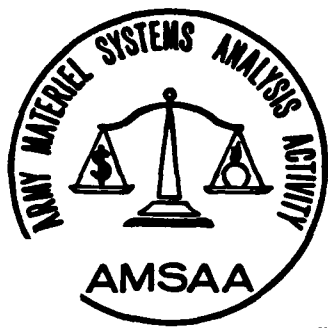


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APRO- 81-08

FINAL

TECHNICAL MANUAL ACQUISITION

MAY 1982

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U. S. ARMY MATERIEL SYSTEMS ANALYSIS ACTIVITY
ARMY PROCUREMENT RESEARCH OFFICE
FORT LEE, VIRGINIA 23801

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APRO 81-08

FINAL

TECHNICAL MANUAL ACQUISITION

by

C. Eugene Beeckler

John I. Neely

The pronouns "he," "his," and "him," when used in this publication, represent both the masculine and feminine genders unless otherwise specifically stated.

Information and data contained in this document are based on input available at time of preparation. Because the results may be subject to change, this document should not be construed to represent the official position of the US Army Materiel Development and Readiness Command.

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US ARMY MATERIEL SYSTEMS ANALYSIS ACTIVITY
Army Procurement Research Office
Fort Lee, Virginia 23801

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EXECUTIVE SUMMARY

A. BACKGROUND. Technical Manuals (TM's) represent a large research and development investment by the Government. TM's are essential to efficient logistic support of deployed Army equipment. The emphasis and resources devoted to assure adequate TM's for Army equipment has not eliminated a multitude of criticism of the TM's ability to support the Army. Critics point to many sources of the problem and offer a like number of solutions.

B. OBJECTIVES. The study objectives are to determine roles and interfaces of Department of the Army (DA) elements in TM acquisition, identify problems and probable causes and recommend the appropriate DA element to resolve the problems.

C. STUDY APPROACH. The study approach consisted of a literature search of recent and current work, applicable regulations, military standards, and other appropriate policies and procedures. Interviews were then conducted with US Army Materiel Development and Readiness Command (DARCOM) and US Army Training and Doctrine Command (TRADOC) individuals most knowledgeable of the TM acquisition process. The information was then analyzed to develop findings, conclusions and recommendations.

D. SUMMARY AND RECOMMENDATIONS. Technical Manuals are essential to the operational readiness of Army equipment and thus must be weighed on a life cycle, not acquisition, cost basis. While it is generally recognized that better quality TM's are evolved from the SPAS Program, additional changes need to be made in the overall TM acquisition process if TM's are to continue to improve. The study identified areas for improved TM acquisition to be pursued by the US Army Training Support Center (ATSC) on behalf of TRADOC and the US Army Materiel Readiness Support Activity (MRSA) on behalf of DARCOM.



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TABLE OF CONTENTS

	<u>PAGE</u>
EXECUTIVE SUMMARY	ii
LIST OF FIGURES	v
<u>CHAPTER</u>	
I. <u>INTRODUCTION</u>	1
A. Background.	1
B. Objectives.	2
C. Study Approach.	2
D. Organization of Report.	3
II. <u>DEFINITIONS, EVOLUTION AND INTER-RELATIONSHIPS.</u>	4
A. Introduction.	4
B. Definitions	4
C. The Evolution of Technical Manuals.	9
D. Summary	19
III. <u>FINDINGS.</u>	20
A. Introduction.	20
B. DARCOM Problems	20
C. TRADOC Problems	26
D. Joint DARCOM AND TRADOC PROBLEMS	28
IV. <u>CONCLUSIONS AND RECOMMENDATIONS</u>	30
A. Introduction.	30
B. Conclusions	30
C. Recommendations	34
APPENDIX A.	37
APPENDIX B.	41
APPENDIX C.	42

	<u>PAGE</u>
SELECTED BIBLIOGRAPHY.	43
STUDY TEAM COMPOSITION.	45

LIST OF FIGURES

<u>FIGURE</u>	<u>PAGE</u>
1a. Major Systems.	13
1b. Non-Major Systems.	14
2. TM Development Process	17

CHAPTER I

INTRODUCTION

A. BACKGROUND.

Technical Manual (TM) acquisitions represent a large expenditure of Government funds. A recent Army logistics study stated that the Army anticipates spending approximately \$500 million for over 3700 new manuals during the next seven years.¹

TM's serve as the primary reference documents for Army equipment. Army troops depend upon the instructions included in the manuals to provide guidance on operating, servicing and maintaining the materiel. Further, TM's serve as the basis for formal equipment training programs. It stands to reason that a cause and effect relationship exists between the quality of TM's and Army readiness levels. There is little doubt that poor quality TM's will often result in abused and deadlined equipment.

In spite of the important role of TM's and the resources devoted to their preparation, criticisms persist. Manuals are accused of being too lengthy and poorly written. Too often they are delivered long after the equipment has arrived in the field.

Critics point to many sources of the problems and offer a like number of solutions. The genesis of this study was a criticism from a Project Manager's Office (PMO) related to TM contracting procedures. It was alleged that acceptance criteria were vague, TM statements of work were inadequate, and contractors were not motivated to assign the preparation of manuals to highly qualified technical personnel.

¹US Army Materiel Development and Readiness Command, "Study of Army Logistics, 1981," Section 25, page 175, 30 August 1981.

B. OBJECTIVES.

A preliminary inquiry revealed that TM difficulties extended beyond contractual matters. As a result the scope of the project was changed to include the following objectives:

1. Identify current policy and procedures for the acquisition of TM's.
2. Determine the roles and interfaces of Department of the Army (DA) elements in TM acquisition.
3. Identify problems and probable causes and recommend the appropriate DA element(s) to resolve the problems.
4. Determine the adequacy of current methods of specifying TM qualitative requirements and contractual acceptance criteria.
5. As required, identify improved means for specifying measurable TM requirements and contractual acceptance criteria.

C. STUDY APPROACH.

1. In order to obtain a listing of TM studies previously performed, a custom bibliography was obtained from the Defense Logistics Studies Information Exchange (DLSIE). A review of relevant studies which appeared in the listing was conducted.
2. Current training literature obtained from the Skill Performance Aids (SPAS) program was examined. Applicable regulations, policies, and contractual specifications and standards were analyzed.
3. Missions and functions of the organizations and functional disciplines involved in TM acquisitions were studied.
4. The preceding literature search and analysis resulted in the identification of key individuals and organizations which should be contacted.

Interviews were conducted with personnel from the Army Training Support Center (ATSC) of the US Army Training and Doctrine Command (TRADOC) and the Materiel Readiness Support Activity (MRSA) of the US Army Materiel Development and Readiness Command (DARCOM). ATSC and MRSA are the Army elements primarily concerned with TM acquisition policies and procedures. Also interviewed were individuals especially knowledgeable in the TM process at selected DARCOM Major Subordinate Commands (MSC's) and TRADOC centers and schools. The research commenced in March 1981 and the field interviews were conducted in May and June 1981.

5. The report is a synthesis of an analysis of the relevant documents and the results of the interviews. A preliminary study draft was coordinated with ATSC and MRSA, and their comments have been incorporated into this report.

D. ORGANIZATION OF REPORT.

Chapter II provides definitions of important words and terms used in the report, a brief overview of the evolution of TM's, and key highlights of the SPAS Program. Chapter III contains findings. Conclusions and recommendations are provided in Chapter IV.

CHAPTER II

DEFINITIONS, EVOLUTION AND INTER-RELATIONSHIPS

A. INTRODUCTION.

Prior to any discussion of the issues identified by the project research, it is necessary to provide: definitions of key words and terms; the evolution of technical manuals; and salient aspects of the Skill Performance Aids Program.

B. DEFINITIONS.

For the purposes of this report, the following definitions are used. The definitions are primarily based on Joint Chiefs of Staff Publication 1, "Dictionary of Military and Associated Terms"; Army Regulation 310-25, "Dictionary of Army Terms"; and Department of the Army Pamphlet Number 700-127, "Integrated Logistic Support Management Model and Glossary."

