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SUPERSEDING
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14 August 1987

PERFORMANCE SPECIFICATION TECHNICAL MANUAL AND FLIGHT CREW CHECKLISTS FOR AIR REFUELING PROCEDURES

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

1. SCOPE

1.1 Scope. This specification covers the preparation of air refueling procedures flight manuals and checklists that will provide flight crews with standard procedures and data to engage in air refueling operations as dictated by mission requirements.

1.2 Detail. The level of detail contained in this performance specification is necessary to comply with the requirements of the Joint Computer-aided Acquisition and Logistics Support (JCALS) system.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 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 sections 3 and 4 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: Det 2, HQ ESC/AV-2, 4027 Col Glenn Hwy, Suite 300, Dayton, OH 45431-1672 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC F7030

AREA 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 form a part of this specification 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**Military**

| | |
|--------------|--|
| MIL-PRF-7700 | Manuals and Abbreviated Checklists, Flight |
| MIL-PRF-5096 | Manuals, Technical: Inspection and Maintenance Requirements; Acceptance and Functional Check Flight Procedures and Checklists; Inspection Work Cards; and Checklists |

STANDARDS**Military**

| | |
|---------------|---|
| MIL-STD-38784 | Manuals, Technical: General Style and Format Requirements |
|---------------|---|

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

(Copies of specifications, standards, and other government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.3 Order of precedence. In the event of a conflict between the text of this document and references cited herein (except for related associated specifications or specification sheets), 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 Function of the manuals and checklists. The documents required herein shall consist of a single unclassified air refueling procedures manual, supplemental manuals, and the necessary checklists. These manuals shall include instructions for all pertinent crew members. They shall cover the necessary procedures for tanker-receiver cell formation, orbit, rendezvous, and air refueling with flying boom/receptacle and probe/drogue equipped aircraft. They shall also include all related information and data, necessary to the operational procedures of air refueling, such as terminology, communication procedures, pertinent tables, diagrams, and profile charts, as applicable, and as provided for herein.

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3.2 General specification. The requirements of MIL-STD-38784 apply. As specified by the acquiring activity, the exceptions and additions specified herein, shall apply to the air refueling procedures manual and the supplemental manuals covered by this specification.

3.2.1 Exceptions and additions to MIL-STD-38784. The following exceptions and additions to MIL-STD-38784 shall apply as indicated by paragraph headings:

3.2.1.1 List of illustrations. Lists of illustrations shall not be required. Illustrations shall be identified by an asterisk preceding entries in the alphabetical index.

3.2.1.2 Part nouns. Part nouns shall be specified by the acquiring activity, standardized, and not necessarily as reflected on the engineering drawings.

3.2.1.3 References. In the paragraph entitled "References," the following changes shall be made: General temperature references shall be given in degrees Celsius in lieu of degrees Fahrenheit. In lieu of requiring the text to refer to speed and distance readings as calibrated by the equipment, the speed and distance readings shall designate if the reading is indicated, calibrated, true, etc. Further, the readings shall indicate the units, e.g., nautical miles, feet, seconds, etc.

3.2.1.4 Figure titles. In the paragraph entitled "Figure titles," tabulated information, and illustrations shall be identified by the word "figure," and by Arabic numerals. For example, the 17th figure (illustration or tabulated information) appearing in section II shall be "Figure 2-17."

3.2.1.5 Revisions. When specified by the acquiring activity, a revision shall be prepared (see 6.2).

3.2.1.6 Sections. Each new section of the manual shall begin on a right-hand page, and shall have a table of contents listing the major elements of the section (see 3.4.1.4).

3.2.1.7 Foldouts. Foldout pages shall not be required.

3.2.1.8 Classified information. The air refueling procedures manual, and the supplemental manuals, shall not contain classified information. If the acquiring activity requires the inclusion of classified information to meet the requirements of this specification, the classified material shall be placed in classified supplements to the air refueling procedures manual, and the applicable supplemental manuals (see 6.2).

3.2.1.9 Publication references. References to other publications, pertinent technical orders, and government publications shall be made as necessary. If a small amount of applicable information is needed from another publication, the applicable portion shall be extracted, modified if necessary, and included, if an appreciable amount of its contents is applicable. When requirements are specified by referencing another publication, the requirements shall be obtainable from the referenced publication without referring to an additional publication.

