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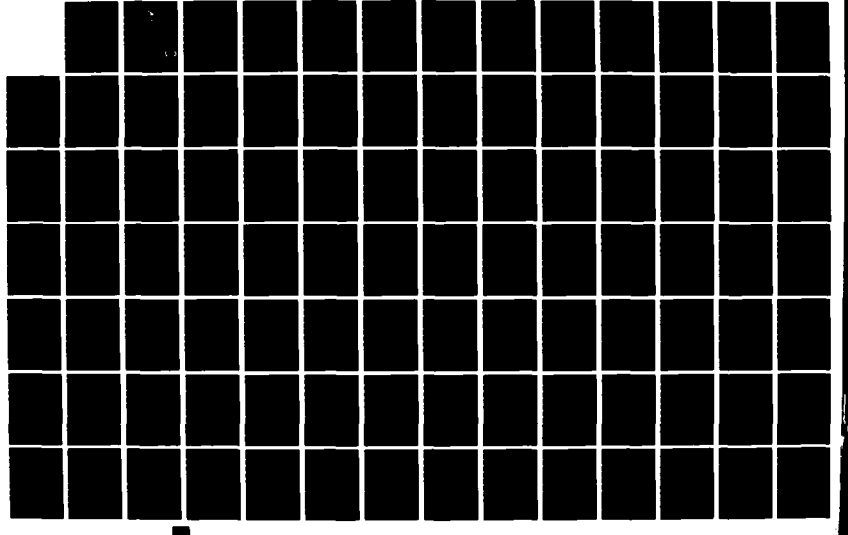

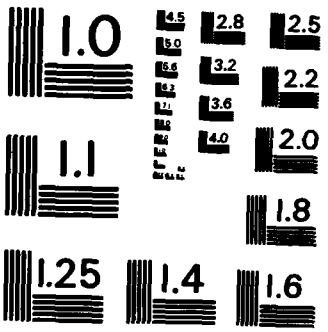

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UNITED STATES AIR FORCE TECHNICAL ORDER ACQUISITION: WHAT CAN BE DONE TO IMPROVE THE EFFECTIVENESS OF THE TECHNICAL ORDER MANAGER?

Marc W. Billingham
Captain, USAF

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AFIT/GLM/LSM/85S-7

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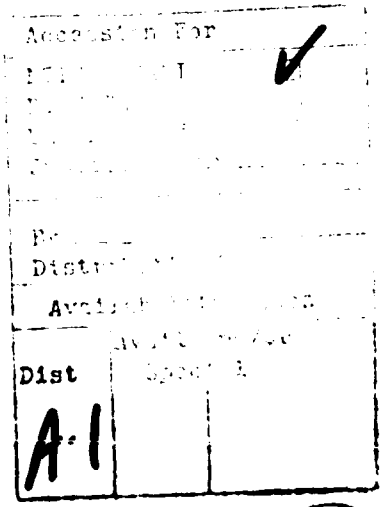

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UNITED STATES AIR FORCE TECHNICAL ORDER ACQUISITION: WHAT CAN BE DONE TO IMPROVE THE EFFECTIVENESS OF THE TECHNICAL ORDER MANAGER?

THESIS

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

Marc W. Billingham, B.A., M.S.
Captain, USAF

David A. Klassen, B.S.
Captain, USAF

September 1985

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The sacrifices made by our wives and children cannot be balanced by a line of thanks. Our work is done and now their time has come.

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List of Acronyms

AD	Armament Division
AFAD	Air Force Authorization Document
AFALC	Air Force Acquisition Logistic Command
AFIT	Air Force Institute of Technology
AFPRO	Air Force Plant Representative Office
AFSC	Air Force Systems Command
ALC	Air Logistics Center
ASD	Aeronautical Systems Division
ATC	Air Training Command
BMO	Ballistic Missile Office
CDRL	Contract Data Requirements List
CTOC	Central Technical Order Management Center
DCAS	Defense Contract Administration Services
DID	Data Item Descriptions
DMC	Data Management Office (Officer)
DPML	Deputy Program Manager for Logistics
ESD	Electronic Systems Division
FSD	Full-Scale Development
ILS	Integrated Logistics Support
MILSPEC	Military Specifications
MILSTD	Military Standard
PCE	Professional Continuing Education
PCO	Procurement Contracting Officer
PMRT	Program Management Responsibility Transfer
RDT&E	Research Development, Test and Evaluation

RFP	Request for Proposal
SDI	Special Duty Identifier
SEI	Special Experience Identifier
SON	Statement of Need
SOW	Statement of Work
SPO	Systems Program Office
TMP	Technical Manual Plan
TO	Technical Order
TOMA	Technical Order Management Agency
TOPP	Technical Order Publication Plan

Abstract

The objective of this research was to examine the job performance of the U.S. Air Force technical order (TO) managers in the TO acquisition process and to identify ways to improve their effectiveness with the end result of improving TOs.

A telephone survey of TO managers performing TO acquisition within Air Force Systems Command was accomplished. Identification of personnel, lack of selection criteria, amount of formal training, interaction of functional offices, and the level of top management awareness were found to be the most significant issues facing the TO manager. TO manager composites were formed for each of the four product divisions (Armament Division, Aeronautical Systems Division, Ballistics Missile Office, Electronics Systems Division). Finally, a composite for the entire Air Force Systems Command was formed.

Recommendations to improve the effectiveness of the TO manager, based on the formation of a three leveled Central Technical Order Management Center (CTOC), were presented. Within this three leveled CTOC framework, the following recommendations were made:

1. The establishment of a career field for senior TO acqusition personnel based on experience and performance within the field.

2. The identification of TO managers by utilizing a Special Duty Identifier (SDI).

3. The establishment of selection criteria based on formal management training and education; prior TO and management experience; and the size, complexity, and acquisition phase of the program.

4. The utilization of an integrated system of TO acquisition management courses and on-the-job training.

5. The continuation of recent attention and additional support by top management to the problems of TO acquisition.

UNITED STATES AIR FORCE TECHNICAL ORDER ACQUISITION: WHAT CAN BE DONE TO IMPROVE THE EFFECTIVENESS OF THE TECHNICAL ORDER MANAGER?

I. Introduction

General Issue

The acquisition process has traditionally concentrated its efforts in the areas of cost, schedule and performance when acquiring a new weapon system. Lt. General Marquez, Deputy Chief of Staff, Logistics and Engineering in a Project Warrior Distinguished Speaker presentation at the Air Force Institute of Technology compared the acquisition process to a stool supported by three legs (21). But recent attention in the area of supportability has added a fourth leg to this stool, with increased emphasis on life cycle costs. The largest portion of life cycle costs occur after the weapon system is produced and in service. The costs are incurred in keeping the weapon system functioning or in real terms, "operational readiness". The maintenance effort cannot occur without specific direction being available to the maintainer; this direction is provided in the form of technical orders (TOs). The TO is one of the keys to a successful maintenance effort. Therefore, management must concentrate the needed effort to ensure that TOs procured in the acquisition process are accurate, timely, cost effective and useable (10).

The TO is not only one of the keys to a successful maintenance operation, the TO is also one of the primary tools of the operator. "Technical Orders are the key to the transfer of essential technical information from design engineers to operators and technicians" (7:1). The combination of operator and technician performance is what determines operational readiness. The highest operational readiness possible is the goal of the Air Force, and technical orders impact directly the successful achievement of that goal. General Kelley, Vice Commander of the Tactical Air Command, in a message dated 21 January 1985, stated:

> "Operational readiness of the tactical air forces suffers because formal technical data for aircraft, weapons, and support equipment are rarely available *when operational testing is performed* or when the weapons are fielded". [20:1]

Exploratory research has found that the acquisition process in many cases has not procured technical orders which are accurate, timely, useable and cost effective. Many possible causes for the problems with technical order acquisition have been explored. This thesis will examine TO acquisition from a management perspective. The central figure in the whole TO acquisition process is the TO manager. The TO manager is tasked by TO 00-5-1 to:

A. Develop as early in the acquisition cycle as possible a Technical Publication Development Management Plan.

B. Evaluate the contractor prepared TO Publication Plan.

C. Contract for a TO status report of scheduled events.

D. Chair and conduct in-process, pre-publication and post-publication reviews. [14:5-6]

These are just a few of the responsibilities levied against the TO manager. It is clear just from these few responsibilities that a TO manager ideally should be a multi-talented individual. In fact, in a course offered by the Air Force Institute of Technology, School of Systems and Logistics, titled "Technical Order Acquisition and Management" the text states that a TO manager should be a proficient technician, an experienced planner, an effective technical writer, a proficient negotiator, a coordinator, a budget analyst and a cost control specialist but most importantly an effective manager (24).

General Problem

Based on a review of the literature on TO acquisition, a further examination of the TO manager is warranted. The TO manager will be profiled from initial selection, training, qualifications, experience, interface with other agencies, duties, continuity and other integral ingredients with an end purpose of determining: What can be done to improve the effectiveness of the TO manager?

Background

The design of a research project attempting to improve the effectiveness of the TO manager must consider

the following issues. First, examine the system within which the TO manager operates. Second, note the responsibilities of the TO manager as specified in the Air Force directives and policy guides. Third, identify the problems related to the TO manager and their recommended solutions.

A review of the literature shows the technical order acquisition process is an integrated subset of the overall major weapons system acquisition process (10). In each of the five phases of the acquisition process; Pre-Conceptual Phase, Conceptual Exploration Phase, Demonstration and Validation Phase, Full-Scale Development Phase, and Production/Development Phase, the TO manager has responsibility for integrating TO requirements. Failure to effectively integrate TO requirements in all phases will result in inadequate, costly, and late TOs to the user (10).

The responsibilities of the TO manager are not listed in a single publication, but rather are sprinkled throughout volumes of regulations, publications, guidelines and handbooks. Three publications: Air Force Technical Order System (AFR 8-2), Air Force Technical Order System (TO 00-5-1), and Technical Publications Acquisition Manual (AFSCM 310.2) when combined provide the clearest picture of the TO manager's many responsibilities (13,14,15).

The system has several problems which contribute to the effectiveness or lack of effectiveness of the individual

TO manager. These problems will be examined in detail based on previous research by Brown and Lyon. They were:

1. Need for better communication and coordination in the TO acquisition process between the various participants;
2. Better manning for TO managers;
3. Better training for TO managers;

The Brown and Lyon recommendations to solve these problems were:

1. Establishment of a central technical order agency;
2. "Skeleton" documents of statement needs, requests for proposal and contracts;
3. A handbook identifying coordination and communication responsibilities;
4. A TO acquisition AFSC or career field;

[7:74]

Definitions

For purposes of this research the following terms are defined:

1. Technical order will refer only to the technical manual/publications used to maintain or operate Air Force equipment.
2. Technical order manager or TO manager will be used to identify that individual tasked with the major responsibility of technical order acquisition. It is not a title per se but a function.
3. Technical Order Management Agency (TOMA) is the organization or office having overall management responsibility for the acquisition of technical orders required for the operation and maintenance of specific equipment, items, or modification thereto (0:29). Throughout the literature the term TOMA is interchangeably used to describe

both the agency and the individual technical order manager. Therefore, this thesis will do the same when directly quoting from the literature.

4. Technical order management effectiveness is the degree to which the TO manager operating within the existing weapon system acquisition process and its integrated subset, the TO acquisition process, procures a TO that is accurate, timely, useable, and at the lowest possible cost (23).

5. A major weapon system acquisition is defined as $200 million Research, Development, Test and Evaluation (RDT&E) or $1 billion procurement (12:6).

6. Top management refers to any position within the acquisition process higher than the technical order manager (i.e. PM, HQ AFSC, HQ USAF).

Assumption

TO management effectiveness should be measured by useability, cost, timeliness and accuracy. Presently, none of the TO management guidelines and regulations specify measures of TO management effectiveness. Yet, as the literature review establishes there are factors concerning the TO manager that have an impact on TO management effectiveness. These factors are; identification of personnel as TO managers, their selection, training, management organization and top management support. Therefore, this thesis makes the assumption that by improving these five factors, the effectiveness in terms of useability, cost, timeliness and accuracy should improve.

Scope of Research

This research project will concentrate on those TO managers involved only in initial acquisition of weapons systems. The TO managers are primarily Air Force Systems Command (AFSC) (or Air Force Acquisition Logistics Center (AFALC) personnel). Air Force Logistics Command TO manager personnel while involved in some acquisition efforts are primarily concerned with support considerations after Program Management Responsibility Transfer (PMRT) and therefore will not be dealt with in this research.

This research project readily admits there are other problems with the acquisition process in general and with TO acquisition in particular. It is not the intention of this effort to identify additional problems or even to identify interrelationships between the many problems. This thesis will narrow its exploration to one small area of the problem, examine it as completely as possible and hopefully gain enough insights to make realistic recommendations to remedy the problem. The five problem areas that will be studied by this research project are:

1. There is no adequate system for identifying TO managers.
2. There are no standards or criteria for selecting individuals for TO manager positions.
3. Training for TO managers is inadequate.
4. Interaction between the TO manager and other functional offices is inadequate.

5. Top management awareness of TO acquisition problems is not adequate.

The research is a further exploration of the work begun by Captain Brown and Captain Lyon. The intent of their research was "to identify the nature of the problems with the technical order acquisition process and to identify potential changes to the acquisition system that can solve these problems" (7:6). One of their goals was to promote further research in the technical order acquisition area. This research effort is a result of the Brown and Lyon work.

Research Objective

The objective of this research is to examine TO managers in the technical order acquisition process and identify ways to improve their effectiveness with the result of improving technical orders. This objective will be accomplished by examining five research questions.

Research Questions

The five research questions are:

1. How are TO managers initially identified?
2. Can the establishment of selection criteria for TO managers improve their effectiveness?
3. Can training improve the effectiveness of TO managers?
4. Can the TO manager's interaction with other functional offices inside and outside of the System Program Office be changed to improve the effectiveness of TO managers?
5. How do TO managers perceive the level of top management awareness of TO acquisition problems?

The answers to these five questions should provide a basis for recommendations to improve the TO manager's effectiveness and further should result in an improvement in the technical order acquisition process.

The next chapter will consist of an in-depth literature review about technical order managers and the existing technical order acquisition process. This literature review will provide the basis for the remainder of this research project.

II. Literature Review

This literature review concerns the TO acquisition process and the TO manager's role in it. It identifies the responsibilities of the TO manager as specified in Air Force directives and policy guides. It also examines the research on current problems related to the TO manager and recommended solutions to these problems. Finally, the relationship between the problems, recommended solutions and the objectives of this research will be discussed.

Overview of TO Acquisition Process

The TO acquisition process is an integrated subset of the weapon system acquisition process. Since TOs are an element of Integrated Logistics Support (ILS), it is essential that the planning for system TOs and associated equipment begin during the early planning phases. When timely TO planning is delayed or obstructed, quality is usually sacrificed and procurement costs go up; therefore, ILS costs over the system's life cycle go up (24:2). The phases of the weapon system acquisition process are; Pre-Conceptual, Conceptual Exploration, Demonstration and Validation, Full-Scale Development, and Production/Deployment.

Pre-Conceptual Phase

The Pre-Conceptual Phase begins with the user preparing a Statement of Need (SON). TO planning should

begin in this phase because the initial development of the operations and maintenance concepts for the weapon system provide the basis for the other phases of the acquisition process (24:2). The maintenance concept identifies the levels of maintenance, skills of maintenance personnel at each level, the amount of maintenance that will be performed and the environment where the maintenance will be performed (24:2). The activities involved in the maintenance concept are important drivers when determining the types and numbers of TOs that will be required to support the weapon system and related support equipment.

The purpose of involving TOs this early in the acquisition process is not to develop specific details, but to understand the factors that will impact TO acquisition later on in the process and begin planning for them as soon as possible. Figure 2.1 summarizes the key factors (24:2).

Conceptual Exploration Phase	Demonstration & Validation Phase	Full-Scale Development Phase	Production/ Deployment Phase

Pre-
Conceptual
Phase

Prepare Statement of Need (SON)

* State mission
* Summarize mission need in operational terms
  - Key tasks to be performed
  - Mission purpose and capability
  - Logistic considerations
    Technical publications concept
    Maintenance concept
* Summarize deficiency
  - Current or projected inability to perform tasks
  - Relationship to short or long range capability objectives

Fig 2.1 Actions Accomplished During Pre-Conceptual Phase

Conceptual Exploration Phase

The Conceptual Exploration phase begins with the Secretary of Defense Decision Memorandum and the establishment of the System Program Office and its director, the Program Manager (10). The purpose of this phase is to identify viable alternatives to the users' needs. Actions involving TOs are exploratory in nature but are very important. According to Mr. Munguia, the course director

for the Air Force Institute of Technology, Technical Order Acquisition and Management Course,

> "The key to developing quality publications at competitive cost is to address the requirements during concept formulation and allow the process to demonstrate its effectiveness in improving overall system supportability". [24]

Figure 2.2 shows key factors that should be considered in this phase (24:3).

Pre-Conceptual Phase	Demonstration & Validation Phase	Full-Scale Development Phase	Production/ Deployment Phase

Conceptual Exploration Phase

- applicability of new technical data preparation and display techniques.
- applicability of current technical data methods and programs.
- applicability of commercial data.
- improving management concepts and techniques that will allow for effective tracking of data cost.
- establishing effective coordination procedures during technical publications development.
- incorporation of a good quality assurance program during development.