1. Concept Formulation Package (CFP).

The documentary evidence that the concept formulation effort has satisfied the concept formulation objectives. The package consists of a Trade-Off Determination (TOD), Trade-Off Analysis (TOA), Best Technical Approach (BTA), and Cost and Operational Effectiveness Analysis (COEA).

2. Department of the Army Equipment Publication (DAEP).

Equipment publications authenticated by the Adjutant General (TAG) for publication as a DA equipment publication.

3. Extension Training Material (ETM).

Training lessons and administrative instructions which are designed to provide the Noncommissioned Officer (NCO) in a field environment with an equipment-specific training package. ETM is to be used to conduct supervised on-the-job training and is prepared for each equipment item by

Military Occupational Specialty (MOS) at a particular level of maintenance. Each ETM package consists of a manager's and a student's guide.

4. Human Factors Engineering (HFE).

The application of scientific principles concerning human physical and psychological characteristics to the design of equipment, so as to increase speed and precision of operations, provide maximum maintenance efficiency, reduce fatigue and simplify operations.

5. Initial Operational Capability (IOC).

The first attainment of the capability by an MTOE unit and supporting elements to operate and maintain effectively a production item or system provided:

- a. The item or system has been type classified as standard or approved for limited production.
- b. The unit and support personnel have been trained to operate and maintain the item or system in an operational environment.
- c. The unit can be supported in an operational environment in such areas as special tools, test equipment, repair parts, documentation and training devices.

6. Logistic Support Analysis (LSA).

An analytical technique used by Integrated Logistic Support (ILS) management to provide a continuous dialogue between designers and logisticians. The LSA provides a system to identify, define, analyze, quantify and process logistic support requirements for materiel acquisition programs. Its companion data system is called the Logistic Support Analysis Record.

7. Logistic Support Analysis Record (LSAR).

A file of logistic support information, in standardized format,

on acquisition programs for specific new or modified systems/equipments. This file serves the acquisition phase utilizing logistic data derived prior to and during this portion of the life cycle to support LSA processes. LSAR can also be interfaced with logistic systems in the operational phases for: logistic support documentation; a life cycle audit trail; and evaluation of achievements.

8. Materiel Fielding Plan (MFP).

A document which in final updated form contains all the detailed plans, schedules, procedures, actions and status necessary to successfully deploy, process, and sustain a new item in a given Theater/Service/Agency in the field. The MFP is capable of being transmitted to the gaining command and, in conjunction with comparable gaining command plans, serves as the basis for signed agreements.

9. Physical Teardown and Maintenance Evaluation.

The nondestructive disassembly of a major system, subsystem, or equipment item to determine if the design specifications have been met and that the physical item has been technically documented as to design, use, and maintenance characteristics through the Logistics Support Analysis (LSA) process.

10. Project Manager (PM).

An individual chartered by the Secretary of the Army who is assigned the responsibility and delegated the full-line authority of the materiel developer for the centralized management of a specific development/acquisition project.

11. Proponent Department.

The military service which has been assigned principal, although not exclusive, interest and responsibility for accomplishment of a specific multi-service acquisition, including responsibility for reconciling the activities of other services that possess collateral interest in the program.

12. Skill Performance Aids (SPAS).

The SPAS Program expands the initial analysis and determination of maintenance and training requirements for an equipment system. It combines the development of technical documentation and associated extension training materials into an integrated package which provides a store of all information needed to operate and maintain that system. The technical documentation provides fully procedurized, highly illustrated instructions which enable soldiers with minimum training to perform complex tasks with minimum supervision. The training material, when used with the technical documentation, teaches selected skills and knowledge which may be necessary to operate and maintain the equipment.

13. System Support Package (SSP).

A composite package of support elements required to keep a materiel system in an operationally ready condition. In its preliminary form it is provided prior to and utilized during development and operational testing and evaluation to validate the organizational, direct support, and general support maintenance capability. For purposes of logistic supportability testing, it typically includes: all draft equipment publications (operator through general support maintenance); repair parts and accessories; special and common tools; test, support, calibration, and maintenance/calibration

shop facilities; personnel with the proper skills; and transportation and handling requirements.

14. Target Audience Description (TAD).

The document prepared by the TRADOC School having proponency for a Military Occupational Specialty (MOS) that will verify and use the TM's.

Minimum information to be included in the TAD is:

- a. MOS description and designation.
- b. Experience (generally an advanced individual training (AIT) graduate who is MOS qualified but has no field experience).
- c. Reading grade level.
- d. Skills and knowledge trained.
- e. Tasks trained in AIT.

15. Target Audience Soldiers (TAS).

A group of soldiers that is representative of those described in the TAD and who will be used for Government verification of the TM's.

16. TRADOC Systems Manager (TSM).

An individual appointed by the Commanding General (CG), TRADOC, to coordinate user responsibilities in the development of assigned system to include logistic and maintenance support planning, personnel planning, development of the training subsystem, operational testing, development and fielding of the required doctrinal and tactical guidance.

17. Validation.

The process by which contractor personnel test the draft TM's operation and maintenance (O&M) procedures for technical accuracy, adequacy and comprehensibility. Validation includes 100% actual performance of all O&M procedures.

18. Verification.

The process by which military operational and support personnel of the type and qualification of those expected to use and maintain the equipment perform 100% of the O&M procedures in the draft TM's for useability and comprehensibility. Technical accuracy and adequacy may also be rechecked at this time. All performance is monitored by experienced Government subject matter experts.

C. THE EVOLUTION OF TECHNICAL MANUALS.

1. Traditional Manuals.

In the past, critics of TM's maintained that the manuals were written at a technical level above that of the normal user. TM's were described as "written by engineers for engineers." Also criticized were the photographs and figures which were reduced to fit the TM format. It was alleged that the two problems resulted in manuals that were difficult to read and understand. While some improvements in readability were made over the years, the consensus was that traditional manuals still had shortcomings. Illustrations were still deficient; the writing styles were staid; and the language was tedious and complex. Other more specific criticisms were that pertinent information was scattered throughout the manuals; excessive and unavoidable references were included; too much dependence was placed on the user's memory; decision-type procedures were included without adequate guidance; and finally, TM's were subjected to inadequate acceptance procedures (desk top review). Then a new problem arose. Due to the enlistment of a different population of soldiers, the reading level of the Army target audience dropped while the writing level of manuals remained the same. Because of the shortcomings of traditional

manuals, Army leadership determined that new approaches to manual preparation were needed.²

2. Integrated Technical Documentation and Training (ITDT) Manuals.

An initial effort at improvement was the ITDT Program. ITDT evolved over a period of years and many studies. ITDT manuals were prepared in accordance with draft military specifications MIL-M-632XX and MIL-M-633XX. The ITDT manuals were designed to be a primary resource for training. Hence, they used simple language, basic "how to" illustrations, and a variety of other techniques designed to capture the understanding of the targeted reader who was a soldier who had received no Advanced Individual Training (AIT). Critics alleged that the simplicity, plus the format chosen, resulted in too many pages. Verification by the target audience soldiers indicated that the procedures indeed worked but were not cost effective. Consequently, ITDT manuals were considered experimental and were tested by the Army on a limited basis. Examples of ITDT TM's are selected tank turrets, tactical vehicles and manuals for the M1 Tank³ (except for the SPAS style operators manual). Thus, the ITDT manual was a transition between the traditional style and SPAS style manuals.

²
US Army Training Development Institute, DARCOM/TRADOC Integrated Technical Documentation and Training Workshop Student Guide, Tab H, p. 4, n.d.

³
US Army Materiel Development and Readiness Command Letter, DRCMM-MP, Subject: Fielding of Skill Performance Aids (SPAS), 12 Mar 81.