3.2.1.10 Alphabetical indexes. All supplemental manuals, regardless of the number of paragraphs, shall have alphabetical indexes.

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3.2.1.11 Position abbreviations. If it is necessary to designate that certain procedural items are accomplished by specific crew members, the abbreviations for crew member positions shall be in accordance with MIL-PRF-7700. These abbreviations shall be compatible with the applicable aircraft flight manual format. If position abbreviations are used, they shall be reflected in the glossary (see 6.5).

3.2.1.12 Paragraphs. Paragraph headings shall be as specified in MIL-PRF-7700. Paragraph numbering shall not be used.

3.2.1.13 Format. All air refueling procedures manuals, regardless of the number of pages, shall be prepared in the same format.

3.3 Type of documents to be prepared. The documents shall consist of a single unclassified air refueling procedures manual, supplemental manuals covering each model of tanker aircraft, supplemental manuals covering each type and/or model of receiver aircraft, and checklists for each type or model, as required. The manuals and checklists shall be delivered in electronic or paper copy as specified in the contract (see 6.2). Document type definitions (DTDs) have not been included at this time. When electronic delivery of the manuals is required by the acquiring activity, DTDs shall be prepared by the contractor, and submitted to Det 2, HQ ESC/AV-2 for approval. The air refueling procedures manual, and supplemental manuals, shall be arranged in accordance with the outlines specified herein.

3.4 Air refueling procedures manual. The air refueling procedures manual shall contain four major areas (see 6.7). Additional data and information may be required by the procuring activity (see 6.2). The four major areas shall be as follows:

- a. Front matter
- b. General
- c. Flying safety
- d. Terminology

3.4.1 Front matter (air refueling procedures manual). The front matter of the air refueling procedures manual shall consist of the following, in the order listed:

- a. Title Page
- b. List of Effective Pages
- c. Status Page for Safety and Operational Supplements
- d. Table of Contents
- e. Table of Supplemental Manuals
- f. Introduction

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3.4.1.1 Title page. The title page for the air refueling procedures manual shall be in accordance with the requirements of MIL-STD-38784, with the exception of the following special requirements (see figure 1).

3.4.1.1.1 Illustration. A large, clear, black and white photographic view of two aircraft performing air-to-air refueling, with appropriate background scenery, shall be placed on the title page. Each change and/or revision shall contain the same view. The placement of the illustration shall not interfere with any printed matter. Digital photographs may be used, if requested by the acquiring activity (see 6.2).

3.4.1.1.2 Title. The words FLIGHT CREW AIR REFUELING MANUAL shall be used, and the type designation may be presented in any size and format suitable for an attractive title page. The words FLIGHT MANUAL shall not be used.

3.4.1.1.3 Supersedure notice. The supersedure notice, for a change or revision, shall be placed so that it does not interfere with the illustration. It shall include a list of all currently incorporated operational and safety supplements. It shall also include a reference to the appropriate technical order index for the current status of flight crew manuals and operational and safety supplements. When several sequenced supplements are incorporated, they shall be grouped. When no operational or safety supplements are replaced, the notice shall read: REFER TO TECHNICAL ORDER INDEX T.O. (Applicable T.O. Number) FOR CURRENT STATUS OF SAFETY AND OPERATIONAL SUPPLEMENTS.

3.4.1.2 List of effective pages. The provisions of MIL-STD-38784 shall apply.

3.4.1.3 Status page for safety and operational supplements. A status page for safety and operational supplements shall be included (see figure 2).

3.4.1.4 Table of contents. The table of contents shall include the major elements of the manual. The provisions of MIL-STD-38784 for tables of contents shall apply.

3.4.1.5 Table of supplemental manuals. A list of each of the supplemental manuals shall be included as a table in the air refueling procedures manual.