Fig 2.2 Actions Accomplished During Conceptual Exploration Phase

Demonstration and Validation Phase

Mr. Munguia describes the Demonstration and Validation Phase as "The most crucial phase in the acquisition process in terms of providing the interface necessary between system design, user, and the logistics community" (23:4). This phase is characterized by rapid expansion of the system project office as managers wrestle with decisions regarding tradeoffs between performance requirements, costs, schedule and system supportability. As a result, functional specialists are needed to manage the identification and coordination of contractor tasking requirements with the user, Air Force Logistics Command, test and evaluation organizations, Air Training Command, and others as the system dictates (24:4).

A key functional specialist is the TO manager. The TO manager is chief of the Technical Order Management Agency. This agency has overall management for the acquisition of all technical publications required for the installation, operation maintenance and overhaul of Air Force weapon systems, support equipment and materials (13:2).

Research has shown that TO requirements not identified during this phase of the systems acquisition cycle have caused substantial increases in operational and maintenance costs in the deployment phase of the process (7:9;11:24;27:27). Therefore, it is important that TOs be

developed concurrently with the total program effort and that TOs are compatible with the overall program objectives (22:37). Major TO requirements that are the responsibility of the TO manager are listed in Figure 2.3 (24:4).

Pre-Conceptual Phase	Conceptual Exploration Phase	Demonstration & Validation Phase	Full-Scale Development Phase	Production/ Deployment Phase

- Establish points of contact with user, logistic support command, training command, and others as required.
- Prepare and coordinate technical publication requirements for draft SOW.
- Coordinate technical publication distribution requirements for early training and test functions.
- Review and resolve technical publication conflicts based on input from data call.
- Specify technical publication requirements in final SOW.
- Participate in contractor selection process.
- Host technical publications guidance conference after selection of contractor.

Fig 2.3 Actions Accomplished During Demonstration and Validation Phase

Full-Scale Development Phase

During the Full-Scale Development Phase program system objectives materialize into the hardware and prototypes of the weapon system and its support equipment.

As contractor system/equipment designs become firm, designs and procedures for operational and maintenance tasks are formalized into procedural data requirements (24:6). The contractor in this phase begins the preparation of draft manuals to be used in contractor validation of manuals. Also, preliminary manuals for ATC training requirements are developed. From the TO manager's point of view, the most important consideration underlying all TO development is that quality assurance procedures are incorporated into the development of TOs (28:28). Factors such as contractor validation, government in process review, and identification and early correction of problems are essential for an effective TO quality assurance program. As in the earlier phases of the program, the TO manager must work closely and coordinate with many other functional offices of the SPO, user, test and evaluation agencies, AFLC, ATC and others as needed to develop quality TOs (28:28). Actions which the TO manager must accomplish or insure are provided are summarized in Figure 2.4 (24:7).

Production/Deployment Phase

The Production/Deployment Phase begins when the Secretary of the Air Force is satisfied that the weapon system developed meets the Air Force's needs and he gives the go ahead (10). In this phase, TO management concerns are still focused on achieving quality assurance for the TOs. As the contractor begins production of the weapon

Pre-Conceptual Phase	Conceptual Exploration Phase	Demonstration & Validation Phase	Full-Scale Development Phase	Production/ Deployment Phase

- Contractor will initiate development of publication in accordance with contract requirements.
- Contractor will review commercial manuals for applicability or possible revision to comply with government requirements.
- Contractor will initiate technical publication validation.
- Contractor will formalize Technical Manual Plan (TMP) in accordance with government guidance.
- Technical publications manager will coordinate specific quality assurance responsibilities with respective DoD organizations.
- Technical publications manager will coordinate technical publication number assignment.
- Technical publications manager will coordinate in-process review conferences.
- Technical publications manager will arrange for early delivery of technical publications to training command and/or test and evaluation teams.
- Technical publications manager will arrange for effective accounting and distribution of publications to be used for verification.
- Technical publications manager will arrange for printing or publication through the government printing office.

Fig 2.4 Actions Accomplished During Full-Scale Development Phase

system, contractor validation is still continuing and Air Force TO verification begins on those TOs validated by the contractor. The Air Force's test and evaluation activities will test the TOs to ensure they are clear and adequate for the operation and adequate for the operation and maintenance of associated equipment and for certifying that the TOs are compatible with the pertinent hardware, tools, and support equipment (24:8). All deficiencies noted during verification are forwarded to the contractor to make the correct changes to the TOs. Once the TOs have been verified and approved the TOs are formalized, published and distributed to the user. Specific actions taken by the TO manager during this phase are shown in Figure 2.5 (24:8).

Remarks

The TO acquisition process just discussed shows the "ideal" rather than the actual process. The difference between the two consists of where and when TO manager actions and responsibilities are performed. A study by Wigton and interviews with TO managers have shown that many of the responsibilities discussed in the Demonstration and Validation Phase are actually done in the Full-Scale Development Phase (FSD) (28:28;27;3;9). In particular the TO guidance conference, the specification of TO requirements in the formal statement of work and the contractor selection process are usually not accomplished until FSD (28:28). Also many of the planning factors for TOs discussed in the

Pre-Conceptual Phase	Conceptual Exploration Phase	Demonstration & Validation Phase	Full-Scale Development Phase	Production/ Deployment Phase

- Continuation of technical publication verification.
- Continuation of in-process reviews.
- Pre-publication reviews.
- Formal inspection and acceptance of technical publications.
- Publication and general distribution of formal technical publications.
- Post publication reviews of technical publications.
- Coordination with logistic command for program management responsibility transfer (PMRT).

Fig 2.5 Actions Accomplished During Production/Deployment Phase

Pre-Conceptual and Conceptual Exploration Phases are not done until the Demonstration and Validation Phase (28:28).

The TO acquisition process is an orderly, sequential step by step process that cannot be shortcut. TO planning begins the process and is followed by TO task identification, TO validation, TO verification, TO change requirements and lastly printing. If these steps are begun in concept exploration, the process will meet the ideal. But if the planning of TO acquisition begins farther into the acquisition process, everything is slipped so that something downstream will suffer: either TO accuracy,

timeliness, cost effectiveness or utility (23). A study by Brown and Lyon found that beginning planning early in the process was not a source of TO problems in itself (7:55). They did find a lack of top level management emphasis on TOs and poor communication and coordination between top management and SPOs is a TO problem area (7:56). Their recommendation to establish a centralized technical order management center and its subordinate, a field assistance division, would make it possible for technical order acquisition planning to begin earlier on selected programs. They stated:

> If field assistance personnel would be assigned to monitor a program as soon as the program is established, then technical order relevant data could be compiled from the beginning of the program. Even though there are not many technical order acquisition related activities during the early stages of a program, the field assistance division would be available and familiar with the program if their assistance is needed. [7:80]

Therefore, the result would support the "ideal" TO acquisition process. The point this thesis makes is: When TO management actions deviate from the "ideal" TO acquisition process, the more difficult it is to get quality TOs, on time, at the lowest possible cost.

The overview of the TO acquisition process highlighted some of the important responsibilities of the TO manager and the way these responsibilities are integrated into the process. The next section will review Air Force

directives and publications that define the TO manager's responsibilities.

TO Manager Responsibilities

Currently, there is no single source that can be consulted that defines in detail the responsibilities of the TO manager (3). Therefore, this review will examine the TO manager's responsibilities in the established precedence by effective Air Force directives and policy guides.

Air Force Regulation 8-2, Air Force Technical Order System is the publication that documents official policy concerning the Air Force TO system (13). AFR 8-2 delineates the responsibility of all participants in the TO system but does not specifically identify the responsibility of the TO manager.

The publication next in precedence is TO-00-5-1, Air Force Technical Order System (14). TO-00-5-1 in addition to specifying the responsibilities of other participants in the TO system, defines the responsibilities of the TO manager. The following is a summary of these responsibilities compiled by Hatterick and Price in AFHRL-TR-80-50 (18:46):

> a. Initiate and coordinate the pre-contract planning for procurement of TOs. Ensure that all affected commands and agencies identify TO-related requirements.
>
> b. Prepare Preliminary TO program planning documentation, to include the work statement and the preliminary TO Publications Plan (TOPP).
>
> c. Conduct and chair all technical publications conferences, meetings, reviews (including in-process,

pre-publication, and post-publication), and other joint efforts related to the program.

d. Ensure that adequate arrangements are made for the participation of AFLC, ATC, using commands, and other affected agencies. Arrange for Contract Administration Office (CAO) representation in meetings with the contractor and procuring activities as required.

e. Provide for the monitoring of the contractor's validation program. Establish and manage a verification effort as either a one-step or two-step program, and coordinate the incorporation of needed changes on a fast-reaction basis.

f. Ensure that the contractor complies with all contractual requirements, applicable specifications, standards, exhibits, maintenance plans, and provisioning and source coding actions relative to the content, format, clarity, level of writing, consistency, adequacy, and accuracy of TOs.

Next in precedence is Air Force Systems Command Manual 310-2, Technical Publication Acquisition Manual (15). This publication re-iterates the responsibilities of TO-00-5-1 but goes into more detail concerning the functions and objectives of AFSC. AFSCM 310-2 states:

> The TOMA will initiate planning for the technical publications development concurrently with the total program planning effort to ensure that the management approach is compatible with the overall program objectives. [15:2-1]

AFSCM goes on to say:

> The TOMA is responsible for the accuracy of the technical publications... [15:2-2]

The format of AFSCM 310-2 breaks out the specific TOMA responsibilities and functions during the TO acquisition process into separate sections of the publication. These sections are (15:2-1):

a. Requirements
b. Specifications
c. Budgeting and Funding
d. Work Statements
e. Contracting
f. In-process and Pre-publication Review
g. Scheduling and Reporting
h. Numbering, Indexing, Printing and Distribution
i. Validation and Verification
j. Inspection and Acceptance Responsibilities
k. Engineering Change Proposal (ECP) and Technical Publications Revisions/Changes

These three publications provide the general policy guidelines and responsibilities of the TO manager. There are several other directives and publications which also identify these same general responsibilities in addition to more detailed instructions, procedures and descriptions. But all are described and discussed in the work of Hatterick and Price and need not be reproduced here (18). Their guidebook for TO managers titled Technical Order Management and Acquisition is the most comprehensive analysis and description of the TO acquisition system. The objective of their research as described in the introduction states:

> This guidebook has been prepared, in two volumes, to be a basic reference publication. It is intended for use by all individuals involved in the acquisition and management of Air Force Technical Orders with emphasis on the responsibilities and concerns of the TO Management Agencies (TOMAs) in those commands acquiring TOs. [18:1]

Their guidebook is the result of a two year study, from May 1978 to May 1980, on the TOMA and designed to be a handbook for TO managers supplementing AF directives and publications (18:1).

Research on TO Manager Related Problems

Research on TO manager related problems has revealed several problem areas. A 1984 study by Brown and Lyon identified three problem areas related to TO managers. They are (1) need for better coordination and communication in the TO acquisition process among its participants, (2) better manning for TO managers, and (3) better training for TO managers (7:53).

Coordination and Communication. The Brown and Lyon recommendations based on a telephone survey of TO managers, Deputy Program Directors for Logistics (DPMLs), members of the Central Technical Order Management Group (CTOM) and AFSC Program Managers, were the establishment of a Central TO Management Center, skeleton documents and a TO manager handbook (7:58).

The Central TO Management Center (CTOC) would be a center of specialized TO acquisition knowledge, and would assist TO managers and other acquisition agencies with TO information and problems (7:27). It would act as a "central clearing house" for the TO acquisition process. Currently the Navy, Army and Air Force Systems Command Armament Division have a centralized management agency (7:28). Specialists in these agencies have been assisting their TO managers in early planning, contracts, and establishing central TO acquisition guidelines.

A 1984 study by Wigton on the need for a centralized TO center also concluded that the Air Force needs a CTOC (28). His study found that:

> Air Force TO responsibilities are not vested in a single organization but are fragmented among and within HQ USAF, AFLC, AFSC and other major commands and several field activities. As a result guidelines were contradictory, vague, confusing, non-directive and biased in favor of major (aircraft) weapons systems acquisition programs. [28:10]

The second recommendation of "skeleton" documents could improve coordination by communicating possible TO needs to individuals not familiar with the TO process (28:29). The "skeleton" documents would be used by individuals working in the Pre-Conceptual and Conceptual Phases of the acquisition process where there is normally no TO manager assigned. These documents would assist early planners of the major weapon system in planning for TO requirements.

The third recommendation by Brown and Lyon about improving coordination and communication within the TO acquisition process is the establishment of a TO handbook (7:59). The handbook would be dedicated, or have sections dedicated to identifying the required coordination and communication channels. Then TO managers would have a better understanding of what their coordination and communication responsibilities were.

The problem of coordination and communication is not new. A study by Carwise and Bemrose in 1967 found:

> ...the management information system for the acquisition of technical publications to be deficient. There is little standardization of status reporting procedures, status information received is practically useless because of inaccuracies, the system does not provide information necessary to avoid procurement of duplicate data, and there is not adequate feedback on user satisfaction. [11:52]
>
> Their recommendations were:
>
> (1) Technical publication managers initiate more aggressive coordination with all personnel who affect their management, (2) An improved management information system be established to aid technical publication managers, (3) a study be initiated to determine the feasibility of increasing the technical publication manager's control over the elements that effect his operation. [11:53]

Better Manning for TO Managers. The second problem area the Brown and Lyon study found was that manning for TO managers was inadequate. Their recommendations for improving the manning problems were (1) establish a separate Air Force Specialty Code for TO managers, and (2) establish a CTOC (7:61).

The Brown and Lyon study theorized that by establishing a separate Air Force Specialty Code, manning problems could be improved (7:33). Since 1967 none of the recommendations have been put into effect. The establishment of a CTOC would address these three areas, but currently the CTOC is not a reality. In a preliminary study, Brown and Lyon found that TO acquisition personnel at the AF Logistics Management Center (AFLMC) considered manning to be a number one problem facing the TO acquisition process. The AFLMC people stated: "They felt that there is no standard

or criteria for assigning TO managers to a program. In fact, many programs do not have full time TO managers" (7:23).

Research by Winn and Williams also found this to be true. They stated:

> Overall manning of the ILS (Integrated Logistics Support) effort, including the Technical Data Element, is significantly below that requested. [29:10]

Brown and Lyon continued to state:

> Inadequate manning is in itself a problem, and is also a major contributor to the other TO acquisition problems. Earlier planning in the TO acquisition process requires adequate manpower to accomplish the job. Better coordination and communication with other agencies also requires manpower. [7:23]

The study by Wigton also found TO manning to be a problem for all AFSC product divisions except the Armament Division. The study's results showed:

> Each product division staff assigned one person to TO acquisition duties. Personnel assigned were not experienced with TO acquisition... TOMA manning with (certain) SPOs were inconsistent, and not based on any standard factors provided by manpower officer, the product division or the AFSC headquarters staff. [28:12]

The study went on to say that in another AFSC product division:

> ...no TOMA personnel were assigned to the SPOs exclusively for TO acquisition. Instead, TOMA duties were performed by personnel responsible for support equipment provisioning as well as TOs. Several of these had TO acquisition experience, but the background of most was in other logistics support areas. [28:12]

The Armament Division (AD) of AFSC was one exception the study found. It had TO managers exclusively assigned to

SPOs for TO acquisition. This was because AD had formed a 'divisional' CTOC to manage all division TO related problems including manning (3).

The recommendations by the Wigton study are similar to the Brown and Lyon study. The Wigton study found:

> A contributing factor to inadequate staffing and manning problems was the lack of one military or civilian career field for TOMAs. This perpetrated inexperience problems within SPOs with military TOMA positions, and created career progression problems for civilian TOMAs. [28:12]

Additionally, civilian TO managers believed their jobs were 'dead-end' jobs. For several years the CTOM Group has been trying to establish military and civilian career fields, without success (28:12).

These last findings are supported by another study, done earlier. Carwise and Bemrose found that TO manager low retention rates were because the job itself was far from enticing, even though challenging (11:45). Their study also recommended a separate AFSC for TO managers because:

> ...an established career field would increase the attractiveness of assignment in the data management area. Those assigned to technical publication management positions, for example, would know what type and level of assignment follows. At present (1967) technical publication managers cannot anticipate future assignments because no progression or assignment pattern exists... [11:45]

A feasibility study by Peters on the establishment of an AFSC for all TO managers in the entire TO system (System of AFLC, user TO management) found the Air Force personnel system would not support a separate AFSC for the following

reasons: limited size of TO population, limited career ladder and progression opportunities, and an extra bureaucratic layer (1:A13-7). Peters' study concluded that the following alternatives need further study:

> a. establishment of a separate TO management AFSC
> b. establishment of a special duty identifier for selected TO management duties
> c. establishment of an AFSC for TOMAs (AFSC and AFLC)
> d. additional overall TO training for all TO users, with an AFSC shredout to identify personnel performing special TO duties. [1:A13-7]

The second alternative recommended by the Brown and Lyon study to solve the manning problem was the establishment of a CTOC. Their results showed that "the establishment of a CTOC would allow smaller programs to effectively purchase TOs without the assignment of a TOMA" (7:28). It further said that the CTOC could assist in TO acquisition needs of smaller programs, thus reducing the need for TOMA manpower in those programs. The end result will be a reduction of manpower requirements overall (7:33).

