

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL:
RADAR INTERFACE EQUIPMENT
ALINEMENT PROCEDURES
GUIDED MISSILE AIR DEFENSE
SYSTEM AN/TSQ-73

This copy is a reprint which includes current pages from Changes 1 through 13.

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GUIDED MISSILE AIR DEFENSE SYSTEM AN/TSQ-73

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CHAPTER 11

RADAR INTERFACE EQUIPMENT ALINEMENT

Section I. INTRODUCTION

11-1. Scope. This volume provides information required to aline and optimize the AN/TSQ-73 (Battalion level only) Radar Interface Equipment (RIE) with various radar sets used during air defense operations. The procedures and data presented in this volume assume that the requirements of TM 9-1430-651-12 (Emplacement and Preparation for Travel) and TM 9-1430-652-10-3 (Initialization and Operating Procedures) have been complied with, i.e., the system is installed, initialized, and is operational. Control and indicator information for the RIE is provided in TM 9-1430-652-10-2. Maintenance and troubleshooting information is provided in TM 9-1430-655-20-3.

WARNING

Radio-frequency (rf) radiation from radar antennas and associated equipment is a potential hazard to personnel. Rf radiation is not cumulative but it can be hazardous. It heats the body tissues, and, if the radiation intensity is sufficiently high, will permanently damage the tissue. This damage is not immediately apparent.

Precautions should be taken to be sure that personnel are not exposed to rf radiations of hazardous intensity levels. Personnel who must be within the hazardous distances for the below listed radars should be instructed not to place themselves on the radiating side of the antenna, and to never look into a transmitting horn or open waveguide which is connected to an energized transmitter.

Personnel are prohibited from entering areas where they may be exposed to levels of rf radiation above 0.01 watt per square centimeter. This level, though not considered hazardous, is stipulated by AR 40-583 as the maximum permissible exposure level for personnel.

A power intensity of at least 0.01 watt per square centimeter is present along the axis of each radar's transmitted beam, for the distances listed below. These distances are based on calculations and actual measurements and may be used as a guide to prevent radio frequency radiation damage. In each instance, radiation intensity rapidly diminishes as the distance is increased.

Antenna	Distance
Improved High-powered Illuminator Radar	366 feet (111.5 meters)
Improved Cw Acquisition Radar	60 feet (18.3 meters)
Improved Pulse Acquisition Radar	50 feet (15.2 meters)
Improved Range-only Radar	148 feet (45.1 meters)

No radiation hazard exists at radar ground level *within* the distance stated if the radars are not depressed below zero degrees elevation. When at all possible during maintenance, however, place the antenna at a high elevation. Personnel are restricted from the area atop the radars in front of the antennas when radiating.

NOTE

Potentially hazardous power density levels do not exist in the radiation field of the improved pulse and cw acquisition radars when scanning.

11-2. Requirement for RIE Alinement. RIE initialization is accomplished separately from other equipments due to the complexity of various setup procedures. Since the RIE is designed to operate with a variety of radar and IFF parameters, and many of the elements of RIE operation have been placed under operator control (via switches and potentiometers) on the RIE control panels no standard procedure is applicable to all situations. However, correct RIE setup is imperative for proper system operation. The following sections contain procedures for alinement of the following radar sets: AN/GSS-1, AN/GSS-7, AN/MPQ-50, AN/TPS-32, AN/TPX-28, and AN/TPX-46. Each procedure should be followed in a step-by-step operation to ensure correct initialization.

11-3. Alinement Criteria. Certain switch settings on the RIE affect the automatic tracking performance of the AN/TSQ-73 system. An observable effect is related to pulse width and beam width settings. These two values determine the resolution of the system; that is, the ability to distinguish or separate two adjacent targets. Using a radar with wide antenna beam pattern and long pulse time, the resolution will be poor. Targets flying parallel paths near to each other will merge as a single track. When paths cross, the targets will merge sooner and separate later, increasing the likelihood that one will be dropped. A narrow beam pattern and short pulse time will have the opposite effect. When using a live radar, the applicable switch settings must correspond to the actual radar characteristics, and the effects described above merely warn the operator what to expect. When operating with simulated radar data from a raid tape, however, the switches may be set to simulate either good or poor resolution, according to the aim of the exercise. A related consideration in simulated exercises is that of radar rotation rate. The system drops tracks based upon how many scans

produce misses. For a given time period, then, while two radar trails are merged, a fast rpm radar will produce more misses on one of the tracks than a slow rpm radar. Thus, more crossing track problems will occur with a high rotation rate. Obviously, this parameter cannot be varied when using a live radar. If no local live radar is available, set applicable RIE switches using assumed but realistic values, when necessary, as if a live radar were present.

11-4. 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 to: Commander, U.S. Army Missile Command, ATTN: AMSMI-LC-ME-PMC, Redstone Arsenal, Alabama, 35898-5238.