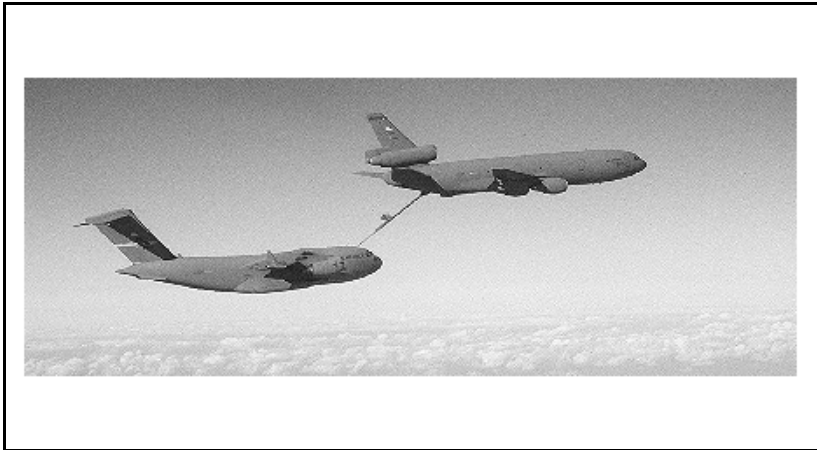
3.4.1.6 Introduction. The introduction shall contain the scope of the manual and any other pertinent data required by the acquiring activity (see 6.2). In addition to the specific information required by this specification, additional information may be added as necessary. The introduction shall include the following paragraphs:

SCOPE. This manual is designed to be used in conjunction with the applicable flight manual and to provide information to all crew members who participate in air refueling operations. Deviations from the procedures contained in this manual must be authorized in detail by a specific operations order or a command directive. Proper control and utilization of the manual will insure concurrent inter-command distribution of standard and up-to-date air refueling data to tanker and receiver crew members. This manual contains information that is general in nature; each supplement contains more specific procedural and need-to-know information for a particular tanker/receiver combination. Each supplement is identified by a numerical designator, a listing of which is contained in the table of contents. Detailed information concerning individual aircraft air refueling systems, limitations, and performance is not contained in this manual.

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T.O. 1-1C-1

FLIGHT CREW AIR REFUELING MANUAL



F34601-92-D-0311

THIS PUBLICATION SUPERSEDES T.O. 1-1C-1, DATED 15 JUNE 1991.

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HANDLING AND DESTRUCTION NOTICE - Comply with the distribution statement, and destroy by any method that will prevent disclosure of contents or reconstruction of the document.

Refer to technical order index T.O. 0-1-1-1 for current status of safety and operational supplements.

Commanders are responsible for bringing this publication to the attention of all affected Air Force personnel.

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15 APRIL 1994

FIGURE 1. Example of an air refueling procedures flight manual title page.

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T.O. 1-1C**STATUS OF SAFETY AND OPERATIONAL
SUPPLEMENTS**

This supplement status page is based on information available to the manual editor as of the date of this publication. The information may not be current and must be updated by any subsequent supplement status pages and by reference T.O. 0-1-1-1.

SUPPLEMENTS IN THIS CHANGE

| Number | Date | Short Title | Section Affected |
|---------------|-------------|--------------------|-------------------------|
|---------------|-------------|--------------------|-------------------------|

OUTSTANDING SUPPLEMENTS

| Number | Date | Short Title | Section Affected |
|---------------|-------------|--------------------|-------------------------|
|---------------|-------------|--------------------|-------------------------|

FIGURE 2. An example of a safety and operational supplement status page.

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SOUND JUDGEMENT. Procedures in this manual are mandatory and must be performed in the prescribed manner, except where deviations are required in the interest of safety of flight.

HOW TO GET PERSONAL COPIES. The required quantities should be ordered before you need them, to assure their prompt receipt. Individual requirements are to be identified to the unit Technical Order Distribution account custodian. Basically, you must order the required quantities on the technical order index (TO 0-1-1-1). Technical Order 00-5-2 gives detailed information for properly ordering these publications. A system shall be established at each base to deliver these publications to the crews immediately upon receipt.

WARNINGS, CAUTIONS, AND NOTES. The following definitions apply to Warnings, Cautions, and Notes found throughout the manual:

WARNING: Operating procedures, techniques, etc., which can result in personal injury or loss of life if not carefully followed.

CAUTION: Operating procedures, techniques, etc., which can result in damage to equipment if not carefully followed.

NOTE: An operating procedure, technique, etc., which is considered essential to emphasize.

SHALL, WILL, SHOULD, AND MAY. The following definitions apply to the words shall, will, should, and may:

SHALL: the instructions or procedures prefaced by SHALL are mandatory.

