DTIC FILE COPY

(2)

AD-A206 842

United States Air Force Computer-aided Acquisition & Logistics Support (CALS) Technical Order System Description

DoD-VA856-87-29

October 1987

FINAL REPORT

DTIC
ELECTE
MAR 3 0 1989
S D
H

John LaPointe
Systems Automation Division

Prepared By
U.S. Department of Transportation
Research and Special Programs Administration
Transportation Systems Center
Cambridge, MA 02142

Prepared For
U.S. Air Force Systems Command
HQ AFSC/PLXC
AF CALS MIO
Andrews AFB, DC 20334-5001

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

89 3 29 100

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY UNCLASSIFIED	3. DISTRIBUTION / AVAILABILITY OF REPORT UNLIMITED
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) DoD-VA856-87-29	5. MONITORING ORGANIZATION REPORT NUMBER(S) DoD-VA856-87-29
6a. NAME OF PERFORMING ORGANIZATION US Department of Transporation 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION US Air Force Systems Command
6c. ADDRESS (City, State, and ZIP Code) Research and Special Programs Administration Transportation Systems Center Cambridge MA 02142-1093	7b. ADDRESS (City, State, and ZIP Code) HQ AFSC/PLXC AF CALS MIO Andrews AFB DC 20334-5001
8a. NAME OF FUNDING / SPONSORING ORGANIZATION US Air Force Systems Command 8b. OFFICE SYMBOL (If applicable) HQ AFSC/PLXC	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code) AF CALS MIO Andrews AFB DC 20334-5001	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification) United States Air Force Computer-aided Acquisition & Logistics Support (CALS) Technical Order System Description - FINAL REPORT	
12. PERSONAL AUTHOR(S) John LaPointe	
13a. TYPE OF REPORT Tech Report 13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) October 1987 15. PAGE COUNT 94
16. SUPPLEMENTARY NOTATION	

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	→ This document

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The USAF Computer-aided Acquisition & Logistics Support Technical Order System Description provides readers with the current, logical view (as delineated by AF regulations, military standards, and applicable technical orders) of the Air Force Technical Order (TO) System. Discrepancies associated with the physical implementation of the TO system are footnoted throughout the document. Each activity associated with the TO process has been functionally described using the AF Integrated Computer Aided Manufacturing (ICAN) modeling techniques. Included in the document are matrix representations of TO organizational responsibility and regulatory controls.

(KP) ←

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED/UNLIMITED
22a. NAME OF RESPONSIBLE INDIVIDUAL Althea Phillips	22b. TELEPHONE (Include Area Code) (617) 494-2117 22c. OFFICE SYMBOL US DOT

DD Form 1473, JUN 86 *Previous editions are obsolete.* SECURITY CLASSIFICATION OF THIS PAGE

ACKNOWLEDGEMENT

I am indebted to the many people who have assisted me in the preparation of this document. In particular, I wish to thank Mr. James Porterfield (TSC) and Mr. Robert Gillett (Unisys) for their laborious efforts in the IDEF modeling of the Air Force Technical Order System and Ms. Susan McCarthy (Dynatrend) for undertaking the thankless jobs of typing, editing, and compiling this document. Finally, I am deeply grateful to Professor Arthur Munguia (AFIT) for providing extensive information on the Technical Order System.

Accession For	
NTIS GRA&I	☑
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

UNITED STATES AIR FORCE
COMPUTER-AIDED ACQUISITION AND LOGISTICS SUPPORT (CALS)
TECHNICAL ORDER SYSTEM DESCRIPTION
TABLE OF CONTENTS

Section		Page
1.0	CALS Overview	1-1
2.0	Air Force Technical Order System	2-1
3.0	Technical Order Process	3-1
4.0	Create TOs	4-1
5.0	Deploy TOs	5-1
6.0	Manage TOs	6-1
7.0	Organizational Assessment	7-1
8.0	Regulatory Controls	8-1

Appendices

A	Air Force Technical Order System - Types of Technical Order Publications	A-1
B	Technical Order System References	B-1
C	Forms Used in the Technical Order System	C-1
D	Exceptions to Technical Order System	D-1
E	Air Force Air Logistics Center Functional Chart	E-1
F	Air Force Technical Order System Dimensions	F-1
G	Air Force Technical System Current Inconsistencies	G-1
H	Acronyms	H-1

TABLE OF CONTENTS (Cont.)

Figure		Page
1	Air Force Technical Order Process	1-4
2	Technical Order Process	3-2
3	Create TOs	4-2
4	Plan TOs	4-5
5	Develop TOs	4-9
6	Review TOs	4-12
7	Deploy TOs	5-2
8	Print TOs	5-5
9	Distribute TOs	5-7
10	Use TOs	5-10
11	Modify TOs	5-14
12	Manage TOs	6-2
13	Budget TOs	6-4
14	Catalog TOs	6-7

Table		Page
1	Computer-aided Acquisition & Logistics Support (CALS) Modular Planning Process Overview	1-3
2	Participating Organizations/Lists	7-2
3	Node A0 - Technical Order Process	7-4

TABLE OF CONTENTS (Cont.)

Table		Page
4	Node A1 - Create TOs	7-5
5	Node A11 - Plan TOs	7-6
6	Node A12 - Develop TOs	7-7
7	Node A13 - Review TOs	7-8
8	Node A2 - Deploy TOs	7-9
9	Node 21 - Print TOs	7-10
10	Node A22 - Distribute TOs	7-11
11	Node A23 - Use TOs	7-12
12	Node A24 - Modify TOs	7-13
13	Node A3 - Manage TOs	7-14
14	Node A31 - Budget TOs	7-15
15	Node A32 - Catalog TOs	7-16
16	Regulatory Controls	8-2

1.0 CALS OVERVIEW

Introduction

The Air Force Computer-aided Acquisition and Logistics Support (CALS) Program has been established to improve weapon system reliability and maintainability, while reducing the costs of weapon system acquisition and support. Of paramount importance to CALS is the delivery and handling of a large quantity of "technical" data. The automation process is intended to make a significant reduction in paper and in labor necessary to enter, manipulate, transfer, and interpret data. The technical information to be digitized in the form of text or images includes: maintenance procedures, test procedures, engineering drawings, design criteria models, etc. The program is striving to replace the current paperwork process by automating (or digitizing) the flow of the technical information.

See #1473

Air Force Policy and Objectives

The October 18, 1985 Air Force Program Management Directive (PMD) established a CALS Management Integration Office (MIO) and directed the following additional tasks:

- To plan for the integration of existing Automated Technical Information (ATI) projects with each other and with a standard information systems framework; to determine the full range of CALS objectives and management concepts; and to plan for large scale demonstrations and implementation of CALS technology on an acquisition program for a weapon system.
- To ensure that system structures are consistent and compatible with Air Force guidelines.
- To perform analyses comparing the costs and present methods of managing technical information and the costs of ATI for comparable elements of the program, and to analyze the return on investment for incremental capabilities developed under ATI.
- To prepare and maintain an ATI and CALS Program Management Plan (PMP) which will address program integration and will consolidate: 1) current and proposed CALS critical schedule and event relationships for CALS program objectives; and 2) plans and opportunities for incorporating improved ATI capabilities in weapon system acquisition programs.

The Air Force established a Management Integration Office (MIO) at HQ USAF/AFSC to oversee the CALS program. Specifically, the MIO is responsible for planning, oversight, and coordination of the CALS initiatives, but not the specific systems. The Transportation Systems Center (TSC) is providing the systems engineering support to the AFSC/MIO in creation of automation plans directed at the fulfillment of the CALS objectives.

Initially, the MIO has identified four Air Force areas to investigate opportunities for improvements: Technical Orders (TOs), Engineering Drawings, Logistics Support Analysis (LSA), and Unified Life Cycle Engineering (ULCE).

Modular Planning Process

In order to satisfy the requirement activities associated with the CALS initiatives areas, TSC, with support from Unisys Corporation and RIS Associates, developed an information engineering systematic approach entitled Modular Planning Process (MPP). The MPP was devised by integrating elements from strategic planning and information engineering methods.

The principal drivers in the evolution of the MPP were:

- A process was needed to focus on technical plans that would not be outdated prior to implementation;
- A process was needed to incorporate transition systems;
- A process was needed to serve diverse information distribution and user demands; and
- A process was needed to deal with the needs of decentralized organizations responsible for the various related weapons system acquisition and logistics support functions.

The MPP has evolved into three phases:

- An examination of the environment
- A study of opportunities
- A plan of future direction.

Table 1 represents an overview of the MPP along with its component tasks within the three aforementioned phases. This document is a product of the completion of the tasks associated with phase I of the MPP.

Purpose

The purpose of this document is to provide to the readers with the current, logical view (as delineated by the Air Force regulations, military standards, and applicable technical orders) of the Air Force Technical Order System (AFTOS) - one of the four initial CALS initiative areas. Discrepancies associated with the physical implementation of the AFTOS have been footnoted throughout the document.

A modeling technique developed during the Air Force Integrated Computer Aided Manufacturing (ICAM) in the mid-to-late 1970s will be used to functionally describe the activities associated with the Technical Order Process (see Figure 1). Known as the ICAM Definition or IDEF, the Technical Order IDEF model will consist of flow charts and a glossary describing each flow chart. In an effort to provide more detail information, matrix representation of organizational responsibilities vs. AFTOS activities and regulatory controls vs. AFTOS activities are included in the document.

TABLE 1. COMPUTER-AIDED ACQUISITION & LOGISTICS SUPPORT (CALS)
MODULAR PLANNING PROCESS
OVERVIEW

EXAMINE THE ENVIRONMENT	STUDY THE OPPORTUNITIES	PLAN THE DIRECTION
Initiate the Process Perform Initial Assessment • Create Preliminary Description of Environment • Identify Organization Expectations • Establish Priorities Develop Specific Procedures • Establish Management Plan • Identify Advisory Group • Prepare Project Plans **Conduct Structured Analysis** Describe Current Environment • Create Functional Model • Identify Major Data Elements • Describe the Organizational Infrastructure • Identify Major Information Flow Parameters Assess Transitional Projects • Identify Objectives • Describe Functions and Data • Identify Technologies • Identify Infrastructure Affected	**Assess Technology** Identify Existing Technologies • Review Current Environment • Review Ongoing Projects • Identify Existing Technologies Research Future Technology Opportunities • Select Technology Areas • Consult with Technology Experts • Examine Similar Applications • Review Development Trends Establish Technology Alternatives • Quantify Directions • Specification of Implementation Issues • Examine Benefits and Costs **Project Future Requirements** Forecast Requirements • Review Applicable Scenarios • Conduct Discussions with MAJCOMs • Forecast Process Changes • Assess Infrastructure Constraints Examine Feasible Alternatives • Determine Feasibility Issues • Review Industry Trends **Define Future State** Describe Future Environment • Define the Impact of Technology on Current State • Define Projected Organizational Responsibilities • Define Relevant Interface Requirements Create Future Functional Model • Develop a Description of Future State • Identify Projected Major Information Flow Parameters	**Formulate Alternatives** Assess Critical Issues • Examine Objectives • Identify Technologies • Review Organizational Issues Propose Initial Alternatives • Select Future Requirements • Identify Technologies • Structure Proposals Review and Modify Alternatives • Review Criteria • Identify Relationships with Transitional Projects • Define Policies and Organizations Involved **Develop Consensus** Review Progress with Advisory Group • Identify Discussion Topics and Priorities • Evaluate Current Environment • Establish Objectives • Provide Access to Information Develop Common Understanding • Review Future Requirements • Evaluate Recommended Solutions • Examine Feasibility Issues Expand Advocacy Network • Identify Implementation Agencies • Select Appropriate Forums • Communicate the Plans **Prepare Implementation Plan** Define Activity Descriptions • Establish Implementation Guidelines • Establish Evaluation Criteria • Develop Implementation Procedures Develop Organization Plan • Confirm Major Milestones • Establish Transition Plan • Identify Organizational Responsibilities Establish Constituency • Gain Management Acceptance of Plan • Obtain a Commitment for Execution Create Documentation • Establish Goals • Define Resource Requirements • Recommend Technologies • Define Organizational Impacts • Establish Financial Parameters

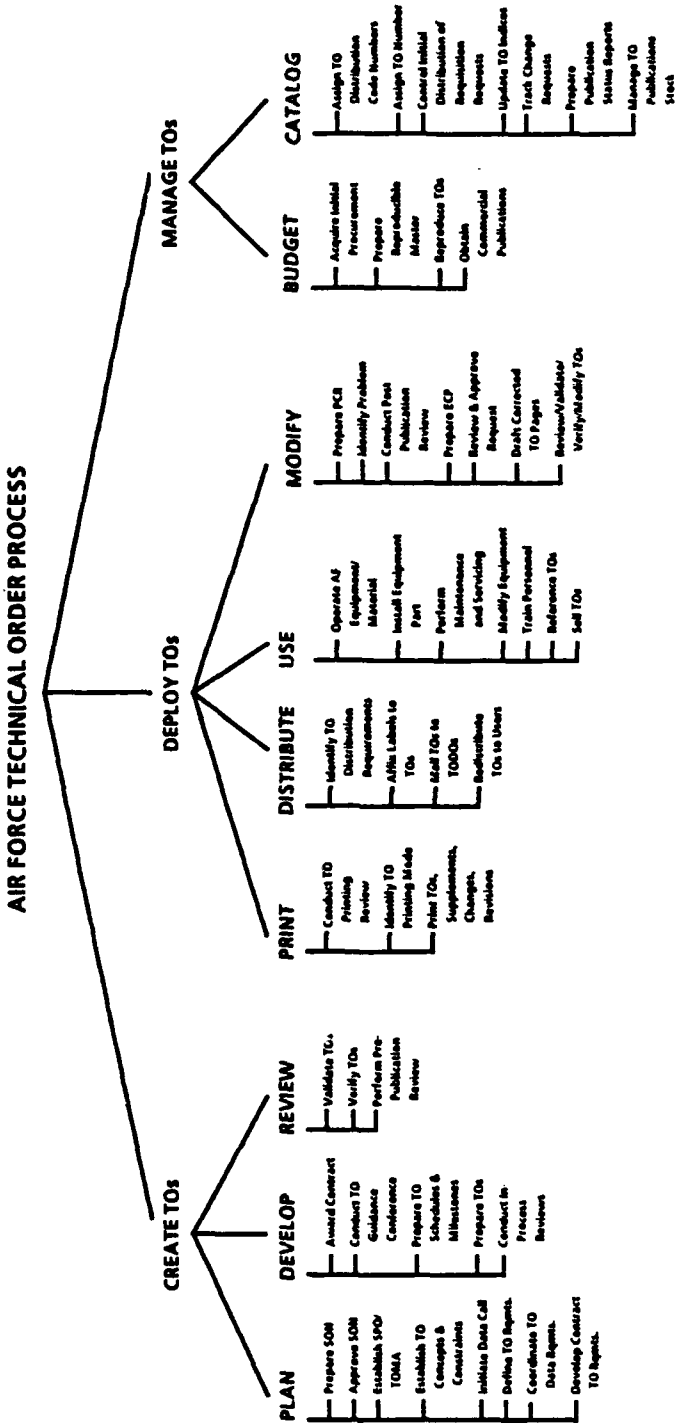


FIGURE 1. AIR FORCE TECHNICAL ORDER PROCESS

2.0 AIR FORCE TECHNICAL ORDER SYSTEM

Background

The Air Force Technical Order (TO) System was established by Air Force Regulation (AFR) 8-2, Air Force Technical Order System, as the official medium for disseminating technical information, instructions, and safety procedures pertaining to Air Force systems and equipment.

According to AFR 8-2, TOs must have the following attributes:

- constitute a military order
- issued in the name of the Chief of Staff, USAF
- by order of the Secretary of the Air Force
- compliance is mandatory

Currently, there exists five types of TOs used throughout the Air Force:

1) Technical Manuals - These are documents which cover installation, operation, maintenance, and handling of Air Force equipment and material.

2) Abbreviated Technical Orders - These are primarily work-simplification devices produced from a technical manual. Examples are: checklists, inspection workcards, or sequence charts.

3) Time Compliance Technical Orders - These documents provide the instructions for modifying equipment (other than temporary modifications authorized in AFR 57-4, Modification Program Approval and Management) and performing, or initially establishing, one-time inspections.

4) Methods and Procedure Technical Orders - These are documents which establish policy and provide information and instruction on maintenance management or administration, configuration management, etc. They are general in content and are not issued against specific systems or equipment.

5) Index Technical Orders - These reference documents provide personnel with a means of selecting TOs, show the status of each TO, and, in certain instances, group the TOs pertaining to specific items of equipment.

Appendix A, Types of Technical Order Publications, outlines categories within each type of TO.

Major References

There are eleven major documents that govern (control) the TO system:

AFR 8-2, Air Force Technical Order System, establishes the technical order system for the Air Force. This regulation explains the TO system by delineating the process for acquiring new TOs (including a description of the type of data to be included in a TO) and by assigning the basic responsibilities for management and improvement to the TO system.

TO 00-5-1, AF Technical Order System, prescribes the concept and management of the Air Force TO system as established by AFR 8-2. Furthermore, this TO provides policy and assigns responsibility related to the acquisition and use of TOs. The various types of TOs are identified and described.

TO 00-5-2, Technical Order Distribution System, creates the TO distribution system. This TO contains the policies and procedures on the TO distribution system for use by the Air Force and other organizations requiring TOs.

TO 00-5-15, Time Compliance Technical Order (TCTO), establishes the TCTO system for the Air Force and prescribes the policies and procedures for its management. The TCTO is the primary means of initiating equipment modification.

TO 00-5-16, Computer Program Identification Numbering System (CPIN).[1]

TO 00-5-17, Computer Program Identification Numbering System (CPIN).[1]

TO 00-5-18, Technical Order Numbering System, prescribes the TO numbering system used for assignment of technical order numbers.

TO 00-5-19, Security Assistance Technical Order Program, contains policy and procedures for US Air Force management of TO requirements to support US Government approved sales of weapons system and equipment.

TO 0-1-01, the index of TO Indexes, and TO 0-1-02, the index of General TOs, are key indexes in the Air Force TO system. There is a separate TO index for each category of TOs which lists TO status and provides a basis for determining initial distribution requirements and updating TO files and records. TO 0-1-01 contains preface information that applies to all indexes.

TO 0-1-01 contains preface information that applies to all indexes, whereas TO 0-1-02 is a listing of general Air Force TOs.

TMCR 86-01, AF Technical Manual Contract Requirement - Preparation Instructions, establishes the requirements for acquisition of technical manuals (including TOs) and all types of equipment. TMCR 86-01 supersedes the use of the data item description (DID) and listing on the contract data requirements list (CDRL).

Appendix B, Technical Order System References, identifies the various Department of Defense/Air Force documents and regulations that govern or guide the Technical Order System.

---

[1] TOs 00-5-16 and 00-5-17 are not major documents that govern the TO system. They are user manuals for the CPIN system but impact the TO process.

Technical Order System Forms

AFR 0-9, Numerical Index of Departmental Forms, lists 300-plus Air Force Technical Order (AFTO) forms that pertain to any one, several, or all TOs. Also, numerous Department of Defense (DoD), Air Force (AF), Air Force Logistics Command (AFLC), and Air Force Systems Command (AFSC) forms pertain to TOs. Appendix C, Forms Used in the Technical Order System, lists those forms that are considered noteworthy to the TO system.

General Policy

The TOs are published under the authority of the Secretary of the Air Force in accordance with AFR 8-2 and are distributed, maintained, and filed in accordance with TO 00-5-2, Technical Order Distribution System. Policy concerning the TO system is determined by HQ USAF/LEYE, and HQ AFLC/MMT manages the TO system. OC-ALC/MMED manages and publishes TO 00-5-1, AF Technical Order System, and TO 00-5-2, whereas WR-ALC/MMED manages and publishes TO 00-5-15, Time Compliance Technical Order. Each TO, issued within the system, is assigned a unique alpha/numeric identifier by OC-ALC. There are 10 types of Air Force technical documents (listed in Appendix D, Exceptions to Technical Order System) that are excluded from the TO system.

IDEF Model of Air Force Technical Order System

The Integrated Computer Aided Manufacturing Definition (IDEF) modeling technique is being used to graphically represent and describe the various functions and associated activities of the Air Force TO system. Essentially, this section depicts an $IDEF_0$ model of the current TO system which includes the major TO functions which are decomposed into their component sub-functions (or activities).

For $IDEF_0$, each node (i.e., function), every box (i.e., sub-function or activity) pictorially depicted has it own set of ICOMs[2] (Inputs, Controls, Outputs, and Mechanisms). Furthermore, a box that can be decomposed into more detailed sub-functions will be considered a node at the next lower level of decomposition. All function and component sub-functions (i.e., activities) along with their associated ICOMs are described in the contiguous Glossary.

Inputs are data that are required to perform an activity, whereas the outputs are the data products of that activity. Controls are the conditions or circumstances that govern the activity. Mechanisms are the people and/or devices that perform or carry out the activity.

Since the physical (real) world does differ from the logical (according to the Air Force Regulations) world, efforts were made to identify within the Glossary the important discrepancies between the logical and physical worlds. However, it is important to note that reasons do exist for these discrepancies (i.e, budgetary problems, labor distribution (manpower), time, etc.).

---

[2] NOTE: In order to keep the diagrams legible, only the major ICOMs are depicted. However, other important ICOMs are stated in the Glossary.

Finally, the model is a simplification of a very complex Air Force process. For the purpose of this report, the technical order process described is associated with the acquisition and management of weapon system TOs. The functional activities associated with non-weapon system TOs and commodity TOs are not significantly different, however, the controls for these TOs are numerous and different, and similarly the mechanisms also differ.

3.0 TECHNICAL ORDER PROCESS

GLOSSARY

Node A0 - Technical Order Process

This node provides a high level overview of the Air Force Technical Order process. This representation decomposes the TO process into three major sub-functions: Create TOs, Deploy TOs, and Manage TOs (see Figure 2). In general during this functional process, the AFSC is responsible for acquiring and managing TOs for major acquisitions until Program Management Responsibility Transfer (PMRT), at which time the Prime ALC assumes control of the TOs. AFR 8-2 sets policy and guidance for the TO system. It is augmented by TO 00-5-1 which prescribes the concept and assigns organizational responsibilities. Requisition and distribution of TOs is set forth in TO 00-5-2.

