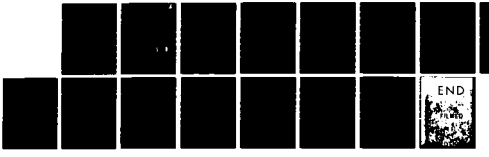
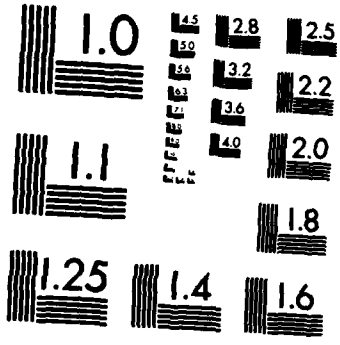
AD-A130 297 US ARMY TEST AND EVALUATION COMMAND TEST OPERATIONS PROCEDURE PERSONNEL T.. (U) ARMY AVIATION DEVELOPMENT TEST ACTIVITY FORT RUCKER AL 08 JUL 83 TOP-7-3-501 1/1

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1. REPORT NUMBER: TOP 7-3-501	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): US ARMY TEST AND EVALUATION COMMAND TEST OPERATIONS PROCEDURE PERSONNEL TRAINING/TRAINING EVALUATION	5. TYPE OF REPORT & PERIOD COVERED: FINAL
6. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR(s): AD A130297	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS: US ARMY AVIATION DEVELOPMENT TEST ACTIVITY (STEBG-MP-QA) FORT RUCKER, AL 36362	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: DARCOM-R 310-6
11. CONTROLLING OFFICE NAME AND ADDRESS: US ARMY TEST AND EVALUATION COMMAND (DRSTE-AD-M) ABERDEEN PROVING GROUND, MD 21005	12. REPORT DATE: 8 July 1983
	13. NUMBER OF PAGES: 17
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report): UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

DTIC ELECTE JUL 13 1983 S D

SUPPLEMENTARY NOTES

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Personnel training
Training evaluation
Training aids
Training facility
Aviation materiel
Developmental testing
Field environment training requirements

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

This document establishes procedure and test methods for training test personnel as to the physical, functional, and operational characteristics of aviation materiel undergoing developmental testing. Test personnel performance in regard to maintenance and operation of the test materiel is subsequently evaluated and training requirements are projected to the field environment.

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US ARMY TEST AND EVALUATION COMMAND
TEST OPERATIONS PROCEDURE

DRSTE-RP-702-105
*Test Operations Procedure 7-3-501
AD No.

8 July 1983

PERSONNEL TRAINING/TRAINING EVALUATION

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1. SCOPE. This document establishes procedures and methods for training test personnel as to the physical, functional, and operational characteristics of aviation materiel undergoing developmental testing, and to evaluate the training program proposed for the field operator. These procedures cover training requirements and training evaluation criteria for aviation developmental materiel including aircraft (both fixed and rotary wing), avionics, aircraft subsystems and associated equipment, ground support equipment, and personnel equipment. Other test requirements will be performed in accordance with the appropriate Test Operations Procedures (TOPs).

2. FACILITIES AND SUPPORT REQUIREMENTS. Most aviation materiel tested under developmental test procedures requires installation either in or on an aircraft or are used in direct support of an aircraft. Therefore, a typical Army airfield installation with appropriate classroom accommodations, hangar, and shop facilities will be adequate to support most training requirements for any aviation test item. A test design plan should provide specific information as to facility and support requirements to accommodate the training criteria. However, if these data are not available, the following facility characteristics and support requirements should be addressed as a minimum.

*This TOP supersedes MTP 7-3-501, Personnel Training, 15 March 1971

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2.1 Facility.

