

NOT MEASUREMENT
SENSITIVE

MIL-DTL-22202D

31 March 1999

SUPERSEDING

MIL-M-22202C

8 July 1977

DETAIL SPECIFICATION

AIRCRAFT CROSS-SERVICING MANUALS, TECHNICAL, PREPARATION OF

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for the preparation of cross-servicing manuals for aircraft. It is intended for use by maintenance activities at airfields/ships, other than that to which the aircraft is assigned, according to an established operational aircraft cross-servicing requirement among member nations of the North Atlantic Treaty Organization (NATO) and the Air Standardization Coordinating Committee (ASCC).

1.2 Detail. The level of detail contained in this specification is necessary to comply with International Standardization Agreements (ISAs) ratified by the United States.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in section 3 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in section 3 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Air Warfare Center Aircraft Division, Code 414100B120-3, Highway 547, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N7330

FSC TMSS

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

- MIL-PRF-5096 - Manuals, Technical – Inspection and Maintenance Requirements; Acceptance and Functional Check Flight Procedures and Checklists; Inspection Work Cards; and Checklists; Preparation of.
- MIL-PRF-9977 - Manuals, Technical and Checklists: Munitions/Weapons Loading Procedures, Non-nuclear and nuclear, and Packages, Standard Data: Munitions Loading Procedures, Non-nuclear.

STANDARDS

DEPARTMENT OF DEFENSE

- MIL-STD-38784 - Standard Practice for Manuals, Technical: General Style and Format Requirements.

(Unless otherwise indicated, copies of the above specifications and standards are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Nongovernment publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

See supplement 1 for list of International Standardization Agreements.

(Unless otherwise indicated, copies of NATO STANAGs and ASCC AIR STDs are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 General requirements.

3.1.1 Preparation requirements. The general manner of preparation and format for the cross-servicing manuals shall be in accordance with the requirements of MIL-STD-38784, except as modified herein.

3.2 Aircraft cross-servicing guides. Cross-servicing manuals are prepared to implement NATO STANAG 3430, "Responsibilities for Aircraft Cross-Servicing (ACS)" and AIR STD 25/45, "Aircraft Cross-Servicing Guides." The cross-servicing source documents are listed in the supplement to this specification and serve as guidance information to assist the preparers of manuals in the selection and application of the necessary criteria; they are not intended to be referenced to implement requirements in the cross-servicing manuals technical orders.

3.2.1 Cross-servicing categories. Aircraft cross-servicing is divided into two categories: Stage A and Stage B.

3.2.1.1 Stage A cross-servicing. The servicing of aircraft on airfields and/or ships which enables the aircraft to be flown on another mission, without change to the weapon configuration. The servicing includes the installation and removal of weapon system safety devices, refueling, replenishment of fluids and gases, drag chutes, starting facilities, and ground handling.

3.2.1.2 Stage B cross-servicing. The servicing of aircraft on airfields and/or ships which enables the aircraft to be flown on an operational mission. The servicing includes all Stage A services plus the loading of weapons and/or film or videotape, and the replenishment of chaff and flares. This includes the processing and interpretation of any exposed film or videotape from the previous mission. Also see MIL-PRF-9977.

3.2.2 General information. The manuals contain the minimum general maintenance and safety information in sufficient detail necessary to permit personnel providing the service to follow the correct procedure to cross-service that aircraft without reference to other more detailed national publications. The manual is the basic technical reference for aircraft cross-servicing, but supplemental checklists may be required for flight line use. To facilitate understanding by the host nation providing the service, the manual text shall be prepared in concise, factual and easily

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understood English and shall employ consistent terminology throughout. Technical phraseology requiring special knowledge shall be avoided except when no other wording will convey the intended meaning. Whenever such terms are used, they shall be explained in the glossary of terms required in 3.2.5.2.6. Colloquialisms, either of phraseology or terms, shall not be used. The cross-servicing manual shall identify in the appropriate chapter locations the International Standardization Agreements listed in the Supplement, and designate whether or not they apply.

