TECHNICAL MANUAL

DS, GS, AND DEPOT MAINTENANCE MANUAL
RADAR SET AN/TPN-18

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RADAR SET AN/TPN-18

NOTE

This manual printed in two volumes as follows:
TM 11-5840-281-36/1, consisting of the Warning Page, List of Illustrations, and Chapters 1 through 5.
TM 11-5840-281-5/2, consisting of Chapters 6 and 7, and Index.
The Warning Page, List of Illustrations, and Index are applicable to both volumes.

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*This manual together with TM 11-5840-281-12, 24 November 1970 and TM 11-5840-281-35/2,15 January 1971 supersedes TM 11-5840-281-15, 29 September 1967.

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CHAPTER 1
INTRODUCTION

1.1. Scope

a. This manual covers direct and general support, and depot maintenance for Radar St AN/TPN-18. Chapter 2 provides a brief explanation of the electrical and mechanical functioning of the overall system and of the individual groups. Chapter 3 provides direct support maintenance instructions which include troubleshooting, alignment, and repair. Chapter 4 provides direct support testing procedures and performance standards. Chapter 5 provides general support maintenance instructions and testing procedures. Chapter 6 provides depot maintenance instructions and testing procedures. Chapter 7 provides depot overhaul standards for checking the equipment after extensive repair or overhaul. Chapters 6 and 7 appear in volume 2 of this manual.

b. The technical manuals necessary to provide complete coverage of Radar Set AN/TPN-18 are: TM 11-5840-281-12, TM 11-58l0-281-20P, TM 11-5840-281-35/1, TM 11-5840-28135/2 and TM 11-5840-281-35P.

NOTES

1. Applicable forms and records are covered in TM 11-5840-281-12.
2.This manual contains unreviewed information compiled by the equipment manufacturer. The information primarily covers radar sets purchased under Contract DAAB07-69-C-0277 but all tests, testing and alignment procedures, and troubleshooting data apply to all radar sets. Older radar sets have different wire numbers and contain terminal-board mounted components instead of the printed (etched) circuits described in this manual.
3. All Radar. Sets AN/TPN-18 manufactured under Contract DAAB07-69-C-0277 contain electromagnetic interference (EMI) filters within Remote Switching Control C-6989/TPN-18, Radar Receiver-Transmitter RT-818/TPN-18, and Control-Indicator C-6988/TPN-18 Refer to the nomenclature plates on the RT-818/TPN-18 and C-6988/TPN-18 to determine the contract under which the equipment was manufactured.

1.2. Indexes of Publications

a. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment.

b. Refer to the latest issue of DA Pam 310-7 to determine whether there are modification work orders pertaining to this equipment.

1-3. Reporting of Equipment Publication Improvements

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, US Army Electrons Command, ATTN: AMSEL-MA-AN, Fort Monmouth, NJ. 07703.

1-4. Differences in Models

A general description of differences in models, if applicable, will be found in TM 11-584-281-12. Specific maintenance and test procedure differences will be found in the appropriate chapters of this manual.

CHAPTER 2

FUNCTIONING OF EQUIPMENT

2-1. Radar Set Description

a. Radar Set AN/TPN-18 is capable of radar search coverage through 360 degrees of azimuth within a range of 40 nautical miles up to an altitude of 12,000 feet minimum using a C-45 type aircraft. The radar precision approach coverage is from 40 nautical miles to within 20 feet of runway touchdown using an 11-degree elevation scan angle (36-degree optional) and a 30-degree azimuth scan angle (60-degree optional).

b. When auxiliary iff equipment is used with Radar Set AN/TPN-18, this secondary surveillance radar is capable of providing positive identification of aircraft and extending the altitude and range above and beyond the radar capability.

c. Radar Set AN/TPN-18 consists of seven functional sections (fig. 2-1). These sections are identified as transmitter, rf, receiver, antenna control and data, control-indicator, receiver-transmitter power supply, and control-indicator power supplies.

d. The transmitter section generates the rf radar pulses; the rf section couples the rf radar pulses from the transmitter section to the azimuth and elevation feedhorns for radiation into space in a specific pattern, then couples the reflected rf signals from the feedhorns back to the receiver section; the receiver section detects and processes the reflected rf signals for visual observation on the control-indicators; the antenna control and data section controls the position of the antennas and switches the rf radar pulses between the antennas; the control-indicator section visually dis-
plays the relative position of the aircraft to the surrounding area; the receiver-transmitter power supply section produces the voltages necessary for operation of the transmitter section, rf section, receiver section, and the antenna control and data section; and the control-indicator power supply section produces the voltages necessary for operation of the indicator circuits.

e. The control-indicator section can be further divided into five functional subsections identified as range mark circuits, sweep generating circuits, cursor generating circuits, cursor control circuits, and indicating circuits.

f. The range mark subsection generates accurately spaced 1-mile range marks for the 5- and 10-mile display ranges, S-mile range marks for the 20- and 40-mile display ranges, and 10-mile range marks for the 80-mile display range. The sweep generating subsection provides a logarithmic 5- and 10-mile time-base in the normal (precision) mode, a linear time-base for normal mode 20- and 40-mile ranges, and a linear time-base for all search mode ranges. The cursor generating subsection produces courseline cursors for the azimuth display, and glidepath and height finding cursors for the elevation display. Refer to paragraph 1-5b(3)(h), (i), and (j) in TM 5840-281-12 for technical characteristics of the cursors. The cursor control subsection uses the antenna angle data and reference voltages to properly time and switch the cursor generating circuits. The indicating subsection uses the voltages from the sweep generating circuits to produce the indicator display required for the mode selected, and then displays the composite video signals on the indicator.

g. Radar Set AN/TPN-18 has six selectable modes of operation. They are identified as SEARCH, NORM, 35° EL, 60° AZ, SIMULT, and IFF. When SEARCH mode has been selected, azimuth Antenna AS-1292/TPN-8 rotates through the full 360-degree search scan, elevation Antenna AS-1291/TPN-8 is inoperative, and Control-Indicator C-6988/TPN-18 uses a ppi display. When NORM mode is selected, azimuth Antenna AS-1292/TPN-8 scans a 30-degree horizontal sector, elevation Antenna AS-1291/TPN-8 scans an 11-degree vertical sector, and Control-Indicator C-6988/TPN-18 uses beta scan. When 35°EL mode is selected, azimuth Antenna AS-1292/TPN-8 scans a 30-degree sector, elevation Antenna AS-1291/TPN-8 scans a 36-degree sector, and Control-Indicator C-6988/TPN-18 uses a beta scan. When 60° AZ mode is selected, azimuth