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DOD STANDARD

PROCEDURES FOR DEVELOPMENT
OF
DEPOT TECHNICAL DATA

AREA MISC

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DOD-STD-1768A (USAF)

DEPARTMENT OF DEFENSE
WASHINGTON, D.C. 20301

Procedures for Development of Depot Technical Data

DOD-STD-1768 (USAF)

1. This Department of Defense Standard is approved for use by the Ballistic Systems Division (BSD), Air Force Systems Command (AFSC), Department of the Air Force, and is available for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to BSD/AWD, Norton AFB, CA 92409-6468, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

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FOREWORD

This standard prescribes the procedures for development and control of depot technical data for use by qualified technicians during depot level overhaul and repair of specified Aerospace Vehicle Equipment (AVE) and Support Equipment (SE).

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FIGURES

TABLES

1. SCOPE

1.1 <u>Purpose</u>. This standard defines the functions and procedures for the development of Depot Technical Data (control manuals, engineering data, and other technical orders) for use in depot level overhaul and repair of Aerospace Vehicle Equipment (AVE) and Support Equipment (SE). It requires the identification of all equipment items, to the lowest reparable unit, for which a depot level maintenance program is identified.

1.2   <u>Application</u>.   This   standard applies to agencies, commands, organizations, and contractors engaged in the development of equipment items which require depot level overhaul/repair.

1.3 <u>Separate Directives</u>. Separate directives or operating procedures may be utilized to expand or implement specific requirements of this standard. This standard also applies to procuring agencies in that all procurement requests shall clearly detail the intent of the Integrated Data Concept. Example: The contractor must specifically be asked to quote the cost of determining the requirements for DSE during development of FSE.

1.4 <u>Precedence</u>. No deviations from this standard will be allowed without approval from AFSC BSD/AWD or the procuring activity. If any specific directives and operating procedures contain data in conflict with this standard, this standard shall take precedence.

2. REFERENCED DOCUMENTS

2.1 <u>Government Documents</u>.

2.1.1   <u>Specifications and Standards</u>.   Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this standard to the extent specified herein.

SPECIFICATIONS

MIL-M-38784	Manuals, Technical: General Style and Format Requirements
MIL-M-7298	Manual, Technical: Commercial Equipment

STANDARDS

MIL-STD-1574	System Safety Program for Space and Missile System
MIL-STD-1767	Procedures for Quality Assurance and Configuration Control of ICBM Weapon System Technical Publications/Data

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2.1.2   Other Government Documents and Publications. The following other Government documents, drawings and publications form a part of this standard to the extent specified herein.

SAMSO STD 77-6	System Requirements Analysis Program for the M-X Weapon System
SAMSO STD 79-1	Integrated System Safety Program for M-X Program
AFLCR 66-17	Depot Maintenance Support Planning
AFR 127-12	Air Force Occupational Safety Fire Prevention and Health (AFOSH) Program
TO 00-5-1	Air Force Technical Order System
TO 00-5-2	Technical Order Distribution System
TO 00-20-1	Preventive Maintenance Program, General Requirements and Procedures

2.2 Source of Documents.

a.   Copies of military standards, specifications, and associated documents listed in the Department of Defense Index of Specifications and Standards are available from the Department of Defense Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.   Copies of industry association documents should be obtained from the sponsoring industry association.   Copies of all other listed documents should be obtained from the contracting activity or as directed by the contracting officer.

b. Copies of the GPO Style Manual are available from the Superintendent of Documents, U. S. Government Printing Office, Washington DC 20402.

c.   Copies of the DOD Thesaurus of Engineering and Scientific Terms and the DDC Retrieval and Indexing Terminology may be purchased from the National Technical Information Service, Springfield, VA 22161, or (for DOD activities and DOD contractors) from the Reference Services Branch, Defense Technical Information Center, Cameron Station, Alexandria, VA 22304-6145.

2.3 Order of Precedence. In the event of a conflict between the text of this standard and the references cited herein, the text of this standard shall take precedence.

3. DEFINITIONS. For purposes of this standard, the following definitions apply.

3.1 Acronyms. The following acronyms are used in this document:

A&CO TA	Assembly and Checkout Technical Analysis
AECO	Advanced Engineering Change Order
AFLC	Air Force Logistics Command
AFOSH	Air Force Occupational Safety and Health
AFSC	Air Force Systems Command
AFOTEC	Air Force Operational Test and Evaluation Center
ALC	Air Logistics Center
AVE	Aerospace Vehicle Equipment
BSD	Ballistic Systems Division
CDRL	Contract Data Requirements List
CI	Configuration Item
DDSL	Depot Data Status List
DID	Data Item Description
DSE	Depot Support Equipment
DSIWG	Development/Support/Interface Working Group
DTDVC	Depot Technical Data Verification Completion Record
DTDVR	Depot Technical Data Verification Recommendation
ECP/ECN	Engineering Change Proposal/Engineering Change Notice
EO	Engineering Order
FSE	Factory Support Equipment
HCI	Hardness Critical Item
LSA	Logistics Support Analysis
LSAR	Logistics Support Analysis Record
MSE	Maintenance Support Equipment
MPL	Maintenance Parts List
OSE	Operational Support Equipment
SE	Support Equipment
SRA	System Requirements Analysis
TCTO	Time Compliance Technical Order
TO	Technical Order
TOMA	Technical Order Management Agency
TPA	Test Planning Analysis
TRC	Technology Repair Center

3.2 Technical Order (Control Manual). A technical order (TO) prepared in accordance with this standard and MIL-M-38784 and incorporating support data, by reference. A control manual identifies all depot overhaul and repair tasks recorded in a preferred sequence, support equipment (special tools and test equipment), consumables, a list of support data required to accomplish each task, and provides a means of determining the configuration of support data and equipment.

3.3 Technical Order (Control Manual) Outline. An outline is a method of organizing material and content of a control manual into a logical, sequential manner by section and paragraph breakdown prior to finalization into a written/printed document.

3.4 Depot Support Equipment (DSE). That class of equipment, excluding common hand tools, necessary to overhaul or repair and test contractor hardware to the lowest reparable unit. This includes commercial equipment,

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as well as equipment specifically designed or built to fulfill a particular depot overhaul or repair function.

3.5   Depot Technical Data.   Documentation (control manuals, supplemental data, engineering data, other TOs, etc.) used by technicians during depot level maintenance on AVE and SE.   The control manual will identify the functions (i.e., repair, install, calibrate, etc.) to be performed on the AVE or SE and direct the technician to the appropriate data to perform the function.