3. SPAS Manuals.

For all practical purposes, the SPAS Program is the new system for TM's. The SPAS military specifications for the preparation of TM's were initially designed for use in 1977.⁴ The SPAS manuals have retained many of the positive features claimed for ITDT manuals. In addition, changes were made in the TM requirements to correct the faults observed with ITDT manuals. While it is too early to state that SPAS is the solution to the Army's TM problems, proponents of the SPAS program claim the following attributes for SPAS manuals. They are easier to read and understand, contain only needed information, pinpoint exactly what has to be done, provide step-by-step procedures, highly illustrative to make them easy to follow, organized for on-the-job use, and tested by soldiers to make sure they work.⁵ The SPAS Program made adjustments to the target audience description. Each manual is tailored to the specific Military Occupational Specialty (MOS) assigned to operate and maintain the equipment. The target audience would usually be an AIT graduate. In addition, the more efficient formats represented in the applicable TM specifications permit a further reduction in the volume of pages. An example of the SPAS TM's is the DRAGON Missile System Operator's Manual, TM 9-1425-484-10.

⁴
Department of the Army Letter 310-79-6, DAMO-RQR(M), Subject: Skills Performance Aids (SPAS) Program, 4 June 1979.

⁵
US Army Logistics Management Center, ALM 30-5267-H, The US Army Skill Performance Aids Program, p. 6, n.d.

4. Responsibilities for SPAS Projects.

a. This paragraph discusses the various DARCOM and TRADOC activities and offices responsible for SPAS projects.⁶ For discussion purposes, SPAS projects may be categorized as either Major Systems with PM's and TSM's or Nonmajor Systems which are not assigned PM's and TSM's. Figure 1a diagrams the interrelationships between Government organizations with TM responsibilities for many Major Systems. Figure 1b diagrams the interrelationships for most Nonmajor Systems. MRSA is the proponent for the specifications which govern TM preparation. A close relationship is maintained with the ATSC, the TRADOC proponent for SPAS. Both MRSA and ATSC are represented on the SPAS Working Group which is chaired by a representative of HQ DARCOM.

b. For Major Systems (Figure 1a) the PM, appointed at the DA level, is the manager of all phases of the hardware system. Decisions on development and support of the system fall within the responsibility of the PM. TRADOC generally appoints a TSM to serve as the central liaison between the PM and TRADOC elements. A memorandum of understanding (MOU) clarifies the division of responsibilities and coordination flow. The Principal Contracting Officer (PCO) normally belongs to the proponent DARCOM Major Subordinate Command (MSC), but in some cases the PCO is assigned to the PM. The PCO is responsible for the contract but generally does not possess specific system or technical experience. He is dependent upon the knowledgeable personnel from a variety of fields to provide information to be incorporated into the contract. A Contracting Officer's Representative (COR) is normally appointed from the DARCOM MSC to assist

⁶

US Army Training Support Center, "SPAS ACOR Workshop," n.d.

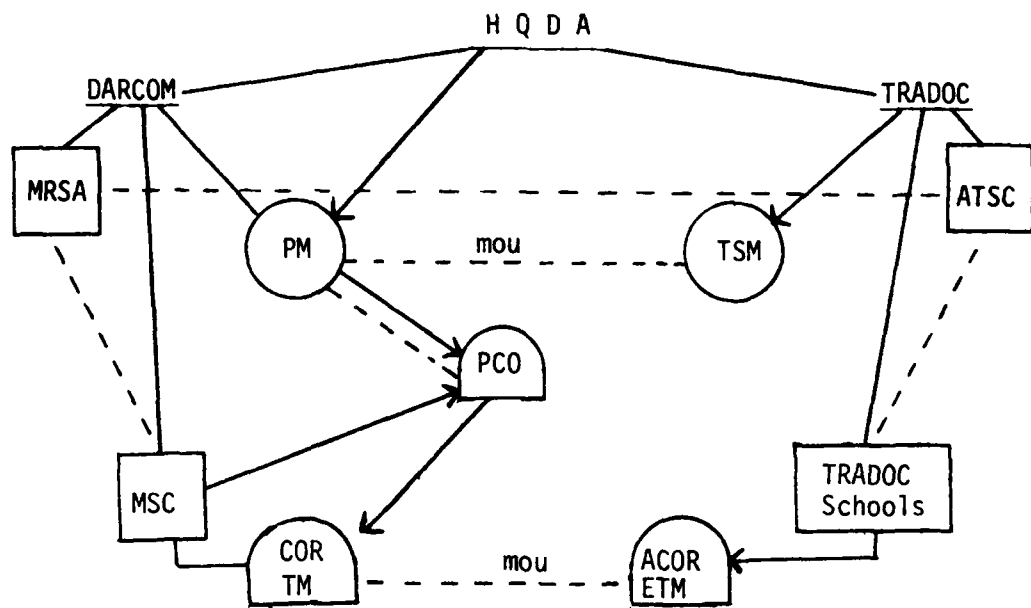


FIGURE 1a.

H Q D A

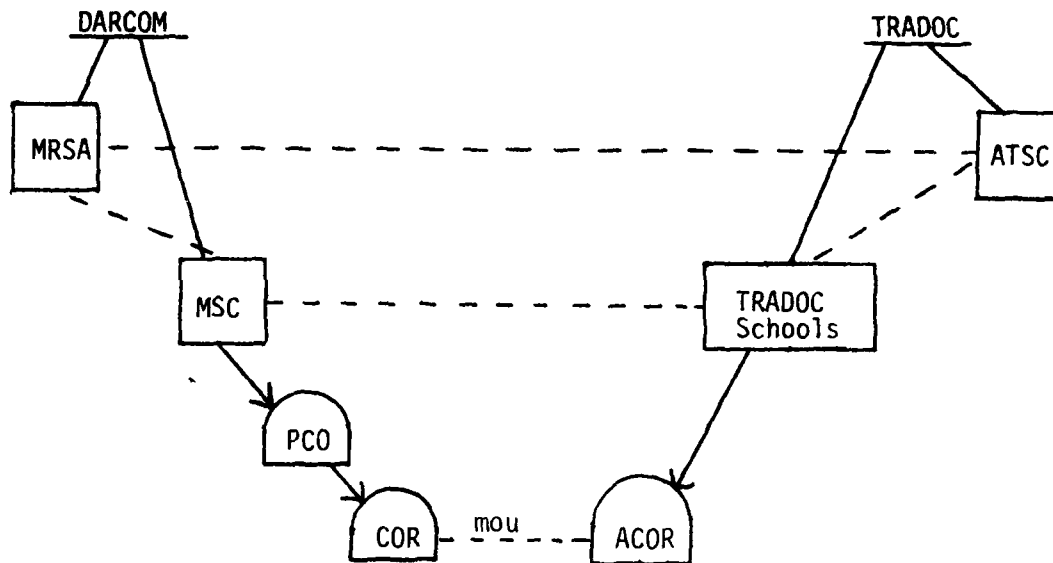


FIGURE 1b.

the PCO. The COR provides system or technical experience (and is sometimes referred to as the contracting officer's technical representative). Although the COR cannot delegate his authority, he may be assisted by technical experts who are specialists in specific areas. An Assistant (ACOR) with training experience may be appointed from a TRADOC school in order to advise the COR on the ETM component of SPAS.

c. For Nonmajor Systems (Figure 1b) the flow of responsibilities is through DARCOM and TRADOC channels. The proponent DARCOM MSC assumes the management role for the system as shown on the diagram. Direct contact is maintained between the MSC and TRADOC schools.

5. Highlights of the SPAS Program.

As an aid to readers that are not intimately involved in TM acquisition, some of the key highlights of the SPAS program are provided.

a. SPAS is a relatively new program. New Military Specifications were initially designated for use in 1977.

b. Only information necessary to do the assigned task is provided in the appropriate format to satisfy comprehension by the intended target audience. This is accomplished by the use of integrated graphics and text.

c. A primary step in manual development is identification of the intended target audience. The manuals are then tailored to the specified audience.⁷

d. Provisions are made for Government verification of the TM's. Military operational and support personnel of the type and qualifications

⁷
US Army DARCOM Handbook, 310-1.1-81, "An Introduction to the Preparation of New Look Technical Manuals," March 1981.

of those expected to use and maintain the equipment perform 100% of the listed maintenance procedures.

e. The SPAS TM development process will be discussed in the next paragraph.

