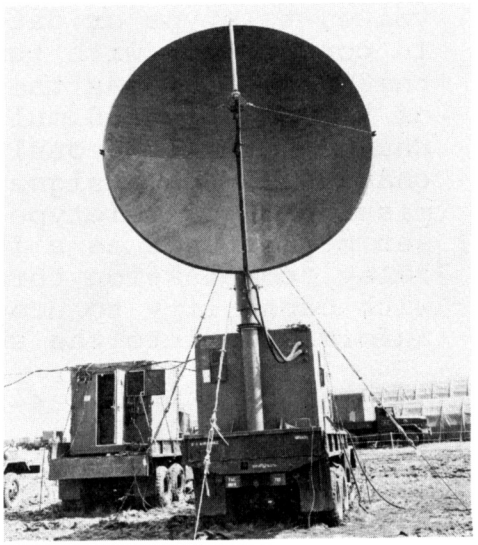
Chapter 3

RADIO RELAY EQUIPMENT



AN/TRC-66A
RADIO SET

DESCRIPTION: The AN/TRC-66A Radio Set is a general purpose, super high frequency (SHF), line of sight (LOS), radio relay and tropospheric forward scatter system. The AN/TRC-66A is packaged in two identical radio equipment shelters designed for rapid tactical deployment. For line of sight operations, one AN/TRC-66A shelter is employed at each terminal station. For the tropospheric scatter mode, two AN/TRC-66A shelters (one radio set AN/TRC-66A) are employed at each terminal station, thereby improving reception through diverse operations. The equipment can be transported by helicopter, truck, or cargo aircraft. The antenna consists of a reflector, support structure and a dual polarized (horizontal and vertical) feed horn. The antenna reflector is parabolic in shape and is constructed of sheet metal sections which are bolted together for operation. In addition, the antenna is stored in a transit case during transport, and is designed for rapid erection at the operating site. Each AN/TRC-66A shelter houses the radio equipment, a portion of the waveguide transmission lines, and accessory equipment. This shelter is also the

mounting base for the antenna when set up for operation. The equipment is compatible with the AN/MCC-12 Frequency Division Multiplexer which has 12 to 252 KHZ baseband output.

CAPABILITY:	Capable of transmitting multiplex voice, teletype or data channels. In conjunction with the AN/MCC-12, the AN/TRC-66A has the capability of transmitting 60 multiplexed voice channels simultaneously. One voice channel may be designated for transmission of 16 teletype channels. This set may be used as a fixed terminal, relay, combination terminal/relay, with capability to drop out or insert information into the system.
FREQUENCY RANGE:	4400 to 5000 MHz (4.4-5.0 GHz).
ANTENNA GAIN:	Parabolic: 42.0 db, 1.2° beam width.
POWER REQUIREMENTS:	120/208 VAC @ 400 Cps, 4 wire, 3 phase, 7545 watts maximum per shelter.
POWER OUTPUT:	Tropo: 1 KW nominal. LOS: 1 watt.
SITING CRITERIA:	Antenna must be free from obstacles for line-of-sight as well as tropo. CAUTION: RADIATION HAZARD EXISTS IN FRONT OF ANTENNA DURING TRANSMISSION.
ERECTION TIME:	10 hours.
MODULATION:	FM
DIVERSITY:	Space, polarization, frequency diversity.
DISTANCE RANGE:	1 to 100 nautical miles (1000 miles with relays).
SPECIAL TOOLS:	Drill Bit Drill Rods Gasoline-powered hammer and drill Mobilizer Transit and tripod

PERSONNEL REQUIRED: 1 each 30470.
1 each 42153.
4 each 30450.