WILL: the instructions or procedures prefaced by WILL are mandatory. WILL is also used to indicate simple futurity, e.g., "loss of hydraulic power will affect operations."

SHOULD: SHOULD is normally used to indicate a preferred, but nonmandatory method of accomplishment.

MAY: May is used to indicate an acceptable but nonmandatory means of accomplishment.

YOUR RESPONSIBILITY - TO LET US KNOW. Every effort is made to keep this manual current. Review conferences with operating personnel and a constant review of accident and flight test reports assure inclusion of the latest data in the manual. We cannot correct an error unless we know of its existence. In this regard, it is essential that you do your part. Comments, corrections, and questions regarding this manual, or any phase of the flight manual program, are welcome (see 6.2h).

3.4.2 General. This section shall contain the following general information and operational procedures which encompass air refueling operations by all types of aircraft:

- a. Command and control of tanker/receiver forces
- b. General tanker/receiver responsibilities (information which is peculiar to specific aircraft types/models shall be covered in supplemental manuals.)

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- c. Refueling airspace requirements
- d. Weather restrictions
- e. Communications requirements
- f. Visual signals

3.4.3 Flying safety. This section shall address flying safety issues which are peculiar to air refueling operations in general, e.g., flying large numbers of dissimilar aircraft in close proximity, conducting rendezvous in controlled airspace, etc. This section shall contain those specific guidelines and lessons learned as specified by the acquiring activity. Broad generalizations shall be avoided.

3.4.4 Terminology. This section shall include a comprehensive glossary of terms and abbreviations used in air refueling operations. Terms which refer only to a particular class of aircraft or refueling technique, e.g., fighter, bomber, probe/drogue, boom/receptacle, etc., shall be clearly identified.

3.5 Supplemental manuals. The supplemental manuals shall contain the following:

- a. Front Matter
- b. Section I - General
- c. Section II - Departure/En Route Procedures
- d. Section III - Rendezvous Procedures
- e. Section IV - Air Refueling Procedures
- f. Section V - Emergency Procedures

3.5.1 Front matter (supplemental manuals). The front matter of supplemental manuals shall consist of the following:

- a. Title Page
- b. List of Effective Pages
- c. Status Page for Safety and Operational Supplements
- d. Table of Contents
- e. Introduction

3.5.1.1 Title page. Title pages for supplemental manuals shall be in accordance with the general requirements of MIL-STD-38784, with the exception of the following special requirements (see figure 3).

3.5.1.1.1 Illustration. A large, clear, black and white photographic view of the aircraft in flight, with appropriate background scenery, shall be placed on the title page. Each change and/or revision shall

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contain the same view. The placement of the illustration shall not interfere with any printed matter (see 6.10).

3.5.1.1.2 Title. The words FLIGHT CREW AIR REFUELING PROCEDURES shall be used, and the type designation may be presented in any size and format suitable for an attractive title page. When applicable, the words PRELIMINARY, UTILITY, or PARTIAL shall be placed above the words FLIGHT CREW AIR REFUELING PROCEDURES. The words FLIGHT MANUAL shall not be used.

3.5.1.1.3 Supersedure notice. The supersedure notice, for a change or revision, shall be placed so that it does not interfere with the illustration. It shall include a list of all currently incorporated operational and safety supplements. This notice shall also include a reference to the appropriate technical order index for the current status of flight crew manuals, operational and safety supplements, and checklists. Incorporated supplements shall normally be listed individually. When several sequenced supplements are incorporated, they shall be grouped. When no operational or safety supplements are replaced, the notice shall read: REFER TO TECHNICAL ORDER INDEX TO (APPLICABLE TO NUMBER) AND ITS SUPPLEMENTS FOR CURRENT STATUS OF OPERATIONAL SUPPLEMENTS AND FLIGHT CREW CHECKLISTS.

3.5.1.2 List of effective pages. A listing of current flight crew air refueling checklists, with the basic and change dates, shall be added to the bottom of the last page of the list of effective pages (see figure 4).

3.5.1.3 Status page for safety and operational supplements. A status page for safety and operational supplements shall be included (see figure 2).

3.5.1.4 Table of contents. The table of contents shall include the major elements of the manual. The requirements of MIL-STD-38784 for tables of contents shall apply (see 6.8). As an additional requirement, each section shall have a table of contents listing the major elements of the section.