6. The SPAS TM Development Process.

NOTE: The process shown here is typical and may be tailored for certain systems.

a. The first step in TM development is analysis of source data as shown in Figure 2. This is part of the LSA. The contractor technical writers' source data encompasses all types of specifications, standards, engineering drawings, instructions, reports, equipment publications, tabular data, and test results set forth in the contract statement of work (SOW), contract data requirements list (CDRL), and data item descriptions (DID's) for the TM's.

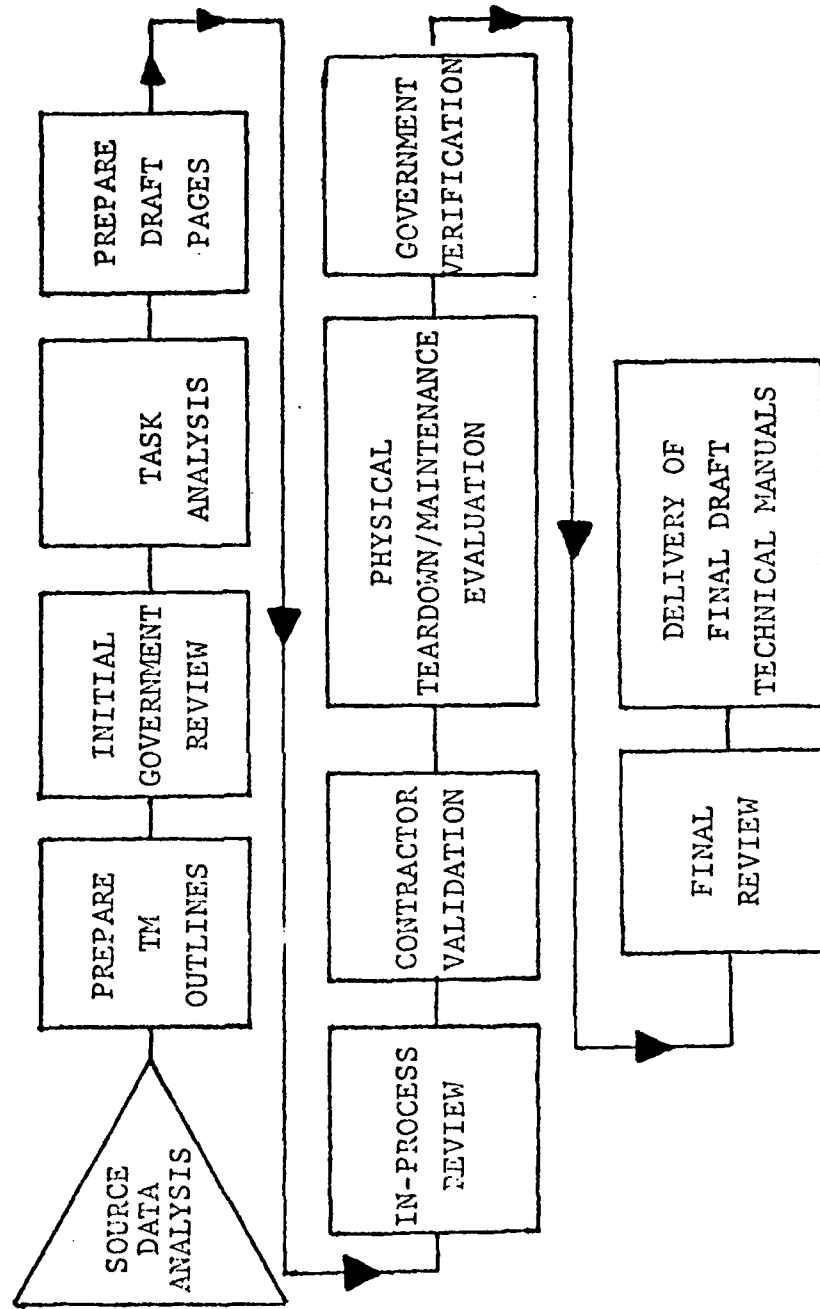
b. Based on the analysis of source data, the contractor technical writers prepare TM outlines. The TM outlines are then submitted to Government as a contractual deliverable.

c. The DARCOM COR, upon receipt of the TM outlines, conducts an initial review. The initial review may include a meeting with the contractor's personnel and other responsible Government activities.

d. A task analysis, performed by the contractor as part of LSA, identifies the maintenance tasks to be set forth in the TM's.

e. Once the maintenance tasks to be covered by the TM's are identified, the contractor prepares the draft pages of the TM's. When appropriate draft pages are completed, they are submitted to the Government for review.

TM Development Process



SOURCE: ATSC SPAS ACOR WORKSHOP

FIGURE 2

f. The Government COR and ACOR, as a minimum, will review the TM draft pages and schedule a formal in-process review (IPR) with the contractor. The IPR will discuss any questions and comment on the draft TM's.

g. The contractor will then conduct a validation of the draft TM's. Validation is the process by which contractor personnel test by actual performance 100% of the draft TM's operation and maintenance (O&M) procedures for technical accuracy, adequacy and comprehensibility.

h. Comments on the content of draft TM may also come from the physical teardown and maintenance evaluation. This is a Government conducted nondestructive disassembly of a major system, subsystem, or equipment to determine if the design specifications have been met and that the physical item has been technically documented as to design, use, and maintenance characteristics through the LSA process.

i. The contractor makes any necessary changes to the TM's and submits the draft TM's to the Government.

j. The next critical step of the process is Government verification. This is the process by which military operational and support personnel of the type and qualification of those expected to use and maintain the equipment perform 100% of the O&M procedures in the draft TM's for useability and comprehensibility. Technical accuracy and adequacy may also be rechecked at this time. All performance is monitored by experienced Government subject matter experts.

k. Based on the Government verification the contractor makes any necessary changes to the TM's and submits the draft TM's to the Government for final review.

l. Again, based on final Government review, the contractor makes changes to the TM's and delivers to the Government the final draft TM's.

m. Specific functions and the responsible individuals for the particular function are provided in Appendix A.

D. SUMMARY.

As this chapter suggests, the preparation and fielding of TM's is an involved process. TM development requirements have gone through a number of significant changes in recent years, and a variety of organizations and disciplines play roles in TM development. It should come as no surprise that many Army personnel are vitally interested in the Army's technical manuals program. Manuals are a direct link between the soldier and his equipment. The TM is his textbook for operating and maintaining the equipment. While it is apparent that concerted efforts have been taken to enhance the TM process, problems remain. The following chapters deal with these issues and recommend actions designed to further improve TM acquisition.

CHAPTER III

FINDINGS

A. INTRODUCTION.

The findings are based on both the observations of the author and the consensus views of the personnel interviewed during the research on this study. Issues or problems have been identified which must be addressed in the future if further improvements are to be made in the acquisition of technical manuals. The problems have been categorized into those which need to be resolved by DARCOM or TRADOC and those which must be resolved jointly by DARCOM and TRADOC.

B. DARCOM PROBLEMS.

1. Tailoring of Requirement for TM's.

Both the military specifications (MIL SPECS) for TM's and the Defense Acquisition Regulation (DAR) provide uniform instructions on preparation of technical requirements and other contractual documents. Both the MIL SPECS and DAR allow for tailoring to meet the unique aspects of individual acquisitions in accordance with Department of Defense Directive 4120.21.⁷

An example is MIL-M-63036A (TM)⁸ which requires that representatives of the procuring activity will verify the contractor's validation. It goes on to state that the procuring activity reserves the right to perform verification by several other methods. Thus the technical requirement must be explicit as to the method the Government will use to conduct verification.

⁷US Department of Defense, Directive Number 4120.21, "subject: Application of Specifications, Standards and Related Documents in the Acquisition Process," November 3, 1980.