The Wigton study also concluded that a CTOC would be a great asset in reducing manning problems. If established one of the CTOC's responsibilities would be to identify, track, and man SPOs and AFLC program offices with qualified TO managers (28:23).

Remarks. Although the majority of the research concluded that a separate Air Force Specialty Code for TO managers is needed, the Peter's study disagreed (1:A13-7).

None of these studies however, described how to establish an Air Force Specialty Code or explore the viable alternatives recommended in the Peter's study. The subject of a separate Air Force Specialty Code therefore is not a closed issue. Any effort directed at improving the TO acquisition process must take into account the manning problems discussed and thus further explore the impact of an Air Force Specialty Code on the effectiveness of the TO manager.

Additionally, interviews with Munguia, Breslin and Weaver concluded that new personnel being assigned TO manager duties should have, as a minimum, several years experience as TO users, especially as maintenance technicians (22;26; 3). Other TO managers agreed with the experts' conclusions. Mr. Cambell and Mr. Burkhardt, TO managers at ESD, both said "a TO manager must have equipment experience first" (8;9). CMSgt Breslin, at AD, summed up the 'experts' recommendation for equipment experience by saying "the TO manager needs to translate the user wants into acquisition requirements." To do this the TO manager has to know both worlds. The TO manager learns the user world by 'hands-on' equipment experience. The acquisition world can be learned through training and experience in the acquisition community (3).

Better Training For TO Managers. The third problem area found by the Brown and Lyon study was that TO manager training needed improvement. They concluded that:

> Training appeared to be the largest single problem with the TO acquisition process. In fact it was very difficult to separate training problems from manning problems or any of the other problems investigated. Training referred to much more than formal education. It also included experience and "corporate knowledge." [7:25]

To solve this problem, the Brown and Lyon study recommended (1) establishment of a separate Air Force Specialty Code or career field for TO managers, (2) establishment of a CTOC, (3) establishment of a handbook on coordination and communication responsibilities (7:65).

In the study's recommendation of a CTOC, the CTOC would be subdivided into three divisions. One of those divisions, the Field Assistance Division, would have the responsibility for establishing a training program for TO managers and monitoring training programs of Air Force Systems Command product divisions and SPOs. The Air Force Specialty Code and handbook recommendation previously discussed would be integrated into the training process (7:79). The study did not recommend a type of manual or requirements for the training program.

The study by Wigton also recommended that the CTOC have the responsibility for a training program (28). Again, their study did not identify any particular program or curriculum other than training in general as a problem area.

Remarks. Currently there are two formal training programs for TO managers. The first is the Air Force

Institute of Technology (AFIT) Technical Order Acquisition and Management Course (SYS 230) taught by Mr. Munguia. The second is a training program set up at AD for AD TO managers by CMSgt Breslin (23;3). The AFIT course, open for TO managers and other personnel with jobs involving TO management is two weeks long. As reported by Brown and Lyon, Mr. Munguia stated:

> The knowledge and expertise required to effectively manage a technical order acquisition program is immense. In a two week course, I cannot do much more than give an overview of the major topic. The best the students can do is learn of their responsibilities and hopefully where to go to when they need assistance with the details. [6]

Important to this problem area is that "corporate memory" is needed to define, plan, and execute a comprehensive training program. A general overview course, similar to the AFIT SYS 230 course is needed but a more in depth and specific course such as the program at AD is also needed at all AFSC product divisions. Furthermore the training program should include the Technical Order Management Agency itself to train new people on the peculiarities of that agency's functions and special TO requirements (23;27;28).

Conclusions

The literature has shown the process of the TO acquisition is a subset or subsystem of the larger acquisition system. The previous research has identified the problems with the TO acquisition process and provided

recommended solutions. The Brown and Lyon study concluded that the problems are interrelated. Treating one problem, say training, will have profound effects on other elements, such as manning or system communication and coordination (7:75). The establishment of a CTOC as both the Brown and Lyon study and the Wigton study advocated was a central key to solving the problems of the TO acquisition process (7:75; 28). The authors of this research project agree. But as the literature has also shown little has been done to learn and understand the elements involved with the human aspect of the problem, the technical order manager. This research project, as described in the scope, will focus on the TO manager.

The literatature review leads to the conclusion that the identification of TO managers is a problem. This can be seen by all prior research advocating that an Air Force Specialty Code is needed for TO managers. Peters points out an Air Force Specialty Code is only one alternative to the identification problem. Other alternatives he points out are an SDI, and an Air Force Specialty Code for joint acquisition TO managers (1:A13-6). A final viable alternative is that no Air Force Specialty Code is needed at all, but the control of TO manager manning can be done "in house" through the CTOC as Wigton and Brown and Lyon point out (7;28).

To define the problem further, five independent variables emerge (16). First is the identification process itself and second, the criteria used to select individuals for TO manager positions. This research project will explore both these variables by asking two research questions:

1. How are TO managers initially identified?
2. Can the establishment of selection criteria for TO managerss improve their effectiveness?

The third variable the literature review discussed was the problem of training. It identified only two formal training programs that are currently in being. Both programs are contributing to the improvement of TO manager effectiveness but on a limited basis. The AFIT course as Mr. Munguia said "only makes TO managers aware of their responsibilities" (6). The AD program that CMSgt Breslin established, is only for AD TO managers (5:6).

Air Force Manual 50-62, Principles and Techniques of Instruction states:

> Training is the factor of management that insures standard procedures, overall efficiency, and mutual understanding. It is the medium used by the executive or commander to pass on the why, what, and how of the job to be done. [17:1]

The literature shows, initially, that the majority of acquisition TO managers are not understanding the why, what and how of the TO manager job. Therefore this thesis will explore further the training aspect of the TO manager. It will do it by answering the research question:

3. Can training improve the effectiveness of the TO manager?

A fourth independent variable this research project will examine is the interaction of other functional offices with the TO manager. The Brown and Lyon study as well as the Wigton study found coordination and communication of the TO manager with elements outside its functional area to be poor (7:58;28:18).

Based on the description of the TO managers' participation in the major weapons system acquisition process and a review of directives and policy guides on the TO manager responsibilities, it can be concluded that much of what the TO manager does requires extensive interaction with other functional areas. Therefore, this thesis will answer the research question:

4. Can the TO managers' interaction with other functional offices inside and outside of the SPO be changed to improve the effectiveness of the TO manager?

Finally, a fifth independent variable identified in the literature review which needs further study is in the area of top management's lack of emphasis on TO problems. Carwise and Bemrose reported in 1967 that top management did not give enough attention to the TO acquisition process (11:53). Wigton, Brown and Lyon studies also point this out (28:13;7:22). Furthermore it can be seen from the fact TO managers are not assigned to the SPO in some cases until the demonstration and validation phase and that TO acquisition

is not given a high enough priority. Yet, as the Brown and Lyon study pointed out, the poor quality of TOs the user has in the deployment phase, are a function of TO acquisition problems (7). Thus, to affect the much needed changes in the TO acquisition process including the establishment of a CTOC, improved training programs, better defined policy guidelines and an established identification and selection process for TO managers, top management must support these changes. Therefore this thesis will answer the research question:

5. How do TO managers perceive the level of top management awareness of TO acquisition problems?

Chapter Summary

The TO acquisition process has been reviewed and important TO manager actions have been identified in the acquisition process. TO manager responsibilities defined in Air Force directives and guides have been identified and a review of current research on the TO acquisition process have identified five TO manager related problems. These problems as identified by the literature review are:

1. There is no adequate system for identifying TO managers.
2. There are no standards or criteria for selecting individuals for TO manager positions.
3. Training for TO managers is inadequate.
4. Interaction of the TO manager and other functional offices is inadequate.

5. Top management awareness of TO acquisition problems is not adequate.

The objective of the research is to answer the five research questions that relate to the five problems. The research questions are:

1. How are TO managers initially identified?

2. Can the establishment of selection criteria for TO managers improve their effectiveness?

3. Can training improve the effectiveness of the TO manager?

4. Can the TO managers' interaction with the other functional offices inside and outside of the System Program Office be changed to improve the effectiveness of the TO manager?

5. How do TO managers perceive the level of top management awareness of TO acquisition problems?

The next chapter will define the methodology for quantifying the five research questions.

III. Methodology

Justification of Research Method

It was mentioned in the Scope section that this research was a further exploration of the work begun by Captain Brown and Captain Lyon. Due to the exploratory nature of this research no hypotheses was tested. The literature review identified five problem areas which this study explored in further detail. The purpose of this research phase was to examine the TO manager's role in the TO acquisition process and to identify ways to improve his effectiveness.

This examination was accomplished by the use of telephone interviews with functioning TO managers. The interviewees were asked to respond either positively or negatively to measurement questions derived from the five research questions. The interview schedule is presented as Appendix A. The percentage of the interviewees' positive or negative responses were used to establish the validity of the research questions as a measure of TO managers' effectiveness. Additionally, expanded response questions were utilized to determine information not reduceable to positive or negative responses and to solicit suggestions or recommendations to improve the management of TOs.

The interview used structured questions; however, one of the advantages of this technique was that responses were expanded as necessary.

Three alternative data collection methods were considered for this research project: (1) on site interviews, (2) mail survey, and (3) telephone survey. While on site surveys were the most flexible, they were also the most expensive. The interview population for this research effort was spread over four Air Force bases located in four states, making the cost in terms of time and money too prohibitive. Since the intent of this research was to contact as nearly as possible the entire TO manager population, the non response rate for mail surveys was unacceptable (16:308). Telephone interviews have reasonably high response rates, using the autovon system eliminates all dollar costs, and interview bias was reduced "because of the lack of face-to-face contact between interviewer and respondent", thus making telephone interviews the most practical measurement tool (16:306).

Population Description

The Brown/Lyon thesis upon which this thesis was predicated divided the respondents by product divisions. The four product divisions within the Air Force Systems Command (AFSC) which dealt with the acquisition of technical orders were the Aeronautical Systems Division (ASD), the Electronics Systems Division (ESD), the Armament Division (AD), and the Ballistic Missile Office (BMO). These four divisions, because they dealt with the acquisition of AF weapon systems and related equipment, were within the scope

of this research. "The fifth product division in AFSC, Space Division, was not included in the research because of the unique, non-weapon system nature of the equipment acquired by that division" (7:38). Furthermore, because this effort was examining the effectiveness of the TO manager within the four product divisions, this thesis used the description of the organizational structure of the four divisions as cited by Brown and Lyon.

> A description of the organizational structures of the four divisions is necessary to understand the nature of the population. These structures differ because of the varying scope of the programs for which the divisions are responsible. For example, ASD deals with major systems acquisitions such as aircraft, simulators, engines, and related aeronautical equipment, while ESD and AD deal with smaller weapon systems or subsystems of larger systems. What follows is a general description of the different divisions' System Program Office (SPO) organizations, recognizing that each SPO will differ in detail.
>
> In ASD, individual SPOs are often large organizations, with separate offices dedicated to specific acquisition responsibilities, and these separate offices contain specialists in the corresponding areas. In general, each ASD SPO has three levels of responsibility regarding TO acquisition. At the upper level are Program Managers (PMs), who are responsible for the acquisition of the entire system, including TOs. Reporting to the PM is a Deputy Program Manager for Logistics (DPML), who is responsible for the portion of system acquisition that relates to logistics, again including TOs. Finally, there are Technical Order Managers (TOMAs), reporting to the DPML, that coordinate and manage the day-to-day activities of TO acquisition.
>
> In contrast to the large-scale SPOs typical of ASD are the SPOs of ESD and AD. The systems these divisions are responsible for acquiring are typically smaller in scope than those of ASD, with a corresponding reduction of dedicated functions within those SPOs. Neither division has TOMAs per se; in ESD the DPMLs perform TO acquisition as part of their normal duties, while in AD TO acquisition specialists

> are matrixed from a central office into SPOs as required. The organization of BMO is a mix of the other three; the SPOs are large (as in ASD) but few in number, while TO acquisition personnel are matrixed from a central office similar to the ESD and AD structure. [7:38-40]

In each product division, respondents were identified as those individuals tasked with the responsibilities of TO acquisition rather than by a formal duty title. The method used to generate possible respondents began by first identifying all the current systems active in the four product divisions. A data base maintained by the Air Force Acquisition Logistics center at Wright-Patterson AFB was used for this purpose. The list of current systems was then cross-matched against a point of contact list provided by each product division. These lists varied in completeness; for example CMSgt Breslin at AD was able to provide a list of names and telephone numbers of every TO manager, which facilitated the interview process greatly. The BMO list began as a single point of contact taken from a list of attendees at the Air Force Institute of Technology, System 230 course, and then utilized the telephone survey instrument to generate the remaining names. ASD required a bit of detective work to identify the individual who had a list of key names within each weapon system acquisition program. By contacting the individuals on the list and again utilizing the telephone interview, a comprehensive list of ASD TO managers was generated. ESD presented the biggest challenge. Mr. Herbert Cambell

provided a list of DPMLs and PMs grouped by program. It was necessary to contact these individuals, explain the nature of the research, and obtain their approval to interview personnel who fit this research's definition of a TO manager. The ESD personnel tasked with TO acquisition are unofficially termed "loggies" and as such were responsible for all logistics tasks in addition to acquisition of TOs. These "loggies" worked in such isolation from each other that it was only rarely that the interviewee was able to provide names of other TO managers.

The TO manager population consists of 109 personnel. Due to the relatively small size of the population, the intent of the research was to conduct a census rather than a sample. The following is a list of identified TO managers in each of the product divisions and the number of them interviewed:

Division	Identified	Interviewed
AD	15	15
ASD	43	41
BMO	6	5
ESD	45	40
TOTAL	109	101

The differences between the identified numbers of TO managers and those interviewed were due to personnel transfers without replacement, SPO recognization, and individuals who were unable to be contacted due to leave or temporary duty during the time the interviews were

conducted. The period the interviews were conducted was from March 1985 to June 1985.

The Telephone Interview

The telephone interview was the method of interrogation used (see Appendix A). The instrument began by introducing the interviewer to the prospective respondent and continued with a brief explanation of the purpose of the interview and why the respondent was chosen to participate.

The questions required several types of responses.

1. Numerical (i.e. dates, number of personnel)
2. Historical (i.e. acquisition phase at time of assignment)
3. Biographical (i.e. job title)
4. Positive/Negative (i.e. yes-no responses)
5. Expanded Response (i.e. suggestions or recommendations)

The only expected separation of respondents was by product division; therefore, no particular sequence was used in conducting interviews. The only ordering was as a result of the names provided by the instrument. The anonymity of respondents was preserved by annotating the response sheet with the title of the product division only.

According to Emory, the three major considerations in evaluating a measurement tool are practicality, reliability and validity (16:128). Practicality was previously discussed in the section explaining the rational behind selecting the telephone interview as the survey instrument.

The reliability of the telephone interview schedule was demonstrated by:

The telephone interview schedule was given a trial run to demonstrate whether the questions contained in the instrument would generate the type responses necessary for the purposes of this thesis. The trial population consisted of twenty Air Force Institute of Technology School of Logistic Professional Continuing Education students whose normal duties involved technical order management in one capacity or another. The students were familiar with the terms and language normally associated with technical orders and were enrolled in Technical Order Acquisition Management SYS 230. The trial population responses from all personnel not functioning as technical order managers, as defined in this thesis, were unuseable. The six respondents actually performing TO manager duties in the acquisition cycle were able to respond to all questions within the expected range.

The validity of the telephone interview schedule was demonstrated by:

1. In preliminary contact with knowledgeable TO personnel, the names most often mentioned as being the "experts" in TO Acquisition were Mr. Art Munguia, of the Air Force Institute of Technology, School of Systems and Logistics and Mr. Chandler H. Weaver, Chief of the Technical Data and Management Office, Air Force Systems Command,

Aeronautical Systems Division (ASD) and CMSgt Edward J. Breslin, Superintendant, Technical Order Management Agency, Armament Division (AD). These three individuals, because of their first hand knowledge of the system, were consulted throughout the development of the basic research questions and again were consulted when evaluating the validity of the telephone interview. The survey instrument used in this thesis was a result of an iterative process of refinement to elicit responses from the TO manager population which would permit the researchers to draw valid conclusions.

2. This telephone interview was further validated by the Wigton study. Although independently developed, the survey instrument used by Wigton "to resolve day to day problems encountered by Air Force TO managers during the acquisition of TOs" closely paralleled the questions contained in this thesis' telephone interview schedule (28).

In conclusion, the selection of a telephone interview as a measurement tool met the requirements for practicality, the pretest demonstrated reliability, and validity was shown by concurrence of the experts.

Research Methodology

The telephone interview was used to identify the background and functions of those individuals performing TO manager duties. The interview also identified possible solutions to problems involving TO managers.

