

DATA ITEM DESCRIPTION			<i>Form Approved</i> OMB NO. 0704-0188	
Public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. TITLE A009, Technical Manuals			2. IDENTIFICATION NUMBER	
3. DESCRIPTION/PURPOSE To prescribe minimum requirements for contractor prepared maintenance, operator, and software user manuals.				
4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY (OPR) USAOTC G4	6A. DTIC APPLICABLE	6B. GIDEP APPLICABLE	
7. APPLICATION/INTERRELATIONSHIP These requirements are applicable to in-house developed technology and other acquired systems lacking adequate documentation to operate or maintain. The resulting documents are subject to Government approval before being accepted as a deliverable.				
8. APPROVAL LIMITATION		9A. APPLICABLE FORMS	9B. AMSC NUMBER	
10. PREPARATION INSTRUCTIONS <p>10.1 When the contractor develops technology he shall provide manual(s) that meet the requirements of paragraphs 10.3 through 10.7 below. If the technology is modified, the manual shall be updated to reflect the changes. For systems not owned by USAOTC the Contractor shall recommend changes. Contractor format is acceptable.</p> <p>10.2 The contractor shall use best judgment in determining applicability of each sub-element of the chapters and sections required by paragraphs 10.3 and 10.7 However, the manual shall provide the necessary operating instructions, alignment procedures, schematics, parts lists, etc. to ensure and safe effective use of the technology.</p> <p>10.3 A Maintenance Manual, Operator's Manual, and/or Software User's Guide shall be developed in accordance with the following items and topics.</p> <ul style="list-style-type: none"> a. Maintenance Manual. <ul style="list-style-type: none"> (1) Purpose (2) References (3) Overview/Description (4) Installation (5) Theory of Operation (6) Alignment and Calibration (7) Maintenance (8) Parts List/Bill of Materials 				
11. DISTRIBUTION STATEMENT DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.				

(9) Drawings

(10) Safety

b. Operator's Manual

(1) Purpose/Description

(2) References

(3) Operation

(4) Equipment

(5) Set up

(6) Software

(a) Principles of Operation

(b) Pre-Operational Procedures

(c) Operations Procedures

(d) Operator Maintenance Checks

(e) Post-Operational Checks

(7) Safety

c. Software User's Guide

(1) Scope

(2) References

(3) Operating instructions

(4) Hardware/Software

10.4 Definition of Maintenance Manual Terms

a. Principles of Operation

(1) Table of contents, organized to section and page

(2) List of illustrations, to include the figure number, exact title, and page number

(3) An introduction stating the general purpose of the manual

(4) Theory of operation

(5) System description, specifications, and features

(6) References to related documents

(7) Procedures to operate, calibrate, maintain, and troubleshoot

(8) Block diagram(s)

(9) An illustration(s) calling out major assemblies and subassemblies with their nomenclature

(10) Tables of technical, environmental, and physical characteristics

b. Installation

(1) Information on unpacking, location of units, interconnections, and initial pre-operational adjustments

(2) Details of cables, ground requirements, and cable fabrication

(3) Illustration(s) of interconnections and front and rear panel and their respective functions

c. Theory of Operation

- (1) Functional block diagram
- (2) For mechanical features, a complete explanation using block diagrams
- (3) Circuit description
- (4) Top down structured proceeding from simplified descriptions and block diagrams of the entire system to detailed

description and drawings in stepwise refinements

d. Alignment and Calibration

- (1) A description of each procedure required to align or calibrate the system
- (2) Complete description of technology and set up procedures
- (3) A complete list, with pictures and drawings as required, of the measurements and the tolerance for these measurements

e. Maintenance

- (1) A schedule maintenance adjustments and procedures
- (2) A list of recommended test equipment
- (3) Physical and functional description
- (4) Lubrication data, cleaning data, materials to be used/avoided
- (5) Troubleshooting steps that permits a technician to locate problems, interpret warning messages, and to make repairs and adjustments quickly and accurately
- (6) For complex equipment or where procedure is not obvious, an outline of disassembly and re-assembly procedures
- (7) Test procedures
- (8) Complete adjustment and maintenance information for mechanical and electromechanical devices
- (9) Oscilloscope waveforms illustrated with peak voltage, duration, repetition rate, pulse shape, and control positions
- (10) A list of cable drawings (internal and external) including drawing number and description
- (11) Maintenance procedures
- (12) Identification of firmware and software

f. Parts List. The parts list shall have two sections. Section I shall list the components of the End Item and section II shall consist of a tabulation of description data on all electrical and mechanical parts. All parts lists shall be sufficiently described to implement re-order and replacement. The parts list shall contain at least the following information.