3.6   Development/Support/Interface Working Group (DSIWG).   A working group consisting of a representative from each agency responsible for technical data development established by the Technical Order Management Agency (TOMA) to plan, schedule and coordinate technical publications/data development and acquisition. The DSIWG will establish operating procedures, develop and monitor technical publications program schedules, continuously monitor program events and requirements, and assure that technical publications/data are scheduled and available to support various program events.

3.7   In-Process Reviews.   Defined in TO 00-5-1.

3.8   Overhaul.   Defined in TO 00-20-1.

3.9   Prepublication Reviews.   Defined in TO 00-5-1.

3.10   Repair.   Defined in TO 00-20-1.

3.11   Source Data.   Documentation developed by a contractor to support equipment items developed by that contractor.   Source data may stand alone or may be incorporated into other documentation when the hardware is integrated into, attached, or otherwise becomes a part of other equipment.

3.12   Support Data.

3.12.1   Engineering Data.   That data delivered to the Air Force and prepared by a contractor to support hardware manufactured/developed and produced by the contractor.   This data includes current engineering drawings, schematics, wiring diagrams and lists, logic diagrams, process specifications, test specifications, vendor developed drawings and procedures, acceptance procedures, etc.   These data are in the form of existing data (developed to support other contractor requirements).

3.12.2   Technical Orders (Supplemental Data).   Data prepared by a contractor when it has been determined there is no existing data, or existing data is determined to be inadequate (ref. 5.1.4.3).   Such data contains a title page, list of effective pages, and a table of contents.

3.12.3   Commercial Manuals.   Manuals applicable to equipment designed and manufactured to commercial specifications, rather than military specifications, and used to support military equipment, systems, and facilities.   All newly identified commercial publications require Air Force

approval before use in accordance with MIL-M-7298. All new commercial manuals should be reported to the TOMA by a CFE/CFAE notice submitted at the early stages of procurement from the vendor. Notices shall be prepared and submitted per MIL-N-7384.

3.12.4 <u>Technical Order</u>. Defined in TO 00-5-1.

3.13 <u>Support Equipment (SE)</u>. Defined in TO 00-20-1.

3.14 <u>Technical Order Management Agency (TOMA)</u>. Defined in TO 00-5-1.

3.15 <u>Test Station</u>. A facility at a Technology Repair Center (TRC) or other depot maintenance location specifically designed to test or calibrate a depot reparable.

3.16 <u>Validation</u>. Defined in TO 00-5-1.

3.17 <u>Verification</u>. Defined in TO 00-5-1.

4. GENERAL REQUIREMENTS

4.1 <u>Integrated Data Concept</u>. The contractor shall prepare documentation, as defined in 3.5, using an integrated data concept under which documentation required to support a function/task common to more than one application will be developed only one time. During the design of Factory Support Equipment (FSE) and software, the contractor will determine requirements for DSE. Operation and maintenance data for FSE that is identified for transition to DSE will be developed by the contractor to enable its use as depot technical data.

4.1.1 <u>Use of Other TOs</u>. Existing TOs common to organizational or intermediate and depot level tasks may be referenced with TOMA approval. If other TOs do not exist, the contractor shall develop depot technical data, as defined in 3.2 and 3.12, to provide the required support.

4.1.2 <u>Exchange of Source Data</u>. Contractors shall exchange source data (see 3.11) when one contractor's configuration item(s) (CI(s)) interfaces with or is integrated into a CI developed by another contractor. The contractor responsible for the integrated data shall identify to the contributing contractor (the contractor responsible for providing the source data) the specific type and format and required submittal dates of the data required for the integration. Exchange of source data shall be through technical interchange meetings or other mutually agreed means. Problems involving exchange of source data shall be identified to the TOMA for resolution.

4.2 <u>Structuring</u>. Technical orders (control manuals) will be structured and packaged to support the Air Force Logistics Command (AFLC) TRC concept as defined in AFLCR 66-17. However, to the extent possible, the contractor shall assure flexibility in structuring to allow possible relocation of TRC responsibility assignment among Air Logistics Centers (ALCs), contractor

depot maintenance, or other designated depot maintenance facilities in the event a reparable is transitioned. Structuring shall be reviewed and approved by the TOMA prior to or in conjunction with control manual outline approval.

4.2.1 <u>Specialized Packaging</u>. Technical orders (control manuals) will be packaged by major reparables for Aerospace Vehicle Equipment, Maintenance Support Equipment, and Operational Support Equipment (AVE/MSE/OSE). Depot Support Equipment (DSE) control manuals will be packaged by test station complex/tasks. Repair stations with minimal Support Equipment (SE) requirements may be packaged in a single control manual.

4.3 <u>Documentation Development</u>. The development of depot technical data is an iterative process, as illustrated in Figure 1. Interim products, as they evolve, shall be used by the contractor to further determine the detailed support documentation requirements.

4.3.1 <u>Interim Products</u>. The contractor will use, but is not limited to, the information available in the LSA, provisioning data and related documentation for development of depot technical data (list of depot reparables, list of DSE, list of applicable TOs, and support data).

4.3.1.1 <u>Interim Products Development</u>. Figure 1 illustrates the development, analysis, and evaluation of interim products required for determination of depot technical data requirements. The development process requires both independent and joint efforts of the TOMA, contractors, and other agencies. Most of the data required for development of the interim products is available directly from other contract requirements.

4.3.2 <u>System Requirements Analysis (SRA) Documentation</u>. The contractor will use the functional flow diagrams, supporting Forms B, LSA Record (LSAR) data sheets, and interim products as a baseline for development of the depot technical data. Depot technical data is directly related to the SRA and LSA as described in 4.7.1 and 4.7.2.

4.4 <u>Quality Assurance and Configuration Accountability</u>. The contractor shall plan for a program for in-house quality assurance and configuration control of technical publications/data in accordance with the contractual requirements set by the procuring activity.

4.5 <u>Safety</u>. Each test, operating, or maintenance procedure (prepared by the contractor) including computer-controlled test sequences will be reviewed by Ballistic Systems Division/System Safety Division or a representative designated by the procuring agency (see 6.2).

