TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE

MANUAL:

OVERALL SYSTEM DESCRIPTION

GUIDED MISSILE AIR DEFENSE SYSTEM AN/TSQ-73

This copy is, a reprint which includes current pages from Changes 1 through 12.

HEADQUARTERS, DEPARTMENT OFTHE ARMY

26 SEPTEMBER 1978

TECHNICAL MANUAL

NO. 9-1425-650-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *26 September 1978*

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL:

OVERALL SYSTEM DESCRIPTION

GUIDED MISSILE AIR DEFENSE SYSTEM AN/TSQ-73

TABLE OF CONTENTS

TABLE OF CONTENTS-Continued

TABLE OF CONTENTS-Continued

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS-Continued

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope. This manual provides operator and organizational maintenance information for the AN/TSQ-73 Guided Missile Air Defense System (fig. 1-1). A summary of system capabilities, use, and maintainability is provided for personnel responsible for operating and maintaining the AN/TSQ-73 system. Chapter 1 provides an overall system description. Chapter 2 provides physical and electrical characteristics (descriptions and tables). Chapter 3 describes the maintenance concept for the AN/TSQ-73. Operation, emplacement, and maintenance instructions are contained in the operator and organizational maintenance manuals listed and briefly described in chapter 4. Appendix A provides a list of references. Appendix B is the components of end item (COEI) list and basic issue items (BII) list. Appendix C is the additional authorization list (AAL) of items. Appendix D is the expendable and durable items list. Appendix E illustrates the instruction placards placed throughout the system. Appendix F is a listing of abbreviations/acronyms.

1-2. Maintenance Forms and Procedures. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 (The Army Maintenance Management System (TAMMS) (Maintenance Management UPDATE).