Responses to the interview questions were grouped by product divisions (AD, ASD, BMO, ESD). Questions involving yes or no responses were scored by percentage and validation of the questions were determined by establishing if a majority of the respondents agreed or disagreed. Questions not involving yes or no responses were also evaluated by what percentage of the respondents had common responses. The background data on those individuals performing TO manager functions within the product division was used to form a composite of each division. The composites for each product division were compared to the other divisions. The division composite were then assessed to determine a composite for all AFSC TO managers on a question by question basis.

Questions 1 through 27 were used to form the TO manager composite. Questions 28 through 37 were used to gather data on TO management improvement areas and Question 38 was used to assure completeness. The open-ended nature of the question was intended to determine if any possible problems or solutions were overlooked.

Analysis of the data was discussed in Chapter V of the thesis. When the telephone survey was completed and the data compiled by product division and question, evaluation was accomplished using the above mentioned technique and then reported in Chapter IV, Results.

IV. Results

Chapter Organization

The data collected during the telephone interview was examined according to the objectives of this research. The presentation of the results of the telephone interview begins with a description of the survey instrument. Following the survey description, a tabular representation of the data received in response to the 37 telephone interview questions is given in Tables 4.1 through 4.5. Composites were formed for each of the product divisions and Air Force Systems Command. The explanation of how these composites were formed is provided in Appendix B. Finally, a grouping of the data from the perspective of the five research questions will be presented in Table 4.6 and 4.7.

Survey Description

The telephone interview was organized to present a composite of the technical order manager from a number of perspectives. Questions 1 through 4 were designed to give biographical information on the specific TO manager or program. Questions 5 through 8 dealt specifically with those qualifications a prospective TO manager had prior to original selection. These responses concentrated on management training and education, prior job training and experience, the individuals' perceptions on why they were selected to be a TO manager and finally, whether they

possessed the Special Experience Identifier (SEI 300) which indicates a prior level of expertise in technical order acquisition and management.

Questions 9 through 12 examined the organizational structure relative to the individual program. Question 13 asked the TO managers whether they perceived top management gave sufficient priority to the acquisition of TOs. The next grouping of questions, 14 through 21 dealt with specific taskings of the TO manager as per AF policy and directives. TO manager interaction with other individuals and agencies was handled by questions 22 through 24. Questions 25, 26 and 27 provided additional information on the specific TO manager and program. The final area of concentration was improvement ideas and this was dealt with by questions 28 through 37. That ended the structured portion of the interview. Completeness was assured by question 38 which was an open ended question that provided the interviewee a chance to make specific recommendations and suggestions to improve the management of technical orders.

The responses for Questions 1 through 37 are presented in tabular form shown in Tables 4.1 through 4.5. The number of the telephone interview question is located in the upper left corner of the table. The total number of A, B, C, D, or E responses and their coresponding percentages are listed vertically beneath the appropriate product

division heading (i.e. AD - Armament Division). The far right column includes total responses for the four product divisions under the heading AFSC - Air Force Systems Command. Blank spaces indicate those alternatives that were not possible responses for a specific question. The expanded responses and the responses to Question 38 were listed by product division in Appendix C.

TO Manager Composites

Composites of TO manager responses for each of the four AFSC product divisions (AD, ASD, BMO, ESD) and a composite for the entire TO manager population of AFSC were compiled to show the majority responses to survey Questions 1 though 27 (See Appendix B). The responses with the highest percentage were selected as representative of the product division position for that question and were included in the composite. For situations where the percentages were identical, all identical alternatives to the question were included as representative.

For questions where all alternatives had a percentage higher that 80%, all alternatives were included in the composite. The data given by the composites were used in the evaluations discussed in the Analysis and the Conclusions and Recommendations chapters.

Table 4.1

Telephone Interview Questions (1-6)

1	AD	ASD	BMO	ESD	AFSC
A	1	2	1	4	8
%	6.7	4.9	20	10	7.9
B	1	9	0	12	22
%	6.7	22	0	30	21.8
C	2	1	1	4	8
%	13.3	2.4	20	10	7.9
D	5	4	0	1	10
%	33.3	9.8	0	2.5	9.9
E	6	25	3	19	53
%	40	61	60	47.5	52.8

2	AD	ASD	BMO	ESD	AFSC
A	10	12	2	11	45
%	66.6	29.3	40	27.5	44.6
B	5	29	3	29	66
%	33.4	70.7	60	72.5	65.4
C					
%					
D					
%					
E					
%					

3	AD	ASD	BMO	ESD	AFSC
A	6	7	3	14	30
%	40	17.1	60	35	29.8
B	8	7	0	9	24
%	53.4	17.1	0	22.5	23.8
C	1	9	0	8	18
%	6.6	22	0	15	17.8
D	0	10	1	6	17
%	0	24.4	20	15	16.8
E	0	8	1	3	12
%	0	19	20	2.5	11.7

4	AD	ASD	BMO	ESD	AFSC
A	0	1	0	4	5
%	0	2.4	0	10	5
B	6	10	2	8	26
%	40	24.4	40	20	25.7
C	6	9	2	6	23
%	40	22	40	15	22.8
D	3	12	1	21	37
%	20	29.3	20	52.5	36.6
E	0	4	0	2	6
%	0	9.8	0	5	5.9

5	AD	ASD	BMO	ESD	AFSC
A	0	6	0	8	14
%	0	14.6	0	20	13.9
B	0	2	0	6	8
%	0	4.9	0	15	7.9
C	4	23	4	22	53
%	26.6	56.1	80	55	52.5
D	10	8	1	3	22
%	66.6	19.5	20	7.5	21.8
E	5	19	1	13	38
%	33.3	46.3	20	32.5	37.6

6	AD	ASD	BMO	ESD	AFSC
A	13	35	3	17	68
%	66.6	85.4	60	42.5	67.3
B	1	6	1	16	24
%	6.7	14.6	20	40	23.8
C	6	8	1	12	27
%	40	19.5	20	30	26.7
D	2	6	0	2	10
%	13.3	14.6	0	5	9.9
E	0	3	0	0	3
%	0	7.3	0	0	3

Table 4.2

Telephone Interview Questions (7-12)

7	AD	ASD	BMO	ESD	AFSC
A	4	8	1	8	21
%	26.6	19.5	20	20	20.8
B	5	7	1	10	23
%	33.3	17.1	20	40	22.8
C	0	0	0	0	0
%	0	0	0	0	0
D	3	1	0	7	11
%	20	2.4	0	17.5	10.9
E	11	28	3	23	65
%	73.3	68.3	60	57.5	64.3

8	AD	ASD	BMO	ESD	AFSC
A	3	11	1	0	15
%	20	26.8	20	0	14.9
B	12	30	4	40	86
%	80	73.2	80	100	85.1
C					
%					
D					
%					
E					
%					

9	AD	ASD	BMO	ESD	AFSC
A	0	2	0	0	2
%	0	4.9	0	0	2
B	0	23	1	40	64
%	0	56.1	20	100	63.4
C	0	1	0	0	1
%	0	2.4	0	0	1
D	15	15	4	0	34
%	100	36.6	80	0	33.7
E					
%					

10	AD	ASD	BMO	ESD	AFSC
A	9	31	4	36	80
%	60	75.6	80	90	79.1
B	2	2	0	5	9
%	13.3	4.9	0	12.5	8.9
C	1	1	0	1	4
%	6.7	4.9	0	2.5	4
D	2	2	0	2	6
%	13.3	4.9	0	5	5.9
E	1	4	1	2	8
%	6.7	9.8	20	5	7.9

11	AD	ASD	BMO	ESD	AFSC
A	1	27	5	20	53
%	6.7	65.9	100	50	52.5
B	14	4	0	20	48
%	93.1	34.1	0	50	47.5
C					
%					
D					
%					
E					
%					

12	AD	ASD	BMO	ESD	AFSC
A	6	9	1	29	45
%	40	22	20	72.5	44.6
B	5	4	3	3	15
%	33	9.8	60	7.5	14.9
C	1	0	0	0	1
%	6.7	0	0	0	1
D	1	2	0	2	5
%	6.7	4.9	0	5	5
E	2	25	1	6	34
%	13.3	61	20	15	33.7

Table 4.3

Telephone Interview Questions (13-21)

13	AD	ASD	BMO	ESD	AFSC
A	5	18	0	23	46
%	33.3	43.9	0	57.5	45.5
B	10	23	5	17	55
%	66.7	56.1	100	42.5	54.5

14	AD	ASD	BMO	ESD	AFSC
A	15	40	5	40	100
%	100	97.6	100	100	99
B	0	1	0	0	1
%	0	2.4	0	0	1

15	AD	ASD	BMO	ESD	AFSC
A	15	40	5	38	98
%	10	97.6	100	95	97
B	0	1	0	2	3
%	0	2.4	0	5	3

16	AD	ASD	BMO	ESD	AFSC
A	15	39	5	38	97
%	100	95.1	100	95	96
B	0	2	0	2	4
%	0	4.9	0	5	4

17	AD	ASD	BMO	ESD	AFSC
A	14	39	4	38	91
%	93.3	95.1	80	95	90
B	1	2	1	2	10
%	6.7	4.9	20	5	10

18	AD	ASD	BMO	ESD	AFSC
A	14	40	5	39	98
%	93.3	97.6	100	97.5	97
B	1	1	0	1	3
%	6.7	2.4	0	2.5	3

19	AD	ASD	BMO	ESD	AFSC
A	15	39	4	39	97
%	100	95.1	80	97.5	96
B	0	2	1	1	4
%	0	4.9	20	2.5	4

20	AD	ASD	BMO	ESD	AFSC
A	15	40	3	40	98
%	100	97.6	60	100	97
B	0	1	2	0	3
%	0	2.4	40	0	3

21	AD	ASD	BMO	ESD	AFSC
A	9	37	4	29	79
%	60	90.2	80	72.5	78.2
B	6	4	1	16	27
%	40	9.8	20	40	26.8

Table 4.4

Telephone Interview Questions (22-27)

22	AD	ASD	BMO	ESD	AFSC
A	12	38	4	38	92
%	80	92.7	80	95	91.1
B	12	39	2	39	92
%	80	95.1	20	97.5	91.1
C	10	34	4	37	85
%	66.7	82.9	80	92.5	84.2
D	10	36	5	31	82
%	66.7	87.8	100	77.5	81.2
E					
%					

23	AD	ASD	BMO	ESD	AFSC
A	14	40	5	40	99
%	93.3	97.6	100	100	98
B	14	40	4	40	98
%	93.3	97.6	80	100	97
C	6	36	3	37	82
%	40	87.8	60	92.5	81.2
D	4	36	5	18	63
%	26.7	87.8	100	45	62.4
E	14	41	3	39	99
%	93.3	100	60	97.5	98

24	AD	ASD	BMO	ESD	AFSC
A	3	10	2	20	35
%	20	24.4	40	50	34.7
B	9	10	1	20	40
%	60	24.4	20	50	39.6
C	10	19	1	21	51
%	66.7	46.3	20	52.5	50.5
D	2	10	4	11	23
%	13.3	24.4	80	27.5	22.8
E					
%					

25	AD	ASD	BMO	ESD	AFSC
A	0	4	0	10	14
%	0	9.8	0	25	13.9
B	1	2	0	23	26
%	6.7	4.9	0	57.5	25.7
C	1	2	0	4	7
%	6.7	4.9	0	10	6.9
D	1	2	0	2	5
%	6.7	4.9	0	5	5
E	12	31	5	2	50
%	80	75.6	100	5	49.5

26	AD	ASD	BMO	ESD	AFSC
A	0	4	0	2	6
%	0	9.8	0	5	5.9
B	15	37	5	38	95
%	100	90.2	100	95	94.1
C					
%					
D					
%					
E					
%					

27	AD	ASD	BMO	ESD	AFSC
A	15	36	5	0	56
%	100	87.8	100	0	55.4
B	0	5	0	40	45
%	0	12.2	0	100	44.6
C					
%					
D					
%					
E					
%					

Table 4.5

Telephone Interview Questions (28-37)

28	AD	ASD	BMO	ESD	AFSC
A	11	34	5	27	77
%	73.3	82.9	100	67.5	76.2
B	4	7	0	13	24
%	26.7	17.1	0	32.5	23.8

29	AD	ASD	BMO	ESD	AFSC
A	15	39	5	36	95
%	100	95.1	100	90	94.1
B	0	2	0	4	6
%	0	4.9	0	10	5.9

30	AD	ASD	BMO	ESD	AFSC
A	12	27	5	22	66
%	80	65.9	100	55	65.3
B	3	14	0	18	35
%	20	34.1	0	45	34.7

31	AD	ASD	BMO	ESD	AFSC
A	13	27	3	25	68
%	86.7	65.9	60	62.5	67.3
B	2	14	2	15	33
%	13.3	34.1	40	37.5	32.7

32	AD	ASD	BMO	ESD	AFSC
A	11	24	3	32	70
%	73.3	58.5	60	80	69.3
B	4	17	2	8	31
%	26.7	41.5	40	20	30.7

33	AD	ASD	BMO	ESD	AFSC
A	11	21	4	18	54
%	73.3	51.2	80	45	53.5
B	4	20	1	22	47
%	26.7	48.8	20	55	46.5

34	AD	ASD	BMO	ESD	AFSC
A	8	30	5	16	59
%	53.3	73.2	100	40	58.4
B	7	11	0	24	42
%	46.7	26.8	0	60	41.6

35	AD	ASD	BMO	ESD	AFSC
A	13	24	4	21	62
%	86.7	58.5	80	52.5	61.4
B	2	17	1	19	39
%	13.3	41.5	20	47.5	38.6

36	AD	ASD	BMO	ESD	AFSC
A	14	33	4	27	78
%	93.3	80.5	80	67.5	77.2
B	1	8	1	13	23
%	6.7	19.5	20	32.5	22.8

37	AD	ASD	BMO	ESD	AFSC
A	14	36	5	28	82
%	93.3	87.8	100	70	81.2
B	1	5	0	12	18
%	6.7	12.2	0	30	18.8

Table 4.6

Cross-reference (Research to Survey Questions)

Research Questions	Telephone Survey Questions
1	2, 5, 6, 7, 8, 26, 28, 29, 34, 35, 36, 37
2	3, 4, 5, 6, 7, 8, 14, 15, 16, 17, 18, 19, 20, 21, 26, 28, 29, 31, 34, 35, 36, 37
3	1, 2, 5, 6, 8, 14, 16, 17, 18, 19, 20, 21, 27, 28, 29, 31, 32, 35
4	4, 10, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 33, 35, 37
5	9, 11, 12, 13, 25, 26, 27, 30, 31, 34, 35, 36, 37

Table 4 7

Cross-reference (Survey to Research Questions)

Telephone Survey Questions	Research Questions					Telephone Survey Questions	Research Questions				
	1	2	3	4	5		1	2	3	4	5
1			3			19		2	3	4	
2	1		3			20		2	3	4	
3		2				21		2	3	4	
4		2				22				4	
5	1	2	3			23				4	
6	1	2	3			24				4	
7	1	2				25					5
8	1	2	3			26	1	2			5
9				4	5	27			3		5
10				4		28	1	2	3		
11					5	29	1	2	3		
12					5	30					5
13					5	31		2	3		5
14		2	3	4		32			3		
15		2	3	4		33				4	
16		2	3	4		34	1	2			5
17		2	3	4		35	1	2	3		5
18		2	3	4		36	1	2	3		5
				4		37	1	2		4	5

TO Management Improvement Areas

The responses to survey questions 28 through 37 depict areas of TO management that TO managers believe may need improvement. Since the responses to these questions represented opinions of TO managers, they were seperated from the other questions and grouped together. The responses to these questions are shown in Table 4.5 by question.

Research Questions

The evaluation of the five research questions required that the responses to the survey be grouped by research question and product division/AFSC. The following are the five research questions:

1. How are TO managers initially identified?
2. Can the establishment of selection criteria for for TO managers improve their effectiveness?
3. Can training improve the effectiveness of the TO manager?
4. Can the TO managers' interaction with the other functional offices inside and outside of the System Program Office be changed to improve the effectiveness of the TO manager?
5. How do TO managers perceive the level of top management awareness of TO acquisition problems?

Shown in Table 4.6 are the survey questions as they apply to the specific research questions. Table 4.7 cross references the research questions with the applicable survey questions.

Summary

The results of the telephone interview were presented according to the objectives of this research. No evaluation or explanation of the data was accomplished, other than that required to describe how the data were tabulated. The analysis and conclusions of this research, based on the data gathered in the telephone interview, will be presented in the following chapters.

V. Analysis

Chapter Organization

The analysis section breaks down the telephone interview questions under the broad areas of:

Biographical Information
Qualifications for Selection
Organizational Structure
Perception of Top Management
TO Manager Interaction
TO Management Improvement Areas
TO Manager Tasking

The analysis then continues with a question by question presentation of the results.

Biographical Information Analysis

Telephone Interview Question 1: Number of months assigned to programs in TO acquisition?

Overall, 52.8% of the respondents were assigned to their current programs for more than 24 months. The majority of TO managers stay with the program for a relatively controlled time and do not move more frequently than two years. 47.8% have less than two years on their current program. This indicates the ongoing nature of the weapon system acquisition process with new programs beginning and personnel from completed programs being reassigned to new programs or, as in the case of enlisted military members, being returned to their primary career field. The data points out that only 7.9% have less than six months assigned to their current program. This small percentage is accounted for by the limited number of new

programs entering the acquisition process and the limited number of new personnel entering the acquisition field.