⁸US Army, MIL-M-63036A (TM), "Military Specification Manuals, Technical: Operator's, Preparation of," 1 April 1980.

The DAR Sections II and III provide guidance on Uniform Contract Format. The DAR states what information will be provided in what sections of the contractual document. The exact wording of the information is left to the discretion of the Contracting Officer. If the technical requirement provides for a separate contractor validation and Government verification or joint contractor validation with concurrent Government verification the contract document must be tailored accordingly.

If proper tailoring is not accomplished, disputes, cost increases and schedule slippages can, and usually do, occur.

2. DARCOM Personnel Knowledge of the SPAS Program.

As stated in Chapter II SPAS is a new program complicated by the existence of three different styles for TM's (traditional, ITDT, and SPAS). Initial SPAS training is concentrated on the DARCOM Major Subordinate Commands (MSC's) publication personnel. The MSC's technical publication personnel are responsible for TM technical requirement generation, contract performance monitorship, and TM acceptance and thus have first priority for training. SPAS training for other acquisition team members is currently inadequate.

Other functional personnel such as the Program Manager (PM), Integrated Logistics Support (ILS), contracting and legal should have knowledge of SPAS to properly discharge their duties to protect the best interests of the Government. ILS personnel should know the impact the LSA and LSAR has on TM's as part of the system support package (SSP). Contracting personnel should be cognizant of SPAS to properly tailor the contractual document. Legal personnel should know SPAS to provide sound legal advice to both requirements and contracting personnel.

More knowledge of SPAS is also necessary for other reasons. One reason is to overcome the criticism that, generally, acquisition personnel are hardware and not software oriented. Another reason is the General Accounting Office (GAO) has made improved operational readiness, ILS, and the SSP topics of future reviews within the Department of Defense.⁹ A third reason is DOD has made logistic supportability a design requirement as important as cost, schedule and performance.¹⁰

3. TM Page Volume and Costs.

Care must be exercised at the TM design level to ensure that the TM's contain only essential information that will optimize operational readiness. TM's must contain data that minimizes life cycle costs, not acquisition cost. Increased TM volume will increase system costs but is valid if the result is increased hardware operational readiness. Too much TM information will unnecessarily increase TM costs and increase fielding costs because the user may lack motivation to maintain the equipment because of volume. This is a criticism of ITDT style manuals. Recognition must be given to the fact that the complexity of many new systems causes a high volume of pages.

4. Coordination of Acquisition Document with MRSA.

Letters issued by the DARCOM Deputy Commanding Generals, Development and Engineering Directorate and Materiel Management Directorate require PM's and DARCOM MSC's to coordinate specified acquisition documents for development items including solicitations with MRSA. The documents will be reviewed by

⁹US General Accounting Office, Reports PLRD-81-6, February 25, 1981, and PLRD-81-32, June 8, 1981.

¹⁰US Department of Defense, Directive 5000.1, subject: "Major System Acquisition," para D.2.h., page 4, 19 March 1980.

MRSA to assure inclusion of the latest SPAS policy. The repeated calls by DARCOM to provide TM acquisition documents to MRSA has shown a need for improved compliance. Proper coordination will enhance the evolving supportability characteristics of developing DARCOM equipment.¹¹ The lack of coordination of acquisition documents with MRSA degrades the effectiveness of the SPAS program and Army acquisition process and makes both subject to unnecessary criticism.

5. Contractor Engineers Knowledge of ILS.

ILS is a complex, but complete system that must be understood and managed by all participants to provide a smooth transition of TM's from the acquisition concept phase through the deployment phase. A basic purpose of ILS is to influence design to optimize the SSP and life cycle costs. In the opinion of Government experts, contractor engineers do not understand the details, importance, and interrelationship of LSA, LSAR, and SPAS and their effect on operational readiness. As a result ILS doesn't properly influence design and the contractor engineers do not properly develop the LSAR C and D sheets, the basic tools in the development of TM's. The contractor engineers also do not interact properly with the contractor manual writers. This leads to poorly conceived and developed TM's.

6. Government Technical Publication Resources.

SPAS manuals can contain two to three times more pages than traditional manuals. This is further complicated by: the number of new systems to be deployed by Army in the remainder of the decade; and the need for MSC technical publication personnel to devote more time to, in essence, train

¹¹

US Army Materiel Research and Development Command, letter DRCRE, subject: "Distribution of Documents for Developmental Items," 21 February 1980.

contractor technical writers because of the issue discussed in the foregoing paragraph B.5. Essentially the technical publication element has an increased workload with limited trained personnel. Manpower has not increased commensurate with workload. SPAS requires increased in-process reviews of draft outlines and manuals. Government surveillance of contractor validation effort requires additional temporary duty (TDY) funds. As with manpower, TDY funds have not increased proportionately with the increased demands of SPAS. Lack of resources will seriously impact the quality of the SPAS TM program and, in turn, the readiness of Army materiel.

7. Coordination of Multi-Service TM Requirements.

Coordination of multi-service TM requirements is complicated by several factors. One complication involves part numbers. It currently takes 9 to 12 months to obtain a National Stock Number (NSN). The Air Force (AF) and Navy use Manufacturer Part Numbers (MPN's) in their TM's. Requisitions use MPN's that are matched by automation to an NSN at a high level in their supply systems, such as a National Inventory Control Point (NICP). The Army uses NSN for TM's and requisition documents. If the AF or Navy is the proponent department, Army requisitions must be manually handled to match MPN's to NSN's, although fielding can be accelerated. If the Army is the proponent department, AF and Navy deployment schedules are delayed. The two methods thus increase costs and delay schedules because of their lack of standardization.

8. PM Priorities.

The PM's primary interest is system deployment or achievement of the Materiel Fielding Plan (MFP) and Initial Operating Capability (IOC). The SSP including TM's is of secondary importance. The acquisition hierarchy is hardware, not software, oriented. In order to support a firm MFP or to make up delays or cost increases caused by development or test problems the PM will defer funding of the SSP. This impacts the quality and timeliness of TM's. PM's obtain waivers of contractor validations, LSAR reviews, and Government verifications to maintain schedules. These waivers degrade the quality of TM's. The inadequate funding, waivers, and inadequate reviews and tests of TM's occurs in most, if not all, systems acquisitions

9. Task Adequacy Checks.

Task adequacy checks, although the responsibility of the contractor, are not properly performed. In many cases no hardware is provided to the writer for TM development. Instead engineering drawings, that are often out of date are used. The contractors maintenance engineers fail to provide LSAR C and D sheets to the TM writer. The various contractor engineers (design, maintenance, etc.) fail to adequately interact with the TM writer. These deficiencies cause the Government to find poor, incorrect, and omitted procedures and schematics in TM's.

10. Instructional Material Adequacy Guide and Evaluation Standard (IMAGES).

IMAGES is a US Army Test and Evaluation Command (TECOM) quality assurance (QA) tool. Some people say IMAGES is a valid QA checklist. It is still being used by TECOM although TM QA policy responsibility now rests with MRSA. IMAGES is alleged deficient because it is only a checklist and is not tailored to the specifics of the hardware that the TM supports. It is quantity, not quality oriented.

The MRSA quality oriented QA versus the IMAGES quantity oriented approaches to TM's violates the "one face to industry" concept and creates a TM QA standardization problem.

C. TRADOC PROBLEMS.

1. Trainer Input for the Acquisition Concept Phase.

As a result of a new policy, TRADOC is responsible for ILS planning and management from Milestone 0 to I (Concept Phase) of the materiel acquisition process.¹² Part of TRADOC's responsibilities is the Concept Formulation Package (CFP).¹³ The CFP includes; manpower and personnel concepts, training and training devices, and an evaluation of existing organic support capability. The TRADOC combat developer is the action officer for the CFP. Frequently, the TRADOC trainer is not aware of the CFP requirement and TM's lack the proper consideration, evaluation and input at the critical earlier stages of the acquisition process. This creates shortfalls that generate problems throughout the acquisition process for the hardware that the TM's are to support. This has been a particularly tense problem for non-developmental items (NDI's).

