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TECHNICAL MANUAL

DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL WITH DEPOT OVERHAUL STANDARDS

RAWIN SET AN/GMD-lA (NSN 6660-00-224-6137)
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RAWIN SET AN/GMD-IA (NSN 6660-00-224-61 37)
RAWIN SET AN/GMD-IB (NSN 6660-00-599-8257)
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CHAPTER 1
INTRODUCTION

1-1. Scope

a. This manual covers direct support, general support, and depot maintenance procedures for Rawin Sets AN/GMD-lA, AN/GMD-lB, AN/GMD-lC, and AN/GMD-lD. It includes a description of the function of the rawin set and instructions for troubleshooting, testing, aligning, repairing the equipment, and replacing or repairing specified maintenance parts,

b. The complete technical manuals for the rawin set include TM 11-6660-206-12, TM 11-6660-206-35, TM 11-6660-206-20P, and TM 11-6660-206-34P.

c. The complete technical manuals for the Meteorological Data Processing Groups OL-192/GMD-l and OL-192A/GMD-l are TM 11-6660-263-10, TM 11-6660-263-24-1, TM 11-6660-263-24-2, TM 11-6660-263-24-3, TM 11-6660-263-24-4, TM 11-6660-263-20P, and TM 11-6660-263-34P,

NOTE

Applicable forms and records are covered in TM 11-6660-206-12.

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3. Reporting Errors and Recommending Improvements

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, NJ 07703, A reply will be furnished direct to you.

1-4. Reporting Equipment improvement Recommendations (EIR)

If your Rawin Set AN/GMD-l needs improvement, let us know. Send us an EIR, You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don 't like the design. Put it on an SF 368 (Quality Deficiency Report).

Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, NJ 07703. We'll send you a reply.

1-5. Differences in Models

Differences in models are covered in TM 11-6660-206-12.

CHAPTER 2

FUNCTION OF EQUIPMENT

Section I. RF SYSTEM

2-1. General

a. The rf system consists of a reflector, an eccentric cup rotated by a drive motor and hollow drive shaft, a dipole antenna, and a transmission line. All components except the reflector are part of the antenna scanner assembly. The basic functions of the rf system are to receive the energy radiated by a radiosonde and to sinusoidally modulate this energy by conical scanning. The amount of modulation superimposed on the received energy depends on the position of the radiosonde with respect to the axis of the reflector. This sinusoidal modulation of the received rf energy is introduced by the rawin set to permit automatic tracking of the radiosonde. It should not be confused with the meteorological pulse modulation originating in the radiosonde. The output of the rf system is connected to the mixer assembly, a part of the receiving system, through a short length of transmission line.

b. The relationship of the rf system with respect to the other functional systems of the rawin set is described in TM 11–6660–206–12.

2-2. Functional Diagram Discussion

a. Reflector. The reflector receives the rf energy from the radiosonde and concentrates it on the eccentric cup, located just beyond the focal point of the reflector.

b. ***Eccentric Cup.*** The eccentric cup is a small off-center reflector which collects the rf energy from the reflector ***(a*** above) and directs it toward the dipole. Rotation of the eccentric cup causes the received signal carrier to vary in phase and amplitude. The amount of variations depends on the position of the radiosonde.

c. Antenna Scanner Assembly Drive Motor and Hello w Drive Shaft. The antenna scanner assembly drive motor, B101, and hollow drive shaft are used to rotate the eccentric cup.

d. Dipole Antenna. The antenna is a half-wave dipole. The rf energy reflected by the eccentric cup induces an rf signal in the dipole antenna. This signal is applied to the transmission line.

e. ***Transmission Line.*** The rigid coaxial transmission line conveys the rf signal from the dipole antenna to the mixer assembly, a part of the receiving system.

2-3. Reflector

The reflector is made of spun aluminum, is parabolic in shape,. has a diameter of 7 feet, and is perforated to decrease wind resistance. The reflector is manufactured in three sections which are bolted together when installed. Together with the other components of the rf system, the reflector is mounted on a support which can be rotated 360° in azimuth and 95° in elevation. The reflector intercepts the plane waves radiated by the radiosonde and reflects them toward the eccentric cup. Because the characteristics of microwaves are similar to those of light waves, the reflector may be used as a directional device at these frequencies.

2-4. Antenna Scanner Assembly Drive Motor

Antenna scanner assembly drive motor B101 is the power source (mechanical) of the conical

scanning action and rotates at 1,725 revolutions per minute (r/rein). It is coupled to the hollow drive shaft by a gilmer-type, V-drive belt that causes the drive shaft and eccentric cup to rotate at 2,040 r/rein. Since the eccentric cup is mechanically connected to the hollow **drive** shaft, they both rotate when power is applied to the drive motor. The rotating joint at the end of the hollow drive shaft acts as a quarter-wave choke to prevent antenna currents from flowing on the outside of the hollow drive shaft. Next to the sprocket on the hollow drive shaft is a gear that meshes with a similar gear on the shaft of the reference generator; this gear ratio is 1 to 1. The reference voltage generator develops an alternating voltage that is used for phase reference in the antenna positioning system. Operation of the drive motor is controlled by the motor standby circuit (para 2–23*f*) and is switched on and off with S602 on the antenna control and S805 on the control-recorder.