(1) Section I

(a) Line drawings of each component or assembly with noun nomenclature. This section shall provide the information needed to facilitate a complete inventory of the system, e.g., components, cables, brackets, mounting hardware, software, manuals, etc.

(b) Vendor data

(c) Repair level

(2) Section II

(a) Reference designation to a line drawing

(b) Name and description (including firmware and software)

(c) True manufacturer's code (FSCM) and separately list referenced manufacturer's codes and addresses

(d) Federal Stock Number or true manufacturer's part number

(e) Quantity

g. Drawings (unless otherwise specified) shall be included in the manual.

(1) Schematic diagrams of individual major assemblies, printed circuit boards (PCB), and where practical, of the complete system.

(2) Logic diagrams

(3) Interconnecting diagrams

(4) Cabling diagrams

(5) Wiring diagrams

(6) Illustrations that identify and call out all circuit components on PCB's

(7) Schematic of all circuitry and chips to include a one-page schematic of the entire system

(8) Mechanical drawings or part, assemblies, PCB's, etc.

(9) PCB artwork

(10) All drawings contained in the manual shall be legible and uncluttered

(11) A drawing tree, showing all drawings top down in a structured, stepwise refined method

h. Safety

(1) Enumerate potential safety hazards and methods of handling, using and operating hazardous material and equipment

(2) Safety operational procedures and emergency procedures

10.5 Definition of Operator's Manual Terms

a. Operations. Principles of operation

(1) Table of contents, organized to section and page

(2) List of illustrations, to include the figure number, exact title, and page number

(3) Clear, concise, non-technical explanation of the operation of the system or equipment

(4) Installation procedures

(5) System/equipment capabilities

(6) Basic principles of operation

b. Operation. Pre-operational procedures

(1) Step-by-step procedures for starting the equipment

(2) Equipment and functional check-out procedures

(3) Operator maintenance checks and procedures

c. Operation. Operating procedures

(1) Step-by-step procedures for equipment operation

(2) Tables and illustrations calling out all controls and indicators and their functions and operation

(3) Tables showing errors/problems and operational procedures to correct

(4) Post-operation checks and procedures

(5) Step-by-step shutdown procedures

d. Operation. Operator maintenance checks

10.6 Definition of Software User's Guide Terms

a. Description

(1) Preparation of Inputs. A definition of the program inputs, other than those required to operate the program. These inputs constitute the basic data that are to be processed by the program. The definition shall include:

- (a) Title of inputs
- (b) Description of inputs
- (c) Purpose and use
- (d) Input media
- (e) Limitation/restrictions
- (f) Format and content
- (g) Sequencing
- (h) Special instructions
- (i) Relationship of inputs to outputs

(2) Results of Operation. A definition of expected results after completion of program operation.

- (a) Description of results
- (b) Form in which results will appear
- (c) Output format and content
- (d) Instruction, on use of outputs
- (e) Limitations/restrictions
- (f) Relationship of outputs to inputs
- (g) Examples

b. Operating procedures. The step-by-step procedures required to:

- (1) Initiate the program
- (2) Maintain program operation
- (3) Terminate and restart the program

(4) Operator Inputs. A complete description of all the control inputs and data formats for the program and the computer operating system, including the function of purpose shall be provided. All inputs, other than those described in paragraph 2a, required to operate the program shall be defined in a similar manner as follows:

- (a) Title of output
- (b) Purpose and use
- (c) Input media
- (d) Limitations/restrictions
- (e) Format and content

(5) Operator Outputs. A complete description of the output formats, other than those described in paragraph 2b, of the program. This shall include samples of each type of possible output format. This subparagraph shall include, but not be limited to the following.

- (a) Title of output
- (b) Purpose and use
- (c) Output media
- (d) Output format

(e) Output content (symbols, codes, etc.)

(6) Method of Modification. This portion shall describe how the source language may be modified. Included shall be the source language computer's reference to an appropriate programming manual, the host computer's operational system's identity, and description of the necessary controls for recompilation or re-assembly. Sufficient information shall be included to allow for the production of a new source program and a new object program.

(7) Re-qualification. The original method of qualifying the program shall be described together with the necessary information to repeat this qualification. Also, a sample run shall be supplied for continued-checks on the program's configuration. The necessary input and expected output shall be included for the sample run.