MAJOR COMPONENTS:

NOMENCLATURE	COMMON NAME
OA-4784/TRC-66A.....	Receiv.-trans. gp.
OA-4844/TRC-66A.....	Ampl. pwr. sup. gp.
OA-4959/TRC-66A.....	Antenna gp.
S-77/TRC-66A.....	Shelter (2 each)

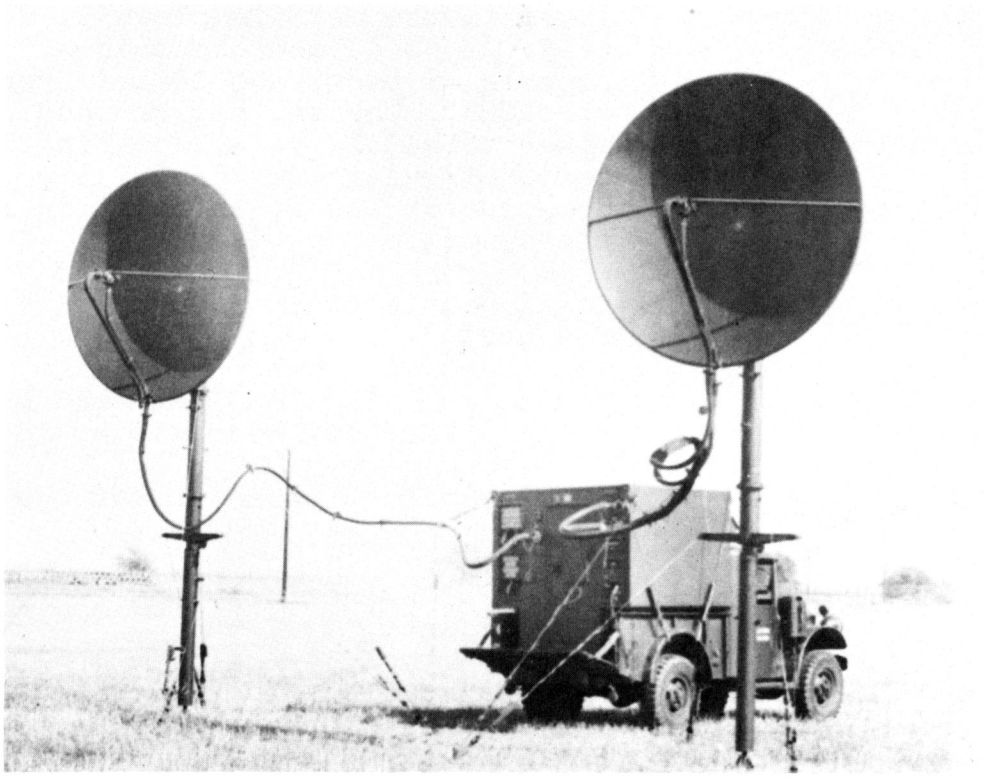
MANUFACTURER: General Instrument Corporation.

COST: $138,800.00.

WEIGHT: One shelter with radio equipment - 2684 lbs.
One antenna group with case - 1375 lbs.

CUBE: One shelter with radio equipment - 387 cu. ft.
One antenna group - 380.8 cu. ft.

APPLICABLE TOs:
31R5-2TRC66-12------Service Instr.
31R5-2TRC66-13------Circuit Diag.
31R5-2TRC66-14------Illus. Parts Brkdn.
31R5-2TRC66-16WC-1--PMI Workcards
31R5-2TRC66-19------Align. Instr.



AN/TRC-97A
RADIO SET

DESCRIPTION: The AN/TRC-97A is a tactical troposcatter radio set with dual space diversity, designed to provide two way voice, digital data and teletype communications. It can also be used for line-of-sight (LOS) and diffraction propagation. A variety of RF power modes can be selected to achieve optimum operation up to 100 NM with single links using any one of the three propagation modes. Longer distances (up to 1000 NM) can be achieved with tandem links using other TRC-97As as repeater stations. The teletype (TTY) multiplexer can be patched into any one of 24 voice frequency channels to provide 16 TTY channels. The system employs either a horn antenna elevated fifty feet to clear obstacles or a highly directional, high gain parabolic dish antenna.