3.5.1.5 Introduction. The introduction shall contain the scope of the manual and any other pertinent data required by the acquiring activity (see 6.2). In addition to the specific information required by this specification, additional information may be added as necessary. The introduction shall include the following paragraph:

SCOPE. This manual is designed to be used in conjunction with the applicable flight manual and the air refueling procedures manual and to provide information to all crew members who participate in air refueling operations. Deviations from the procedures contained in this manual must be authorized in detail by a specific operations order or a command directive. Proper control and utilization of the manual will insure concurrent inter-command distribution of standard and up-to-date air refueling data to tanker and receiver crew members. Detailed information concerning individual aircraft air refueling systems, limitations, and performance is not contained in this manual.

3.5.1.5.1 Paragraph titles. The introduction shall also include the following paragraphs: "SOUND JUDGEMENT," "HOW TO GET PERSONAL COPIES," "WARNINGS, CAUTIONS, AND NOTES," "SHALL, WILL, SHOULD, AND MAY," and "YOUR RESPONSIBILITY - TO LET US KNOW," as specified in paragraph 3.4.1.6.

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T.O. 1-1C-1-8

FLIGHT CREW AIR REFUELING PROCEDURES



SUPPLEMENT VIII

F34601-94-D-1296

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(See index T.O. 0-1-1-1, for current status of Safety and Operational Supplements and Flight Crew Checklists.)

Commanders are responsible for bringing this publication to the attention of all affected Air Force personnel.

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1 MAY 1995

FIGURE 3. Example of a supplemental flight manual title page.

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T.O. 1-1C-1-8

Technical orders are normally distributed promptly after printing. Date(s) shown on the title page (lower right) are for identification only. This is not a distribution date. Processing time sometimes causes distribution to only appear to have been delayed.

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

LIST OF EFFECTIVE PAGES

NOTE: The portion of text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of Issue for original and changed pages are:

| | | | | | |
|----------------------|----------|--------------------|-----------|--------------------|-----------|
| Original 0 | 1 May 78 | Change 3 | 20 Nov 81 | Change 6 | 30 Nov 84 |
| Change 1 | 1 Jul 79 | Change 4 | 1 Feb 83 | | |
| Change 2 | 1 Nov 80 | Change 5 | 15 Dec 83 | | |

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 54 CONSISTING OF THE FOLLOWING:

| Page No. | Change No. | Page No. | Change No. | Page No. | Change No. |
|---------------------------|------------|----------------------|------------|----------------------|------------|
| Title | 6 | 1-6 | 0 | 3-1 | 4 |
| A | 6 | 1-6A | 6 | 3-2 | 2 |
| Flyleaf 1 | 5 | 1-6B | 6 | 3-2A | 5 |
| Flyleaf 2 Blank | 5 | 1-7 - 1-8 | 0 | 3-2B Blank | 5 |
| I - ii | 5 | 1-9 | 6 | 3-3 - 3-4 | 6 |
| iii | 6 | 1-10 Blank | 6 | 3-5 | 5 |
| iv Blank | 6 | 2-1 - 2-2 | 0 | 3-6 | 4 |
| 1-1 - 1-3 | 4 | 2-3 | 5 | 4-1 - 4-2 | 0 |
| 1-4 | 3 | 2-4 - 2-5 | 0 | 4-3 - 4-4 | 1 |
| 1-5 | 4 | 2-6 Blank | 0 | 4-5 | 5 |

CURRENT FLIGHT CREW AIR REFUELING CHECKLIST

1-1C-1-8CL-1 15 Apr 74 Change 8 15 Dec 83

Upon receipt of the second and subsequent changes to this technical order, personnel responsible for maintaining this publication in current status will ascertain that all previous changes have been received and incorporated. Action should be taken promptly if the publication is incomplete.

ADDITIONAL COPIES OF THIS PUBLICATION MAY BE OBTAINED BY USAF ACTIVITIES IN ACCORDANCE WITH T.O. 00-5-2.

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FIGURE 4. An example of a list of effective pages.

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3.5.2 Section I - general. Section I shall contain information on mission planning and communications. It shall be arranged as follows:

3.5.2.1 Mission planning. The mission planning subsection shall contain a presentation of all mission factors and criteria which must be considered when planning air refueling operations.

