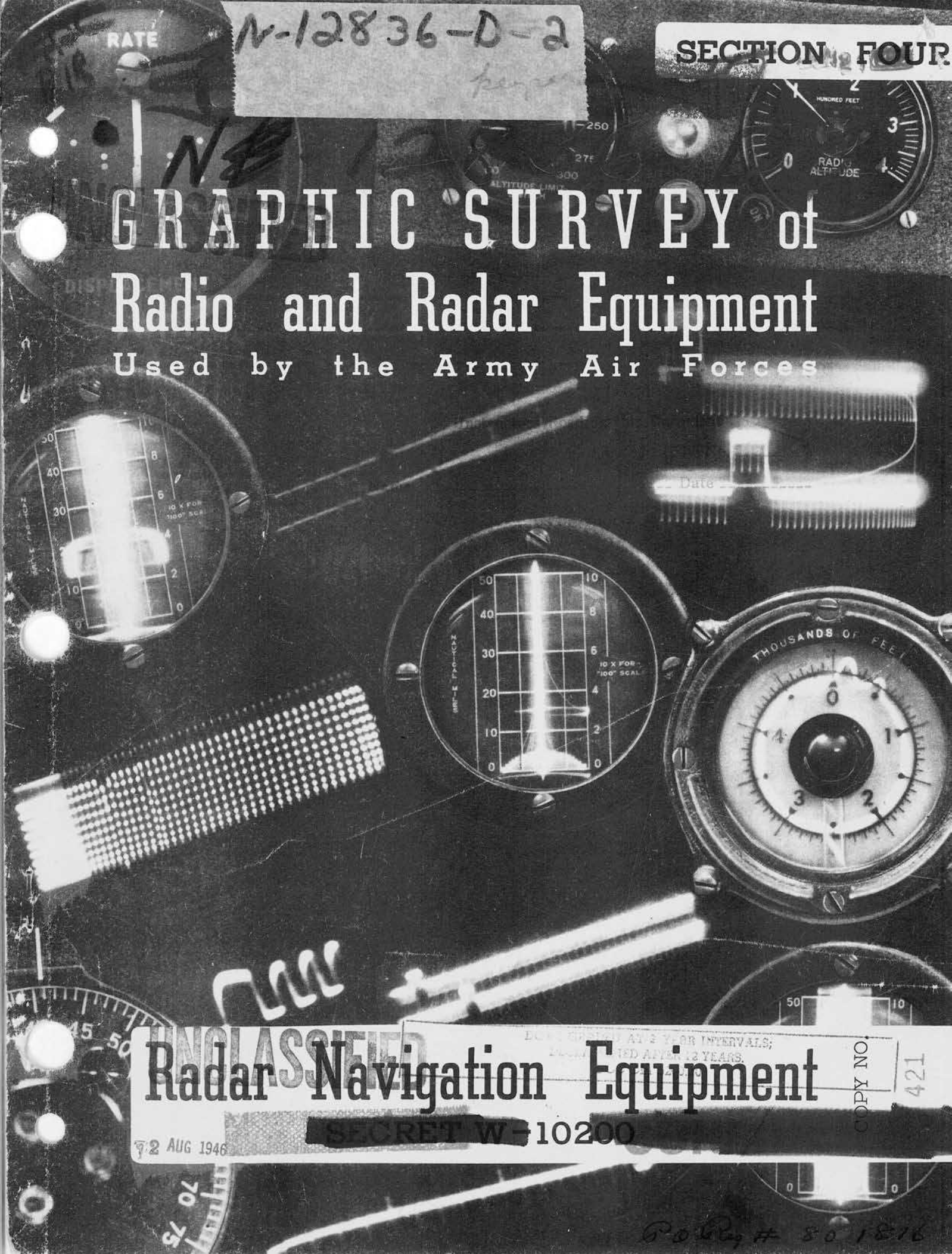
SECTION FOUR

GRAPHIC SURVEY of Radio and Radar Equipment

Used by the Army Air Forces



Radar Navigation Equipment

Air [redacted] Command

Wright Field Dayton, Ohio

GRAPHIC SURVEY of Radio and Radar Equipment

Used by the Army Air Forces

[redacted]

BY AUTHORITY OF DIRECTOR, ATSC 1 July 1945

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Hobart R. Yeager
Colonel, Air Corps

GRAPHIC SURVEY

Nomenclature	Description	Present Security Classification
AN/APA-9	Precision Navigation Equipment	Unclassified
AN/APN-1	Altimeter	Unclassified
AN/APN-2	Airborne Interrogator Responser	Restricted
AN/APN-2T1	Trainer Equipment	Restricted
AN/APN-3	Airborne Precision Navigation and bombing Equipment (Shoran)	Unclassified
AN/APN-4	Navigation Equipment (Loran)	Unclassified
AN/APN-7	Airborne Transponder Beacon	Unclassified
AN/APN-9	Simplified Loran Equipment	Unclassified
AN/APN-10	Glider Interrogator Responsor	Restricted
AN/APN-12	Beacon Interrogator Responsor	Unclassified
AN/APN-19	Airborne Beacon	Unclassified
AN/APN-T1	Trainer Equipment	Unclassified
AN/CPA-1	Beacon Antenna Assembly	Restricted
AN/CPN-2	Air Transportable Precision Navigation & Bombing Equipment	Unclassified
AN/CPN-3	Homing Beacon	Unclassified
AN/CPN-6	Homing Beacon (BGX)	Unclassified
AN/CPN-7	Blind Approach Beacon(BABS)	Confidential
AN/CPN-8	Portable Beacon (BPS)	Unclassified
AN/CPN-11	Transportable "Loran" Ground Station	Unclassified
AN/CPN-12	Air Transportable "Double Master Loran" Ground Station	Unclassified
AN/CPN-16	Sea Rescue Beacon	Unclassified
AN/CPT-2	Sea Rescue Beacon	Restricted
AN/TPN-1	Portable Transponder Beacon	Restricted
AN/TPN-3	Portable Transponder Beacon	Restricted
AN/UPN-1	Ultra Portable Beacon	Unclassified
AN/UPN-2	Ultra Portable Beacon	Unclassified
AN/UPN-3	Ultra Portable Beacon	Unclassified
AN/UPN-4	Ultra Portable Beacon	Unclassified
MX-137/A	Reflector Target	Unclassified
MX-138/A	Reflector Target	Unclassified
SCR-718-C	Altimeter	Unclassified
YJ	Homing Beacon	Unclassified
	Test Equipment	
AN/UPM-1A	Radar Maintenance Equipment	Restricted
TS-10/APN	Test Set	Unclassified
TS-16/APN	Test Set	Unclassified
TS-23/APN	Test Set	Restricted
TS-111/CP	Test Set	Unclassified
TS-251/UP	Test Set (Loran)	Restricted

Foreword

Purpose : This graphic survey of Radio and Radar Equipment used by the Army Air Forces is intended to furnish authorized personnel with graphic and narrative data relative to description, electrical and physical characteristics, purpose, and tactical employment of the radio and radar equipment used by the Army Air Forces.

Restriction : The Graphic Survey is not authorized as a basis for procurement storage, or issue, but is prepared only for information and guidance of research, development, procurement, storage, issue, and staff and planning activities.

Scope : This publication is intended to cover all active equipment, both in use and in development. Publication is accomplished in a series of separate sections in order that reproduction and dissemination may be effected economically and expeditiously.

Format : Permanent binder covers are not furnished with the various sections of the Graphic Survey, but the pages of each section are printed on 8 1/2 x 11 inch paper and punched for the standard AAF three-hole binder, (binder, loose-leaf, 3 post, stock number 8700-043800), commonly known within the AAF as "Technical Order Binder". With a few exceptions, data concerning each equipment is presented on two pages. The first page contains a description and information relative to use, installation, and electrical characteristics; the second page, photographs of the various components and physical weights and dimensions. Within each section, the equipments are arranged alphabetically by official nomenclature and type designation.

Suggestions : Suggestions are invited for improvement of form, content, or to otherwise increase the ultimate utility to the user within the scope and purpose of this publication. Comments should be addressed to the Commanding General, Air Technical Service Command, Wright Field, [redacted] Attention: TSERR1B, for consideration.

Security : The Graphic Survey is classified "Secret" because of the broad scope of the equipment covered in each volume and the secret classification of many of the equipments. Each addressee will be responsible for maintaining the security of his copies in accordance with the provisions of AR 380-5. Security classification of each individual equipment at the time of publication will be indicated on the pages relative to that equipment.

Distribution : Requests relative to distribution of this publication should be addressed to Commanding General, Air Technical Service Command, Attention: TSERR1B. Revisions and additions are forwarded periodically to original addressees in order that all copies may be kept up to date. Each copy has a serial number which is recorded on a master distribution file index.

Authority : Preparation, publication and distribution of the Graphic Survey is accomplished in accordance with letter, Headquarters, AAF(AFDMA-2F), dated 5 April 1945, subject "Graphic Survey of Radio and Radar Equipment Used by the AAF". AAF report clearance number AAF-MD-E89 has been assigned.

Section 4 Radar Navigation Equipment

NOMENCLATURE	DESCRIPTION	*TYPE	**STATUS
AN/APA-9	Precision Navigation Equipment		D
AN/APN-1	Altimeter	Standard	P
AN/APN-2	Airborne Interrogator Responser	Standard	P
AN/APN-2T1	Trainer Equipment		P
AN/APN-3	Airborne Precision Navigation and bombing Equipment (Shoran)	Standard	P
AN/APN-4	Navigation Equipment (Loran)	Standard	P
AN/APN-7	Airborne Transponder Beacon		P
AN/APN-9	Simplified Loran Equipment		D
AN/APN-10	Glider Interrogator Responsor		D
AN/APN-12	Beacon Interrogator Responsor	Sub-Standard	P
AN/APN-19	Airborne Beacon		D
AN/APN-T1	Trainer Equipment		P
AN/CPA-1	Beacon Antenna Assembly	Standard	P
AN/CPN-2	Air Transportable Precision Navigation and Bombing Equipment	Standard	P
AN/CPN-3	Homing Beacon	Sub-Standard	P
AN/CPN-6	Homing Beacon (BGX)		P
AN/CPN-7	Blind Approach Beacon (BABS)	Standard	P
AN/CPN-8	Portable Beacon (BPS)	Standard	P
AN/CPN-11	Transportable "Loran" Ground Station	Limited Procurement	D
AN/CPN-12	Air Transportable "Double Master Loran" Ground Station	Limited Procurement	D
AN/CPN-16	Sea Rescue Beacon	Limited Procurement	D
AN/CPT-2	Sea Rescue Beacon	Limited Procurement	D
AN/TPN-1	Portable Transponder Beacon	Limited Standard	P
AN/TPN-3	Portable Transponder Beacon	Limited Standard	P
AN/UPN-1	Ultra Portable Beacon	Limited Procurement	D
AN/UPN-2	Ultra Portable Beacon	Limited Procurement	D
AN/UPN-3	Ultra Portable Beacon	Limited Procurement	D
AN/UPN-4	Ultra Portable Beacon	Limited Procurement	D
MX-137/A) MX-138/A)	Reflector Target	[redacted]	P

See reverse side for addenda and errata information.

NOMENCLATURE	DESCRIPTION	*TYPE	**STATUS
SCR 718-C	Altimeter	Standard	P
YJ	Homing Beacon	Standard	P
MAINTENANCE AND TEST EQUIPMENT			
AN/UPM-1A	Radar Maintenance Equipment		P
TS-10/APN	Test Set	Standard	P
TS-16/APN	Test Set	Standard	P
TS-23/APN	Test Set	Standard	P
TS-111/CP	Test Set	Standard	P
TS-251/UP	Test Set (Loran)	Standard	P

* For definition of Type classification terms see AR 850-25
**STATUS Defined:
D - (Development): Initial pilot run has not been completed.
P - (Production): Initial pilot run has been completed and quantity production is underway or has been completed.

ERRATA

AN/APN-2
AN/APN-2T1

Scope illustration caption: "Scope display shows range vertically on three scales, and azimuth horizontally right or left of beacon response centerline. Signal above shows range to beacon 33 miles and 30° left."

AN/APN-3

"Computor: this is a bombing computor (AAF type K 1) which automatically releases bombs and corrects for ballistics and wind."

AN/APN-10

Scope illustration should show only statute mile scale with ranges of 0 to 5 and 0 to 50 miles. Illustration showing "Nautical Miles" and 0 to 10 scale is incorrect.

AN/CPN-3

First paragraph: "Radio Set AN/CPN-3, is an air transportable radar beacon for ground installation, designed to provide range, direction, and identification for homing of planes equipped with 10 cm band search radars."

AN/CPN-16

Illustration caption: "Sea Rescue Beacon Transmitter AN/CPN-16X for use in one man life rafts."

Radar Assembly AN/APA-9, is an airborne navigational equipment designed to operate with the British Oboe Mark II navigation system. It is informally known as the "Aspen," and is functionally similar to the AAF Shoran system.

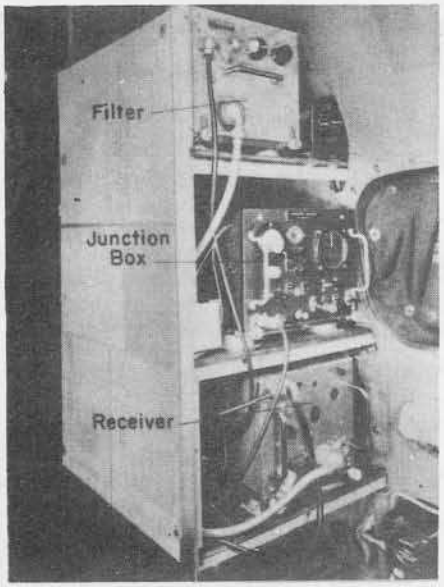
The "Aspen Kit", as Radar Assembly AN/APA-9 is called, essentially consists of an antenna; a modified AN/APS-2A modulating assembly with a RT Box; a mechanical bearing indicator, and certain minor components for operation of the set.

"Aspen" is a navigation system whereby the airborne equipment (AN/APA-9) acts as a transponder unit upon being triggered by the two ground interrogator beacons commonly known as the "Cat" and "Mouse" stations. By measuring, with accurate ranging circuits, the time required for the radar signal to make the "round-trip" (station-plane-station), the ground station computer can plot the airplane's location with an accuracy of 50 feet of his actual position.

Blind-bombing is accomplished by flying the aircraft along a given arc centered around the "Cat" station with the release point at a predetermined range from the "Mouse" station. The point of intersection of the pulse signal arcs from these two stations is the correct bomb release point. The bombardier is given aural warning and release signals by variation of pulse repetition rate from the "Mouse" station The pilot is given left-right aural signals by variation of pulse repetition rate from the "CAT" station. One target can be attacked by this technique.

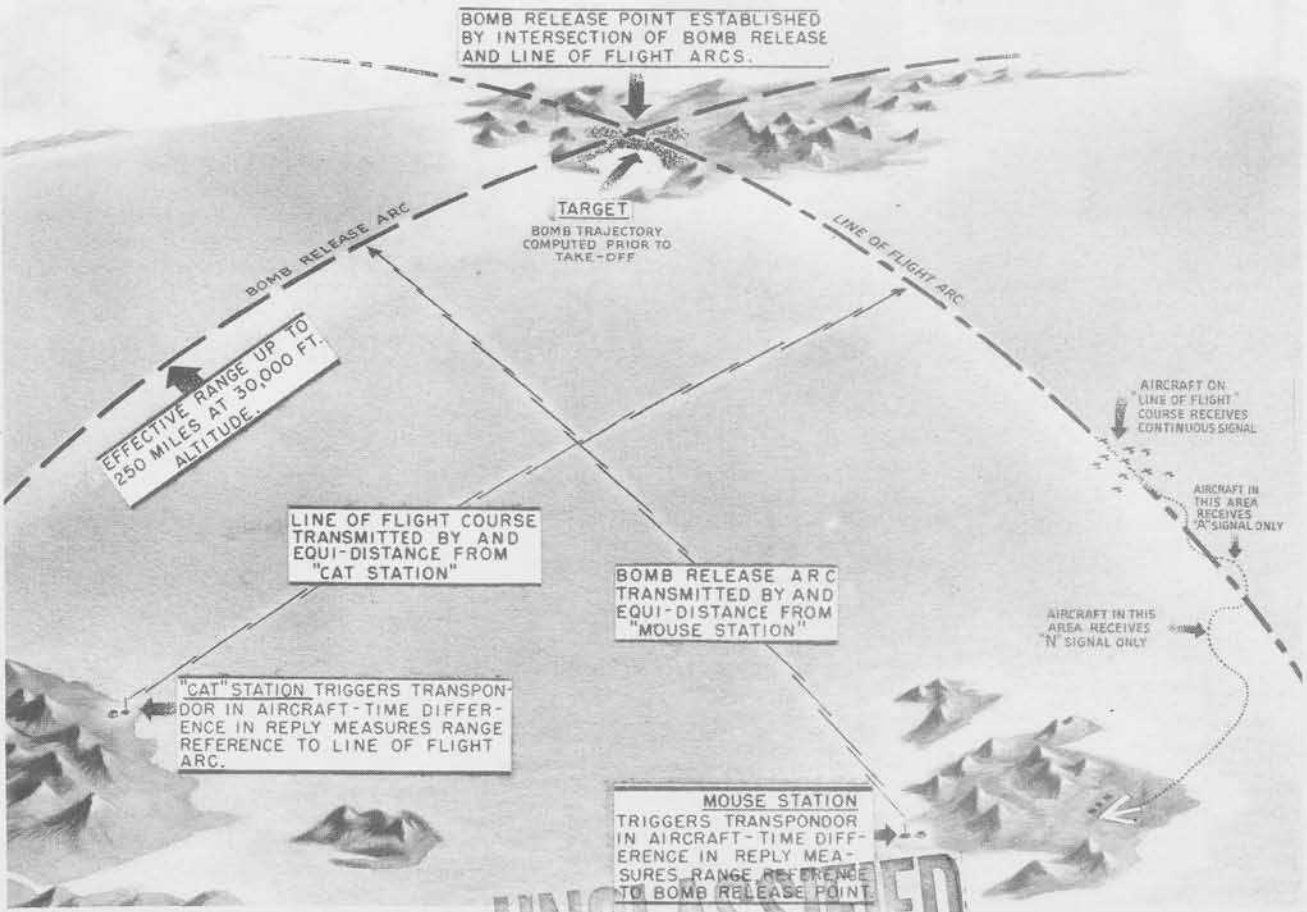
Ground Oboe stations are supplied by the British, while the airborne equipment is supplied by both the British and the United States.

Test equipment used for maintenance includes Test Set AN/CPM-1

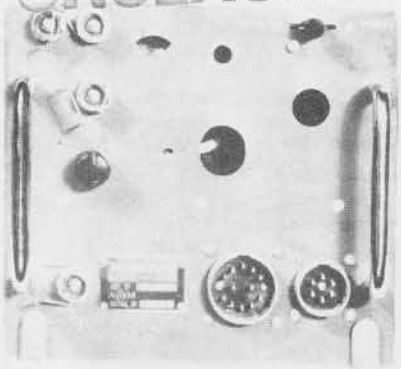


Installation AN/APA-9 in B-24

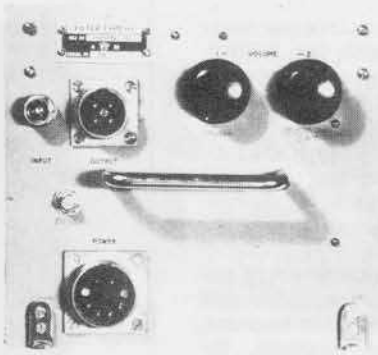
POWER INPUT	600 WATTS, 26 VOLTS DC
POWER OUTPUT	50 KW (PEAK)
FREQUENCY	3243-3155 MC
RANGE	250 MILES AT 30,000 FT.
ACCURACY	BOMBING 100 YARDS RANGE 20 YARDS



Radar Assembly AN/APA-9 ("ASPEN") is the airborne element of the OBOE Navigation System which in addition to facilitating precision blind bombing - may be used as a navigation device to direct reconnaissance or troop carrying aircraft to predetermined areas.



Penwiper Receiver



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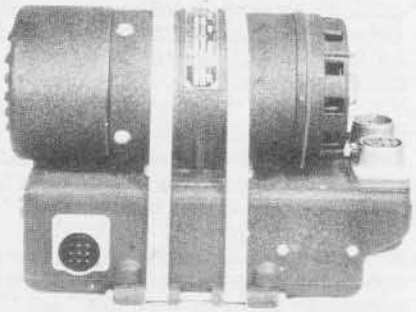
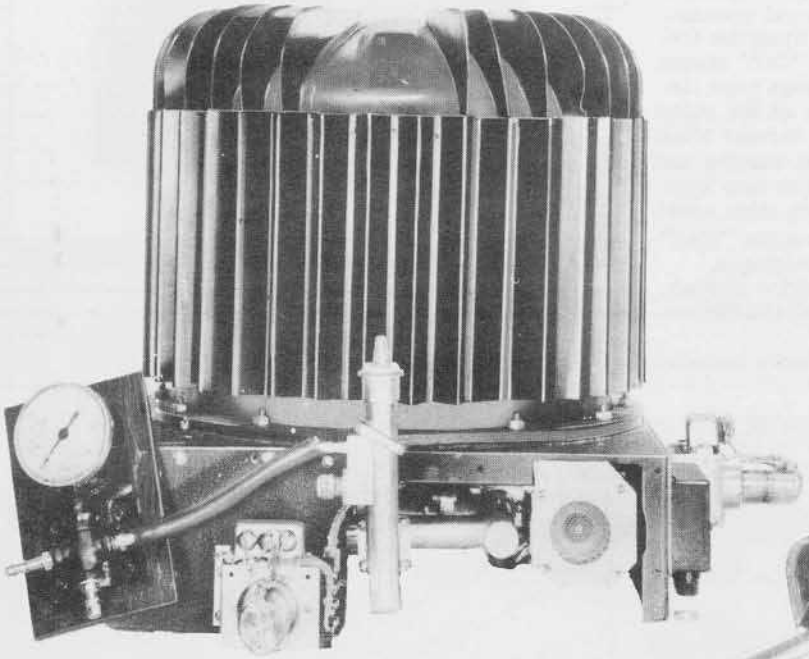
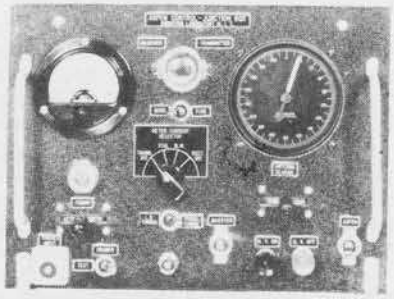


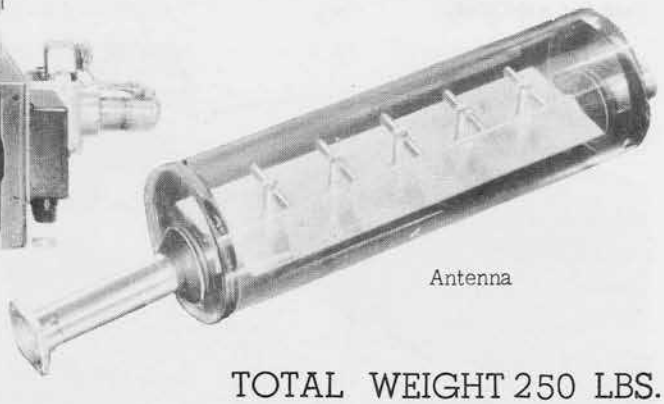
Motor Generator



Transmitter Converter



Control Box



Antenna

RADAR ASSEMBLY AN/APA-9

TOTAL WEIGHT 250 LBS.

Component	Nomenclature	Size	Weight
Control Box	C-10/APA-9		
Antenna Assembly	AS-66/APA-9	Heighth 18" x Diam 4"	10 Lbs.
Jack Box	J-47/APA-9	5" x 4" x 3"	1 Lb.
Motor Generator	PU-43/A		30 Lbs.
Regulator Box	CN-10/A		10 Lbs.
Headset	H-14/A		
Transmitter Converter	RT-38/APA-9	24" x 24" x 24"	100 Lbs.
Control Box	C-84/APA-9	8" x 11" x 20"	32 Lbs.
Mounting	MT-157/APA-9	24" x 24" x 24"	10 Lbs.
Cord	CG-51/APA-9		5 Lbs.
Mounting	MT-176/APA-9		1 Lb.
Mounting	FT-447		
Mounting	MT-23/A		
Antenna Cover	CW-17/APA-9		5 Lbs.
Filter	British Supplied		
Mounting	FT-446	14" wide x 18" long	
Coupling	M-297		
Receiver			
Transformer			

and includes plugs, forrule, nuts, cords, connectors, cable clamps, Flexible conduit, adapters, cordage and misc. Cable.

*AN/APN-1

Radio Set *AN/APN-1 is an airborne frequency modulated radar altimeter designed for installation in aircraft to provide direct indication of altitude above terrain during flight.

This equipment is designed to emit, in a downward direction from the transmitter antenna, a radio freguency carrier which is frequency modulated at a rate of 120 cycles per second between the approximate limits of 420 and 460 mc on the low range (0-400 feet) and 443 to 447 mc on the high range (400-4000 feet). The earth's surface reflects some of this radiated carrier, and the reflected signal is received on a separate receiver antenna.

During the time interval required for the signal to travel to earth and return to the aircraft, the transmitter frequency will have changed. The combination of the received signal with a signal obtained directly from the transmitter will result, by process of detection, in an audio frequency signal the average frequency of which is proportional to the altitude of the aircraft above the ground.

This equipment provides a dual range indicator of 0-400 feet and 400-4000 feet; having an accuracy within plus or minus 6 feet on the 400-foot range and within plus or minus 60 feet on the 4000-foot range.

Radio Set *AN/APN-1A differs from *AN/APN-1 only in that it is equipped with a single-range indicator and a two-position external range switch is used to provide dual range altitude readings. Both sets may be used in conjunction with an automatic pilot.

This equipment is designed for dc operation and consumes approximately 2.5 amperes with 27.5 volts delivered to the battery input receptacle of the transmitter-receiver. The input current at 27 volts is increased to approximately 2.7 amperes when a limit indicator is used.

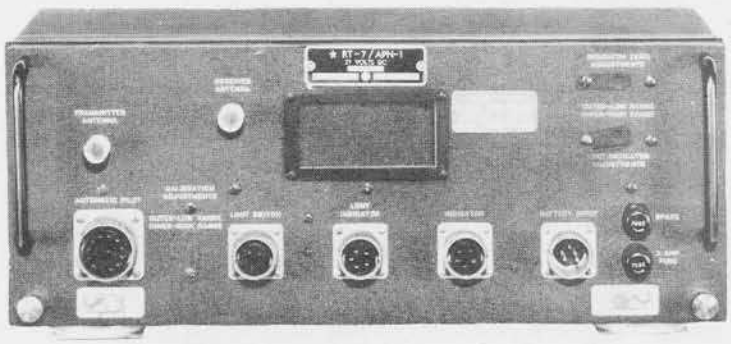
The following test sets are required for the maintenance and tuning of *AN/APN-1: Test Set TS-10C/APN or Test Set TS-10B/APN; Test Set TS-16/APN; RCA 158 Oscilloscope; and Multimeter TS-352/U.

Requirements as of 1 February 1945 were 10,870 for the calendar year 1945.

POWER INPUT	73 WATTS
FREQUENCY	420-460 MC 442-446 MC
TYPE OF SIGNAL	FM
RANGE	0-400 FT. + 6 FT. 400-4000 FT. + 60 FT.
SWEEP RATE	120 CPS

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
2	12H6	2	955
3	12SJ7	2	9004
4	12SH7	1	0D3/VR-150

Altitude Limit Switch
SA-1/ARN-1



Altitude Indicator
ID-14/ARN-1

Transmitter Receiver RT-7/APN-1 On Mounting Base MT-14/ARN-1

Antenna AT-4/ARN-1

RADIO *SET AN/APN-1

TOTAL WEIGHT 45 LBS.

Component	Nomenclature	Size	Weight
Transmitter-Receiver	*RT-7/APN-1	8" x 19" x 9"	19 Lbs.
Mounting Base	*MT-14/ARN-1	3" x 19" x 8"	2 Lbs.
Altitude Indicator	*ID-14/APN-1	4" x 4" x 6"	2 Lbs.
Altitude Limit Switch	*SA-1/ARN-1	6" x 4" DIAM	2 Lbs.
Antenna	*AT-4/ARN-1	8" x 12" x 2"	2 Lbs.
Lamp	LM-38 (3 EA)		

and includes plugs, cable marker tags, cable clamps, conductors, adapters, circuit breaker, indicators, misc. cable, and brackets.

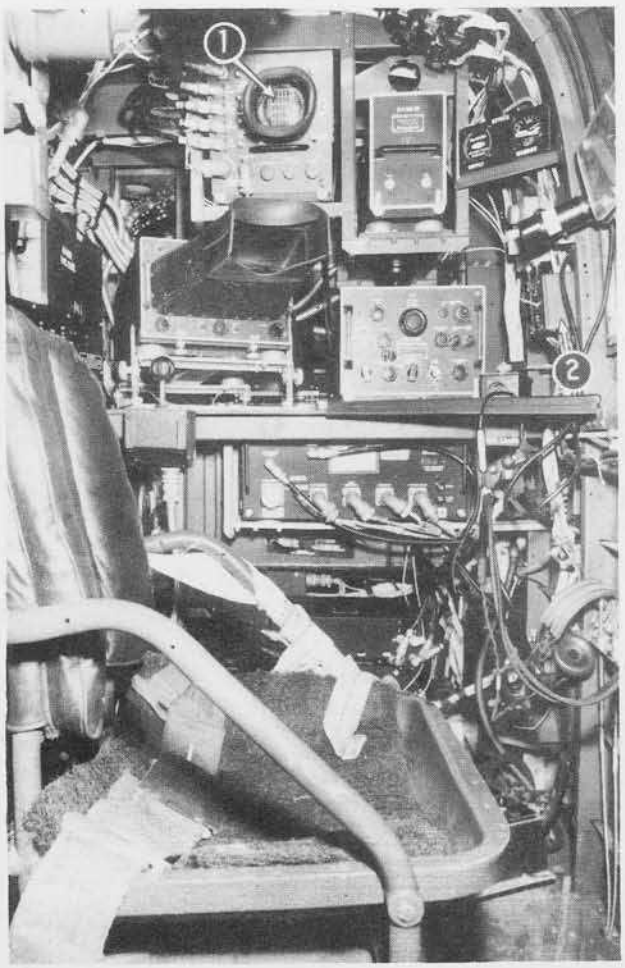
*AN/APN-2

Radio Set *AN/APN-2 is an airborne radar interrogator-respondor of the "Rebecca" type that will enable an aircraft to home on ground radar beacons of the "Eureka" type such as AN/PPN-1 and AN/PPN-2 and the heavier beacons, AN/TPN-1 and AN/TPN-2. It is used in conjunction with suitable beacons for night landing of parachute troops, landing of gliders and maintaining airborne supply operation to isolated positions.

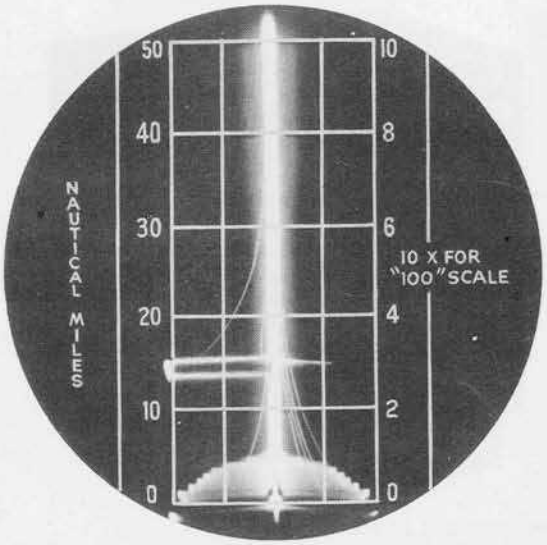
In operation the Rebecca (*AN/APN-2) emits a pulse, "triggering" the Eureka (AN/PPN-1) and causing it to return a pulse. This returned pulse is received by the Rebecca in the aircraft and appears as a signal pip on the scope, thereby indicating range and direction of the beacon.