2. Dual Role of TRADOC.

TRADOC has combat-developer and trainer missions and organizational segments. In meeting with DARCOM, the TRADOC representative may be combat developer or trainer oriented. If both mission elements of TRADOC are represented in meeting with DARCOM, who is first among equals? This can result in decisions and agreements satisfactory to one or the other side of TRADOC's

¹²US Army Regulation 700-127, "Integrated Logistic Support," para. 3-3.d., page 3-3, 1 April 1981.

¹³US Army Pamphlet No. 700-127, "Integrated Logistic Support Management Model and Glossary," para. B-10.a., page B-8, April 1979.

dual mission, but contrary the overall best interests of TRADOC. A single unified voice of TRADOC is essential in dealing with DARCOM. The equal voice of TRADOC in relation to DARCOM can be degraded by the foregoing to the detriment of the total Army.

3. TRADOC System Managers (TSM's).

There are inequalities between TRADOC System Managers (TSM's) and DARCOM PM's. First, there is not a counterpart TSM for each PM or one TSM may be responsible for more than one project managed system. In some cases the TSM is of a lower rank than the PM.¹⁴ Additionally, the standard TSM office is staffed with one colonel, one lieutenant colonel, two majors and one secretary. It is difficult for the TSM to organize, energize, integrate, and ensure that the proper TRADOC element does its job with respect to assigned systems.¹⁵ Comparatively, a PM has considerably more personnel resources to discharge his mission. This creates a situation wherein the TSM is tasked to do more than his capabilities allow. The result can be misrepresentation of the best interests of TRADOC as the combat developer, trainer and user representative. The Department of the Army world-wide and the National Defense suffers.

4. Target Audience Descriptions (TAD's).

Target audience descriptions are not standardized, omit critical data and contain erroneous information. Although ATSC has issued a policy letter¹⁶ to eliminate these problems, more than a year later interviewees still expressed the same concerns. Thus the LSA, LSAR, and TM's are based on improper information and must be redone at a loss of time and monies.

¹⁴US Army Materiel Development and Readiness Command, Army Project Management List," 1 August 1981.

¹⁵US Army Aviation Center, "Aviation Digest," page 23, July 1981.

¹⁶US Army Training Support Center, Letter, ATTSC-DS-SPAS, subject: "Target Audience Description for Skill Performance Aids (SPAS) Program," 19 March 1980.

5. Multiple School Involvement.

Situations arise in which more than one TRADOC School is involved in the development and validation of TM's. When this occurs, coordination problems arise. Only one school has its TM project officer designated as an Assistant Contracting Officers Representative (ACOR) to support the DARCOM Contracting Officer's Representative (COR) for TM effort, although other schools have responsibility for discrete portions of the TM's.

Information from the contractor, PMO and DARCOM must be routed through the ACOR to the other interested schools. Also, many times only the ACOR and not the project officers of the other cognizant schools attend In-Process Reviews (IPR's) and other meetings. The designated TRADOC ACOR must continuously coordinate the effort with all interested schools but frequently does not do so. Thus, multiple school involvement can create ineffective and time consuming communication problems that lead to unnecessary increases in acquisition costs.

D. JOINT DARCOM AND TRADOC PROBLEMS.

1. Compression of Schedules.

In many acquisition programs compression of schedules often occurs. A program may experience slippages but the final fielding date is not changed. This causes an accordion effect at program end so that waivers must be requested from the validation and verification process and to allow the printing and fielding of draft technical manuals. When schedule compression occurs, TM quality suffers. Besides increasing the risk of providing inaccurate manuals, costs increase (often double) due to the need for changes or revision after the TM are printed and fielded. Some manuals, because of low priority, may never be corrected because of a continuing lack of resources.

2. LSAR Verification.

ILS provides for Government LSAR verification. However, adequate verification is not accomplished due to a lack of identification of specific responsibility and a lack of manpower. Action officers in both TRADOC and DARCOM cite lack of time and manpower as reason for cursory reviews of LSAR's. The dynamics of a development program heighten the criticality of LSAR verification. The end result is basic errors are made that impact the entire TM development process.

3. Common and Special Tools, Test Equipment, and Spare Parts for Verification.

Common and special tools and test equipment may be on the TRADOC schools property book, but are dedicated to instruction of students. Thus they are not available for verification of TM's. Additionally, spare parts can cause problems because the school must requisition through the supply system and this can impact verification schedules. One example has 2000 spare parts lines on requisition with a 60 day lead-time for filling the requisition, yet the parts are for verification scheduled to commence in 50 days. These problems can impact both time and costs.

4. Preventive Maintenance Checks and Service (PMCS) and Pre-Fire Checklists.

The PMCS and pre-fire checks are the most used portions of a TM. It is understood that many operators tear out these two sections of the TM's. This causes the life of a TM in the field to be a fraction of its contemplated life span. This results in driving the cost of publication to an unacceptably high level.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION.

In this chapter the summary conclusions are presented as well as recommendations to improve the overall TM process. The conclusions pertain to the current state of technical manual acquisitions and are a synthesis of the thoughts of representatives from all the diverse elements with technical manual responsibilities. While it is generally recognized that technical manuals of better quality have evolved from the SPAS Program, additional changes need to be made in the overall TM system if TM acquisitions are to continue to improve. The existing problems were addressed in Chapter III, Findings. The recommendations are tied specifically to the issues described in Chapter III.

B. CONCLUSIONS.

1. Operational readiness is one of the final tests of the Army's ability to meet its mission on behalf of the National Defense. Readiness is directly affected by the quality of logistics support for military hardware. The key to effective logistic support is the System Support Package which includes technical manuals. If TM's are either not provided with deployed equipment or are inadequate, there is a high probability that much of the hardware will become part of an expensive stockpile of deadlined equipment. It follows then that the availability of good quality TM's makes a major contribution to the readiness of Army tactical units.

2. The foundation for the development and preparation of good TM's is a system which provides for a thorough analysis of operational and maintenance characteristics of equipment and an analysis of what the soldier must

do to keep the equipment operating properly. The system must also include an information system which records the results of the analysis. In the SPAS program, the LSAR is the element for this data. It is imperative that acquisition personnel understand the complex interrelationship between the LSAR and the preparation of TM's in order to assure that high quality TM's are provided with deployed equipment.

3. Quality assurance provisions for SPAS manuals appear to be a distinct improvement over the provisions formerly applied to the acceptance of traditional manuals. QA provisions for SPAS manuals require: contractor validation that all tasks are complete and accurate and can be comprehended by the target audience by performing the tasks with personnel representative of the target audience; and 100% Government verification for technical accuracy plus comprehension of final draft manuals using target audience troops. Unfortunately, all or part of the above can and has been waived in the past. As one person stated, "We have a good system for obtaining quality manuals that will work, if we let it."

4. QA and acceptance of TM's within DARCOM is the responsibility of the MSC's Maintenance Directorate, Technical Publication Division acting as a Contracting Officer's Representative or technical monitor for the Contracting Officer. Normally, QA and acceptance of supplies and services are accomplished by a Defense Contract Administration Services or MSC Product Assurance Directorate representative. The Director of Product Assurance, Headquarters, DARCOM and MSC Product Assurance Directorates are not involved in TM acquisition. The US Army Materiel Readiness Support Activity (MRSA) is the DARCOM proponent for the SPAS program under the technical direction of the Director of Materiel Management, Headquarters, DARCOM.