Telephone Interview Question 2: Any coordination or training with predecessor or experienced TO manager?

The majority of respondents said no to this question. Two product divisions, ASD and ESD, had the highest percentage of negative responses, 70.7% and 72.5% respectively. The majority of TO managers came into a program whether it was new or ongoing without the benefit of being acclimated to the program. The TO acquisition responsibilities passed to them without an orderly exchange of information on what had been done, what condition the program was in, or what needed to be done next.

Additionally, the majority of TO managers were not trained on the peculiarities of the product the TOs were to support, what agreements and compromises had previously been negotiated in problem areas, or how the TO's requirements had been tailored to the system being procurred.

Armament Division was the only product division with an aggressive management policy to address this problem. Whenever possible, the hiring and assignment of new personnel was designed to ensure an overlap of incoming and outgoing TO managers, by program. Where this was not possible, the formal training program for new personnel provided for "over the shoulder" supervision by an experienced TO manager.

Telephone Interview Question 3: Number of TO managers assigned to your position since program inception?

This question was designed to establish a measure of the continuity within a particular program. Unfortunately, while the responses indicated in most cases multiple TO managers, additional ramifications were impossible to determine because no link existed between causes for TO manager turnover, length of the acquisition program, and the question of civilian continuity versus military PCS moves. BMO was seemingly an exception to the multiple TO manager phenomena. This exception was explained by the relative newness of current BMO acquisition programs.

Telephone Interview Question 4: Program acquisition phase when the first TO manager was assigned?

The acquisition phase which the majority of respondents cited for assignment was Full-Scale Development at 36.6%. Although Full-Scale Development is the most numerically large percentage, when combined with the Conceptual and Demonstration Validation Phases, the total percentage for the middle three phases was near 90%. Only 5% were identified in the Pre-Conceptual Phase and none of this 5% came from either AD or BMO. This shows a trend of little upfront planning for TOs and illustrates the increased attention TOs receive during the later phases prior to production.

Qualifications for Selection Analysis

Telephone Interview Question 5: What formal management training/education have you had?

Less than 14% of the personnel performing TO management had a bachelor's degree in any field concerned with management and the percentage of masters degrees was an even smaller 8%. While the possession of a degree in management does not guarantee an ability to manage technical order acquisitions, it could be considered as at least an indicator of potential aptitude.

The Air Force Institute of Technology has courses designed for Continuing Professional Education; the interview showed that over 50% of the technical order managers had taken one or more of these courses. However, the course designed specifically for TO managers, System 230 was cited by only 28 of the 101 respondents. The other courses which combined with System 230 to make up the 50% figure were primarily logistical in scope. ESD had the lowest percentage of attendees. Two reasons were cited. Severe undermanning prevented personnel from attending. Also, ESD personnel were responsible for all logistics considerations. Therefore, when the time could be found, the course attended was usually related to logistics rather than TOs.

The ATC courses cited were primarily NCO Academy/Leadership School and represented that portion of the interview population which either is or was enlisted.

The other responses fell into the category of management course work at less than a bachelors degree level.

Telephone Interview Question 6: What prior job experience in TO related fields did you have prior to your selection?

The majority of respondents (67.3%) said their job experience with TOs was as a maintenance technician at the user level. Examination of the product divisions found this also to be true. A high percentage (40%) of the ESD TO managers said that they also had experience as TO managers in the past prior to coming to their present program. A small number of respondents said they had experience as AFPRO representatives (3.0%) and/or working in Test and Evaluation positions (9.9%). A higher number (23.0%) of TO managers said they had some experience as non-acquisition TO managers either in AFLC or as user level unit TO managers.

The range of prior job experience in TO related fields covered a great span. 16 individuals cited no prior job experience or exposure in TO related fields prior to their selection. The product division where this occurred with the greatest frequency was ESD. ESD had 1 in 4 individuals with no prior experience in TO related fields.

Telephone Interview Question 7: Why do you feel you were selected for this position?

The interview question results showed a majority of respondents (64.3%) said they were selected for their current position by management. Selection by management

meant different things in different circumstances. For example, at AD, the individual in most cases went through a formal evaluation of his technical training, APRs, rank, and several other factors before the actual hiring (3). At ESD, selection by management usually meant the individual was simply available and unless specific problems requiring special or extra TO expertise had developed, one TO manager was pretty much the same as another.

The Special Experience Identifier was included as an alternative, yet no one gave this response any impact on his selection. Twenty one TO managers said they were "the next person through the door." 22.8% volunteered and 10.9% selected career broadening as their choice. In response to this question, some respondents combined 2 or more choices because a single choice did not create a complete picture.

Telephone Interview Question 8: Do you have the Special Experience Identifier (SEI 300)?

The majority of respondents (85.1%) said they did not have the SEI 300, while only 14.9% said they did. Examination of the product divisions results also showed at least one TO manager in every five possessed the SEI except at ESD. Respondents not aware of the SEI 300 identifier were scored as no responses.

Organizational Structure Analysis

Telephone Interview Question 9: Title of immediate supervisor?

Sixty-three percent of the respondents said they were supervised by the DPML of the program. A small percentage (3%) of TO managers interviewed were supervised by either the Program Manager or the Data Management Officer. This would indicate that the management of TOs, a logistics function, was actually controlled by a manager of logistics, the DPML. The exception was the Armament Division. Five of the more senior ranking TO managers supervised the other ten and all 15 TO managers interviewed at AD were under the control of the manager of the AD central TO management agency. Also BMO TO managers indicated that only 20% of them worked for the DPML. The majority of these TO managers said they were supervised by the Human Factors Director.

Telephone Interview Question 10: Number of personnel you supervise?

The majority of respondents (79.1%) indicated that they supervised no one. This was also true when each product division was examined. Those respondents who did say they supervised other personnel were TO managers who had responsibility for the TO Management Agency (TOMA). In some programs where there was more than one TO manager asigned, the size of the TOMA ranged from two to eight TO managers and one TO manager provided supervision over the others.

Telephone Interview Question 11: Do you work in a major or non-major acquisition program?

A little more than half the respondents (52.5%) said they did work in a major program while 47.5% said they worked in a non-major program. Two product divisions, ASD and BMO, reported a majority of TO managers worked in major acquisition programs and AD TO managers said 93.3% of them worked in non-major programs. ESD TO managers were evenly split between major and non-major programs.

Telephone Interview Question 12: How many TOs do you manage?

Of the TO managers interviewed, 44.6% said they managed less than 50 TOs, 33.7%said they managed over 200 TOs. Within the ASD product division, 61% of the TO managers said they managed over 200 TOs with one TO manager reporting he managed 1300 TOs. The majority of ESD respondents (72.5%) said they managed less than 50 TOs and several TO managers responded they managed less than 20 TOs. BMO TO managers responded that 60% of them managed between 50 and 100 TOs. Seventy-three percent of the AD TO managers said they managed no more than 100 TOs. A concise summary of this question for all the product divisions is shown in the TO Manager Composites, Appendix B.

Telephone Interview Question 25: What portion of your duty day/week is spent performing TO management?

The majority (49.5%) of TO managers responded they spent more than 70% of their time performing TO management. This was also true for AD, ASD, and BMO TO managers. ESD TO

managers on the other hand said the majority of them spent on the average between 10% and 30% of their time on TO management. They did say though, in the expanded responses, that during major milestones in TO management such as In-Process Reviews, or when TO problems, arose they spent much of their duty day/week performing TO management. ESD TO managers, unlike the majority of the other product division TO managers, are also responsible for all fifteen elements of logistics. In fact those individuals performing the TO acquisition and management functions at ESD refer to themselves as logisticians not TO managers.

Telephone Interview Question 26: Is this an additional duty?

TO managers by a large majority (94.1%) said that TO management was not an additional duty. Question 25 pointed out that ESD TO managers only spent 10-30% of their time on TO management, but this, as Question 26 states, was not an additional duty but a part of the ESD logisticians' duties. The six other respondents who said TO management was an additional duty, did so because they were temporarily taking over the TO management functions until a TO manager could be assigned.

Telephone Interview Question 27: Are you evaluated based primarily on your TO management duties?

The majority of respondents (55.4%) said yes, they were evaluated on their TO management duties. Yet, as pointed out in Questions 25 and 26, ESD TO managers are not

evaluated solely on their TO management duties, but as logisticians. Thus, removing ESD responses from the data, 91.8% of the TO managers for AD, ASD, and BMO were evaluated primarily on their TO management functions.

Perception of Top Management

Telephone Interview Question 13: Is sufficient priority afforded by top management for the acquisition of TOs?

The majority of respondents (54.5%) said no to this question. An examination of the product division results showed that a majority of ESD TO managers (57.5%) perceived top management as giving sufficient priority to TO acquisition. 100% of the TO managers at BMO felt there was not enough emphasis placed on TOs by top management.

TO Manager Interaction Analysis

Telephone Interview Question 22: SPO functional offices with whom you have frequent contact?

Interview results for all respondents showed that TO managers had frequent contact with the PM, DPML, Data Management Officer and contracting. However, by examining the product division, AD TO managers had frequent contact only with the PM and DPML. ASD TO managers had frequent contact with all SPO functional offices while BMO TO managers did not have frequent interaction with the DPML. ESD TO managers also said they had frequent contact with the PM, DPML and the Data Management Officer but not with contracting.

Telephone Interview Question 23: Activities outside the SPO with whom you have frequent contact?

This question was asked to determine the interaction a TO manager had with an outside agency in performing TO management tasks. Interview results for all TO managers showed that respondents had frequent contact or interaction with the user, ALCs, ATC and the contractor but not with the AFPRO. Examination of the product divisions' results revealed that each of the divisions had differences as to the frequency of contact with individual outside agencies. These differences only point out the level of involvement TO managers had with an outside agency in performing TO management.

Telephone Interview Question 24: Common problems in coordinating requirements with outside activities and agencies?

The biggest problem all TO managers said they had in coordinating TO requirements with outside activities and agencies was scheduling (50.5%). Although scheduling had the majority of responses, the other alternatives also had a relatively large number of responses (see Table 4.4 Telephone Interview Questions 22-27). Examination of the product divisions also showed this selection of responses. AD, ASD, and ESD TO managers indicated the majority of their coordination problems were scheduling while BMO TO managers said coordination with the SPOs contracting personnel was their major problem. The results, along with expanded responses, tend to indicate that the coordination problems

are interrelated and that singling out only one coordination problem as the key would not be a true indication of TO manager coordination problems.

TO Management Improvement Areas Analysis

Telephone Interview Question 28: Assignment of better qualified personnel?

The majority of respondents (76.2%) said that there needs to be the assignment of better qualified personnel in TO management. The majority of TO managers in the product divisions also said this was true, but AD respondents had the lowest percentage of responses at 73.3%. All five BMO TO managers said the TO management process needs better qualified personnel.

Telephone Interview Question 29: Formal training for TO managers?

The majority of TO managers (94.1%) said there needed to be formal training for TO managers. Only 6 respondents said formal training was not needed.

Telephone Interview Question 30: Higher priority to acquisition of technical orders by top management?

The highest response rate to this question was yes with 65.3%. All four product divisions' respondents also said there should be a higher priority for the acquisition of TOs by top management but 45% of the ESD TO managers did not think that this was an area that needed improvement. The results also showed that all five BMO TO managers thought this was an area that needed improvement.

Telephone Interview Question 31: Improve TO manager guidance as outlined in AF policy and procedure?

This question refers mainly to TO 00-5-1 and the Air Force 800 series of regulations. Only 67.3% of the respondents said this was an area that needed improvement. 32.7% of the TO managers said guidelines and regulations were acceptable as they were. Examination of the results for the individual product divisions found there was no difference in the responses than was found for the entire TO manager population.

Telephone Interview Question 32: A TO Handbook?

The majority of TO managers interviewed (69.3%) said there needed to be a TO manager's handbook, while 30.7% said it was not necessary. These results also reflected similar percentages within each of the product divisions.

Telephone Interview Question 33: Better coordination between AF agencies and major commands?

The results to this question showed a relatively slight majority (53.5%) in favor of improving this area of TO management. On the other hand, 46.5% said this was not so. In particular, ESD TO managers said a majority of them (55%) believed coordination with other agencies was sufficient the way it was. Also, the difference between responses for ASD respondents was close. 51.2% said yes, while 48.8% said no.

Telephone Interview Question 34: Career field for TO managers?

The majority of the TO managers responded yes (58.4%)

to this question with 41.6% responding no to a TO manager career field. The results by product division showed that for BMO TO managers, 100% believed there should be a separate career field while a majority of ESD respondents (60%) said no, there should not be. AD results showed a slight difference favoring the career field with ASD TO managers showing a 73.2% majority in favor of a separate career field.

Telephone Interview Question 35: Central Air Force TO Management Agency?

All four product divisions results showed a majority of respondents favoring the idea, with an overall percentage rate of 61.4%. The ASD and ESD product division results showed the smallest percentage difference between the responses.

Telephone Interview Question 36: Special Duty Identifier (SDI)?

77.2% of the respondents said an SDI would be a good TO management improvement idea. AD respondents had the highest percentage of yes responses with 93.3 while ESD TO managers had the lowest with 67.5%.

Telephone Interview Question 37: Controlled tour?

The majority of TO managers by a large margin (81.2% yes/18.8% no) said a controlled tour as the program TO manager was necessary. All five of the BMO respondents said a controlled tour was a good idea, while only 70% of the ESD TO managers said it was a good idea.

TO Manager Tasking Analysis

Telephone Interview Questions 14-21:

14. Are you allowed direct input to SOW?
15. Do you identify types of manuals?
16. Do you identify types of documentation?
17. Do you approve the TO Publication Plan?
18. Do you approve the TO Status and Schedules?
19. Do you identify the validation requirements?
20. Do you identify the verification requirements?
21. Do you arrange for the printing and distribution of TOs?

These eight questions were grouped together because of the nature of the results below. Therefore, the display format was required to be different for this section of analysis.

The technical order manager was required to perform the tasks specified in TO 00-5-1 (14). Telephone interview questions 14 through 21 were designed to give the researchers the degree of task compliance. The results were not as expected. The researchers expected to discover non-compliance in these taskings and the level of non-compliance would serve as an indicator of less than optimum performance. However, with one exception, the responses to questions 14 through 21 were above 90%, indicating an extraordinarily high level of compliance. The one exception was question 21 dealing with the printing and distribution of technical orders. Question 21, rather than indicating non-performance, was simply a reallocation of responsibility to the ALC.

Summary

The analysis of the telephone interview questions was presented in order to establish a basis for drawing conclusions and forming recommendations. These conclusions and recommendations are presented in the final chapter of this thesis.

VI. Conclusions and Recommendations

Chapter Organization

This chapter states the conclusions reached by this research effort. The conclusions are based on information obtained from over 100 telephone interviews and synthesized to corespond to the five research questions. The chapter continues with the researchers' recommendations organized around the concept of a Central Technical Order Management Center (CTOC), and cites similarities and differences between the recommendations of this research effort and that of its predecessors. Having completed these tasks, the chapter concludes with recommendations for further research.

Research Question 1 Conclusions

1. How are TO managers initially identified?

There presently exists no single standard or universal method within the Air Force Systems Command to identify individual TO managers. Each product division has unique requirements for performance, yet none of the product divisions has developed a method to identify those individuals who could meet their performance requirements. Factors such as having previously been a user level maintenance technician, while applicable in all product divisions, were not a common factor possessed by all TO managers within any product division. Experience as a TO manager, a key point of consideration in any selection

process, is not even an identifiable skill under the present military personnel system. For example: A program manager is looking for an individual with experience as a radio repair technician, who previously worked as a TO manager on another program. The program manager wants to take full advantage of the trained manpower available. The present personnel system could provide him with a list of technicians trained in radio repair but nothing would indicate if any of these technicians had previously been TO managers.

The Special Experience Identifier (SEI 300) is perceived by some people as answering this problem. However, the SEI 300 merely represents a coding on the records of someone curently working in TO management and drops from the system when that individual returns to his previous career field.

The civilian identification process varies from product division to product division. Within ESD the individual who comes to work on a program, unless he is a new hire, is assumed to be an expert in each of the 15 logistics areas. TO management is just one area, but by virtue of the fact the individual has worked on other programs, he is now also an experienced TO manager.

The one common element in each product division is that each has one or more informally identified "TO experts." These individuals, by a combination of

background, training and experience, have become the point of contact for other TO managers within that product division. The usual civilian selection process is more often than not an indication of availability rather than an indication of ability. The ability of an individual is usually passed by "word of mouth", and unless special problems arise with a program "the next person through the door" can become the person responsible for TO management. One individual commented on a factor which makes the identification process even more critical. The number of experienced TO experts is declining. The group of individuals to which others turn for advice is leaving the system due to retirement, health, and other considerations faster than they can be replaced. Common sense dictates that a one for one replacement of experts with novices will result in a reduction in performance. One interviewee indicated that his product division was so undermanned that people could not attend training, but must learn on the job.

Presently, the only product division with a system to identify, monitor and track experienced TO managers is AD. This system manages "in house" a list of names of qualified individuals who either are working at AD, previously worked at AD, or who have been recommended to work at AD.