A form of communication between Rebecca and Eureka is also provided. The Eureka operator, while listening for triggering through his earphones, can send the Rebecca operator a coded message by depressing a key provided for that purpose. Such messages are read in the Rebecca indicator as a blinking of the signal pip. This type of communication, though slow, can be used to notify Rebecca planes of any last minute changes caused, for example, by change of wind direction or surprise enemy action.

Chief difference between Rebecca - Eureka and other beacon systems lies in the size and weight of the units. Rebecca is designed solely to interrogate an Eureka; it serves no other function and requires no other radar in the aircraft. Hence Rebecca can be installed in a troop carrier airplane at a cost in weight of only 85 pounds compared to an installed weight of 400-500 pounds for an ASV radar.



(1) Indicator BC-929-A (2) Radio Control Box BC-1145-A Radio Receiver and Transmitter BC-800-A (not shown)



Scope records range vertically on three scales & azimuth horizontally right or left of centerline of beacon response signal above shows beacon 33 miles away & approx. 30° right.

As soon as an Eureka has been set up (usually it can be done in less than 10 minutes) it is ready to be triggered and to signal in return to incoming Rebecca equipped troop carriers.

Rebecca and Eureka must each use the proper frequency channel - i.e., Rebecca interrogates and Eureka is triggered on one frequency; Eureka responds and Rebecca receives the response on another frequency. This allows 20 different channels, enough to act as a safeguard against tapping by the enemy.

Radio Set *AN/APN-2 is designed to direct an airplane to within 200 yards of the ground beacon and will provide a good homing signal at a distance of 50 miles from transportable Beacon Transmitter-Receiver AN/TPN-3, and 80 miles from transportable Beacon Transmitter-Receiver AN/TPN-2.

Power requirements of the equipment are 185 watts at 80 or 115 volts, 400-2400 c.p.s. and 25 watts at 24 volts dc.

Radio Set *AN/APN-2Y is identical to *AN/APN-2 except for its voltage supply requirement of 12 volts dc.

Test equipment used in the maintenance of Radio Set *AN/APN-2 includes Squadron Test Equipment IE-56-A and Depot Test Equipment IE-45-A.

Army requirements as of 1 February 1945 were 5512 for the calendar year 1945.

POWER INPUT	185 WATTS - 80/115V.AC 25 WATTS @ 24V. DC
POWER OUTPUT	500 WATTS (PEAK)
FREQUENCY	214-234 MC
TYPE OF SIGNAL	PULSE
RANGE	50 MI WITH AN/TPN-1 25 MI WITH AN/PPN-1 80 MI WITH AN/TPN-2
SENSITIVITY	20 MICROVOLTS

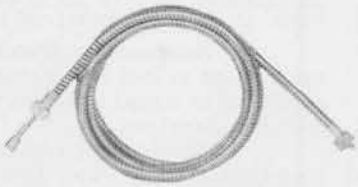
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	955	1	5U4G
3	956	1	2C26
6	6AC7	1	6V6GT/G
1	6SL7GT	1	6X5GT/G
3	6SN7GT	1	6G6G
3	6H6GT/G	1	3BPI
2	2X2		

Radio Receiver and Transmitter
*RT-1A/APN-2
on Mounting FT-416-A

Indicator BC-929-A
on Mounting FT-409-A

Visor

Remote Control
Device C-134/APN

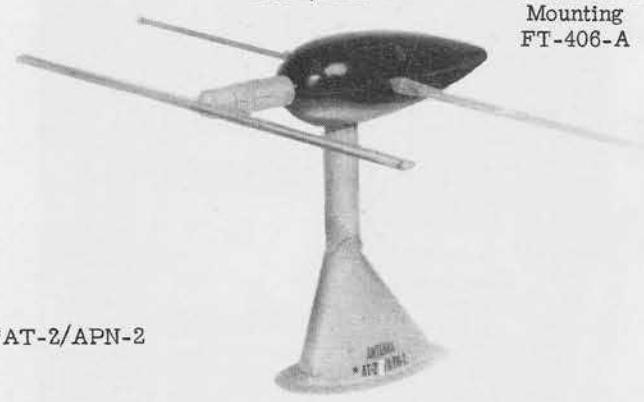


Tuning Shaft MC-215

Tuning Adapter
MX-196/APN

Antenna
*AT-1/APN-2

Control Box
*C-3/APN-2
Mounting
FT-406-A



Antenna *AT-2/APN-2

RADIO SET *AN/APN-2

TOTAL WEIGHT 85 LBS.

Component	Nomenclature	Size	Weight
Radio Receiver and Transmitter	*RT-1/APN-2	13" x 12" x 9"	34 Lbs.
Radio Control Box	*C-3/APN-2	3" x 4" x 8"	2 Lbs.
Indicator	BC-929-A	9" x 9" x 16"	26 Lbs.
Antenna	*AT-2/APN (2 ea)	8"	5 Lbs.
Mounting	FT-409-A	9" x 16"	3 Lbs.
Mounting	FT-416-A	13" x 9"	3 Lbs.
Mounting	FT-406-A	4" x 8"	1 Lb.
Antenna	*AT-1/APN-2	8"	2 Lbs.
Remote Tuning Device	C-134/APN	4" x 3" x 3"	1 Lb.
Tuning Adapter	MX-196/APN	3" x 3" x 2"	1 Lb.
Tuning Shaft	MC-215		1 Lb.

and includes plugs, adapters, fuses and RF cable.

~~CONFIDENTIAL~~

AN/APN-2T1

Training Equipment AN/APN-2T1 is a bench trainer designed to train students in the operation of Radio Set *AN/APN-2. It is intended to present the conditions which may arise during actual flight. Provision is made for the selection of similated video range, azimuth, beacon signals etc., chosen by the instructor, training the student to make the necessary adjustments or observations on the *AN/APN-2 normally required during actual flight.

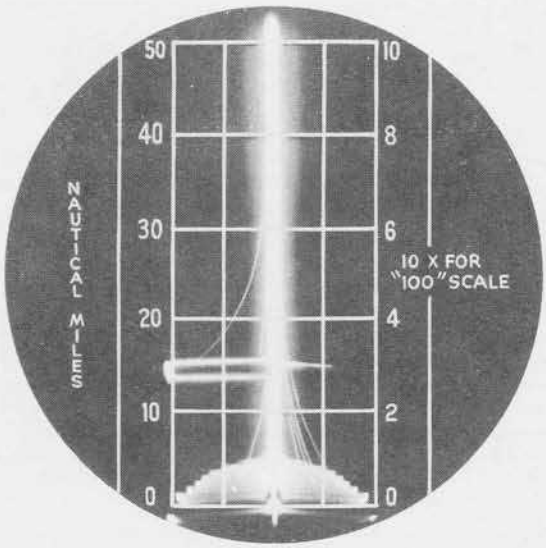
Signals furnished by the various beacons used with the *AN/APN-2 can be similated by the trainer. The equipment contains all the components of the *AN/APN-2 with the addition of a Radio Frequency Oscillator O-7/APN-2T1.

AN/APN-2T1 requires no special test equipment.

There were no Army Air Force Requirements as of 1 February 1945.

POWER INPUT	160 WATTS @ 80 VOLTS A.C.
TYPE OF SIGNAL	PULSE

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	955	1	5Y3GT/G
2	6SN7GT		



Scope records range vertically on three scales & azimuth horizontally right or left of centerline of Beacon Response signal; above shows simulated beacon 33 miles away and approx. 30° right.

Visor

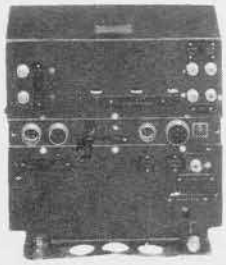
Indicator BC-929-A

Training Unit

Indicator BC-929-A

Visor

Inverter Unit PE-115-A



Radio Receiver and Transmitter

Control Panel BC-793-A

Radio Control Box

TRAINING EQUIPMENT AN/APN-2T1 — TOTAL WEIGHT 200 LBS.

Component	Nomenclature	Size	Weight
Radio Receiver and Transmitter	RT-1/APN-2	13" x 12" x 9"	35 Lbs.
Mounting	FT-416-A	12" x 10" x 3"	3 Lbs.
Indicator	BC-929-A(2 each)	9" x 9" x 16"	26 Lbs.
Mounting	FT-409-A(2 each)	15" x 9" x 2"	3 Lbs.
Radio Control Box	C-3/APN-2	3" x 4"x 8"	2 Lbs.
Mounting	FT-406-A	7" x 4" x 2"	1 Lb.
Radio Frequency Oscillator	O-7/APN-2-T1	11" x 22" x 15"	65 Lbs.
Inverter Unit	PE-115-A	12" x 8" x 12"	33 Lbs.
Control Panel	BC-703-A	9" x 10" x 12"	20 Lbs.

and includes plugs and misc. cables.

Radio Set AN/APN-3 is the airborne portion of the precision aircraft navigational system known as Shoran. Used for precision navigation, permitting positioning of aircraft within 75 feet of any point in the range of the system.

Shoran consists of a single aircraft equipment (AN/APN-3) and two identical ground station equipments (AN/CPN-2). The AN/APN-3 measures the distance from the aircraft to each of the two ground stations (AN/CPN-2). A maximum of 20 AN/APN-3's can use a single pair of ground beacons simultaneously.

Used as a bombing system, the course of each aircraft is determined with the aid of accurate maps. The AN/APN-3 is adjusted so that when the aircraft reaches the point of bomb release the pips indicating the distance to each of the ground stations will coincide with the reference mark on the indicator. Approach to the target may be made from any direction in a given arc. (For further details on the operation of Shoran see Radio Set AN/CPN-2).

The following major components of AN/APN-3 perform the operations indicated:

Transmitter; this unit operates alternately on two different frequencies (about 20 mcx apart) which permits discrimination between the two receiving ground stations.

Receiver-Indicator; this unit receives the response from the two ground beacons (AN/CPN-2) by means of a scrambling device relays them to the indicator in their proper relation. The 3-inch "J-type" scope (circular scan) indicates the time delay in miles distance between the arrival of the two signals.

Comparator; this unit indicates the departure or error of the aircraft in respect to the predetermined course.

Computor; this is a bombing computor (AAF type K-1) which automatically releases the bombs and corrects for bassistics or wind.

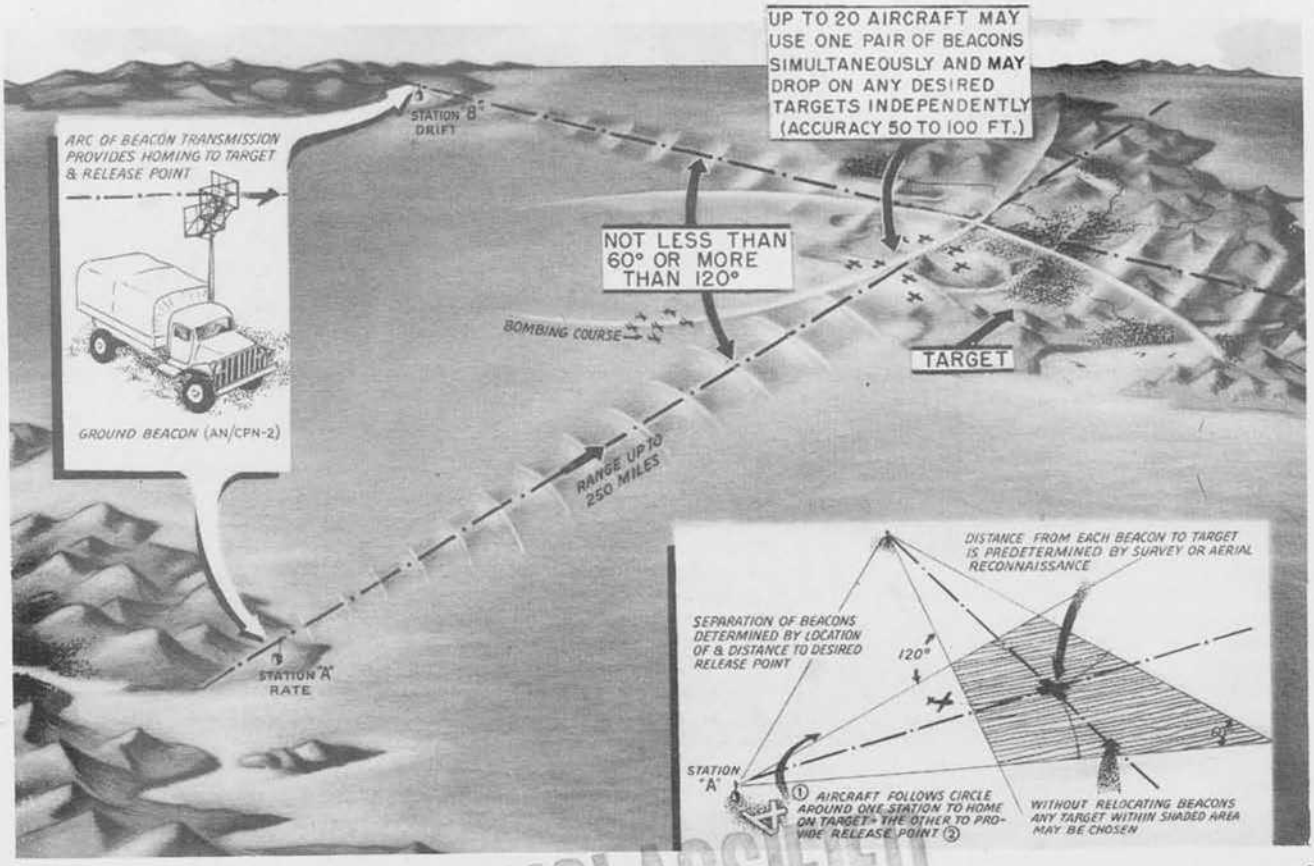
Antenna; this component is used to transmit and receive the rf signals. It consists of two vertical coaxial units and is omnidirectional.

Test equipment required includes Wavemeter TS-247/APM-48, Voltemeters IS-185 and IS-189, Power Meter TS-305/UP, Cord CX-187/APN-3.

POWER INPUT	700 WATTS, 115 VOLTS, 400 TO 2400 CPS. 495 WATTS, 27.5 VOLTS D.C.
POWER OUTPUT	12 KW (PEAK)
FREQUENCY (TRANSMIT.)	220 TO 270 MCS
FREQUENCY (RECEIV.)	220 TO 330 MCS
SWITCHING RATE	10 CPS
PULSE LENGTH	0.5 MICROSECOND
RECEIVER SENSITIVITY	10 MICROVOLTS
RANGE	280 MILES AT 40,000'
ACCURACY	INDICATED DISTANCE: ±75'; BOMBING: 12.5 MILS

TUBE COMPLEMENT

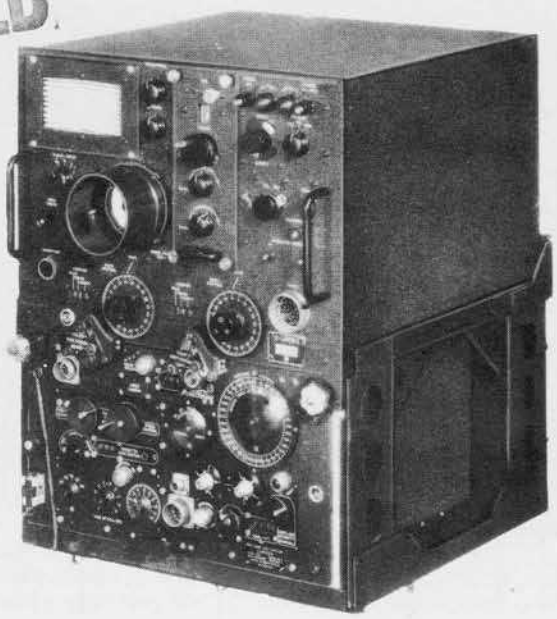
NO.	TYPE	NO.	TYPE
3	3E29	2	6J6
3	5R4GY	1	2X2
2	5Y3GT/G	1	3DP1
11	6A7	5	6SA7
4	6AG7	8	6SL7GT
1	6H6	19	6SN7GT
1	RKR73	4	6V6GT/G
2	4C28	3	OD3/VR-150
7	6AG5	1	OC3/VR-105



Radio set AN/APN-3 is the airborne element of an Aircraft Navigation System employing radar ranging and principles known as SHORAN. It may be used for precision bombing, dropping paratroops and supplies, aerial mapping, or precision navigation of aircraft and surface vessels.

AN/APN-3

Radio Transmitter T-11/APN-3
On
Mounting MT-215/APN-3



Indicator ID-17/APN-3
On
Mounting MT-216/APN-3

Comparator CM-3/APN-3
On
Mounting Base MT-167/U

Antenna
AT-13/APN-3

Antenna
AT-14/APN-3

Pilot Direction
Indicator ID-103/APN-3

RADIO SET AN/APN-3

TOTAL WEIGHT 335 LBS.

Component	Nomenclature	Size	Weight
Computer	K1	9" x 17" x 20"	56 Lbs.
Radio Receiver	R-15/APN-3	(included as indicator)	
Indicator	ID-17/APN-3	15" x 18" x 25"	77 Lbs.
Antenna	AT-14/APN-3	3" x 3" x 12"	1 Lb.
Radio Transmitter	T-11/APN-3	20" x 23" x 21"	106 Lbs.
Visor	M-387	4" x 4" x 4"	
Antenna	AT-13/APN-3	3" x 3" x 14"	1 Lb.
Mounting	MT-215/APN-3	2" x 20" x 21"	9 Lbs.
Mounting	MT-216/APN-3	12" x 18" x 21"	16 Lbs.
Cord	CX-198/APN-3	Length 5'	
Inverter	PU-16/AP		
Pilot Direction indicator	ID-103/APN-3	4" x 4" x 4"	1 Lbs
Mounting	MT-182/AP		
Comparator	CM-3/APN-3	5" x 8" x 23"	19 Lbs.
Mounting	MT-167/APN-3	2" x 22" x 8"	3 Lbs.

and includes plugs, adapters, connectors, switch and miscellaneous cable.

*AN/APN-4

Radio Set *AN/APN-4, the airborne receiver element of the Loran navigation system (long range navigation), is utilized in conjunction with Loran ground stations to determine the geographical position of an aircraft in flight. This system, comprising a set of three or more fixed transmitters operated in conjunction with appropriate special receiver equipment, provides, by the utilization of radar ranging principles, long range navigation information, used for the guidance of aircraft.

Comparable in accuracy to celestial navigation, Loran has the advantage that it can be used under unfavorable weather conditions. Maximum range of Loran operation is approximately 600 miles over water and 300 miles over land when working with direct radio waves (ground waves) from the associated ground stations, and approximately, 1,200 miles when sky waves (reflected waves) are used.

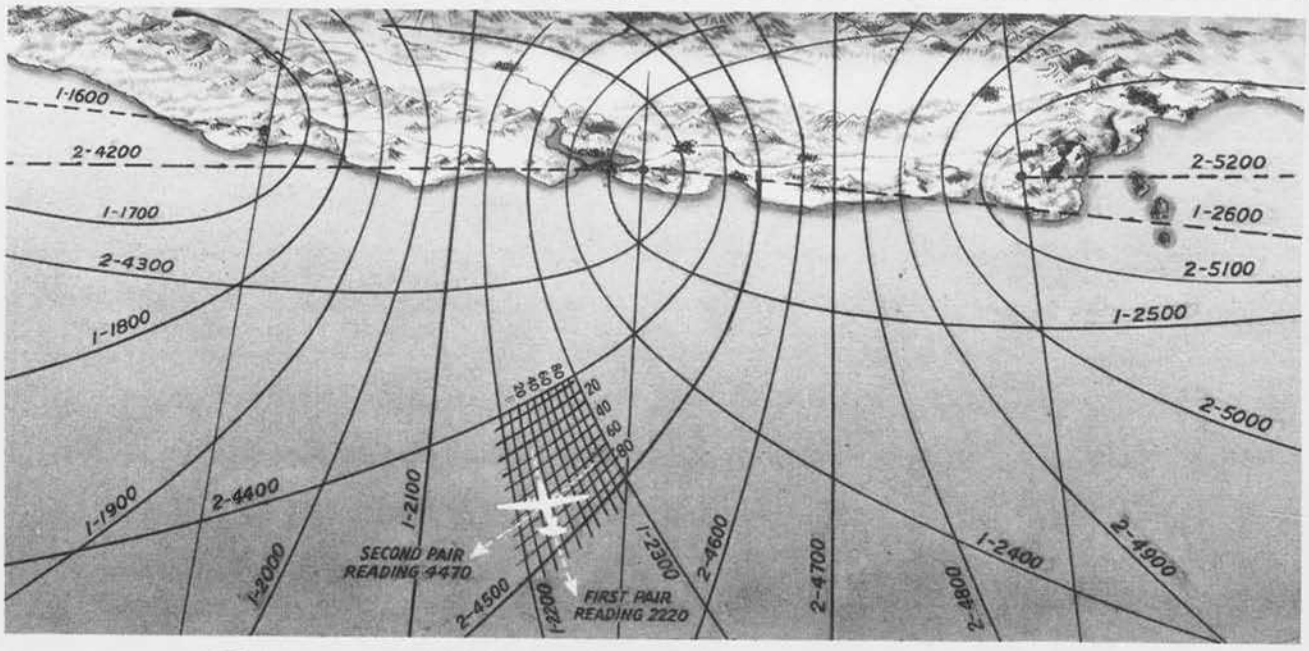
Synchronized ground stations operating in pairs generate radio frequency energy in the form of short wave trains having predetermined recurrence rates. The control station is designated the "Master" and the other, the "Slave." The difference in time of arrival of the two pulses at the airborne receiver is accurately measured by displaying the received pulses on timing markers on the screen of the cathode-ray tube of the airborne indicator. This information gives location of the airplane on a line of constant time difference which is plotted on a map of the region. To establish a navigational "fix," line of position must be obtained from another pair of stations, and the point of intersection of these lines is the position of the aircraft. Loran maps have been prepared for those areas now covered by the Loran net.

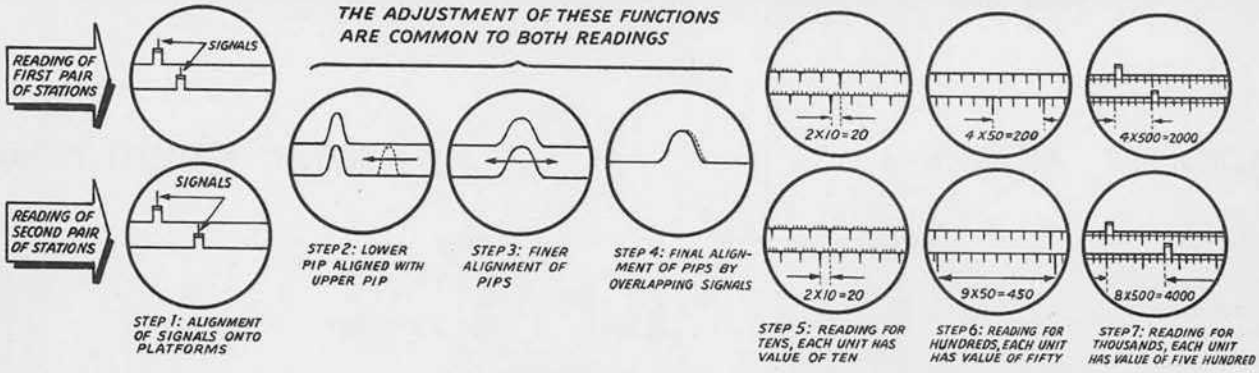
Radio Set *AN/APN-4 fulfills the need for a radio navigational device to be used over areas far removed from radio range transmitters. It is not intended to replace the radio compass, but to extend the use of radio navigation beyond the range of low frequency transmitters. It is particularly useful on long ranges over water when overcast makes celestial navigation impossible.

Test Equipment used in the maintenance of this equipment includes TS-20/APN-4.

POWER INPUT	260 WATTS, 80 or 115 V.
FREQUENCY	1.7 TO 2.0 MC (4BANDS)
TYPE OF SIGNAL	PULSE
RANGE	600 MILES (GROUND WAVES) 1200 MILES (SKY WAVES).

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
4	6SK7GT	1	5U4G
1	OC3/VR-105	2	2X2
16	6SN7GT	1	6SA7GT
4	6SL7GT	1	5CP1
2	6SJ7GT	8	6H6GT/G
3	6B4G		

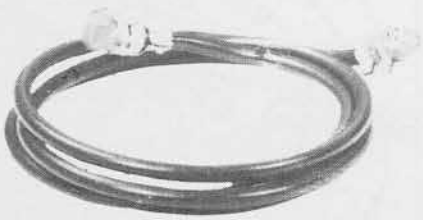




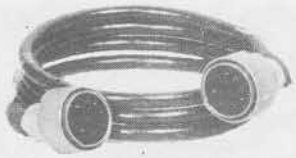
Radio Set *AN/APN-4 is the airborne receiver element of the Loran Navigation System with which a radar fix is obtained by taking a reading on each of two Loran chains in the order shown.

Indicator *ID-6B/APN-4.

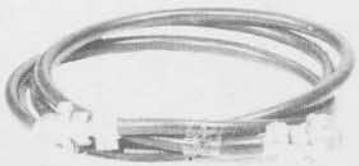
Radio Receiver *R-9A/APN-4



Cord CD-946



Cord CD-540



Cords CD-946

Power Cord

RADIO SET AN/APN-4

TOTAL WEIGHT 75 LBS.

Component	Nomenclature	Size	Weight
Radio Receiver	R-9/APN-4	20'' x 9'' x 8''	26 Lbs.
Mounting	FT-447-A		3 Lbs.
Indicator	ID-6/APN-4	20'' x 9'' x 12''	36 Lbs.
Mounting	FT-446		3 Lbs.

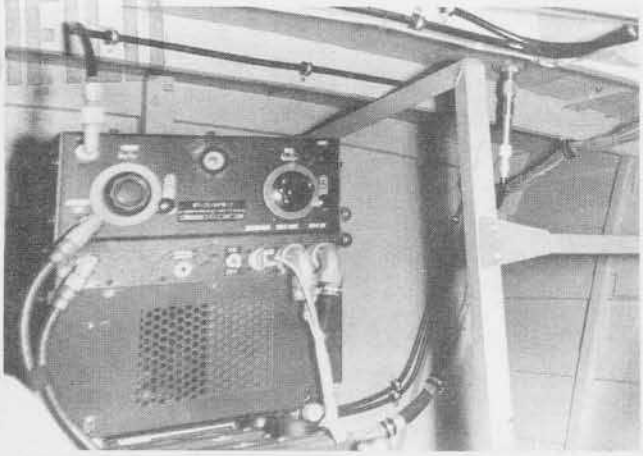
and includes plugs, cordage, couplings, cable clamps, wire and RF cable.

Radar Beacon AN/APN-7 is an airborne transponder beacon employed to establish the identity of the aircraft in which it is installed. The equipment is designed particularly for operation with ASG, SCR-517 and SCR-717 and provides navigational aid to other aircraft, acting as a "rooster" on which they may home. It facilitates the location of a predetermined meeting place with other aircraft.

The receiver has a 12mc. bandwidth and can be tuned over the 3220 mc. to 3320 mc. range. The transmitter uses a 446B lighthouse tube, with a power output of 200 watts. The transmitter may be tuned over the 3220 mc. to 3320 mc. range.

Test equipment required for maintenance includes Test Set TS-14/AP, Frequency Meter TS-46/AP, Dumont 241 Oscilloscope and RCA type MI-18709 Signal Generator.

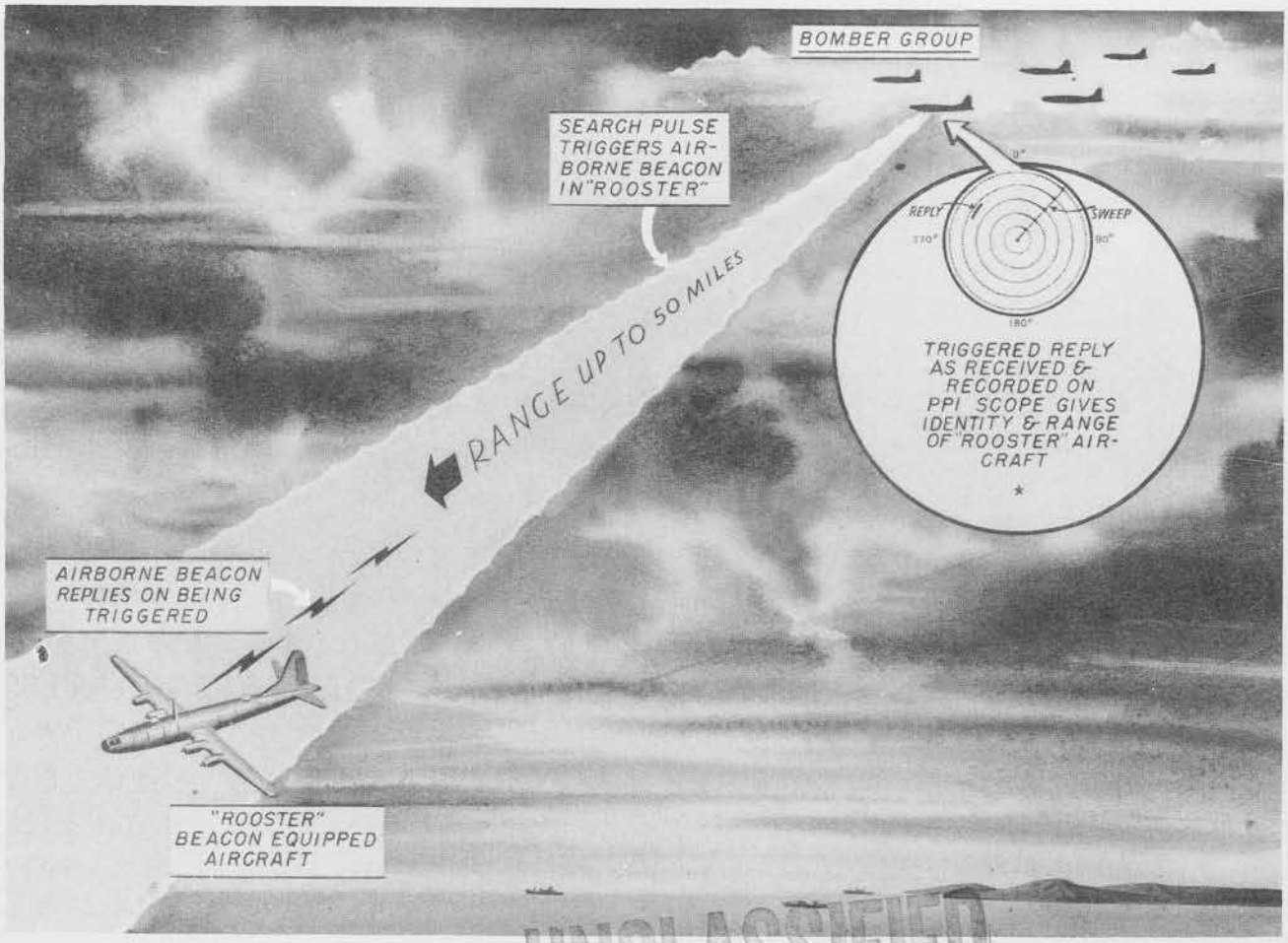
AAF requirements as of 22 February 1945 were 225 for the calendar year 1945.