3.5.2.2 Communications. The communications subsection shall incorporate all procedures for inter-plane communications, both oral and visual, normal and/or mandatory radio calls, and visual signals, during radio silence air refueling. Visual signals which are defined in the air refueling procedures manual shall not be duplicated.

3.5.3 Section II - departure procedures. Section II shall contain procedures for buddy and cell departures, aborts, climb separation, element/cell join-up, and radar station keeping.

3.5.3.1 En route procedures. This subsection shall describe refueling cell composition and tanker/receiver formations. Responsibilities for navigation and position reporting shall be provided by the acquiring activity. Post refueling, cell termination, weather abort, and lost wingman procedures shall be described, using illustrations as necessary.

3.5.4 Section III - rendezvous procedures. Section III shall contain the subsections specified herein.

3.5.4.1 General. This subsection shall contain general information about refueling rendezvous, to include weather requirements, altimeter settings, use of navigation aids, and use of altitude blocks for separation.

3.5.4.2 Rendezvous equipment. This subsection shall describe rendezvous equipment used by each type of compatible receiver or tanker.

3.5.4.3 Receiver formation during rendezvous. This subsection shall specify the types of formations to be flown by receivers, from the air refueling initial point (ARIP) to the point where join-up is complete. Procedures for day visual meteorological conditions and night/weather formations shall be described. Procedures for early arrival at the tanker(s) shall also be specified.

3.5.4.4 Detailed rendezvous procedures. This subsection shall specify detailed procedures for each type of refueling rendezvous, to include point parallel, on-course, en route, and alternate rendezvous procedures, where applicable. Special procedures for specific tanker/receiver combinations shall be included. Illustrations shall be used to depict tanker and receiver tracks for each type of rendezvous. When necessary, charts shall be included to facilitate calculation of turn range and offset. Holding procedures shall be described and illustrated for each type of rendezvous. Receiver descent, closure, and rendezvous overrun procedures shall be specified.

3.5.5 Section IV - air refueling procedures. Section IV shall contain procedures to be used, from the first receiver's arrival in the precontact position, until the completion of air refueling operations. It shall contain the subsections specified herein.

3.5.5.1 General. This subsection shall explain the scope and content of section IV. Additionally, it shall contain general information, about air refueling procedures, which does not pertain to any other subsection. The importance of optimum techniques and vigilance, while in close formation, shall be stressed.

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3.5.5.2 Refueling sequence. This subsection shall contain guidelines for determining the refueling sequence of multi-ship receiver flights. Procedures and techniques for moving to and from the precontact position shall be discussed. Responsibility for determining and modifying refueling sequence shall be specified.

3.5.5.3 Precontact. This subsection shall describe the precontact position, and shall discuss precontact procedures and techniques to be used by receivers.

3.5.5.4 Contact and air refueling procedures. This subsection shall contain procedures and techniques to be used, by all participating crew members, during contact and fuel transfer. Boom/receptacle and/or probe/drogue procedures shall be described, as applicable. Each tanker flight manual shall contain a line drawing of each compatible receiver aircraft, which accurately depicts its proper contact position from the boom operator's aspect, and the proper position for the boom or drogue. Receiver flight manuals shall illustrate boom envelope limits, correlated where possible, with the receiver/director light displays for each compatible tanker. A line drawing shall depict each compatible tanker and boom/drogue assembly, as they would appear to a receiver pilot, in the proper contact position. Procedures/techniques for closure and effective contact, afterburner refueling, toboggan, and disconnect procedures, shall be discussed. Normal fuel transfer rates shall be listed for each tanker/receiver combination.

3.5.5.5 Fuel management. This subsection shall contain procedures for managing fuel load and center of gravity.

3.5.5.6 Normal flight crew procedures. This subsection shall contain detailed flight crew procedures, for air refueling, which shall supplement the normal procedures in section II of the flight manual. They shall be presented in the same format, specified by MIL-PRF-7700. Each crew position, with duties during air refueling, shall have procedures listed by the following phases of the air refueling operation, as applicable: Hot Armament Safety Check, (in-flight); Rendezvous and Predescent (normally 30 minutes prior to Air Refueling Control Time (ARCT); Precontact/Preparation for contact (prior to ½ N/M); Disconnect; and Post Air Refueling.