Box A1 - Create TOs

Once a Statement of Need (SON) has been approved by HQ USAF, maintainability analysis is performed for the proposed weapon system. Planning commences with the development of a maintenance concept in support of the weapon system operational concept and concludes with a Request for Proposal submitted for the contractor to respond. Once a contract has been awarded, TOs are developed according to the tailored Technical Manual Contract Requirements (TMCR) 86-01. At various intervals, the drafted TOs are reviewed to ensure technical accuracy, completeness, and compatibility with the contract and requirements of applicable military specifications. Once approved, the TO master can be reproduced and then deployed.

INPUTS: Statement of Need (SON) and System Operations Requirement Document (SORD).

CONTROLS: AFR 8-2, TO 00-5-1, and AFR 57-1, Operational Needs.

OUTPUTS: TO Master, Contract Line Item Number (CLIN) - including TMCR 86-01. Also, AFLC 189, Request for Technical Order Number. and AFLC 190, Technical Order Number, Index and ADP Control Record.

MECHANISMS: HQ USAF, System Program Office (SPO), Air Logistics Center(s) (ALCs), Using Commands (Users), and Contractor(s).

Box A2 - Deploy TOs

A TO Master is reproduced and an initial distribution is made to the user. Uses of TOs include: operating, maintaining, inspecting, servicing, supplying, modifying weapons system and components. Also, TOs are used for training and planning purposes. Technical Orders can be modified by supplementing, changing, or revising the technical information within the manual. The AFTO 22, Technical Order Improvement Report and Reply (AFTO 27, Technical Order System, Publication Change Request for Preliminary TOs) is the user means of recommending correction to a TO of an error or omission of a technical nature. (NOTE: AFTO 22 status is maintained by the USAF Logistics Management of Technical Order System - DSD G022.) For "one time" inspection or accomplishing a modification to equipment, a TCTO is prepared.

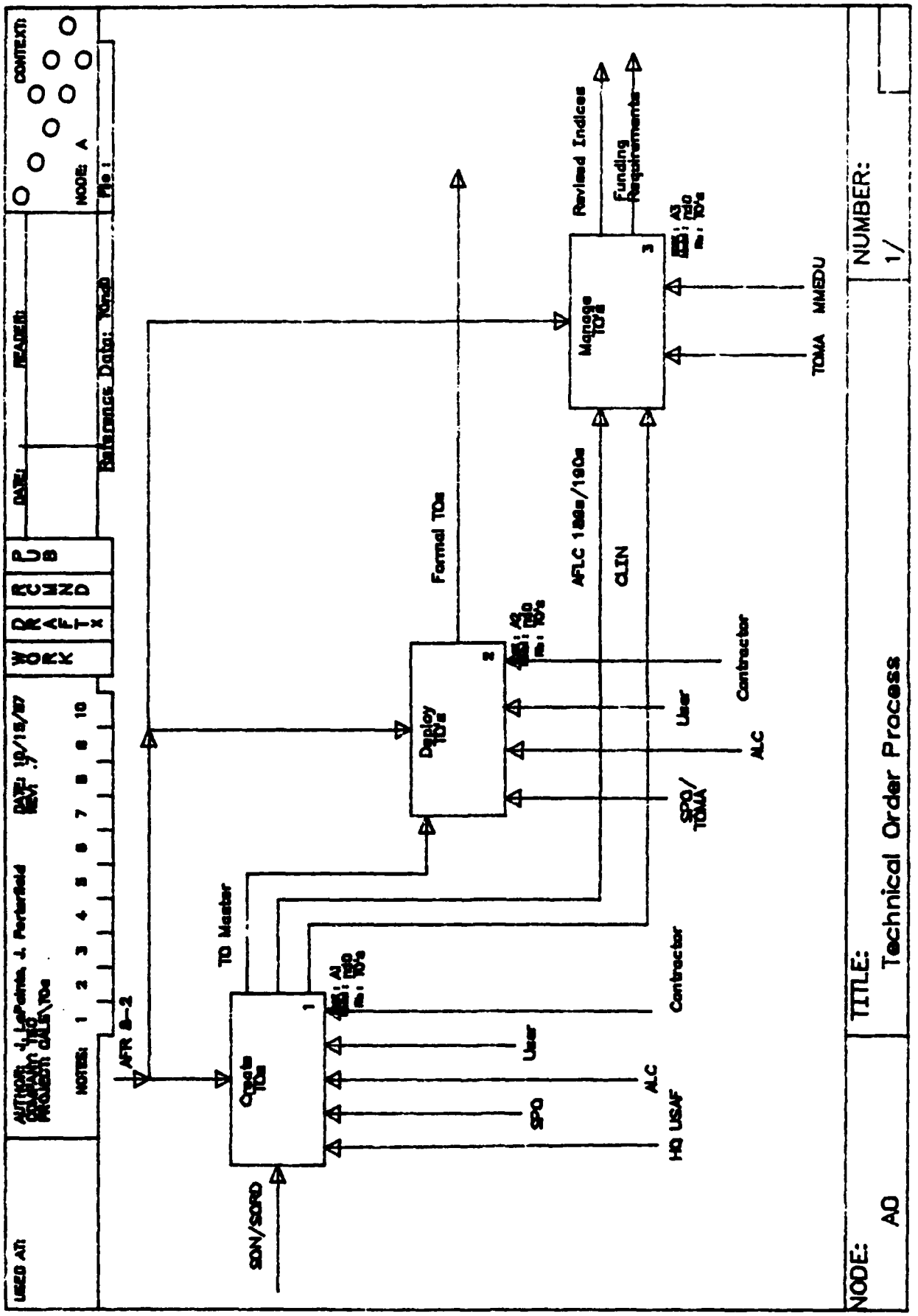


FIGURE 2. TECHNICAL ORDER PROCESS

INPUTS: TO Master.

CONTROLS: AFR 8-2, TO 00-5-1, TO 00-5-2, and TO 00-5-15.

OUTPUTS: Formal TOs and AFTO 22.

MECHANISMS: SPO/Technical Order Management Agency (TOMA), ALC/TOMA, Users, and Contractors.

Box A3 - Manage TOs

Manage TOs consists of two major functions: budgeting and cataloging. Prior to PMRT, AFSC has responsibility for budgeting and funding for all TO requirements. (NOTE: TOs are procured as a separate line in the contract). After PMRT, budgetary responsibility is assumed by AFLC. However, in many cases, post-PMRT residual tasks may be managed by AFSC until they are completed. After the completion of the acquisition phase, the cost of a master reproducible copy and all applicable printing costs for any changes (excluding those attributed to engineering modification or replenishment spares) is charged to operation and maintenance (O&M) funds. Cataloging commences with a request of an assignment of a TO number. AFLC 189 and AFLC 190 are used for these purposes. (Note: An AFLC 189 is used for requesting a TO Number, whereas an AFLC 190 is used to update the equipment number to the TO number cross-reference index.) Once approved by OC-ALC/MMEDU, information concerning the proposed TO is inputted into DSD G022 and the TO Indices are revised. Cataloging also consists of other activities such as: screening of ID requirements for a TO, preparing publication status reports, tracking change requests, and managing TO publications stock.

INPUTS: AFTO 22, AFLC 189, AFLC 190, and CLIN.

CONTROLS: AFR 8-2, TO 00-5-01, TO 00-5-2, and AFLC 8-5, Technical Order Mechanized Information, Numbering, Indexing and Distribution System.

OUTPUTS: Revised Indices and Funding Requirements.

MECHANISMS: SPO/TOMA, ALC/TOMA, ALC/Technical Order Distribution Control Authority (TODCA), and OC-ALC/MMEDU.

4.0 CREATE TOs

GLOSSARY

Node A1 - Create TOs

TO acquisition actually begins with the approval of a SON. An integral part of developing the TOs is the planning effort which starts with the maintenance concept and its impact on TOs. An effective Technical Order Management Agency (TOMA) must be established as early as possible in the process to assure a successful program with quality products. Furthermore, data requirements and support documentation must be identified and included in the contract. As the TOs are being developed, formal reviews must be undertaken to ensure that the TOs are being prepared in accordance with contract data requirements and military specifications (see Figure 3).

Box A11 - Plan TOs

TO planning generally begins in the early stages of the acquisition of a system/equipment. In general, AFSC is responsible for the acquisition and preparation of Weapon System TOs. (NOTE: AFLC, in some circumstances, is the acquisition agency particularly for commodity procurements, non-system procurements, and modifications for existing systems). AFSC through their System Program Office (SPO) establishes a Technical Order Management Agency (TOMA)[3] -- an "agency" of at least one person who oversees the the development, management and printing of each TO. The Technical Order System Section of the Air Logistics Center (ALC), which has been designated as primed for the weapon system, provides the technical support. As early as possible, the TOMA with support from the Prime ALC develop a Technical Order Development Management Plan (TODMP) which is the guideline for all the TOs that will be produced to support the major acquisition program. Technical data calls and collection are requested by the SPO/TOMA. The TO data requirements are identified by review and tailoring of the TMCR (Technical Manual Contract Requirements) 86-01.

INPUTS: Statement of Need (SON), Program Management Plan (PMP), Integrated Logistics Support Plan (ILSP), Acquisition Plan, and Current Hardware/Software Technology. Also, Type A Systems Specifications and Weapon System concepts and current systems design data.

CONTROLS: AFR 8-2, and TO 00-5-1. Also, AFR 57-1 (Operation Needs), AFR 310-1 (Management of Contractor Data), AFSCM 310-2 (Contractor Data Management), and TMCR 86-01.

OUTPUTS: TODMP and the TO requirements, specifically the tailored TMCR 86-01.

MECHANISMS: HQ USAF, AFSC, specifically the SPO and Data Management Office/r (DMO), and AFLC, specifically the Prime ALC and their DMO. Also, Air Force Test Operation and Evaluation Center (AFOTEC), Air Training Center (ATC), and Using Commands.

---

[3] Very often in the real world, the TOMA is not identified during this activity. Until identification, the TOMA responsibilities are normally performed in coordination with the SPO, the appropriate ALC, the Integrated Logistics Support Manager, or similar office.

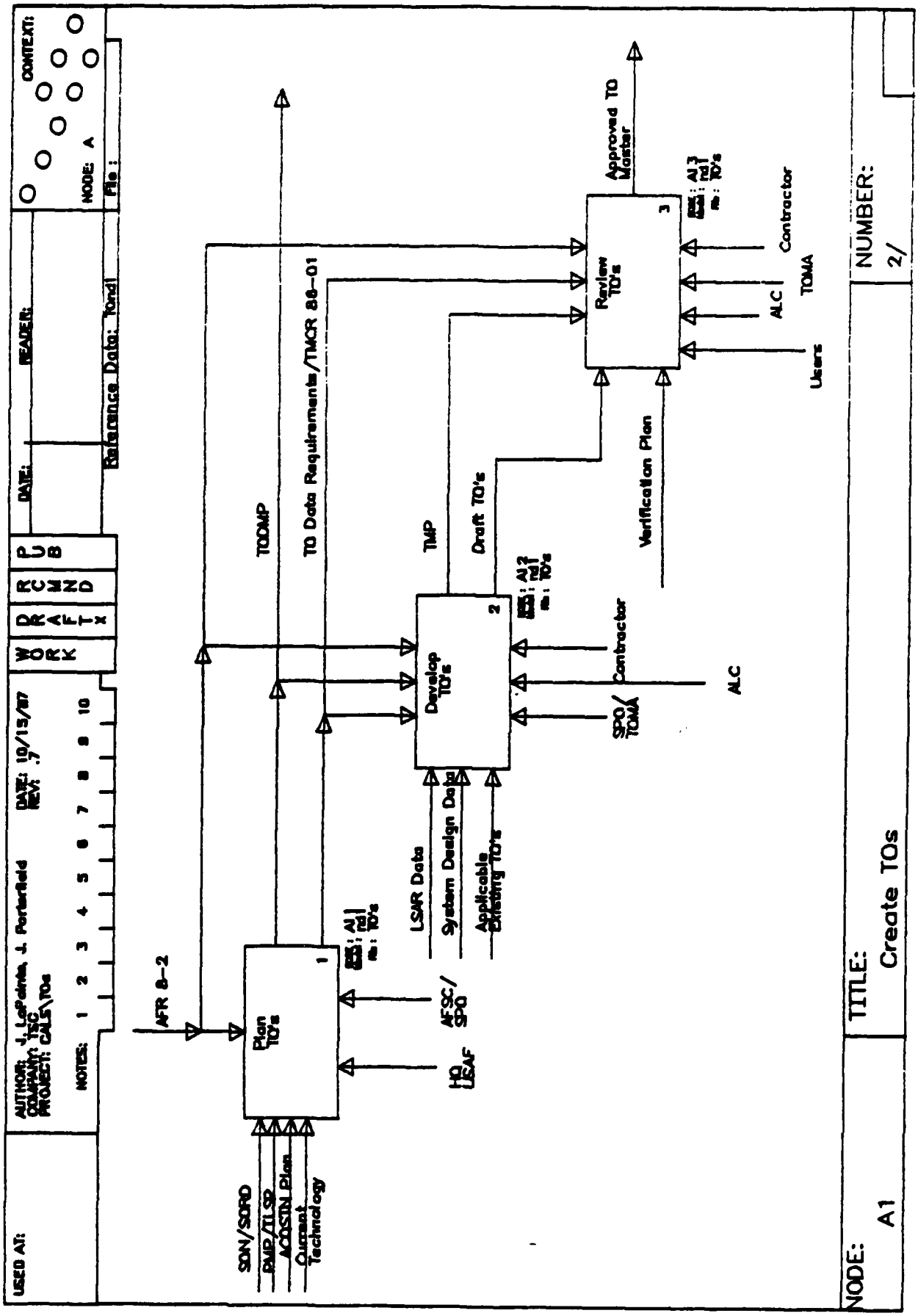


FIGURE 3. CREATE TOs

Box A12 - Develop TOs

This function represents the activities that are associated with producing a draft version of the TO from the TO requirements. Each draft TO is produced according to its Technical Manual Plan (TMP) which is prepared by the contractor. (NOTE: The TOMA must ensure that the TMP is compatible to the TODMP and should be contractually binding). The TOMA will conduct In-process Reviews (IPRs) as sections or parts of the draft TO are completed. (NOTE: Status is reported on the Data Item Description (DID) "Technical Order Status and Schedules" and is included on DD Form 1423).

INPUTS: Logistics Support Analysis Records (LSAR) data, System Design data, and applicable existing TOs. Also, Support Equipment Requirement Documents (SERDs) and Contractor Furnished Equipment Notices (CFENs).

CONTROLS: AFR 8-2, TO 00-5-1, and TMCR 86-01. (Note: TMCR 86-01 contains all applicable military standards (see appendix B) for the TOs needed to support the equipment being acquired.)

OUTPUTS: TMP and draft of each TO. Also, for each TO, an AFTO 158 (TO Review Comment Sheet) and updated DD 1423.

MECHANISMS: TOMA, ALCs, and contractors. Also, AFOTEC, ATC, and Using Commands.

Box A13 - Review TOs

The draft is validated by the contractor (witnessed sometimes by an Air Force representative) and verified by Air Force (users). These activities are established to ensure that the manuals provide explicit, technically accurate, safe procedures. Once approved by the TOMA, the TO is prepared for printing.

INPUTS: Draft TOs

CONTROLS: AFR 8-2, TO 00-5-1, and TMCR 86-01.

OUTPUTS: Preliminary and/or Approved TOs. Also, for each TO, a Validation Completion Report, TO Verification/Acceptance Certificate, DD Form 254 (DoD Contract Security Classification Specification).

MECHANISMS: TOMA, ALCs, and contractors. Also, AFOTEC, ATC, and Using Commands.

Node A11 - Plan TOs

Comprehensive and up-front planning is essential for timely, accurate, and complete technical orders (see Figure 4). The activities associated with Plan TOs include:

- Prepare Statement of Need (SON)
- Approve SON
- Establish SPO/TOMA
- Establish TO Concepts and Constraints
- Initiate Data Call
- Define TO Requirements
- Coordinate TO Requirements
- Develop Contract TO Requirements

Box A111 - Prepare Statement of Need (SON)

Technical Orders planning commences with a using command preparing a Statement of Need according to AFR 57-1 and submitting it for approval to HQ USAF.

INPUTS: Weapon System concept or potential solution to a problem.

CONTROLS: AFR 8-2 and AFR 57-1.

OUTPUTS: SON.

MECHANISMS: Using Commands.

Box A112 - Approve SON

HQ USAF approves or disapproves the SON. If approval is granted, HQ USAF designates the SPO.

INPUTS: SON.

CONTROLS: AFR 8-2 and AFR 57-1.

OUTPUTS: Approve SON.

MECHANISMS: HQ USAF.

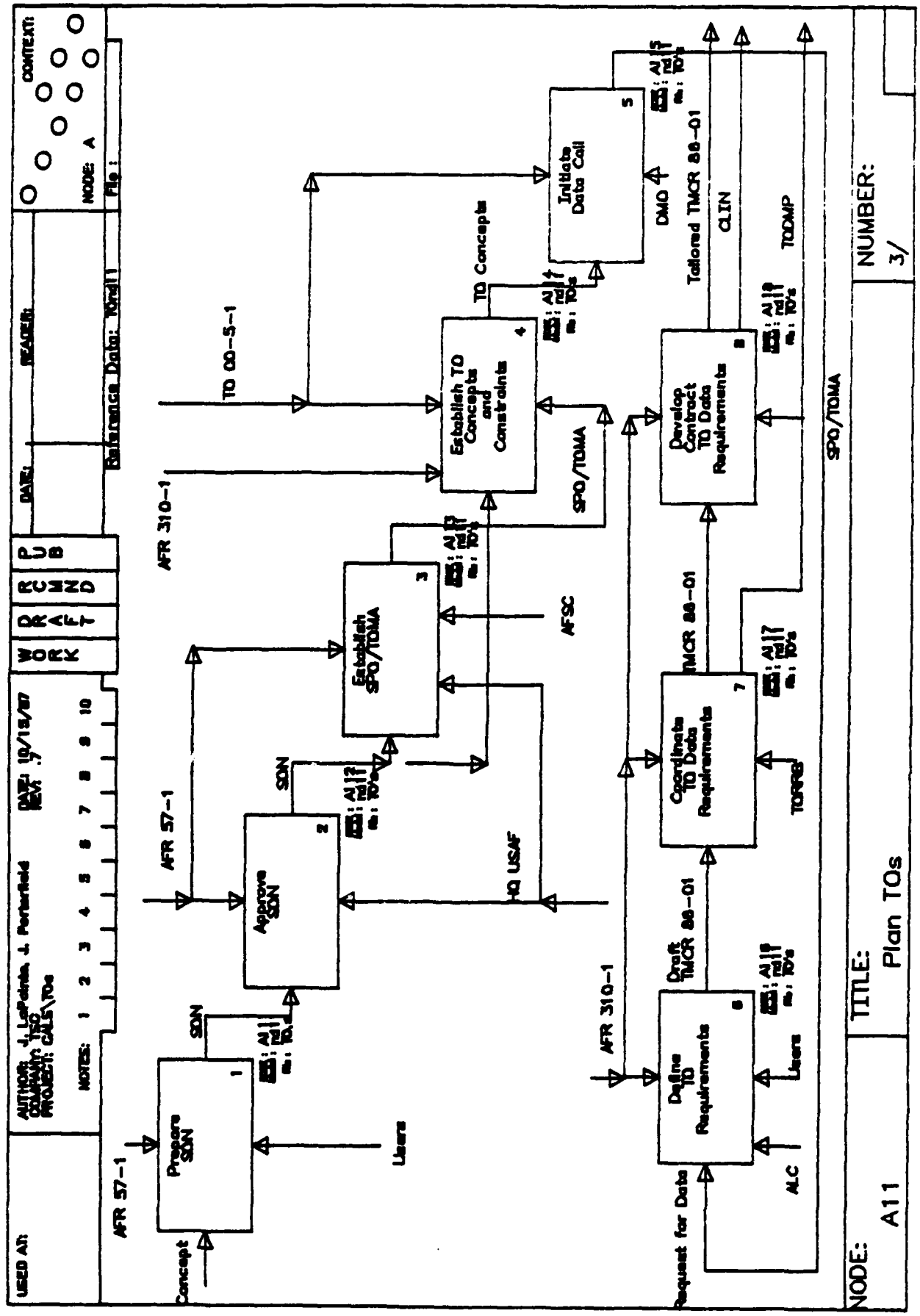


FIGURE 4. PLAN TOs

Box A113 - Establish SPO/TOMA

HQ USAF along with HQ AFSC identifies the agency where the SPO will be located. The SPO, in turn, identifies the Technical Order Management Agency (TOMA). Furthermore, the prime ALC is identified.

INPUTS: Approve SON.

CONTROLS: AFR 8-2 and AFR 57-1.

OUTPUTS: Designation of SPO.

MECHANISMS: HQ USAF and AFSC.

Box 114 - Establish TO Concepts and Constraints

During the conceptual phase, various alternative programs are generated and examined. In support of this effort, technical data concepts are prepared and similarly examined. Preferred technical data concepts are identified which will properly support the new weapon system, equipment, etc. A Technical Order Development Plan (TODMP)[4] is drafted outlining the acquisition process. Incorporated in the TODMP are Air Force responsibilities with the development of TOs (i.e., Data Calls, preparation of Statement of Work, In-process Reviews, etc.).

INPUTS: Approve SON, Weapon System Concepts, and Current Hardware/ Software Technology.

CONTROLS: AFR 8-2 and TO 00-5-1.

OUTPUTS: TO concepts which will be transformed into the TO requirements.

MECHANISMS: HQ USAF and AFSC, specifically the SPO.

Box 115 - Initiate Data Call

The Data Management Office/r (DMO) issues a data call to all affected agencies. The purpose of data calls is for the agencies to identify their data requirements. The SPO/TOMA should ensure that all proper agencies are notified and requests are made of their data requirements.