Receiver-Transmitter RT-21/APN-7 installed for operation.

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	721-A	1	OC3/VR-105
1	707-B	1	OD3/VR-150
1	446-B	1	6E5
3	6SN7GT	1	6B4G
1	RK-34	1	2X2
11	6AG5	1	5U4G
1	13T4	1	6X5GT/G

POWER INPUT	200 WATTS, 105-130 V, 400 TO 2400 CPS; 10 WATTS, 12/24 V, DC
POWER OUTPUT	200 WATTS (PEAK)
FREQUENCY	3220-3320 MC
TYPE OF SIGNAL	PULSE
RANGE	50 MILES



Radar Beacon AN/APN-7 is an airborne transponder beacon used to establish the identity of the aircraft in which it is installed and provide navigational aid to other aircraft.

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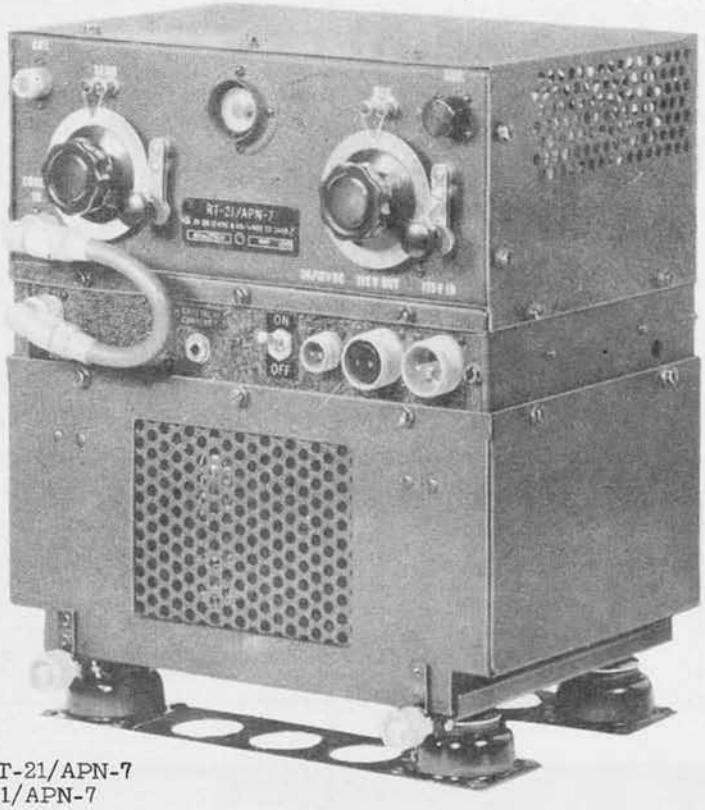
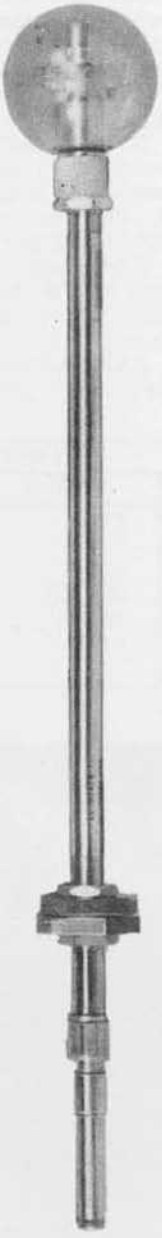


Receiver-Transmitter RT-21/APN-7
on Mounting Base MT-111/APN-7



Antenna Assembly
AS-31/APN-7

Coder KY-3/APN-7
on Mounting Rack MT-148/APN-7

RADAR BEACON AN/APN-7

TOTAL WEIGHT 53 LBS.

Component	Nomenclature	Size	Weight
Receiver-Transmitter	RT-21/APN-7	13'' x 13'' x 10''	36 Lbs.
Antenna Assembly	AS-31/APN-7	25'' x 4'' x 4''	3 Lbs.
Mounting Base	MT-11/APN-7	2'' x 12'' x 10''	3 Lbs.
*Coder	KY-3/APN-7	7'' x 5'' x 16''	9 Lbs.
*Mounting Base	MT-148/APN-7	2'' x 6'' x 17''	2 Lbs.

and includes antenna cable assembly, plugs and cable adapter.

* optional items

Radar Set AN/APN-9 is an airborne long range navigational equipment operated in conjunction with Loran ground stations to provide navigation aid for heavy and medium bombardment and transport type aircraft.

This set, known as "Simplified Loran", is a single unit receiver-indicator weighing about 40 pounds, excluding power source. Radar Set AN/APN-9 will replace Radio Set AN/APN-4, which is heavier and consists of several units.

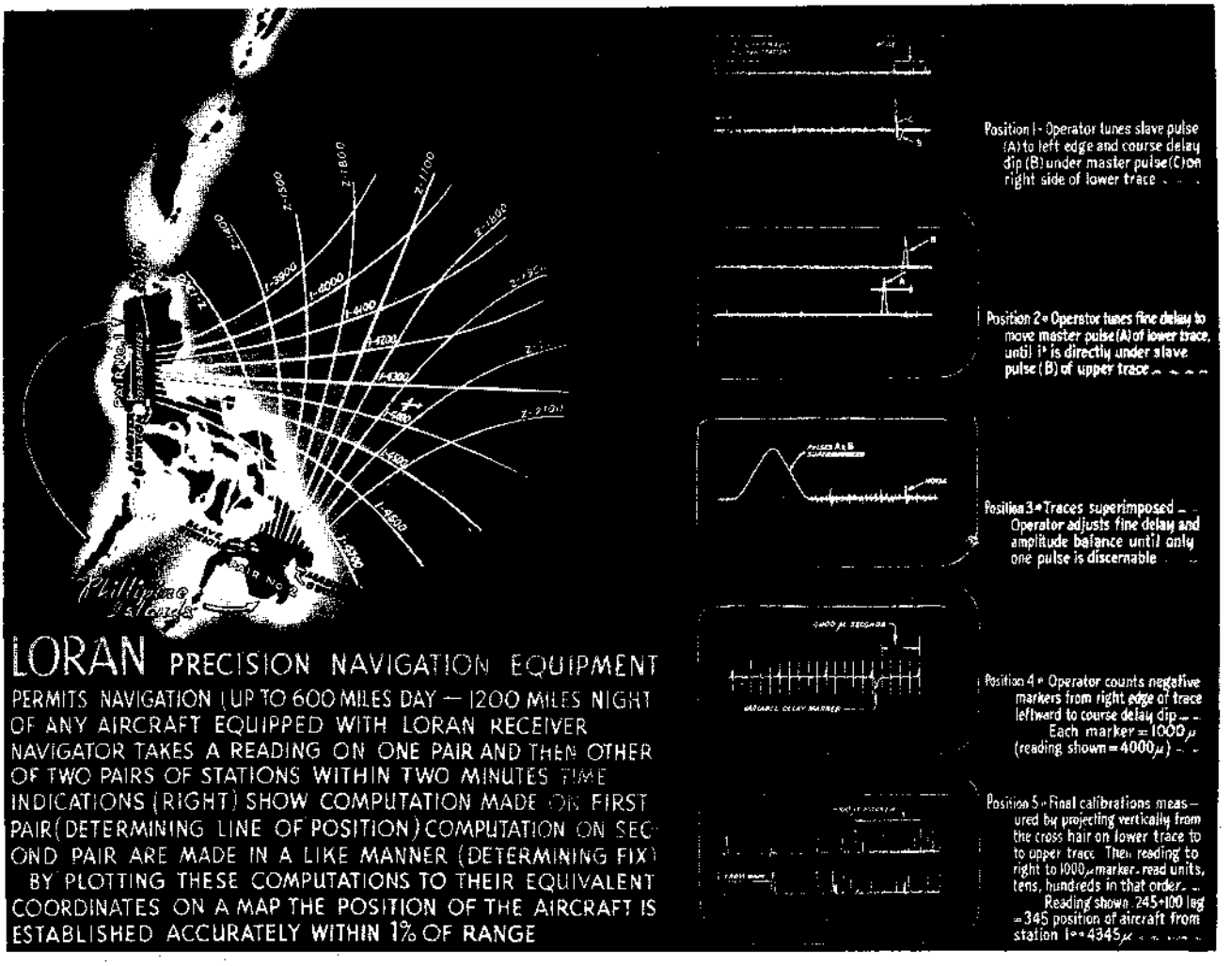
Comparable in accuracy to celestial navigation, Loran has the advantage that it can be used under unfavorable weather conditions. Maximum range of Loran operation is approximately 600 miles over water and 300 miles ever land when working with direct radio waves (ground waves) from the associated ground stations, and approximately 1,200 miles when sky waves or reflected waves from three ground stations are used.

Ground stations operating in synchronism generate radio frequency energy in the form of short wave trains having predetermined recurrence rates. These stations operate in pairs, one designated the "master" station, and the other, a "slave" station. The difference in time of arrival of the two pulses at the airborne receiver is accurately measured by displaying the received pulses superimposed on timing markers on the screen of the cathode-ray tubes of the airborne indicator. This information locates the airplane on a line of constant time difference which is plotted on a Loran chart of the region. To establish a navigation fix, a line of position must be obtained from another pair of stations. The point of intersection of the two lines of constant time difference locates the position of the aircraft on the Loran Chart.

Test equipment required in the maintenance of Radio Set AN/APN-9 includes Test Set TS-251/UP, RCA Oscilloscope Type 158, Signal Generator I-72 and Weston Output Meter model 571 Type 3A.

POWER INPUT	190 w. @ 80/115 v. 400 - 2400 cps
FREQUENCY	1.7 - 2 Mc
TYPE OF SIGNAL	pulse
RANGE	600 miles (ground waves) 1,200 miles (sky waves)

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	3BP1	3	6SL7GT/G
1	2X2	13	6SN7GT/G
1	5Y3GT/G	7	6H6GT/G
1	6Y6G	3	6SK7GT/G
2	6SJ7GT/G	1	6SA7GT/G
1	OC3/VR-105	1	6N7



Radio Set AN/APN-9 is the airborne receiver element of the Loran Navigational System with which a radar fix is obtained by taking a reading on each of two Loran chains in the order shown.

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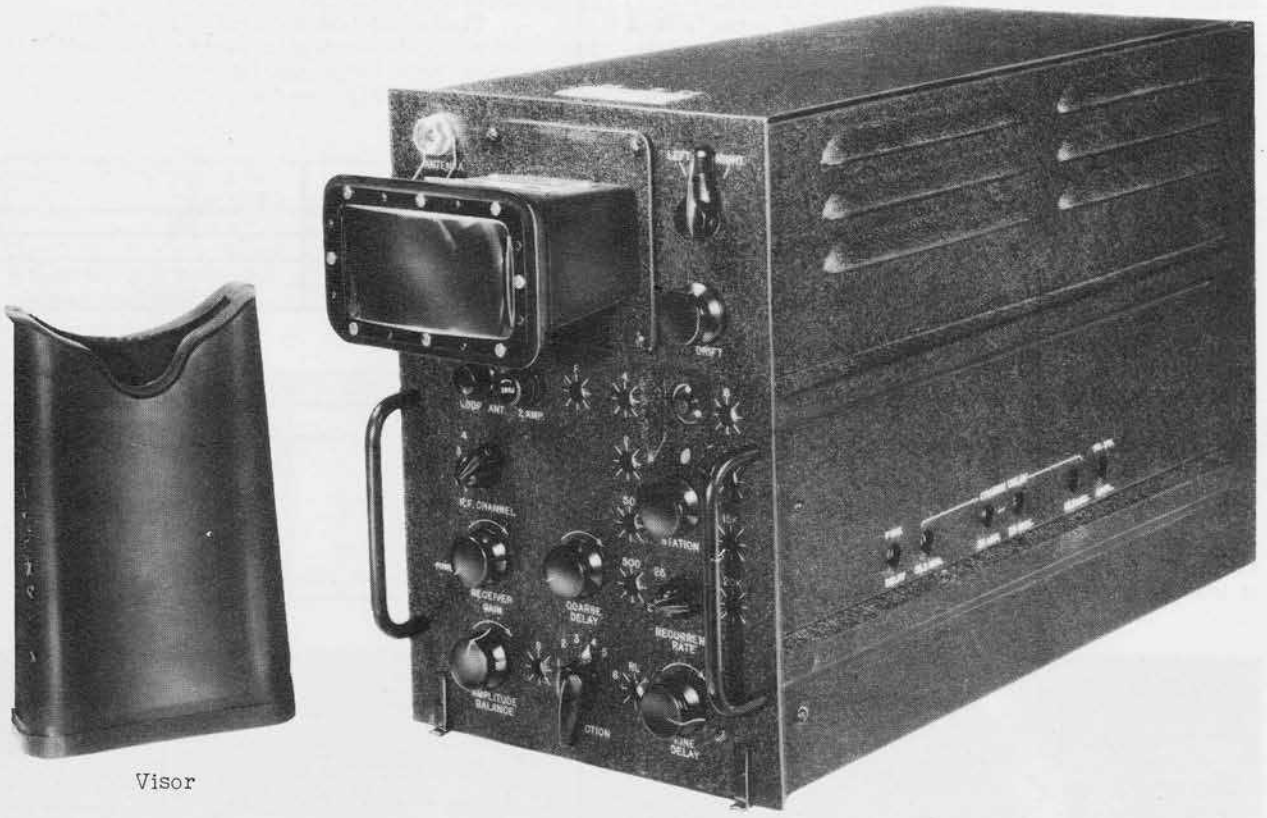


Visor

Receiver Indicator R-65(XA) /APN-9(XA-2)

RADAR SET AN/APN-9

TOTAL WEIGHT 41 LBS.

Component	Nomenclature	Size	Weight
Receiver-Indicator	R-65/APN-9	11" x 9" x 19"	35 Lbs.
Mounting	MT-203/APN		3 Lbs.
Coupling	MC-277		*
Cable Clamp	M-297		*
Radio Frequency Cable	RG-8/U	40'	1 Lb.
Coupler	CU-92/APN	3" x 2" x 2"	*
Adapter	M-359		*
Plugs	PL-259-A		*

Uses either fixed or trailing wire antenna.

* Weight less than one pound.

SECRET

AN/APN-10

Radar Set AN/APN-10, a light weight, interrogator-responsor type, airborne navigational equipment, is designed to direct an airplane to within 200 yards of a ground or airborne beacon. The set will provide a good homing signal at a distance of fifty miles from transportable Beacon Transmitter-Receiver AN/TPN-2 or Radio Set SCR-695, and at twenty-five miles from portable Beacon Transmitter-Receiver AN/PPN-1 or AN/PPN-2.

In conjunction with suitable companion beacons, this equipment may be used for landing parachute troops or gliders by night; maintaining airborne supply operations to isolated positions at night; demarcation of bombing line for close support bombers; identification of certain advanced units; homing on airfield beacons; homing on airborne beacons; identification of other friendly airplanes, and as a ground interrogator-responsor for identifying friendly airplanes and checking IFF equipment in aircraft during take-off or landing.

This equipment is essentially a radio transmitter-receiver with a cathode ray indicator. A pulse modulated signal is transmitted by Radar Set AN/APN-10, received by the ground or airborne beacon which then automatically transmits a reply on the same or a different frequency, which when received is displayed on the cathode-ray indicator.

The airplane is directed toward the beacon by turning until signals of equal amplitude are observed on each side of the indicator.

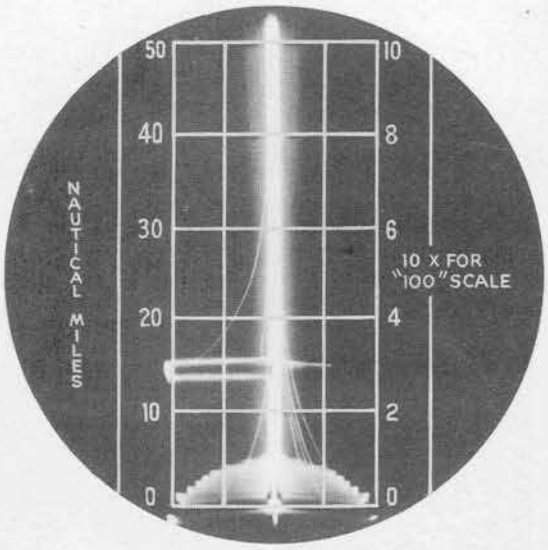
This receiver-transmitter is housed in a single unit and will transmit and receive on any frequency between 160 and 240 mc. Desired frequencies are selected by means of a tuning knob on the front panel of the unit.

Radar Set AN/APN-10 may be installed in bombers, transports, gliders, and fighter airplanes, having a radio operator's or navigator's compartment. One individual is required to operate this equipment.

Radar Set AN/APN-43 is similar to AN/APN-10, and may be used in connection with any Eureka type beacon such as AN/TPN-2, AN/PPN-1, or AN/PPN-2. It also operates in conjunction with YH and YJ type beacons and SCR-695 IFF equipment.

Test equipment required for maintenance and tuning of AN/APN-10 includes Test Equipment IE-45 (depot) and Test Equipment IE-56 (field).

There were no AAF requirements as of 1 February 1945.



AN/APN-10 scope displays ground station responses on two scales with 0 to 5 and 0 to 50 mile ranges, and indicates right-left direction of the ground station relative to the line of flight.

POWER INPUT	100 WATTS @ 22-30 VOLTS DC.
POWER OUTPUT	100 WATTS (PEAK)
FREQUENCY	160-240 MC
TYPE OF SIGNAL	PULSE
RANGE	25-50 MILES

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	6F4	1	3BP1
6	6AK5	1	VR-150/30
4	6J6	2	955
3	6C4	1	6V6
1	6AG5	1	8016

RADAR SET AN/APN-10

TOTAL WEIGHT 30 LBS.

Component	Nomenclature	Size	Weight
Transmitter-Receiver-Indicator	RT-XA-16/APN-10(XA-2)	11" x 8" x 19"	30 Lbs.

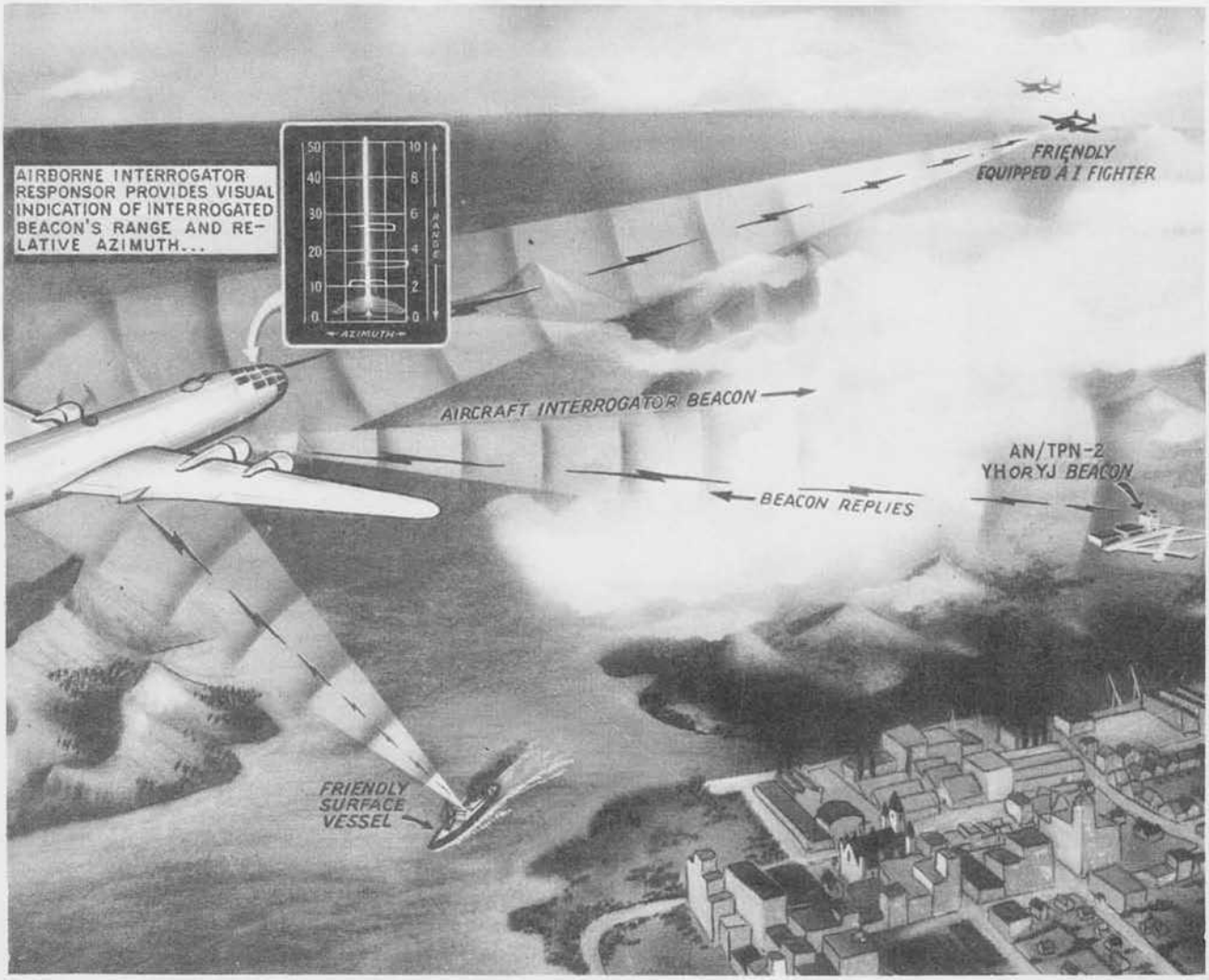
Radar Set AN/APN-12 is an airborne interrogator responsor equipment designed to indicate range and relative azimuth in conjunction with ground installations of radar beacons of the Eureka type, BABS equipment, and YH and YJ radar beacons. A modified "A" scope is used to give right left indications and range. This set is similar to Radio Sets SCR-729 and AN/APN-2 and is intended to supplement and eventually replace these sets since it combines their functions and frequency coverage. Shape and mounting of the AN/APN-12 is comparable to that of the SCR-729 and AN/APN-2.

This equipment consists of a Receiver-Transmitter RT-11/APN-12 which can transmit and receive on at least three separate frequencies in the Mark III IFF band and on the five Rebecca-Eureka frequencies. Frequency of the transmitter and receiver are independently adjustable. Selector switch tuning permits use of any preset transmitter or receiver frequency while the aircraft is in flight. Normally the unit will operate as an interrogator responsor; however, the basic circuits have been so designed that the equipment may also operate as a transpondor beacon. The choice of either one depends on the tactical requirements.

Test Equipment required for the operation and maintenance of AN/APN-12 includes Test Equipment IE-56-A, Signal Generator GR-804-C and Oscilloscope RCA-158.

POWER INPUT	30 WATTS D.C. @ 24-28 VOLTS - 150 WATTS @ 80 OR 115 VOLTS, 400 to 2400 C.P.S.
POWER OUTPUT	400-500 WATTS
FREQUENCY	200-240 MC and 156-186 MC
TYPE OF SIGNAL	PULSE
RANGE	20 MI. FOR EUREKA BEACON, 90 MI. FOR YH OR YJ BEACON, 50 MI. FOR AN/TPN-1, AN/TPN-3, SCR-695, 100 MI. FOR AN/TPN-2

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
6	6SN7GT	1	6J6
4	6H6GT/G	7	6AC7
2	2X2	1	6V6GT/G
2	6X5GT/G	2	6SL7GT
1	6G6GT	1	5U4G
1	3BP1	1	2C26A
1	6AK5	1	6E5
1	9002	1	6SJ7



Radar Set AN/APN-12 is an airborne interrogator responsor equipment used in conjunction with ground beacons for aircraft navigation and for Mark III IFF land, sea and air operations.

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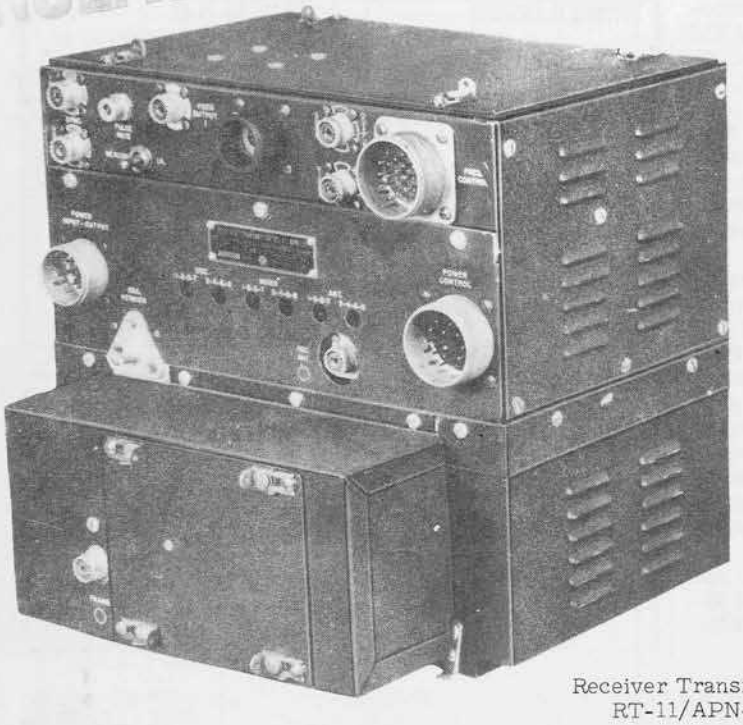
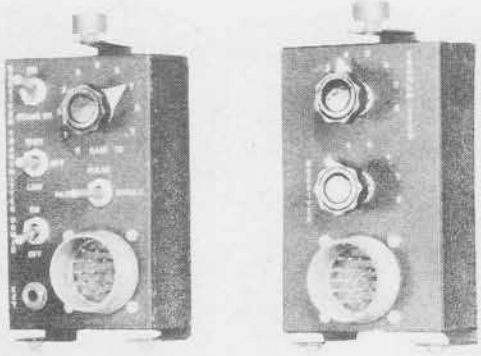
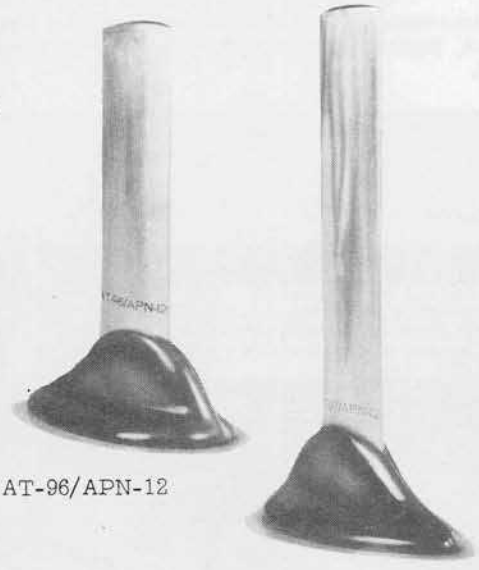


Receiver Transmitter
RT-11/APN-12

Video Gate MX-284/APN-12



Control Boxes



Antenna AT-96/APN-12

Antenna AT-97/APN-12

RADAR SET AN/APN-12

TOTAL WEIGHT 105 LBS.

Component	Nomenclature	Size	Weight
Receiver-Transmitter	RT-11/APN-12	12" x 12" x 13"	40 Lbs.
Control Box	C-169/APN-12	4" x 6" x 3"	1 Lb.
Control Box	C-170/APN-12	4" x 10" x 3"	1 Lb.
Indicator	ID-169/APN-12		26 Lbs.
Mounting	FT-406-A (2 each)		*
Mounting	FT-409-A		3 Lbs.
Mounting	FT-416-A		3 Lbs.
Antenna	AT-96/APN-12 (3 each)		5 Lbs.
Antenna	AT-97/APN-12 (2 each)		5 Lbs.
Video Gate	MX-284/APN-12	5" x 6" x 10"	9 Lbs.
Mounting Base	MT-165/U	6" x 2" x 10"	2 Lbs.
Cable Clamp	M-297		*
Coupling	MC-277		*
Remote Tuning Device	C-195/APN-12	3" x 3" x 3"	1 Lb.
Receptacle	UG-191/AP	1" long x 1" diam.	*

and includes plugs, adapters, cable adapters and r-f cables.
* less than one pound in weight.

Radar Beacon AN/APN-19, (Rosebud) is an airborne range coded beacon which is installed in fighters to enable Ground Radars AN/CPS-1, AN/CPS-6 and SCR-584 to identify and vector these airplanes at ranges greater than the ground radars normally can function with airplanes not so equipped. This equipment increases the range and reliability for close support bombing and photo-reconnaissance when used with modified SCR-584 radars.

The set is capable of being interrogated by radars having beacon functions and replying with a range coded signal permitting the beacon to be located in range and azimuth. A tunable 7 megacycle-bandwidth cavity is available when it is desired to eliminate all frequencies except those of one interrogating radar. Reply may be coded by three code pips, the spacing of which may be varied so that seven combinations are possible.

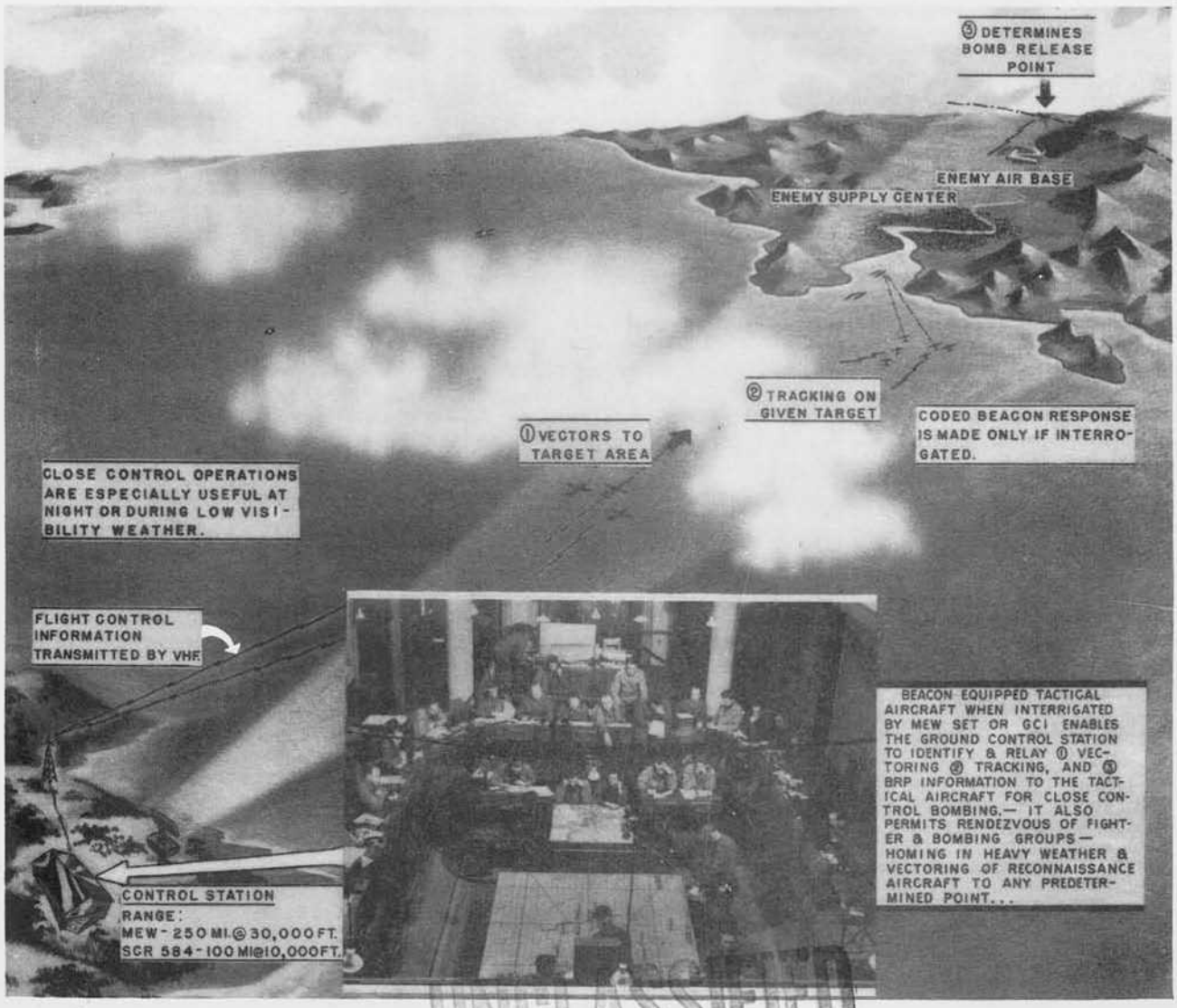
The equipment is similar to Radio Set AN/UPM-2 adapted for airborne operation. Antenna Assembly AS-172/AP, the horizontally polarized antenna designed for airborne operation, consists of a dual linear array of six dipoles for receiving and transmitting. Present indications show that for fighter planes, vertically polarized antennas are preferred as the vertically polarized dipoles will be only one and one-half inches long.