The conclusion that there is no established method for identifying TO managers is consistent with the research

findings of others, most notably Brown and Lyon, Wigton and Peters (7;28;1).

Research Question 2 Conclusions

2. Can the establishment of selection criteria for TO managers improve their effectiveness?

The first chapter of this thesis stated that there were no formal selection criteria for TO managers and the results from the telephone interview supported this statement. Therefore, the answer to Research Question 2 drawn from this research is "yes." This conclusion is based on a number of factors.

First, as Research Question 1 pointed out, there must exist a means to identify TO managers. Since such a means does not exist, it is difficult to build a pool of TO managers.

Second, there is currently no universally applied selection criteria in any of the product divisions. Without a defined set of selection criteria, (i.e. what is looked for in a TO manager) choosing the right person for the job becomes conjecture.

Third, this research identified several key elements of TO management which can be used to establish selection criteria for TO managers. These key elements are:

1. Formal management training/education
2. Prior TO experience
3. Prior management experience
4. Size and complexity of program
5. Acquisition phase when selection of a TO manager is needed.

Fourth, any selection criteria must correspond with the critical taskings of the TO manager. The analysis of Telephone Interview Questions 14 through 21 pointed out that all TO managers performed the tasks as identified in TO 00-5-1. Therefore, the potential capability of an individual to perform these tasks should also be a selection criteria.

Research Question 3 Conclusions

3. Can training improve the effectiveness of the TO manager?

This research effort concludes that training can improve the effectiveness of the TO manager. To begin with, as the results and analysis of Telephone Interview Questions 28 and 29 indicate, the majority of TO managers said there is a need for better qualified personnel and formal training programs for TO managers. These results are supported by the findings of the lack or inadequacy of training at the present.

The expanded responses (Appendix C) and Telephone Interview Question 38 pointed out it takes twelve to eighteen months for a TO manager to become proficient. Since nearly 50% of the current TO managers have less than two years experience, they have just reached proficiency in their jobs. Furthermore, the TO managers said they had little or no coordination or training with either their predecessor or an experienced TO manager when they came to their current positions. Also, the results showed only 28

of the 101 TO managers had taken the AFIT PCE course; SYS 230, Technical Order Acquisition and Management. The majority of the respondents stated their only previous TO experience was as user level maintenance technicians. These findings, combined with the fact that TO managers have no extensive training in management principles, support the conclusion that training can improve the effectiveness of the TO manager.

Although the recommendation section of this research question discusses ways to improve training for TO managers, at this time any training program must key on and be developed around the central taskings the TO managers must perform in order to accomplish effective TO management. The results and analysis of Telephone Interview Question 14 through 21 support this conclusion in that for all product divisions, TO managers, performed the TO taskings outlined in TO-00-5-1.

Research Question 4 Conclusions

> 4. Can the TO manager's interaction with the other functional offices inside and outside of the System Program Office be changed to improve the effectiveness of the TO manager?

The results and analysis of the structured Telephone Interview Questions indicated that the TO manager had frequent contact with the other functional offices of the SPO and outside the SPO with agencies and commands. These results, combined with the results and analysis of the TO

manager taskings, lead to the conclusion that from a quantitative analysis, the TO manager's interaction with the other SPO functional offices had little or no negative impact on the effectiveness of the TO manager. Thus, these results would indicate that the TO managers' interaction with the other functional offices should not be changed. Furthermore, the analysis of Telephone Interview Question 33 showed only a slight majority of the TO managers (53.5% vs. 46.5%) were in favor of improving the coordination between TO manager and other AF agencies and major commands. Since coordination is a key part of the interaction process involving the TO manager and the other functional offices, this result only gives minor support to the conclusion that the interaction process should not be changed. However, a review of the expanded responses and Telephone Interview Question 38 responses (Appendix C) indicate that the qualitative interaction of the TO manager and the other functional offices does impact upon the effectiveness of the TO manager.

The qualitative information on the interaction process indicates there is a negative impact upon the TO manager's effectiveness. Displayed in the lists below is an extraction of these responses from Appendix C.

<u>AD Responses</u>

- MAJCOMS need to be educated on time constraints on technical data

- 50% of TO manager inputs to SOW are changed or ignored without consultation

- TO managers have responsibility for TOs but no authority

- user needs training to understand acquisition process for TOs

- trouble getting through AF bureaucracy to person at working level

ASD Responses

- people in the acquisition business outside the TO system don't know what TOs are all about-- they should

- AFLC not communicating their TO needs to AFSC people

- enlisted TO managers don't have "horsepower" to get things done

- DPMLs and PMs should take AFIT PCE course (SYS 230) on TO management because they don't understand what is involved in TO acquisition

- military TO managers should be the rank of MSgt at least

- AFPRO people don't understand TO acquisition process enough to take care of TO validation

- TO acquisition definitely needs a better system for coordination and communication

- TO managers need to use tact when trying to get cooperation from others

- NCO managers find it difficult to function because of rank differences - rank seems to get in the way

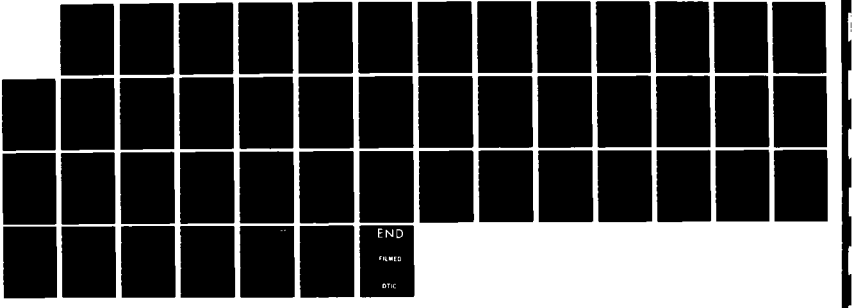
- education of others on the TO acquisition process is needed

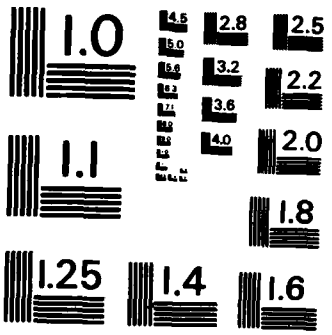
- TO managers don't have the authority to get things done the way they should

ESD Responses

- people in acquisition process are not well versed in TOs; no one understands system

AD-A160 908 UNITED STATES AIR FORCE TECHNICAL ORDER ACQUISITION 2/2
WHAT CAN BE DONE TO I.. (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST..
UNCLASSIFIED M W BILLINGHAM ET AL. SEP 85 F/G 5/1 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963 - A

- qualified people to perform verification are tough to find
- process is dependent on ALC actions; as a result, delays occur which the TO manager has no control over
- continuity is needed; same people should be sent to reviews for entire process
- consistency to commitments is needed; either same people or at least commitment to predecessor's position
- ALC needs to put more emphasis on sending right people to in-process reviews, verifications
- ALC TDY funds are not earmarked against specific programs; when money gets tight only larger more important programs get money
- user interface is needed early; need user to send same players for continuity
- DCAS/AFPRO knowledge of TO acquisition process very poor to the point of contractor validation is almost nonexistent

BMO Responses

- TO manager must control TO portion of the budget

In summary, the responses to the structured questions of the telephone interview indicate that the TO managers had frequent contact with the other functional offices in the performance of their TO management taskings. Yet, the quality of this interaction, as indicated in the expanded responses, supports a conclusion that the interaction should be changed.

Research Question 5 Conclusions

5. How do TO managers perceive the level of top management awareness of TO acquisition problems?

The results and analysis of Telephone Interview Questions 13 and 30 showed by a slight majority that TO managers perceived the level of top management awareness of TO acquisition problems to be inadequate.

Although Question 13 indicates 3 out of 4 product divisions thought insufficient priority was afforded by top management for acquisition of TOs, the only product division to identify this with an overwhelming majority response was BMO. 100% of BMO's TO managers held the view that insufficient priority was afforded to acquisition of TOs by top management. Due to the small size of TO manager population at BMO, this high percentage did little to sway the figures for the entire population. While a majority of TO managers (54.5%) felt insufficient priority was afforded to acquisition of TOs by top management, the researchers felt that this was too small a margin to draw any definitive conclusions. At ESD, however, a majority felt that sufficient priority was afforded to the acquisition of TOs by top management. This difference in perception may be accounted for by the fact that ESD is the only product division where TO management is not a specialty.

Question 30 responses indicate, in contrast to Question 13, that all product divisions thought a higher priority to acquisition of TOs by top management might improve TO management. The conclusion based on research results is that the level of top management awareness is

slightly inadequate and is a lower priority area for improvement. The recommendations section will point out proposed reasons for the inconclusive nature of the responses to this research question.

Recommendations

As pointed out by Brown and Lyon, any proposed recommendations to the TO acquisition process must apply a systems theory approach because all the elements or factors are integrated and interrelated (7). Therefore, any recommendations to improve the effectiveness of the TO manager must utilize the same systems approach and consider the same interrelationships. The factors for TO manager effectiveness are; identification of TO manager personnel, the criteria used for their selection, the means used for their training, the method of management organization and the level of top management support. The five research questions which examined these factors are:

1. How are TO managers initially identified?
2. Can the establishment of selection criteria for TO managers improve their effectiveness?
3. Can training improve the effectiveness of TO managers?
4. Can TO managers' interreaction with other functional offices inside and outside of the System Program Office be changed to improve the effectiveness of TO managers?
5. How do TO managers perceive the level of top management awareness of TO acquisition problems?

The cornerstone of any recommendation to improve the TO acquisition process and the effectiveness of the individual TO manager is the establishment of a Central Technical Order Management Center (CTOC). The CTOC would serve in the capacity of a staff agency for the central management of TOs and would provide guidance, expertise and assistance to TO managers. In order to perform in this capacity, the CTOC should be established at three levels.

The first and highest level CTOC would be at the Air Staff level. This Air Force CTOC would provide broad TO management policy and guidelines for the entire Air Force, integrating AFSC and AFLC requirements and providing an Air Force interface to DoD needs in TO management.

The second level CTOC, located at HQ AFSC, would implement the Air Staff CTOC policy dealing primarily with the acquisition of TOs as a subset of the weapon system acquisition process. Also, this CTOC would provide further AFSC policy and guidance relating to the third level CTOC located in each of the product divisions.

The third level CTOC would be located in each of the product divisions. The third level CTOCs would implement higher level CTOC policy and provide guidance and expertise to the TO managers located within the SPOs of the product division. Because each of the product divisions have different needs and requirements for TOs, the product

division CTOC's management policy and procedures would be tailored to meet these needs and requirements.

The concept of a three level CTOC should provide increased standardization in policy and guidance throughout the TO system, especially within AFSC, and still be able to fulfill the individual aquisition program needs for TO management.

This concept is in full agreement with the results of this research because it would key upon the central figure in TO management, the TO manager, by providing guidelines, policy, and most importantly, expert support. The CTOC concept, as discussed here, would do this through the management of the five TO manager effectiveness factors; identification of TO manager personnel, their selection, training, organizational and top management support.

Prior research studies have identified possible solutions to TO management problems, which support the improvement of the five TO manager effectiveness factors. These possible solutions are discussed below.

The concept of a CTOC or some central control agency for the management of TOs and the TO acquisition process is not original with this research. Both the Brown and Lyon study and the Wigton study recommend the creation of such an agency (7;28). The Wigton study concluded that a CTOC should be a great asset in reducing manning problems, and could identify, track and assist program offices with

qualified TO managers (28:23). The Brown and Lyon study states that such an agency would provide "expertise and assistance to the SPOs and technical order policy makers from a centralized location" (7:85).

A functional product division CTOC is already in existence at AD (4). Mr. Paul Cambell is currently developing a product division CTOC at ESD along similar lines (9). The potential exists for a product division CTOC at BMO due to an organizational structure which has all TO managers co-located in the same office and reporting to the same senior manager. ASD has the highest probability of potential gain from such a concept due to their large size, number of TO managers, the portion of the acquisition budget which is controlled by ASD, and the fragmented nature of present ASD policy and guidance.

This research differs from past research in its recommendation by advocating a three level approach. This three level approach ensures top management awareness and subsequently, support of TO acquisition problems.

The necessary training for TO managers would also be based on the three level CTOC concept. The Air Staff level CTOC would provide the general training policy guidelines, and function in a supervisory capacity to ensure adequate training was received by all personnel performing TO acquisition and management.

The second level Air Force Systems Command CTOC would be responsible for the development and administration of the broad common training required by all personnel performing TO management and acquisition. This research recommends that every TO manager attend, preferably prior to assignment but no later than six months after assignment, management courses teaching the following subject areas:

Introduction to Acquisition Management
Technical Order Acquisition and Management
Introduction to Acquisition Logistics

Further, a more detailed course should be developed as a follow-on to Technical Order Acquisition and Management to address more specific facets of TO management (4).

The third level CTOC located at the respective product divisions must continue the training process begun at the second level with local TO courses supplemented by supervised on-the-job training.

The lack of an effective, integrated training program for TO managers has been cited in virtually all research on the subject. The Peter's study commented, "...personnel performing duties as TO managers did not have the knowledge or expertise to effectively perform their duties ...personnel became proficient through a trial and error learning process" (1:A13-1). Furthermore, Work Group 5 (TO Acquisition Improvement) Consolidated Findings recommended that with regards to training that:

1. AFSC/ALXD and AFALC should actively manage the training quotas for AFIT SYS 230, and ensure that

only TO managers are trained until such time as we are able to afford to send other people to the course.

2. AFIT SYS 230 should be expanded to include instructions on how to use DID's, MIL specs, and CDRL's.

3. AFIT SYS 100 should be a prerequisite to AFIT SYS 230. [5:7]

Additionally, Bemrose and Carwise found in 1967, there was "an insufficient number of trained and qualified" TO managers based on their research (11:45). In 1983, Major Towner in his thesis on acquisition of technical orders linked the CTOC concept with training by stating the lack of such a center "makes it difficult for inexperienced TOMA personnel to learn the process" (25:39). The Air Force Logistics Management Center findings agreed with this research's recommendation that all "prospective or newly assigned TOMA personnel" should attend a TO manager's course, and its findings were instrumental in the creation and establishment of SYS 230 at AFIT (2:28).

The third level of training at the product division is already in existence and functioning well at AD (4). A similar training approach is also being utilized within the larger program offices at ASD. The F-15 SPO has developed a comprehensive in house OJT program to advance newly assigned personnel to the required skill level in a time sequenced plan individually tailored to the knowledge and training of the TO manager (27). These two examples show that the potential exists for the third level CTOC training concept,

either administered directly by the product division CTOC as in the case of AD or supervised by the product division CTOC and administered by the large SPO as in the case of the F-15.

Two of the five independent variables which emerged in this thesis were the problems of identification and the criteria used to select individuals for TO manager positions. As pointed out earlier in this chapter, a means must be developed to identify TO managers and define their selection criteria. The Special Experience Identifier (SEI 300) will not be a factor in rectifying either problem for reasons detailed under Research Question 1 Conclusions. The career field or Air Force Specialty Code issue, while gaining wide attention in the literature has developed two distinct camps among the population interviewed for this research. One group thinks a career field is a definite must and the other group does not want a career field to be formed. The researchers wish to stress the point that if a career field were to be developed, an environment which would break down the barriers between the opposing groups must first be created. The CTOC or systems approach could be applied to this issue. To create a career field over the objections of the various groups, its proponents would have to be located at least in the Air Staff Level CTOC. The concerns of military and civilian TO managers would have to be dealt with equally but seperately. The career field

would only be open to individuals identified as specialists and who also have the desire to be in the field. This would permit the flexibility required at the product division level and allow the diversity necessary in a dynamic acquisition environment.

The designation of specialist will be based on actual working experience as a TO manager, performance as a TO manager, individual desires, and AF needs. The product level CTOC will make the recommendation to the Air Force Systems Command level CTOC that an individual be assigned the Air Force Specialty Code/career field or its civilian equivalent. This would provide career progression in TO management, something currently lacking and a source of several negative responses to the question on creation of a career field.

This thesis strongly recommends a Special Duty Identifier be developed as a prefix or suffix to every experienced TO manager's present Air Force Specialty Code or career field. In this manner, the experienced individual can be tracked and identified by the personnel system. The experienced individual is defined as a person who has performed the TO acquisition management tasks identified by TO 00-5-1 for a minimum of three years and has completed all required training as specified in the training recommendations.

The issue of selection criteria for TO managers can now be tied to the identification process. The conclusion to Research Question 2 listed five key elements for the basis for the selection criteria. These are:

1. Formal management training/education
2. Prior TO experience
3. Prior management experience
4. Size and complexity of program
5. Acquisition phase when selection of a TO manager is needed

These key elements and policy established by the proposed AFSC CTOC provide the product division CTOC guidelines within which to make hiring decisions for their TO manager positions. As guidelines, they allow the product division CTOC both the flexibility and judgement in coordination with the PM or DPML, to select the right person for the right job. The driving force for the selection of an individual for a TO manager position is to match individual qualifications to the specific needs of the program.