CHARACTERISTICS	MINIMUM REQUIREMENTS
Classroom(s) and conventional classroom equipment (desks, blackboards, etc.)	Classroom sufficient to accommodate one desk per student and appropriate blackboard and/or visual aid requirements.
Office and administrative work area	Sufficient to accommodate the test personnel.
Shop facilities including avionics, engine, hydraulics, airframe, etc.	As required to support the test item and test item support requirements, standard Army tool set and test equipment, etc.
Hangar facility	As specified in the TDP, LOA, or ROC document.
Runway	As specified in the TDP, LOA, or ROC document (Technical Manual 5-803-4).[1]*
Appropriate air space	As specified in the TDP, LOA, or ROC document.

2.2 Support Requirement.

Manuscript manual(s)	TDP, LOA, ROC, materiel operating and maintenance manuals presented in the maintenance test support package (MTSP).
Training aids	Projectors, screens, recorder.
Materiel to be tested	Physical and functional mock-up.
Training plan	TDP, LOA, ROC, materiel operating and maintenance manuals.
Qualified personnel to administer training program	As specified in the TDP, LOA, or ROC document.
Test support equipment items required to administer training	As specified in the TDP, LOA, or ROC document.

*Footnote numbers match footnote references in Appendix C.

2.3 References.

a. Army Regulation 71-3, User Training.

b. Army Regulation 200-2, Environmental Quality, Environmental Effects of Army Actions.

c. Army Regulation 385-16, Systems Safety Engineering and Management.

d. DARCOM Regulation 70-8, w/TECOM Supplement 1, DARCOM Value Engineering Program.

e. DARCOM Regulation 385-26, Safety, Aviation Safety, w/TECOM Supplement 1.

f. DARCOM Regulation 700-13, Integrated Logistic Support Performance Evaluation Report, w/TECOM Supplement 1.

g. TECOM Regulation 70-5, Use of Test and Evaluation Personnel in Development Testing.

h. TECOM Regulation 70-24, Research and Development.

i. TECOM Regulation 385-7, Safety, Potential Health Hazards to Humans Participating in Testing.

j. MIL-C-55163, Calibration of Test and Measuring Equipment.

k. MIL-H-46855, Human Engineering Requirements for Military Systems, Equipment and Facilities.

l. MIL-STD-1472, Human Engineering Design Criteria for Military Systems, Equipment, and Facilities.

m. FM 21-6, How to Prepare and Conduct Military Training.

n. TECOM Independent Evaluation Plan/Test Design Plan (IEP/TDP) associated with the DT under consideration.

o. TECOM Test Activity applicable Detailed Test Plan (DTP).

3. PREPARATION FOR TEST.

3.1 Training Program Planning. The procuring command is responsible for the scope of initial training and familiarization required on aviation materiel

scheduled for developmental testing. The development test project officer should become familiar with the planned scope of training and should insure that the appropriate actions listed below are accomplished:

a. Review the IEP/TDP (reference para 2.3 n) and DTD (ref para 2.3.0), if available. Otherwise, review the objectives and scope of development testing set forth in AR 70-10.[2]

b. Review the materiel specifications.

c. Review the results of the materiel developer's engineering test, in particular, data relating to personnel and training requirements.

d. Consult with Army specialists in the applicable materiel areas.

e. Review manufacturer's notes, design data, and technical manuals on similar equipment, and training circulars or bulletins issued on items within the materiel and commodity areas.

f. Review the qualifications of assigned test personnel in light of the scope of training. Select test personnel that can be stabilized at the test site during the test period. Arrangements should be made before training is initiated to stabilize test personnel during the test period, if there is a risk that such personnel will be transferred.

g. Consult with Army technical training specialists with respect to the scope of training, appropriate training period, and training material to be used.

h. Review Army Regulation 350-35 (para 2.3.g)[3] for training requirements germane to the materiel being tested.

i. Submit training requirements to the materiel developer.

j. Review the Safety Assessment Report for safety and health hazards, safety design features, and safety precautions related to the materiel being tested.