2-5. Eccentric Cup

a. Description. The eccentric cup is an off-center, hemispherical reflector that rotates about the axis of the rawin set reflector. It is driven by the antenna scanner assembly drive motor and hollow drive shaft, and is located in front of the dipole antenna. As the cup rotates on its axis, its focus describes a circle about the dipole antenna and causes the antenna lobe to rotate about the axis of the reflector. This rotation of the antenna lobe produces the effects of conical scanning. This effect is illustrated in figure 2–1.

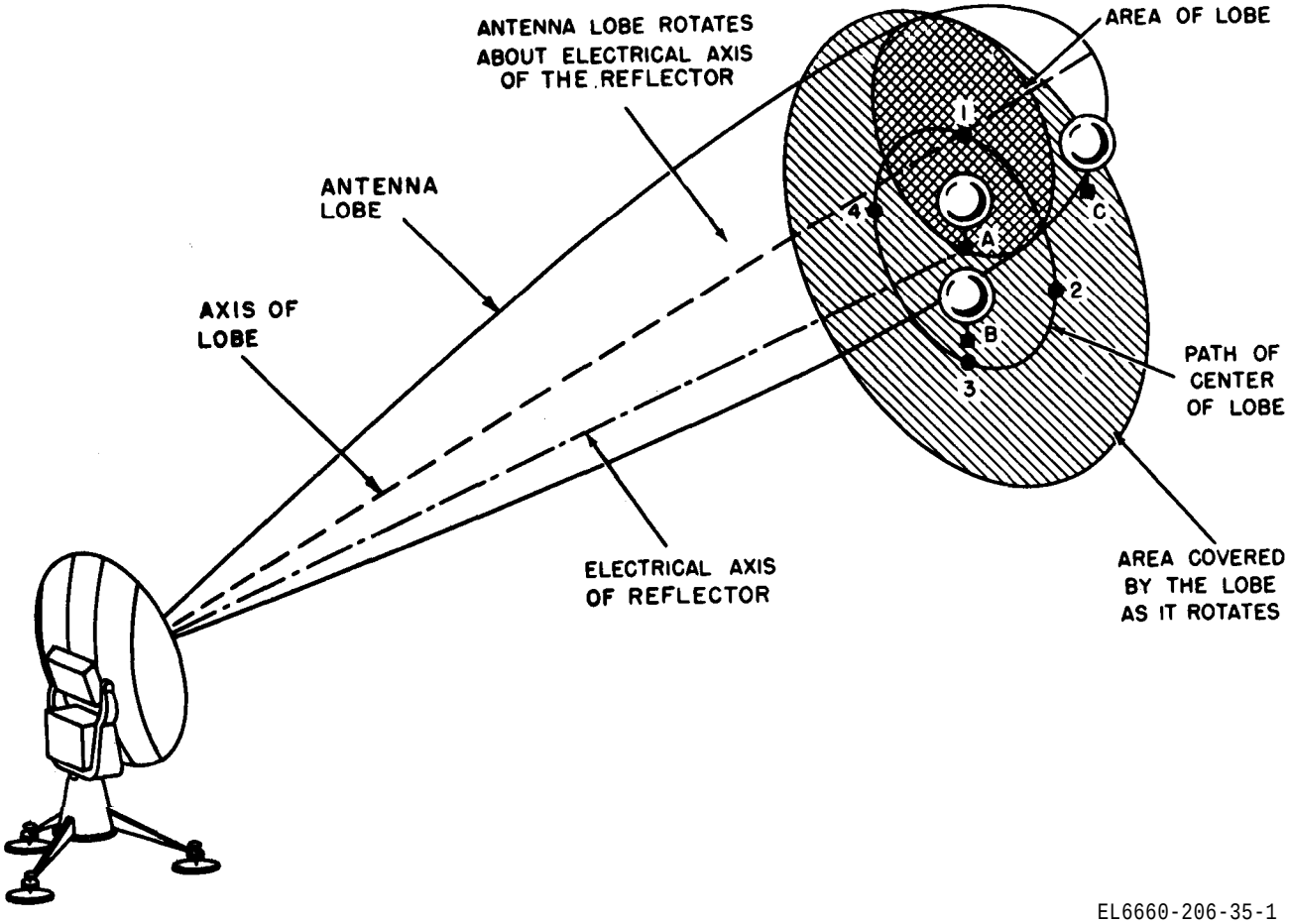

Figure 2–1. Effect of conical scanning.