INPUTS: TO concepts.

CONTROLS: AFR 8-2, AFR 310-1 (Management of Contractor Data), AFSCM 310-2 (Contractor Data Management), and TO 00-5-1.

OUTPUTS: Request for data requirements

MECHANISMS: AFSC/DMO and Prime ALC/DMO.

---

[4] In the real world, the TOMA has not been identified. At best, the SPO with assistance from the prime ALC will draft an outline of the TODMP.

Box 116 - Define TO Requirements

From the identification of the functional subsystems and major end items of equipment, the TO requirements are established in gross form. This occurs after system/equipment design specifications have been identified in sufficient detail. At this time, a call for technical data is initiated.

INPUTS: Request for data requirements. Also, Program Management Plan (PMP), Integrated Logistics Support Plan (ILSP), Statement of Capability, Current Systems Design Data, Type A System Specifications, and the Acquisition Plan.

CONTROLS: AFR 8-2, AFR 310-1 (Management of Contractor Data), AFSCM 310-2 (Contractor Data Management), and TO 00-5-1.

OUTPUTS: An initial draft of the TO requirements as tailored TMCR 86-01.

MECHANISMS: AFSC/DMO, Prime ALC/DMO and Using Commands

Box 117 - Coordinate TO Requirements

The SPO/TOMA calls for a joint planning/requirement meeting (TO Requirements Review Board (TORRB)), in order to establish the proper TO requirements. At this time, existing data is reviewed, the number and types of TOs are determined, and the requirements for the TOs are coordinated. The TOMA drafts the TODMP.

INPUTS: Initial draft of the TO requirements, and any applicable existing data or commercial publications.

CONTROLS: AFR 8-2, TO 00-5-1, and AFSCM 310-2, Technical Publications Acquisition Manual.

OUTPUTS: TO Requirements as revised TMCR 86-01 and a draft TODMP.

MECHANISMS: TOMA, TORRB, Prime ALC, and Using Commands.

Box 118 - Develop Contract TO Requirements

The requirements for acquisition of TOs are set and the generic TMCR 86-01, Air Force Technical Manual Contract Requirements, is tailored (prepared) according to the data requirements. The Contract Administration Office (CAO) and the TOMA prepares and distributes to potential contractors Request for Proposals (RFPs).

INPUTS: TO Requirements.

CONTROLS: AFR 8-2, TO 00-5-1, TODMP, AFSCM 310-2, and Preparation Instructions for TMCR 86-01.

OUTPUTS: The tailored TMCR 86-01, the Contract Line Item Number (CLIN), and RFP.

MECHANISMS: TOMA and CAO.

Node A12 - Develop TOs

After the contract has been awarded, the contractor formalizes his Technical Manual Plan (TMP), which details the planning, preparation, validation and verification, and delivery of technical orders. Milestones are also included in the TMP (see Figure 5). The activities associated with Develop TOs include:

- Award Contract
- Conduct TO Guidance Conference
- Prepare TO Schedules and Milestones
- Prepare TOs
- Conduct In-process Reviews

Box A121 - Award Contract

TOs, in support of a weapon system, should be acquired by separately priced Contract Line Item Numbers (CLIN) and on a time-phased schedule according to AFR 800-2 (Acquisition Program Management). Once the contract has been awarded, the contractor prepares the TMP (according to TMCR 86-01) which is formally submitted for approval at the TO Guidance Conference.

INPUTS: RFPs.

CONTROLS: AFR 8-2, AFR 800-2, and TO 00-5-1.

OUTPUTS: Contract binding TMCR 86-01.

MECHANISMS: AFSC.

Box A122 - Conduct TO Guidance Conference

After the contract for writing the TO has been awarded, a TO Guidance Conference is convened to ensure that common understanding of the data requirements exists among all parties. A Technical Manual Plan (TMP) is prepared by the contractor and is used as the guiding document for the contractor in preparing TOs. The TOMA verifies that the TMP is compatible with the TODMP. Furthermore, Contractor Furnished Equipment Notices (CFENs) are completed by the contractor and submitted to the TOMA and the primary ALC requesting a TO number. (NOTE: A CFEN is the instrument by which the contractor can recommend organizational level, intermediate level, and/or depot level TOs that have not been previously identified.) The prime ALC completes and submits AFLC Form 189, Request for TO Number, to OC-ALC/MMEDU.

INPUTS: CFENs.

CONTROLS: AFR 8-2, TO 00-5-1, TODMP, and TO Requirements.

OUTPUTS: Technical Manual Plan (TMP), AFLC 189, Request for TO Number, and AFLC 190, Technical Order Number, Index and ADP Control Record.

MECHANISMS: TOMA, Contractors, prime ALC, AFOTEC, ATC, and Using Commands.

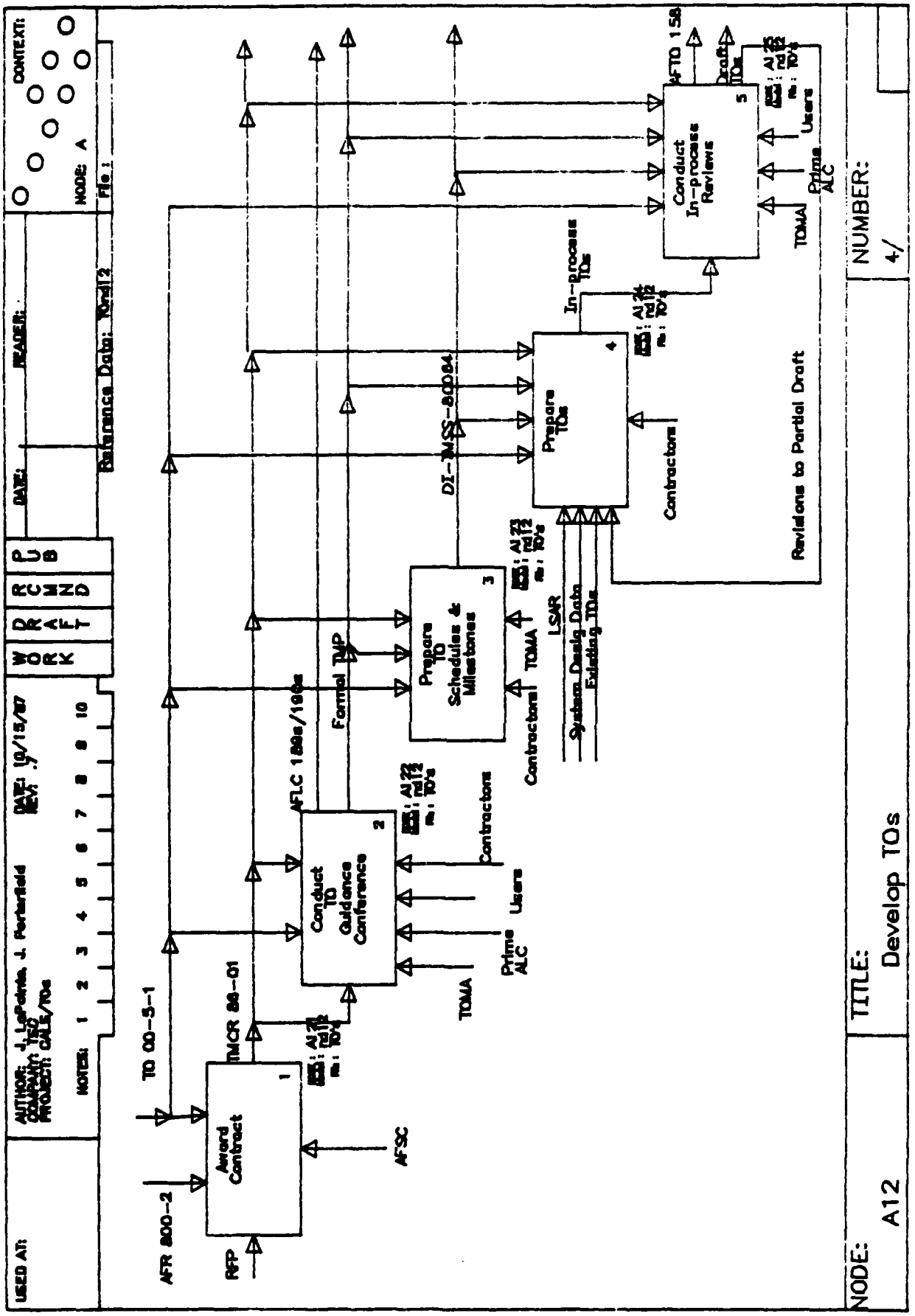


FIGURE 5. DEVELOP TOs

Box A123 - Prepare TO Schedules & Milestones

DI-TMSS-80064 (TO Status and Schedules) is initially completed by the SPO/TOMA and included as part of the Contractor Data Requirements List (CDRL). Subsequent reports are completed by the contractor and submitted through the TOMA to the SPO until the initial delivery of the TOs.

INPUTS: DI-TMSS-80064 included as part of the CDRL.

CONTROLS: TMCR 86-01

OUTPUTS: DI-TMSS-80064.

MECHANISMS: SPO/TOMA and Contractor.

Box A124 - Prepare TOs

The contractor commences drafting the TO. As sections are completed, they are submitted to the TOMA for the In-process Review (see Node 24). It is the contractor's responsibility to correct any discrepancies revealed during the IPRs.

INPUTS: Logistic Support Analysis Records (LSAR), specifically LSAR B, Item Reliability and Maintainability Characteristics; LSAR C, Operations and Maintenance Task Summary; LSAR D, Operations and Maintenance Task Analysis; and LSAR H, Support Items Identification. Also, System Design data, and applicable existing TOs.

CONTROLS: AFR 8-2, TO 00-5-1, TMCR 86-01, TMP. Also, TO Number, TO Indexes, and DI-TMSS-80064.

OUTPUTS: Draft sections of the TOs.

MECHANISMS: Contractor.

Box A125 - Conduct In-process Reviews

These reviews are scheduled by the TOMA to ensure that the TOs are being prepared in accordance with the appropriate specifications. Normally, there are IPRs at the following intervals of the completion of the draft: 30-40%, 60-70%, and 90-100%. However, depending on the complexity of the weapon system and/or TO, there could be fewer or more IPRs. The contractor is responsible for correcting any discrepancies that are contained in the draft TO (see Box A124).

INPUTS: In-process draft TOs.

CONTROLS: AFR 8-2, TO 00-5-1, TMCR 86-01, and TMP.

OUTPUTS: Completed draft TOs and for each IPR of a TO, the AFTO 158, TO Review Comment Sheet. Also, requests for revisions to the partial draft.

MECHANISMS: TOMA, Prime ALC, and Users.

NOTE: Boxes A124 and A125 are repeating activities.

Node A13 - Review TOs

For the successful development of TOs, it is absolutely necessary that the various reviews be conducted. The draft TO is validated by the contractor (witnessed sometimes by an Air Force representative) and verified by Air Force (users). Once approved by the TOMA, the TO is prepared for printing (see Figure 6). The activities associated with Review TOs are:

- Validate TOs
- Verify TOs
- Perform Pre-publication Review

Box A131 - Validate TOs

A draft TO is tested on Government Furnished Equipment (GFE) by the contractor for technical accuracy. An Air Force witness, designated by the TOMA, approves that the testing was performed by completing the AFSC Form 11, Validation Completion Report. DD Form 254, DoD Contract Security Classification Specification is completed by the contractor stipulating whether the TO has any classified data. The reading grade level (RGL) of the TO is determined and verified that it conforms with reading level of the target audience. Upon completion of this validation process the TO is considered preliminary.

INPUTS: Draft TOs.

CONTROLS: AFR 8-2, TO 00-5-1, TMCR 86-01, and TMP.

OUTPUTS: Preliminary TOs. Also, for each TO, AFSC 11 and DD Form 254 are completed. For each TO, an AFTO 124, Computation of Technical Order Reading Grade Level, is completed.

MECHANISMS: Contractor and Government Furnished Equipment (GFE). Also, the TOMA designated witness.

Box A132 - Verify TOs

Required by DoD policy, verification is the process by which Preliminary TOs are tested and proven by Air Force personnel. For each TO and as part of the Verification Plan (to be included as part of the TODMP), a TO Verification Status Page is prepared. The TO Verification Status Page identifies the verification required and the usability of the data contained in the validated Preliminary TO. Upon completion of the testing of the TO, an AFTO 4, Technical Order Verification/Acceptance Certificate, is issued. Finally, verified Preliminary TOs[5], with approval of the pertinent government agencies, may be produced to meet special training requirements.

---

[5] Production of Preliminary TOs is the rule rather than the exception. Past history indicates that the user receives the hardware prior to release and distribution of a formalized TO. Thus, preliminary TOs are used until the release of the formalized TOs.

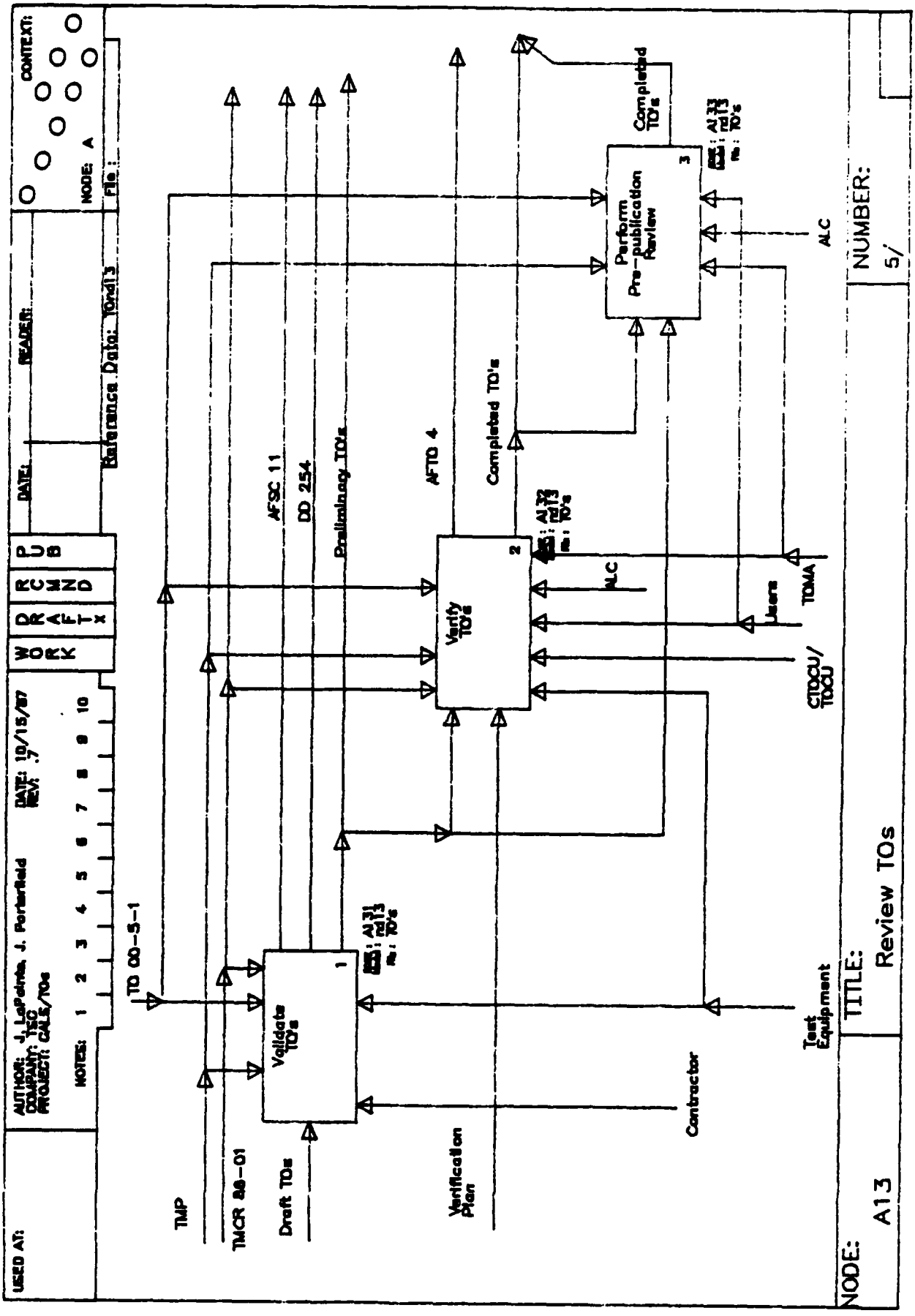


FIGURE 6. REVIEW TOs

INPUTS: Preliminary TOs and for each TO, a Verification Plan.

CONTROLS: AFR 8-2, AFR 80-34, TO 00-5-1, TMCR 86-01, and TMP.

OUTPUTS: Completed, verified TOs and for each TO, an AFTO 4.

MECHANISMS: TOMA, Central Technical Order Control Unit (CTOCU) or Technical Order Control Unit (TOCU), Prime ALC, AFCC, Using Commands, and GFE. (Note: In some cases, AFSC/AFFTC (Air Force Flight Test Center) may be contracted by the TOMA to perform the verification.)

Box A133 - Perform Pre-publication Review

These are reviews that are scheduled by the TOMA to assure incorporation of changes in TOs resulting from the verification process. Compliance with contract requirements is also verified at this time. (Note: If the Pre-publication Review is waived (i.e., not required) the completed TO is considered an approved TO only if accompanied by an AFTO 4.)

INPUTS: Completed TOs and in certain situations (when approved by the Air Force) Preliminary TOs.

CONTROLS: AFR 8-2, TO 00-5-1, TMCR 86-01, and TMP.

OUTPUTS: An approved Technical Order. Also, written responses indicating that some changes from the verification process exist that have not been properly incorporated.

MECHANISMS: TOMA, Prime ALC, and Using Commands.

NOTE: Boxes A132 and A133 are repeating activities.

5.0 DEPLOY TOs

GLOSSARY

Node A2 - Deploy TOs

Formal TO Masters are reproduced, distributed, and used by the Air Force community. As stated in AFR 8-2, TO compliance is mandatory since it constitutes a military order. Uses of TOs vary from training and planning, to maintaining and supporting weapon systems. Recommendations for improvements to the TOs are made through the Technical Order Improvement Systems (TOIS) using the AFTO 22 forms. Furthermore, TCTOs are prepared for setting forth instructions on "one time" inspection or modification to the weapon system (see Figure 7).

Box A21 - Print TOs

Approved TOs and any Changes/Revisions and/or Supplements to the TOs are reviewed for format, printed, and reproduced. Prior to PMRT, printing of TOs is the responsibility of the SPO/TOMA. Support is requested from the AFSC/DA who in turn takes steps in obtaining the appropriate quantity to be printed. After PMRT, these roles are assumed by the prime ALC/TOMA with support requested from the Air Base Group, Director of Administration (ABG/DA).

INPUTS: Approved TOs or approved Changes/Revisions and/or Supplements to the TOs.

CONTROLS: AFR 8-2, AFR 6-1 (Policies, Procedures and Standards for Production and Procurement of Air Force Printing, Duplicating, Copying and Microform and the Printing Mode), AFR 6-1/AFLC Sup 1, and MIL-P-38790, Printing Procedures. Also, TO 00-5-1, AFLC/AFSC 8-3 (Processing Interim Technical Orders), AFLC 8-4 (Air Force Technical Order System) and TMCR 86-01.

OUTPUTS: Printed TOs, Changes/Revisions and Supplements. Also, if required electrical messages.

MECHANISMS: TOMA Air Force Plant Representative Office (AFPRO) or Navy Plant Representative Office (NAVPRO), AFSC/DA or ABG/DA, and/or GPO Printing Contractor.

Box A22 - Distribute TOs

In most situations, distribution is made by providing mailing labels to the GPO printing contractor. The printing contractor is responsible for distribution in accordance with the instructions on the mailing labels. However, in some cases and within the guidelines established in AFLC 6-1, distribution is made by the prime ALC through the ABG/DA. Once received by the TO Distribution Offices (TODOs), the TOs are redistributed to the appropriate users.

INPUTS: Printed TOs (includes electrical messages, changes/revisions, and supplements). Also, AFTO 187 (TODO Technical Order Publication Requirement Table), AFTO 276 (Special Requisition for Air Force Technical Order), AFTO 221 (ADP Requisition for AFTO), AFTO 273/274 (Initial Distribution Labels), and AFTO 110 (Technical Order Distribution Record).