4.5.1 <u>Safety Critical Procedures</u>. Test, operating, or maintenance procedures (prepared by the contractor) that involve or affect safety will be designated as safety critical procedures. Safety critical procedures will be approved by Ballistic Systems Division/System Safety Division or a representative designated by the procuring activity (as outlined in MIL-STD-1574) during an in-process, verification, or prepublication review.
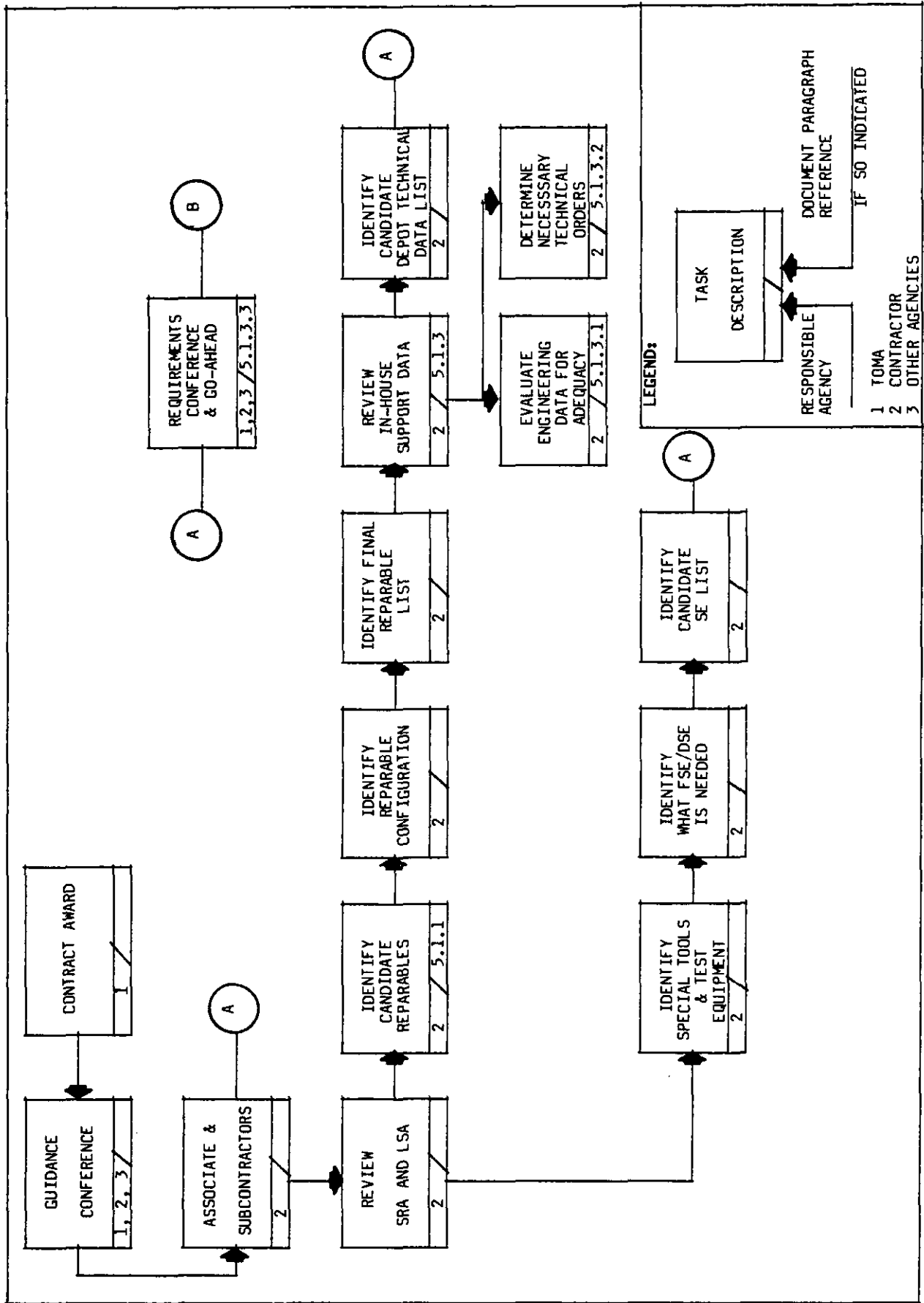
FIGURE 1. Depot Technical Data Development Process (Page 1 of 2)
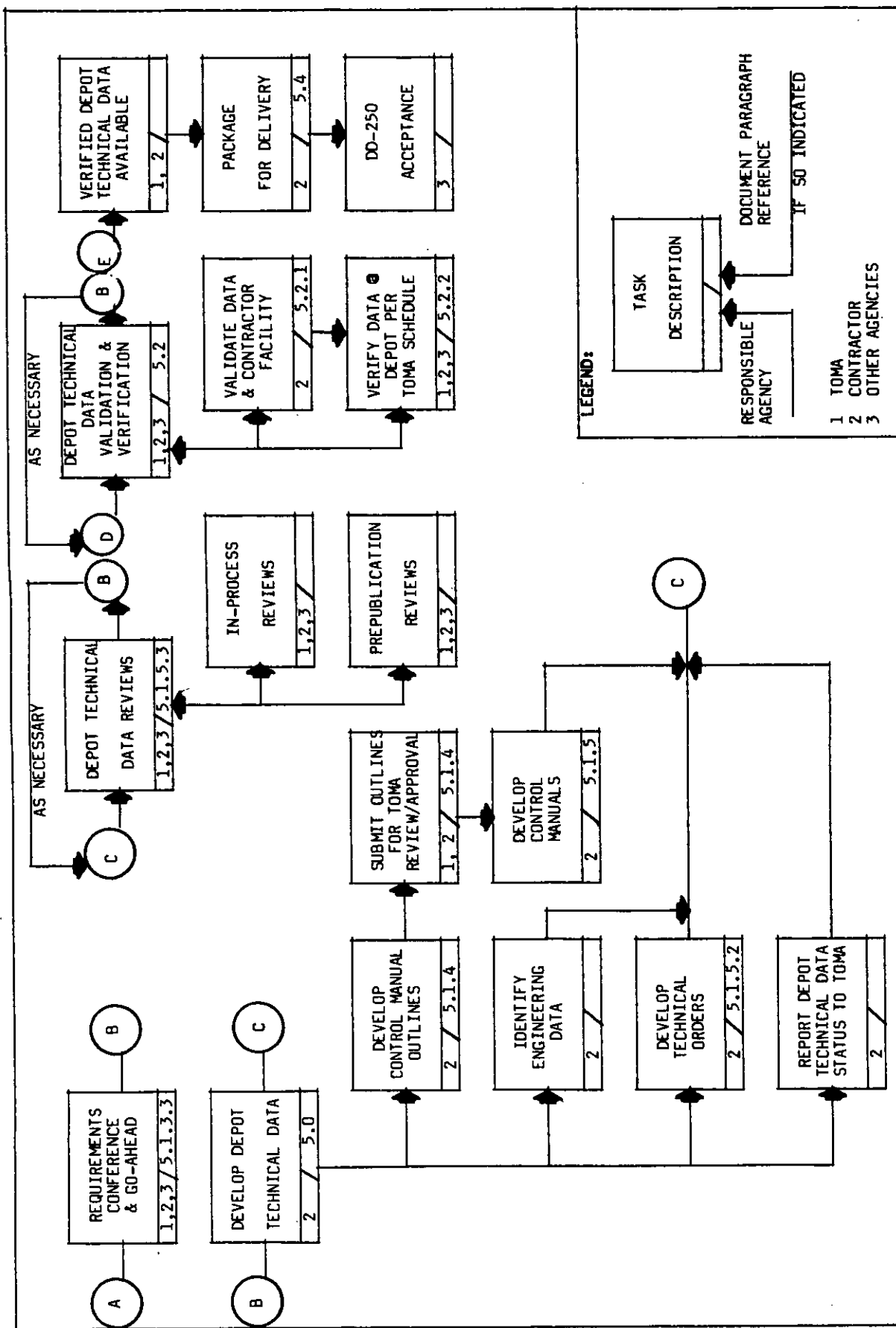
FIGURE 1. Depot Technical Data Development Process (Page 2 of 2)