3.2.3 Checklists. The checklists are intended to be practical supplements to the aircraft cross-servicing manual and should be cross-referenced in the appropriate section of the manual. Separate checklists need not be developed if national checklists are suitable for cross-servicing flight line use. As an example, weapons loading checklists normally contain minimum sequence of actions essential to ensure correct functioning and safety and therefore should not be altered but would be used for cross-servicing in their usual form. On the other hand, national servicing checklists often include special checks or detailed technical procedures not appropriate to cross servicing. In such cases, abbreviated cross-servicing checklists are required, which eliminate unnecessary steps for the experienced user. Also see MIL-PRF-5096.

3.2.4 Size. The guides shall be prepared in the standard 8 1/2 by 11 inch size.

3.2.5 Arrangement. The guides shall be arranged in the following manner:

Front Matter

Chapter 1 – Leading Particulars

Chapter 2 – Aircraft Handling, Launching and Recovery

Chapter 3 – Flight Line Servicing

Chapter 4 – Armament Systems

Chapter 5 – Locally Manufactured Equipment

Glossary

Index

3.2.5.1 Front matter. Front matter shall be prepared in accordance with MIL-STD-38784.

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3.2.5.1.1 Foreword. The foreword shall provide an explanation on the cross-servicing manual's scope and arrangement to assist in the use of the guide, including any relevant information such as acknowledging that the guide is provided in compliance with NATO STANAG 3430 and/or ASCC AIR STD 25/45.

3.2.5.1.2 Safety summary. Provide information necessary to acquaint personnel with the avoidable hazards associated with the aircraft. These instructions shall include hidden hazards such as interrelated system functions, seat and canopy ejection systems, and other cartridge-initiated devices. This information shall not replace specific precautions and warnings which are to be included wherever applicable throughout the manual or its supplements.

3.2.5.2 Contents of chapters.

3.2.5.2.1 Chapter 1, leading particulars. Chapter 1 shall detail the leading particulars for the aircraft and provide the general supporting information necessary to turn around the aircraft. The following shall be included:

a. General Description and Function of the Aircraft. A brief description of the aircraft and its function shall be provided to detail any relevant information to distinguish between production blocks or models covered by the manual. In particular, include the following:

- (1) A three-view (top, front and side) line drawing of the aircraft, showing principal overall dimensions, and required clearances in English and metric units.
- (2) A table detailing leading particulars of the aircraft and general description of its systems.
- (3) An illustration portraying danger area such as engine intake and exhaust, areas swept by propellers or rotors, radar emissions, and gun/rocket/chaff/flare trajectories.
- (4) An illustration portraying the permissible walkways on the aircraft.
- (5) An illustration, accompanied by safety measures where needed, portraying the maintenance accesses and openings which are applicable to aircraft cross-servicing.
- (6) An illustration portraying the internal arrangement for emergency shutoff of fuel sources and electrical circuits.

b. Maintenance Notes. The maintenance notes shall summarize the general information required to undertake cross-servicing tasks on the aircraft.

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c. Armament Installations. The additional information necessary to undertake Stage A aircraft cross-servicing of an armed aircraft shall be detailed in this part. The availability of standard armament handling equipment shall be fully considered. Supporting illustrations shall be provided where appropriate. Cross-reference may be made to the appropriate part of Chapter 4.