5. One unfair criticism of TM's is that TM's do not contain troubleshooting of all possible faults. From a logical prudent man standpoint, coverage of all possible faults would entail time and money expenditures of unacceptable magnitudes. Thus official DA policy states in part that the troubleshooting section of a manual will consist of a scope paragraph that contains statements such as:

"This manual cannot list all possible malfunctions that may occur or all tests or inspections, and corrective actions."

and

"Table 0-0 lists the common malfunctions that you may find during the operation or maintenance of the (insert type of equipment or system) or its components."¹⁷

Also, policy provides that contents of TM by categories of maintenance will contain only essential information and data needed to perform function allocated to that level of maintenance in the maintenance allocation chart.¹⁸

6. Opinion differs considerably on the degree of theories and basic mechanical skills that are or should be taught in the TRADOC Schools. Some critics say no theory or basic mechanical skills are taught or not enough are taught. Theory and basic mechanical skills are taught in the TRADOC Schools, but have been reduced to the minimum essential level. An example is one school that once spent as much as a week on Ohm's Law of Electricity. Now the school only teaches that electricity flows from positive to negative.

¹⁷US Army Regulation 310-3, "Preparation, Coordination, and Approval of Department of the Army Publications, para 9-25, page 9-8, December 1968 through Change 12, 15 September 1979.

¹⁸Ibid, para 9-18, pages 9-5 and 9-6.

Basic mechanical skills are similarly taught as part of initial entry training. The acceptable level of theory and basic mechanical skills was not addressed by the research. In essence, this conclusion points out a needless controversy created by lack of knowledge and interest on the part of the players in the TM acquisition arena.

7. One DARCOM MSC commander has taken steps that should lead to improved TM acquisitions. The actions and positions include:

a. The Integrated Logistics Support (ILS) Division was moved to a staff level equal to a directorate. ILS now reports through a Deputy Commanding General to the Commander.

b. A review was made of the numbers and grades of personnel of the Project Manager Offices (PMO's) to assure the personnel were dedicated to management of their area of expertise and not involved in operational matters supported by a MSC staff or operational element. If operational work was identified, the position would be reassigned to the appropriate MSC element.

c. The commander will not certify a materiel release for new equipment without a complete and acceptable system support package (SSP). The Commander's actions were a determined application of the Department of Defense policy that logistics supportability is as important as cost, schedule and performance.¹⁹

8. An outstanding vehicle for improvements in ILS and TM acquisitions is the ILS Lessons Learned (LL's) program. One product of the program is the ILS LL's report that summarizes experiences of the Army in the

¹⁹US Department of Defense, Directive 5000.1, subject: "Major System Acquisitions," para D.2.h., page 4, 19 March 1980.

development and fielding of materiel systems. The other product of the program is customized reports of LL's for specific functional areas such as publications and testing. These products are available upon request from MRSA.²⁰ Examples of lessons learned are provided in Appendices B and C. This report contains only results of the project research. Issues in this report that duplicate MRSA published ILS LL's are coincidental.

9. Solutions to TM issues identified in this report must be primarily addressed by functional specialists other than contracting, but contracting personnel must be knowledgeable in TM acquisition, specifically the SPAS program. This will assure realistic, complete, and economical TM's are acquired, no more or no less than the Army's minimum essential requirements on a life cycle cost basis.

C. RECOMMENDATIONS.

1. DARCOM.

- a. Emphasize the need to tailor technical requirements for TM's.
- b. Train all functional members of the acquisition team on the SPAS program.
- c. Educate contractor technical writers and engineering personnel on the SPAS program.
- d. Insure that the potential benefits of SPAS TM's which include increased operational readiness and decreased life cycle costs are considered in any discussion of increased page volume and TM costs.
- e. Instruct the DARCOM Procurement and Production Directorate on the requirement to send MRSA copies of TM acquisition documents such as solicitations.

20

US Defense Systems Management College, "Concept," Volume 4, Number 3, pages 113-119, Summer 1981.

f. Provide additional resources to DARCOM technical publication elements.

g. Take steps to minimize the problems associated with multi-service TM requirements.

h. Give logistic supportability equal importance to cost, schedule and performance on system acquisitions.

i. Make a decision about the future of IMAGES and its role in the quality assurance of TM's.

j. Take action to reflect MSC's technical publications element responsibilities in appropriate regulations (e.g., DARCOM Supplement 1 to AR 310-3).

k. Insure that PMO's or ILS elements are not involved in operational or functional matters supported by other MSC staff elements.

l. Insure that quality assurance provisions for technical manuals (i.e., validation and verification) are not waived or modified without full concurrence by the MSC's technical publications element.

2. TRADOC.

a. Assure that its trainer elements provide timely and complete input to combat developer elements for the Concept Formulation Package.

b. Assure a balance of interests between TRADOC trainer and combat developer roles, both internally and externally. A mechanism for resolution of honest impasses between the roles must be provided.

c. Review the system for the establishment and staffing of TRADOC System Managers (TSM's). There is an imbalance of TSM's and their staffs when compared to the DARCOM PM's and their staffs.

d. Monitor target audience descriptions (TAD's) to assure the TAD's are standardized, complete and accurate.

3. DARCOM and TRADOC.

a. Devote sufficient time and resources to do TM's right the first time rather than suffer the wasted effort and funds to revise the TM's at a later date, or worse, not at all.

b. Provide the proper personnel and time to verify contractor generated LSAR.

c. Consider having the contractor furnish common and special tools, test equipment and spare parts identical to those contemplated for use by field units for Government verification of TM's.

d. Study the cost effectiveness of PMCS and pre-fire checks as a separate manual of fatigue pocket size.

e. Identify the DA elements to pursue the problems identified by this report. Suggested is the Army Training Support Center (ATSC) on behalf of TRADOC and MRSA for DARCOM. This is logical since the organizations are the respective MACOM's proponents for the SPAS program within their major commands.

f. Give maximum distribution to the MRSA semi-annual ILS lessons learned within all functional areas and levels of the acquisition community. The ILS lessons learned program is an excellent vehicle for dissemination of information of the nature found in this report.

APPENDIX A

SPAS FUNCTIONS AND RESPONSIBILITIES

<u>FUNCTION</u>	<u>RESPONSIBILITIES</u>
Associate Contractor Work Requirements with the Appropriate TM/Extension Training Material (ETM Specifications	The DARCOM MSC publications specialist would structure the TM Scope of Work (SOW) using the specifications and monitor the contractor TM performance against the specifications. The TRADOC ETM technical specialist would structure the ETM SOW using the ETM specification and monitor the contractor's ETM performance against the ETM specification.
Matching Target Audience and Relevant Materials	The target audience specialist at the proponent TRADOC school and the DARCOM publications specialist are responsible for monitoring the contractor's performance in this area.
Describe Training Acquisition for Developmental Systems Acquisition of SPAS Program Products	The TRADOC System Manager plans for training. The DARCOM MSC publications specialists, in conjunction with such technical advisors as the ILS Managers, maintenance specialists, human factors engineering and TRADOC training specialists, will provide input for the acquisition of the new TM & ETM.

FUNCTION

Evaluate Initial Page
Preparation

Discriminate Validation/
Verification Options

Describe the Analysis of
Source Data

Describe SPAS Program
Proposal Evaluation

RESPONSIBILITIES

The DARCOM publications specialists/ technical writers are responsible for monitoring and accepting these contractor deliverables for the TM's; TRADOC personnel are responsible for training aspects.

The DARCOM publication specialist is responsible for describing validation and verification requirements to the contractor and monitoring both events for TM. Likewise, the TRADOC ETM technical advisor is responsible for ETM validation and verification.

The DARCOM publication specialist, along with the DARCOM maintenance specialist, equipment specialist, and the human factors engineers, would monitor this important LSA aspect of contractor performance; the TRADOC ETM technical specialist would monitor the analysis for training considerations.

A team consisting of the DARCOM publication specialist, DARCOM ILS data manager, possibly maintenance and

FUNCTION

RESPONSIBILITIES

Describe Extension Training
Materials

equipment specialists would comprise the DARCOM proposal evaluation team for the TM proposal. The TRADOC ETM technical advisor with education, job and task analysis subject matter specialists comprises the ETM team.

The TRADOC ETM technical specialist with the team of education, target audience, job and task analysis, and subject matter specialists is responsible for establishing the contractor work requirement and monitoring his performance for ETM.