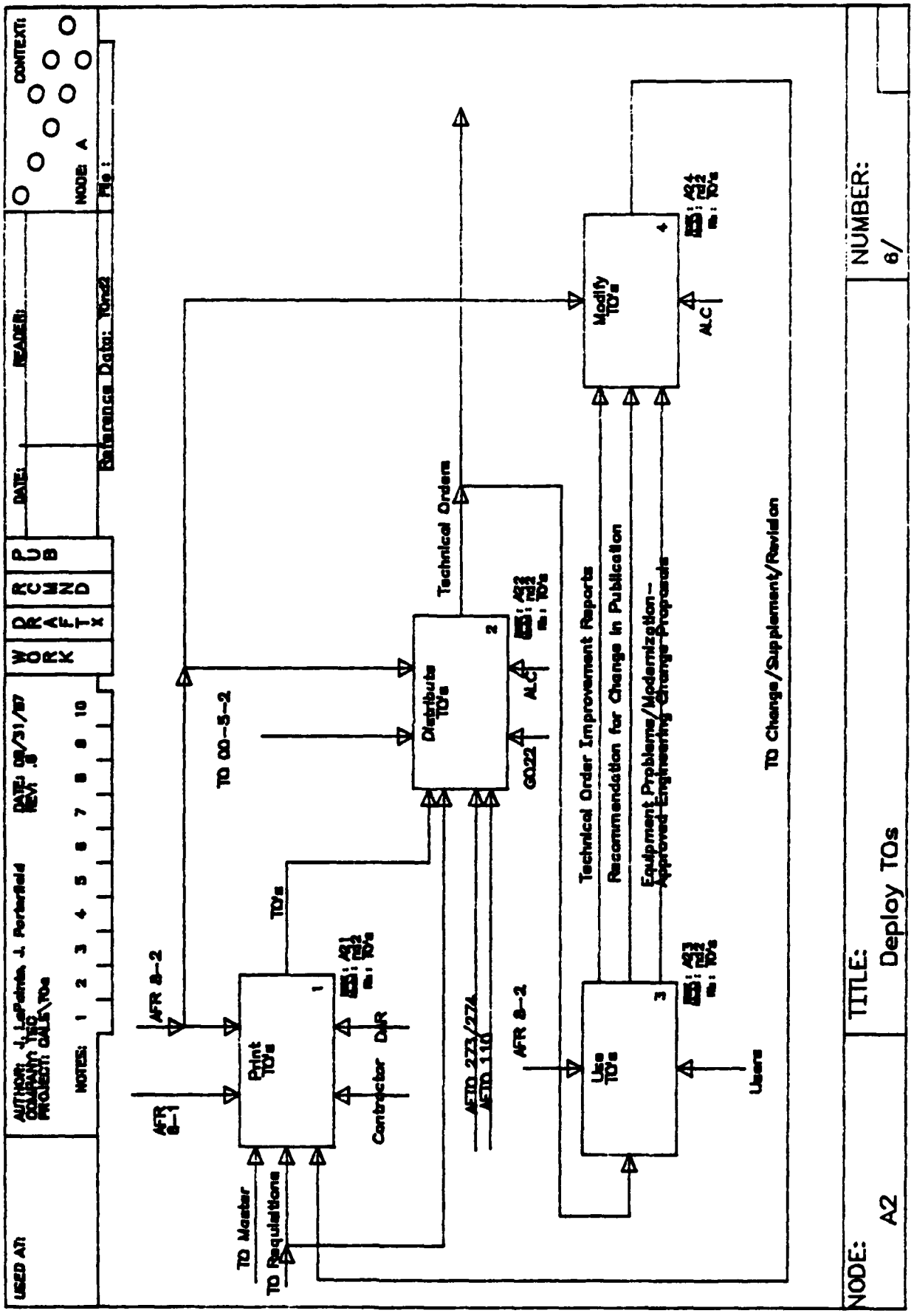


FIGURE 7. DEPLOY TOs

CONTROLS: AFR 8-2, TO 00-5-1, AFLC 7-1, AFLC 8-4, and TO 00-5-2.

OUTPUTS: Printed TOs, Changes/Revisions, Supplements, or electrical messages.

MECHANISMS: ABG/DA, AFSC/DA, GPO Printing Contractor, and TODO.

Box A23 - Use TOs

The use of TOs is the basic premise for their preparation, printing, and distribution. Basically, all Air Force commands use TOs in support of their mission. TOs provide instructions on operating, maintaining, servicing, supplying, and modifying weapons system and their respective components and other non-weapons system commodities. Furthermore, TOs are used for training, planning, and referencing purposes. Besides the Air Force, there are other users of TOs including the other armed services, other government agencies, foreign governments, and the U. S. public.

INPUTS: Printed TOs.

CONTROLS: AFR 8-2, AFR 12-32 (Schedule of Fees for Copying, Certifying, and Searching Records and Other Documentary Material), AFR 66-19 (Interservicing of Technical Manuals and Related Technology), AFR 80-34 (Withholding Unclassified Data from Public Disclosure), AFR 400-3 (Foreign Military Sales), TO 00-5-1 and TO 00-5-19.

OUTPUTS: Printed TOs and AFTO 22s.

MECHANISMS: USAF.

Box A24 - Modify TOs

Modify TOs consist of the various activities associated with changes and updates that occur to a TO. Basically, TOs can be modified by various means: supplements - to augment or change data within paragraphs or sections contained in the basic TO; changes - to replace pages in the basic TO; and revisions - to produce a second or subsequent edition of the TO. Furthermore, a TCTO, which is used to provide instruction for equipment modifications or to establish one-time inspections, can impact existing TOs. When a modification TCTO is issued, updates to all affected TOs are issued concurrently to provide the "after modification" data. These updates may be either a Safety Supplement, an Operational Supplement, or Technical Order Page Supplement.

INPUTS: AFTO 22, AFTO 27, Printed TOs. Also, Equipment Problems and/or Modifications.

CONTROLS: AFR 8-2, AFLC/AFSC 8-3, AFLC 8-4, TO 00-5-1, and TO 00-5-15.

OUTPUTS: Approved Changes/Revisions or Supplements, or TCTOs.

MECHANISMS: TOMA, Prime ALC, Using Commands, and Contractors.

Node A21 - Print TOs

The appropriate quantity of TOs to be reproduced from the approved negatives is based on the number of AFTO 187s (Technical Order Publication Requests) submitted to OC-ALC/MMEDU plus the number of copies that are required as backup stock (see Figure 8). The activities associated with Print TOs include:

- Conduct TO Printing Review
- Identify TO Printing Mode
- Print TOs, Supplements, Changes, Revisions

Box A211 - Conduct TO Printing Review

The TOMA edits and reviews (for formatting purposes) the approved TO. In many cases, Memorandums of Agreement (MOAs) are written between the TOMA and AFPRO or NAVPRO that is based at the contractor's site which allows the AFPRO to perform this quality review.

INPUTS: Approved TOs or approved Changes/Revisions and/or Supplements.

CONTROLS: AFR 8-2 and MIL-P-38790, Printing Procedures.

OUTPUTS: TO Master (or a master copy of Changes/Revisions, Supplements, or Electrical Messages).

MECHANISMS: SPO/TOMA, ALC/TOMA, or AFPRO.

Box A212 - Identify Printing Mode

Prior to PMRT, the identification of the initial printing of TOs will be done by the AFSC/DA. After PMRT, this identification is performed by the Prime ALC ABG/DA. Depending on the size of the TO and the number of copies that have been requested, the DA determines whether the reproduction of the master copy can be done on-site or must be contracted out. Normally, if the the total number of pages is less than 25,000 on the duplicating press or 60,000 on the printing press and no fold-out exceeds 22 inches, copies of the master can be reproduced by the DA. (NOTE: Number of copies to be reproduced is based on the number of completed AFTO Form 187, Technical Order Publications Request. (See Box A221 -- Identify TO Distribution Requirements).

INPUTS: AFTO 187.

CONTROLS: AFR 8-2, AFR 6-1, and AFR 6-1/AFLC SUP 1.

OUTPUTS: Printing Mode (DA or Printing Contractor).

MECHANISMS: AFSC/DA or Prime ALC ABG/DA.

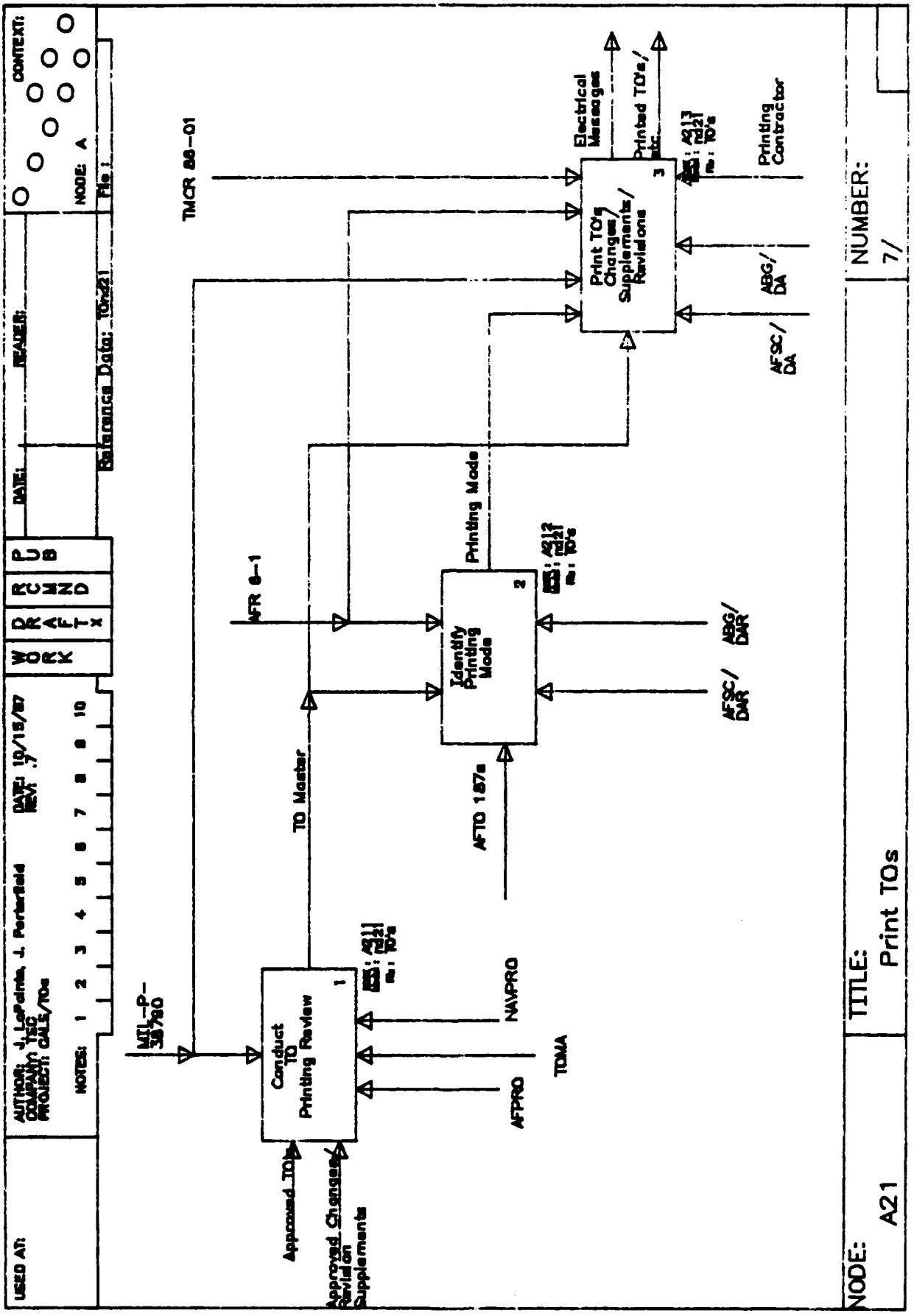


FIGURE 8. PRINT TOs

Box A213- Print TOs, Supplements, Changes, Revisions

The TO Master is reproduced by either the DA or a GPO-approved printing contractor. The AFLC/DA is supported at each ALC by the ABG/DA. If printing is contracted, the GPO Regional Office will administer the printing contractor. Immediate action Time Compliance Technical Orders (TCTOs), Interim Safety Supplements, and Interim Operational Supplements are normally sent out electronically. These electrical messages are followed by a "hard copy" TCTO. or supplement. (Note: Interim Immediate Action TCTOs are processed according to the AFLC/AFSC Regulation 8-3, Processing Interim Technical Orders.)

INPUTS: TO Master.

CONTROLS: AFR 8-2, MIL-P-38790, TMCR 86-01, AFR 6-1, AFLC 6-1 Sup, AFLC/AFSC 8-3, and AFLC 8-4.

OUTPUT: Hard copies of TOs, Changes (or Revisions) and Supplements, or Electrical Messages.

MECHANISMS: AFSC/DA, ABG/DA, and/or GPO Printing Contractor.

Node A22 - Distribute TOs

As soon as a TO Number has been assigned by OC-ALC/MMEDU, it will be registered in the appropriate TO Index. At this time, users justify their need for the TO(s) by completing and submitting an AFTO Form 187. The Technical Order Distribution Office (TODO), in turn, compiles all AFTO 187s and submits them to OC-ALC/MMEDU (see Figure 9). The activities associated with Distribute TOs are:

- Identify TO Distribution Requirements
- Affix Labels to TOs
- Mail TOs to TODOs
- Redistribute TOs to Users

Box A221 - Identify TO Distribution Requirements

For initial distribution, users requesting TOs identify their needs by completing and submitting an AFTO Form 187 to their respective TODO. Once approved, the TODO normally forwards the request to the Technical Order Requirements Unit at OC-ALC through the Automated Digital Information Network (AUTODIN). These messages are written to tape and delivered to the USAF Logistics Management of Technical Orders System (DSD G022) central processing unit site. TODOs without AUTODIN facilities mail their AFTO 187s to OC-ALC/MMEDU who enters the request into G022 through keypunch processing. Once the user's ID has been established in the system, s/he will automatically receive any future changes, supplements, and/or revisions associated with her/his requested TO(s). Mailing Labels (AFTO Form 273 for unclassified TOs or AFTO Form 274 for classified TOs) are provided to the Prime ALC.

NOTES: (1) A one-time requisition of a TO can be made using AFTO Form 276, Special Requisition for Air Force Technical Order. The AFTO 276 is only used by TODOs to requisition TO changes for 120 days after a change is listed in a TO Index.

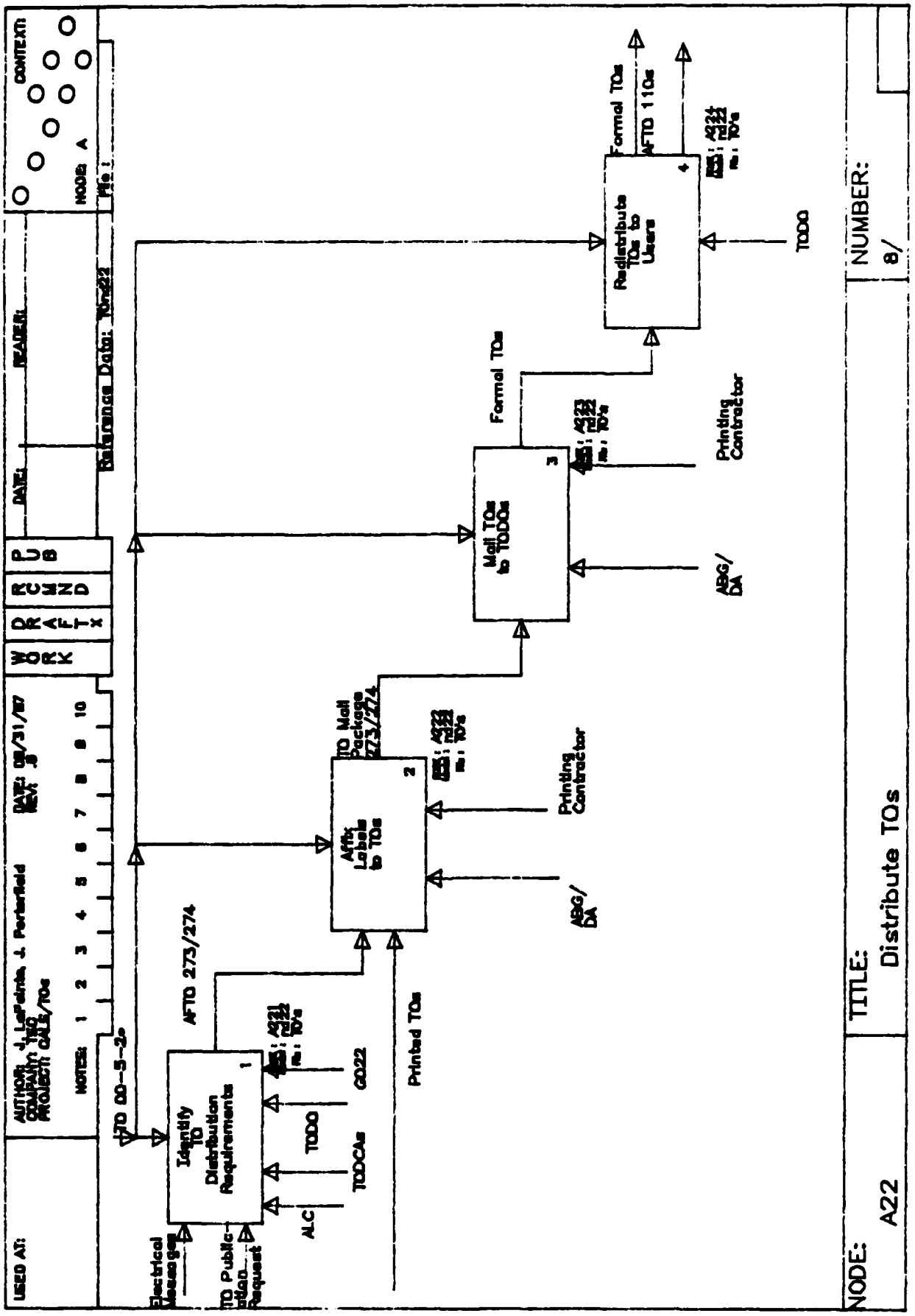


FIGURE 9. DISTRIBUTE TOs

(2) Requisition shipments resulting from ADP action are made using AFTO Form 221 (ADP Requisition for AFTO).

(3) At times, TODOs forward special requests for TOs to the Prime ALC.

(4) Recipients of immediate actions, TCTOs, are identified through G022.

(5) Users use the TO indexes for status and information on TOs.

(6) Mailing labels for classified TOs must be accompanied by an AF Form 310 (Document Receipt and Destruction Certificate) when the classified TO is Secret or above.

(7) "Hard copy" TCTOs are distributed using requirements established in the G022. Electrical message Interim TCTOs are distributed according to message address lists maintained by the activities responsible for preparing the message (i.e., ALC/MM_R).

INPUTS: Printed TOs (includes electrical messages, changes/revisions, and supplements), AFTO 187, AFTO 221, AFTO 273/274, AFTO 276, and AFTO 110 (including AFTO 110A and AFTO 110B).

CONTROLS: AFR 8-2, AFLC 7-1, AFLC 8-4, AFLC 8-5, TO 00-5-1, and TO 00-5-2.

OUTPUTS: Printed TOs, AFTO 273/274, AFTO 110 (including AFTO 110A and AFTO 110B).

MECHANISMS: Users, TODOs, OC-ALC/MMEDU, TODCAs, and G022.

Box A222 - Affix Labels to TOs

The mailing labels are affixed to the TO packages and prepared for shipping.

INPUTS: Printed TOs and AFTO Forms 273 or 274.

CONTROLS: AFR 8-2, TO 00-5-2, AFLC 8-4, AFLC 7-1 and AFLC 8-5.

OUTPUTS: TO Mail Packages.

MECHANISMS: AFSC/DA, ABG/DA, or GPO Printing Contractor.

Box A223 - Mail TOs to TODOs

The TO packages are mailed to the TODOs. Non-classified TOs are mailed third class, whereas classified TOs are mailed first class.

INPUTS: TO Mail Packages.

CONTROLS: AFR 8-2 and TO 00-5-2.

OUTPUTS: Printed TOs.

MECHANISMS: AFSC/DA, ABG/DA, or GPO Printing Contractor.

Box A224 - Redistribute TOs to Users

The TODOs redistribute the printed TOs (to accounts, i.e., TODAs) according to the information that has been recorded on the AFTO 110.

INPUTS: Printed TOs.

CONTROLS: AFR 8-2, TO 00-5-2, and AFTO 110.

OUTPUTS: Printed TOs and updated AFTO 110.

MECHANISMS: TODO.

Node A23 - Use TOs

Uses of TOs vary not only within the Air Force (i.e., training, maintaining weapon systems, etc.), but also outside the Air Force environment (i.e., teaching, maintaining weapon systems, etc.) (see Figure 10). Within the Air Force Using Commands, the means by which TOs are used also differs significantly. For example, a MAC weapon system may store its TOs on board because it may be away from its home base for upwards of two weeks. However, TOs supporting either a SAC bomber or a TAC fighter will be stored at its base since the flights are of shorter duration. The activities associated with Use TOs are:

- Operate AF Equipment or Material
- Install Equipment Part
- Perform Maintenance and Servicing
- Modify Equipment
- Train Personnel
- Reference TOs
- Sell TOs

Box A231 - Operate AF Equipment or Material

In support of the Air Force weapon systems, various types of TOs (i.e., Flight Manuals, Methods and Procedures, Abbreviated TOs, Index TOs, and Time Compliance Technical Orders) are developed. One category within technical manual type is a flight manual. Flight manuals are prepared in order to provide pilots sufficient information concerning aircraft equipment, characteristics, and operation.

INPUTS: Flight Manuals.

CONTROLS: AFR 8-2, AFR 60-9 (Flight Manual Program).

OUTPUTS: If necessary, AF 847 (Recommendations for Change in Publication).

MECHANISMS: Using Commands.