3.2 The project officer should insure the personnel training and familiarization includes provisions for training ground and flight personnel in the following areas:

a. Aviation materiel inspection.

b. Physical and functional characteristics.

c. Installation and removal.

d. Operational use of the equipment.

e. Maintenance.

f. Safety and health.

g. Environmental considerations.

h. Security.

3.3 Scheduling Equipment, Facilities, and Training Aids. Schedule the use of training materials and facilities that normally require long lead times as soon as practical. Schedule the items listed under Section 2, Facilities and Support Requirements, and the fabrication or procurement of any special training aid(s), as required. Arrange, as applicable, for the services of the equipment manufacturer's technical representatives or lecturers and for any other offsite personnel required to train test personnel and to provide sufficient instructor personnel to supervise on-the-job training undertaken during the instruction period.

3.4 Special Training. Certain complex or unique equipment may warrant specialized training.

a. Appropriate instruction may be required at the manufactory.

b. Appropriate instructions may be received at Army technical schools on similar equipment in conjunction with instructor self-study of materiel specifications and technical manuals.

c. Refresher training in some cases may only require a program of self-study using the manuscript technical manuals and other approved literature related to the equipment.

4. TEST CONDUCT.

4.1 Test Personnel Training and Familiarization.

4.1.1 Ground Personnel.

4.1.1.1 Aviation Materiel Inspection.

a. Familiarize personnel responsible for conducting arrival and preoperational inspections with TOP 7-3-503.[4]

b. Review the contents of DARCOM Regulation 70-13 and illustrate how to properly fill out the Equipment Performance Report (EPR) form for inventory discrepancies, maintenance test package defects, or omitted/incorrect shipping container markings.

c. Familiarize appropriate personnel with techniques for determining the condition of the equipment and, if possible, provide personnel with a list of any critical defects that could preclude using the equipment for developmental test.

4.1.1.2 Physical Characteristics Determination.

a. Instruct personnel in techniques for determining the equipment's size, e.g., dimensions, weight, and if applicable, volume. Provide guidance for selecting the proper tools and/or scale for determining the size and weight of various aviation equipments. Familiarize appropriate personnel with the procedures of TOP 7-3-500.[6]

b. Familiarize appropriate personnel with TOP 7-3-519[7] and that portion of TECOM Regulation 108-2,[8] as applicable to the photographs required of the equipment's major components.

4.1.1.3 Installation and Removal.

a. Familiarize test personnel with the instructions provided by the installation and removal portion of the equipment's manuscript, technical manual, and/or with approved drawings and diagrams furnished with the equipment.

b. Review interface characteristics (physical and electrical) of the aircraft scheduled to receive the equipment or subsystem.

c. Familiarize test personnel with the specific installation characteristics criteria of the LOA or ROC. Use the contents of TOP 7-3-502[9] to provide a general outline of installation procedures and as a source of criteria in the absence of specific instructions.

4.1.1.4 Operational Training.

a. Require personnel to perform all functional operations related to tactical or operational usage of the equipment within acceptable safety limitations. Observe test personnel while they are performing these tasks, and record the progress and skill attained for each test team member.

b. Require loading and handling test personnel to perform all tasks normally associated with the materiel including simulated aircraft turnarounds.

c. Provide instructions and demonstrations of the capabilities, operation, and limitations of the equipment at appropriate times throughout the operational training period.

d. Where vehicles are involved, give driving and maneuvering demonstrations. Test personnel shall comply with facility policy with respect to operators' licenses.

e. Instructions will be as similar as possible to the training which personnel in the field will receive on the equipment.