CAPABILITY: Full duplex voice, teletype, FSK or data channels. The TRC-97 employs 12 channels and the TRC-97A

(used in the TACS) employs 24 channels, 23 voice and one channel capable of providing 16 teletype circuits. The set may be used as a fixed terminal, relay, combination terminal/relay with capability to drop out or insert information into the system.

FREQUENCY RANGE: Continuous 4400 to 5000 MHz. (4.4 - 5.0 gcs).

ANTENNA GAIN: Parabolic: 38db, 3° beam width.
Horn: 20db, 18° beam width.

POWER INPUT: 120/208 VAC, 3 phase at 400 Cps at 10 Kw.

POWER OUTPUT: Tropo: 1 Kw nominal.
LOS: 1 watt.

SITING CRITERIA: Antenna must be free from obstacles for line-of-sight as well as tropo. CAUTION: RADIATION HAZARD EXISTS IN FRONT OF ANTENNA DURING TRANSMISSION.

ERECTION TIME: 4 men approximately 1½ hours.

MODULATION: FM

DIVERSITY: Dual Space.

DISTANCE RANGE: 1 to 100 nautical miles (1000 miles with relays).

MAJOR COMPONENTS:

NOMENCLATURE	COMMON NAME
S-308/TRC-97	Shelter
MT-3658/TRC-97A	Transit Frame.
OA-7160/TRC-97A	Antenna, Horn with mast.
OA-8112/TRC-97A	Antenna, Parabolic with mast.
OA-7161A/TRC-97A	Transceiver Group.

NOMENCLATURE	COMMON NAME
GCC-6.....	Multiplexer Group.
M-37 (being replaced).....	Truck, cargo, 3/4 ton (will be new, 1¼ ton truck)
M-101/V-334.....	3/4 ton trailer, cargo

MANUFACTURER: R.C.A.

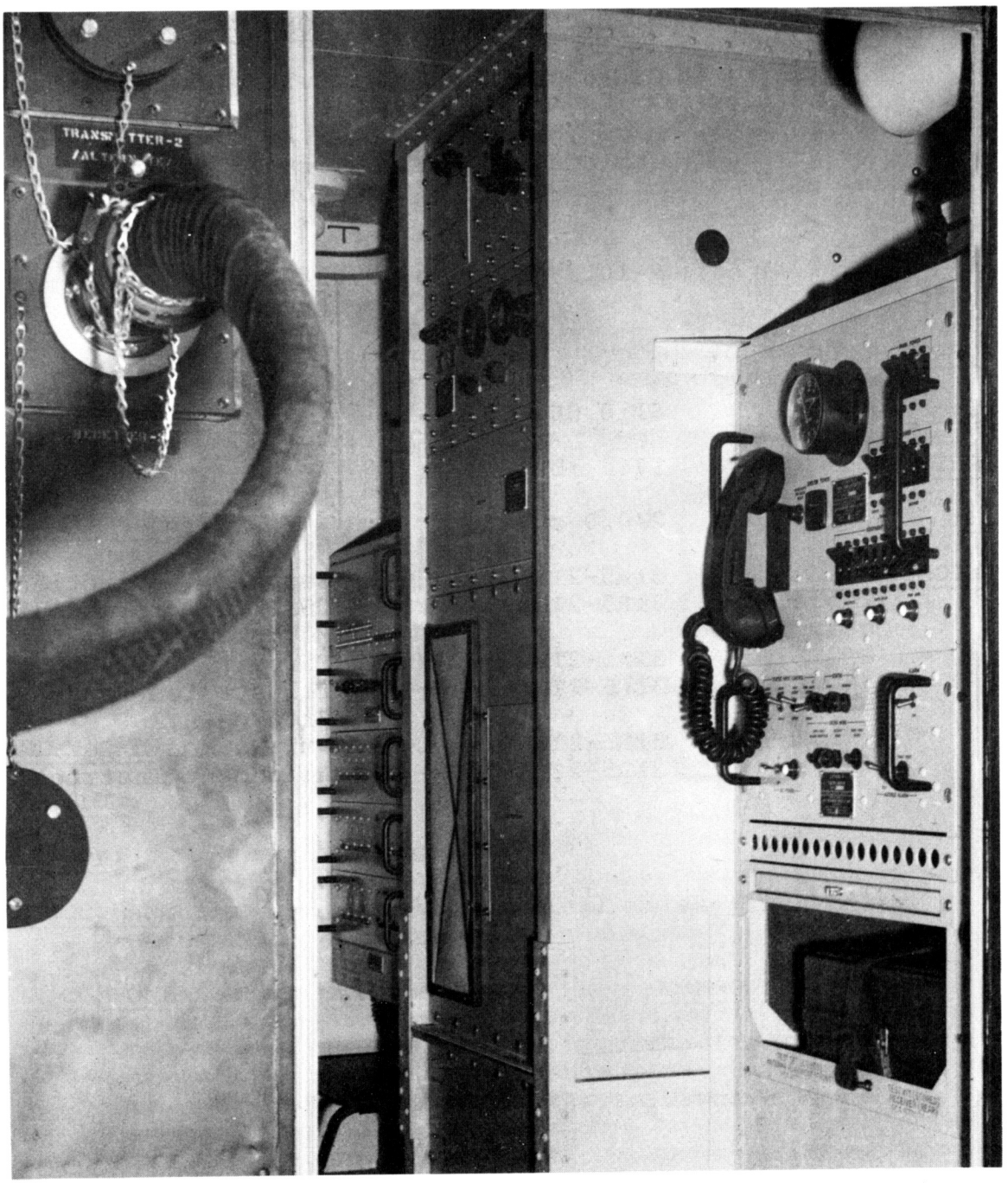
COST: $110,000.00.