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4.5.2 Air Force Occupational Safety and Health (AFOSH) Requirements. Technical orders (supplemental data) will be reviewed to ensure compatibility with Air Force Occupational Safety and Health requirements in accordance with SAMSO STD 79-1 and AFR 127-12.

4.6 Development Process. Development of adequate and accurate depot technical data is a viable process during which all elements that impact the documentation are reviewed, analyzed and evaluated. Although it is a progressive process, it will be necessary to revisit some steps as the effort continues.

4.7 Relationship of Depot Technical Data to the SRA/LSA.

4.7.1 System Requirements Analysis. The SRA comprises the operational analysis, the LSA, the Test Planning Analysis (TPA), and the Assembly and Checkout Technical Analysis (A&CO TA). The SRA, defined in SAMSO STD 77-6, is a systematic approach to establishing and optimizing requirements for equipment, personnel, procedures, and facilities. It provides the baseline against which proposed system changes can be evaluated.

4.7.2 Logistics Support Analysis. The LSA prescribes the total resources (tools, SE, technical data, spares, personnel, etc.) required to maintain the weapon system in the operational mode. The logistics support requirements are initially identified via functional flow diagrams and attendant Forms B (system functional requirements analysis forms). The depot level maintenance requirements are identified in Functional Flow Diagrams and the supporting Forms B. The LSA is further documented on LSAR data sheets.

5. DETAILED REQUIREMENTS

5.1 Technical Orders (Control Manuals). The contractor shall develop a control manual, or a series of control manuals (as defined in 3.2), for those categories of equipment for which the contractor is responsible and determined to be reparable by the LSA per 5.1.1. Example categories are: electrical, mechanical, electronic, pneumatic, hydraulic, etc. (see 6.2).

5.1.1 Reparable Parts List. The contractor shall utilize the LSAR summaries (and selected LSAR Data Sheets, as required) to identify all equipment items for which depot level maintenance task allocations have been determined. Identified items shall form the basis for the Depot Reparables List to be compiled in accordance with paragraph 50.1.6, Appendix A for each control manual.

5.1.2 Depot Support Equipment.

5.1.2.1 Base Data Review. Review LSAR data sheets and appropriate LSAR summaries to determine the DSE required for depot overhaul/repair of those items identified on the reparable parts list after completion of 5.1.1. Identified DSE shall be included in the depot support matrix (paragraph 50.1.8, Appendix A).

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5.1.2.2   <u>Special Skills Review</u>.   Review the identified equipment list and
determine the special skills that are considered necessary to set up and
operate the equipment. Give special consideration to the following elements:

    a.   Detailed set-up procedures;

    b.   Complex wiring connections;

    c.   Potentially dangerous features;

    d.   Sensitivity of the equipment to environmental influences; and,

    e.   Other restraining influences.

5.1.2.3   <u>Information Usage</u>.   The DSE list identified in 5.1.2.1 will become
part of the technical order (control manual) when that manual is compiled in
accordance with 5.1.5.

5.1.3   <u>Document Identification</u>.   Using   the   results of 5.1.1 and 5.1.2,
identify the documentation that will be required to perform the depot
maintenance of the items identified on the reparable parts list.

5.1.3.1   <u>Existing Support Data</u>. Review existing support data, as defined in
3.12, and determine which can be used, as is, to satisfy the depot
maintenance requirements for the items identified on the reparable parts
list. The contractor shall use MIL-M-7298 to evaluate commercial manuals.
Usable documentation shall be incorporated by reference into the control
manual.

5.1.3.1.1   <u>Calibration Instructions</u>.   Calibration   instructions, when
required, will be provided in contractor format to periodically certify SE at
intervals recommended by the contractor or an Air Force supplied calibration
measurement summary.   Assure that calibration checkout and acceptance
procedures provide a full-loop system of checks of the AVE/SE interconnected
configuration when such checks are required. When required to support a test
station (see 3.16), operations and calibration instructions will be packaged
as a technical order (supplemental data). When calibration instructions must
be developed, organize the data as follows (see 6.2):

    a.   Calibration parameters
    b.   Equipment required
    c.   Preliminary notes
        (1)   Safety
        (2)   Clean rooms
        (3)   Special requirements
    d.   Detailed step-by-step calibration procedures.

5.1.3.1.2   <u>Parts Identification Data</u>.   Parts identification data, including
pertinent equipment configuration and parts interchangeability information,
shall be depicted in existing contractor documentation.   Do not include

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Maintenance Parts Lists (MPLs) unless unusual problems might exist in the identification of parts, for procurement, through use of existing TOs or contractor documentation, and are specifically approved by the Air Force Systems Command (AFSC) and AFLC agencies.

5.1.3.2 Requirements Conference(s). The TOMA will schedule and conduct depot technical data requirements conferences for the purpose of reviewing candidate depot technical data recommended by the contractor. The contractor shall participate in requirements conferences and shall assist in resolution of all comments and objections arising during the conferences. During the conferences, the contractor shall offer for consideration the identification of existing data proposed for incorporation, by reference, into the technical orders (control manuals), and identification of proposed technical orders (supplemental data) to be developed under 5.1.4.3. Any number of conferences may be held until the TOMA is assured the required support data is adequately defined. After review of the candidate support documentation by the TOMA, the contractor will be authorized to develop control manual outlines as required by 5.1.4.1.