4.1.1.5 Maintenance Training.

a. Familiarize appropriate personnel with the intent of TECOM Supplement 1 to DARCOM Regulation 700-15[10] and TOP 7-3-507.[11]

b. Review the contents of AMC Regulation 700-38,[12] and illustrate how to properly fill out the EPR form for reporting equipment malfunctions, failures, and defects.

c. Review the contents of the maintenance test support package. By dictate of Army Regulation 700-127,[13] para 1-11c, the complete maintenance support package will be thoroughly evaluated during the DT/OT II and III testing. Failure to receive a complete maintenance test support package for testing during the DT/OT II and III will be a bar to test initiation unless approval to proceed without the package is obtained in accordance with the proper authority as presented in the above reference.

d. Determine the expected maintenance requirements during training and conduct of the developmental test. If sufficient or unique natural maintenance actions are not expected to fully exercise the maintenance package, consult appropriate methodology personnel in planning adequate, realistic, maintenance actions through simulated failures. Insure that test personnel become thoroughly knowledgeable with the maintenance support package and that a complete evaluation of the maintenance support package can be accomplished.

e. Review procedures for using special test equipment and tools recommended for use with the equipment or subsystem. Arrange for test personnel participation and a suitable period of on-the-job training using conventional special test equipment and/or tools, as applicable.

f. Review reliability, availability, and maintainability indicators which pertain to the equipment under test and emphasize the importance of data collection tasks associated with the determination of these measures of the equipment's effectiveness and military worth. Review the contents of Army Regulation 702-3.[14]

g. Review recommended maintenance, troubleshooting, and repair methods provided by the technical manual's maintenance section. Illustrate the use of wiring lists, charts, and other maintenance aids in the manuals or those recommended for use with the equipment.

4.1.2 Flight Personnel.

4.1.2.1 Materiel Familiarization.

a. Acquaint flight personnel with the operational characteristics of the equipment or subsystem using operators' manuals. Provide details involving equipment weight and other data essential for the proper computation of weight and balance in accordance with TM 55-405-9.[15]

b. Familiarize flight personnel with equipment or subsystem emergency and alternate modes of operation.

4.1.2.2 Preflight Briefings. Conduct detailed familiarization and briefing sessions prior to the initial flights with the test aircraft. Discuss the tactical employment of the equipment/subsystem and the options available. Where armament items are under test, consult TOP 4-3-010[16] and TOP 7-3-015[17] for briefing areas unique to these commodities.

4.1.2.3 Flight Operations Training. Conduct a detailed flight operations training program which includes flight operations procedures, flight performance and characteristics, and flight limitations. This training should encompass all systems and subsystems which interface with the test materiel or influence the operational procedures, performance, or safety of the test materiel.

4.2 Safety Training. Throughout the training program, point out any potential hazards and emphasize precautions to be observed during developmental testing, insure that these participants are informed of any health hazards and precautionary or protective procedures per TECOM Regulation 385-7,[18] and provide for review of appropriate first aid procedures. Familiarize personnel with safety goals of the LOA or ROC and with the test plan safety evaluation procedures. Safety training should always include adequate reminders that developmental testing can be hazardous since, in many instances, the equipment or subsystem has not been used under environmental, climatic, or tactical conditions equivalent to field use. Evaluation of aviation materiel safety characteristics is an essential part of determining whether or not the tested items are suitable for Army use in the field. Consult TOP 7-3-506[19] for specific guidance.

4.3 Environmental Training.

4.3.1 Environmental Impact. Throughout the training program, point out any environmental considerations and emphasize precautions to be observed to protect the environment.

4.3.2 Environmental Considerations. Review the following TOPs on environmental considerations: TOPs 1-1-002,[20] 1-1-003,[21] 1-1-004,[22] 1-1-005,[23] 1-1-006,[24] and 1-1-008.[25]

4.4 Security. Security safeguards for the United States Government and for the security of the developmental test materiel must be considered early in the test planning stage. The following steps must be taken:

a. Consult the primary test agency security representative for security guidance. Coordinate with security personnel of other test support agencies and industry as appropriate.

b. Point out appropriate security measures to be followed throughout the test to safeguard intra-industry proprietory and classified material and to safeguard the security of government property.