Test equipment required for maintenance and tuning includes Test Set TS-125/AP, Wavemeter TS-117/GP, Test Set TS-3A/AP, Signal Generator TS-155C/UP, Pressurizing Kit MK-20/UP, Multimeter TS-297/U, Oscilloscope TS-239/UP, Oscilloscope TS-34/AP, Voltage Divider TS-890/AP, Multimeter TS-352/U, Dynamotor Test Set TS-414/U, and Tube Tester I-177.

Army Air Forces requirements as of 1 February 1945 were 3273 for the calendar year 1945.

POWER INPUT	120 WATTS @ 28 VOLTS D-C
POWER OUTPUT	50 WATTS (PEAK)
FREQUENCY	2700-3400 MC
TYPE OF SIGNAL	RANGE CODED PULSES
SENSITIVITY	2 TO 5 x 10-8 WATTS

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
3	2D21	1	2C40
2	7F8	5	7F8



Radar Beacon AN/APN-19 installed in fighter or other light aircraft permits close control operations at much greater ranges than are possible with normal detection radar in that the aircraft contact is maintained with the control station by beacon pulse rather than with the weaker reflected pulse.

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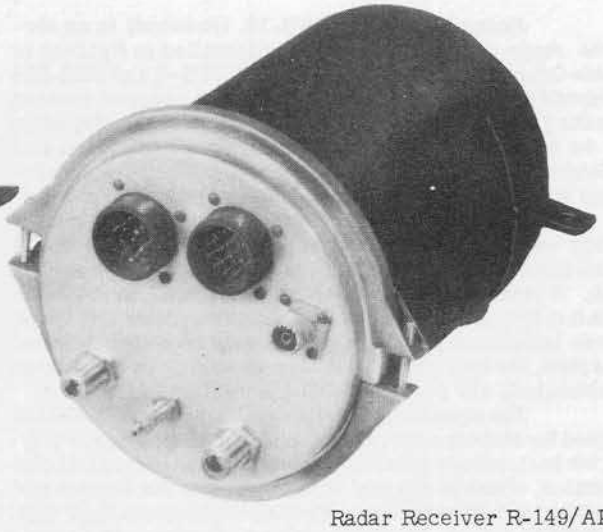
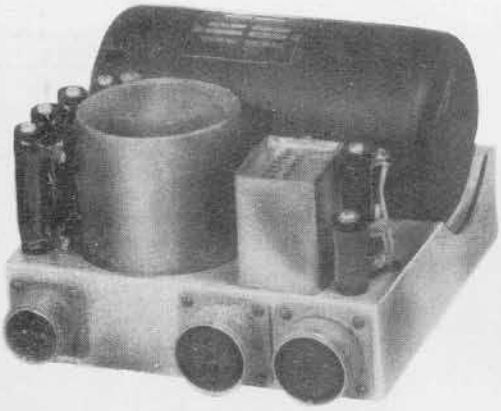
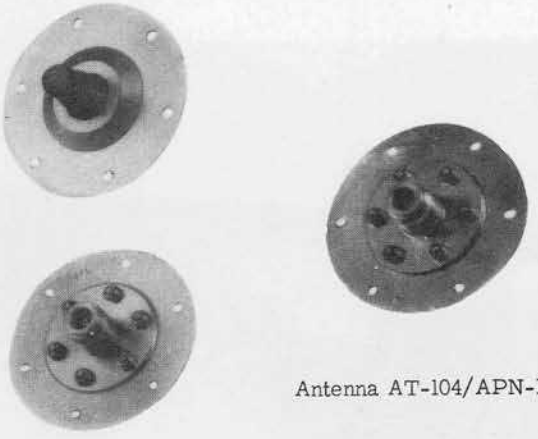
Radar Transmitter T-128/APN-19



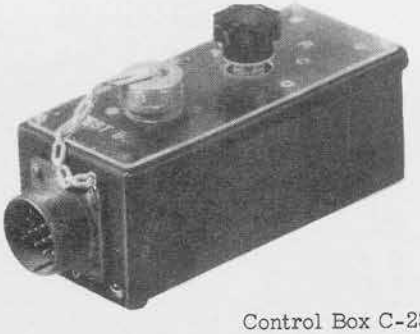
Radar Receiver R-149/APN-19



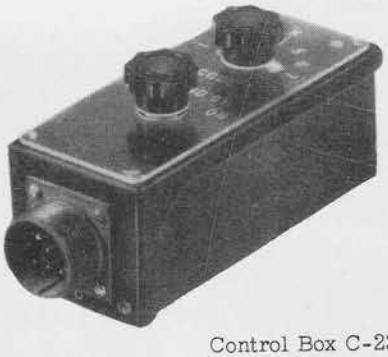
Dynamotor DY-30/APN-19



Antenna AT-104/APN-19



Control Box C-238/APN-19



Control Box C-239/APN-19

RADAR BEACON AN/APN-19

TOTAL WEIGHT 30 LBS.

Component	Nomenclature	Size	Weight
Control Box	C-238/APN-19	4" x 3" x 7"	*
Control Box	C-239/APN-19	4" x 4" x 5"	1 Lb.
Antenna	AT-104/APN-19	2" x 3" Diameter	*
Radar Transmitter	T-128/APN-19	9" x 7" Diameter	7 Lbs.
Radar Receiver	R-149/APN-19	9" x 7" Diameter	6 Lbs.
Dynamotor	DY-30/APN-19	5" x 8" x 7"	10 Lbs.

and includes plugs cable adapters etc.

Training Equipment AN/APN-T1 is a bench trainer designed to train students in the operation of Radio Set SCR-729. It is intended to present realistically to the student as many as possible of the situations which may arise under actual flight conditions in connection with the performance of SCR-729.

Training Equipment AN/APN-T1 comprises various components of SCR-729, slightly modified. The training unit consists of two chassis, mounted one above the other, and assembled in a double-deck cabinet. The upper chassis contains Code Selector KY-2/APN-T1, while the lower contains RF Generator O-6/APN-T1. Either chassis may be removed through the front of the cabinet by disconnecting the interconnecting cable and removing the proper rack panel screws.

Synchronizing pulses from Radio Receiver and Transmitter BC-800-A are applied to the input circuit of the generator and enter two parallel channels. One channel generates a signal which simulates ground reflections. The other channel generates signals which simulate responses from various beacons and IFF equipment. The code selector works in conjunction with the generator, providing mechanical switching to simulate coding; and also provides a means of switching for the selection of the desired signals. Each of the two generator channels contains an RF oscillator which is modulated by the video signals generated in that channel. The resulting RF pulses from both oscillators are coupled into a common RF output cable and applied to the receiver antenna input of Radio Receiver and Transmitter BC-800-A. These RF pulses are detected and the video pulses applied in the normal manner to Indicator BC-929-A. Thus, so far as the student is concerned, the indications on the indicator are similar to those occuring under flight conditions. The selection of the video signal, range, azimuth, etc., are at the discretion of the instructor. The instructor can, by suitable manipulation of the controls of the unit, require the student to make any adjustments or observations on SCR-729 which would normally be required of the student under flight conditions.

Two indicators may be connected in parallel in order to provide separate indications for instructor and student. The BC-800-A and BC-929-A are wired so that they can be operated from the 80-volt supply. This permits all units of the equipment to be operated from a common power supply.

No special test equipment is necessary for maintenance of this trainer.

There were no AAF requirements as of 1 February 1945.

POWER INPUT	28 AMPS 24 V. DC
TYPE OF SIGNAL	PULSE

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	6AC7	2	6SN7GT
1	6J5	1	5Y3GT/G
2	955		

Indicator BC-929-A

Visor

Radio Frequency Generator O-6/APN-T1

Visor

Indicator BC-929-A

Inverter Unit PE-115-A

Radio Receiver and Transmitter

Control Panel BC-703-A

Control Box BC-1145-A

TRAINING EQUIPMENT AN/APN-T1 — TOTAL WEIGHT 196 LBS.

Component	Nomenclature	Size	Weight
Radio Receiver and Transmitter	BC-800-A	13" x 13" x 9"	34 Lbs.
Mounting	FT-416-A	12" x 10" x 3"	3 Lbs.
Indicator	BC-929-A (2 each)	9" x 9" x 16" (ea)	26 Lbs.
Mounting	FT-409-A (2 each)	15" x 9" x 2"	3 Lbs.
Radio Control Box	BC-1145-A	3"x 4" x 8"	2 Lbs.
Mounting	FT-406-A	7" x 4" x 2"	3 Lbs.
Radio Frequency Generator	O-6/APN-T1	9" x 19" x 15"	18 Lbs.
Code Selector	KY-2/APN-T1	9" x 19" x 15"	36 Lbs.
Double Deck Cabinet		18" x 19" x 15"	36 Lbs.
Inverter Unit	PE-115-A	12" x 8" x 12"	33 Lbs.
Control Panel	BC-703-A	9" x 10" x 12"	20 Lbs.

and includes plugs, adapters, wire and misc. cable.

Beacon Antenna Assembly AN/CPA-1 is an air transportable adapter equipment used to convert Beacon Transmitter-Receivers AN/TPN-1, AN/TPN-2 or AN/TPN-3 for blind approach of aircraft equipped with interrogator responsor equipments, such as Radio Set AN/APN-2 or SCR-729 under adverse weather conditions. Approaches can be accomplished to within one mile of a runway. The actual landing is then accomplished visually.

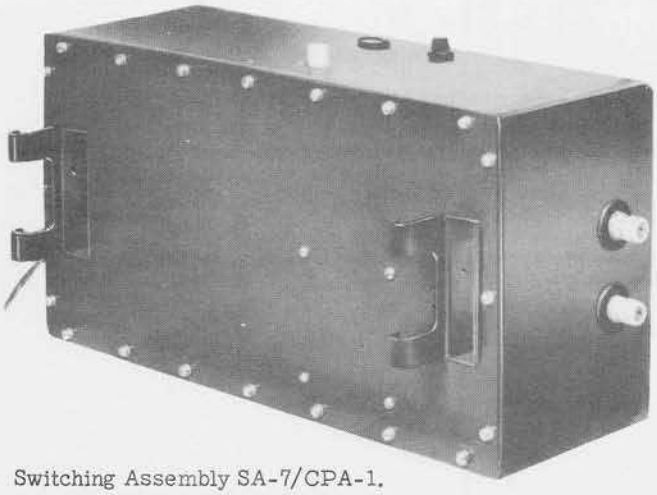
This assembly consists of a collapsible triangular frame-like antenna reflector, and a switching unit for alternating the antenna leads. This set when used with the radar homing beacon, will form a "BABS" system, similar to Radio Set AN/CPN-7.

Power is obtained from 110 volts, 50-60 cycle power source or from a 24 volt dc. source utilizing an inverter. Power input is 20 watts. The equipment operates over a frequency range of 214 - 234 mc.

AN/CPA-1 requires no special test equipment for maintenance or operation.

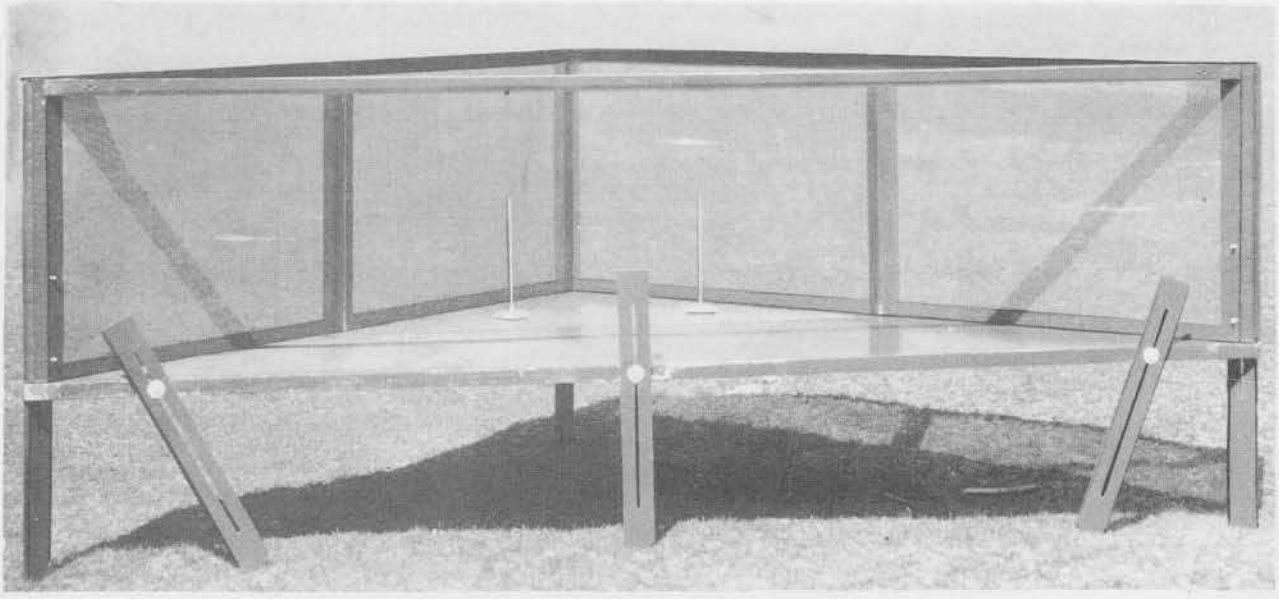
There were no AAF requirements as of 1 February 1945.

POWER INPUT	20 WATTS @ 110 VOLTS
FREQUENCY	214 - 234 MC.



Switching Assembly SA-7/CPA-1.

Inverter Unit PP-76/CPA-1.



Antenna System AS-30/CPA-1 assembled for operation.

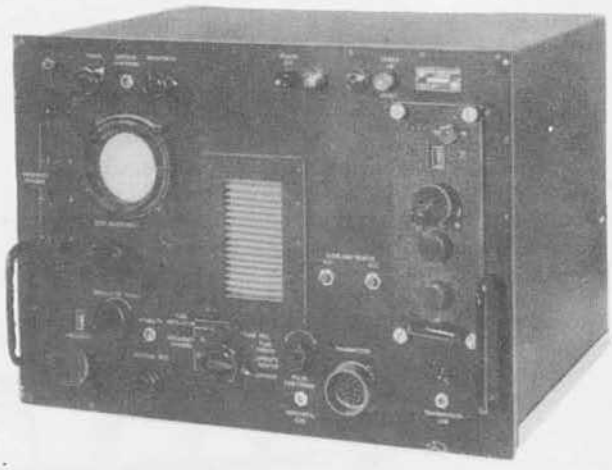
RADAR ANTENNA ASSEMBLY AN/CPA-1 TOTAL WEIGHT 155 LBS.

Component	Nomenclature	Size	Weight
Antenna System	AS-30/CPA-1	54" x 122" x 62"	90 Lbs.
Switching Assembly	SA-7/CPA-1	9" x 10" x 19"	27 Lbs.
Inverter Unit	PP-76/CPA-1	6" x 7" x 7"	10 Lbs.

and includes plugs and cords.

Radio Set AN/CPN-2 is the ground portion of the precision aircraft navigational system known as Shoran which employs radar ranging and beacon principles. This system is used for precision navigation, permitting positioning of aircraft within 75 feet of any point in the range of the system.

Shoran consists of one aircraft equipment (AN/APN-3) and two identical ground station equipments (AN/CPN-2). The AN/CPN-2's provide signals which are utilized by the aircraft equipment (AN/APN-3) to measure the distance from the aircraft to each of the two AN/CPN-2 ground stations. In practice one performs the "rate" duties while the other acts as the "drift" station. The "drift" station is the one which provides the course or arc flown by the navigator. The "rate" station provides the intersecting or bombing point. These indications depend on the plane's receiver-indicator system, i.e., a ground station may be a "rate" station for one airplane and a "drift" station for another. A maximum of 20 airborne equipments can use a single pair of ground beacons simultaneously. (For further details on the operation of Shoran refer to Radio Set AN/APN-3.)



Monitor ID-18/CPN-2

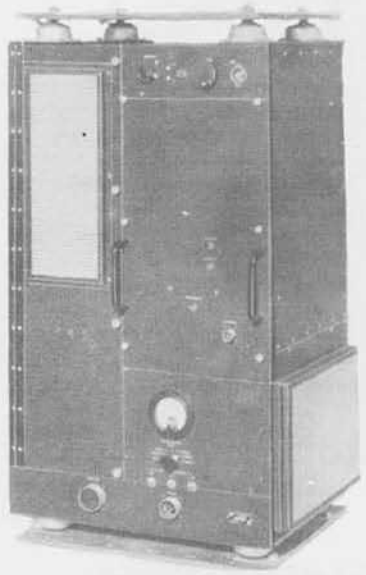
The following major components of AN/CPN-2 perform the functions indicated:

Transmitter; when interrogated by AN/APN-3 this unit responds by transmitting a pulsed signal at the proper rf frequency.

Monitor; this component contains the rf receiver unit for receiving the signals from AN/APN-3. It also incorporates a network for controlling the overall delay of the station, and a master timing unit used as a reference standard for the airborne timer. An oscilloscope is provided for checking the delay and a wavemeter is included for checking the frequency of the rf receiver.

Shoran may be used as an aid in photographic reconnaisance, aerial mapping for establishing a bombing line, dropping paratroopers and supplies over a pre-selected point, and for precision navigation of aircraft and of ships to the ground stations.

Additional test equipment used in the maintenance of Radio Set AN/CPN-2 includes Voltmeters IS-185 and IS-189, and Power Meter TS-305/UP.



Radio Transmitter T-12/CPN-2

POWER INPUT	1200 WATTS, 115 VOLTS, 400 CPS; 400 WATTS, 24 VOLTS, D.C.
POWER OUTPUT	30 KW (PEAK)
FREQUENCY	290 TO 330 MCS (TRANSMITTER), 220 to 330 MCS (RECEIVER)
TYPE OF SIGNAL	PULSE
PULSE LENGTH	0.55 MICROSECONDS
PRF	930 TO 9300 CPS
RANGE	AIRCRAFT AT 40,000', 280 MILES
OPERATORS	TWO

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
5	3E29	2	705 A
1	5X3GT	1	6E5
13	6AC7	7	6AG5
3	6AG7	1	2X2
3	5R4GY	1	3BP1
5	6H6	2	6V6GT/G
6	6J6	1	OD3/VR-150
9	6SN7GT		

Radio set AN/CPN-2 should be placed on the highest terraine available and away from surrounding hills or buildings.

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Complete installation of Vehicular Mounting Kit for Radio Set AN/CPN-2.

RADIO SET AN/CPN-2

TOTAL WEIGHT 1163 LBS

Component	Nomenclature	Size	Weight
Transmitter	T-12/CPN-2	26" x 20" x 41"	209 Lbs.
Monitor	ID-18/CPN-2 with receiver	26" x 20" x 22"	98 Lbs.
Antenna Mast & Reflector	AN-28/CPN-2	12" x 9" x 144"	191 Lbs.
Antenna Bed			78 Lbs.
Mast Accessories		19" x 44" x 14"	195 Lbs.
2 Homelite Power Type HRU-AD	PU-4/CPN-2	17" x 35" x 21"	140 Lbs.
2 Gas Cans in case packed for shipment		13" x 14" x 29"	49 Lbs. (Ea.)

Radio Set AN/CPN-3, is an air transportable radar beacon for ground installation, designed to provide range, direction and identification for the homing of planes equipped with search radars. 10 cm band.

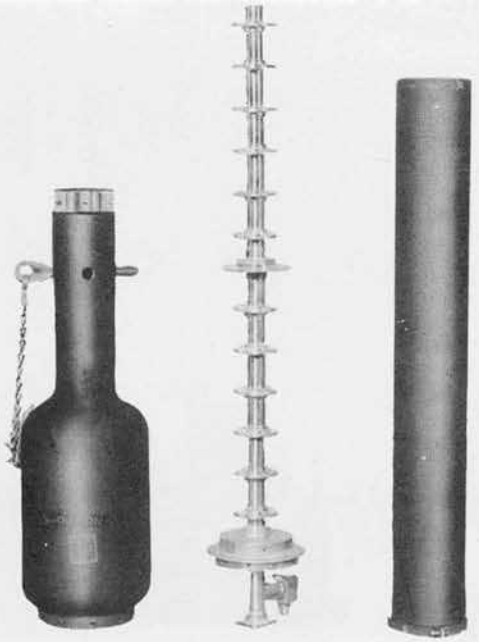
When attempting to home on this equipment, the aircraft equipped with airborne search equipment switches from radar "search" to "beacon" position. The signals from the aircraft, when received at the beacon, actuate the beacon transmitter, causing a group of coded pulse signals to be generated and transmitted to the aircraft where they appear as echoes on the indicator of the radar equipment. The distinctive keying or pulse grouping of the beacon signals identifies the beacon to the homing aircraft.

Performance, in general, has been good, and these beacons are in operational field and training use. In the British Isles, the beacons are operated in pairs, one automatically being put into operation by the failure of the other. An over interrogation gate and local interference eliminator have been incorporated in the system.

This equipment uses separate receiving and transmitting antennas; each a linear array of six elements of three horizontal dipoles, curved and equally spaced about a point.

It is expected that Radio Set AN/CPN-3 will be replaced by Radio Set AN/CPN-8.

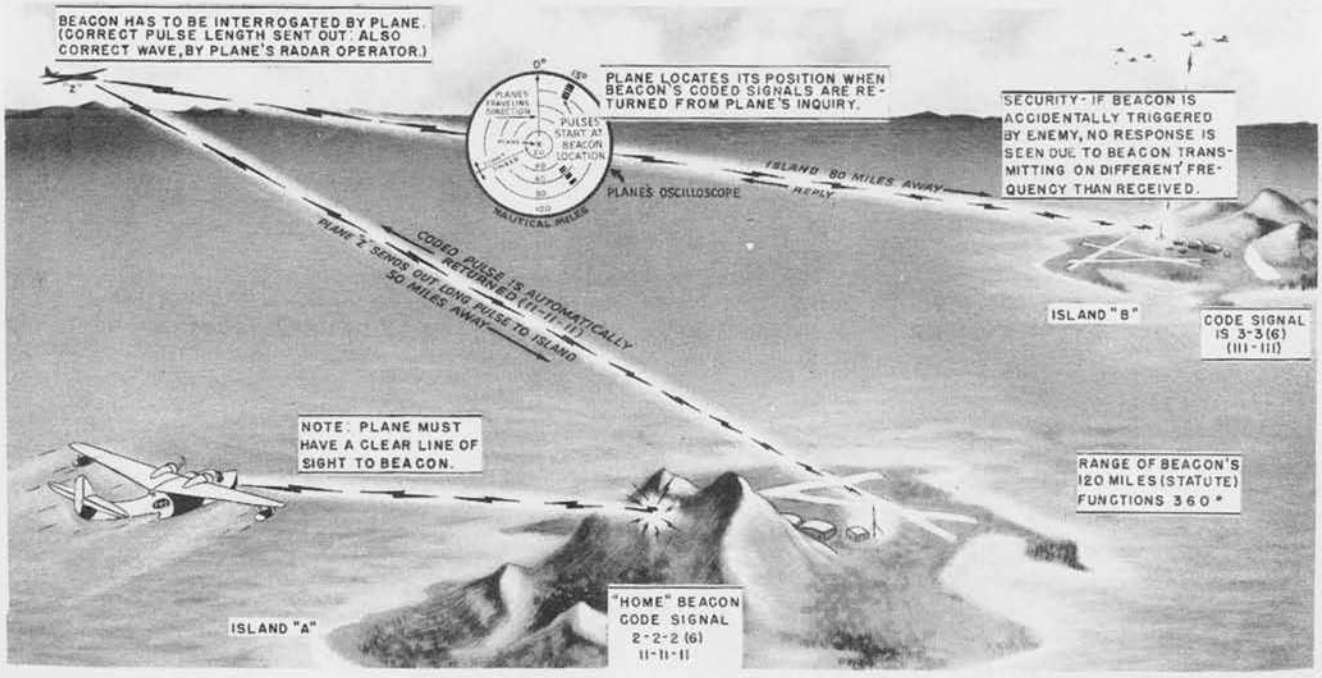
Test equipment required in the maintenance and tuning of this equipment includes Voltmeter IS-189, Test Set TS-14/AP, Synchroscope TS-28/APN, Phantom Antenna and Attenuator TS-74/UPM, Voltage Divider TS-89/AP, Wavemeter TS-111/CP.



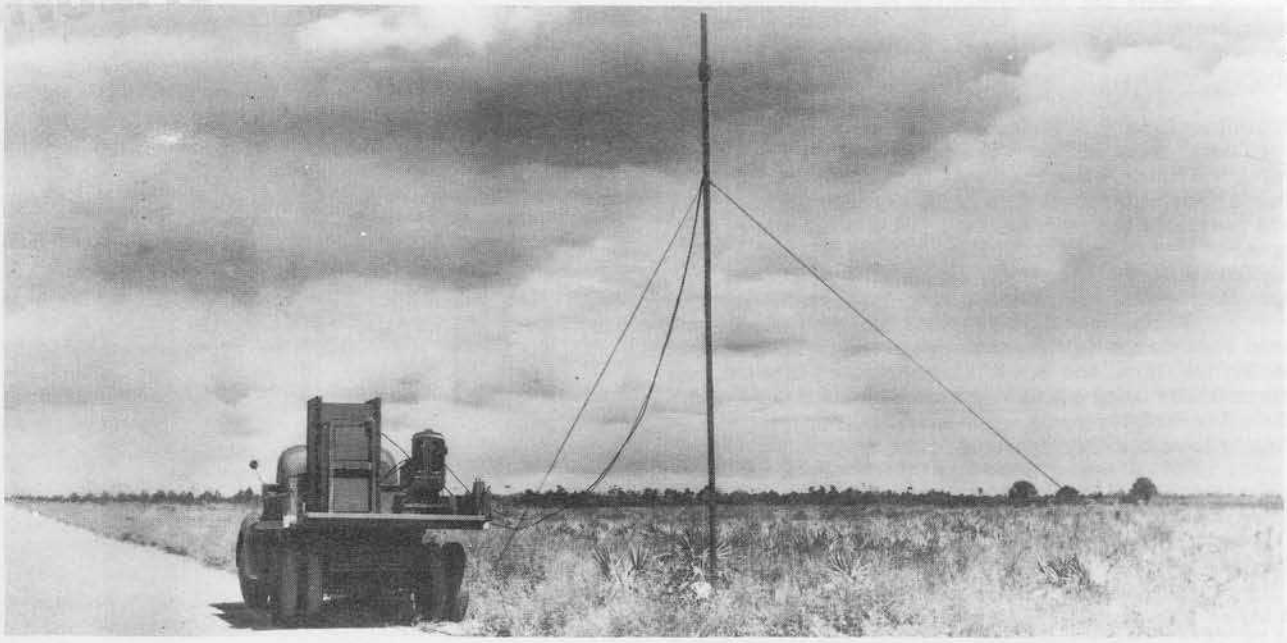
Mast Head AS-9/CPN-3

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
2	417A	1	VR-150-30
3	5U4G	1	2AP1
2	5Y3GT	1	6X5GT
8	6AC7	1	2J37
1	6H6	2	304TH
3	6L6G	1	829
4	6SJ7GT	2	1616
17	6SN7GT	2	8020
1	6Y6G	2	VR-90-30
1	VR-105-30	2	6AG7

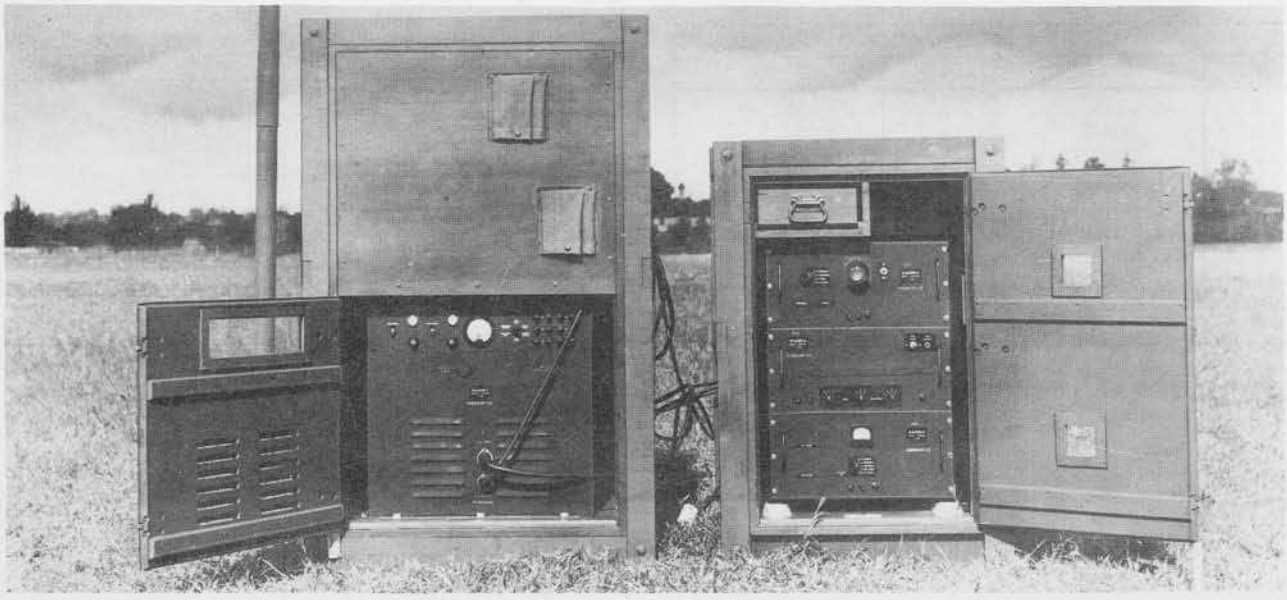
POWER INPUT	1.7 KW @ 115 VOLTS
POWER OUTPUT	10 KW (PEAK)
FREQUENCY	TRANS. 3256 MC. REC. 3267 - 3333 MC
TYPE OF SIGNAL	CODED PULSE
TYPE OF PRESENTATION	RANGE CODED DISPLAY ON RADAR SCREEN
DATA SUPPLIED (TO AIRBORNE SET)	BEACON IDENTIFICATION, RANGE AND AZIMUTH FROM BEACON
MAXIMUM RANGE	LINE OF SIGHT TO 100 MI.
PULSE LENGTH	0.5 MICROSECONDS



Radio Set AN/CPN-3 is an air transportable radar beacon designed to provide range, direction and identification for the homing of 10 cm band ASV radar equipped aircraft.



Radio Set AN/CPN-3 in rear of truck.



Radio Set AN/CPN-3 front view, doors of housings open.

RADIO SET AN/CPN-3 TOTAL WEIGHT 1400 LBS.