5.1.4 Technical Order Preparation and Reviews.

5.1.4.1 Technical Order (Control Manual) Outline. Prepare control manual outlines, as defined in 3.3, prior to preparation of control manuals. The contractor shall be prepare control manual outlines in accordance with Appendix A (see 6.2)

5.1.4.2 Technical Orders (Control Manual). After outline review by the TOMA, the contractor shall prepare control manual in accordance with Appendix A (see 6.2).

5.1.4.2.1 Support Data. During preparation of technical orders (control manuals), incorporate the applicable existing support data by reference into the control manual.

5.1.4.3 Technical Orders (Supplemental Data). Prepare supplemental data, as defined in 3.12.2, during preparation of control manuals, and incorporate that documentation by reference into the control manual. Such technical orders will contain a title page, list of effective pages, and a table of contents in accordance with MIL-M-38784. The text of the data is to be prepared in contractor format and should include warnings, cautions and notes conforming to MIL-M-38784 (see 6.2).

5.1.4.4 Depot Technical Data Reviews. The TOMA will maintain close liaison with the contractor during all phases of development. The TOMA will conduct in-process and prepublication reviews, in accordance with TO 00-5-1, to assure that final depot technical data provided to the user conforms to all established technical requirements.

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5.2   Validation/Verification of Depot Technical Data.

5.2.1   Validation.-   The   contractor   shall   validate the control manuals, supplemental data and all referenced support documentation in accordance with TO 00-5-1.   Validation   shall be   performed at the contractor's facility, or another designated facility where adequate reparables   and SE   are available. Use only   qualified technicians In accordance with the tasks specified in the supporting data, the reparable item(s) to which the data applies,   and the SE identified in   the data.   Observation   by the   Air Force is optional and the contractor shall be responsible for notification of validations   scheduled to allow the . TOMA or   its designated   representative to witness the validation. Nonsupport by such witnesses   for   scheduled   validation   shall   not restrict contractor validation accomplishment.

5.2.1.1   Correction   of   Deficiencies.   The   contractor   shall   correct deficiencies identified during validation prior to beginning of verification.

5.2.1.2   Validation   Certification.   The   contractor   shall   provide certification of   validation, if requested by the TOMA, prior to verification (see 6.2).

5.2.2 Verification. Verification will be accomplished in accordance with TO 00-5-1 by depot technicians normally assigned to the appropriate AFLC repair areas to demonstrate   that   depot   technical   data,   reparables,   and   SE are compatible.

5.2.2.1   Technical Order Verification Recommendation.   The TOMA shall prepare a Depot   Technical   Data   Verification   Recommendation   (DTDVR)   list   at the conclusion of   validation.   See Figure   3 for   a sample   DTDVR.   A DTDVR is subject to concurrence/modification by the TOMA and/or AFLC.

5.2.2.2   Use of Draft Copies.   Verification   may be   accomplished from draft copies if necessary to accommodate schedules, availability of reparables, SE, etc.

5.2.2.3   Verification Schedules. The   contractor shall   support verification activities   scheduled   by   the   TOMA   and/or   AFLC   based   on availability of required equipment, software, facilities, and qualified personnel.   Schedules will be coordinated with the contractor and affected agencies.   The TOMA will have prime responsibility for the verification.

5.2.2.4   Depot Technical Data Verification   Completion Record.   Verification results will   be documented on a Depot   Technical   Data Verification Completion Record (DTDVCR), as shown in Figure 2, by the verification team.

5.2.2.5   Correction   of   Deficiencies.   The   contractor   shall   correct deficiencies that are discovered during verification prior to approval of the verification by the TOMA and/or   AFLC.   If,   during   verification, existing support data   is determined   to be   inadequate for   depot use, the contractor shall   prepare   technical   orders   (supplemental   data)   in   accordance   with 5.1.4.3 (see 6.2).

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DEPOT TECHNICAL DATA VERIFICATION COMPLETION RECORD

FORM APPROVED:
OMB NO: 0704-0188

PAGE	OF	PAGES

REFERENCE DOCUMENT

| CONTROL MANUAL | VERIFICATION LOCATION | DATE |

| T.O. NUMBER | DOCUMENT NUMBER | |

| T.O. TITLE | DOCUMENT TITLE | VERIFICATION START | COMPLETION DATE |

| T.O. BASIC DATE | DOCUMENT BASIC DATE | |

| T.O. CHANGE NUMBER | DOCUMENT CHANGE NUMBER | ☐ VERIFICATION ☐ COMBINED V/V |

T.O. CHANGE DATE	DOCUMENT CHANGE DATE	TYPE OF DATA VERIFIED	DEPOT EFF
		☐ ENGINEERING DATA
CONTROL T.O. CONTRACTOR	REFERENCE DOCUMENT SOURCE	☐ SUPPLEMENTAL DATA

DATA MATRIX ELEMENTS

FLOW CHART NUMBER	FUNCTION NUMBER	REFERENCE DOCUMENT ELEMENTS			AFLC SIGNATURE	PUBLICATION ENGINEER	DATE	REMARKS
		PARAGRAPH	FIGURE	TABLE				

| VERIFICATION TEAM CHAIRPERSON | AFLC ACCEPTANCE | DATE |

AFSC Form 1286, JUN 87   PREVIOUS EDITIONS ARE OBSOLETE.

FIGURE 2. Depot Technical Data Verification Completion Record.

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DEPOT TECHNICAL DATA VERIFICATION RECOMMENDATION

FORM APPROVED:
OMB NO.: 0704-0188

	CONCUR	NON-CONCUR	DATE
AFLC			
AFTEC			
BMO			

REF DOCUMENT

DOCUMENT NUMBER

DOCUMENT TITLE

DOCUMENT CHANGE NUMBER

DOCUMENT CHANGE DATE

REF DOCUMENT SOURCE

REF DOCUMENT FUNCTION

REPARABLE ITEM CONFIGURATION

EQUIPMENT REQUIREMENTS

CONTRACTOR

CONTROL MANUAL NUMBER

T.O. TITLE

T.O. CHANGE NUMBER

TRC EFF

CONTROL NUMBER

VERIF NEED DATE

DATA MATRIX ELEMENTS

FLOW CHART NUMBER	FUNCTION NUMBER	REF DOCUMENT ELEMENTS		
		PARAGRAPH	FIGURE	TABLE

AFSC Form 1285, JUN 87

PREVIOUS EDITIONS ARE OBSOLETE.