Although the telephone interview responses relating to the TO manager's interaction with other offices showed a favorable frequency, the expanded responses listed in Research Question 4 Conclusions and also in Appendix C indicated many interaction problems. Therefore, the recommendations of this thesis would once again rely on the CTOC concept to improve the quality of interaction between offices both inside and outside the SPO. Other personnel within the weapons system acquisition process who must

interact with the TO manager should attend training to fully understand and facilitate communications between offices of differing disciplines. The interaction problem results because a TO manager has the responsibility for TO acquisition but in many cases has no authority to implement required actions.

In the recommendations section, the statement was made that an Air Staff level CTOC would help to ensure top management awareness of TO acquisition problems. Top management awareness of TO acquisition problems was historically a major problem in the management of TOs as discussed in the studies by Brown and Lyon, Towner, Carwise and Bemrose and Wigton (7;25;11;28). However, recent high level attention in the area of TOs has at least temporarily altered the previously held perception of top management awareness regarding TOs based on this research's findings.

This thesis has shown that TO managers perceive they are receiving more support now than in the past. But, further support is necessary to obtain future improvements in TO management. The research recommendation for a three level CTOC would provide the top management support without which the needed improvements would never be implemented. Top management support is the key to any improvement in the TO acquisition process.

Further Recommendations for Research

The first recommendation is that in an effort to obtain a complete picture of the entire TO manager population, a study be made of the Air Logistics Command personnel performing this management function.

A second issue requiring research is the establishment of some standard of measure to judge and compare TO cost, timeliness and useability across acquisition programs. This standard of measure is a necessity in establishing accountability, a key to effecting any positive change.

Third, the researcher's felt a sense of shared frustration with previous researchers that problems identified as early as 1967 have still had no corrective action taken. A look at what factors contribute to this resistance to change within the acquisition community could prove to be revealing.

Chapter Summary

This study offered managers and policy makers in the weapons system acquisition process information about the effectiveness of TO managers and the problems which impact that effectiveness. The answers toward which the five research questions were directed present viable alternatives for the improvement of TO manager effectiveness. The systems approach stresses that only a solution which integrates all of the interrelated facets of TO management

will enhance the of impact the TO manager. The three level Central Technical Order Center provides such a solution. Additionally, in the course of this study, other questions have been raised. Future research efforts, answering those questions, will aid in the formation of a more effective TO acquisition process and thus provide better TOs for the United States Air Force.

Appendix A: Telephone Interview Schedule

INTRODUCTION: Good morning/afternoon. I am Capt. _____ a graduate student at the Air Force Institute of Technology. I am doing research concerning the TO acquisition process, and you can help. You were asked to participate because your duties involve TO management. Your responses to my questions will be kept anonymous, and will be combined with the responses of others who have similar TO management duties. The purpose of my research is to learn more about the TO acquisition process and in particular, managements' impact upon the process. Your responses will help me do this. Please consider only the acquisition process for new systems when giving your responses. This interview consists of a series of structured questions and one open ended question. If the time is convenient for you I would like to begin. (response yes/no) Do you have any questions before we start? (Response yes/no)

Biographical Information

1. Number of months assigned to program in TO acquisition?
   a)less than 6 b)6-12 c)12-18 d)18-24
   e)more than 24

2. Any coordination or training with predecessor or experienced TO manager? A)Yes____ B)No____

3. Number of TO managers assigned to your position since program inception?
   a)1 b)2 c)3 d)4 or more e)unknown

4. Program Acquisition Phase when first TO manager assigned?
   a)Pre-Conceptual b)Conceptual Exploration
   c)Demonstration-Validation d)Full-Scale Development
   e)Production

Qualifications for Selection

5. What formal management training/education have you had? (you may select more than one)
   a)Bachelors degree in Management
   b)Masters degree in Management
   c)AFIT PCE courses
   d)Air Training Command courses
   e)other _____

6. What prior job experience in TO related fields did you have prior to your selection? (you may select more than one)
a)Maintenance (user) Technician b)previous TO manager
c)non-acquisition TO manager d)Test and Evaluation
e)AFPRO

7. Why do you think you were selected for this position?
a)"next person through the door" b)volunteer
c)SEI d)career broadening e)selected by management

8. Do you have the Special Duty Identifier (SEI 300)?
A)Yes____ B)No____

Program Organizational Structure

9. Title of immediate supervisor?
a)PM b)DPML c)DMO d)other_____

10. Number of personnel you supervise?
a)0 b)1 c)2 d)3 e)4 or more

11. Do you work in a major or non-major acquisition program? (Major - $200 million RDT&E, $1 billion procurement)
a)Major b)Non-Major

12. How many TOs do you manage?
a)less than 50 b)50-100 c)100-150 d)150-200
e)200 or more

To the following questions please respond Yes/No.

Perception of Top Management

13. Is sufficient priority afforded by top management for acquisition of TOs? A)Yes_____ B)No_____ Explain:

TO Manager Taskings

14. Are you allowed direct input to SOW? A)Yes____ B)No____

15. Do you identify types of manuals (i.e. mil-spec vs commercial) A)Yes_____ B)No_____

16. Do you identify types of documentation? (i.e. mil-spec, mil-std. DIDs, AFADs) A)Yes_____ B)No_____

17. Do you approve the TO Publication Plan (TOPP)? (DI-M-3401) A)Yes_____ B)No_____

18. Do you approve the TO status and schedules? (DI-M-3402) A)Yes_____ B)No_____

19. Do you identify the validation requirements? A)Yes_____ B)No_____

20. Do you identify verification requirements? A)Yes___ B)No___

21. Do you arrange for the printing and distribution? A)Yes____ B)No____

TO Manager Interaction

22. SPO functional offices with whom you have frequent contact? (you may select more than one)
a)PM b)DPML c)DMO d)PCO

23. Activities outside the SPO with whom you have frequent contact? (you may select more than one)
a)User b)ALC c)ATC d)AFPRO e)Contractor

24. Common problems in coordinating requirements with outside activities? (you may select more than one)
a)lack of qualified personnel b)funds c)schedule
d)other_____

25. What portion of your duty day/week is spent performing TO management?
a)less than 10% b)10%-30% c)30%-50% d)50%-70%
e)more than 70%

26. Is this an additional duty? A)Yes____ B)No____

27. Are you evaluated based primarily on your TO manager duties? A)Yes____ B)No____

What of the following areas do you think might improve TO management?

Improvement Areas

28. Assignment of better qualified personnel?A)Yes____ B)No____

29. Formal training for TO managers? A)Yes____ B)No____

30. Higher priority to acquisition of TOs by top management? A)Yes____ B)No____

31. Improve TO manager guidance as outlined in AF policy and procedures? A)Yes____ B)No____

32. A TO Handbook? A)Yes____ B)No____

33. Better coordination between AF agencies and major commands? A)Yes____ B)No____

34. Career field for TO managers? A)Yes_____ B)No_____

35. Central Air Force TO management agency? A)Yes___ B)No___

36. Special Duty Identifier (SDI)? A)Yes____ B)No____

37. Controlled tour? A)Yes____ B)No____

This ends the structured portion of the interview. I would also like to ask you:

38. Do you have any specific suggestions or recommendations to improve the management of tech orders?

Finally, in order to generate as complete a list of personnel performing TO manager duties as possible, could you provide me with the names, projects, and telephone numbers of any TO managers with whom you work or have contact?

This ends the interview. Thank you very much for your time and assistance.

Appendix B: TO Manager Composites

THE ARMAMENT DIVISION TO MANAGER:

Biographical Information

1. had more than 24 months assigned to program
2. had coordination or training with an experienced TO manager or predecessor
3. was the second TO manager assigned on the majority of the programs
4. was first assigned either during the Conceptual Exploration or Demonstration-Validation Phase

Qualifications for Selection

5. has attended NCO leadership school
6. was previously a maintenance technician at the user level
7. was selected for his position by local acquisition management
8. does not have the Special Experience Identifier (SEI 300)

Organizational Structure

25. spent more than 70% of his duty day or week performing TO management or acquisition
26. considered TO management as his primary duty
27. was evaluated primarily on TO manager duties
9. worked under the supervision of another TO manager
10. supervised no personnel
11. worked on a non-major acquisition program (as per DoD Directive 5000.1)
12. managed less than 50 TOs

Perception of Top Management

13. perceived TO acquisition was not afforded sufficient priority by top management

TO Manager Taskings

14. made direct inputs into SOW and/or RFP

15. identified types of manuals

16. identified types of documentation

17. approved the TO publication plan

18. approved the TO Status and Schedules

19. identified validation requirements in the SOW

20. identified verification requirements

21. arranged for TO printing and distribution

TO Manager Interaction

22. had frequent contact with PM and DPML

23. had frequent contact with user, ALC and the contractor

24. had a common problem in scheduling activities with outside agencies

THE AERONAUTICAL SYSTEM DIVISION TO MANAGER:

Biographical Information

1. had more than 24 months assigned to current program

2. had no coordination or training with an experienced TO manager or predecessor

3. was the fourth TO manager assigned on the majority of programs

4. was first assigned during the Full-Scale Development Phase

Qualifications for Selection

5. attended at least one Professional Continuing Education Course at AFIT

6. was previously a maintenance technician at the user level

7. was selected for his position by local TO acquisition management

8. does not have the Special Experience Identifier (SEI 300)

Organizational Structure

25. spent more than 70% of his duty day or week performing TO management and acquisition

26. considered TO management as his primary duty

27. was evaluated primarily on duties

9. worked under the supervision of a DPML

10. supervised no personnel

11. worked on a major acquisition program (as per DoD Directive 5000.1)

12. managed more than 200 TOs

Perception of Top Management

13. perceived TO acquisition was not afforded sufficient priority by top management

TO Manager Taskings

14. made direct inputs into SOW and/or RFP

15. identified types of manuals

16. identified types of documentation

17. approved the TO Publication Plan

18. approved the TO Status and Schedules

19. identified validation requirements in the SOW

20. identified verification requirements

21. arranged for TO printing and distribution

TO Manager Interaction

22. had frequent contact with PM, DPML, DMO and PCO

23. had frequent contact with user, ALC, ATC, AFPRO and the contractor

24. had a common problem in scheduling activities with outside agencies

THE BALLISTIC MISSILE OFFICE TO MANAGER:

Biographical Information

1. had more than 24 months assigned to current program

2. had no coordination or training with an experienced TO manager or predecessor

3. was the first TO manager assigned on the majority of programs

4. was first assigned during the Conceptual Exploration or Demonstration-Validation Phase

Qualifications for Selection

5. attended at least one Professional Continuing Education Course at AFIT

6. was previously a maintenance technician at the user level

7. was selected for his position by local TO acquisition management

8. does not have the Special Experience Identifier (SEI 300)

Organizational Structure

25. spent more than 70% of his duty day or week performing TO management and acquisition

26. considered TO management as his primary duty

27. was evaluated primarily on TO manager duties

9. worked under the supervision of a Human Factors Director

10. supervised no personnel

11. worked on a major acquisition program (as per DoD Directive 5000.1)

12. managed between 50 and 100 TOs

Perception of Top Management

13. perceived TO acquisition was not afforded sufficient priority by top management

TO Manager Taskings

14. made direct inputs into SOW and/or RFP

15. identified types of manuals

16. identified types of documentation

17. approved the TO Publication Plan

18. approved the TO Status and Schedules

19. identified validation requirements in the SOW

20. identified verification requirements

21. arranged for TO printing and distribution

TO Manager Interaction

22. had frequent contact with PM, DMO and PCO

23. had frequent contact with user, ALC and AFPRO

24. had a common problem in dealing with PCO

THE ELECTRONIC SYSTEM DIVISION MANAGER:

Biographical Information

1. had more than 24 months assigned to current program
2. had no coordination or training with an experienced TO manager or predecessor
3. was the first TO manager assigned on the majority of programs
4. was assigned during the Full-Scale Development Phase

Qualifications for Selection

5. attended at least one Professional Continuing Education Course at AFIT
6. was previously a maintenance technician at the user level
7. was selected for his position by local TO acquisition management
8. does not have the Special Experience Identifier (SEI 300)

Organizational Structure

25. spent 10 to 30% of his duty day or week performing TO management and acquisition
26. considered TO management as one of several primary duties
27. was not evaluated primarily on TO manager duties
9. worked under the supervision of a DPML
10. supervised no personnel
11. worked on either a major or non-major acquisition program (as per DoD Directive 5000.1)
12. managed less than 50 TOs

Perception of Top Management

13. perceived TO acquisition was afforded sufficient priority by top management

TO Manager Taskings

14. made direct inputs into SOW and/or RFP

15. identified types of manuals

16. identified types of documentation

17. approved the TO Publication Plan

18. approved the TO Status and Schedules

19. identified validation requirements in the SOW

20. identified verification requirements

21. arranged for TO printing and distribution

TO Manager Interaction

22. had frequent contact with PM, DPML and DMO

23. had frequent contact with user, ALC, ATC, and the contractor

24. had a common problem in scheduling activities with outside agencies

THE AIR FORCE SYSTEMS COMMAND TO MANAGER:

Biographical Information

1. had more than 24 months assigned to current program

2. had no coordination or training with an experienced TO manager or predecessor

3. was the first TO manager assigned on the majority of programs

4. was assigned during the Full-Scale Development Phase

Qualifications for Selection

5. attended at least one Professional Continuing Education Course at AFIT

6. was previously a maintenance technician at the user level

7. was selected for his position by local TO acquisition management

8. does not have the Special Experience Identifier (SEI 300)

Organizational Structure

25. spent more than 70% of his duty day or week performing TO management and acquisition

26. considered TO management as his primary duty

27. was evaluated primarily on TO manager duties

9. worked under the supervision of a DPML

10. supervised no personnel

11. worked on a major acquisition program (as per DoD Directive 5000.1)

12. managed less than 50 TOs

Perception of Top Management

13. perceived TO acquisition was not afforded sufficient priority by top management

TO Manager Taskings

14. made direct inputs into SOW and/or RFP

15. identified types of manuals

16. identified types of documentation

17. approved the TO Publication Plan

18. approved the TO Status and Schedules

19. identified validation requirements in the SOW

20. identified verification requirements

21. arranged for TO printing and distribution

TO Manager Interaction

22. had frequent contact with PM, DPML, DMO and PCO

23. had frequent contact with user, ALC, ATC, and the contractor

24. had a common problem in scheduling activities with outside agencies

Appendix C: Expanded Responses and Telephone Interview Question 38 Responses

AD Responses

- lack of a central AF management facility
- lack of identification of need to automate
- training is more important than assignment of better qualified personnel
- a career field would make the process worse
- automate at once
- develop local management policies and procedures and ensure dissemination of this information
- trouble getting through AF bureaucracy to person at working level
- consolidated TO for TO managers; single source of nonconflicting information
- would like to work entire program; start to finish; avoid second guessing
- formal training doesn't teach what you need to know to do day to day job
- career field would provide stability; stay with program through completion; promote and test based on day to day job
- central agency to provide standardization and remove contradictions from regulations
- a TO handbook until regulations are consolidated and conflicting regulations removed
- career field should be for experienced NCOs to ensure user experience
- controlled tour should be tied into acquisition time rather than a strict 3 or 4 year tour
- biggest problem is the need for better directives, guidance and regulations

- need more direct, precise guidelines; present guidelines too ambiguous

- verification needs to be performed by 3 to 5 level technicians not senior NCOs

- need AFSC to have control of personnel; TO manager should have 5 to 7 level before becoming a TO manager

- TO manager needs training in data management, configuration and logistics

- do away with paper TOs

- top management needs to be more informed

- more guidance or a handbook is needed; presently no one source for information; conflicting guidance

- need a formal training course before becoming a TO manager

- need to educate MAJCOMMs on time constraints on technical data

- creating a career field not a good idea because you would lose user experience

- need a Special Duty Identifier and a controlled tour for continuity

- 50% of TO manager inputs to SOW are changed or ignored without consultation

- TO manager has responsibility for TOs but no authority

- only senior NCOs with user background should be TO managers

- need formal training course on nuts and bolts of day to day job

- TOs need to have separate contract line item like hardware; would solve priority problem

- need a technical school and career field; can then test for promotion on TO management not old career field

- need career field with a controlled tour to enable same person start to finish to establish accountability

- attend formal training early not after already doing job

- need guidebooks and regulations that tell specific "how to" information not broad management

- user needs training to understand acquisition process for TOs

ASD Responses

- people should receive TO management training before they are put into the job of TO manager

- new people coming into TO management should work under an experienced TO manager before they do it alone

- TO manager guidance and regulations revolve around the major aircraft acquisitions; not much guidance on modifications or minor programs

- TOs must be tailored to the program they are being acquired for, but a new person does not know how to tailor TOs

- controlled tour is not a problem for civilian TO managers

- TO 00-5-1 is just right; more than adequate

- TO management is a good career broadening experience for flight line maintenance technicians

- no career ladder for career field in TO management

- too many "chiefs" in TO management; not enough "indians"

- definitely need top management emphasis on TO acquisition management

- people in the acquisition business outside the TO system don't know what TOs are all about-- they should

- there has to be a "realistic" TO management training course; the current AFIT PCE course only deals with the "ideal"

- need to get TO managers assigned early in the acquisition cycle

- learning curve too long for a "good" TO manager; somewhere around 12 to 18 months