3.2.5.2.2 Chapter 2, aircraft handling, launching and recovery. This chapter shall provide the necessary information to handle the aircraft on the ground, and to launch and recover it from an airfield or ship where appropriate. Supporting illustrations shall be provided where practicable. The following shall be specified or included:

a. Cross-servicing Equipment List. The equipment and tools necessary to conduct Stage A or Stage B aircraft cross-servicing shall be listed in the manual and in the appropriate checklists. The lists shall be designed to permit the assembly of the equipment prior to the arrival of the aircraft. Each item shall be identified by a reference number, descriptive title, its purpose or function, the minimum performance capability (in both English and metric units) necessary for that equipment to perform the required handling, servicing or replenishment function, and by a NATO or ASCC identifying number and/or part number. Wherever the manual specifies the use of an item of equipment, its reference number shall refer it to the text and illustrations. Equipment which has to be manufactured by the host nation shall be identified and cross-referenced to the applicable drawing in Chapter 5. Any equipment normally carried in the aircraft, including safety devices, shall also be listed together with its purpose and storage location.

b. Pilot-to-Ground Electronic Communication. The procedures and requirements for establishing pilot-to-ground crew communication shall be described.

c. Methods of Grounding/Earthing. The procedures and requirements for grounding/earthing the aircraft shall be described.

d. External Electrical Power. Instructions for the connection of external electrical power to the aircraft shall be detailed. Requirements for voltage and frequency regulation, current type and magnitude, phase and power factor, for both maintenance and engine starting shall be included, along with any precautions.

e. External Hydraulic/Pneumatic Power. Instructions for the connection and application of external hydraulic power and pneumatic power to the aircraft shall be detailed. Requirements for nominal pressure, flow rate, temperature and engine starting times shall be included.

f. External Air Conditioning. Instructions for the connection and application of external air conditioning to the aircraft shall be described. Requirements for air mass flow rate, temperature, pressure, filtration, maximum permissible moisture content and dehumidification following cooling shall be included.

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- g. Towing or Winching. The procedures, limitations, and equipment for towing or winching the aircraft shall be described. The maximum force to be applied during towing or winching shall be specified to enable the correct shear pins to be fitted, as necessary. Any specific instructions necessary for positioning the aircraft in a hardened shelter shall also be included.
- h. Aircraft jacking. Instructions and requirements for aircraft jacking shall be provided.
- i. Picketing and Deck Securing. The procedures and patterns for picketing and deck securing at various wind and/or sea state conditions shall be described and illustrated.
- j. Folding Procedures. The procedures for folding the nose, wing, fin, pylons, or rotor blades shall be provided as appropriate. Details of any additional precautions necessary when external stores are fitted shall also be included.
- k. Safety Devices, Blanks, and Covers. The procedures and requirements for fitting safety devices, blanks, covers and gust locks shall be specified.
- l. Cockpit Access. The procedures for gaining access to the cockpit shall be detailed.
- m. Emergency Access and Crew Evacuation. The procedures for gaining emergency access shall be included. Details of crew harness release mechanisms are to be provided.
- n. Engine Starting. Information shall be provided to enable the ground crew to assist the pilot, as necessary, in starting the aircraft engine(s).
- o. Fire Fighting. Information to facilitate fire-fighting techniques shall be provided. It should include the location of all combustible and hazardous material.
- p. De-icing. Procedures for de-icing the aircraft shall be specified together with any restrictions on fluid application. Critical surfaces shall be identified.
- q. Ground Marshalling. Specific ground marshalling signals which depart from the normally accepted standard signals shall be identified.
- r. Inspection. Access and inspection procedures with illustrations where necessary shall be provided for daily, pre-flight, turnaround and post-flight inspections.
- s. Carrier-borne Aircraft. The address from which aircraft catapulting and arrested landing information can be obtained shall be provided.

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NOTE: US Navy catapulting and arrested landing information for carrier-borne aircraft can be obtained from:

Commander
Code 480000B150-3
Naval Air Warfare Center Aircraft Division
Highway 547
Lakehurst, NJ 08733-5037

t. Emergency Crash Handling. In the event of any emergency wherein a crash-damaged or disabled aircraft must be removed, the procedures necessary to properly secure and safety the aircraft shall be specified. An illustration in the format of figure 1 shall be provided, locating the fuselage structural hardpoints for hoisting the aircraft with "belly band" type fabric slings.