WEIGHT: 1760 lbs.

CUBE: 240.0 cu. ft.

APPLICABLE TOs:

31R5-2TRC97-2-------	Service Instructions.
31R5-2TRC97-2-1-----	USAF Calibration and Measurement Summary.
31R5-2TRC97-3-------	Circuit Diagrams.
31R5-2TRC97-4-------	Illustrated Parts Breakdown.
31R5-2TRC97-6WC-1---	PMI Workcard Set.
31R5-2TRC97-9-------	Alignment Instructions.



AN/MCC-12 MULTIPLEXER

DESCRIPTION: The AN/MCC-12 is a frequency division multiplexer set used to connect sixty telephone subscriber circuits into a microwave radio relay system. The multiplexing frequency buildup consists of 60, 0-4 KHz wide channels, "stacked" one above another ranging in frequency from 12 KHz to 252 KHz to maintain channel separation. This composite band of frequencies is fed to a radio transmitter, such as the AN/TRC-66A, for transmission to a distant station, either line-of-sight or tropospheric scatter mode. Any one voice frequency channel can be selected to accommodate 16 multiplexed TTY channels simultaneously with the other 59 voice frequency channels. The MCC-12 is housed in a portable shelter, capable of mounting on an M35, 2½ ton truck.

CAPABILITY: Inputs from subscribers can be either 2 wire or 4 wire 600 ohm impedance. "N-Band" signaling is compatible with the AN/TRC-66A and AN/TRC-97A. A

built-in test set offers complete alignment and troubleshooting capabilities. Further, the AN/MCC-12 is capable of handling 59 voice frequencies and 16 FSK teletype channels.

FREQUENCY RANGE: Baseband from 12 Kc to 252 Kc.

SITING CRITERIA: Locate within approximately 25 feet of AN/TRC-66A microwave relay equipment.

ERECTION TIME: Approximately 30 minutes.

PERSONNEL REQUIRED: 1 each 30450.

POWER REQUIREMENTS: 3 phase, 4 wire, 120/208 VAC at 400 Hz, 3500 watts.

MAJOR COMPONENTS: AN/MCC-12 Multiplexer and AN/GGc-17 Converter-telegraph set.