Component	Nomenclature	Size	Weight
Radio Receiver	R-11/CPN-3	8" x 18" x 13"	53 Lbs.
Coder	KY-1/CPN-3	8" x 19" x 13"	40 Lbs.
Monitor	ID-13/CPN-3	8" x 19" x 13"	27 Lbs.
Radio Transmitter	T-8/CPN-3		
Power Supply	PP-8/CPN-3		
Mast Head	AS-9/CPN-3	43" x 4" diam.	
Antenna Support	AB-2/CPN-3 includes Mast Head 20' High		127 Lbs.

and includes plugs cable adapters etc.

Radio Set AN/CPN-6, an air transportable coded beacon for ground installation, provides range, direction and identification for the guidance of aircraft and is similar to Radio Set AN/CPN-3 but operates on a higher frequency.

This equipment is a homing beacon which, when used in conjunction with suitable airborne radar interrogator-responsor equipment, will aid aircraft in navigating to a designated spot on the ground.

When attempting to home on this beacon an aircraft equipped with airborne interrogation equipment flies toward the beacon with the interrogator operating. Signals from the aircraft, when received at the beacon actuate the beacon transmitter, causing a coded group of pulse signals to be generated which are transmitted to the aircraft, where they appear as echoes on the indicator of the interrogator-responsor equipment. The distinctive keying or pulse grouping of the beacon signals identifies the beacon to the homing aircraft. The discriminator accepts 2 to 5 microseconds interrogating pulses, rejecting pulses shorter than 2 microseconds or longer than 5 microseconds. A selection of 56 codes are available in each transmitter.

This equipment has a linear array of slotted wave guide elements, 12 for the receiver and 12 for the transmitter. The pattern is uniform in azimuth, 3 db down at 5 degrees above or below the horizontal. There is a special two-element broad beam antenna for shipboard installation.

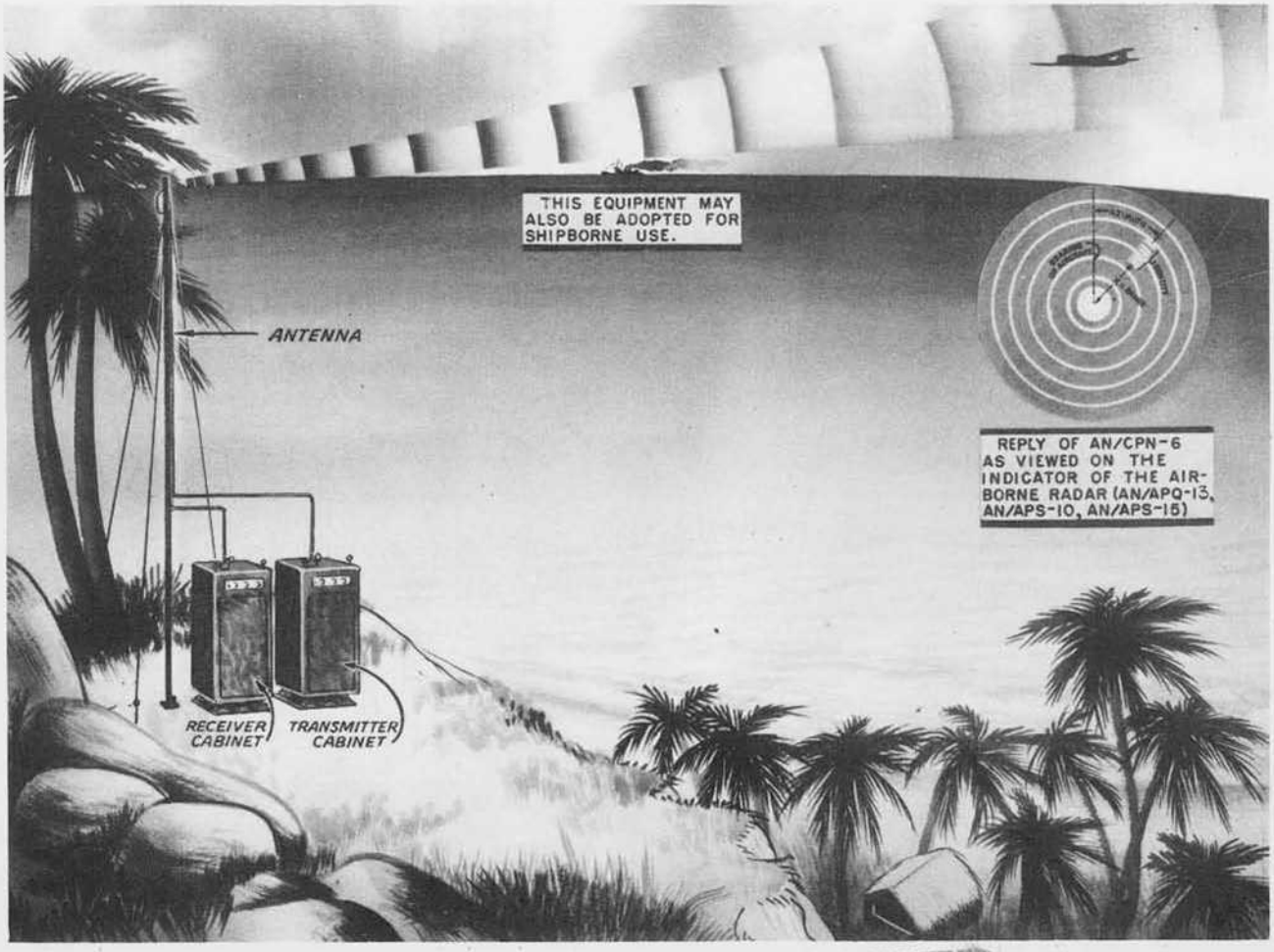
Power is obtained from a 115/230 volt, 50-70 cps source with a power consumption of 2 kilowatts and a peak power output of 25 to 50 kilowatts. Maximum range of the equipment is 100 miles.

Test equipment required for the maintenance of Radio Set AN/CPN-6 includes Detector Amplifier Assembly AN/UPA-1, Voltmeter IS-189, Synchroscope TS-28/UPM, Voltage Divider TS-89/AP, Radio Frequency Test Load TS-108/AP, Test Set TS-120/UP.

AAF requirements as of 1 February 1945 were 240 for the calendar year 1945 and 60 for 1946.

POWER INPUT	2 KW @ 115/230 VOLTS 50-70 CPS
POWER OUTPUT	25-50 KW (PEAK)
FREQUENCY	TRANSMITTER 9310 MC; RECEIVER 9320-9430 MC
TYPE OF SIGNAL	RANGE CODED
RECEIVER SENSITIVITY	0.0004 MICROWATTS
RANGE	100 MILES
PULSE LENGTH	1/2 MICROSECOND

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	723B	5	OD3/VR-150
14	6AC7	1	6AG7
7	6SN7GT	1	815
7	6SL7GT	2	5D21
6	5R4GY	1	2J48
3	6B4G	2	705A
2	6SJ7GT	2	IN23
1	OC3/VR-105		



Radio Set AN/CPN-6 installed as ground station for homing identification and guidance of aircraft.

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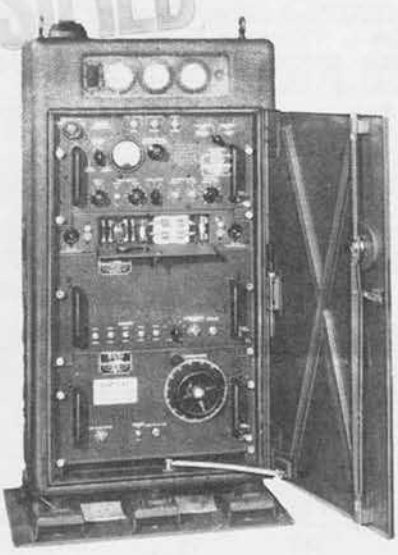
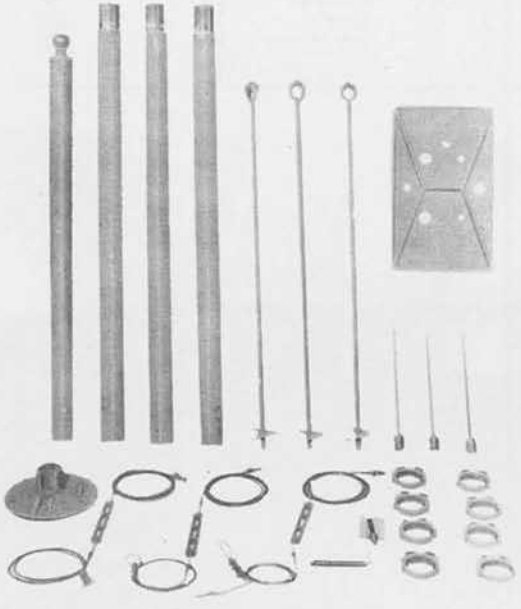
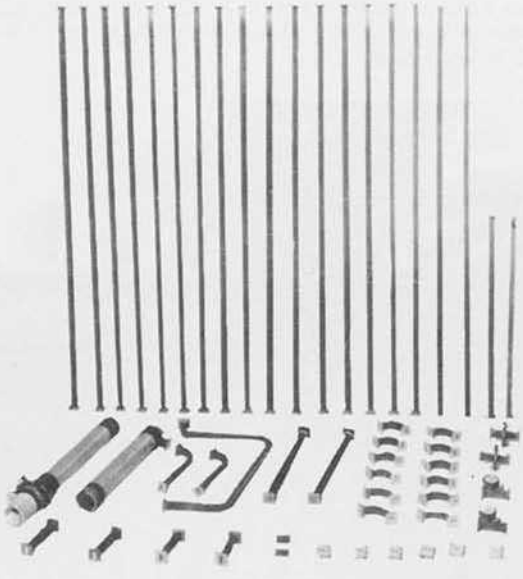


Receiver Cabinet

Transmitter Cabinet



Antenna Mast Assembly (AB-42/CPN-6)



Antenna Assembly (AS-119/CPN-6)

RADIO SET AN/CPN-6

TOTAL WEIGHT 1800 LBS.

Nomenclature	Component	Size	Weight
Antenna Assembly	AS-119/CPN-6		177 Lbs.
Antenna Mast Assembly	AB-42/CPN-6	20" x 4" dia.	193 Lbs.
Transmitter-Modulator	T-79/CPN-6	17" x 15" x 20"	115 Lbs.
Radar Receiver	R-88/CPN-6	11" x 16" x 20"	45 Lbs.
Coder	KY-6/CPN-6	11" x 16" x 20"	57 Lbs.
Modulator Driver	AM-44/CPN-6	11" x 16" x 20"	74 Lbs.
Discriminator	F-12/CPN-6		45 Lbs.
Transmitter Power Supply	PP-93/CPN-6	18" x 17" x 12"	143 Lbs.
Auto Transformer	MX-202/CPN-6	12" x 8" x 10"	66 Lbs.
Receiver Cabinet	CY-170/CPN-6	18" x 50" x 24"	265 Lbs.
Transmitter Cabinet	CY-169/CPN-6	18" x 50" x 24"	265 Lbs.

and includes set of connecting and interconneting cords and test accessories kit.

Radio Set AN/CPN - 7, sometimes known as "BABS", is a modification of the airborne IFF Radio Set SCR-695 to form a ground, air-transportable, radar beacon transponder to provide a means of landing aircraft equipped with Radio Set SCR-729 or Radio Set AN/APN-2 under conditions of poor visibility and low ceiling. Use of the equipment will permit approaches in line with and to within one mile of the runway and to an altitude of 200 feet, the actual landing being conducted visually.

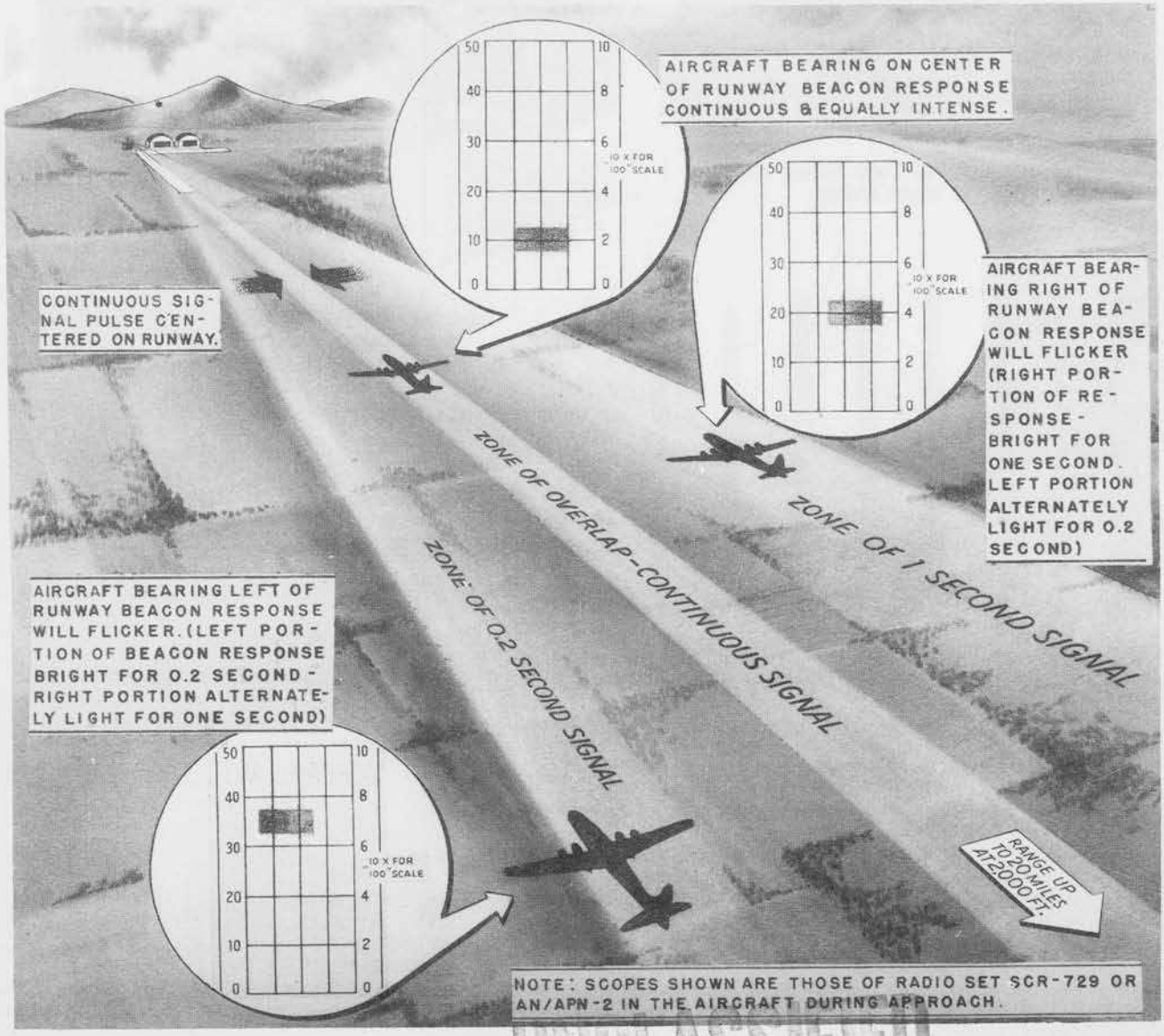
When interrogated by an interrogator-responsor such as SCR-729, the BABS beacon transmits a beam slightly off the right of the runway (as viewed from the approaching aircraft) for approximately 1 second, and then another to the left of the runway for about 0.2 seconds. When exactly on the runway, the approaching aircraft is in a field of constant signal strength and receives a signal of unchanging amplitude, this manifesting itself as a steady signal (without flicker) on the airborne indicator. If the airplane is to the right or to the left of the runway, the amplitude of the signal will be different and an amplitude flicker will be observed on the right or left of the indicator corresponding to the side of the runway that the airplane may be approaching.

This equipment requires a 110 volts 60 cycle power source.

Test equipment used in the maintenance of this equipment includes Test Equipment IE-46.

POWER INPUT	95-160 WATTS, 110 V, 60 CPS
POWER OUTPUT	10 WATTS
FREQUENCY	RECEIVER 171-181 MC. TRANSMITTER 168.5 - 178.5 MC.
TYPE OF SIGNAL	PULSE
RANGE	20 MI. AT 2000 FT.

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	5U4G	3	6H6
3	7193	6	6SH7



Radio Set AN/CPN-7 (BABS) is air transportable radar beacon transponder which provides means of landing aircraft equipped with Radio Set SCR-729 or Radio Set AN/APN-2

AN/CPN-7

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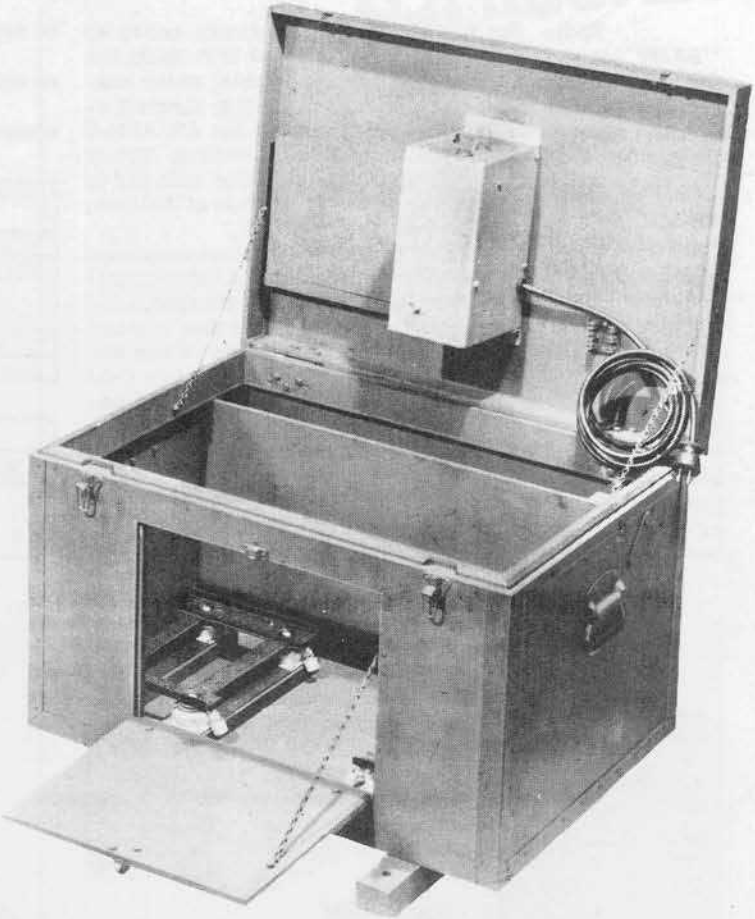
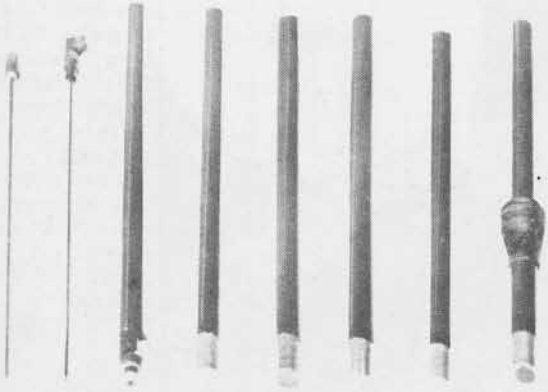
Case CY-47/CPN-7 with Power Unit, Onan Model 358RS

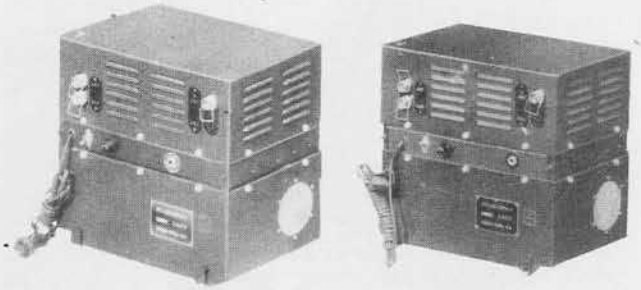


Case CY-46/CPN-7 with Mountings FT-247-F and Switching Assembly SA-10/CPN-7



Antenna AT-31/CPN-7

Antenna Mast AB-3/TPN-1



Receivers-Transmitters RT-29/CPN-7

RADIO SET AN/CPN-7

TOTAL WEIGHT 200 LBS.

Component	Nomenclature	Size	Weight
Case	CY-46/CPN-7	28'' x 20'' x 18''	45 Lbs.
Receiver-Transmitter	RT-29/CPN-7	13'' x 14'' x 10''	40 Lbs.
Switching Assembly	SA-10/CPN-7	8'' x 3'' x 13''	11 Lbs.
Antenna	AT-31/CPN-7	Length 18''	
Antenna Mast	AB-3/TPN-1	Length 20' Diam. 2''	7 Lbs.
Case	CY-47/CPN-7	28'' x 20'' x 18''	45 Lbs
Onan Power Plant	#358RS		
Antenna System	AS-48/CPN-7	8'' x 8'' x 11'' Height 27''	
Mounting	FT-242-F		

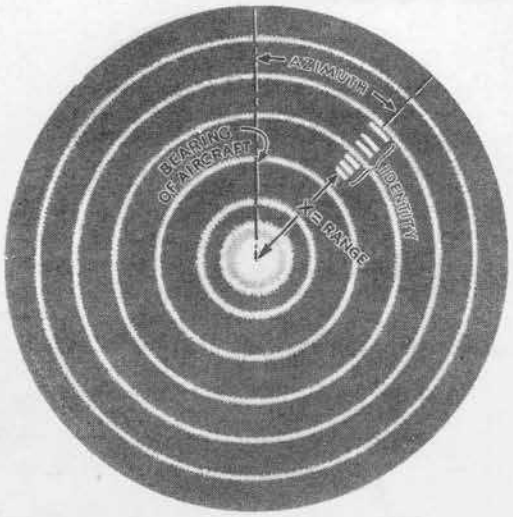
Radio Set AN/CPN-8, an air transportable coded beacon for ground installations is similar to Radio Set AN/CPN-3 except that AN/CPN-8 is much smaller. Designed to respond to 10 cm band radar sets having provision for beacon interrogation, provides range, direction and identification for the guidance of planes.

When attempting to home on this beacon, an aircraft equipped with airborne interrogation equipment flies towards the beacon with the interrogator operating. The signals from the aircraft, when received at the beacon actuate the beacon transmitter, causing a group of coded pulse signals to be generated and transmitted to the aircraft where they appear as echoes on the indicator of the interrogator-responser equipment. The distinctive keying or pulse grouping of the beacon signals identifies the beacon to the homing aircraft. The discriminator rejects pulses shorter than 2 micro-seconds or longer than 4 micro-seconds. Coding is provided by means of 6 code pips, making 50 codes possible.

The antenna consists of a linear array of vertically stacked triple dipoles, 14 in transmitting and 14 in receiving antennas. It is omnidirectional in azimuth with 7 degree vertical half power beam width, mounted on a mast so that total height is 25 feet. Usual polarization is horizontal but vertically polarized antennas are available.

Radio Set AN/CPN-8 transmits coded pulses on 3256 mc. and receives in the frequency range of 3267 to 3333 mc. The equipment operates on 100-130 volts or 200-260 volts, 50-70 cycles. An input of 1300 watts produces a peak power output of 2.25 kw or more. The maximum range of the equipment is more than 100 miles.

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
2	5R4GY	3	3B24
11	6AC7	4	6X5GT/G
3	6AG7	1	715B
2	6B4G	2	807
1	6SJ7	2	OD3/VR-150
7	6SL7GT	1	5CP1
10	6SN7GT	2	2X2
3	OC3/VR-105	2	6H6
1	2J38	1	446B or 2C40

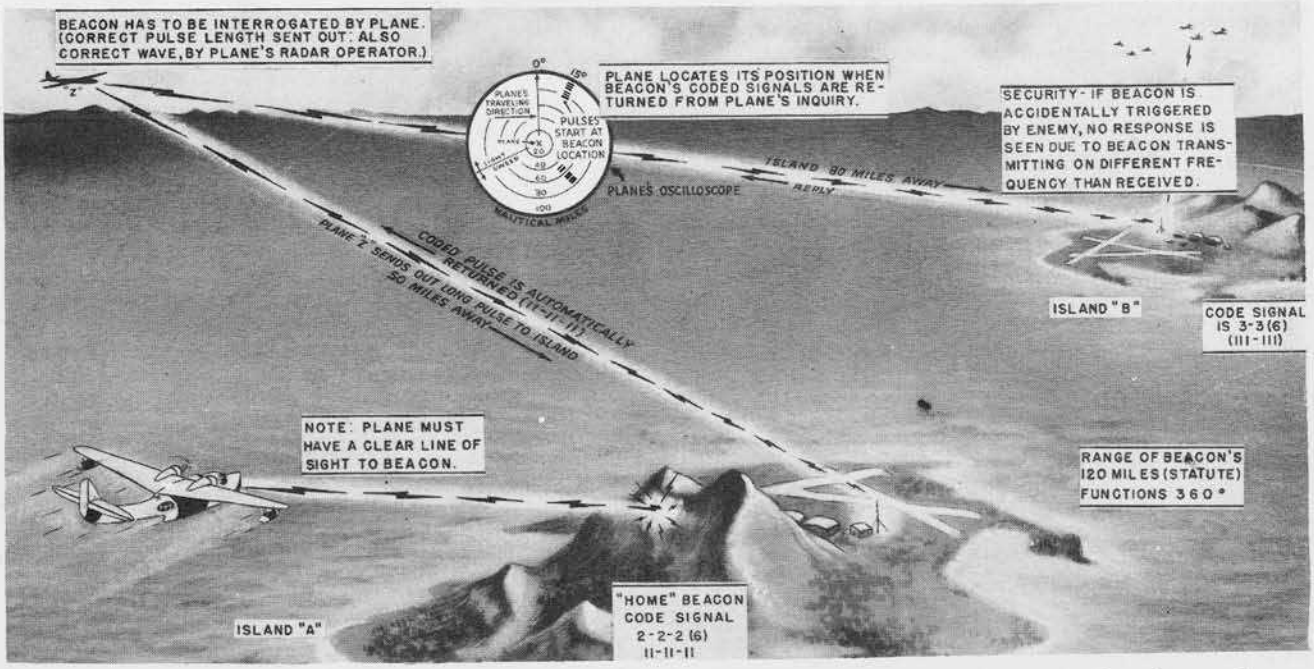


Airborne Equipment Records Beacon Range (distance from center of scope to first pip), azimuth (position on scope), and identity (number & arrangement of pips)

Test equipment required for the maintenance of Radio Set AN/CPN-8 includes: Wavemeter TS-111/CP, Voltage Divider TS-89/AP, Phantom Antenna and Attenuator TS-74/UPM, Antenna Dipole Assy. AS-23/AP, Power Meter TS-125/AP, and Voltmeter IS-189.

Army Air Forces requirements as of 1 February were 338 for the calendar year 1945 and 40 for 1946.

POWER INPUT	1.3 KW @ 100-130 OR 200-260 VOLTS
POWER OUTPUT	2.25 KW (PEAK)
FREQUENCY	TRANSMITTER 3256 MC RECEIVER 3267-3333 MC
TYPE OF SIGNAL	CODED PULSE
RANGE	100 MILES
PULSE LENGTH	.5 MICRO SECONDS



Radio Set AN/CPN - 8 is an Air Transportable Radar Beacon designed to provide range, direction, and identification for homing 10 cm band radar equipped aircraft.

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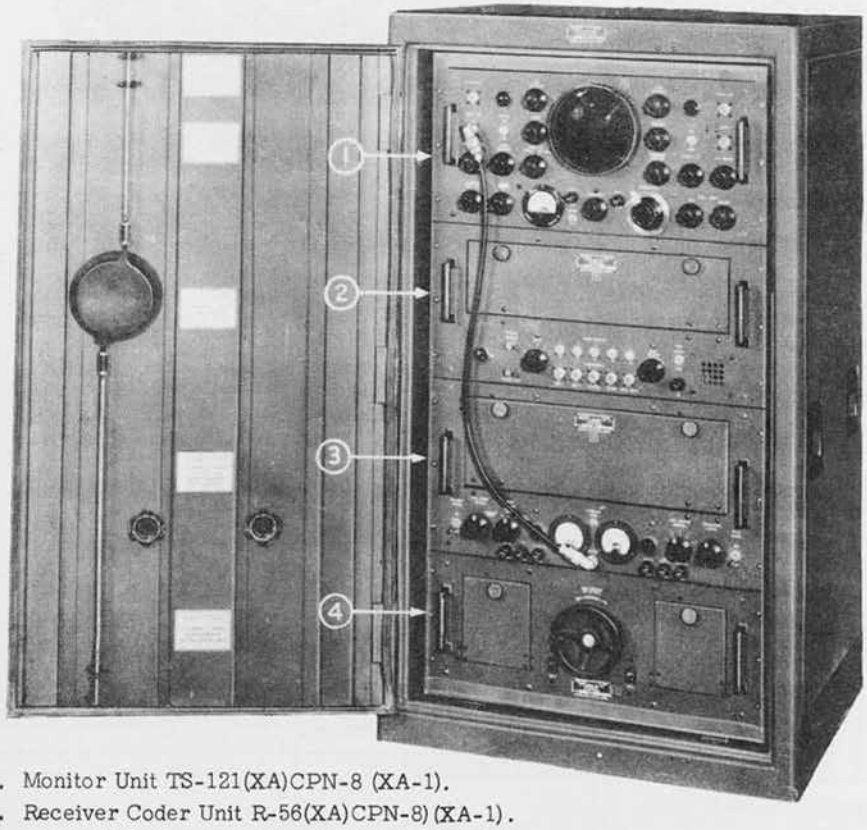


1. Monitor Unit TS-121(XA)CPN-8 (XA-1).
2. Receiver Coder Unit R-56(XA)CPN-8)(XA-1).
3. Modulator & Transmitter Unit T-50(XA)CPN-8 (XA-1)
4. Voltage Control Unit CN-11(XA) CPN-8 (XA-1)

RADIO SET AN/CPN-8

TOTAL WEIGHT 1900 LBS.

Component	Nomenclature	Size	Weight
Receiver Coder Unit	R-56/CPN-8	10" x 17" x 22"	73 Lbs.
Transmitter and Modulator	T-50/CPN-8	11" x 17 ' x 22"	110 Lbs.
Voltage Control Unit	CN-11/CPN-8	8" x 17" x 22"	64 Lbs.
Monitor Unit	TS-121/CPN-8	10" x 17" x 22"	90 Lbs.
Mast Head	AS-72/CPN-8	5" x 4" dia.	25 Lbs.
Mast Head	AS-80/CPN-8	6" x 5" dia.	30 Lbs.
Case	CY-68/CPN-8	23" x 27" x 46"	188 Lbs.
Antenna Support	AB-18/CPN-8	20' x 4" dia.	90 Lbs.
Case	CY-166/CPN-8	15" x 17" x 68"	110 Lbs
Case (2 Operating spares)	CY-248/CPN-8	32" x 26" x 20"	450 Lbs.
Transmission Line	CG-172/CPN-8	44' long	25 Lbs.
Transmission Line	CG-173/CPN-8	48' long	25 Lbs.
Cord	CG-119/U		

and includes connecting and interconnecting cords

Radar Sets AN/CPN-11 and AN/CPN-12 comprise an air-transportable ground Loran chain which provides a signal for position "fixing" by aircraft equipped with Radar Set AN/APN-4 or Radar Set AN/APN-9. In operation, two AN/CPN-11's are used as "slave" stations and are triggered by the double master station AN/CPN-12.