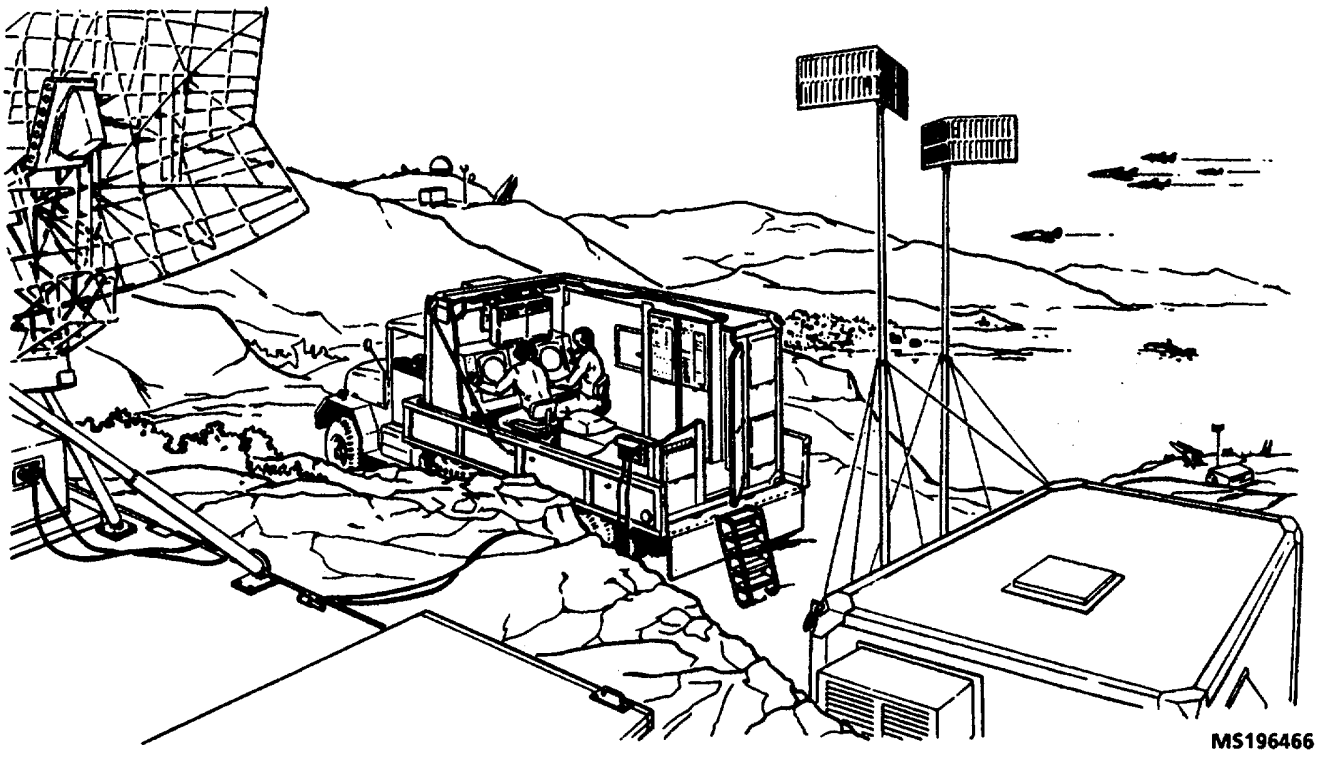

Figure 1-1. Guided Missile Air Defense System AN/TSQ-73

1-3. Reporting Equipment Publications Improvements. Reporting of errors, omissions, and recommendations by the individual user for improving this publication is encouraged. Reports should be submitted on DA Form 2028, Recommended Changes to Publications, and forwarded direct to: Commander, U.S. Army Missile Command, ATTN: AMSMI-MMC-LS-LP, Redstone Arsenal, Alabama 35898-5238. You may also send in your comments electronically to our e-mail address: ls-lp@redstone-emh2.army.mil or by fax 205-842-6546/DSN 788-6546.

1-4. Destruction of Army Materiel to Prevent Enemy Use. If capture of this equipment appears imminent, or if the equipment must be abandoned, it should be destroyed to prevent enemy use. Destruction procedures should be carried out only on orders from cognizant authority. Refer to TM 43-0002-21 for procedures required for destruction of equipment and related system materiel. Priority items requiring destruction are recorded tape cartridges and classified manuals.

1-5. Abbreviations. Refer to appendix F for a list of abbreviations used in this manual.

1-6. Official Nomenclature. AN/TSQ-73 system nomenclature associated with the equipment described is listed in table 1-1. For further identification, a cross-reference is provided for the manufacturer's part number and for the common name used in this manual.

Table 1-1. ANITSQ-73 Official Nomenclature

Official nomenclature	Part no.	Common name
Air Defense System, Guided Missile AN/TSQ-73(V)	13143900-2	AN/TSQ-73 system (battalion configuration)
	13143900-3	AN/TSQ-73 system (brigade configuration)
Shelter, Electrical Equipment S-529/TSQ-73(V)	13143902-2	System shelter (battalion configuration)
	13143902-3	System shelter (brigade configuration)
Console, Assault Fire Command, Guided Missile OJ-299/TSQ-73(V)	10284960-7	Display console
Data Display Group OD-96/TSQ-73(V)	10281361-2	Data Display Group (DDG)
Recorder-Reproducer, Guided Missile System, RD-449/TSQ-73(V)	10285127	Magnetic Tape Unit (MTU)
Test Set, Electronic Circuit Plug-In Unit TS-3317/TSQ-73(V)	10281395	Module Test Set (MTS)

Section II. SYSTEM DESCRIPTION

1-7. System Elements and Expansion Capability (fig. 1-2).

a. *System Elements.* The AN/TSQ-73 system is organized into four functional subsystems of equipment: display; radar interface; automatic data processing; and communications. The widespread use of microelectronic digital circuitry to replace discrete component digital elements and a number of analog elements has resulted in size, weight, and power reductions that enable the entire system to be housed in a single mobile shelter. Because of the modular nature of the system equipment, the baseline AN/TSQ-73 can be easily expanded for increased air defense missions or for modified roles and missions.

b. *Expansion Capability*. The AN/TSQ-73 system has increased capacity for computing, display, and communications. The system is programmable and compatible with a wide range of radars and with other command and control systems, and can be deployed anywhere in the world. The baseline AN/TSQ-73 can be expanded to a variety of special primary or backup missions without design modification. The growth capacity is as follows:

(1) Situation display (situation information display and auxiliary readout console) expansion to 8 consoles.