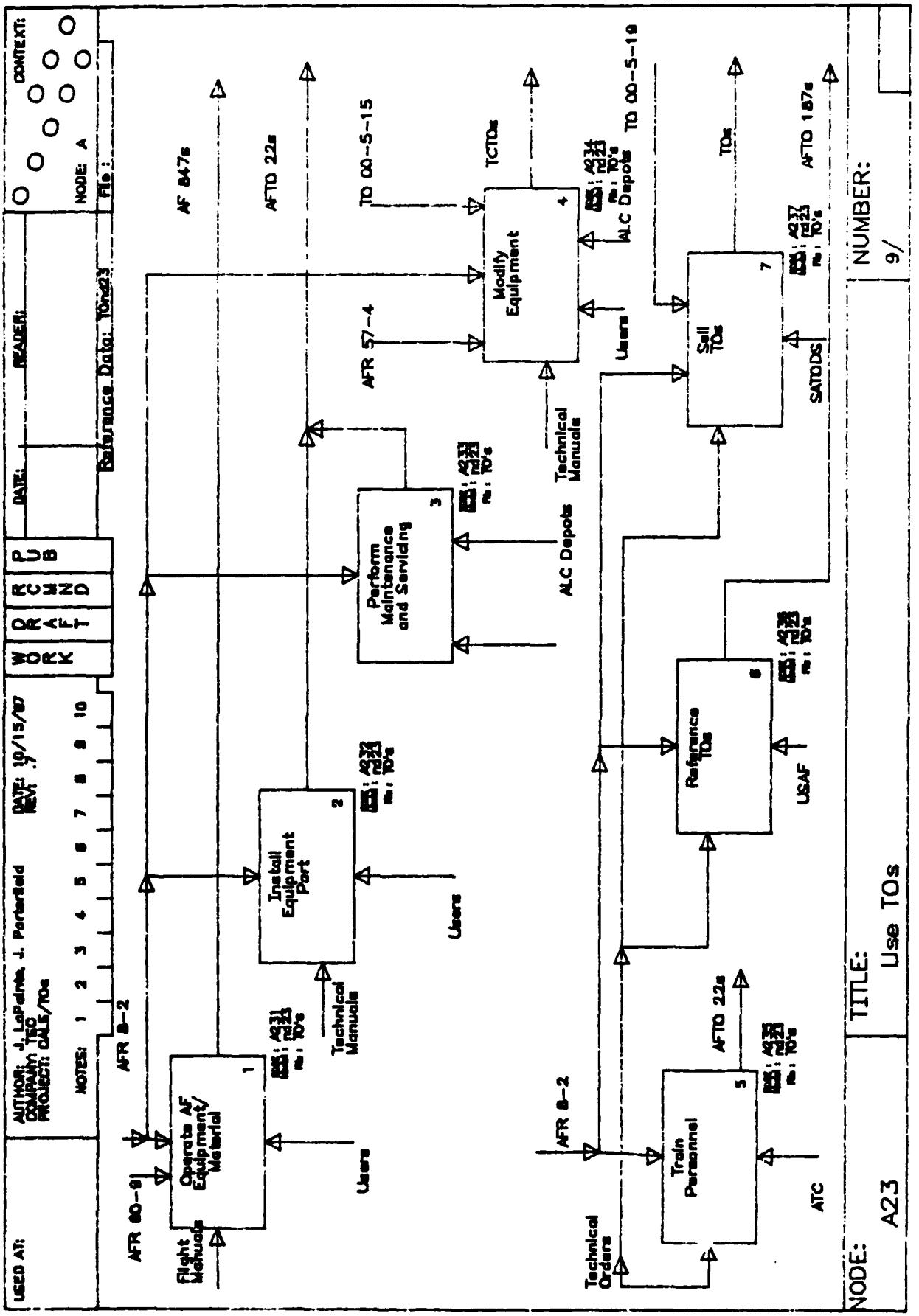


FIGURE 10. USE TOs

Box A232 - Install Equipment Part

Various categories of technical manuals provide instructions on how to install the components of a weapon system. Examples of technical manuals that contain this type of information are: Standard Installation Practices; Facility, Subsystem, and System Installation; some Job Guide Manuals; some Organizational Maintenance TOs; Other Equipment TOs; and General Engineering and Planning.

INPUTS: Technical Manuals.

CONTROLS: AFR 8-2.

OUTPUTS: If necessary, AFTO 22.

MECHANISMS: Using Commands.

Box A233 - Perform Maintenance and Servicing

The categories of Technical Manuals that provide support in maintenance of the weapons system include: Organizational Maintenance (for equipment installed on aircraft), Intermediate Maintenance (for maintenance performed at a user base), and Depot Maintenance (for overhaul maintenance performed at an ALC Depot). Also, Job Guide Manuals, Scheduled Inspection and Maintenance Manuals, Calibration Manuals, and Fault Isolation Manuals are some examples of maintenance and servicing TOs.

INPUTS: Technical Manuals.

CONTROLS: AFR 8-2.

OUTPUTS: If necessary, AFTO 22[6].

MECHANISMS: Using Commands and ALC Depots.

Box A234 - Modify Equipment

The primary means by which a weapons system or equipment supporting the weapons system can be modified is by a TCTO. The TCTOs provide the instructions for modifying equipment - other than temporary modifications authorized in AFR 57-4 (Modification Program Approval and Management). (NOTE: TCTOs are used for performing or initially establishing one-time inspections.) For equipment modification, it is essential that the TCTO kit (modified part) accompanies the TCTO[7].

INPUTS: Technical Manuals.

CONTROLS: AFR 8-2, AFR 57-4, TO 00-5-15.

OUTPUTS: TCTOs.

MECHANISMS: Using Commands and ALC Depots.

---

6 For an ALC depot only: In emergency work stoppage situations, an AFLC 103 (Nonconforming Technical Assistance Request and Reply) is prepared by maintenance. If approved, a "Special Handling" AFLC 252 may be used until a change or supplement can be prepared.

7 For Immediate Action and some Urgent Action TCTOs, they are released by electrical messages without regard to the kits or additional parts.

Box A235 - Train Personnel

One of the major uses of TOs is for training. Although the various MAJCOMs use TOs in this capacity, it is the Air Training Command (ATC) mission to recruit, train, and educate the Air Force personnel.[8] All types of TOs are used in training or instructing the Air Foce personnel as pilots, navigators, mechanics, etc. However, ATC must identify the TOs that are intended for use in the training courses.

INPUTS: Technical Orders.

CONTROLS: AFR 8-2.

OUTPUTS: If necessary, AFTO 22.

MECHANISMS: MAJCOMs, specifically ATC.

Box A236 - Reference TOs

Another use of TOs is for referencing. The TO Indexes identify the majority of TOs used in the Air Force.[9] Furthermore, TOs are grouped in various combinations (i.e., List of Applicable Publications - provide a list of TOs applicable to a system/equipment, Cross Referencing TOs, etc.). Another example of Reference TOs is the Illustrated Parts Breakdown (IPB) TOs. These IPBs contain a listing of part numbers, names, and other information needed to get the parts required to maintain a piece of equipment.

INPUTS: Technical Orders.

CONTROLS: AFR 8-2.

OUTPUTS: AFTO 187s.

MECHANISMS: USAF.

Box A237 - Sell TOs

Selling represents another use of TOs. Technical Orders are sold to other U. S. Government agencies, the U. S. public, and also to foreign countries to support the foreign military sales of weapons systems. The Security Assistance Technical Order Distribution System (SATODS) has been established in order to obtain reimbursements for the TOs sold overseas.

INPUTS: Technical Orders.

CONTROLS: AFR 8-2, and TO 00-5-19.

OUTPUTS: Technical Orders.

MECHANISMS: SATODS

---

[8] Basically all enlisted members and approximately 90% of new officers receive their first training at ATC.

[9] Special Weapons TOs and Series 33 L TOs are not registered in the TO Indexes.

Node A24 - Modify TOs

Basically, TOs can be modified by various means: supplements, augmenting or changing data within paragraphs or sections contained in the basic TO; changes, replacing pages in the basic TO; revisions, producing a second or subsequent edition of the TO; or TCTO, providing instruction for equipment modifications or establishing one-time inspections (see Figure 11). The activities associated with Modify TOs are:

- Prepare Publication Change Request (PCR)
- Identify Problem
- Conduct Post-publication Review
- Prepare Engineering Change Proposal (ECP)
- Review and Approve Request
- Draft Corrected/New Pages
- Review/Validate/Verify Modified TOs (including TCTOs)

Box A241 - Prepare Publication Change Request (PCR)

During the Acquisition Phase, for changes and improvements to Preliminary TOs which have been authorized for operational or maintenance use of a Weapons System/Equipment, an AFTO Form 27, Technical Order System Publication Change Request (PCR), must be submitted. AFTO 27s are normally reviewed and processed by the Central Technical Order Control Unit (CTOCU) whose chairmanship has been designated by AFSC.

INPUTS: Printed TOs.

CONTROLS: AFR 8-2 and TO 00-5-1.

OUTPUTS: Recommended TO changes.

MECHANISMS: AFSC and CTOCU.

Box A242 - Identify Problem

For recommending improvements to formal TOs, a user will prepare an AFTO Form 22, Technical Order System Improvement Report. AFTO 22s are normally used for reporting deficiencies or inaccuracies of a technical nature or recommending a specific TO improvement. All emergency AFTO 22s should be submitted to the organization responsible for the TO with an information copy forwarded to the user's MAJCOM Control Point. Urgent and routine AFTO 22s should be forwarded to the user's MAJCOM TO Control Point. (Note: For Flight Manuals, an AF Form 847, Recommendation for Changes in Publication, is used in lieu of AFTO 22.)

INPUTS: Printed TOs.

CONTROLS: AFR 8-2 and TO 00-5-1.

OUTPUTS: AFTO 22 or AF 847, and identification of the affected Weapon System/Equipment.

MECHANISMS: Using Command and ALC Depots.

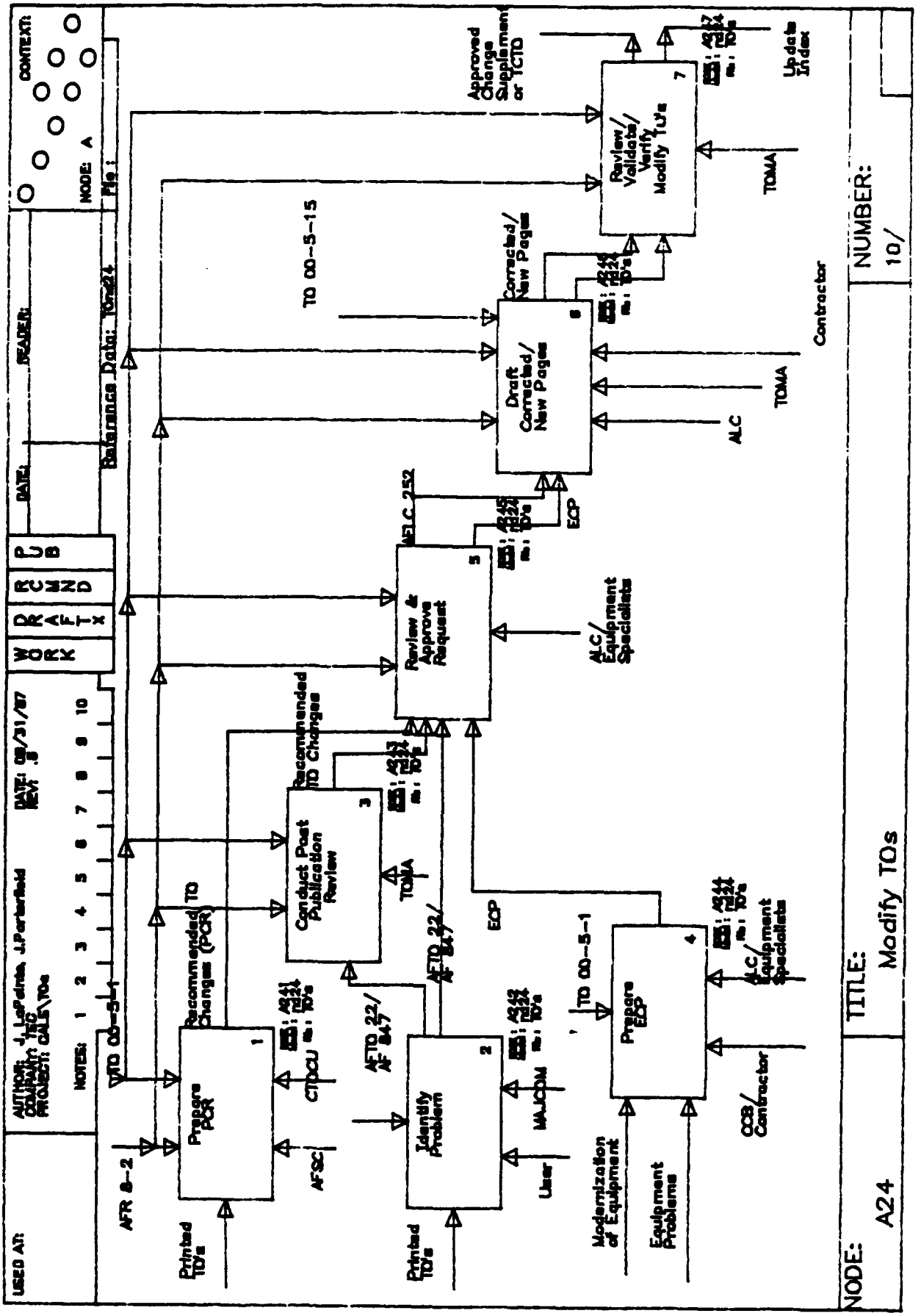


FIGURE 11. MODIFY TOs

Box A243 - Conduct Post-publication Review

Post-Publication Reviews are performed after the formal TO has been delivered to the using command. There are two types of Post-publication Reviews: Command Reviews and Currency Reviews. The need for the Command review is determined by the TOMA and/or MAJCOM. The decision is based on following factors: (a) the number of modifications made to the affected equipment, (b) the TO changes required because of the modifications, and (c) the number of AFTO 22s and AF 847s received. Currency reviews are reviewed by those responsible for the technical content of the TO. Unclassified TOs are reviewed when they have not been modified within a three-year time frame. Classified TOs are reviewed if they have not been modified within a one-year time frame.

INPUTS: Printed TOs, and AFTO 22s or AF 847s.

CONTROLS: AFR 8-2, AFLC 8-4, and TO 00-5-1.

OUTPUTS: Recommended TO changes.

MECHANISMS: TOMA and Using Commands.

Box A244 - Prepare Engineering Change Proposal (ECP)

All Engineering Change Proposals (ECPs) must be approved by the Configuration Control Board (CCB). After PMRT, the ALC Equipment Specialist prepares an Engineering Change Proposal (ECP) whenever an equipment problem arises that requires either new instructions or modification(s) to that equipment. Equipment modernization also requires that an ECP be prepared.

INPUTS: Modernization of Equipment, Equipment Problems.

CONTROLS: AFR 8-2, AFLC 8-4, and TO 00-5-1.

OUTPUTS: ECP.

MECHANISMS: Contractor and CCB, or ALC Equipment Specialist.

Box A245 - Review and Approve Request

The Prime ALC Technical Content Manager (Equipment Specialist, Flight Manual Manager, etc.), sometimes with assistance from the appropriate contractor, reviews and approves the AFTO 22s and AF 847s. An AFLC Form 252, Technical Order Publication Change Request, is prepared for each problem. Several AFTO 22s or AF 847s relating to the same problem should be incorporated in one AFLC 252.

INPUTS: AFTO 22 or AF 847, and identification of the affected Weapons System/Equipment.

CONTROLS: AFR 8-2 AFLC 8-4,and TO 00-5-1.

OUTPUTS: AFLC 252.

MECHANISMS: TOMA, Prime ALC Technical Content Manager and Contractor.

Box A246 - Draft Corrected/New Pages

If required from the recommendations and publication reviews, corrected and/or new pages are drafted. Prior to PMRT, it is the responsibility of the TOMA and the printing contractor to prepare the corrected or additional pages. After PMRT, the Prime ALC TOMA is responsible for drafting new and/or modified (i.e., change or supplemental) pages. If the TO has been subjected to several changes and/or supplements, a decision concerning revisions to the TO will be made.

INPUTS: Recommended TO Changes and/or AFLC 252.

CONTROLS: AFR 8-2, AFR 6-1, AFLC 6-1 Sup, AFLC 8-4, and TO 00-5-1.

OUTPUTS: Corrected/New Pages or Revised TO.

MECHANISMS: TOMA, Technical Content Managers at the ALCs, and the Automated Technical Order System (ATOS). (NOTE: ATOS phase I purpose is to automate the publication of TO Change pages.)

Box A247 - Review/Validate/Verify Modified TOs (including TCTOs)

The Modified TOs (including TCTOs) are reviewed, validated, and verified by the responsible organization (i.e, TOMA, and Contractor). Once approved, the modified TO is prepared for printing and distribution (See activities associated with Node A21 and A22). The appropriate TO indexes are updated with the modification date.

INPUTS: Draft TCTO or Draft of Modified TO.

CONTROLS: AFR 8-2, AFLC/AFSC 8-3, AFLC 8-4, TO 00-5-1, and TO 00-5-15.

OUTPUTS: Approved TCTO or Modified TO and updated TO Indices.

MECHANISMS: Depending on responsibility: TOMA. Also, G022.

6.0 MANAGE TOs

GLOSSARY

Node A3 - Manage TOs

A key ingredient to the success of the TO Process is effective management. The complexity of the Air Force Weapons System makes it nearly impossible for an individual organization to have total knowledge/expertise in all of the areas associated with the TO Process. However, proper coordination between all organizations will yield coherent and technically accurate TOs. In general, it is the TOMA responsibility to pull together the necessary resources required to acquire and maintain quality TOs. Many of the TOMA responsibilities have been discussed in the preceding two sections. This section will describe two more functions (budgeting and cataloging) in which the TOMA and the TO Distribution Control Authority (TODCA) are actively involved. Grouped under Manage TOs, these functions are performed during the entire lifecycle of the TO process (see Figure 12).

Box A31 - Budget TOs

It is the TOMA responsibility to estimate the costs associated with acquiring the TOs necessary for the support of the weapons system. Normally, historical information from other acquisition programs and past experience are baseline figures for arriving at a budget. This cost information is reported on DI-TMSS-80068 (Report of Technical Manual Cost). The acquiring agency with support from the appropriate MAJCOM is responsible for the cost of acquiring TOs. After PMRT, costs associated with the completion of the acquisition phase of TOs and/or the reproduction of existing TOs due to changes or revisions are financed by operation and maintenance funds.

INPUTS: Contract Line Item Number

CONTROLS: AFR 5-1 (Air Force Publications Management Program), AFR 8-2, AFR 800-4 (Transfer of Program Management Responsibility), AFR 800-6 (Acquisition Management - Program Management - Financial), TO 00-5-1, and AFLC 8-4.

OUTPUTS: Funding Requirements.

MECHANISMS: SPO/TOMA, ALC/TOMA, and MAJCOM.

Box A32 - Catalog TOs.

As soon as a requested TO number has been approved, the cataloging process for that TO commences. The TO Indexes must be updated with information concerning the forthcoming TO. Other activities included as part of this function are: screening requests for TOs, preparing publication status reports, tracking change requests, and managing TO publications stock.

INPUTS: AFLC 189s and AFLC 190s.

CONTROLS: AFR 8-2, AFLC 8-4, and AFLC 8-5.

OUTPUTS: TO Indexes and various Status Reports.

MECHANISMS: SPO/TOMA, ALC/TOMA, and MAJCOM.

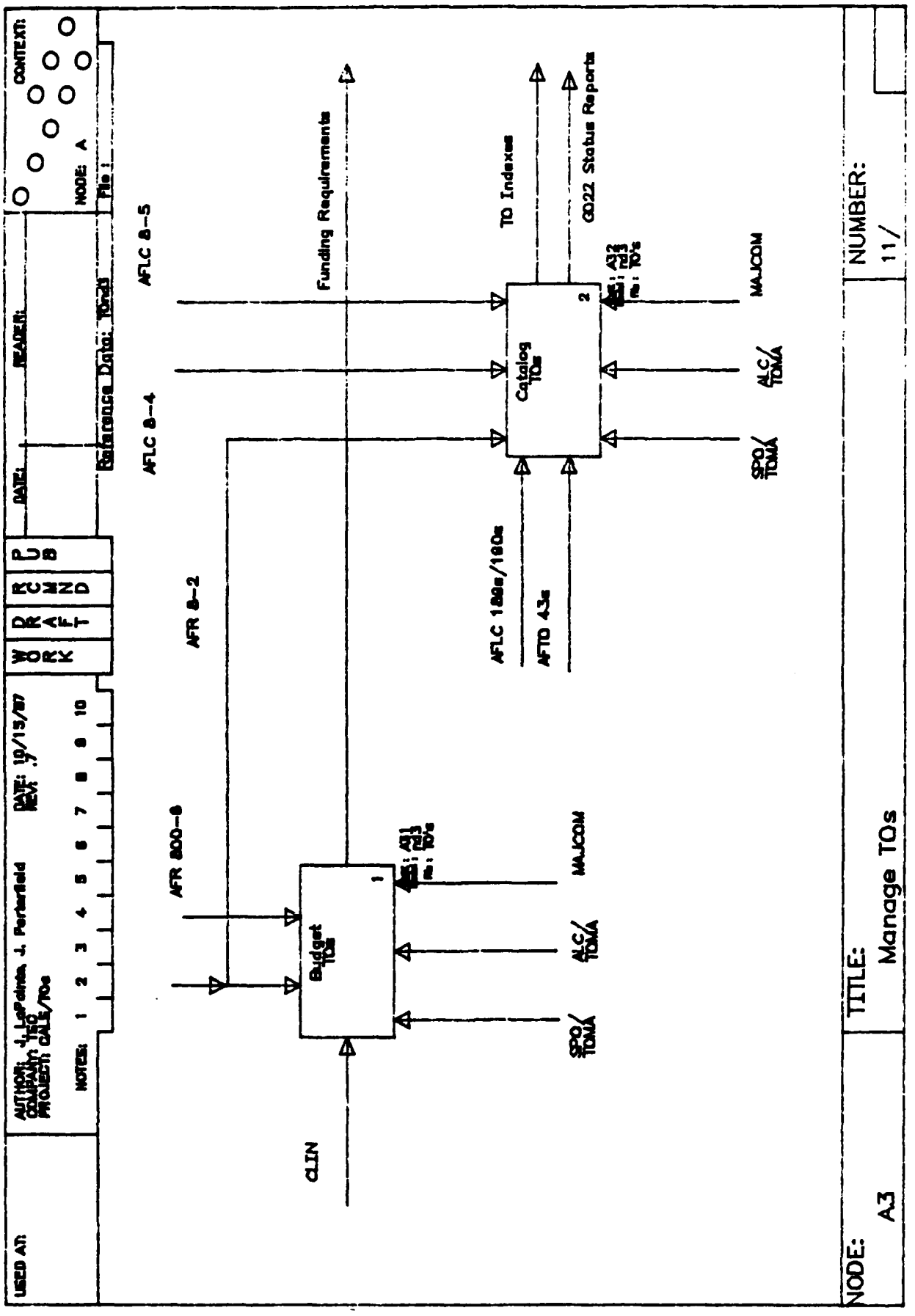


FIGURE 12. MANAGE TOs

Node A31 - Budget TOs

Costs associated with acquiring TOs increase with the complexity of the weapons system. For instance, the B-1B Weapons System will require 1,000,000 pages of technical data. Past history indicates that a single page of technical data can cost $500. However, the need for quality TOs often conflict with the demands for a limited budget (see Figure 13). The activities associated with Budget TOs are:

- Acquire Initial Procurement
- Prepare Reproducible Master
- Reproduce TOs
- Obtain Commercial Publications

Box A311 - Acquire Initial Procurement

The SPO/TOMA budgets and funds for all TOs required to support the new weapons system. At times, included are travel funds associated with the review/validation/ verification activities in the TO Process.