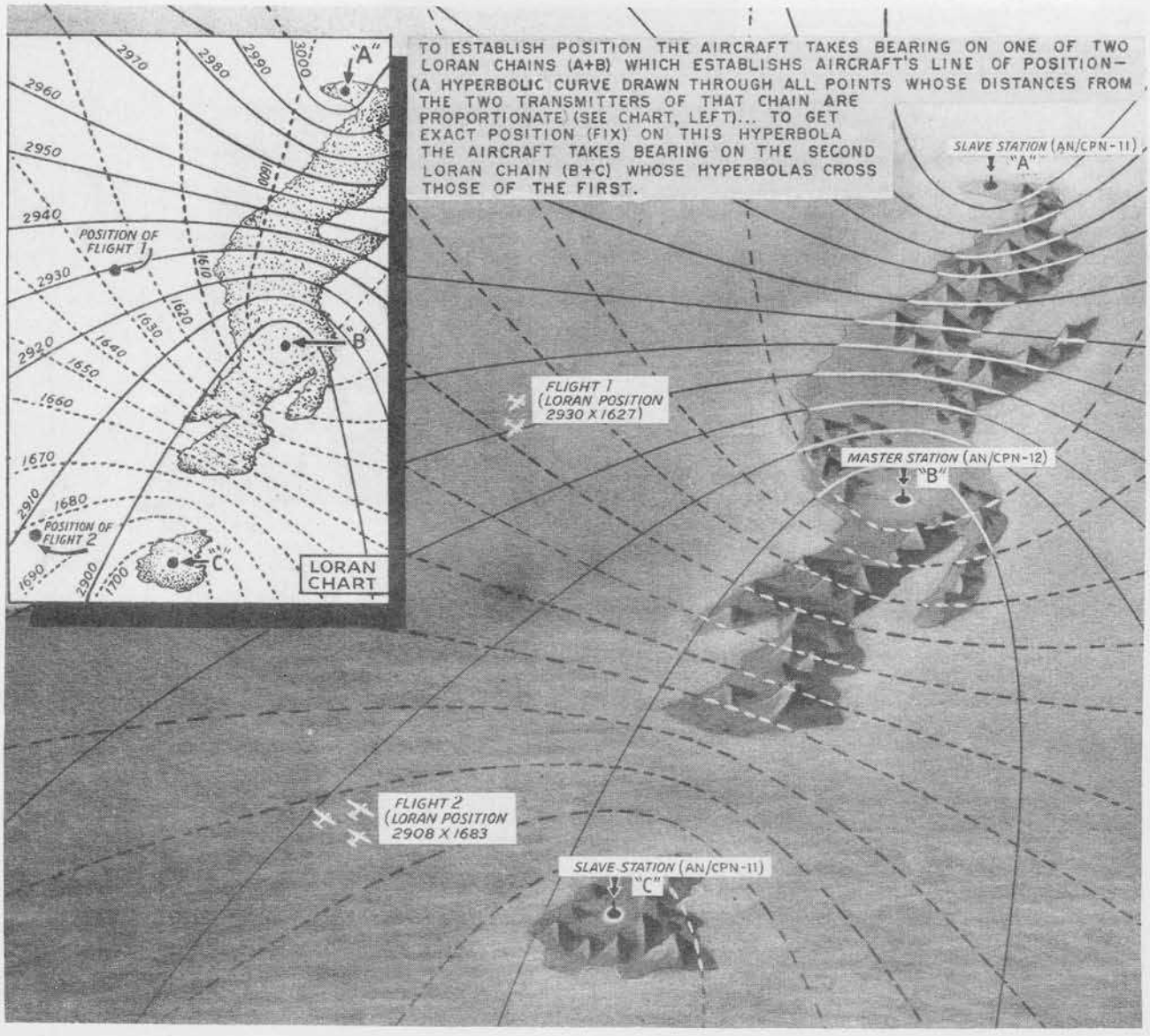
This is lightweight equipment intended for use in operations where time will not permit the installation of heavier conventional fixed or mobile Loran equipment, and in other installations where the latter equipment is considered impracticable for other reasons.

The standard airborne Loran receiving equipment AN/APN-4 is used as the basic timing device. Each station includes 100 percent spare components with 200 percent spare power supply components. Equipment is designed for continuous 24 hours per day operation for at least three months. Components are interchangeable in AN/CPN-11 and AN/CPN-12.

Test equipment required for the operation and maintenance of AN/CPN-11 includes General Radio Wave Meter (566A), Simpson Test Meter (IS-189), Oscilloscope 3" Dumont 224A, Signal Generator I-72, and Hickok Model 110.

POWER INPUT	115 VOLTS, 400 CYCLES
POWER OUTPUT	25 KW. (PEAK)
FREQUENCY	1700 - 2000 KC.
TYPE OF SIGNAL	PULSE

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
2	5D21	18	6H6GT
2	807	20	6SL7GT
6	3B24	2	2050
50	6SN7GT	2	5CP1
6	5U4G	2	6V6GT
4	OC3/VR-105	4	2X2
10	6B4G	2	6SA7/GT
4	6SJ7GT	8	6SK7GT/G
12	6AC7		



Radar Sets AN/CPN-11 and AN/CPN-12 constitute an air transportable ground Loran chain which provides properly equipped aircraft with means whereby they may obtain a fix of position at any time within the range of 200 miles by day and 400 miles at night.

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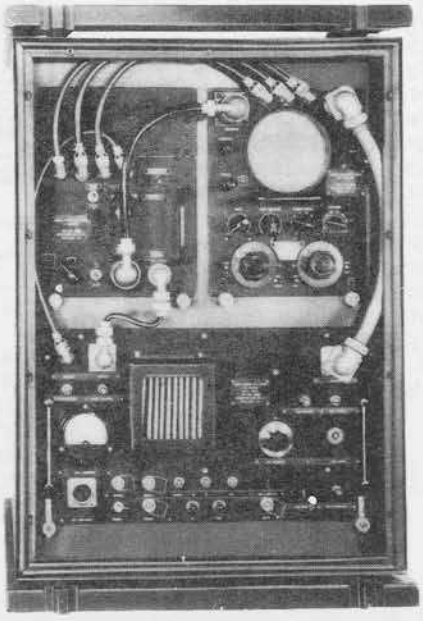
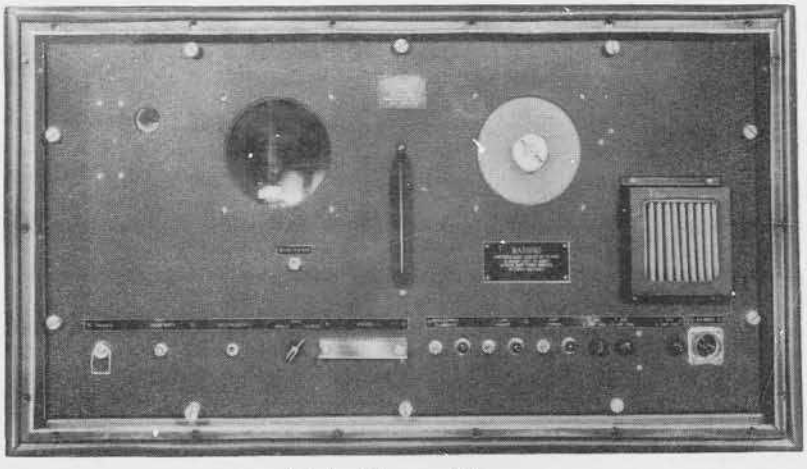


Timer Cabinet



Radar Transmitter

RADAR SETS AN/CPN-11

TOTAL WEIGHT 13,000 LBS.

Component	Nomenclature	Size	Weight
Antenna Assembly	AS-130/CPN		
Ground Kit	MX-209/CPN		600 Lbs.
Case	CY-173/CPN (2 each)	29" x 21" x 24"	
Radar Transmitter	T-82/CPN-(2 each)	24" x 24" x 40"	101 Lbs.
Synchronizer	SN-16/CPN (2 each)	10" x 24" x 29"	50 Lbs.
Case	CY-187/CPN (2 each)	30" x 30" x 18"	62 Lbs.
Antenna Mast	AB-46/C (4 each)	Length 60'	750 Lbs.
Power Unit	PU-6/TPS-1 (4 each)	20" x 20" x 30"	225 Lbs.
Indicator	ID-102/CPN (2 each)	9" x 12" x 20"	32 Lbs.
Junction Box	J-111/CPN (2 each)	2" x 3" x 15"	5 Lbs.
Junction Box	J-110/CPN (3 each)	2" x 3" x 15"	5 Lbs.
Timer Cabinet Assembly	CY-249/CPN (2 each)	21" x 24" x 29"	58 Lbs.
Antenna Coupling Unit	CU-76/CPN (2 each)	10" x 15" x 20"	30 Lbs.
Antenna Coupling Unit	CU-77/CPN (2 each)	6" x 6" x 6"	3 Lbs.
Radar Receiver	R-133/CPN (2 each)	9" x 12" x 20"	25 Lbs.

and includes tent, shelter assembly, set of interconnecting cables and fittings including r-f transmission lines and tool equipment set

Radar Sets AN/CPN-12 and AN/CPN-11 comprise an air-transportable ground Loran chain which provides a signal for position "fixing" by aircraft equipped with Radar Set AN/APN-4 or Radar Set AN/APN-9. In operation, two AN/CPN-11's are used as "slave" stations and are triggered by the double master station AN/CPN-12.

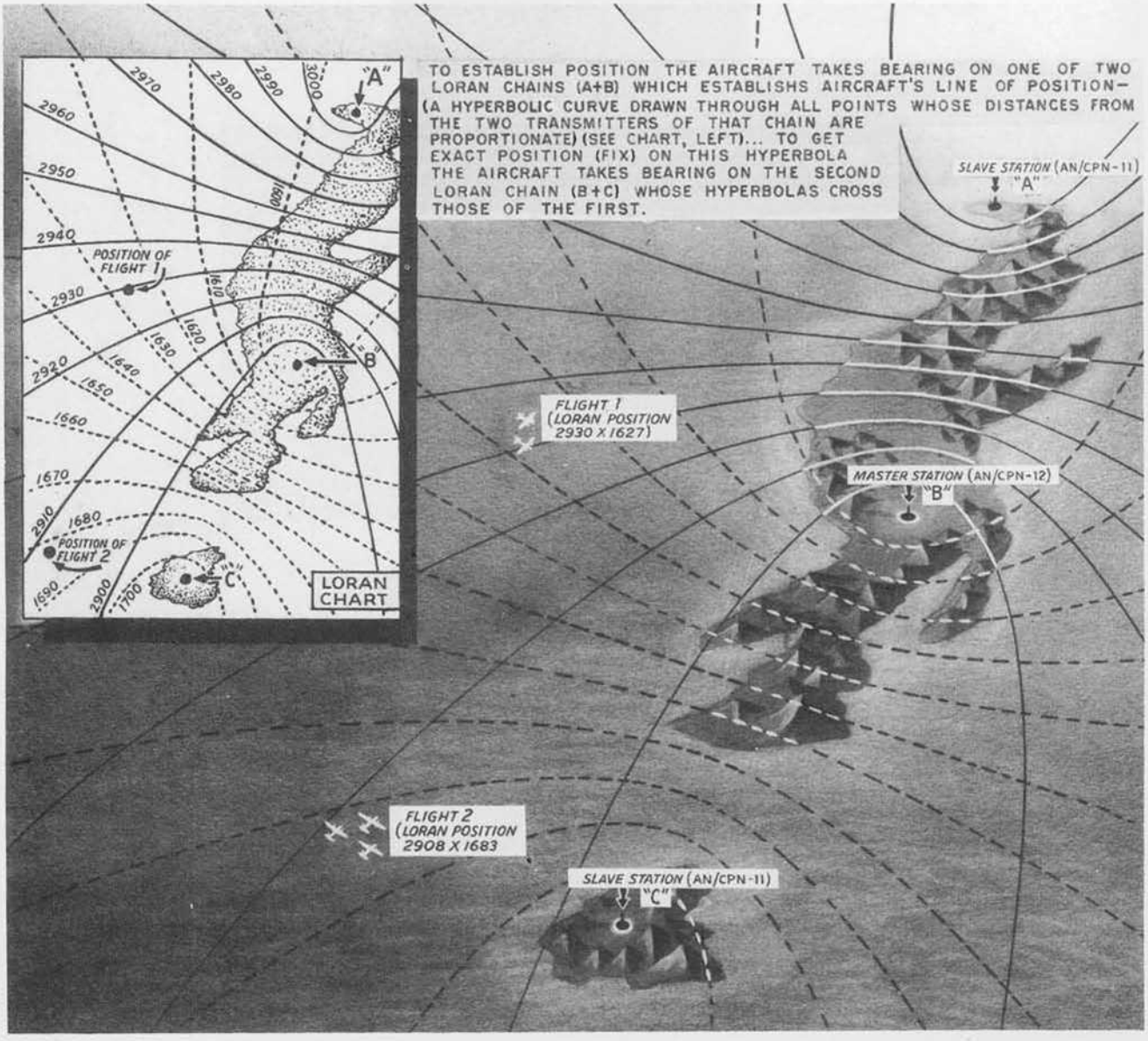
This lightweight equipment is intended for use in operations where time will not permit the installation of heavier conventional fixed or mobile Loran equipment, and in other installations where the latter equipment is considered impracticable for other reasons.

The standard airborne Loran receiving equipment AN/APN-4 is used as the basic timing device. Each station includes 100 percent spare components with 200 percent spare power supply components. Equipment is designed for continuous 24 hours per day operation for at least three months. Components are interchangeable in AN/CPN-11 and AN/CPN-12.

Test equipment required for the operation and maintenance of AN/CPN-12 includes General Radio Wave Meter (566A), Simpson Test Meter (IS-189), Oscilloscope 3" Dumont 224A, Signal Generator I-72, and Hickok Model 110.

POWER INPUT	115 VOLTS, 400 CYCLES
POWER OUTPUT	25 KW. (PEAK)
FREQUENCY	1700 to 2000 KC
TYPE OF SIGNAL	PULSE

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
2	5D21	20	6B4G
2	807	8	6SJ7
6	3B24	4	2050
96	6SN7GT	2	6V6GT/G
10	5U4G	4	5CP1
8	OC-3/VR-105	16	6SK7GT/G
24	6AC7	4	6SA7GT/G
36	6H6GT/G	8	2X2
40	6SL7GT		



Radar Set AN/CPN-12 and AN/CPN-11 constitute an air transportable ground Loran chain which provides properly equipped aircraft with means whereby they may obtain a fix of position at any time within the range of 200 miles by day and 400 miles at night.

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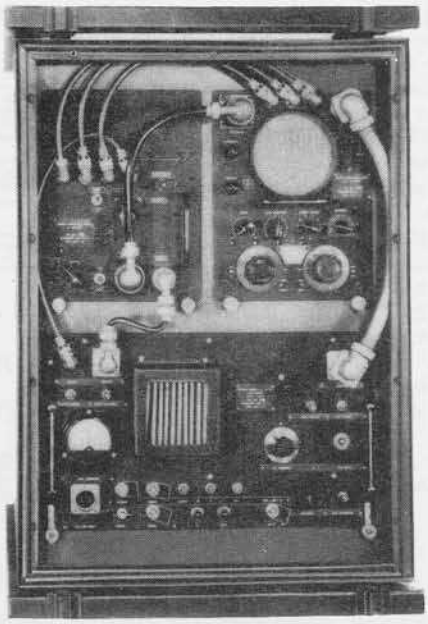
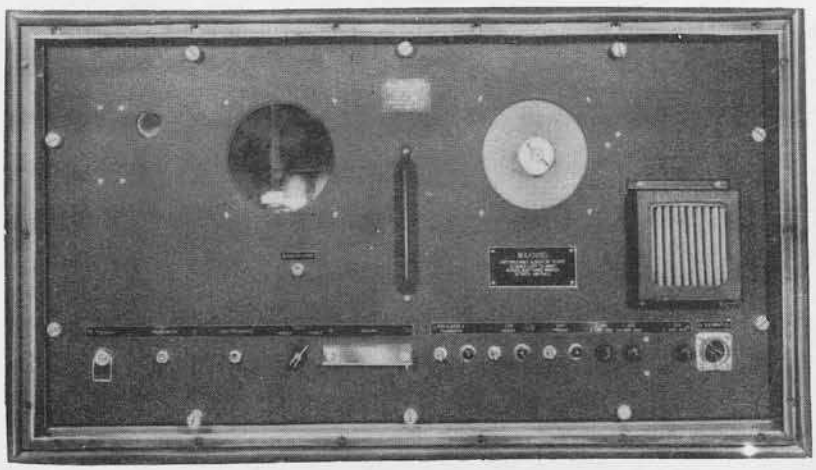


Timer Cabinet



Radar Transmitter

RADAR SET AN/CPN-12

TOTAL WEIGHT 18 000 LBS.

Component	Nomenclature	Size	Weight
Radar Transmitter	T-82/CPN (2 each)	24" x 24" x 40"	101 Lbs.
Synchronizer	SN-16/CPN (4 each)	10" x 24" x 29"	50 Lbs.
Case	CY-187/CPN (2 each)	30" x 30" x 18"	62 Lbs.
Antenna Mast	AB-46/C (4 each)	60' long	750 Lbs.
Power Unit	PU-6/TPS-1 (4 each	20" x 20" x 30"	225 Lbs.
Case	CY-173/CPN (4 each)	29" x 21" x 24"	
Antenna Assembly	AS-130/CPN		
Indicator	ID-102/CPN (4 each)	9" x 12" x 20"	345 Lbs.
Ground Kit	MX-209/CPN		600 Lbs.
Junction Box	J-111/CPN (2 each)	2" x 3" x 15"	5 Lbs.
Junction Box	J-110/CPN (2 each)	2" x 3" x 15"	5 Lbs.
Timer Cabinet Assembly	CY-249/CPN (4 each)	21" x 24" x 29"	20 Lbs.
Junction Box	J-112/CPN (3 each)	2" x 15"	5 Lbs.
Antenna Coupling Unit	CU-76/CPN (2 each)	10" x 15" x 20"	30 Lbs.
Antenna Coupling Unit	CU-77/CPN (2 each)	6" x 6" x 6"	3 Lbs.
Radar Receiver	R-133/CPN (4 each)	9" x 12" x 20"	25 Lbs.

and includes set of interconnecting cables and fittings including r-f transmission line.

AN/CPN-16

(AND AN/CPN-16X)

Radar Beacons AN/CPN-16 and AN/CPN-16X are lightweight, air transportable sea rescue transponders designed to facilitate the location of life rafts by radar equipped searching aircraft. AN/CPN-16 is designed for multiplace rafts while AN/CPN-16X is designed for single-place-raft installation. It operates in conjunction with and provides range and azimuth information to such radars as SCR-521-A, SCR-729-A and AN/APN-12. No special skill is required for the operation of the unit.

In operation this equipment may be automatically interrogated by a searching aircraft, or it may be operated in morse code fashion by the life raft occupant. A monitoring circuit is provided whereby the pilot may search for aircraft in his vacinity and monitor the units transponder action. A continuous operating life of at least 30 hours is expected under most conditions.

The collapsible antenna mast is approximately 59 inches high when extended and is vertically polorized. It is so constructed that it mounts into the life raft socket normally provided for a corner reflector target.

Although the pulse transmitted by AN/CPN-16 is four miles long an experienced scope operator encounters very little difficulty in tracking to a point directly over the raft. The expected range for this beacon is 50 miles against the above radars.

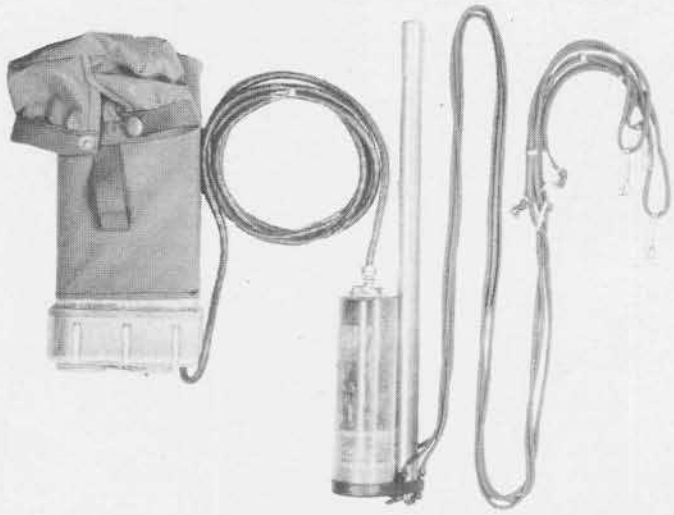
This unit is similar to AN/CPT-2 in application only. It will eventually replace it.

Test Equipment IE-45 is used for the maintenance of AN/CPN-16 and AN/CPN-16X.

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	455A	1	1D8GT

Sea Rescue Beacon Transmitter AN/CPN-16, 16X for use in one-man life rafts.

POWER INPUT	"A" BATTERY; 1.5 VOLTS 200 MA "B" BATTERY; 135 VOLTS
POWER OUTPUT	0.5 WATTS (PEAK)
FREQUENCY	176 MCS.
TYPE OF SIGNAL	PULSE
RANGE	50 MILES
PULSE LENGTH	10 MICROSECONDS (APPROX.)



Components of Radar Beacon AN/CPN-16

RADAR BEACON AN/CPN-16

TOTAL WEIGHT 6 LBS.

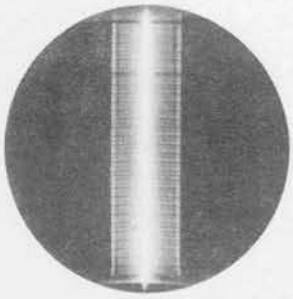
Component	Nomenclature	Size	Weight
Receiver Transmitter	RT-103(XA)CPN	2" x 3" x 15"	1 Lb.
Battery Case	CY-439(XA-3)/CPN-16(XA-2)	10" x 5" x 3"	5 Lbs.

RADAR BEACON AN/CPN-16X

TOTAL WEIGHT 5 LBS.

Component	Nomenclature	Size	Weight
Receiver Transmitter	RT-103(XA)CPN	2" x 3" x 15"	1 Lb.
Battery Case	CY-440(XA-1)/CPN-16(XA-1)	10" x 5" x 2"	4 Lbs.

AN/CPT-2



Radar Set AN/CPT-2 is a lightweight, air transportable, sea rescue beacon intended for use by a fighter pilot forced down on over-water flight. Used in one-man life rafts, this set enables searching aircraft, equipped with radar sets such as SCR-521, SCR-729 and AN/APA-12, to locate the raft. No special skill is required for operation.

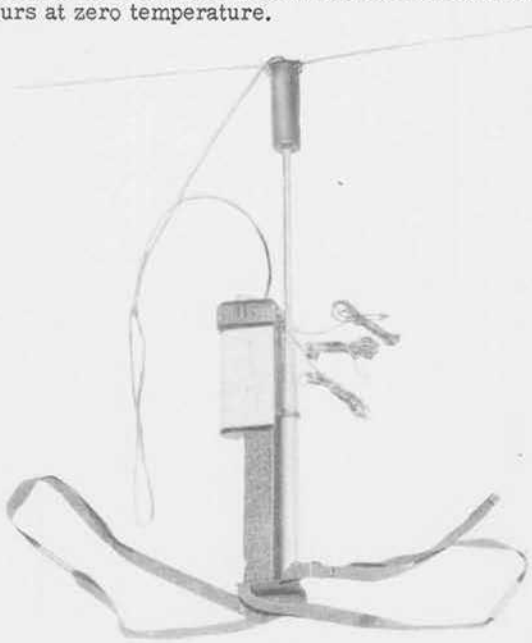
The above oscilloscope pattern illustrates how a typical signal from AN/CPT-2 will appear on the radar receiver-indicator located in the searching aircraft.

An improved higher-powered version of this sea rescue beacon for single or multiplace rafts is now under development. It will operate on the crossband principle and contain such additional features as monitoring facilities and coded output signals. See AN/CPN-16 for further information.

AN/CPT-2 will transmit continuously at 176 mc. with a range of approximately 12 to 18 miles, permitting direction finding (DF) bearings to be taken on the equipment. Range of the aircraft from the beacon cannot be determined directly although a rough idea of range is indicated by the signal intensity.

Frequency stability is achieved by careful construction of the transmitter circuits and by choosing the batteries so the plate voltage does not vary appreciably during the life of the beacon. Pulse rate is 45 kc, plus or minus 5 kc. Frequency is adjustable from 166 to 186 mcs.

Continuous operating life of the beacon is at least 30 hours at normal temperatures, decreasing to about 12 hours at zero temperature.



Radar Set AN/CPT-2 (XA-3)

Radio Set AN/CPT-2 is installed in life raft after being forced down and operates automatically.

After the signal is picked up, the searching aircraft is turned to give equal strength on both sides of the screen. A sudden decrease in signal strength indicates passing directly over the raft.

Power source for Radar Set AN/CPT-2 is two 1-1/2 volt "A" batteries and one 93-1/2 volt "B" battery.

This set is similar in purpose to the British T-3180 (Walter) but is improved mechanically and is designed for American production techniques.

Test equipment required for use in maintenance and operation of the equipment includes Test Equipment IE-56-A and Signal Generator BC-906-C or D.

AAF requirements as of 1 February 1945 were 5,000 for the calendar year 1945.

POWER SOURCE	BATTERY
POWER OUTPUT	100 MILLI WATTS
FREQUENCY	176 MC
TYPE OF SIGNAL	PULSE
ANTENNA	2 QUARTER-WAVE DIPOLES
RANGE	12-18 MILES

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	3A5		

RADAR SET AN/CPT-2

TOTAL WEIGHT 4 LBS.

Component	Nomenclature	Size	Weight
Beacon and Antenna		2" x 15" x 5"	3 Lbs.
Battery (2 ea.)	BA-30		*
Battery	BA-38-R		*

* Weight less than one pound.

July 1945

Beacon Transmitter Receiver AN/TPN-1 is an air transportable ground beacon responder consisting of a modified SCR-695, power supply, and antenna. This device when in operation, and only when interrogated by the proper airborne equipment, emits a radio signal which, when interpreted by suitable apparatus, provides navigational information for homing purposes.

This equipment is used in conjunction with Radio Set AN/APN-2 by the Troop Carrier Command for marking glider landing and drop zones.

Beacon Transmitter Receiver AN/TPN-1 (Big Eureka) weighs 150 pounds. It can be set up in about half an hour and requires no operator once it is turned on.

The equipment is operated from a 24-volt battery with a power input of 90 watts producing a power output of 15 watts over a frequency range of 214 to 234 mc. Its operating range is approximately 90 miles.

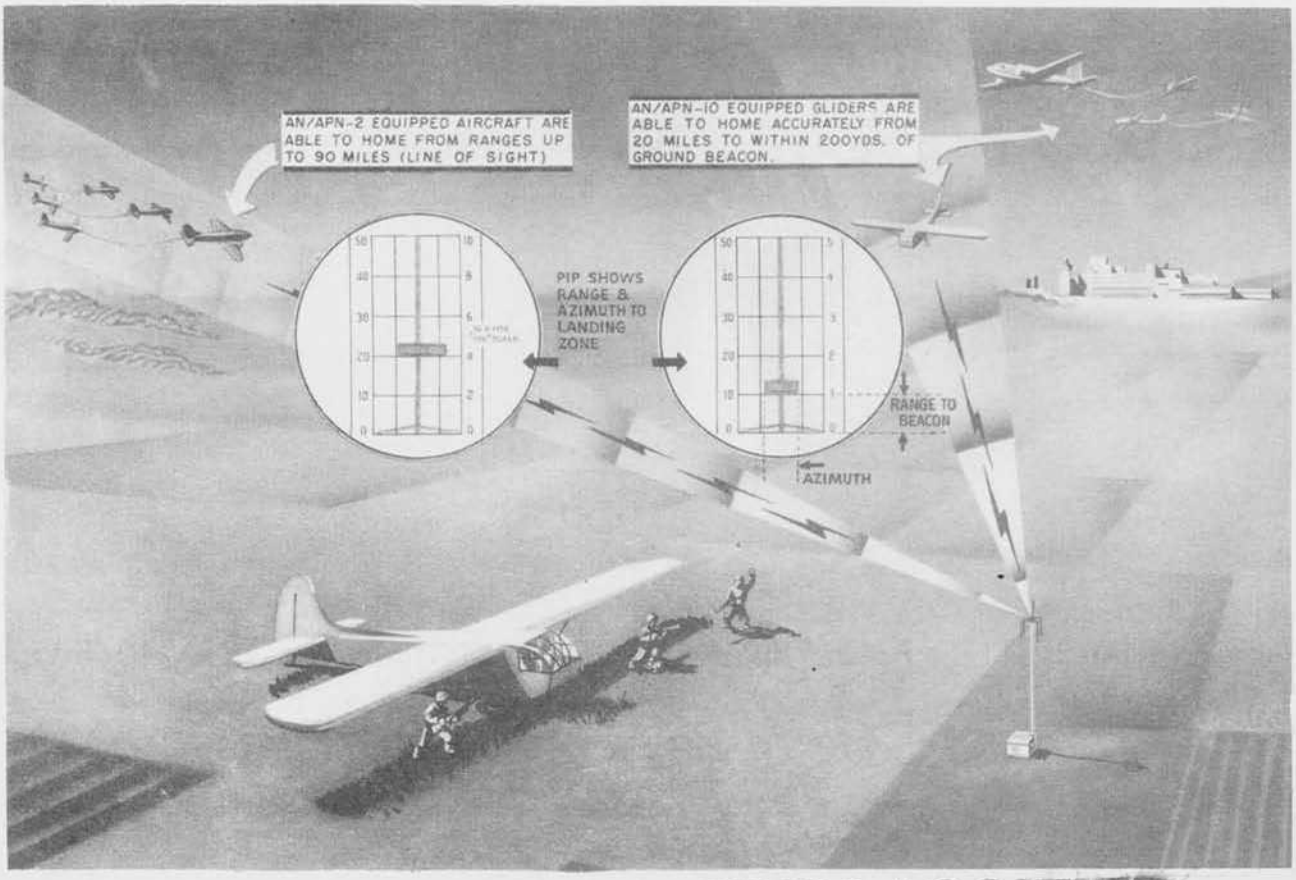
Test equipment used in the maintenance and operation of the equipment includes IE-46-B and IE-45.

There were no Army Supply Program requirements as of 1 February 1945.

POWER INPUT	90 WATTS, 24 V. DC
POWER OUTPUT	15 WATTS (PEAK)
FREQUENCY	214 - 234 MC (REC. AND TRANS.)
TYPE OF SIGNAL	PULSE
RANGE	90 MILES

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
3 3	7193 6H6	6	6SH7

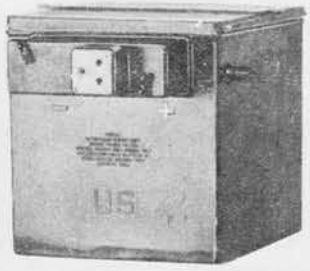
AN/TPN-1 packed in Case CY-21/TPN-1 is air transportable and easily assembled.



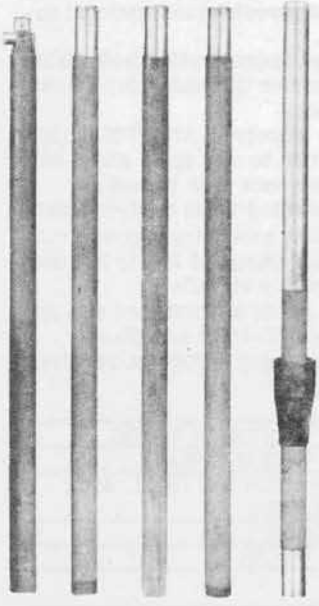
Beacon Transmitter Receiver AN/TPN-1 is an air transportable ground beacon which operates unattended to guide tow planes and gliders to predetermined disembarkation zones.