- people are rotated, moved frequently especially people on In-Process Review teams

- TOs badly integrated into maintenance concept

- AFLC not communicating their TO needs to AFSC people

- too much of the TO acquisition is subjective; need more objectivity in TO acquisition guideliines

- no standards for TO verification or validation

- enlisted TO managers don't have "horsepower" to get things done

- DPMLs and PMs should take AFIT PCE course (SYS 230) on TO management because they don't understand what is involved in TO acquisition

- TO manager must be a person who works well on their own
  -- self-motivated
  -- works well with others
  -- is an effective communicator

- need more civilians as TO managers; military don't stay with the program long enough to establish "corporate memory"

- military TO managers should be at least a MSgt in rank

- civilian TO managers provide longevity and stability

- problem with TO verification is you can't get equipment when needed

- enlisted military TO manager does not get promoted based on TO acquisition knowledge but on knowledge of his current AFSC

- militay TO manager must have user experience of at least 9 to 10 years before becoming a TO manager

- if there is going to be a Central Air Force TO Management Agency, it should be headed by a Colonel

- TOs should be a separate line item on contract

- TO management training program should start with introduction of TO acquisition management prior to starting job; then following a period of 9 to 12 months on the job, a more indepth course on details of TO acquisition management

- TO management guidelines and regulations written in too broad terms; need specifics

- for military enlisted TO managers, a TO management AFSC should be for the top three NCO grades

- AFPRO people don't understand TO acquisition process enough to take care of TO validation

- need a better system for evaluating the prices and costs of TOs

- definitely need better system for TO acquisition coordination and communication

- TO manager needs to use tact when trying to get cooperation from others

- difficult for NCO TO manager to function because of rank differences; rank seems to get in the way

- need more guidelines for commercial manuals

- need standards in TO system; guidelines and regulations don't provide them

- need more training courses in acquisition business not just for TOs

- need more education of others on the TO acquisition process

- TO managers don't have the authority to get things done the way they should

- do too much busy work, therefore don't get the right things done

- takes 18 months on the job to be good at TO management

- because someone did TO management for airframes doesn't mean the same person will do a good job managing TOs for engines

- #1 problem in TO management is accountability; no one in the chain or at the top is accountable for TOs; no responsible structure

- treating TO management as just another "logistic element" is another downfall of the system

- need a management chain that knows the TO acquisition business

ESD Responses

- contractor constantly slips schedule on TOs
- need to identify early to contractor the priority of TOs
- don't want AFSC for TO managers
- people should attend formal training after a 2 or 3 month field exposure
- TOs are low priority with all other logistics functions
- people in acquisition process are not well versed in TOs; no one understands system
- training is a big factor across the board; need better training or more knowledgeable people
- a career field would be over kill; TOs are an integral part of the complete logistics system
- TO acqusition is easy to learn; a background in the technical specialty is more important (ie. radio repair)
- need more emphasis on logistics in general; TOs in particular
- TOs are most important logistics aspect but little or no emphasis is placed on their acquisition
- TAC letter is excellent; emphasis now on engineering/schedule until user screams TO is inadequate
- technical support not provided; RFP went out without review of technical inputs
- training is necessary but when short-handed can't spare time to go
- sole source contractors tacked shortages in other areas to the cost of TOs
- need life cycle and cost factors for TOs; if contractor uses 173-10, pamphlet guidelines are $630 per page
- little historical data available on TO costs; can't dispute a contractor's proposal

- need definitive guidance on data requirements and management for commercial manuals (ie. computers)
- tough to find qualified people to perform verification
- need higher priority to acquisition by top management especially if staff is like at ESD
- can't emphasize enough the need for training
- an AFSC would provide for career development and progression
- functional area training after 2 months OJT to avoid getting inundated with terms
- unless a program is large there is not enough work for a TO specialist
- lose logistics continuity if you specialize only on TOs
- need help in identifying costs of TOs; no set standards; varies from contractor to contractor
- short military tours cause problems; huge military turnover
- deployment takes priority; TO schedules are unrealistic
- process is dependent on ALC actions as a result delays occur over which TO manager has no control
- every ILS manager is expected to be an expert in all 15 logistics areas-- contractor has an expert in each
- too much work to spare people for training
- best solution is to have a TO specialist; can't happen at ESD because of manning
- need a TO handbook with specific guidance
- need a higher priority on manning so you can specialize
- need to establish system baselines
- TO process needs to start early and not be put off to last minute
- contractor is under no monetary incentive to produce good TOs

- career field for TO mangers too narrow; need experience in other logistics areas

- need a central book to draw everything together

- need more teeth in SPO to hold contractor to (DIDs) rather than deleting them to save money

- need a way to track changes from in-process reviews to actual change

- need continuity; same people should be sent to reviews for entire process

- need one central agency or ALC to ensure compliance with MILSTD

- the luxury of functional specialty causes you to operate in a vacuum; what you do in TOs affects other logistics considerations; if you do them all you have accountability

- relying on validation results by contractor is an unnecessary expense because verification is what we rely on

- existing training courses are a regurgitation of regulations; judgement is required to tailor regs to a specific program

- everything is number one priority

- need consistency to commitments; either same people or at least commitment to predecessor's position

- high turnover in program office with military

- having a logistics manager totally responsible for TO acquisition is a mistake; too big, no training, no background

- ALC needs to put more emphasis on sending right people to in-process reviews, verifications

- ALC not given enough money to fully support the TDY requirements

- ALC TDY funds not earmarked against specific programs; when money gets tight only larger more important programs get money

- given the importance of TOs, they deserve more visibility

- "metal on the ramp" philosophy causes TOs to get pushed to the side

- don't like to go to reviews and see different faces at each review

- TO acquisition needs to be done uniformly throughout the product division

- user needs to send same people to all in-process reviews

- training needs to be upfront; presently no experience, learn by doing and rely on experienced loggies

- need to clarify what we expect from contractors

- every TO manager should go to school

- need clarification on whether to use AFADs or not

- there is a problem when dealing with small contractors who can't or don't know how to prepare TOs

- logistics and TOs need more people; undermanned at least 20%

- need to remove the perception that loggies are "second team"

- in AFSC TOs there is not right kind of visibility

- TO manager can't influence design of equipment

- need to change perception that loggies are not educated or retired on active duty

- rewrite regulations to make duties, responsibilities and schedules definite

- need one way, one guideline for all

- need to get people through the existing training programs; either don't get sent or get sent late

- main problem is not enough time for training

- need to move towards supportability

- need a single source of information; a how to, what to, when to handbook

- specifications are outdated; don't use current technology

- need to rewrite specs to avoid paying for same thing twice

- need a formal program of training enroute PCS to get whole job perspective

- ongoing battle on whether to add commercial manuals to our system

- need leverage to get commercial manuals reviewed

- TDY schedules conflict; need to be in two different places at the same time

- TO AFSC too specialized

- TO acquisition no big deal; fairly easy; not too many problems

- early reviews are a waste of time; basically blank pages

- difficult to get away for training; can't afford to let him go

- need user interface early; need user to send same players for continuity

- need one slant or set of rules on joint service acquisitions

- a new person cannot reasonably be expected to support TOs without early training

- need a comprehensive checklist to know what you are supposed to be doing at a given point in time

- good people get promoted out of acquisition or go to industry

- ESD TO acquisition is mostly done by locals because of high transient rate

- the experience level of acquisition people has gone way down

- there are conflicting priorities and TOs usually come out last

- need a two step process of training followed by experience

- career field a fantastic idea; problem is you get to GS-11 and die in TOs

- a CTOM would do the most good; would give TOs the visibility they need

- being a TO expert ruins your image; must divorce yourself from TOs for promotion

- TOs only play a minor part; no attention at any level

- commercial manuals should not be a part of the TO system

- need people dedicated to in-process reviews from ALC and using commands

- DCAS/AFPRO knowledge of TO acquisition process very poor to the point that contractor validation is about nonexistent

- delay TO verification until actual user has had TOs in hand on the job for at least a year if user can perform their duties with unverified TOs

- need current, updated MILSPECs

- logesticians have too many things to do to be good at any of them; there should be TO acquisition management experts verifying the TOs

- TO manager career field would create "tunnel vision" and this hinders good TO management

- TOs should not be finalized until they have been out in the field at least a year; leave in verified format

BMO Responses

- must get logistics upfront in the acquisition cycle

- TO manager must control TO portion of the budget

- TO managers should have specific guidelines and a handbook for reference

- TO managers should be trained and have a Special Duty Identifier

- contractors are not getting qualified people who know TOs

- lack of qualified people staying in TO acquisition jobs

- always hearing about poor TO management; need more feedback on good programs

- need automation in TO acquisition management

- should have positions so that TO manager career field can be established; currently there are no positions

- because of the way TOs are being currently acquired we are wasting too much money on TOs

- too many varied regulations; they need to be boiled down to a few

- need an expanded training course on TO management; more of a "how to do it" course

Bibliography

1. Air Force Logistics Management Center. U.S. Air Force Centralized Technical Order Management Group Executive Committee Meeting Minutes. Gunter Air Force Station AL, 16 and 17 November 1982.

2. Air Force Logistics Management Center. Initial Technical Order Project Findings. Gunter Air Force Station AL, 14 June 1977.

3. Breslin, CMSgt Edward J., Chairman, TO Improvement Working Group #5. Personal Interview. Eglin AFB FL, 25 January 1985.

4. Breslin, CMSgt Edward J., Superintendent, Technical Order Management Agency. Personal Interview. Eglin AFB FL, 18-19 March 1985.

5. -----. Work Group 5 (TO Acquisition Improvement) Consolidated Findings, Unpublished report. AD/ALPO, Eglin AFB FL, 1 November 1983.

6. Brown, Capt Thomas D., Jr. Personal interview with Arthur A. Munguia, Course Director, Technical Order Acquisition Management Course. Air Force Institute of Technology, Wright-Patterson AFB OH, 17 November 1983.

7. Brown, Capt Thomas D., Jr., and Capt Dennis R. Lyon. United States Air Force Technical Order Acquisition: What Are the Problems and How Can They Be Corrected? MS Thesis, AFIT/GLM/LSM/84S-6 School of Systems and Logistics, Air Force Institute of Technology Wright-Patterson AFB OH, August 1984 (AD-A146 931).

8. Burkhardt, Regis. Technical Order Manager, ESD/OCBY. Personal Interview. Hanscom AFB MA, 20 December 1984.

9. Cambell, Herbert P., Technical Order Manager, ESD/ALLP. Personal Interview. Hanscom AFB MA, 20 December 1984.

10. Campbell, Capt John A., Reading and lecture materials distributed in CM 5.23, Contracting and Acquisition Management. School of Systems and Logistics Air Force Institute of Technology (AU), Wright-Patterson AFB OH, Fall 1984.

11. Carwise, Capt Edward R., and Lt Richard L. Bemrose. "A Proposal for Improving AFSC Management of Technical Publications." MS Thesis, SLSR-9-67. AFIT/SL, Wright-Patterson AFB OH, August 1967 (AD-825 201).

12. Department of Defense Directive 5000.1, Major System Acquisition. Washington: Department of Defense, 29 March 1982.

13. Department of the Air Force. Air Force Technical Order System. AFR 8-2. Washington: HQ USAF, 3 May 1982.

14. Department of the Air Force. Air Force Technical Order System. TO 00-5-1. Washington: HQ USAF, 15 January 1983.

15. Department of the Air Force. Technical Publications Acquisition Manual. AFSCM 310-2. Headquarters Air Force Systems Command, Andrews AFB Washington DC, 14 May 1971.

16. Emory, C. William. Business Research Methods(Revised). Homewood IL: Richard D. Irwin, Inc., 1980.

17. Extension Course Institute, Principles and Techniques of Instruction. AF Manual 50-62. Air University, 1 April 1974.

18. Hatterick, Richard G., and Harold E. Price. "Technical Order Management and Acquisition." Unpublished technical report, AFHRL-TR-80-50, Air Force Human Resources Laboratory, Air Force Systems Command, Brooks AFB TX, May 1981.

19. Headquarters Air Force Logistics Command. Air Force Technical Order System. AFLCR 8-4. Wright-Patterson AFB OH, 25 May 1983.

20. Kelley, Lt Gen Robert E., Vice-Commander Tactical Air Command. "Technical Data - It's Time To Get Tough." Electronic Message. 21 1517Z. January 1985.

21. Marquez, Lt Gen Leo, Deputy Chief of Staff, Logistics and Engineering, HQ USAF. "Projected Warrior Distinguished Speaker Program Presentation." Air Force Institute of Technology, Wright-Patterson AFB OH. 18 October 1984.

22. Munguia, Arthur A. Course materials distributed in SYS 230, Technical Order Acquisition and Management. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, December 1984.

23. -----. Personal Interview. Air Force Institute of Technology, Wright-Patterson AFB OH, 14 December 1984.

24. -----. "Planning the Acquisition of Technical Publications." Unpublished technical report. Air Force Institute of Technology (AU), Wright-Patterson AFB OH.

25. Towner, Maj Timothy N. A Determination of the Information Requirements for the Management of the Acquisition of Technical Orders. MS Thesis, LSSR 31-83 School of Systems and Logistics, Air Force Institute of Technology (AU). Wright-Patterson AFB OH, September 1983 (AD-A134 417).

26. U.S. Department of the Air Force. Integrated Logistics Support (ILS) Program. AFR 800-2. Wright-Patterson AFB OH, 1978.

27. Weaver, Chandler H., DAF. Chief, Technical Publications and Data Management Office, ASD. Personal Interview. Wright-Patterson AFB OH, 9 January 1985.

28. Wigton, Maj Norman P. Centralized Technical Order Management Center, Unpublished report no. 811212. Air Force Logistics Management Center, Gunter Air Force Station AL, 1984.

29. Williams, Herman and Arthur B. Winn. A Correlation Between the Assignment of Personnel to Technical Order Validation/Verification Versus Technical Order Deficiency Forms Generated. MS Thesis, LSSR 22-80. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, June 1980 (AD-A087 090).

VITA

Captain Marc W. Billingham was born on 10 October 1954 in Norwood, Massachusetts. He graduated from high school in Walpole, Massachusetts in 1972 and attended the University of New Hampshire from which he received a degree of Bachelor of Arts in Psychology in May 1976. Upon graduation, he received a commission in the US Air Force through the ROTC program. In July 1977, he completed missile combat crew training at Vandenberg AFB, California and served as a missile combat crew member and flight commander in the 564th Strategic Missile Squadron. Additionally, he was a missile combat crew evaluator in the 341st Strategic Missile Wing at Malmstrom AFB, Montana until September 1981. He then served as an ICBM operations instructor and flight chief in the 4315th Missile Combat Crew Training Squadron at Vandenberg AFB, California until entering the Air Force Institute of Technology School of Systems and Logistics in May 1984.

Permanent address: 27 North St. Circle
Walpole, Massachusetts 02081

VITA

Captain David A. Klassen was born on 19 September 1952 in Fargo, North Dakota. He graduated from East Valley High School in Spokane, Washington in 1970. He began college studies at Eastern Washington University and then attended Spokane Falls Community College before enlisting in the Air Force in 1973. He was trained as a telephone inside plant equipment installer and worked in that capacity until December 1975 when he was selected to complete his college studies under the Airman Scholarship and Commissioning Program. He graduated Magna Cum Laude from the University of Albuquerque with a Bachelor of Science degree in Business Administration and received a commission through the ROTC program at the University of New Mexico in Albuquerque, New Mexico in December 1977. He completed missile combat crew training at Vandenberg AFB, California in November 1978. He served as a missile combat crew member in the 490th Strategic Missile Squadron and then as a missile combat crew instructor. Additionally, he was an emergency actions controller for the 341st Strategic Missile Wing at Malmstrom AFB, Montana until entering the Air Force Institute of Technology School of Systems and Logistics in May 1984.

Permanent address: 10121 E. Nora

Spokane, Washington 99206

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SECURITY CLASSIFICATION OF THIS PAGE

The objective of this ~~research~~ was to examine the job performance of the U.S. Air Force technical order (TO) managers in the TO acquisition process and to identify ways to improve their effectiveness with the end result of improving TOs.

A telephone survey of TO managers performing TO acquisition within Air Force Systems Command was accomplished. Identification of personnel, lack of selection criteria, amount of formal training, interaction of functional offices, and the level of top management awareness were found to be the most significant issues facing the TO manager. TO manager composites were formed for each of the four product divisions (Armament Division, Aeronautical Systems Division, Ballistics Missile Office, Electronics Systems Division). Finally, a composite for the entire Air Force Systems Command was formed.

Recommendations to improve the effectiveness of the TO manager, based on the formation of a three leveled Central Technical Order Management Center (CTOC), were presented. Within this three leveled CTOC framework, the following recommendations were made:

1. The establishment of a career field for senior TO acqusition personnel based on experience and performance within the field.
2. The identification of TO managers by utilizing a Special Duty Identifier (SDI).
3. The establishment of selection criteria based on formal management training and education; prior TO and management experience; and the size, complexity, and acquisition phase of the program.
4. The utilization of an integrated system of TO acquisition management courses and on-the-job training.
5. The continuation of recent attention and ~~additional~~ support by top management to the problems of TO acquisition.

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