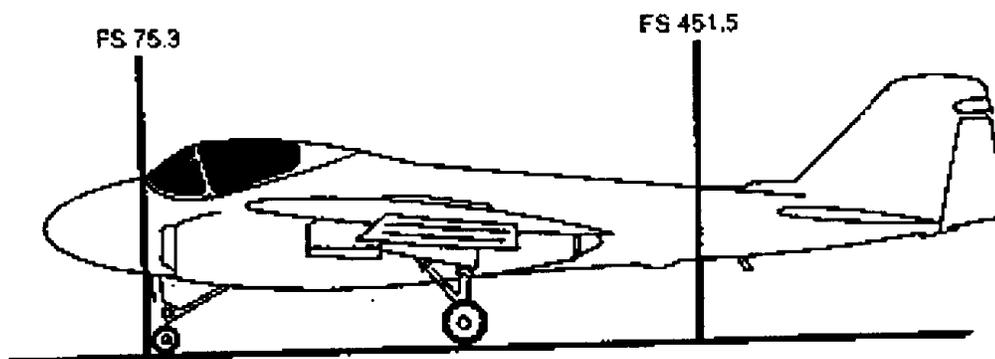


FIGURE 1. Crash handling structural hardpoints.

u. Helicopters Operating from Ships. The recommended performance parameters, illustrated as necessary for takeoff and recovery on landing platforms of ocean going vessels, shall be provided. Particular emphasis shall be given to the clearances required which shall be illustrated in the format of figure 2 using a line drawing of the actual helicopter.

3.2.5.2.3 Chapter 3, flight line servicing. This chapter shall describe the specific maintenance actions to be undertaken to satisfactorily complete Stage A aircraft cross-servicing. Supporting illustrations shall be provided wherever necessary. The following shall be included:

a. Consumable Materials. A list of consumable materials with acceptable and emergency alternatives shall be provided. The materials shall be identified by the appropriate NATO/ASCC code numbers and/or other identifying national part numbers or specifications along with cross-references to other member nations' designations.

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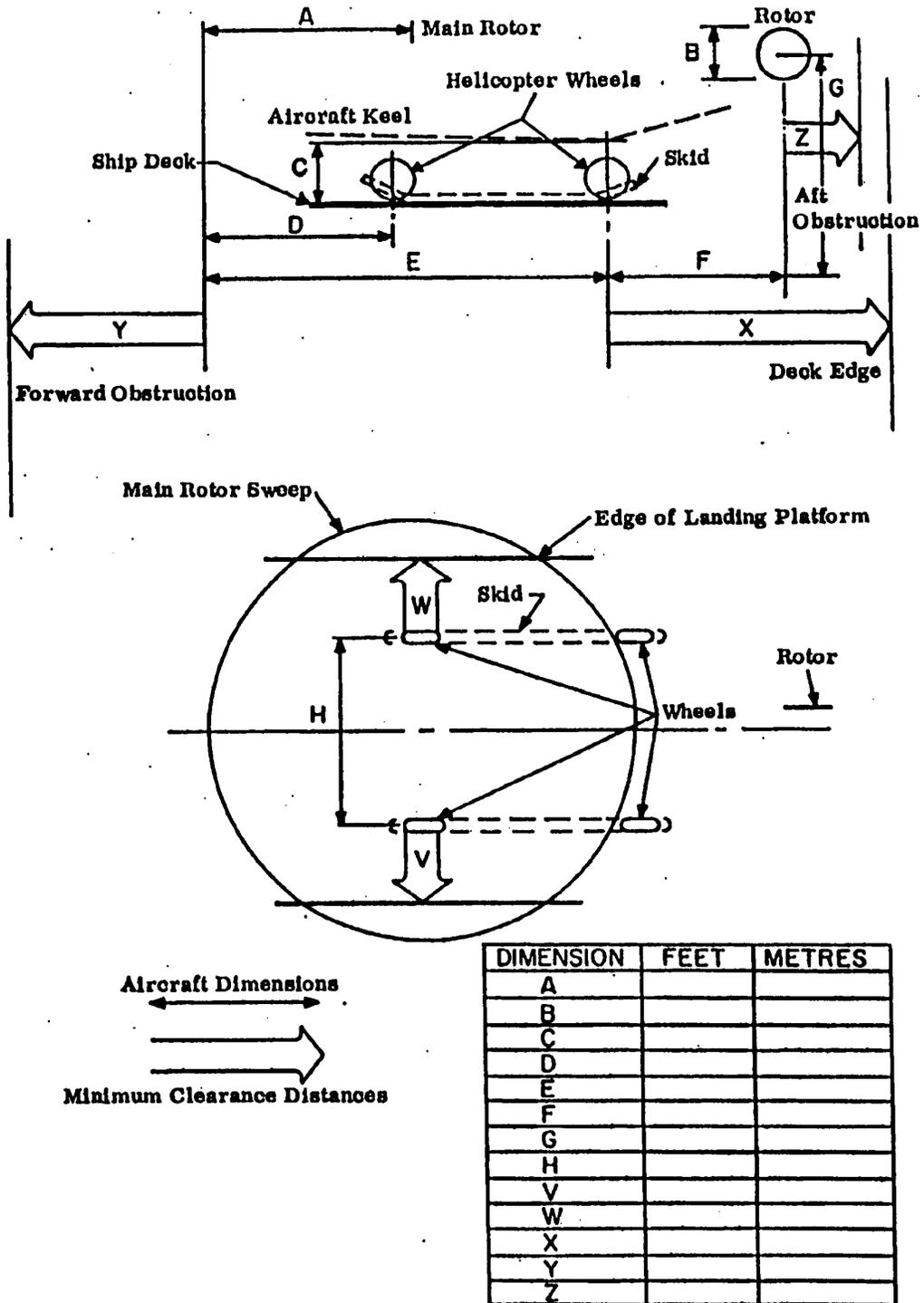