5. TRAINING PROGRAM EVALUATION.

5.1 Training Effectiveness.

a. Evaluate the equipment's LOA/ROC skill level goals by using personnel of varying skill levels to perform required tasks.

b. Evaluate the results of the pretest training program and project the training requirements and effectiveness to the operational field environment. Observe any change in personnel proficiency with equipment, e.g., inefficient initial usage may indicate an inadequate training program.

c. Complete questionnaire and qualitative evaluation presented in Appendix B.

d. Prepare an error report form for each test incident in accordance with TOP 1-2-610.[26]

e. Document errors or omissions in the maintenance manuals on DA Form 2028 and forward to the proponent.

5.2 Recommendations Reflecting the Field Users' Requirements.

5.2.1 Make recommendations reflecting the following:

a. Facility recommendation addressed in Section 2.1.

b. Support recommendations addressed in Section 2.2.

c. Scope of training.

d. Skill level.

e. Number of personnel required for given task.

f. Length of on-the-job training.

g. Any test personnel problem with special tools or test equipment.

h. Safety training.

6. DATA REDUCTION AND PRESENTATION.

6.1 Qualitative Assessment. Evaluate developmental test personnel's classroom performance against performance during the developmental test. Formulate recommendations with respect to the difficulty of learning how to operate and maintain the equipment and the LOA or ROC skill level goals. List any mishaps or personnel accidents which resulted from training deficiencies. Indicate recommended corrective actions to preclude recurrence of these mishaps or personnel accidents.

6.2 Complete checklist and data collection forms presented in Appendixes A and B, respectively.

Recommended changes to this publication should be forwarded to Commander, US Army Test and Evaluation Command, ATTN: DRSTE-AD-M, Aberdeen Proving Ground, MD 21005. Technical information may be obtained from the preparing activity: Commander, US Army Aviation Development Test Activity, ATTN: STEBG-MP-QA, Fort Rucker, AL 36362. Additional copies are available from the Defense Technical Informat' .. Center (DTIC), Cameron Station, Alexandria, VA 22314. This document is identified by the accession number (AD No.) printed on the first page.

APPENDIX A

CHECKLIST

PERSONNEL TRAINING (AVIATION MATERIEL)

	Yes	No
1. Has training been completed in accordance with this TOP?		
2. Were facility accommodations presented in para 2.1 adequate?		
3. Were support accommodations presented in para 2.2 adequate?		
4. Is the training program as constructed adequate for the field user?		
5. Is the training program as constructed beyond the scope required for the field user?		
6. Is the training program as constructed ready to be fielded?		
7. Have all data collected been reviewed for correctness and completeness?		
8. Have all training issues pertinent to the aviation materiel under test been addressed?		
9. Have all data been collected in accordance with the provisions of this TOP?		
10. Have data forms in Appendix B been completed?		
11. Have data forms been reviewed for correctness and completeness?		
12. Have all data been prepared for inclusion in the final test report?		

APPENDIX B

DATA COLLECTION FORMS

PERSONNEL TRAINING (AVIATION MATERIEL)

I. Personnel Requirements to Field Aviation Materiel:

A. Operator Personnel	MOS	SKILL LEVEL	NO. REQ
1			
2			
3			
..			
..			
B. Maintenance Personnel	**MOS**	**SKILL LEVEL**	**NO. REQ**
1			
2			
3			
..			
..			
C. Logistics Support Personnel	**MOS**	**SKILL LEVEL**	**NO. REQ**
1			
2			
3			
..			
..			

II. Minimum Personnel Training Accommodations:

A. Facility Characteristcs	Minimum Requirement
1. Classroom(s):	_____
2. Classroom(s) Equipment:	
a. Chalkboard	_____
b. Desk	_____

Facility Characteristics	Minimum Requirement
c. Table(s)	_____
d. ..	
e. ..	
3. Administration Work Area:	
a. Number and size room(s)	_____
b. Desk(s)	_____
c. Reproduction Required	_____
d. ..	
..	
..	
4. Shop Facilities:	
a. Avionics	_____
b. Engine	_____
c. Hydraulics	_____
d. Airframe	_____
..	
..	
5. Hangar Facility/Facilities:	
a.	_____
b.	_____
..	
..	