AN/TPN-1

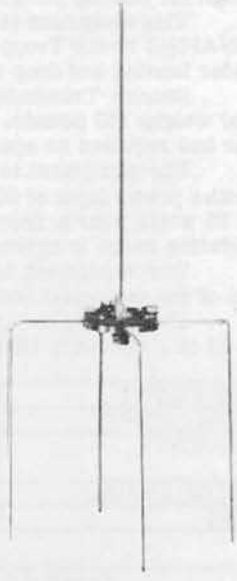
CONFIDENTIAL



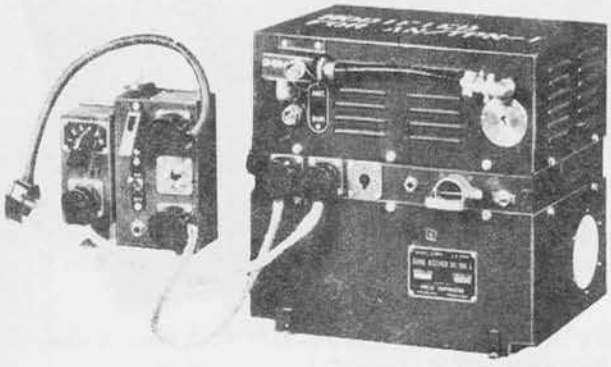
Aircraft Battery
Type G-1



Antenna Mast

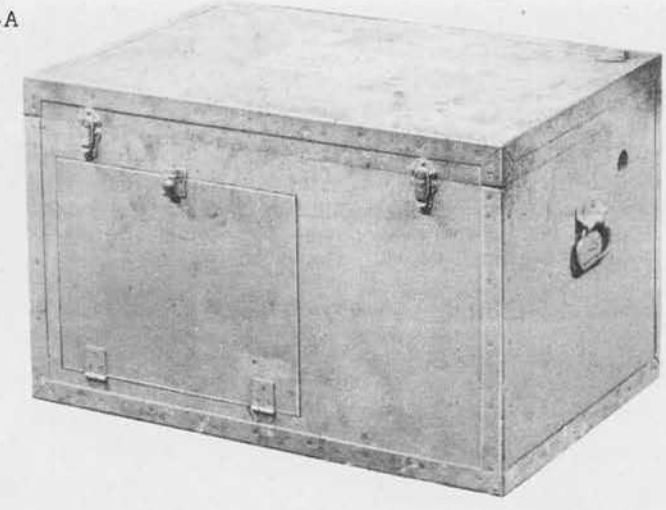


Modified
Antenna AN-95

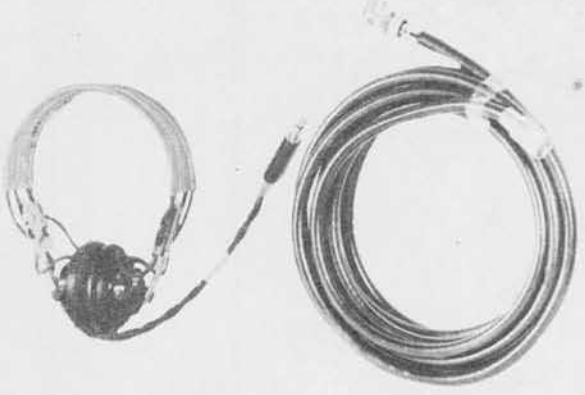


Control Equipment
RC-255-A

Modified Radio
Receiver BC-966-A



Case



Headset
HS-23

Transmission Lines
(Antenna)

BEACON TRANSMITTER RECEIVER AN/TPN-1 TOTAL WEIGHT 240 LBS

Component	Nomenclature	Size	Weight
Case	CY-21/TPN-1	28'' x 20'' x 18''	47 Lbs
Antenna Mast	AB-3/TPN-1	11'' x 2''	5 Lbs
Modified Antenna	AN-95-A	14'' x 4''	1 Lbs
Modified Radio Receiver	BC-966-A	13'' x 14'' x 10''	36 Lbs
Radio Control Equip	RC-255-A	6'' x 7'' x 3''	3 Lbs
Air Corps Type G-1 Battery		10'' x 10'' x 11''	77 Lbs

Beacon Transmitter Receiver AN/TPN-3 is an air transportable ground beacon used in conjunction with Rebecca Mark I, II, III, Radio Set AN/APN-2 and Radio Set AN/APN-5. Provides homing facilities for Troop Carrier Command squadrons and BABS facilities when used in conjunction with Beacon Antenna Assembly AN/CPA-1.

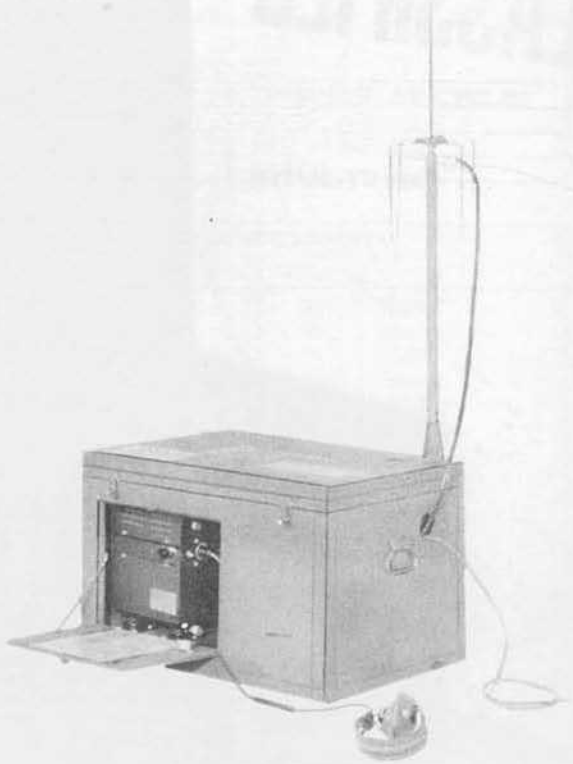
This equipment consists of a lightweight modified Radio Set SCR-695 housed in a single chest, which may easily be carried be two men, and can be set up for operation in approximately 15 minutes.

Power for operation of Beacon Transmitter Receiver AN/TPN-3 may be obtained from a local 115 or 230 volt, 50-60 cycle power supply. When being used in enemy territory, power can be supplied from any one of a number of suitable power supply equipments that can also be transported with this equipment.

Test Equipment IE-45 and IE-46-B may be used for maintenance and tuning.

POWER INPUT	70 WATTS
POWER OUTPUT	15 WATTS (PEAK)
FREQUENCY	214 MC TRANSMITTER AND 234 MC RECEIVER
TYPE OF SIGNAL	PULSE
RANGE	90 MILES (LINE OF SIGHT)

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
3	7193	5	6SH7
2	6H6	1	5U4G



Beacon Transmitter-Receiver AN/TPN-3

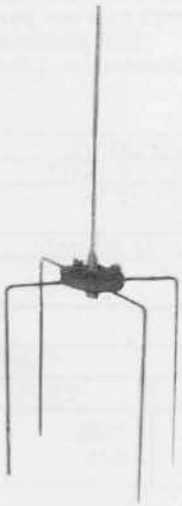
Beacon Transmitter AN/TPN-3 is an air transportable Radar Beacon providing homing facilities to troop carrying aircraft under conditions of poor visibility.

AN/TPN-3

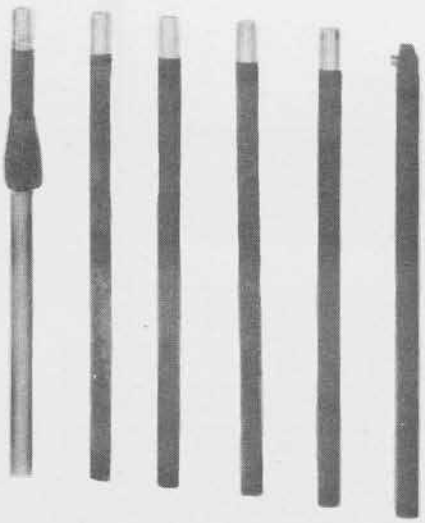
CONFIDENTIAL

Case CY-21/TPN-1

Receiver-Transmitter RT-14/TPN-3



Antenna AT-16/TPN-



Antenna Mast AB-3/TPN-1

Cord CX-74/TPN-3

Cord CX-16/TPN-1

Headset HS-23

BEACON TRANSMITTER RECEIVER AN/TPN-3 TOTAL WEIGHT 100 LBS.

Component	Nomenclature	Size	Weight
Modified Radio Receiver	BC-966-A	13'' x 14'' x 10''	47 Lbs.
Modified Antenna	AN-95-A	14'' x 4'' Diam.	2 Lbs.
Antenna Mast	AB-3/TPN-1	121'' x 2'' Diam.	4 Lbs.
Case	CY-21/TPN-1	28'' x 20'' x 18''	47 Lbs.

Radar Beacon AN/UPN-1, sometimes known as BUPS, is an ultra portable beacon for ground, paratroop or shipboard use having a range of 35-50 miles. The set is capable of being interrogated by airborne radars operating on beacon function and replying with a coded signal permitting the beacon to be located in range and azimuth.

Capable of transmitting five different codes, this beacon is housed in a rectangular chassis containing a control panel with a knob for selecting operation (on-off-stand-by-tune), a knob for selecting codes and a knob for tuning the transmitter. The antenna consists of a dual linear array of six dipoles each (receiving and transmitting) housed in a weatherproof plastic cylinder and having horizontal polarization. It transmits signals on 3256 mc. and receives over the frequency range of 3267 to 3333 mc.

Power is obtained from a special 12 volt battery pack with power input of 36 watts. Peak Power output of the equipment is 50 watts.

Twelve experimental d-c units were built for field tests and are now in operational use. Production deliveries were being made in April 1945.

Test equipment used in the maintenance of Radar Beacon AN/UPN-1 includes Test Set TS-3/AP, Test Set TS-14/AP, Oscilloscope TS-34/AP, Voltmeters IS-185 and 189, and Audio Oscillator Hewlett-Packard 200C.

Army Air Forces requirements as of 26 February 1945 were 672 for the calendar year 1945 and 45 for 1946.

Aircraft Interrogation Triggers Beacon Reply which establishes its identity & position in range and azimuth.

Battery Charger & Battery in carrying position-entire equipment may be packed in 2 packages & carried by one man. (1) Harness MX-253/UPN-1 (2) Rectifier Battery Charger PP-116/UPN (3) Battery Case CY-222/UPN-1.

POWER INPUT	36 WATTS AT 12 VOLTS
POWER OUTPUT	50 WATTS (PEAK)
FREQUENCY	RECEIVER 3267-3333 MC
	TRANSMITTER 3256 MC
TYPE OF SIGNAL	PULSE
TYPE PRESENTATION	CODE DISPLAY ON THE RADAR SCREEN
DATA SUPPLIED (TO AIRBORNE SET)	IDENTIFICATION, RANGE AND BEARING FROM BEACON
RANGE	35-50 MILES AIRBORNE RADAR TO GROUND
PULSE LENGTH	0.5/MICROSECONDS

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
5	1LN5	2	8016
2	7F8	1	446B
6	3B7/1291	2	1N27

CONFIDENTIAL

Battery Case CY-222/UPN-1

Harness MX-252/UPN-1

Antenna Assembly
AS-171-UP

Antenna Support
AB-49/UP

Rectifier Battery Charger
PP-116/UPN-1

Case CY-225/UP

Receiver Transmitter RT-72/UPN-1

RADAR BEACON AN/UPN-1

TOTAL WEIGHT 115 LBS.

Component	Nomenclature	Size	Weight
Transponder Assembly	RT-72/UPN-1	13" x 7" x 13"	27 Lbs.
Case	CY-220/UPN-1	13" x 7" x 15"	8 Lbs.
Harness	MX-242/UPN-1		1 Lb.
*Chest	CY-221/UPN-1	13 "x 13" x 9"	12 Lbs.
Battery Case	CY-222/UPN-1 (2 each)	7" x 8" x 11"	25 Lbs.
Rectifier Battery Charger	PP-116/UPN-1	7" x 8" x 11"	14 Lbs.
Harness	MX-253/UPN-1		1 Lb.
Antenna Assembly	AS-172/AP	4" x 7" x 14"	5 Lbs.
Antenna Assembly	AS-171/UP	25 1/2" x 4" Diameter	10 Lbs.
Cord	CX-237/U	50'	2 Lbs.
Cord	CG-92/U (2 each)	4' 6" long	**
Antenna Support	AB-49/UP	32" high	7 Lbs.
Case	CY-225/UP	6" x 6" x 40"	1 Lb.

*includes operating spare parts
**weight less that one pound.

Radar Beacon AN/UPN-2, sometimes known as BUPS, is an ultra portable beacon for ground, paratroop or shipborne use with a range of 35-50 miles. It is similar to AN/UPN-1 except for power source. The airborne version of AN/UPN-2 is known as Radar Beacon AN/APN-29. The set is capable of being interrogated by airborne radars of the proper frequency on beacon function and replying with a coded signal permitting the beacon to be located in range and azimuth.

This beacon is housed in a rectangular chassis containing a control panel with a knob for selecting operation (on-off-standby-tune), a knob for selecting codes, and knob for tuning the transmitter. It transmits signals on 3256 mc. and receives over the frequency range of 3267 to 3333 mc.

Power input of 150 watts, 50-2400 cycles, 115 or 230 volts produces a peak power output of 50 watts.

Radar Beacon AN/UPN-2 requires a ground Antenna Assembly AS-171/UP consisting of a dual linear array of six dipoles each (receiving and transmitting) housed in a weatherproof plastic cylinder and having horizontal polarization.

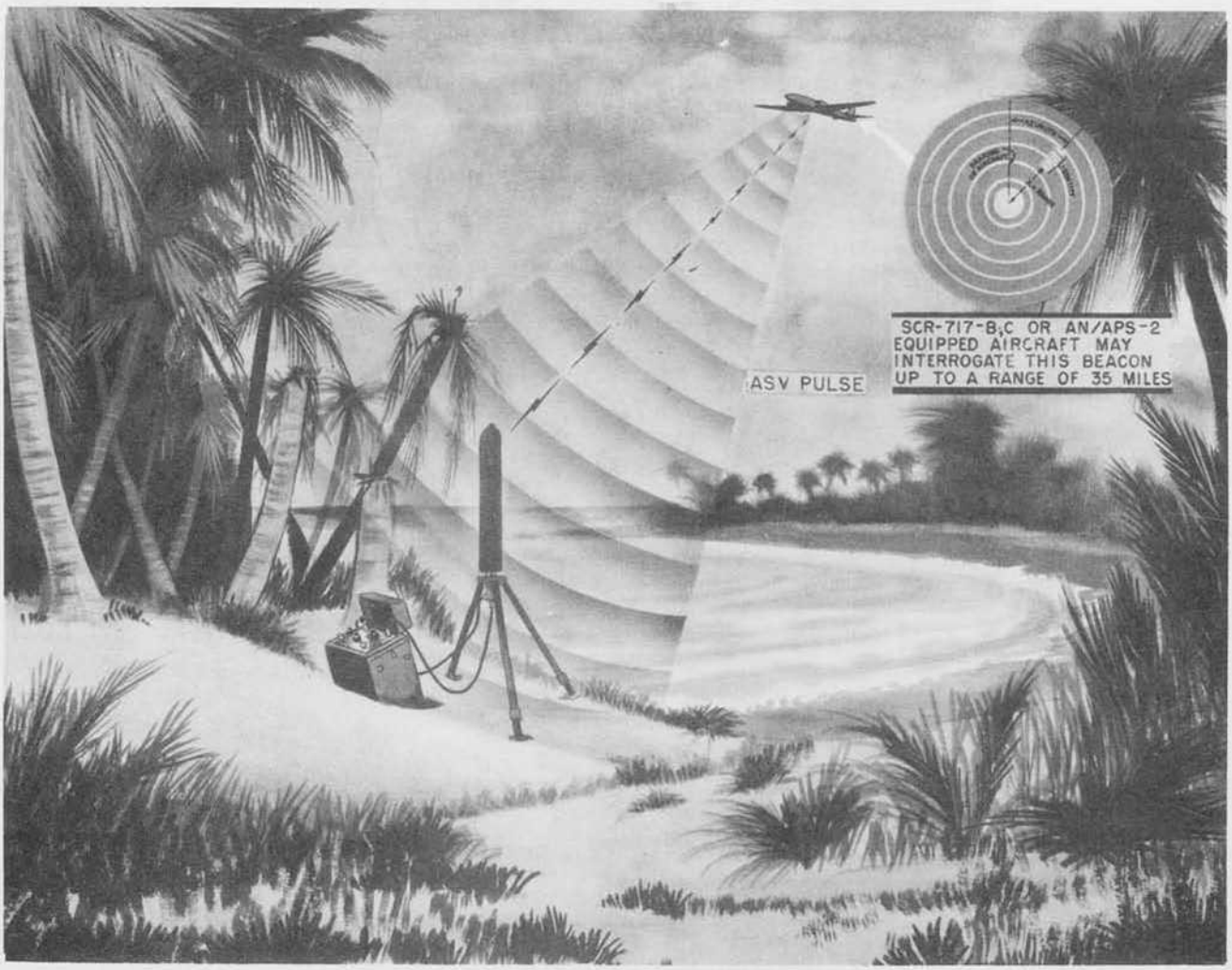
Twelve experimental ac units were built for field tests and are now in operational use. Production deliveries were being made in April 1945.

Test equipment used in the maintenance of Radar Beacon AN/UPN-2 includes Test Set TS-3/AP, Test Set TS-14/AP, Oscilloscope TS-34/AP, Voltmeters IS-189 and IS-185, and Audio Oscillator Hewlett-Packard 200C.

Army Air Forces requirements as of 1 February 1945 were 304 for the calendar year of 1945 and 18 for 1946.

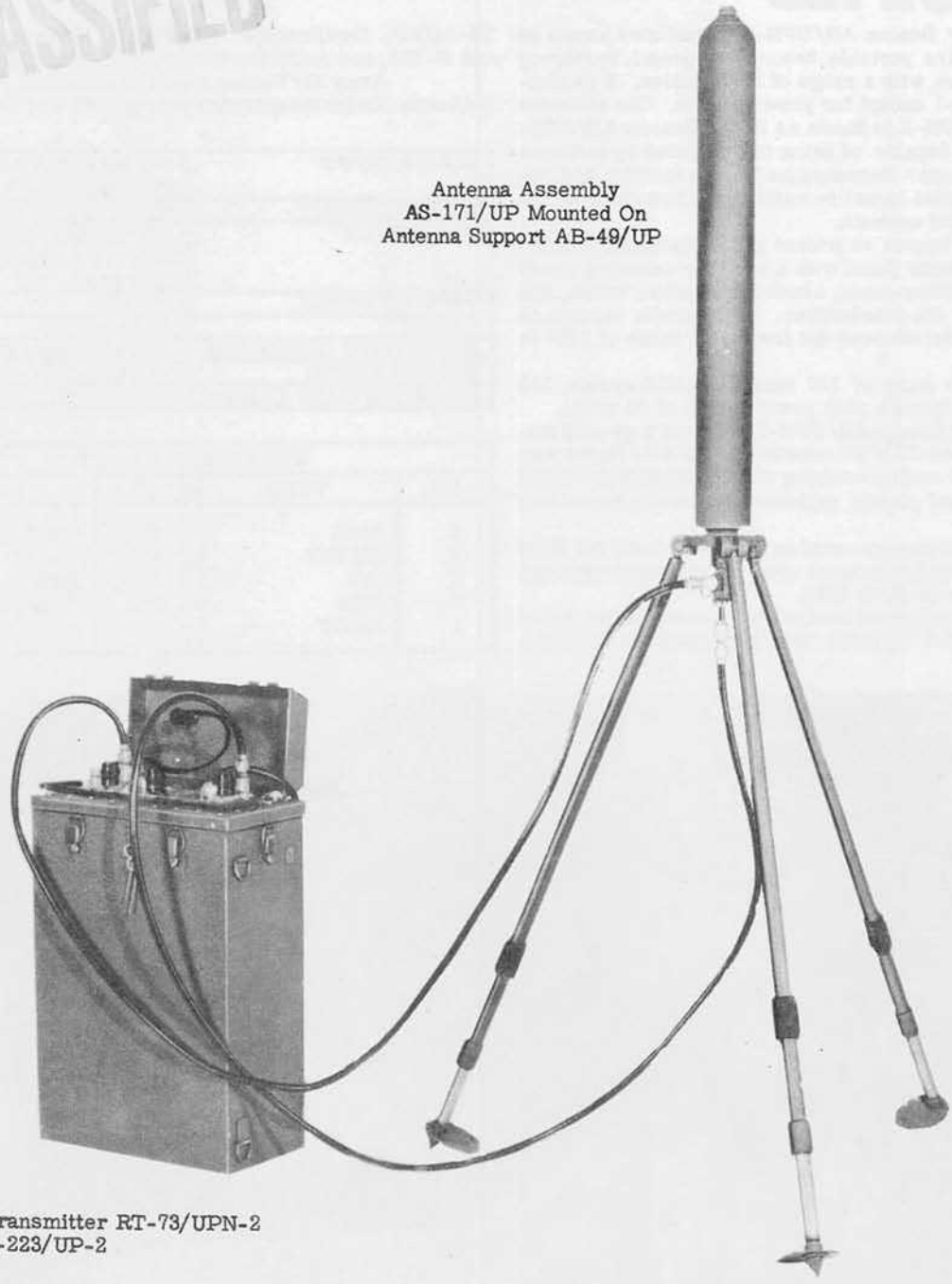
POWER INPUT	150 WATTS AT 115/230 VOLTS, 50-2400 CPS
POWER OUTPUT	50 WATTS (PEAK)
FREQUENCY	RECEIVER: 3267 TO 3333 MC; TRANSMITTER: 3256 MC
TYPE OF SIGNAL	PULSE
RANGE	35-50 MILES
SENSITIVITY (RECEIVER)	0.05 MICROWATTS
PULSE LENGTH	0.5 MICROSECONDS
BLANKING GATE LENGTH	500 MICROSECONDS

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
3	6AK5	1	OD3/VR-150
7	6SL7GT	1	10-4B
1	2X2	1	446B
2	2C26	2	OC3/VR-105
1	5R4GY	2	IN27



Radar Beacon AN/UPN-2 on being interrogated by airborne radar (on beacon function) replys in code permitting the beacon to be located in range and azimuth.

CONFIDENTIAL



Antenna Assembly
AS-171/UP Mounted On
Antenna Support AB-49/UP

Receiver Transmitter RT-73/UPN-2
In Case CY-223/UP-2

RADAR BEACON AN/UPN-2

TOTAL WEIGHT 80 LBS.

Component	Nomenclature	Size	Weight
Transponder Assembly	RT-73/UPN-2	7" x 14" x 20"	40 Lbs.
Case	CY-223/UPN-2	7" x 13" x 21"	5 Lbs.
Harness	MX-254/UPN-2		1 Lb.
*Chest	CY-224/UPN-2		12 Lbs.
Antenna Support	AB-49/CP	32" high	5 Lbs.
Case	CY-225/CP	6" x 6" x 40"	1 Lb.
Cord	CX-237/U	50'	2 Lbs.
Antenna Assembly	AS-171/UP	36" x 4" Diameter	10 Lbs.
Cord	CG-92/U (2 each)	5'	**

* includes operating spare parts

** weight less than one pound.

Radar Beacon AN/UPN-3 (BUPX) is a portable set designed for use as a navigation and homing beacon and for bomb run designation. When interrogated by airborne radars on beacon functions it transmits a range coded signal identifying the beacon so that it may be located in range and azimuth.

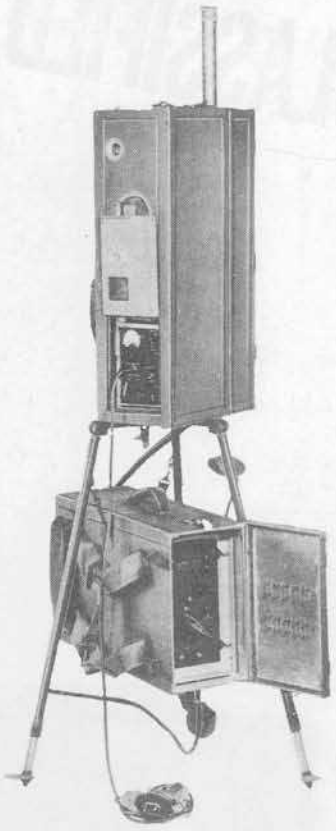
Twelve code combinations are selectable. Provision is made for earphone monitoring of the set for interrogation. The complete equipment, less power supply source, but including the antenna is suitable for transportation by two men with harness pack or a small trailer or jeep and for mounting therein for operation from any location. Antenna consists of a linear array of coaxial fed horizontally polarized, vertically stacked dipoles. There are 10 rows of probe fed slots, 4 in each row, giving a 360° azimuth pattern.

This set formerly designated AN/PPN-6, will operate in conjunction with the following Radio Sets: AN/APS-3, AN/APS-4, AN/APS-10, AN/APS-15, AN/APQ-13.

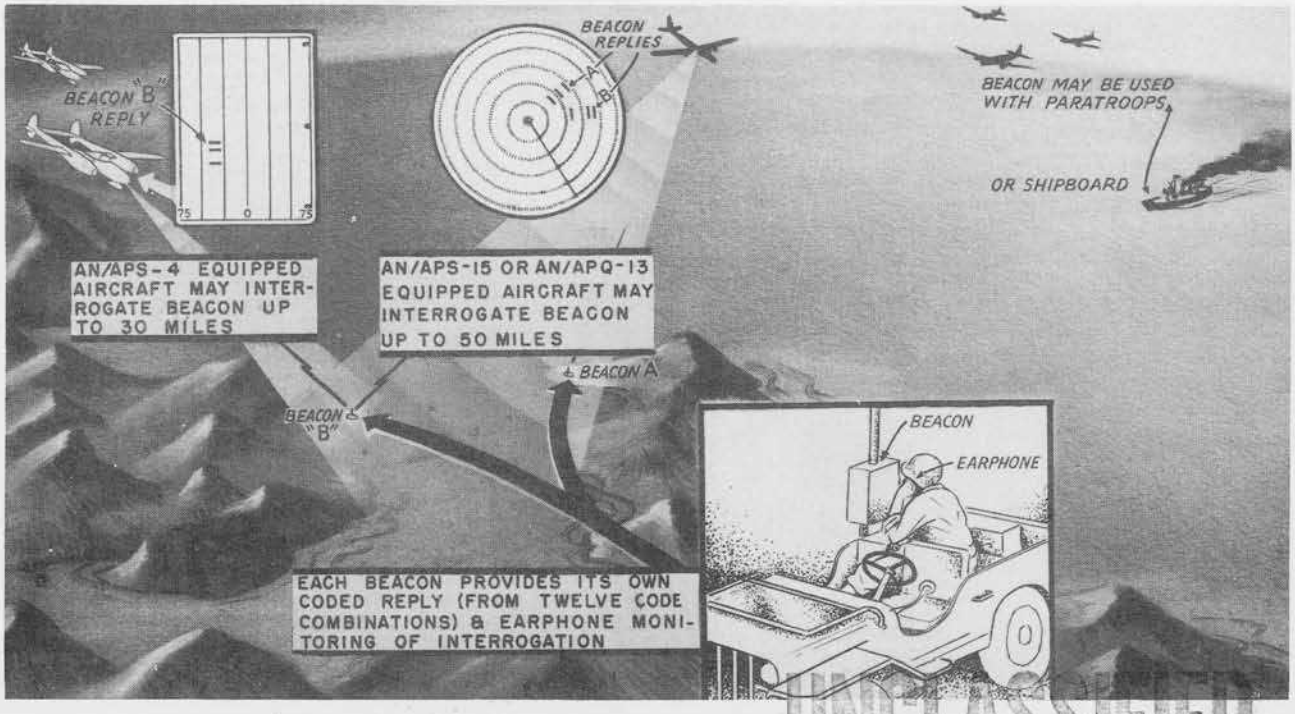
Test equipment required in maintenance and operation of AN/UPN-3 includes Test Set TS-120/UP, Voltage Divider TS-89/AP, Voltmeter IS-189, Spectrum Analyzer TS-148/UP, Oscilloscope TS-239/UP, Radio Frequency Test Load TS-108/AP.

POWER INPUT	300 WATTS @ 115 V 50-400 CPS
POWER OUTPUT	300 WATTS (PEAK)
FREQUENCY	9320-9440 MC.
TYPE OF SIGNAL	RANGE CODED PULSE
RANGE	50 MILES AN/APQ-13 @ 10,000'; 30 MILES AN/APS-4 @ 10,000'; 100 MILES AN/APS-10 @ 10,000'
SENSITIVITY (RECEIVER)	2 x 10-9 WATTS

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
14	7F8	1	VR-105/30
7	6AK5	1	VR-150/30
1	2J41	1	6X5GT
1	3D21	1	5Y3GT
2	2X2A	1	2K25
1	6L6	2	IN23
1	5T4	1	IN23B



Radar Beacon AN/UPN-3



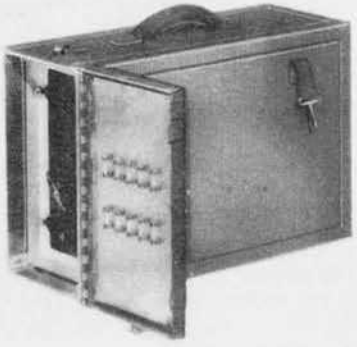
Radar Beacon AN/UPN-3 (BUPX) is an ultra portable ground, paratroop and shipborne beacon designed to provide navigation information, act as homing beacon and designate bomb runs.

SECRET

Cordage
Container

Antenna Assembly
AS-241 (XA) /UPN-3 (XA-1)

Receiver-Transmitter
RT-84 (XA) /UPN-3 (XA-
In Case
CY-354 (XA) /UPN-3 (X/



Rectifier Power Unit
PP-156 (XA) /UPN-3 (XA-1)
In Case
CY-355 (XA) /UPN-3 (XA-1)

Mounting
373 (XA) /UPN-3 (XA-1)

RADAR BEACON AN/UPN-3

TOTAL WEIGHT 124 LBS.

Component	Nomenclature	Size	Weight
Receiver-Transmitter	RT-84/UPN-3		39 Lbs.
Case	CY-354/UPN-3		22 Lbs.
Mounting	MT-273/UPN-3		
Harness	ST-105/UPN-3		
Rectifier Power Unit	PP-156/UPN-3		42 Lbs.
Case	CY-255/UPN-3		15 Lbs.
Harness	ST-104/UPN-3		
Antenna Assembly	AS-241/UPN-3		
Case	CY-356/UPN-3		
Cord	CX-770/U	10' long	
Cord	CX-789/UPN-3	30" long	

and includes set of interconnecting cords.

AN/UPN-4

Radar Beacon AN/UPN-4 (BUPX) is an ultra portable ground and shipborne beacon weighing approximately 97 pounds and designed to provide navigation information, act as homing beacon, and designate bomb runs. When interrogated by an airborne radar, it replies with a coded signal which identifies the beacon and its location.

This set differs from Radar Beacon AN/UPN-3 in that it operates from a self-contained storage battery which has a life of 4 to 6 hours without recharging, and is suitable for transportation in small trailers or jeeps and may be mounted therein for operation. This model is being considered for paratroop use.