FIGURE 2. Helicopter clearance requirements.

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- b. Replenishment and Drain Points. All replenishment and drain points shall be identified. NATO/ASCC symbols and NATO/ASCC code number shall be included where appropriate.
- c. Replenishment Connectors. Details of the type of replenishment connector, coupling or fitting shall be provided and shall be cross-referenced to the appropriate replenishment point(s).
- d. Capacity of Systems. Details of the capacities of the systems liable to require replenishment shall be provided in English and equivalent metric units.
- e. Methods of Replenishment/Emptying. The preferred method of replenishment or emptying, and any alternative methods, shall be described.
- f. Access and Aircraft Cross-servicing Procedures. The methods for gaining access and undertaking aircraft cross-servicing procedures shall be described. Any actions required immediately after landing shall be clearly identified. Mandatory entries required in the aircraft maintenance records form shall be specified.
- g. Cross-servicing in Hardened Aircraft Shelter. Details of any additional or amended procedures and precautions that are necessary when the aircraft is replenished or cross-serviced in a hardened shelter shall be provided.
- h. Drag Chute Procedures. Drag chute packing and installation procedures shall be included.
- 3.2.4.2.4 Chapter 4, armament systems. This chapter shall identify the general maintenance and detail any special aircraft handling to be undertaken to satisfactorily complete Stage B armament cross-servicing on the aircraft and shall be complementary to the NATO/ASCC cross-servicing checklists prepared as specified in MIL-PRF-9977. Supporting illustrations shall be provided wherever necessary. This chapter shall include the following:
- a. Description. A brief description of the aircraft armament systems shall be provided.
- b. Safety Devices. The armament safety devices shall be described together with their intended purpose and the requirements for their installation and subsequent checking.
- c. Safety Procedures. The required safety procedure for handling, loading and down-loading an armed aircraft shall be detailed.
- d. Post-Flight Safety Procedures. The procedures to be followed immediately after landing to make an armed aircraft safe shall be described.