3.5.6 Section V - emergency air refueling procedures. Section V shall contain detailed emergency procedures, for air refueling, which supplement the emergency procedures in section III of the flight manual. They shall be presented in the same format, specified by MIL-PRF-7700 and MIL-STD-38784. Procedures shall be included for the following: breakaway; air refueling system malfunctions; reverse flow air refueling; refueling with engine failure(s) or other aircraft malfunctions; and responsibilities in the event of crash landing, ditching, or bailout, as applicable.

3.6 Checklists. Air refueling checklists shall be prepared in accordance with MIL-PRF-7700 and MIL-PRF-5096. They shall contain the following:

- a. Normal flight crew procedures (see 3.5.5).
- b. Emergency procedures (see 3.5.6).
- c. A table of air refueling visual signals.

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4. VERIFICATION

4.1 Verification. Unless otherwise specified in the contract or purchase order:

- a. Validity of the accuracy and scope of the air refueling manuals and checklists technical content, and user interface functionality shall be the responsibility of the contractor (see 6.3).
- b. The contractor shall provide suitable facilities to perform the validation functions specified herein.
- c. The contractor's existing quality assurance (QA) procedures shall be used.
- d. The government reserves the right to review any of the verifications, when such reviews are deemed necessary to ensure supplies and services conform to the prescribed contractual requirements.

4.1.1 Minimum verification requirements. As a minimum, verification shall ensure the following:

- a. Suitability of the manuals for the intended environment.
- b. Usability by the intended users.
- c. Compatibility with other government systems.

4.1.2 Compliance. All manuals shall meet all the requirements of sections 3 and 5 of this specification, as required by the acquiring activity (see 6.2). The requirements set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies, submitted to the government for acceptance, comply with all requirements of the contract. Use of sampling inspections shall be at the discretion of the contractor, and in accordance with commercially acceptable quality assurance procedures. However, use of sampling in QA procedures does not authorize submission of known defective material, either indicated or actual, nor does it commit the government to accept defective material.

5. PACKAGING.

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When 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 System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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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 covers the preparation of manuals and checklists for use by flight crews in planning and executing air refueling operations.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this document.
- b. Issue of the DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced herein (see 2.2.1).
- c. If a revision is to be prepared (see 3.2.1.5)
- d. If classified information is to be included (see 3.2.1.8)
- e. If electronic delivery of the manuals is required (see 3.3).
- f. If additional data and information are required (see 3.4, 3.4.1.6, 3.5.1.5).
- g. If digital photographs are required (see 3.4.1.1.1).
- h. Procedures for submission of recommended changes (see 3.4.1.6).
- i. Packaging requirements (see 5.1).

6.3 Definitions. To clarify terms used throughout this specification, the following definitions are given:

6.3.1 Air refueling. The refueling of an aircraft in-flight by another aircraft.

6.3.2 Air refueling control time. The planned time that the receiver and tanker will arrive over the air refueling control point.

6.3.3 Air refueling initial point. A point located upstream from the air refueling control point at which the receiver aircraft initiates a rendezvous with the tanker.

6.3.4 Air refueling rendezvous. The procedures employed to enable the receiver(s) to reach the precontact position behind the assigned tanker(s) by electronic, radio, and/or visual means.

6.3.5 Alternate rendezvous. A rendezvous accomplished when primary means are not available.

6.3.6 Altitude blocks. A specified number of altitudes authorized by air traffic control for operation of aircraft.

6.3.7 Breakaway. The command used by either tanker or receiver crew members to indicate a need for emergency vertical and horizontal separation of tanker and receiver.

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6.3.8 Buddy takeoff/departure. When tanker and receiver take off and climb as an element/cell.

6.3.9 Contact. That configuration in which the tankers and receivers are physically engaged and if applicable, their respective electrical systems indicate a contact made condition.

6.3.10 Contact position. The stabilized position of the receiver within the air refueling envelope where it is possible to make contact.

6.3.11 Controlled airspace. Airspace requiring communication with an Air Traffic Control facility.

6.3.12 Disconnect. When tanker and receiver separate from air refueling contact; also it is a command to separate, but not warranting a breakaway.

6.3.13 En route rendezvous. Procedure used when join-up is to be accomplished en route to the refueling area at the join-up initiation geographic point (RZ) by making good a scheduled time. Timing may be accomplished by utilizing an orbit delay or timing triangle.