Facility Characteristics	Minimum Requirement
6. Runway	_____
7. Appropriate Air Space	_____

B. Support Characteristics	Minimum Requirement
1. Manuscript Manual(s):	_____
a.	_____
b.	_____
c.	_____
..	
..	
2. Training Aids:	
a. Projector	_____
b. Viewgraph Machine	_____
c. Projector Screen	_____
d. Tape Recorder	_____
..	
..	
3. Materiel/Materiel Subsystems:	
a. Avionics	_____
b. Hydraulics	_____
c. Power	_____
..	
..	

Support Characteristics	Minimum Requirement
4. Special Equipment:	
a. Computer	
b. Oscilloscope	
c. Recorder	
..	
..	

5. Specialized Instructor Personnel:	MOS	SKILL LEVEL
a. Avionics		
b. Hydraulics		
c. Power System		
d. Transmission System		

III. References Germane to Materiel Training:

A.

B.

C.

..

..

IV. Qualitative Training Evaluation and Comments:

A. Ground Personnel Training:

1. Aviation Materiel Inspection.

2. Physical Characteristics Determination.

3. Installation and Removal.

4. Operational Training.

5. Maintenance Training.

B. Flight Personnel Training:

1. Materiel Familiarization.

2. Preflight Briefings.

3. Flight Operation Training.

C. Safety and Health:

1. Ground.

2. Flight.

D. Environment:

1. Environment Impact.

2. Environment Considerations.

E. Overall Training Effectiveness--Recommendations:

APPENDIX C

FOOTNOTE REFERENCES

1. Technical Manual 5-803-4, Planning of Army Aviation Facilities.

2. Army Regulation 70-10, Test and Evaluation During Development and Acquisition of Materiel.

3. Army Regulation 350-35, New Equipment Training.

4. TOP 7-3-503, Arrival Inspection/Pre-Operational Inspection (Aviation Materiel).

5. DARCOM Regulation 70-13, w/TECOM Supplement 1, Test and Evaluation -- Incidents Disclosed During Materiel Testing.

6. TOP 7-3-500, Physical Characteristics (Aviation Materiel).

7. TOP 7-3-519, Photographic and Video Image Support (Aviation Materiel).

8. TECOM Regulation 108-2, Audio-Visual Services Administrative and Technical Procedures.

9. TOP 7-3-502, Installation Characteristics (Aircraft Allied Equipment and Subsystems).

10. TECOM Supplement 1 to DARCOM Regulation 700-15, Integrated Logistics Support(ILS).

11. TOP 7-3-507, Integrated Logistics Support.

12. See 5 above.

13. Army Regulation 700-127, Integrated Logistic Support.

14. Army Regulation 702-3, Army Materiel Reliability, Availability and Maintainability.

15. TM 55-405-9, Army Aviation Maintenance Engineering Manual, Weight and Balance.

16. TOP 4-3-010, Ammunition, Aircraft.

17. TOP 7-3-015, Aircraft Armament.

18. TECOM Regulation 385-7, Potential Health Hazards to Humans Participating in Testing.

19. TOP 7-3-506, Safety (Aviation Materiel).

20. TOP 1-1-002, Arctic Maintenance Considerations.

21. TOP 1-1-003, Arctic Personnel Effects (C1, 28 Nov 73).

22. TOP 1-1-004, Arctic Instrumentation Considerations.

23. TOP 1-1-005, Adaptation of Military Materiel for Arctic Use.

24. TOP 1-1-006, Desert Environmental Considerations.

25. TOP 1-1-008, Tropic Environmental Considerations.

26. TOP 1-2-610, Human Factors Engineering, Part I, Test Procedures.


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