FIGURE 3. Depot Technical Data Verification Recommendation

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5.2.2.6   Verification Approval.   Approval of the verification will be in accordance with TO 00-5-1.

5.3   Configuration Control.

5.3.1   The contractor shall maintain control manuals and supplemental data throughout the   development period   to assure adequate and accurate technical data when delivered.

5.3.2   Temporary changes prepared by the   depot   and   hardware   changes that impact referenced   engineering data and/or supplemental technical orders that occur between formal delivery and transfer of program management to AFLC will be monitored   by the   contractor for inclusion as formal changes to the basic manuals.

5.3.3   The contractor will   prepare   changes   and   revisions   as   dictated by changes in   equipment or   procedures.   Technical orders (control manuals) and technical orders (supplemental data), as prepared to this   standard, shall be changed or revised in accordance with TO 00-5-1 (see 6.2).

5.4   Preparation for   Delivery.   Packaging, packing and marking for shipment of depot technical data shall be in accordance with MIL-M-38784.

6.   NOTES

6.1   Intended Use.   The   purpose   of   this   publication   is   to   bring into conformity the preparation of military standards and handbooks, to ensure the inclusion of essential data and description for the selection and application of   items   and   processes,   and   to   aid   in   the   use   and   analysis   of DOD standardization document.

6.2   Data Requirements.   When this standard is used   in an   acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified   by an approved Data Item   Description (DD   Form 1664)   and delivered   in accordance with the approved CDRL incorporated into the contract.   When the provisions of DoD FAR Supplement Part 27, Sub-Part 27.475-1 are invoked and the DD Form 1423 is not used, the data specified   below   shall   be   delivered   by   the   contractor in accordance   with   the   contract   or purchase order requirements.   Deliverable data required by this standard is cited in the following paragraphs.

Paragraph No.	Data Requirement Title	Applicable DID
5.1, 5.2.2.5, 5.3.3	Depot Technical Order Control Manuals	DI-MISC-80843
5.1.4.1	Depot Technical Order Control Manual Outline	DI-MISC-80844

4.5, 5.1.4.3,   Technical Orders (Supplemental Data)   DI-MISC-80845
5.1.3.1.1,
5.2.2.4, 5.2.2.5,
5.3.3

5.2.1.4   Validation Completion Report,   DI-TMSS-80070
                  Technical Manuals

6.3 Subject Term (Key Word Listing). The following key words are to be used
by the contractor in the preparation of control and supplemental manuals (as
defined in this specification) without modification of their intent or
meaning.

        Aerospace Vehicle Equipment
        Technical Orders (Control Manual)
        Depot Support Equipment
        Depot Technical Data
        Logistics Support Analysis
        Maintenance Technical Orders (Control Manuals)
        Source Data
        System Requirements Analysis
        Technical Order
        Technical Order Management Agency
        Validation
        Verification

6.4 Changes From Previous Issue. Vertical lines or asterisks are not used
in this revision to identify changes with respect to the previous issue due
to the extensiveness of the changes.

Custodian: Preparing Activity:
    Air Force - 14   Air Force - 14

Review Activities:
    Air Force - 15

                                        Project Number MISC-F062

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APPENDIX A

DEPOT LEVEL OPERATIONS
AND
MAINTENANCE CONTROL MANUALS

10. SCOPE

10.1 Purpose. This appendix provides preparation instructions for depot level operations and maintenance control manuals.

10.2 Applicability. This appendix is a mandatory part of this standard and is applicable as shown in 1.2 of the basic standard.

20. REFERENCED DOCUMENTS. (Not Applicable)

30. DEFINITIONS. (Not Applicable)

40. GENERAL REQUIREMENTS

40.1 Content.

40.1.1 Type of Data. Manuals shall reference only that data required by technicians trained in performing depot level tasks (overhaul/maintenance/ repair) on AVE and SE.

40.1.2 Extent of Coverage. Each manual shall include sufficient information to effect a complete overhaul and repair of the equipment item. Include consideration of all operations such as receiving, inspection, teardown, assembly, calibration and application of special tools, the hook-up and use of test equipment, performance of tests (including acceptance tests), special handling requirements, special safety requirements, etc.

40.2 Automation Capability. Prepare technical orders with a capability for conversion to an automated TO system. Data will be formatted as required to allow conversion to a computer-assisted data retrieval system.

50. DETAILED REQUIREMENTS

50.1 Format. Comply with this standard. Include the following elements:

50.1.1 Title Page. The title page shall comply with MIL-M-38784.

50.1.2 List of Effective Pages. The list of effective pages ("A" page) shall comply with MIL-M-38784.

50.1.3 List and Status of Data to Be Verified. The list and status o' data to be verified ("B" page) shall be in accordance with Figure 4. The "B" Page shall list all unverified data. Such unverified data shall be identified by

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					LIST OF DATA TO BE VERIFIED

THE PARAGRAPHS AND TABLES THAT
REQUIRE VERIFICATION ARE LISTED BELOW

DATA MATRIX NO.	REF. DOC. NO.	PARA	FIG	TABLE	UNVERIFIED AT TRC INDICATED AND/OR WITH EQUIPMENT CONFIGURATION NOTED

ALL OTHER APPROVED REQUIREMENTS HAVE BEEN ACCOMPLISHED

"B"

FIGURE 4. Example of List of Data To Be Verified ("B" Page)

the data matrix number, and the referenced document number. The procedural data of the referenced document shall be identified by paragraph, figure, or table. Unverified data shall be listed against specific TRC locations or against reparable item configurations. As verifications are completed, they will be deleted so that the "B" page will reflect the unverified data status of that control manual at any point in time.

50.1.4   TO/Equipment Configuration Status Record ("C" Page). The "C" page shall be in accordance with Figure 5. Identify each revision and change to the TO/equipment configuration. Identify each approved Engineering Change Proposal (ECP)/Time Compliance Technical Order (TCTO) against equipment associated with each revision/change.