6.3.14 Hot armament. Forward firing ordnance that can be selected and fired by the receiver pilot or crew.

6.3.15 Join-up. Those procedures employed to enable the tanker to assume formation lead and the receiver to assume observation position.

6.3.16 Observation position.

- a. (Bomber) A position to the right and/or left and slightly behind the tanker where receiver fly while observing or awaiting air refueling.
- b. (Helicopter) A position to the left or right of the tanker, outboard of the wingtip and slightly above and behind the tanker horizontal stabilizer where the receivers fly while observing or awaiting air refueling.
- c. (Fighter) A position to the right and/or left and slightly behind the tanker wing with a minimum of one receiver wingspan clearance between tanker and receiver (weather permitting).

6.3.17 Offset (track). The lateral distance the tanker is displaced from the air refueling initial point to air refueling control time track to compensate for turn radius and drift.

6.3.18 Overrun.

- a. Rendezvous - An overrun when the receiver passes the tanker prior to or during the tanker rendezvous turn.
- b. Closure - An overrun when the receiver's closure rate prevents stabilizing in the precontact position, or when forward movement of the receiver is considered excessive during contact or approach to contact.

6.3.19 Point parallel rendezvous procedures. The procedures normally used when the tanker arrives in the refueling area ahead of the receiver (A tanker orbit is normally planned).

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6.3.20 Post air refueling procedures. The procedures employed by tankers and receivers after final disconnect and prior to establishing cruise.

6.3.21 Precontact (ready) position.

- a. Boom and receptacle - The position approximately 50 feet behind and slightly below the tanker boom nozzle where the receiver stabilizes before being cleared to the contact position.
- b. Probe and drogue - A position where the probe is approximately 5 feet directly aft of the drogue.
- c. Helicopter - A position behind the paradrogue and slightly below the tanker wing where the receiver stabilizes before attempting contact.

6.3.22 Radio silence. Air refueling without the aid of verbal instructions.

6.3.23 Radar station keeping. Term used when radar is used as the primary method for maintaining an aircraft in a specified location.

6.3.24 Rendezvous equipment. Electronic/radio equipment installed in tanker and receivers for use in accomplishing a rendezvous.

6.3.25 Reverse flow air refueling. The transfer of fuel from receiver to tanker.

6.3.26 Toboggan. The maneuver called for by receiver pilot (verbal or C-130 visual signal) to the tanker pilot to commence approximately 300 feet per minute rate of descent.

6.3.27 Turn range. The distance used to determine the tanker start turn point and is measured directly from aircraft to aircraft.

6.3.28 Verification. Verification (section 4), in the context of this specification equates to the contractor's quality assurance program for validating the content of the air refueling manuals and checklists. Suggested validation methods include:

- a. Actual performance. Using production configured equipment, hands-on performance of the procedure using the technical instructions as written.
- b. Simulation. Using production configured equipment and the air refueling manual procedures and checklists, simulate the actions required by the task steps.
- c. Table top analysis. Primarily for nonprocedural data, compare the technical content to source data to ensure the technical accuracy and depth of coverage.

6.4 Page size. The air refueling procedures manual, and the supplemental manuals, should fit the flight manual binders.

6.5 Position abbreviations. Circled or asterisked line items may also be used as defined in the applicable aircraft flight manual (-1) (see 3.2.1.11).

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6.6 Review of reproducible copy. The review of reproducible copy by government activities is not intended to reduce or replace the contractor's responsibility for verification of technical accuracy.

6.7 Subject matter. The internal subject matter in each of the areas, except front matter, should not duplicate information or data contained in the supplemental manuals (see 3.4).

6.8 Table of contents. When the entire page is not used for the table of contents, the text of the section may begin immediately below the table of contents (see 3.5.1.4).

6.9 Technical manuals. The requirement for technical manuals should 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 (AMSDDL) 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 a separate contract line item in the contract.

6.10 Title page illustration. It is not required that the aircraft be depicted as being air-refueled (see 3.5.1.1.1).

6.11 Key words.

- Air refueling
- Air refueling manual
- Air refueling procedures
- Departure procedures
- Emergency air refueling procedures
- Flight crew checklists
- Rendezvous procedures

6.12 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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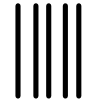
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