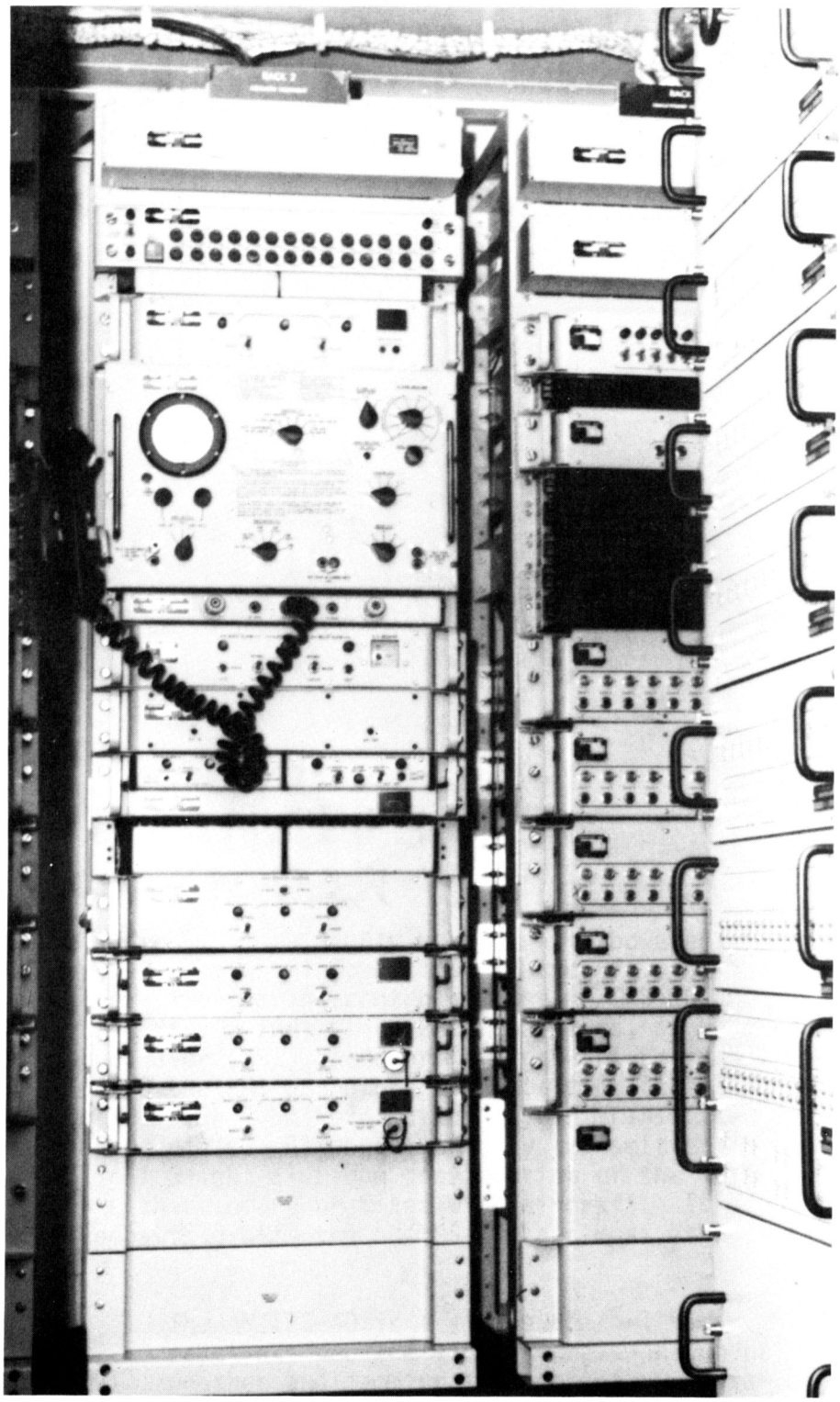
MANUFACTURER: Lenkurt Electric Co.
Electronics Communications, Inc.

COST: $133,858.00.

WEIGHT: 4775 lbs.

CUBE: 391 cu. ft.

APPLICABLE TO: 31 W1-2MCC12- series.



Interior View AN/MCC-12 Multiplexer