Structuring the Statement of
Work for Effective SPAS Program
Products

The DARCOM publications specialist, should prepare the publications portion of the SOW; and the TRADOC ETM technical advisor should provide the input for the ETM portion of the SOW.

Tailoring the LSA/LSAR for
SPAS Data Requirements

The DARCOM publication specialist working with the DARCOM PM ILS Data Specialist would develop the description of the contractor requirement to develop LSA/LSAR for developing TM's and ETM's. Also, they would evaluate the contractor's plan for developing LSA/LSAR and monitor his performance.

<u>FUNCTION</u>	<u>RESPONSIBILITIES</u>
Responding to the Data Call for SPAS Request for Proposal (RFP)	The TRADOC ETM technical specialist would do the same for the ETM portion. The DARCOM publication specialist, assisted by the ILS manager for data, generally will provide the DARCOM input to the data call, while the TRADOC training specialist will provide input data for the ETM portion of the RFP.
Evaluate Contractor Proposals	A team consisting of the DARCOM publication specialist and the DARCOM ILS data manager would comprise DARCOM proposal evaluation team for the TM proposal. The TRADOC ETM technical advisor and education, job and task analysis and subject matter specialists evaluate ETM proposals.
Evaluate Contractor ETM Materials	The TRADOC ETM technical specialist, along with a TRADOC team of education, target audience, job and task analysis and subject matter specialists, would evaluate ETM materials.
Evaluate Contractor Validation Plan and Verification Trials	The DARCOM MSC publication specialist will verify TM's and ETM assisted by the TRADOC ETM technical advisor.

SOURCE: US Army Logistics Management Center, ALM 30-5256-H1(A), n.d.

APPENDIX B

LESSON LEARNED #11

TOPIC: Verification of Publications

SYSTEM: Aviation Systems

LESSON LEARNED: Publications may be fielded with incomplete or inaccurate tools, parts or procedures descriptions unless an up-to-date prototype end item and only the tools and test equipment specified in the technical publications are used to validate the accuracy of the publications.

PROBLEM: The prototype system was planned with a 75% fixed publication effort and 25% change. The production model publications became 25% fixed data with 75% changes. Publication efforts were planned and scheduled on the competitive design which was used for contractor publication validation. The contractor used contractor tools for this validation.

DISCUSSION: The production publications, tools, special tools, and test equipment were fielded with discrepancies and shortcomings due to the fact that the publications were not verified by using currently approved Army tools and test equipment on a first production helicopter.

APPROPRIATE ACTION: Aircraft project managers must plan and schedule a developmental prototype of the system/end item representative of that which will be tested at DT/OT II and perform PT/LD verifying all equipment publications. Publication writers must be on-hand during PT/LD to change or update all drafts. However, when significant design changes occur, project managers must schedule appropriate logistic supportability testing to verify the suitability of the new requirements and the revised technical publications.

CROSS REFERENCE:

1. SSP
2. Contract Requirements
3. Publications

SOURCE: US Army MRSA, "Integrated Logistics Support Lessons Learned," October 1980.

APPENDIX C

LESSON LEARNED #12

TOPIC: Publications for NDI

SYSTEM: Nondevelopmental Item (NDI)

LESSON LEARNED: Commercial manuals may contain extensive data on equipment that is not included in a NDI acquisition.

PROBLEM: The equipment was fielded with unedited commercial manuals.

DISCUSSION: Frequently, commercial manuals provided with NDI acquisitions contain information on all makes and models manufactured by a specific contractor and are designed for use by a dealer who services all models. Only a small portion of the manuals pertain to the specific model procured by the Army. Consequently, it is very difficult for the user to find the needed information. Further, the unnecessary weight and the constant burden of updating places an unnecessary burden on the user. Availability of commercial manuals is a critical problem because the user must pay for replacements and updates.

APPROPRIATE ACTION: The publications to support NDI's may be either commercially developed or developed by the government. However, the manuals should only contain data pertinent to the NDI. The government must consider the follow-on procurement life cycle. Commercial off-the-shelf manuals should be reviewed and evaluated in compliance with MIL-M-7298c(2).

CROSS REFERENCE:

1. Publications
2. NDI

SOURCE: US Army MRSA, "Integrated Logistics Support Lessons Learned," October 1980.

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STUDY TEAM COMPOSITION

The study team consisted of the following individuals:

C. Eugene Beeckler, Project Officer and Procurement Analyst, US Army Procurement Research Office (APRO), US Army Materiel Systems Analysis Activity (AMSAA), B.B.A., University of Wisconsin, 1961; M.S. in Procurement and Contract Management, Florida Institute of Technology, 1976. In addition to numerous consulting projects Mr. Beeckler has been project officer on research in the areas of warranties, economic price adjustment, letter contracts and Acquisition Strategies for Nondevelopmental Items. Mr. Beeckler was a Contract Specialist with the AMC Chicago Procurement District, the NIKE-X Project Office and various Commands assigned to Ballistic Missile Defense Program. Mr. Beeckler was also a Supervisory Contract Specialist/ Contracting Officer with the US Army Procurement Agency, Europe, Frankfurt/Main, FRG. After a short assignment as a Contract Negotiator with the Army Missile Command, Mr. Beeckler joined the APRO.

John I. Neely is an Industrial Engineer at US Army Procurement Research Office, US Army Materiel Systems Analysis Activity, Fort Lee, VA. He earned his M.S.I.E. from Purdue (1942) and has a B.S. in Education from Indiana University (1938). Mr. Neely has been licensed as an Industrial Engineer in several states. Prior to coming to the US Army Procurement Research Office (APRO), he was an Industrial Engineer with the Defense Logistics Agency, and taught I.E. for the US Navy in the Far East. He received the civilian "E" Award from President Roosevelt for R&D at Eli Lilly and Company.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER APRO 81-08	2. GOVT ACCESSION NO. AD A116772	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Technical Manual Acquisition		5. TYPE OF REPORT & PERIOD COVERED Final
7. AUTHOR(s) C. Eugene Beeckler John I. Neely		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS USA Materiel Systems Analysis Activity Army Procurement Research Office ATTN: DRXS-PRO, Ft. Lee, VA 23801		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS USA Materiel Development & Readiness Command ATTN: DRCSM-PMP 5001 Eisenhower Ave., Alexandria, VA 22333		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE May 1982
		13. NUMBER OF PAGES 51
		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)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Procurement, Policy; Technical Manuals; Skill Performance Aids (SPAS) Program; Readiness		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) BACKGROUND. Technical Manuals (TM's) represent a large research and development investment by the Government. TM's are essential to efficient logistic support of deployed Army equipment. The emphasis and resources devoted to assure adequate TM's for Army equipment has not eliminated a multitude of criticism of the TM's ability to support the Army. Critics point to many sources of the problem and offer a like number of solutions. OBJECTIVES. The study objectives are to determine roles and interfaces of Department of the Army (DA) elements in		

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TM acquisition, identify problems and probable causes and recommend the appropriate DA element to resolve the problems. STUDY APPROACH. The study approach consisted of a literature search of recent and current work, applicable regulations, military standards, and other appropriate policies and procedures. Interviews were then conducted with US Army Materiel Development and Readiness Command (DARCOM) and US Army Training and Doctrine Command (TRADOC) individuals most knowledgeable of the TM acquisition process. The information was then analyzed to develop findings, conclusions and recommendations. SUMMARY AND RECOMMENDATIONS. Technical Manuals are essential to the operational readiness of Army equipment and thus must be weighed on a life cycle, not acquisition, cost basis. While it is generally recognized that better quality TM's are evolved from the SPAS Program, additional changes need to be made in the overall TM acquisition process if TM's are to continue to improve. The study identified areas for improved TM acquisition to be pursued by the US Army Training Support Center (ATSC) on behalf of TRADOC and the US Army Materiel Readiness Support Activity (MRSA) on behalf of DARCOM.

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