INPUTS: Contract Line Item Number

CONTROLS: AFR 5-1, AFR 8-2, AFR 800-4, AFR 800-6, TO 00-5-1, and AFLC 8-4.

OUTPUTS: Funding Requirements.

MECHANISMS: SPO/TOMA and MAJCOM.

Box A312 - Prepare Reproducible Master

After PMRT and for formal TOs, costs associated with preparing reproducible masters and the required copies normally are funded with operation and maintenance dollars. Any supplement, change, or revision to the TOs is also funded through the same mechanism.[10]

INPUTS: Contract Line Item Number

CONTROLS: AFR 5-1, AFR 8-2, AFR 800-6, TO 00-5-1,and AFLC 8-4.

OUTPUTS: Funding Requirements.

MECHANISMS: ALC/TOMA.

---

10 Not included are changes attributed to modifications or replenishment spares.

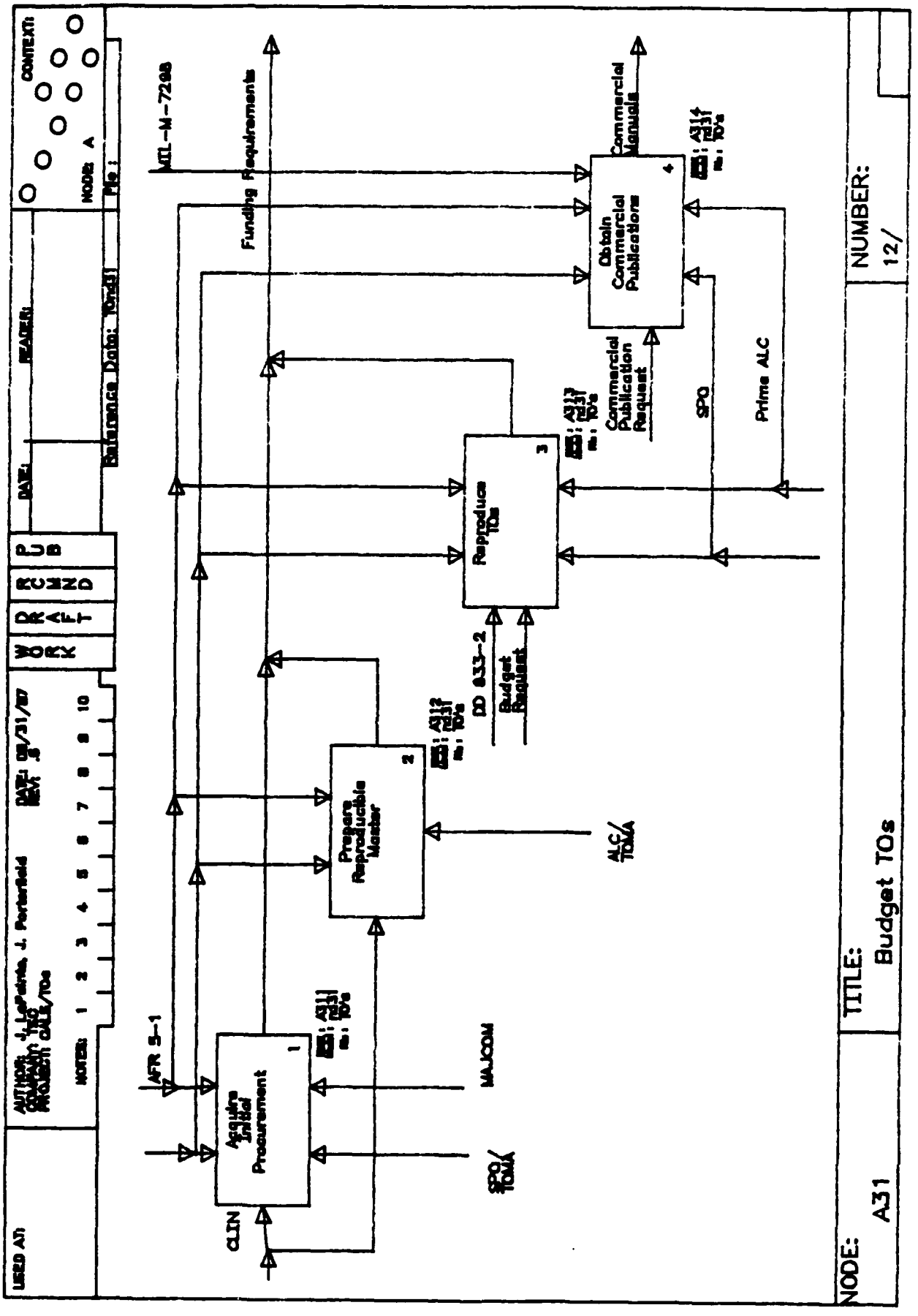


FIGURE 13. BUDGET TOs

Box A313 - Reproduce TOs

For initial acquisition, costs associated with the reproduction of TOs should be included in the program documents. Identified on the CDRL is a DD Form 633-2 (Contract Pricing Proposal). For TOs that support weapons systems that have been PMRT, it is the prime ALC responsibility for managing these costs.

INPUTS: For initial acquisition - DD Form 633-2, and after PMRT the prime ALC budget request.

CONTROLS: AFR 5-1, AFR 8-2, AFR 800-6, TO 00-5-1,and AFLC 8-4.

OUTPUTS: Funding Requirements.

MECHANISMS: For initial acquisition - SPO, and after PMRT - prime ALC.

Box A314 - Obtain Commercial Publications

These manuals are documents that are owned and furnished by the manufacturers. The commercial manuals normally contain technical information on the assembly, installation, operation, service, disassembly, overhaul, reassembly of equipment, and identification of parts. During the initial acquisition of the weapon system, commercial publications (when feasible) will be included as part of the equipment or item cost. After the procurement contract has been closed, these publications are purchased with O&M funds. Those commercial manuals that meet criteria established by MIL-M-7298 (Manuals, Technical: Commercial Equipment) will most likely be assigned a TO Number and included in the TO System.

INPUTS: Commercial Publications Request.

CONTROLS: AFR 5-1, AFR 8-2, TO 00-5-1, and AFLC 8-4. Also, MIL-M-7298.

OUTPUTS: Commercial Manuals.

MECHANISMS: For initial acquisition - SPO, and after PMRT - prime ALC.

Node A32 - Catalog TOs

This function includes those activities which are relevant to the numbering, indexing, managing the distribution, and improving the Air Force TO System (see Figure 14). The activities associated with Catalog TOs are:

- Assign TO Distribution Code Numbers
- Assign TO Number
- Control Initial Distribution of Requisition Requests
- Update TO Indexes
- Track Change Requests
- Prepare Publication Status Reports
- Manage TO Publications Stock

Box A321 - Assign TO Distribution Code Numbers

All requests for establishing a TODO Code must be submitted to OC-ALC/MMEDU for approval using an AFTO Form 43 (Request for USAF Technical Order Distribution Code Assignment or Change). It is necessary to establish a TODO account prior to any requests for TOs. (NOTE: Once approved, it is the prime ALC's TODCA responsibility to determine if the TODO is authorized to receive the requested TOs.)

INPUTS: AFTO 43.

CONTROLS: AFR 8-2, TO 00-5-1, TO 00-5-2, and AFLC 8-5.

OUTPUTS: Approved AFTO 43.

MECHANISMS: OC-ALC/MMEDU.

Box A322 - Assign TO Number

As CFE Notices are received by the TOMA, they are forwarded to the prime ALC for review. If approved, the prime ALC's MMEDT completes an AFLC 189 and AFLC 190, and in coordination with OC-ALC/MMEDU assigns a TO Number.

INPUTS: CFE Notices.

CONTROLS: AFR 8-2, TO 00-5-1, TO 00-5-2, and AFLC 8-5.

OUTPUTS: Approved AFLC 189s and AFLC 190s.

MECHANISMS: OC-ALC/MMEDU and prime ALC.

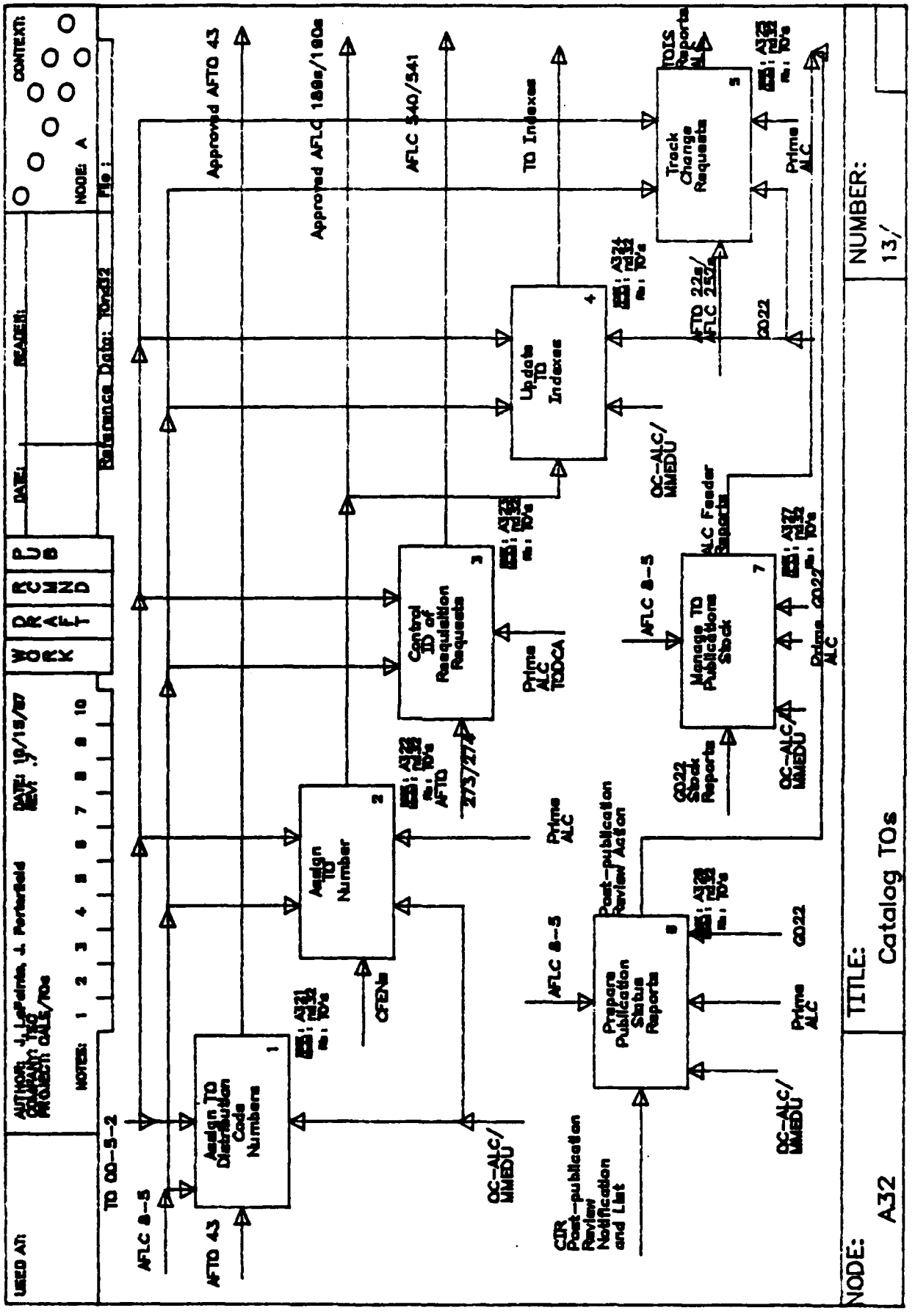


FIGURE 14. CATALOG TOs

Box A323 - Control Initial Distribution of Requisition Requests

The prime ALC's TODCA has the responsibility to perform all required screening and to manage the release of the distribution instructions along with any special distribution instructions. Furthermore, the TODCA may request the deck of mailing labels (representing the ID requests) to verify that the TODO is authorized to receive the requested TO(s). The management criterion that was developed is recorded on AFLC Form 540 (TODCA TO Management Record).11

INPUTS: Mailing Labels (AFTO 273/274).

CONTROLS: AFR 8-2, TO 00-5-1, TO 00-5-2, and AFLC 8-5.

OUTPUTS: AFLC 540 or AFLC 541.

MECHANISMS: Prime ALC TODCA.

Box A324 - Update TO Indexes

With the issuance of Index TOs, the users have a means of selecting their required TOs. There are various types of TO Indexes including: TO Indexes for each category of TOs (TO 0-1-XX); Cross-reference Table of TCTO Numbers to Applicable Data Code Numbers (TO 0-4-2); Cross-reference of Equipment Numbers to TO Numbers (TO 0-4-6-2); and List of Applicable Publications. The TO Indexes show the status of all TOs. Because of the current and pertinent information contained in these TOs, they are updated frequently. The listing of a TO in the TO Indexes commences with the approval of an AFLC 189 and AFLC 190.

NOTES: (1) The TO Indexes are updated by OC-ALC/MMEDU based on TO activity within the TO category.

(2) List of Applicable Publications is an index-type TO, numbered in the aircraft category and updated as needed by the ALC prime for the related aircraft.

(3) Information on the AFLC 190 is essential to the maintenance of TO 0-4-6-2.

INPUTS: AFLC 189.

CONTROLS: AFR 8-2, TO 00-5-1, TO 00-5-2, and AFLC 8-5.

OUTPUTS: TO Indexes.

MECHANISMS: OC-ALC/MMEDU and G022

---

11 Other information recorded on the AFLC 540 and 541 include TO Reprint Status and receipt data, and issue records for special control TOs.

Box A325 - Track Change Requests

An AFTO Form 22 is used for recommending changes (of a technical nature) to any AF Technical Order. Once approved by the prime ALC, an AFLC Form 252 is prepared by the Technical Content Manager responsible for the TO. It is the prime ALC/MMEDT responsibility for monitoring the processing and evaluation of AFTO 22 and providing this information to the G022 central processing unit at OC-ALC. Status reports such as Technical Order Improvement System (TOIS) Transactions Processed, TOIS Improvement Report Master, and TOIS Resolution Date Notice are products from the G022.

INPUTS: AFTO 22(s) and its corresponding AFLC 252(s).

CONTROLS: AFR 8-2, TO 00-5-1, TO 00-5-2, and AFLC 8-5.

OUTPUTS: TOIS Transactions Processed, TOIS Improvement Report Master, and TOIS Resolution Date Notice.

MECHANISMS: Prime ALC MMEDT, MM_R, and G022.

Box A326 - Prepare Publication Status Reports

As an output of the Centralized Inventory and Master Record (CIR) subsystem (of the G022 System), Publication Status Reports provide the prime ALC with status and notification of those TOs requiring review. This Post-publication review notice is printed when no action has been taken on unclassified TOs for three years and/or classified TOs for one year.

INPUTS: CIR Post-publication Review Notification and List.

CONTROLS: AFR 8-2, TO 00-5-1, TO 00-5-2, and AFLC 8-5.

OUTPUTS: Post-publication Review Action.

MECHANISMS: OC-ALC/MMEDU, G022, and prime ALC.

Box A327 - Manage TO Publications Stock

There are approximately 150 reports that are generated monthly by the G022 system. Of these, several are generated for the purpose of assisting the prime ALC TODCA in managing the TO stock level. Some of these reports are: TODCA Notice Backorder Reached (only for those TOs where the stock balance in the G022 system has reached the minimum reserve level), Technical Order Reprint (only for those TOs where the stock balance in the G022 system has reached the reprint level plus minimum reserve level), and Technical Order Storage and Issue Report (used for workload statistics, status of backorders, reprint actions, data on new TO procedures, number of prime TOs assigned by kinds and types, and management action to expedite TO delivery and orientation of G022 records). It is the TODCA responsibility to respond (if required) to these reports (i.e., ALC Feeder Reports).

INPUTS: TODCA Notice Backorder Reached, Technical Order Reprint, and Technical Order Storage and Issue Report.

CONTROLS: AFR 8-2, TO 00-5-1, TO 00-5-2, and AFLC 8-5.

OUTPUTS: ALC Feeder Reports.

MECHANISMS: OC-ALC/MMEDU and prime ALC. Also, G022.

7.0 ORGANIZATIONAL ASSESSMENT

This section represents a broad overview of the organizational roles in the TO Process. The matrices included in this section depict and map AF organizations/units to the TO functions that were earlier described. The matrices emphasize the roles of the organizations located at the Air Logistics Centers. After PMRT, the ALCs assume managerial responsibility both administratively and technically for the TOs. In addition, the ALCs are actively involved in the process prior to PMRT. Furthermore, an improved, automated TO system would significantly impact the current organizational structure and role of the ALC.

This organizational assessment includes both physical AF organizational units (i.e., AFSC/ASD, AFLC/MMT, ALC/MMEDT, etc.) and those logical units that are composed in order to support the TO process (i.e., SPO/TOMA, TORRB, TODO, etc.). Also, included in this latter list is the G022 computer system located at OC-ALC.

Table 2 is a list which defines the organizational terms used in the matrices.

TABLE 2

PARTICIPATING ORGANIZATIONS/UNITS

	HQ USAF	Headquarters United States Air Force	
AFSC	AFSC	Air Force Systems Command	
	ASD	Aeronautical System Division	
	ESD	Electronic Systems Division	
	AFSC/DA	AFSC/Director of Administration	
	AD	Armament Division	(not shown)
	AMD	Aerospace Medical Division	(not shown)
	SP	Space Division	(not shown)
	BMO	Ballistic Missile Office	(not shown)
AFLC/ALC	AFLC	Air Force Logistic Command	
	AFLC/MMT	AFLC/Directorate of Reliability, Maintainability, and Technology Policy	
	ALC	Air Logistics Center	
	AGMC	*Aerospace Guidance and Metrology Center*	
	MMEDT	TO System Section (at an ALC)	
	MLMT	TO System Section (at AGMC)	
	MMEDU	TO System Section - Central Management Office at OC-ALC	
	MRED	Security Assisted TO Distribution System Office (at an ALC)	
	MM_R	Engineering/Planning Branch (at an ALC)	
	MM_M	Logistics Management Branch (at an ALC)	
	MAAT	Technical and Engineering Branch (at an ALC)	
	MA_P	Production Branch (at an ALC)	
	MAQ_	Quality Assurance Branch (at an ALC)	
	MA_E	Maintenance Engineering/Planning (at an ALC)	
	AFOTEC	Air Force Operational Test and Evaluation Center	
	AFCC	Air Force Communication Command	
	ATC	Air Training Command	

Using Commands	MAC	Military Airlift Command	
	SAC	Strategic Air Command	
	TAC	Tactical Air Command	
	AAC	Alaskan Air Command	(not shown)
	PACAF	Pacific Air Forces	(not shown)
	USAFE	United States Air Force in Europe	(not shown)

Composed Units	ABG DA	Air Base Group, Director of Administration
	SPO/TOMA	Systems Program Office, TO Management Agency
	ALC/TOMA	ALC, TO Management Agency
	TODCA	TO Distribution Control Authority
	DMO	Data Management Office
	TORRB	TO Requirements Review Board
	CTOCU	Central TO Control Unit
	CCB	Configuration Control Board
	TODO	TO Distribution Office
	TODA	TO Distribution Account
	AFPRO	Air Force Plant Representative Office
	NAVPRO	Navy Plant Representative Office
	GPO	Government Printing Office
	G022	Logistic Management of TO System

TABLE 3. NODE A0 - TECHNICAL ORDER PROCESS

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM—R	MM—M	MAAT	MA—P	MAQ—	MA—E	AFOTEC	AFCC-ATC	USING COMMANDS	ARG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRS	CTOCU-CCB	G822	TODO-TODA	ASPRO-NAVPRO	GPO	CONTRACTORS
A1 - CREATE TOs	●	●			●		●		●	●					●	●	●		●			●	●	●	●				●
A2 - DEPLOY TOs		●1	●1	●	●	●	●	●	●		●	●	●	●		●	●	●2	●1	●2	●			●1	●	●	●	●	●
A3 - MANAGE TOs	●	●1		●2	●	●	●												●1	●	●				●	●			

1 Prior to PMRT
2 After PMRT

TABLE 4. NODE A1 - CREATE TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM_R	MM_M	MAAT	MA_P	MAQ_	MA_E	AFOTEC	AFCC-ATC	USING COMMANDS	ABG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCB	G822	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A11 - Plan TOs	●	●			●		●		●	●					●	●	●		●			●	●						
A12 - Develop TOs		●			●		●		●						●	●	●		●										●
A13 - Review TOs		●			●		●		●						●	●	●		●					●					●

1 Prior to PMRT
2 After PMRT

TABLE 5. NODE A11 - PLAN TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM_R	MM_M	MAAT	MA_P	MAQ_	MA_E	AFOTEC	AFCC-ATC	USING COMMANDS	ABG-DA	SPO-TOMA	ALC-TOMA	TODCA	OMO	TORRB	CTOCU-CCB	GB22	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A111 - Prepare SON																	●												
A112 - Approve SON	●																												
A113 - Establish SPO/ TOMA	●	●																											
A114 - Establish TO Concepts & Constraints	●	●																	●										
A115 - Initiate Data Calls		●		[1]	●														●			●							
A116 - Define TO Requirements		●			●		●		●	●					●	●	●		●			●							
A117 - Coordinate TO Requirements		●			●		●		●	●					●	●	●		●			●	●						
A118 - Develop Contract TO Requirements		●																	●										

1 Prior to PMRT
2 After PMRT

TABLE 6. NODE A12 - DEVELOP TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM-B	MM-M	MAAT	MA-P	MAQ-	MA-E	AFOTEC	AFCC-ATC	USING COMMANDS	ARG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCB	6922	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A121 - Award Contract		●																	●										
A122 - Conduct TO Guidance Conference		●			●		●		●						●	●	●		●										●
A123 - Prepare TO Schedules & Milestones		●																	●										●
A124 - Prepare TOs																													●
A125 - Conduct In-Process Reviews		●			●		●		●						●	●	●		●										●

