"A Quest for Excellence: Final Report to the President."* President's Blue Ribbon Commission on Defense Management, Washington DC. June 1986.

7. Grier, Peter. "Another Run at the Acquisition Process," *Air Force Magazine, 6*: 48-52, (June 1993).

8. Auster, Bruce B. "The Commander and Chiefs." *U.S. News & World Report 114*: 37-40 (8 February 1993).

9. Morrocco, John D. "Congress Orders Two Reviews of Tactical Aircraft Plans," *Aviation Week & Space Technology:* 28-29 (5 October 1993).

10. DiMascio, A.J. "The Project Cycle," in *Military Project Management Handbook*, New York: McGraw-Hill, Inc., 1993.

11. Warren, Robert A. and Carleton R. Cooper. *Science, Technology, and the Program Manager*, Air Command and Staff College, Air University, Maxwell AFB AL., August 1993.

12. Flinn, Lt Col. "Acquisition Professional Development - Congress Wants to Know," *TIG Brief, 5*: 6-7, (September-October 1992).

13. Meyer, Henry D. and others. *The Manager's Guide to Developing Subordinate Managers*, New York: American Management Association, 1980.

14. Automated Lessons Learned Capture and Retrieval System (ALLCARS). Air Force Lesson Numbers 1394 and 1942; Navy Lesson Number 11277. Aeronautical Systems Center, Wright Patterson AFB OH.

15. Rhea, Russell H. *Navy Joint Acquisition Program Managers: Is Their Training Adequate for the Job They Are Tasked To Do?*, AD-A214949, MS thesis, AFIT/GLM/LSR/89S-50. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright Patterson AFB OH, September 1989.

16. Somers, Paul W. *A Leadership Development Model for United States Air Force Civil Engineering Company Grade Officers*, AD-A175089, MS thesis, AFIT/GEM/DET/86S-25. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright Patterson AFB OH, September 1986.

17. Solberg, Harold A. and Charles J. Steiner. *A Review and Analysis of System Program Office Manager's Experience and Training, and It's Relation with the Man-Machine Concept*, AD-750846, MS thesis, AFIT/SLSR/16-72B. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright Patterson AFB OH, September 1972 (AD-75D-846).

18. Roberts, Charles E. *Assessment of the Technical Training Received by Source Selection Participants in Air Force Systems Command*, AD-A174294, MS thesis, AFIT/GSM/LSY/86S-16. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright Patterson AFB OH, September 1986.

19. Department of the Air Force. *Human Resources Development Process Guide (Draft)*. AFMCP 50-15. HQ AFMC, 27 May 1993.

20. Department of Defense. *Defense Acquisition Management Policies and Procedures*. DoD Instruction 5000.2. Washington: GPO, 23 February 1993.

21. Sullivan, Patricia and Rachel Spilka. "Qualitative Research in Technical Communication: Issues of Value, Identify, and Use," *Technical Communication*, Fourth Quarter 1992.

22. Yin, Robert K. *Case Study Research, Design and Methods*, Newbury Park CA: SAGE Publications, 1989.

23. Department of the Air Force. *Program Master List (Revision 2)*. HQ AFMC/XRI, Wright Patterson AFB OH, 7 January 1994.

24. Air Command and Staff College. *DoD Acquisition*. Air University, Maxwell AFB AL, August 1993.

25. Schenk, Steven M. *The Language of Logistics*, Battelle Memorial Institute, June 1993.

26. Aeronautical Systems Center. *ASC Strategic Plan 1993*. Wright Patterson AFB OH, (no date).

27. Vore, Daniel R. and Norah H. Hill. "The Role of Lessons Learned in Defense Acquisition," in *Military Project Management Handbook*, New York: McGraw-Hill, Inc., 1993.

28. Aeronautical Systems Center. *Pre-Milestone I Program Development Process Guide (Draft)*. Wright Patterson AFB OH: ASC/YX, no date [1993].

29. McGinnis, Michael. Chief of Logistics, Trainer and Simulator System Program Office, Wright Patterson Air Force Base OH. Personal interview. 31 May 1994.

30. Gricius, Randall E. and John H. Herd. *Institutionalized Communication Between Researchers and Logisticians: An Examination and Recommendation*, AD-A147050, MS thesis, AFIT/GLM/LSM/84S-27. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright Patterson AFB OH, September 1984.

31. Jungwirth, Lt Col. "Acquisition Managers and Requirements Definition", *TIG Brief*, 4: 7-8 (July-August 1991).

32. Cochrane, Charles B.. "DoD's New Acquisition Approach: Myth or Reality," *Program Manager XXI*: 38-46 (July-August 1992).

33. Canan, James W. "The Painful Transition," *Air Force Magazine* 76: 12-14 (October 1993).

34. Rush, Benjamin C. "Program Control," in *Military Project Management Handbook*, New York: McGraw-Hill, Inc., 1993.

35. Air University. *Compendium of Authenticated Systems and Logistics Terms, Definitions, and Acronyms.* Air Force Institute of Technology (AU), Wright Patterson AFB OH, April 1981.

36. Blanchard, Benjamin S. *Logistics Engineering and Management (Fourth Edition)*, Englewood Cliffs NJ: Prentice Hall, 1992.