(2) Memory expansion and growth to 262,144 words.

(3) Plug-in additional digital data link terminals.

(4) Track expansion, through software.

In addition, the system is designed for easy conversion to accommodate future technology advances. Subsystem designs are partitioned to allow replacement of functional groups of circuit cards with even more advanced microelectronic circuit devices for increased system capability. Because of its present technical innovations, high reliability, built-in test features, maintainability, logistics, and growth capacity, the system provides improved capability in fixed installations and mobility to operate in the field.

1-8. Display Subsystem (fig. 1-3).

a. *Display Consoles.* The display console provides the primary interface between the operator and the AN/TSQ-73 system. Two situation display consoles with both Plan Position Indicator (PPI) and Auxiliary Read-Out (ARO) displayed on a single crt provide the operator with the essential data to make fast, accurate decisions based on up-to-the-second displayed information. Console controls allow him to communicate directly with the system for callup or insertion of additional data, for limiting the amount of displayed data, or for modifying existing data. The display console is the key element in performing the following system functions:

(1) Display of the tactical situation data consisting of radar returns and associated computer generated synthetic symbols, maps, lines, and alphanumeric characters.

(2) Operator participation with the computer in tactical data processing operations.

(3) Computer driven, tabular, alphanumeric status panel.

(4) Auxiliary readout for additional track data.

As self-contained units, the display consoles operate independently of each other and of the Data Display Groups (DDGs). While only two consoles are presently used, the display group has a built-in growth capability for expansion to as many as eight consoles for increased mission tasks without design modifications. Consoles also can be located remotely up to 330 feet from the shelter. Although reliable components are used throughout, the display group design provides a rapid means to detect, isolate, and repair faults through use of both built-in on-line fault detection and off-line fault isolation. Ease of repair is facilitated by accessibility of components and testpoints. The AN/TSQ-73 display console incorporates design innovations which enhance combat effectiveness of the system. The general-purpose display console provides the following display data:

(1) Track positions.

(2) Weapon positions.

(3) Maps.

(4) Jam strobes.

(5) Velocity vectors.

(6) Safe corridors.

(7) Pairing lines.

(8) PATRIOT engagement boundaries.

(9) Defended areas and points.

(10) Range and angle marks.

(11) Fixed point sites.

(12) Data link transmission zones.

(13) Weapons Control Zone (WCZ).

(14) Missile Engagement Zone (MEZ).

(15) Forward Support Coordination Line (FSCL).

b. A*rr*angement *of Display Console.* The arrangement of the display console controls and crt optimizes operator effectiveness. The convenience of the console controls is made possible by use of a built-in alterable data processor, which is programmed to meet the specific user operational requirements.

(1) Through the technique of time division multiplexing video and alphanumerics, the console displays data on a rectangular single-gun crt. The display surface includes a ppi area 141M2 inches in diameter, occupying the major portion of the display surface, and a rectangular area 8 inches wide by 2 inches high at the lower edge of the display surface.

The PPI display is presented on the circular area and the ARO display is generated in the lower rectangular area.

(2) Operator entry is made by switch actions, a full 36-character alphanumeric keyboard, and a force stick for entering position coordinates. Standard display content and quality controls are provided.

(3) Track symbols displayed include position and identification, track number, raid size, height, velocity, extended vectors, and source code. Two area maps, operator selectable from a list of 10 maps, may be displayed simultaneously. For friendly aircraft protect-