50.1.5   Table of Contents.   The table of contents shall comply with MIL-M-38784.

50.1.6   Section I, Introduction. Identify each of the following paragraphs by title and include, in the subparagraphs thereof, a brief and concise explanation of each.

    a.   Scope.

    b.   Application. Include a NOTE, indicating to the using technician that all referenced engineering data (3.12.1) in the Depot Support Matrix (Section III) are to be requisitioned from ALC Engineering Management Office in accordance with local procedures. Referenced technical orders (3.12.2) are to be requisitioned in accordance with TO 00-5-2.

    c.   Composition and Use.   Explain the composition and use of each section of the manual.

    d.   Depot Reparables List. Identify depot reparables, to the highest reparable level, which are included in the manual. Subindentured items need not be listed. Use official part/equipment numbers and nomenclature. If a CI number has been assigned, enter the number in parentheses directly below the part/equipment number. The Depot Reparables List shall be in tabular form as shown in Table I. List entries in alphanumerical order by part/equipment number.

Table I.   Depot Reparables List

Part/Equipment Number	Part/Equipment Nomenclature	Page Number

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TECHNICAL ORDER/EQUIPMENT CONFIGURATION, STATUS RECORD		
ECPs AND TCTOs AFFECTING THIS TECHNICAL ORDER ARE LISTED BELOW		
ECP/TCTO NUMBER	INITIAL TOCN NUMBER	REMARKS
WS-XXX-A-MMA-B622 (TCTO XXX-LG118A-210)	6	Hybrid Explicit Multiplexer
WS-XXX-A-MMA-B623 (TCTO XXX-LG118A-216)	6	PBV/Stage III Jumper
WS-XXX-A-MMA-B507R1	9	Deletion of Plate Finish from Mod 5 Section
CCP-2120	17	Incorporate ILCS Modification
WS-XXX-A-MMA-1286 (TCTO XXX-LG118A-518)	21	Incorporate Thrust Termination Event to Diagnostic Data Package
WS-XXX-A-MMA-1840	22	Modify R/V for Combat Training Launch
WS-XXX-A-MMA-1296 (TCTO XXX-LG118A-1742)	25	Incorporate ERCS Battery Monitor

"C"

FIGURE 5. Example of "C" Page (Technical Order Versus Equipment Configuration Status Record

e. **List of Support Equipment.** Identify the DSE required to perform each function for each reparable item by CI number (if available), part number, model number, nomenclature, manufacturer, and National Stock Number (if available). Use the format of Table II. In the first column, list each DSE item numerically for referencing in the Depot Support Matrix of Section III. Specify the quantity of each item of special tools/test equipment, if needed. Air Force standard test equipment will be identified for use except when specifically designated test equipment is required. This listing of tools and test equipment shall take precedence over tools and test equipment listed in reference documents.

Table II. List of Support Equipment

Item	Nomenclature	Part Number, Model Number and Manufacturer	National Stock Number	Configuration Item
1	Oscilloscope (2 each)	535A Tektronix	6625-00-799-7956	
2	Bridge, Impedance	250-DA Electro Scientific Industries	6625-00-534-7458	
3	Keyboard, Printer	1816-1 IBM	7440-00-458-3081	

50.1.7 Section II, Depot Functional Flow Charts. Include a depot functional flow chart as illustrated in Figure 6 depicting depot level functions required to overhaul each item of equipment for which the manual is prepared. These functions will be derived from the LSAR task analyses and further defined by the functions listed in 50.1.7.3.

50.1.7.1 Data Matrix Numbers. In the first column, assign data matrix numbers using a decimal system. Begin with the highest level indenture of s depot reparable item, identified by the first number, and progress to lower indentures designated by the second and succeeding digits. Reparables common to two or more CIs will be subsequently identified by the data matrix number first assigned to it.

50.1.7.2 Reparable Parts Number and Nomenclature. List the reparable parts by part number and nomenclature beginning with the highest level indenture

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DATA NUMBER MATRIX	INDENTURE	REPARABLE PART NUMBER AND NOMENCLATURE	FUNCTION					
			TEST a	REPAIR b	CHECKOUT c	CALIBRATE d		
	1	CI 00XXXXX 25-2377 Cooler, Liquid, Guidance Section						
1.1	2	1790-1B (10-20677-4) Amplifier, Electronic Control ASK-15-F37U	x					
1.1.1	3	25-78898-1 Temperature Monitor Module	x	x	x			
1.2	2	173-9504-2 Feedback Net	x	x				
1.2.1	3	2670-127 Feedback Network, Valve						
1.2.2	3	2670-130 Resistor Assembly	x	x				
1.2.3	3	2670-140 Output Assembly	x	x				
1.2.4	3	1670-201 Chopper Assembly, Pre-Amplifier	x	x	x			
1.3	2	1790-501 Inverter Assembly	x	x	x			
1.4	2	1790-603 Filter Assembly, Switch, Electro-Interference	x	x				

FIGURE 6. Example of Depot Functional Flow Chart

and progressing to the lowest. Identify the indenture level in the indenture column.

50.1.7.3   **Functions.**   Consider the following functions for applicability. Identify other functions, if required or necessary.

   a. Inspect

   b. Disassemble

   c. Clean

   d. Assemble

   e. Test

   f. Repair

   g. Checkout

   h. Alignment

   i. Service

   j. Handle

   k. Overhaul

   1. Remove

   m. Install

   n. Adjustment

   o. Adjust

   p. Purge

   q. Protect

   r. Store

   s. Temporary Preservation/Protection

   t. Special Handling or Condemnation Procedures

   u. Lubrication

   v. Printing, Refurbishing and Marking

   w. Reclamation

50.1.7.4 <u>Function Identifiers</u>. Identify functional columns with lower case alpha designators sequentially in the order of performance. Place an "X" in the functional columns only if the function is applicable to the reparable part identified.

50.1.7.5 <u>Depot Support Matrix Relationship</u>. Relate each part to the depot support matrix contained in Section III of the manual by entering in the appropriate column the data matrix number assigned on the depot support matrix.

50.1.8 <u>Section III, Depot Support Equipment and Data Matrix</u>. Identify the DSE and the support data (defined in 3.12) required to perform each function for each reparable item. Use the format of Figure 7. Abbreviations contained in Table III may be used in preparation of the depot support matrix. Other abbreviations may be used provided they are peculiar to the particular support data or equipment and are listed in a glossary within the manual.