37. McCarthy, Herbert W. "Logistics," in *Military Project Management Handbook*, New York: McGraw-Hill, Inc., 1993.

38. McIlvaine, Paul J. "Ensuring Optimal System Acquisition through Life Cycle Costing," *Defense Management Journal*, 34-39 (4th Quarter 1981).

39. Wendt, Robert L., President of the Sperry Division of Sperry Corporation. "An Industry Overview of DoD Manpower and Support Policy in Acquisition." 4-7. Address to the NSIA-LOMAC. Clearwater FL, 14 February 1981.

40. Berman, M.B. and C. L. Batten. *Increasing Future Fighter Weapon System Performance by Integrating Basing, Support and Air Vehicle Requirements.* Rand Corporation, Santa Monica CA, April 1983.

41. Department of Defense. *Defense Acquisition Management Documentation and Reports.* DoD 5000.2M. Washington: GPO, 23 February 1993.

42. Smeal, Britton M. *Adapting the Logistics Planning and Requirements Simplification System to Meet Air Force Needs,* AD-A229620, MS thesis, AFIT/GLM/LSY/90S-54. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright Patterson AFB OH, September 1990.

43. Ruben, Roberta Lynne. *Finding Information, A Guide to Research in Academic Libraries.* Salem WI Sheffield Publishing Company, 1991.

44. C. William Emory and Donald R. Cooper. *Business Research Methods (Fourth Edition),* Homewood IL: Richard D. Irwin, Inc., 1991.

45. Marshall, Catherine and Gretchen B. Rossman. *Designing Qualitative Research.* Newbury Park CA: SAGE Publication, 1989.

46. Finkelstein, Walter and J.A. Richard Guertin. *Integrated Logistics Support, The Design Engineering Link,* New York: IFS Publications, 1988.

47. Patton, Michael Q. *Qualitative Evaluation Methods.* London: Sage Publications, 1980.

48. Zikmund, William G. *Business Research Methods (Third Edition),* Chicago: The Dryden Press, 1991.

49. Davis, Duane and Robert M. Cosenza. *Business Research for Decision Making,* Boston: Kent Publishing Co., 1985.

50. Air Force Materiel Command. Air Force Acquisition Model (AFAM), Version 1.4. Aeronautical System Center, Wright Patterson AFB OH.

51. Coogan, Charles. *Guide to LSA During Concept Exploration (Draft),* Acquisition Logistics Engineering, Worthington OH, (October 1992).

52. Department of the Air Force. *Human Resources Development.* AFMCR 50-4. Washington: HQ AFMC, 25 February 1993.

53. Young, Jenny L. *Acquisition Logistics Toolbox and Index,* Aeronautical Systems Center, Wright Patterson AFB OH: ASC/ALL, (March 1994)

54. Mehuron, Tamar A. "A Checklist of Major Aeronautical Systems," *Air Force Magazine* 77: 63-71 (January 1994).

55. Bowman, Peg. "Don't Reinvent the Wheel," *Leading Edge* 34:18-19 (December 1992).

## Vita

Charleen A. Szczepanski was born on 14 July 1952 in Chicago, Illinois. She graduated from Fairborn High School in 1970 and attended Wright State University, graduating with a Bachelor of Science in Environmental Sciences in June 1984. Her acquisition logistics career began as a PACE trainee assigned to the former Air Force Acquisition Logistics Division (AFALC) until 1984. Ms. Szczepanski was assigned as a Deputy Program Manager for Logistics in the Fighter Engine Division of the Propulsion System Program Office from August 1984 to June 1992. Her dedication, diligence, and total quality efforts on the F110 family of engines were evident to her peers. In August 1992, she was transferred to the newly formed Program Development System Program Office (ASC/YX) where she was assigned as an Integrated Logistics Support Manager (ILSM). Ms. Szczepanski was assigned to an integrated product team that was charged with documenting and improving the way ASC develops programs from pre-Milestone I/IV. In May 1993, she became a graduate student at the Air Force Institute of Technology.

Ms. Szczepanski has over 14 years of acquisition logistics experience and has a Level III certification in Acquisition Logistics and a Level II certification in Program Management. She is actively involved in the Society of Logistics Engineer (SOLE) Dayton Chapter and has served as the editor for the *Dayton Digest* for the past two years.

Upon graduation, she will be assigned to the C-17 Program Management Office at Wright Patterson AFB, Ohio.

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**13. ABSTRACT (Maximum 200 words)**

Due to changes in the national security environment, the Department of Defense has revised its approach to acquisition. There will be greater emphasis on research, development, and advanced technologies. The Department of Defense will concentrate on upgrading current systems using rollover of new technologies from development programs that have advanced to a certain point but not into production. The people working in acquisition must hold skills in planning and developing new technologies prior to pre-Milestone I. A major concern is the training, education, and professional development of the defense acquisition work force. The data contained in this study was generated from six case studies of ACAT ID program management offices at Wright Patterson AFB OH. The objective of this research was determine if acquisition logistics managers have sufficient training and tools necessary to perform pre-Milestone I tasks. Logistics considerations, training and education, and tools and aids were analyzed to determine a common logistics relationship that could be applied to the pre-Milestone I process. The results determined a generalist rather than being a specialist is required, projects should develop weapon system data base repositories to ensure sustainment of programmatic information, and additional tools are recommended in areas of new concepts.

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