1 Prior to PMRT
2 After PMRT

TABLE 7. NODE A13 - REVIEW TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM_R	MM_M	MAAT	MA_P	MAQ_	MA_E	AFOTEC	AFCC-ATC	USING COMMANDS	ARG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCB	G822	TODO-TODA	ASPRO-NAVPRO	GPO	CONTRACTORS
A131 - Validate TOs		●																	●										●
A132 - Verify TOs		●		[1]	●		●		●						●	●	●		●					●					
A133 - Perform Pre-Publication Review		●			●		●		●								●		●										

1 Prior to PMRT
2 After PMRT

TABLE 8. NODE A2 - DEPLOY TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM-R	MM-M	MAAT	MA-P	MAQ-	MA-E	AFOTEC	AFCC-ATC	USING COMMANDS	AEG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCB	6922	TODO-TODA	AFPRO-NAVPRO	SPO	CONTRACTORS
A21 - Print TOs		●1	●1		●2		●2											●2									●	●	●
A22 - Distribute TOs			●1		●	●	●									●	●	●2			●				●	●			●
A23 - Use TOs		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●				●	●			●
A24 - Modify TOs		●1			●2		●		●		●	●	●	●		●	●		●1	●2				●1					●

1 Prior to PMRT
2 After PMRT

TABLE 9. NODE A21 - PRINT TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM-R	MM-M	MAAT	MA-P	MAQ-	MA-E	AFOTEC	AFCC-ATC	USING COMMANDS	ABG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORBB	CTOCU-CCB	G822	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A211 - Conduct TO Printing Review		●1			●2		●2												●1	●2							●1		
A212 - Identify TO Printing Mode			●1															●2											
A213 - Print TOs, Supplements Changes Revisions			●1															●2										●	●

1 Prior to PMRT
2 After PMRT

TABLE 10. NODE A22 - DISTRIBUTE TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM_R	MM_M	MAAT	MA_P	MAQ_	MA_E	AFOTEC	AFCC-ATC	USING COMMANDS	ASG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCB	4822	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A221 - Identify TO Distribution Requirements					●	●	●									●	●				●				●	●			
A222 - Afix Labels to TOs			●[1]															●[2]											●
A223 - Mail TOs to TODOS			●[1]															●[2]											●
A224 - Redistribute TOs to Users																										●			

1 Prior to PMRT
2 After PMRT

TABLE 11. NODE A23 - USE TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM—R	MM—M	MAAT	MA—P	MAQ—	MA—E	AFOTEC	AFCC-ATC	USING COMMANDS	ARG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCB	G822	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A231 - Operate AF Equipment/ Material																●	●												
A232 - Install Equipment Part					●						●					●	●												●
A233 - Perform Maintenance and Servicing											●					●	●												
A234 - Modify Equipment					●						●					●	●												
A235 - Train Personnel																●	●												
A236 - Reference TOs		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●				●	●			●
A237 - Sell TOs								●												●	●				●				

1 Prior to PMRT
2 After PMRT

TABLE 12. NODE A24 - MODIFY TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM—R	MM—M	MAAT	MA—P	MAQ—	MA—E	AFOTEC	AFCC-ATC	USING COMMANDS	AEG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORR	CTOCU-CCB	G822	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A241 - Prepare PCR		●1																	●1					●1					
A242 - Identify Problem											●	●	●	●	●	●	●												
A243 - Conduct Post-Publication Review		●1			●				●								●2		●1	●2									●
A244 - Prepare ECP									●															●1					●
A245 - Review and Approve Request		●1							●										●1										
A246 - Draft Corrected TO Pages		●1			●2		●2		●2										●1	●2									●
A247 - Review/ Validate/Verify Modify TOs		●1			●2														●1	●2					●				

1 Prior to PMRT
2 After PMRT

TABLE 13. NODE A3 - MANAGE TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM_R	MM_M	MAAT	MA_P	MAQ_	MA_E	AFOTEC	AFCC-ATC	USING COMMANDS	ABG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCB	G822	TODO-TODA	ASPRO-NAVPRO	GPO	CONTRACTORS
A31 - Budget TOs	●	●1		●2	●2	●	●2												●1	●2						●			
A32 - Catalog TOs					●	●	●													●	●				●				

1 Prior to PMRT
2 After PMRT

TABLE 14. NODE A31 - BUDGET TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	AFSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM—R	MM—M	MAAT	MA—P	MAQ—	MA—E	AFOTEC	AFCC-ATC	USING COMMANDS	ARG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCR	GB22	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A311 - Acquire Initial Procurement	●	●																	●										
A312 - Prepare Reproducible Master	●	●1		●2															●1	●2									
A313 - Reproduce TOs	●	●1		●2															●1	●2									
A314 - Obtain Commercial Publications	●	●1		●2															●1	●2									

1 Prior to PMRT
2 After PMRT

TABLE 15. NODE A32 - CATALOG TOs

ORGANIZATIONS/ FUNCTIONS	HQ USAF	ASSC-ASD ESD	AFSC-DA	AFLC-MMT	ALC-AGMC	MMEDU	MMEDT-MLMT	MRED	MM—R	MM—M	MAAT	MA—P	MAQ—	MA—E	AFOTEC	AFCC-ATC	USING COMMANDS	ARG-DA	SPO-TOMA	ALC-TOMA	TODCA	DMO	TORRB	CTOCU-CCB	GB22	TODO-TODA	AFPRO-NAVPRO	GPO	CONTRACTORS
A321 - Assign TO Distribution Code Numbers					•	•																			•				
A322 - Assign TO Number					•	•																			•				
A323 - Control Initial Distribution of Requsition Requests					•	•																			•				
A324 - Update TO Indices					•	•																			•				
A325 - Track Change Requests					•	•																			•				
A326 - Prepare Publication Status Reports					•	•																			•				
A327 - Manage TO Publications Stock					•																•								

1 Prior to PMRT
2 After PMRT

8.0 REGULATORY CONTROLS

The following two matrices associate key regulatory controls to their respective function(s). A more detailed list of the regulatory controls, including all appropriate military standards, can be found in Appendix B, Technical Order System References.

Listed below are those regulatory controls that will be definitely impacted by an automated Technical Order System. These regulatory controls are properly identified (by title) in Appendix B.

Air Force Regulations

AFR 6-1 and AFR 6-1 AFLC Sup 1

AFR 8-2

AFR 66-19

AFR 310-1

AFR 400-3

Air Force Logistics Command/Air Force System Command Regulations

AFLC/AFSCR 8-3

AFLC 8-4

AFLC 8-5

AFSCM 310-2

Air Force Technical Order System

TO 00-5-1

TO 00-5-2

TO 00-5-15

TO 00-5-18

TABLE 16. REGULATORY CONTROLS

REGULATIONS/ FUNCTIONS	AFR 5-1	AFR 6-1	AFR 8-2	AFR 12-32	AFR 57-1	AF 57-4	AFR 66-19	AFR 88-34	AFR 310-1	AFR 400-3	AFR 800-4	AFR 800-6	AFR 6-1 AFLC SUP 1	AFLC 7-1	AFLC/ AFSCR 8-3	AFLC 8-4	AFLC 8-5	AFSCM 310-2	MIL-M 38 784	MIL-P 38790	MIL-STD 1752	TO 00-5-1	TO 00-5-2	TO 00-5-15	TO 00-5-18	TM CR 86-01
A1 - CREATE TOs			•		•			•	•									•	•		•	•				•
A2 - DEPLOY TOs		•	•	•			•	•		•			•	•	•	•		•		•		•	•	•		•
A3 - MANAGE TOs	•		•								•	•					•					•	•		•	

REGULATORY CONTROLS

REGULATIONS/ FUNCTIONS	AFR 5-1	AFR 6-1	AFR 8-2	AFR 12-32	AFR 57-12	AFR 57-4	AFR 66-19	AFR 80-34	AFR 310-1	AFR 400-3	AFR 600-4	AFR 600-6	AFR 6-1 AFLC SUP 1	AFLC 7-1	AFLC/ AFSCR 8-3	AFLC 8-4	AFLC 8-5	AFSCM 310-2	MIL-M 38 784	MIL-P 38790	MIL-STD 1752	TO 00-5-1	TO 00-5-2	TO 00-5-15	TO 00-5-18	TM CR 86-81
A11 - Plan TOs			•		•				•									•				•				•
A12 - Develop TOs			•																•		•	•				•
A13 - Review TOs			•					•											•		•	•				•
A21 - Print TOs		•	•										•		•	•				•		•				•
A22 - Distribute TOs			•											•		•	•					•	•			
A23 - Use TOs			•	•		•	•	•		•						•						•				
A24 - Modify TOs		•	•			•							•		•	•						•		•		
A31 - Budget TOs	•		•								•	•				•						•				
A32 - Catalog TOs			•													•	•					•	•		•	

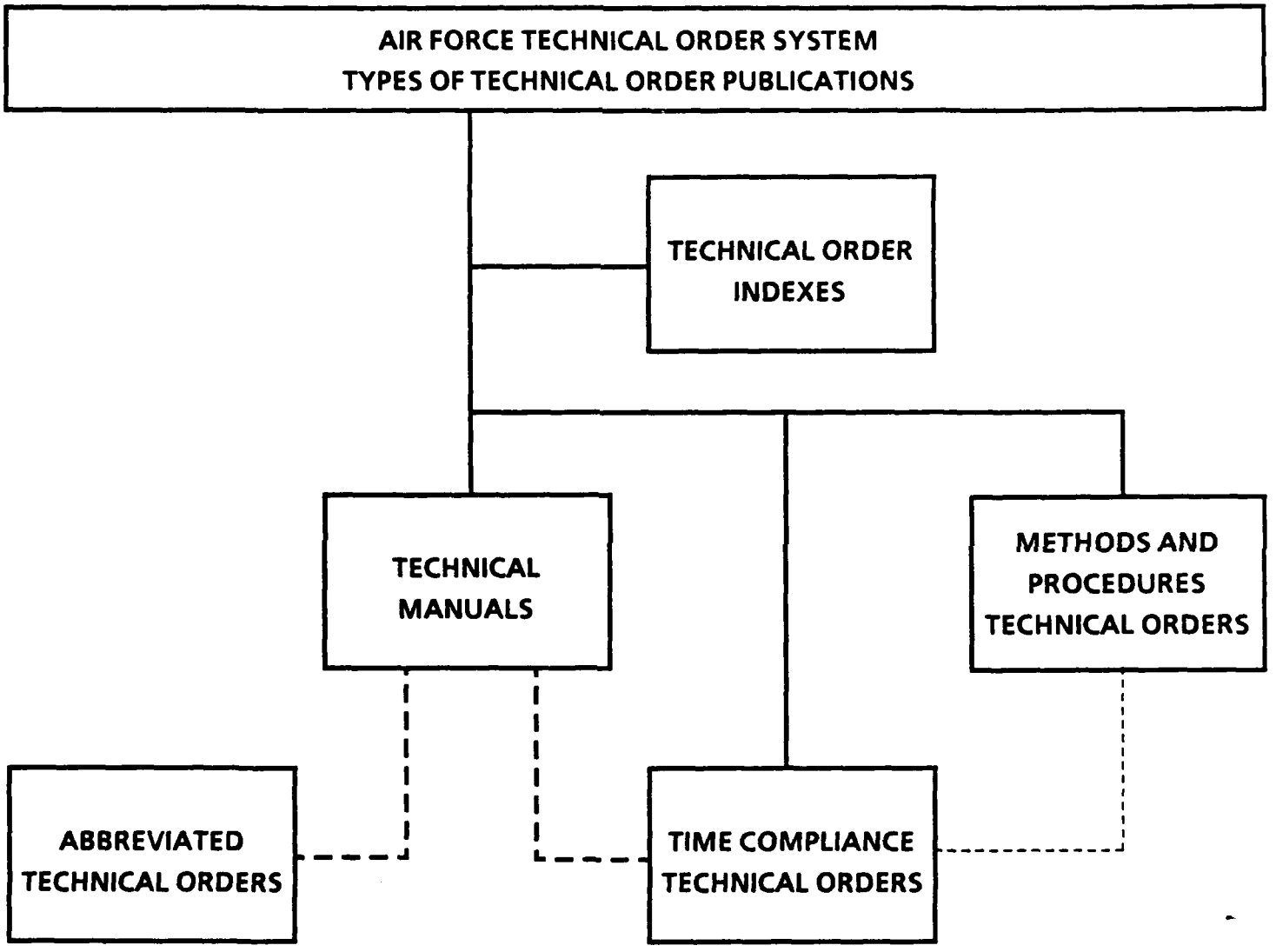
UNITED STATES AIR FORCE

COMPUTER-AIDED ACQUISITION AND LOGISTICS SUPPORT (CALS)

TECHNICAL ORDER SYSTEM DESCRIPTION

APPENDICES

APPENDIX A


AIR FORCE TECHNICAL ORDER SYSTEM
TYPES OF TECHNICAL ORDER PUBLICATIONS
TECHNICAL ORDER INDEXES
TECHNICAL MANUALS
METHODS AND PROCEDURES TECHNICAL ORDERS
ABBREVIATED TECHNICAL ORDERS
TIME COMPLIANCE TECHNICAL ORDERS

TYPES OF TECHNICAL ORDER PUBLICATIONS

- **Technical Manuals - Categories**
  - (1) Flight Manuals
  - (2) Job Guide Manuals
  - (3) Nuclear Weapons Manuals (applicable to missiles and aircraft)
  - (4) Non-nuclear Munitions Manuals (applicable to combat aircraft)
  - (5) Integrated Manuals (Nuclear and Non-nuclear)
  - (6) Non-nuclear Munitions Manuals for Equipment other than Aircraft and Missiles
  - (7) Aircraft Emergency Rescue Information Manual
  - (8) Facility, Subsystem, and System Installation-Engineering and Installation Manual
  - (9) General Engineering and Planning Manual
  - (10) Standard Installation Practices Technical Orders
  - (11) Engine Maintenance Work Packaged Technical Orders

- **Methods and Procedures Technical Orders - Categories**
  - (1) Air Force TO Policy and Procedures
  - (2) Distribution and Storage of Air Force TO System Publications
  - (3) Visual Inspection System (Policies, Methods, and Procedures)
  - (4) Hi-Value Item Lists

- **Index Type Technical Orders - Categories**
  - (1) TO Indexes
  - (2) Alphabetical Listing
  - (3) Cross Reference Tables
  - (4) List of Applicable Publications

- **Time Compliance Technical Orders - Categories**
  - (1) Immediate Action TO
  - (2) Urgent Action TO
  - (3) Routine Action TO
  - (4) Record TO
  - (5) Inspection TCTO

- **Abbreviated Technical Orders - Categories**
  - (1) Inspection Work Cards and Worksheets
  - (2) Lubrication Charts
  - (3) Checklists

(Source: TO 00-5-1)

APPENDIX B

TECHNICAL ORDER SYSTEM REFERENCES

AFR 0-9	Numerical Index of Departmental Forms
AFR 5-1	Air Force Publications Management Program
AFR 6-1	Policies, Procedures and Standards for Production and Procurement of Air Force Printing, Duplicating, Copying and Microform
AFR 7-1	Receiving, Distributing, Requisitioning and Warehousing Publications and Forms
AFR 8-2	AF Technical Order System
AFR 12-30	The AF Freedom of Information Act Program
AFR 12-32	Schedule of Fees for Copying, Certifying, and Searching Records and Other Documentary Material
AFR 12-50	Disposition of AF Documents, Policies, Procedures and Responsibilities
AFR 57-1	Operational Needs
AFR 57-4	Modification Program Approval and Management
AFR 60-9	Flight Manual Program
AFR 66-19	Interservicing of Technical Manuals and Related Technology
AFR 80-30	Marking Documents with Export-Control and Distribution - Limitation Statements
AFR 80-34	Withholding Unclassified Technical Data from Public Disclosure
AFR 80-45	Distribution Statements on Technical Documents
AFR 310-1	Management of Contract Data
AFR 400-3	Foreign Military Sales
AFR 800-4	Transfer of Program Management Responsibility
AFR 800-6	Acquisition Management - Program Control - Financial
AFR 6-1/AFLC Sup 1	Policies, Procedures and Standards for Production and Procurement of Air Force Printing, Duplicating, Copying and Microform
AFLC/AFSCR 6-1	TO Printing

TECHNICAL ORDER SYSTEM REFERENCES (CONT.)

AFR 7-1/AFLC Sup 1	Receiving, Distributing, and Warehousing Prime Technical Orders (TOs)
AFLC/AFSCR 8-1	Nuclear Weapons/Aircraft Delivery, Loading and Transport Technical Manual Program
AFLC/AFCCR 8-2	AFLC and AFCC Technical Order Responsibilities and Agreements
AFLC/AFSCR 8-3	Processing Interim Technical Orders
AFLC 8-4	Air Force Technical Order System
AFLC 8-5	AFLC Regulation - Technical Order Mechanized Information, Numbering, Indexing, and Distribution System
AFLC/AFSC/ TACR 8-13	Aircraft/Nonnuclear Munitions TO Program
AFLCR 8-48	AF Technical Order System Data Operations (D069)
AFLCM 171-56	Initial Distribution of TOs Subsystem (G022A)
AFLCM 171-59	Preparation of Technical Order Indexes Subsystem (G022B)
AFLCM 171-60	ALC Logistics Subsystem (G022C)
AFLCM 171-61	TO Management Information Subsystem (G022D)
AFLCM 171-64	Occupational Safety and Health Act Review Subsystem (G022E)
AFLCM 171-156	TO Repository Management Subsystem (G022F)
AFLCM 171-	SA-ALC TO Inventory & Modification Tracking Subsystem (G022G)
AFSCM 310-2	AFSC Technical Publication Acquisition Manual: Contractor Data Management
AFP 8-17	Technical Order Account Managers Pamphlet
TO 00-5-1	Air Force Technical Order System
TO 00-5-2	Technical Order Distribution System
TO 00-5-15	Time Compliance Technical Order System
TO 00-5-16	Computer Program Identification Numbering System (CPIN)
TO 00-5-17	Computer Program Identification Numbering System (CPIN)

TECHNICAL ORDER SYSTEM REFERENCES (CONT.)

TO 00-5-18	USAF Technical Order Numbering System
TO 00-5-19	Security Assistance Technical Order Program
TO 0-1-01	TO Indexes
TO 0-1-02	Index of General TOs
TO 00-25-115	Logistics/Maintenance Engineering Management Assignments
TMCR 86-01	AF Technical Manual Contract Requirement - Preparation Instructions
MIL-STD-1752	Establishing Reading Grade Levels
MIl-STD-1790	Data Requirements for Development, Acquisition, and update of Technical Manuals
MIL-M-5096	Technical Manual, Inspection/Maintenance Requirements, Work Card, Inspection/Lube Requirements/Acceptance/Functional Check Flight Procedures, Check Lists, Functional Check Flight Charts, Inspect Sequence
MIL-M-5166	Technical Manual, Assembly, Servicing and Organizational Maintenance Instructions (for Guided Missiles and Pilotless Aircraft)
MIL-M-5288	Technical Manual, Cargo Aircraft Loading and Offloading
MIL-M-5920	Technical Manual, Basic Weight Checklist and Loading Data
MIL-M-6675	Technical Manual, Intermediate Maintenance Instructions
MIL-M-7298	Technical Manual, Commercial Equipment
MIL-M-7700	Flight Manuals
MIL-L-8031	List of Applicable Publications
MIL-M-9854	Technical Manual, Structural Repair (for Aircraft)
MIL-C-9883	Checklist, Organization Maintenance (for Missile and Space Systems)
MIL-M-9891	Technical Manual, Field Maintenance and Depot Overhaul Instructions (for Missile and Space System Components and Related Equipment)
MIL-M-9913	Technical Manual, Inspection, Repair and Packing Instructions (for Parachutes)

TECHNICAL ORDER SYSTEM REFERENCES (CONT.)

MIL-M-9927	Checklist, Organizational Maintenance (for Aeronautical Weapons System)
MIL-M-9977	Technical Manual and Checklists, Munitions Loading Procedures, Nonnuclear and Nuclear (Aircraft)
MIL-M-9994	Technical Manual, Operation and Maintenance Instructions (for Mobile Training Sets and Part Task Trainers)
MIL-M-22202	Technical Manual, Aircraft Cross Servicing
MIL-M-25394	Technical Manual, Overhaul Instructions and Intermediate Maintenance Instructions (for Engines)
MIL-M-25802	Technical Manual, Loading and Transport of Nuclear Weapon Cargo in Cargo Aircraft
MIL-T-25832	Technical Manual, Aircrew, Nuclear Weapon Delivery, Air-to-Air
MIL-M-25848	Technical Manual, Aircrew, Special Weapon, Air-to-Ground Missile Delivery, Strategic Bomber Aircraft
MIL-M-26788	Technical Manual, Operation and Maintenance Instructions (for Automotive Equipment)
MIL-M-27018	Technical Manual, Weapon Loading Procedures, Air Defense Fighter-Interceptor Aircraft
MIL-M-27026	Technical Manual and Checklist, Nuclear Delivery, Level, Strategic Bomber Aircraft
MIL-C-27278	Checklist, Flight Crew
MIL-T-27579	Technical Manual, Aircrew, Nuclear Weapon (Bomb) Delivery, Multimode
MIL-M-27586	Technical Manual and Checklist, Nuclear Munitions Loading Procedures, Strategic Bomber Aircraft
MIL-M-27594	Technical Manual and Checklist, Assembly, Test and Storage Procedures, Missile/Warhead Mating
MIL-M-38311	Operation and Associated Checklist (ICBM)
MIL-M-38384	Technical Manual, Nonnuclear Munitions Delivery, Tactical Fighter and Tactical Bomber
MIL-M-38701	Technical Manual, Inspection Requirements, Work Cards, for Missile and Space Weapon Systems

TECHNICAL ORDER SYSTEM REFERENCES (CONT.)