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e. Voltage Checks. The requirements and procedures for “stray voltage” or “no voltage” checks shall be specified.

f. Weapon Loading/Down-Loading. The weapon loads cleared for carriage by the aircraft shall be listed and cross-referenced to the supplemental checklists containing the detailed weapon loading and down-loading procedures. The requirements and procedures to make host nation’s weapons compatible with owner nation aircraft shall also be specified, and included in the aircraft cross-servicing checklist.

g. Pre-Flight Arming Procedures. The procedures for arming the aircraft immediately prior to flight shall be specified.

h. Failed or Unexpended Munitions. The procedures and specific safety precautions for handling munitions (missiles, bombs, rockets, gun ammunition and chaff and flare cartridges which either failed to release or were not expended shall be described and included in a supplemental checklist. Any mandatory reporting requirements or entries in the aircraft maintenance records form shall be specified.

3.2.5.2.5 Chapter 5, locally manufactured equipment. This chapter shall contain a list and product drawings of all items which may have to be manufactured locally by the host nation to enable cross-servicing to be performed. The drawings shall contain sufficient information regarding materials as to enable the selection of suitable alternatives.

3.2.5.2.6 Glossary. Explanation of technical terms and abbreviations used throughout the cross-servicing manual shall be contained in a glossary immediately following Chapter 5.

3.2.5.2.7 Index. An alphabetical index by subject matter shall be the last item in the cross-servicing manual.

4. VERIFICATION

4.1 Verification. Verification shall be conducted as prescribed in the contract.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When the actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point’s packaging activity within the Military Department or Defense Agency, or within the Military Department’s Systems Command. Packaging data retrieval is available from the managing

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Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. This specification is intended for use in the preparation of cross-servicing manuals in conformance with NATO STANAG 3430 and ASCC AIR STD 25/45. The manuals covered by this specification are military-unique because they implement US obligations ratified in international standardization agreements for cross-servicing of member nations' aircraft.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
- c. Packaging requirements (see 5.1).
- d. Verification requirements (see 4.1).

6.3 Technical manuals. The requirement for technical manuals shall be considered when this specification is applied on a contract. If technical manuals are required, specifications and standards that have been cleared and listed in DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL) must be listed on a separate Contract Data Requirements List (DD Form 1423), which is included as an exhibit to the contract. The technical manuals must be acquired under separate contract line item in the contract.

6.4 International standardization agreements. The entire section 3 is the subject of international standardization agreements NATO STANAG 3430 and ASCC AIR STD 25/45. When amendment, revision, or cancellation of this specification is proposed which will modify the international agreements concerned, the preparing activity will take appropriate action through international standardization channels, including departmental standardization offices, to change the agreements or make other appropriate accommodations.

6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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CONCLUDING MATERIAL

Custodians:
Army - TM
Navy - AS
Air Force - 16

Preparing activity:
Navy - AS
(Project TMSS-0324)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.
NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
MIL-DTL-22202D

2. DOCUMENT DATE (YYMMDD)
990331

3. DOCUMENT TITLE

AIRCRAFT CROSS-SERVICING MANUALS, TECHNICAL, PREPARATION OF

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*

b. ORGANIZATION

c. ADDRESS *(Include Zip Code)*

d. TELEPHONE
(Include Area Code)
(1) Commercial:

7. DATE SUBMITTED
(YYMMDD)

(2) DSN:
(If Applicable)

8. PREPARING ACTIVITY

a. NAME
COMMANDER
NAVAL AIR WARFARE CENTER
AIRCRAFT DIVISION

b. TELEPHONE NUMBER *(Include Area Code)*
(1) Commercial (732) 323-2947 (2) DSN 624-2947

c. ADDRESS *(Include Zip Code)*
CODE 414100B120-3
HIGHWAY 547
LAKEHURST, NJ 08733-5100

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
Defense Logistics Agency (DLSC-LM),
Attn: Carla Jenkins/John Tascher
8725 John J. Kingman Road, Ste 2533
Fort Belvoir, VA 22060-6221
Telephone (703) 767-6874