Table III. Depot Support Matrix Abbreviations

Accel	Accelerate	Lub	Lubricate
Acpt	Acceptance	Maint	Maintenance
Adj	Adjustment	Meas	Measure/Measurement
Assy	Assembly	Mfg	Manufacture/Manufacturing
Diag	Diagram	Mod	Modification
Doc	Document	Opn	Operation/Operating
Dwg	Drawing	PL	Parts List
Elec	Electrical/Electronic	PN	Part Number
Equiv	Equivalent	P/O	Part of
Fctn	Function/Functional	Proc	Procedure
Ident	Identification	Rmv	Remove
Instr	Instruction	Schem	Schematic
Instl	Installation	Suppl	Supplement
LM	List of Material	Transp	Transportation

50.1.8.1 <u>Data Matrix</u>. The entry under the data matrix column shall be related by number, alpha designator and title to the function(s) identified for that item on the depot functional flow chart contained in Section II.

50.1.8.1.1 <u>Alpha Designator and Function Name</u>. Alpha designators and function names shall appear in the table in the order maintenance is performed (e.g., Remove, Test, Repair, Test, Install). When a calibration is not chronological and is performed as part of the maintenance flow, it shall be placed at the proper place on the table (e.g., Repair, Calibrate, Install). When calibration is periodic and not part of the normal

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DEPOT SUPPORT MATRIX

DATA MATRIX			SUPPORT EQUIPMENT (FROM TABLE II – SECTION I)	SUPPORT DATA		
NO.	FUNCTION	NAME		NUMBER	TYPE	APPLICATION
1.1	a	Test	1, 2, 3	Z2-31253 Para. 7.6.2.2	Doc	Fault Isolation
				X2-10337	Doc	Acceptance
				16385	Schem	Wiring Diagram

PART NO. 1790-1B   NAME: AMPLIFIER, ELECTRONIC   DATA MATRIX NO.   1.1
(10-20677-4)   CONTROL

FIGURE 7. Example of Depot Support Matrix

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maintenance flow, it shall be listed last for that data matrix number (e.g., Repair, Install, Calibrate).

50.1.8.2   Support Equipment.   List the DSE item numbers, from Table II of Section I, required to accomplish the task.

50.1.8.3 Support Data.   Identify all drawings, diagrams, specifications, technical manuals and other documents under the support data column that are necessary for the performance of the indicated function(s). When only parts of the identified document are required to support the function(s), indicate specific paragraphs, tables, and appendices.

50.1.8.3.1 List of Drawings, Diagrams, Specifications and Other Documents. The documents identified for a single function shall be listed in the order the documents will be used to perform that function.   Example, when removing a part, the technician would reference a drawing for parts identification and location before proceeding to the procedures in supplemental data.

50.1.8.4 Easy Reference. At the bottom of each page, in the space provided for that purpose, list each data matrix number identified on the page. Data matrix numbers shall be arranged in numerical sequence with second and subsequent data matrix numbers listed below the first in a vertical column.

50.1.8.5   Hardness Information.   The contractor shall indicate hardness critical items (HCIs) by placing **HCI** directly below and centered under the part number affected at the bottom of the page.

50.1.9   Section IV, Depot Data Status List (DDSL). In the preface to Section IV, include the following:

NOTE

> All data, referenced in Section III and utilized at the
> depot, must be at least as recent as that indicated in
> the following list. Some data may be more recent than
> indicated in this list if supplied since the last issue
> of this Control Manual, but in no case should any data
> be of an earlier version.   ALL VARIATIONS IN DATA
> STATUS MUST BE REPORTED.

50.1.9.1 Drawings/Documents. In the DDSL, Figure 8, record each drawing and document referenced in the Depot Support Matrix in alphanumeric sequence.

50.1.9.2   Sheet Number Identification. Identify the specific drawing sheet by the number which is applicable for the task.

50.1.9.3 Change Letter/Change Date.   Enter either the applicable change letter or change date of the drawing/document and sheet number identified.

DRAWING/DOCUMENT	SHEET NO.	CHG LTR OR CHG DATE	CHANGES
AA0101-003			Ref TO-XXX-XX-X
AA0102-004	1	B	
AA0108-008		C	
AA0203-406	3	E	
AA0301-038		F	
AA0303-019		A	
ABD473-101-024N		NC	
ABD473-105-024N		NC	
ABD473-187-024N		AV	
ABD1800-080-000N			Ref TO-XXX-XX-X
ABD1800-545-024N			Ref TO-XXX-XX-X
ABL1800-200-000N			Ref TO-XXX-XX-X
C78-18/201 VOL 1		12-19-79	
C78-18/201 VOL 2		12-19-79	

FIGURE 8. Example of Depot Data Status List

50.1.9.4   Changes.   List   incremental   changes such as Engineering Orders (EOs), Engineering Change Notices (ECNs), Advanced   Engineering Change Orders (AECOs), etc., which might be released against   the applicable drawing/ document. When documents listed are not subject to the configuration control of the   using control   manual, but   are supplied   under an associated control manual, list the number of the associated manual.

50.1.10 Reparable Parts Index. List in alphanumeric sequence all reparable equipment in Section III, see 50.1.8.4. Identify equipment by part number or type number, and identify the page(s) of Section III where the applicable SE and support data are referenced. See Figure 9.

50.1.11 Glossary. The glossary shall comply with MIL-M-38784.

60. NOTES

60.1   Incorporation of Data Changes. Data changes, additions, or deletions that affect the support data column of Section III in the control manual will normally be released concurrently with the referenced support data, whether by change page or revision.

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REPARABLE PART INDEX

Part/Equipment Number	Page Number	Part/Equipment Number	Page Number
ACAT201	3-359	01-00683-001, -002	3-482
BACC61R63P	3-591	01022-00001	3-591
BCAY199	3-359	03-01403-008	3-41
CR143Z10007	3-83	03-01404-003	3-44
GS3555	3-588	03-01404-003	3-44
GS3558	3-588	03-01415-003	3-46
HTE 21-51000-15	3-196	03-01489-003	3-47
HTE 21-51001-6,-7,-14	3-196	03-01494-003	3-44
HTE 25-41803-8, -22	3-196	10-20496-32	3-14
IT-53228	3-584A	10-20496-41, -42	3-13
KFB40	3-255	10-20677-4	3-4
KFB41	3-256	10-20842-3	3-83
KMX-131-1			
KMX-131-2			
LA10	3-582	10-21549-1	3-300
TE 25-43511-1	3-225	10-21552-6	3-356
VPS-51L	3-580	10-21553-20	3-354
W4000	3-194	10-21560-1	3-561
W4001	3-193	10-21652-1, -2	3-537
W4005	3-195	10-21653-1	3-525
01-00517-006	3-41	10-21668-1, -2	3-500B
01-00533-003	3-44	10-21676-1, -2	3-481
01-00682-001, -002	3-481		

FIGURE 9. Example of Reparable Part Index

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