MIL-M-38413	Manual and Aircrew Checklist for Air Refueling Procedures
MIL-M-38716	Technical Manual and Checklist, Nonnuclear Munitions Loading Procedures (Strategic Aircraft)
MIL-M-38720	Checklist, Intermediate Maintenance, Bench Check (Airborne Armament and Electronic Systems/Equivalent)
MIL-M-38733	Technical Manual, Operation Instructions (for Hand-held Flight Computers)
MIL-M-38769	Technical Manual, Work Unit Code
MIL-M-38777	Technical Manual, Inspection Requirements, Lubrication Requirements, And Work Cards (for Ground Communication-Electronic and Meteorological and Related Equipment
MIL-M-38778	Checklist, Title Page, List of Effective Pages, Printing and Binders, General Requirements
MIL-M-38780	Technical Manual, Nondestructive Inspection
MIL-M-38781	Technical Manual and Checklists and Source Data, Storage and Maintenance Procedures (for Nonnuclear and Chemical Munitions/ Biological Research Agents)
MIL-M-38784	Technical Manual, General Style and Format Requirements
MIL-M-38787	Technical Manual, Transportation, Handling, Inspection, Operations, Firing, Post Firing and Dissection Procedures (for Missile Motors)
MIL-M-38789	Technical Manual, Overhaul Instructions and Overhaul Instructions with Illustrated Parts Breakdown (for Various Equipment and Accessories)
MIL-P-38790	Printing Procedures
MIL-M-38791	Technical Manual, Engineering Installation Facility Standards (for Ground Communication-Electronic and Meteorological Equipment
MIL-M-38793	Technical Manual, Calibration Procedures
MIL-M-38795	Technical Manual, System Peculiar Corrosion Control
MIL-M-38796	Technical Manual, Organizational, Intermediate Maintenance, and Depot Overhaul Instructions with Illustrated Parts Breakdown (for Special Shipping and Storage Containers (Empty) for Nonnuclear Munitions

TECHNICAL ORDER SYSTEM REFERENCES (CONT.)

MIL-M-38797	Technical Manual, Operation Instructions and Maintenance Instructions (for Various Types of Equipment)
MIL-M-38798	Technical Manual, Operation Instructions, Maintenance Instructions, Circuit Diagrams, Alignment Procedures and Installation Planning
MIL-M-38800	Technical Manual, Organizational Maintenance Instructions (for Aircraft, Missiles and Nonmunition Accessories)
MIL-M-38801	Technical Manual, Aircraft Emergency Rescue Information (Fire Protection)
MIL-T-38804	Time Compliance Technical Orders (TCTOs)
MIL-M-38807	Technical Manual, Illustrated Parts Breakdown
MIL-M-38811	Technical Manual, Methods and Procedures Technical Orders
MIL-M-38812	Technical Manual, Maintenance/Overhaul Instructions and Maintenance/Overhaul Instructions with Illustrated Parts Breakdown (for Automotive Equipment)
MIL-A-38813	Aircraft and Missile System Peculiar Storage Manuals
MIL-M-63010	DoD Standard Generator Sets
MIL-M-63018	Nonnuclear Explosive Ordnance Disposal (EOD) Procedures for Aircraft Weapon Systems
MIL-M-82376	Operation and Maintenance Instructions (Class I Trainers and Class III Training Aids)
MIL-M-83493	Technical Manual, Organizational (Flightline) Maintenance for Remotely Piloted Vehicles
MIL-M-83495	Technical Manual, Organizational Maintenance Manual Set, General Requirements
MIL-M-83498	Technical Manual, Testing Aircraft Power Package (Quick Engine Change Configuration)
MIL-M-83499	Flight Manuals, Supplementary
MIL-M-87138	Technical Manual, Aircraft Structural Integrity Program - Force Management Data Acquisition Maintenance Procedures
MIL-M-87153	Technical Manual, Operator Test Procedures Manuals Using Automatic Test Equipment
MIL-M-87158	Technical Manual, Aircraft Battle Damage Repair

TECHNICAL ORDER SYSTEM REFERENCES (CONT.)

MIL-M-87253	Operator Test Procedures Manual Using Automatic Test Equipment
MIL-M-87920	Manual Set, Technical, Organizational and Intermediate Maintenance, General Requirements
MIL-M-87929	Technical Manual, Maintenance Instructions in Work Package Format for Engines (Intermediate and Depot)
AFIT/SYS 230	Technical Order Acquisition and Management (Course Text)
Project 5036410	"Acquisition of Technical Orders from Contractors" - Air Force Audit Agency (dated 24 June 1986)
UM 110231100	Integrated Computer-Aided Manufacturing (ICAM) Function Modeling Manual ($IDEF_0$) - Softech, Inc., Waltham MA
PMD XXXXXX(1)/ PE64XXX	Program Management Directive for Automated Technical Order System (ATOS) Phase III (dated 5 Feb 86)
ECI Course 1200	Air Force Technical Order System - 2 Volume Self-Study Course
----	Automated Technical Order System (ATOS) Phase II Functional Description - RJO, Dayton, OH
----	Information Engineering for Large Organization, A Case Study in the Air Force - DOT/TSC, UNISYS, Inc., and RIS, Inc., Cambridge, MA

APPENDIX C
FORMS USED IN THE TECHNICAL ORDER SYSTEM

Air Force Technical Order

AFTO Form 4	Technical Order Verification/Acceptance Certificate
AFTO Form 22	Technical Order Improvement Report and Reply
AFTO Form 27	Technical Order System, Publication Change Request (PCR)
AFTO Form 32	Technical Order Binder Label
AFTO Form 43	Request for Technical Order Distribution Code Assignment or Change
AFTO Form 110	Technical Order Distribution Record
AFTO Form 110A	Technical Order Distribution Record, Part III
AFTO Form 110B	Technical Order Distribution Record, Part IV
AFTO Form 124	Computation of Technical Order Reading Grade Level
AFTO Form 131	Technical Order Index, Routine and Annual Check
AFTO Form 158	Technical Order Review Comment Sheet
AFTO Form 187	Technical Order Publications Request
AFTO Form 215	Notification
AFTO Form 221	ADP Requisition for AFTO
AFTO Form 273	Initial Distribution Label (unclassified data)
AFTO Form 274	Initial Distribution Label (classified data)
AFTO Form 276	Special Requisition for Air Force Technical Order

Air Force Logistics Command

AFLC Form 103	Nonconforming Technical Assistance Request and Reply
AFLC Form 189	Request for Technical Order Number
AFLC Form 190	Technical Order Number, Index and ADP Control Record
AFLC Form 201A	Master Typing Guide
AFLC Form 201C	Layout and Master Typing Guide

FORMS USED IN THE TECHNICAL ORDER SYSTEM (CONT.)

AFLC Form 201E	Master Typing Guide
AFLC Form 252	Technical Order Improvement Report and Reply
AFLC Form 254	Reproduction Assembly Sheet
AFLC Form 407	Technical Order Reproducible Material Record
AFLC Form 531	TO Receiving/Processing Record
AFLC Form 540	TODCA TO Management Record
AFLC Form 541	TODCA TO Management and Issue Record
AFLC Form 578	USAF Technical Order Initial Distribution Verification
AFLC Form 632	TO/CPIN Distribution and Record Request
AFLC Form 654	TODCA Master Record Source Document
AFLC Form 873	Time Compliance Technical Order Requirements
AFLC Form 874	Time Compliance Technical Order Supply Data Requirements
AFLC Form 875	TCTO Programming Document

Air Force Systems Command

AFSC Form 11	Validation Completion Report

Air Force

AF Form 145	Certificate of Destruction of Material
AF Form 310	Document Receipt and Destruction Certificate
AF Form 585	Contractor Data Requirements Substantiation
AF Form 847	Recommendations for Change in Publication (Flight Publications)
AF Form 1423	Contract Data Requirements List

Department of Defense

DD Form 173	Emergency Requisition Message
DD Form 254	DoD Contract Security Classification Specification
DD Form 632-2	Contract Pricing Proposal

FORMS USED IN THE TECHNICAL ORDER SYSTEM (CONT.)

DD Form 843	Requisition for Printing and Binding Services
DD Form 1392	Data Message Form
DD Form 1423	Contract Data Requirements List (CDRL)
DD Form 1664	Data Item Descriptions

General Printing Office

GPO Form 2511	Print Order

Others

TMCR 86-01	Air Force Technical Manual Contract Requirements
----	Technical Order Development Management Plan
----	Technical Order Verification Status Page

Data Item Descriptions

DI-TMSS-80063	Technical Manual Publication Plan
DI-TMSS-80064	Technical Manual Schedules and Status Report
DI-TMSS-80065	Procedural Support Data
DI-TMSS-80066	Development Program Manuals
DI-TMSS-80067	Technical Manual CFAE/CFE Notices
DI-TMSS-80068	Report of Technical Manual Costs
DI-TMSS-80069	Technical Manual Validation Plan
DI-TMSS-80070	Validation Completion Report, Technical Manuals

APPENDIX D

EXCEPTIONS TO TECHNICAL ORDER SYSTEM

The TO system is not applicable to the following types of Air Force publications:

1) Publications for experimental equipment designed specifically for research purposes.

2) Publications for the operation and maintenance of real property, except as specifically authorized by Air Force regulations.

3) Subjects which are more suitable for coverage in Air Force stock list publications systems as specified in AFR 72-1, Air Force Participation in the Federal Catalog System.

4) Subjects which are more suitable for issuance as standard publications as specified in AFR 5-1, Air Force Publications Management System.

5) Computer programs and computer program documents managed according to AFRs 800-14 and 700-series regulations (Lifecycle Management of Computer Resources in Systems and Data Automation, respectively). (Exception: Computer program manuals that instruct loading and operation may be managed in the TO system.)

6) Publications for equipment maintained by the original manufacturer or contractor over its life cycle

7) Cryptological equipment manuals which are managed by HQ Electronic Security Command (HQ ESC).

8) Numerical Control (NC) program tapes.

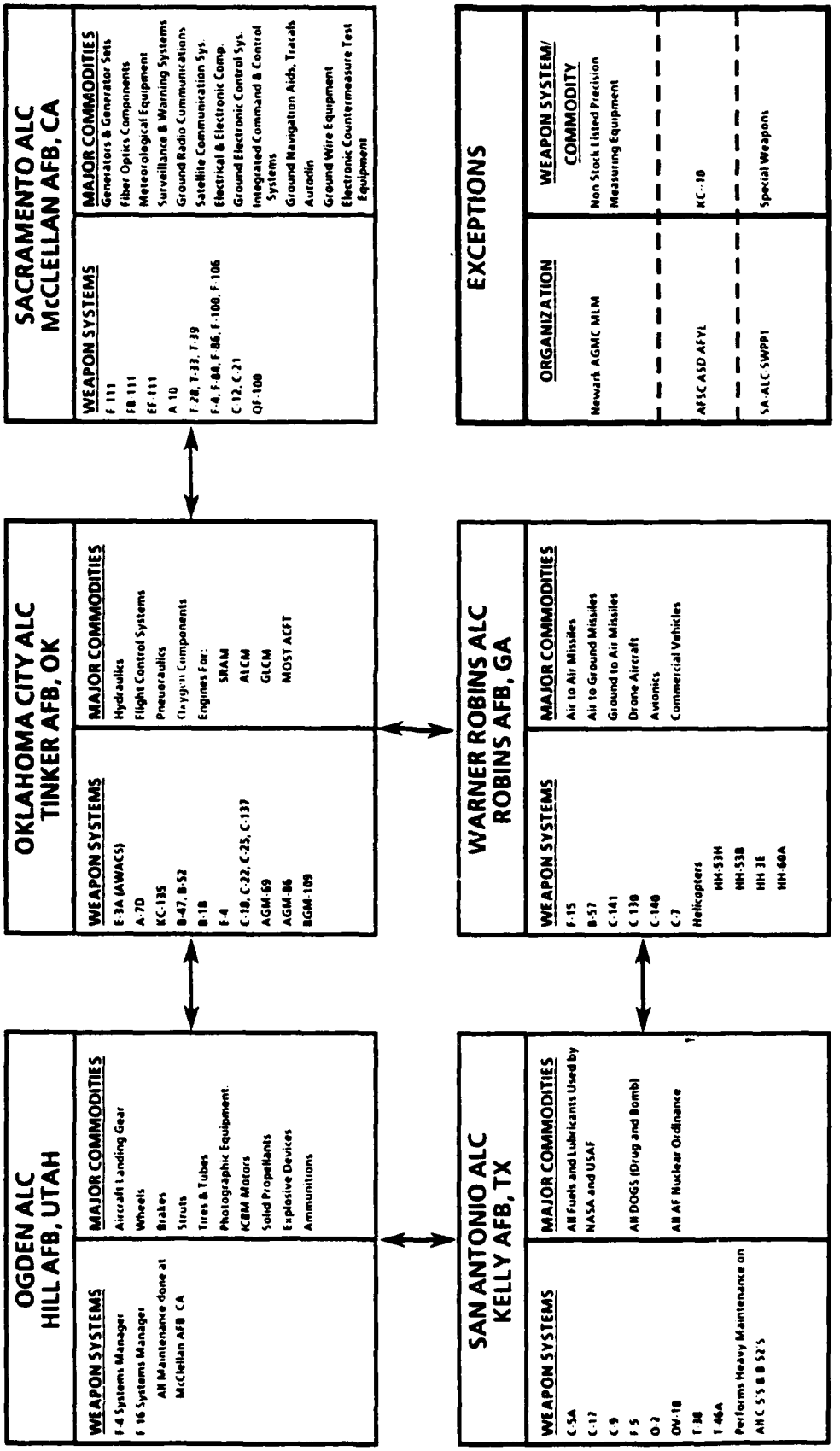
9) Other instructions excluded by authorization of HQ USAF.

10) "Blue Line" Copies. Although not a formal TO, approval may be granted to use a "blue line" copy until the receipt of a formal TO.

APPENDIX E

AIR FORCE AIR LOGISTICS CENTER

FUNCTIONAL CHART



Reference TO 00-25-115 for current assignments.

APPENDIX F

TECHNICAL ORDER SYSTEM DIMENSIONS

- As of May 1987, an inventory of 151,421 active Air Force TOs:
  - OC-ALC is prime for 17,307 Air Force TOs.
  - OO-ALC is prime for 17,012 Air Force TOs.
  - SA-ALC is prime for 43,850 Air Force TOs.
  - SM-ALC is prime for 30,065 Air Force TOs.
  - WR-ALC is prime for 35,219 Air Force TOs.
  - Newark-AGMC is prime for 7,861 Air Force TOs.
  - OC-ALC/MMEDU is prime for 102 Air Force Tos.
  - SA-ALC/SWPPT is prime for 5 Air Force TOs.

- For the FY83-86, there were 32,067 TO numbers requested - an average of 8,017 per year.

- 75% of all TOs are used within the AF Technology Repair Centers (TRCs) - a designated repair function responsible for maintenance on specific item of equipment.

- Current TO inventory is approaching 20,000,000 pages. With the B-1B Weapon System, an additional 1,000,000 pages (approximately 3,500 new TOs) will be added to the inventory.

- AF directives allow for 210 days for a routine TO change to be implemented.

- 70-90% of all printing is done by civilian contractor.
- According to ATOS Phase III Program Management Directive (dated 5 Feb 86), it was estimated that there existed 50,000,000 pages of backlogged unfulfilled requirements in areas such as Aircraft Battle Damage Repair TOs and Technical Order Page Supplements (TOPS), and many others which were unfunded.
- 55 Military Specifications/Standards have the ability to impact a TO.

- Approximately 350 - 400 forms are used throughout the TO system. The majority are AFTO forms (approximately 300 - 325 in number).

- Additional Data:
  - 3,300,000 Initial Distribution (ID) Requirements.
  - 6,000 TODOs, total (4,000 Air Force TODOs).
  - 8,000 requests for TOs, daily.
  - 800,000 special requisition for TOs in FY 1986.
  - 98% fill rate on TO requests.

- An <u>average</u> TO consists of approximately 150 pages and is 40% graphics and 60% text.

APPENDIX G

TECHNICAL ORDER SYSTEM CURRENT INCONSISTENCIES

EXAMPLES

- Printing and Distribution:
  - TOPS and Supplements (SUPS) are not included in next change.
  - TOPS and SUPS are received out of sequence.
  - Changes arrive with missing pages.
  - Pages are printed out of sequence.
  - Pages are unreadable or misprinted.
  - Wrong quantity received.
  - Wrong TO is received.
  - Long back orders (exceeding 6 months).
  - Users do not establish proper requirements.

- The Air Force Audit Agency, Project 5036410 "Acquisition of Technical Orders from Contractors" (Report of Audit - 24 June 1986) states the following:
  - From 1977 to 1986, there were 88 Cause Code I Mishaps in the Air Force; in 41 of these cases (47%) inaccurate technical data were determined to be a contributing factor with equipment losses or damages exceeding $85 million.
  - 95% of Validation for the B-1B TOs was performed by desk-top analysis instead of actual performance of tasks.
  - 42% of B-1B TO procedures required major or total rewrite.
  - For three weapon systems (i.e., B-1B, F-16C/D, and KC-135R), the contractors failed to provide 125 of 688 installation-level TOs in time for the Air Force to perform verification.

- There is an increasing use of vendor off-the-shelf (commercial) manuals. These manuals do not normally conform to the standards established for the contractually produced manuals (i.e., many Air Force TOs are written for 8th or 10th grade reading levels).

- USAF Logistics Management of Technical Orders System (DSD G022) is a 20 year old hardware/software system.
  - Lack of Functional Specifications and Documentation on the G022.
  - Redesign efforts are constrained by budgetary problems.
  - TO Indices are automated, but no on-line access.

TECHNICAL ORDER SYSTEM CURRENT INCONSISTENCIES

EXAMPLES (Cont.)

- Indexing of TOs -- 30-35% of all Air Force TOs, specifically Commercial Publications, do not conform to TO 00-5-18, USAF Technical Order Number System.
- Contracted TODOs are improperly trained.
- Inaccurate information on AF/AFTO/AFLC/AFSC forms.
- Semantics/Terminology
  - Concept(s) of Technical Order and/or Technical Manual
  - Concept of Abbreviated TO.

APPENDIX H
ACRONYMS

AAC	Alaskan Air Command
ABG	Air Base Group
AD	Arnament Division
ADP	Automatic Data Processing
AF	Air Force
AFB	Air Force Base
AFCC	Air Force Communication Command
AFFTC	Air Force Flight Test Center
AFLC	Air Force Logistics Command
AFOTEC	Air Force Operational Test and Evaluation Center
AFPRO	Air Force Plant Representative Office
AFR	Air Force Regulation
AFSC	Air Force Systems Command
AFTO	Air Force Technical Order
AFTOS	Air Force Technical Order System
AGMC	Aerospace Guidance and Metrology Center
ALC	Air Logistics Center
AMD	Aersospace Medical Division
ASD	Aeronautical System Division
ATC	Air Training Center
ATI	Automated Technical Information
AUTODIN	Automated Digital Information Network
BMO	Ballistic Missile Office
CALS	Computer-aided Acquisition and Logistics Support
CAO	Contract Administration Office

ACRONYMS (Cont.)

CCB	Configuration Control Board
CDRL	Contract Data Requirements List
CFEN	Contractor Furnished Equipment Notice
CIR	Centralized Inventory and Master Record
CLIN	Contract Line Item Number
CPIN	Computer Program Identification Number
CTOCU	Central Technical Order Control Unit
DA	Director of Administration
DAR	Director of Administration and Reprographics
DID	Data Item Description
DMO	Data Management Office/r
DoD	Department of Defense
DSD G022	USAF Logistics Management of Technical Order System
ECP	Engineer Change Proposal
ESD	Electronic Systems Division
FY	Fiscal Year
GFE	Government Furnished Equipment
G022	USAF Logistics Management of Technical Order System
GPO	Government Printing Office
HQ	Headquarter
ICAM	Integrated Computer Aided Manufacturing
ICOMs	Inputs, Controls, Outputs, Mechanisms
ID	Initial Distribution
IDEF	ICAM Definition
ILS	Integrated Logistics Support
ILSP	Integrated Logistics Support Plan

ACRONYMS (Cont.)

IPR	In-process Review
LSA	Logistics Support Analysis
LSAR	Logistics Support Analysis Record
MAAT	Technical and Engineering Branch (at an ALC)
MAC	Military Airlift Command
MA_E	Maintenance Engineering/Planning (at an ALC)
MA_P	Production Branch (at an ALC)
MAJCOM	Major Command
MAQ_	Quality Assurance Branch (at an ALC)
MIO	Management Integration Office
MLMT	TO System Section (at AGMC)
MMEDT	TO System Section (at an ALC)
MMEDU	TO System Section - Central Management Office at OC-ALC
MM_M	Logistics Management Branch (at an ALC)
MM_R	Engineering/Planning Branch (at an ALC)
MOA	Memerandum of Agreement
MPP	Modular Planning Process
MRED	Security Assisted TO Distribution System Office (at an ALC)
NAVPRO	Navy Plant Representative Office
PACAF	Pacific Air Forces
PCR	Publication Change Request
PMD	Program Management Directive
PMP	Program Management Plan
PMRT	Program Management Responsibility Transfer
RFP	Request for Proposal
SAC	Strategic Air Command

ACRONYMS (Cont.)

SATODS	Security Assistance Technical Order Distribution System
SERD	Support Equipment Requirement Document
SON	Statement of Need
SORD	System Operations Requirement Document
SPO	Systems Program Office
SUPS	Supplements
TAC	Tactical Air Command
TCTO	Time Compliance Technical Order
TM	Technical Manual
TMCR	Technical Manual Contract Requirement
TMP	Technical Manual Plan
TO	Technical Order
TODA	Technical Order Distribution Account
TODCA	Technical Order Distribution Control Authority
TODMP	Technical Order Development Management Plan
TODO	Technical Order Distribution Office
TOIS	Technical Order Improvement System
TOMA	Technical Order Management Office
TOPS	Technical Order Page Supplement
TORRB	TO Requirements Review Board
ULCE	Unified Life Cycle Engineering
USAF	United States Air Force
USAFE	United States Air Force in Europe