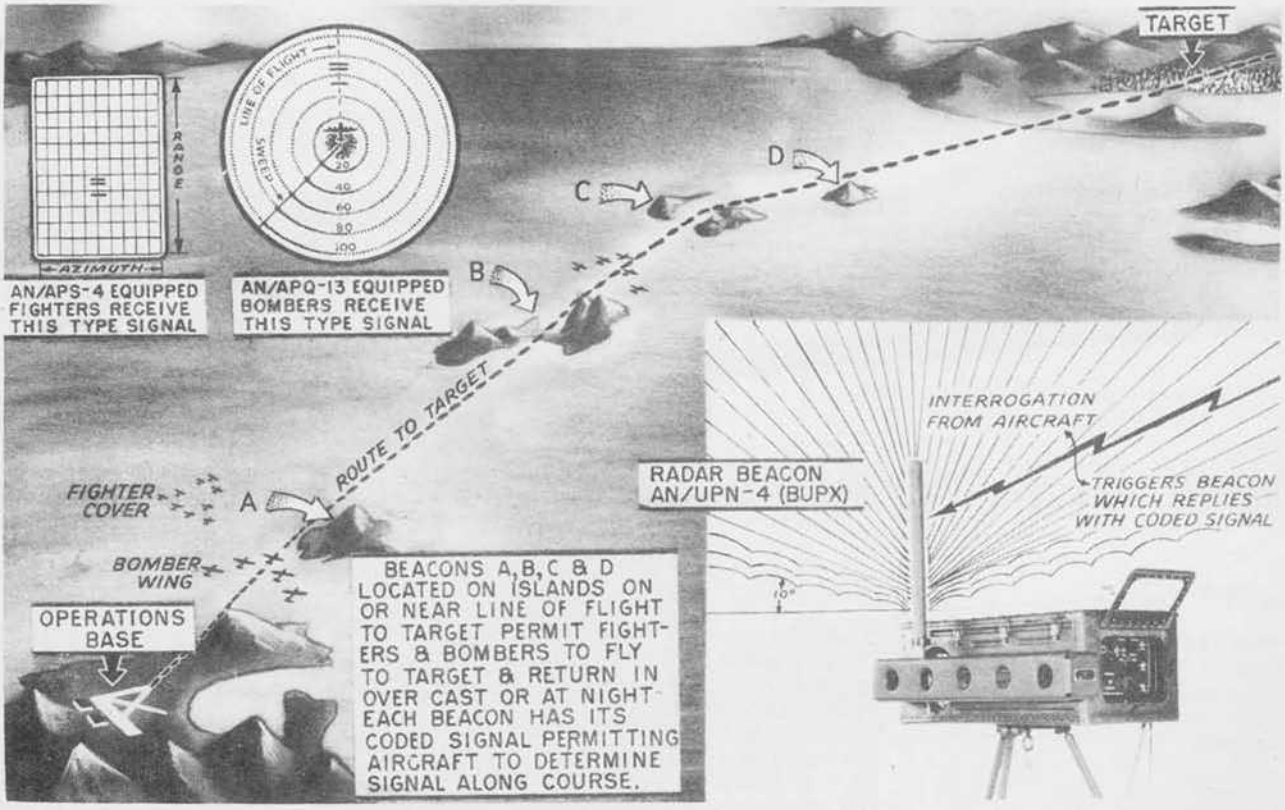
Five coded combinations are possible with this equipment. The antenna consists of a linear array of coaxial fed, horizontally polarized dipoles, vertically stacked, with 360° azimuth pattern.

Radar Beacon AN/UPN-4 formerly known as AN/PPN-7 is used with airborne Radar Set AN/APS-3, Radio Sets AN/APS-4, AN/APQ-13 and Radar Equipment AN/APS-15.

Test equipment recommended for use in the operation and maintenance of AN/UPN-4 includes Test Set TS-120/UP, Oscilloscope TS-239/UP, Radar Maintenance Equipment AN/UPM-1A, Synchroscope TS-28/UPN, R-F Test Load TS-108/AP, Spectrum Analyzer TS-148/UP, Pressurizing Kit MK-20/UP, Voltmeter IS-189, Multimeter TS-352/U and Tube Tester I-177.

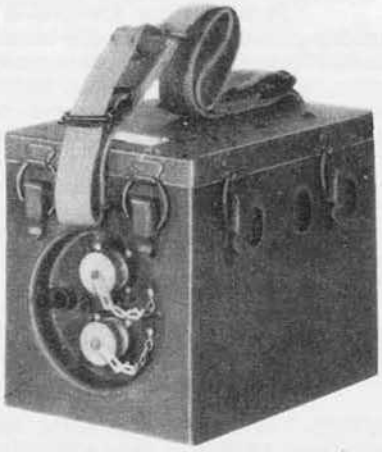
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
6	3A5	2	VR-150
6	1L4	1	VR-90
4	6C4	1	1N23A
1	3D21A	1	1N31
1	2J41		

POWER INPUT	12 VOLTS D.C. 45 WATTS
POWER OUTPUT	300 WATTS (PEAK)
FREQUENCY	9320 - 9430 MC REC. 9310 MC TRANS.
TYPE OF SIGNAL	CODED PULSE
RANGE	30 MILES



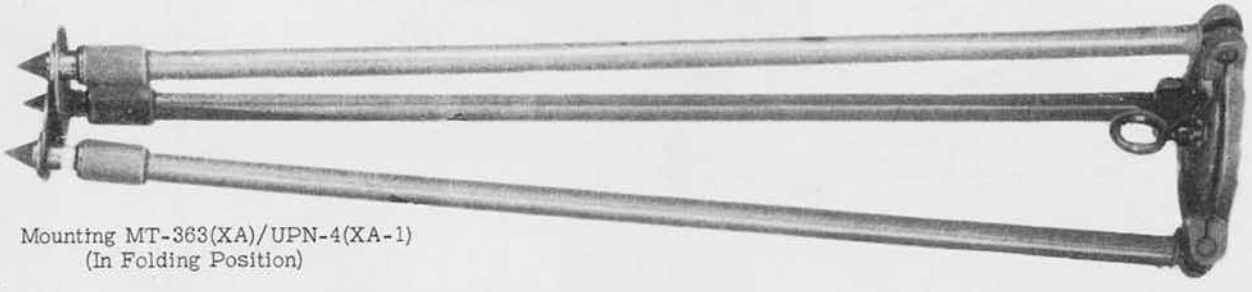
Radar Beacon AN/UPN-4 is an ultra portable ground, paratroop and shipborne beacon designed to provide navigation information, act as homing beacon and designate bomb runs to aircraft equipped with radars operating in its frequency range.

CONFIDENTIAL



Battery Pack BB-222(XA)/UPN-4(XA-1)

Receiver-Transmitter RT-83(XA)/UPN-4(XA-1)
In Case CY-336(XA)/UPN-4(XA-1) (Antenna Erected)



Mounting MT-363(XA)/UPN-4(XA-1)
(In Folding Position)

RADAR BEACON AN/UPN-4

TOTAL WEIGHT 97 LBS.

Component	Nomenclature	Size	Weight
Receiver-Transmitter	RT-83/UPN-4		35 Lbs.
Case	CY-336/UPN-4	26" x 13" x 10"	18 Lbs.
Antenna Assembly	AS-235/UPN-4	24" long	4 Lbs.
Power Pack	BB-222/UPN-4 (2 each)	10" x 7" x 6"	ea. 27 Lbs.
Harness	ST-103/UPN-4		2 Lbs.
Case	CY-338/UPN-4	8" x 13" x 12"	14 Lbs.
Harness	ST-102/UPN-4		1 Lb.
Mounting	MT-363/UPN-4	34" x 7" x 7"	10 Lbs.
Antenna Guard attached to Case CY-336/UPN-4		28" x 5" x 4"	

and includes set of interconnecting Cords.

July 1945.

Reflector Target

MX-137/A, MX-138/A and MX-138A/A

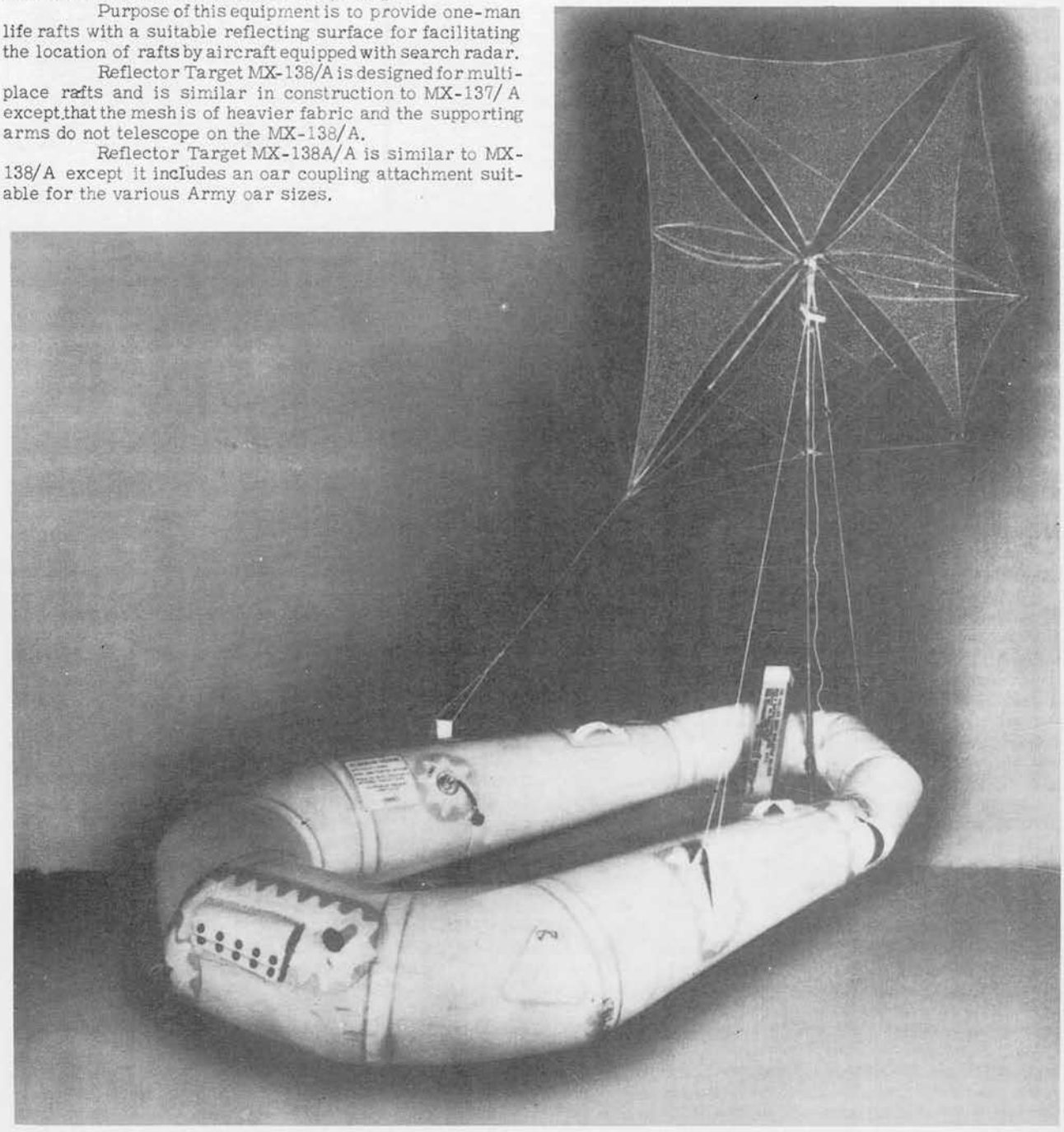
Reflector Target MX-137/A is a collapsible assembly of monel metal mesh and telescoping duralumin tubing. When set up for operation it forms eight corner reflectors designed to provide dependable response to any S or X band radar equipped search aircraft within a six to twelve nautical mile radius. The reflector assembly is small, lightweight, of simple construction and may be packed in the standard one-man life raft package.

Purpose of this equipment is to provide one-man life rafts with a suitable reflecting surface for facilitating the location of rafts by aircraft equipped with search radar.

Reflector Target MX-138/A is designed for multi-place rafts and is similar in construction to MX-137/A except that the mesh is of heavier fabric and the supporting arms do not telescope on the MX-138/A.

Reflector Target MX-138A/A is similar to MX-138/A except it includes an oar coupling attachment suitable for the various Army oar sizes.

RANGE MX-138/A RANGE MX-138A/A	AN/APS-2 - 12 TO 18 MILES AN/APS-3 - 5 MILES SCR-717-B - 12 MILES
ANTENNA	TWELVE TRIANGULAR REFLECTING ELEMENTS OF KNITTED FABRIC SILVER-PLATED



REFLECTOR TARGET

TOTAL WEIGHT 2 LBS.

Component	Nomenclature	Size	Weight
Reflector Target	MX-137/A	2"x2"x16" (collapsed)	2Lbs.
Reflector Target	MX-138/A	2"x2"x24" (collapsed)	2Lbs.
Reflector Target	MX-138A/A	2"x2"x28" (collapsed)	2Lbs.

SCR-718-C

Radio Set SCR-718-C is an altimeter equipment used in aircraft to determine absolute altitude above terrain. It provides indication of actual altitude above terrain rather than altitude above sea level as indicated by barometric altimeters.

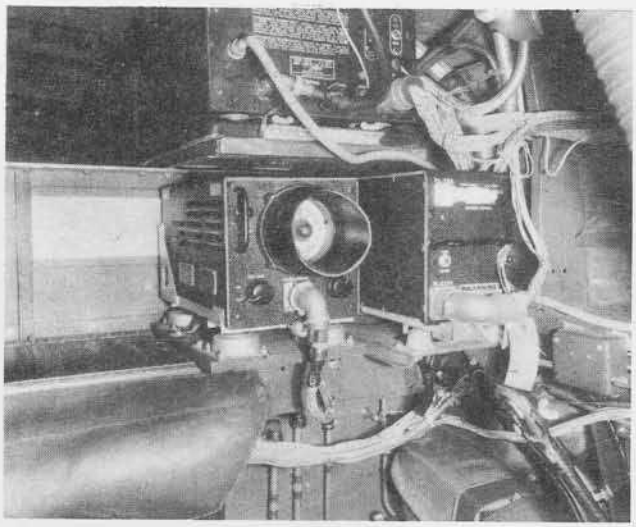
Designed for comparatively accurate altitude indication, this set has two scale ranges - 0 - 5,000 ft., 0 - 50,000 ft., however ranges in excess of 40,000 ft. are considered unreliable. Considerable utilization of this equipment has been effected in aircraft used for high-level precision bombing, weather reconnaissance, topographic recognition, and photographic missions.

Essential principle of this equipment operation is the same as any radar device, namely: the transmission of pulses of radio energy; the reception of the pulse after reflection from the earth's surface; and the measurement of the time elapsing between transmission and reception.

Selection of either range scale may be effected by use of the switch, mounted on the Indicator Unit, which changes the oscillator frequency and sweep rate. In altitude determination of ranges in excess of 5,000 ft., the 0 - 50,000 ft., range scale is normally used, however, a more accurate determination of altitude may be effected by use of both the low and high range scales, switching alternately from one to the other. This feature is the principal improvement in this equipment over the predecessor equipments SCR 718-A and SCR 718-AM, which have only one scale, 0 - 5,000 ft.

Test equipment required for the maintenance and tuning of SCR-718-C is: Test Set TS-10B/APN or TS-10C/APN, Test Set TS-23/APN and RCA 158 Oscilloscope, or equal.

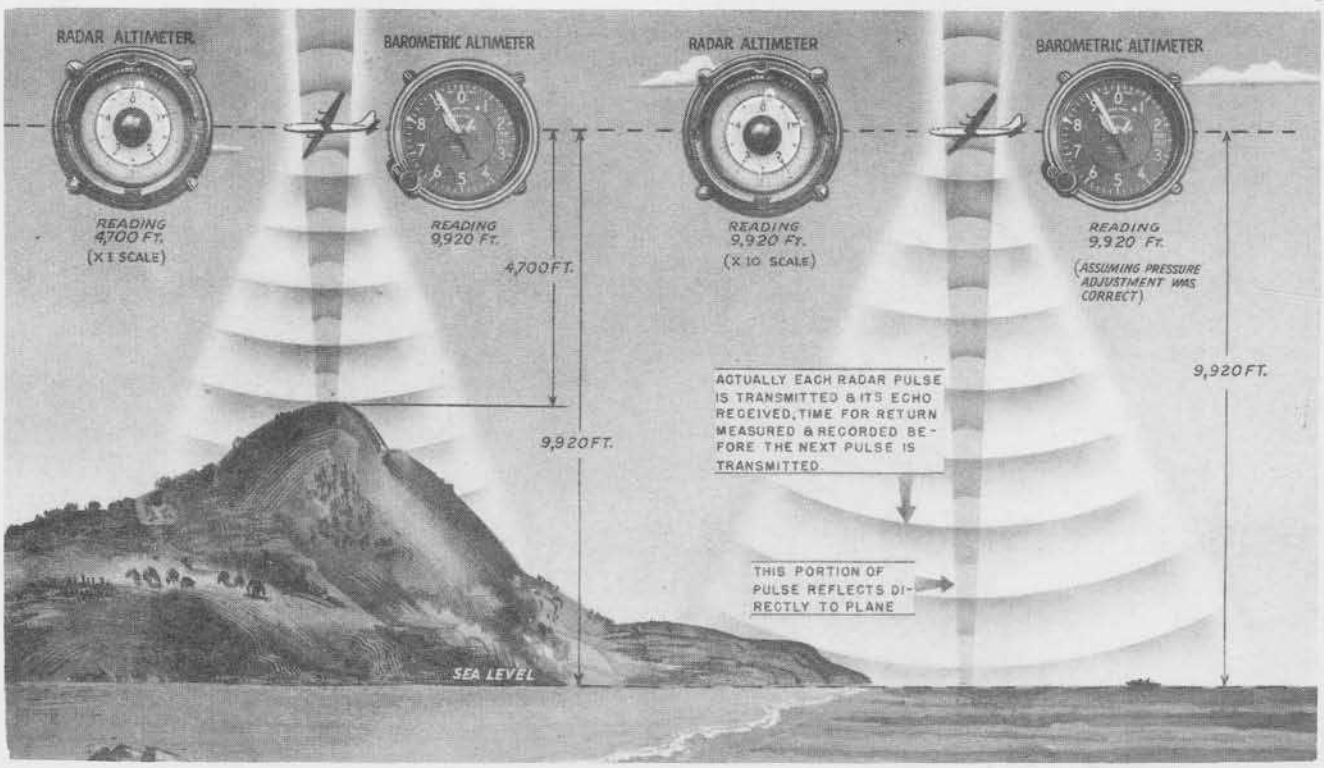
TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
3	6J6	1	6L6
12	6AG5	1	2X2A
1	5Y3GT/G	1	3DP1-S2



Indicator I-152-( ) installed in aircraft.

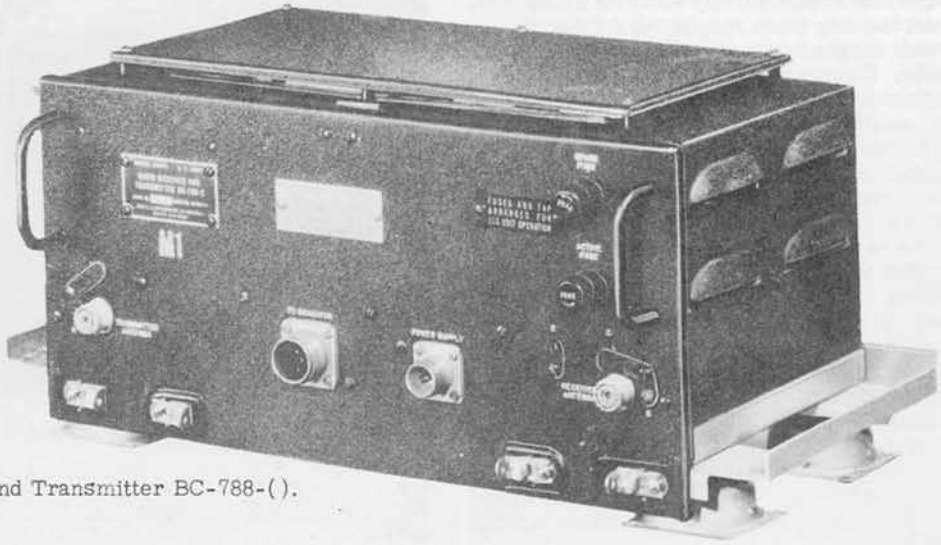
AAF requirements as of 22 February 1945 were 10,353 sets for the calendar year 1945, and 10,292 sets for 1946.

POWER INPUT	135 WATTS @ 80-115 V.
POWER OUTPUT	6-10 WATTS (PEAK)
FREQUENCY	440 ± 5 MC.
TYPE OF SIGNAL	PULSE
RANGE	0-40,000 FT.
ACCURACY	± (50 FT. PLUS 0.25% INDICATED ALTITUDE)
ANTENNAS	1 TRANSMITTING AND 1 RECEIVING HALF-WAVE DIPOLE.



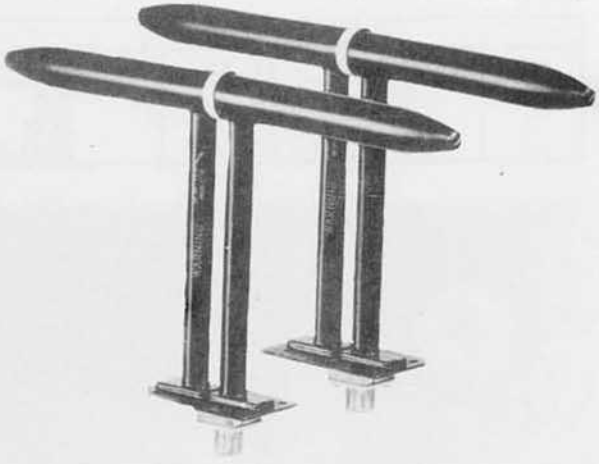
Radio Set SCR-718 is a precision altimeter which records the absolute altitude of an aircraft above the terrain, regardless of air pressure or variations in temperature.

SCR-718-C



Radio Receiver and Transmitter BC-788-().

Indicator I-152-()



Antennas *AT-4/ARN-1.

Visor M-387.

RADIO SET SCR-718-C

TOTAL WEIGHT 34 LBS.

Component	Nomenclature	Size	Weight
Indicator	I-152-()	7'' x 13'' x 7''	10 Lbs.
Radio Receiver and Transmitter	BC-788-()	16'' x 9'' x 8''	10 Lbs.
Antenna (2ea)	*AT-4/ARN-1	8'' x 12'' x 1''	
Mounting Base	*MT-14-ARN-1		
Mounting	FT-445-A		
Visor	M-387		

and includes plugs, adaptors, cable etc.

Model YJ Radio Equipment is a two-channel, automatic responding radar beacon ("racon") used by the Navy for shore installation. This equipment will automatically transmit coded signals in reply to interrogating signals from craft equipped with radar equipment operating in the 176 mc. and the 515 mc. band.

An aircraft or ship equipped with appropriate radar equipment may interrogate and receive a resppnse from any YJ beacon within its range. The coded signal from the beacon is presented visually on the indicater of the airplane, indicating relative direction and range from the beacon.

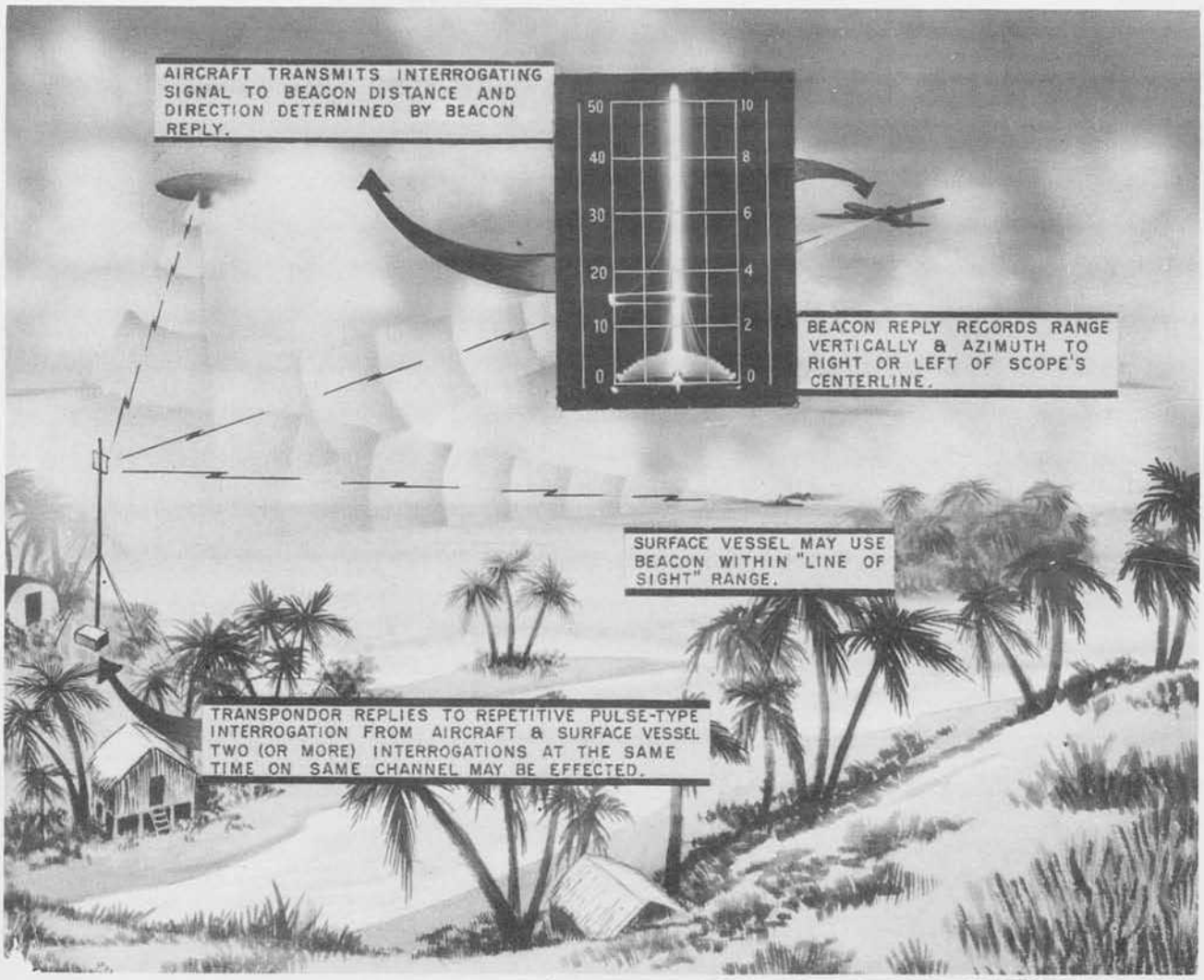
In operation the transponder replies to a repetitive pulse-type signal transmitted by the interrogating radar equipment. This signal is picked up by the antenna of the transponder and is passed through the receiver circuit. The output of the receiver is of a pulse character and causes the transmitter to emit a similar pulse. The response is keyed with one or two letters of the International Morse code (dot and dash) for identification purposes.

When the beacon receives two (or more) interrogating signals on the same channel at the same time, it tries to reply to each, pulse-for-pulse. So far as the equipment is concerned it is receiving and replying to a single interrogation of twice the repetition rate; however, if two interrogating pulses arrive at or about the same instant, the equipment may reply as to one pulse.

Test Equipment required in the maintenance of the YJ beacon includes Radar Maintenance Equipment AN/UPM-1A and Frequency Meter TS-127/U.

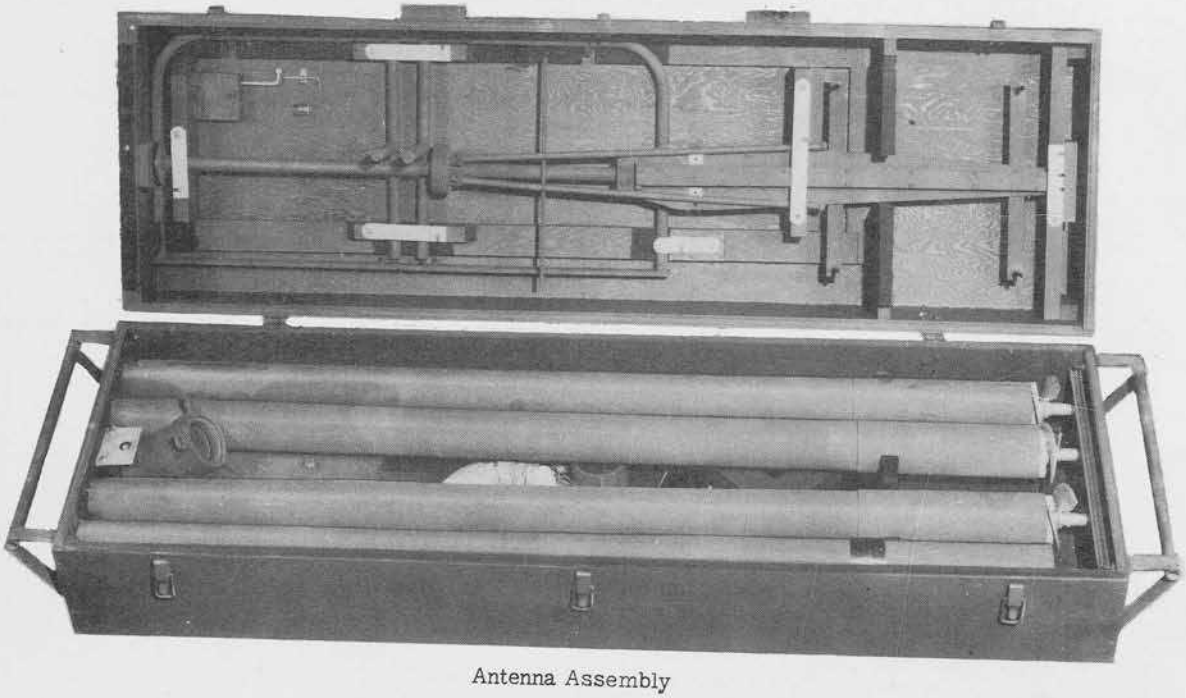
POWER INPUT	150 WATTS @115/230 V, 60 CPS
FREQUENCY	176 OR 515 MC.
TYPE OF SIGNAL	PULSE
RANGE	100 MILES

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
7	6SN7GT	1	807
2	5R4GT	2	6SH7
1	38205	2	8025
1	6X5GT	1	829
1	7193	1	6V6GT
2	9004	1	955
8	6SK7	1	



Model YJ equipment is a two channel (176mc. & 515mc bands) automatic responding radar beacon used by the Navy for shore installation. It has a maximum range of 100 miles.

Model YJ



Antenna Assembly

MODEL YJ

TOTAL WEIGHT 695 LBS.

Component	Nomenclature	Size	Weight
Rectifier Power Unit	CMD-20ACH	16'' x 13'' x 11''	57 Lbs.
"A" Band R-F Unit	CMD-43ABW	13'' x 11'' x 8''	14 Lbs.
"B" Band R-F Unit	CMD-43ABX	13'' x 11'' x 8''	18 Lbs.
Housing Assembly (in carrying case)		60'' x 23'' x 22''	*197 Lbs.
Antenna Assembly (in case)	CMD-66AEY	68'' x 19' x 15''	*333 Lbs.
Accessories: Cables, Plugs etc			*76 Lbs.

*Crated Weight

T E S T
Equipment

Radar Maintenance Equipment AN/UPM-1A is a ground portable beacon and monitor test set used to test and monitor radar beacons and other equipment operating in the frequency range of 155-235 mc, and 460-570 mc.

This test equipment may be used to measure or check transmitter frequency, power output pulse width and pulse shape; measure and check receiver sensitivity and band width; measure or check pulse shape at receiver output; give an indication of the approximate repetition rate of transponders; provide for beacon monitoring; and measure or check delay time in transponder or beacons.

A 3- inch oscilloscope is used as an indicator and voltage measuring instrument. The usual focus, intensity and centering control are provided by a linear sweep of 40, 200, or 2000 micro-seconds duration. Horizontal timing calibration is provided.

Oscillators of pulse radio frequency signals are provided in each frequency band. They may be synchronized from an external source or from an internal synchronizing generator.

Wavemeters with separate diode detectors measure the frequency of either the internal pulse signal generators or external pulse radio frequency signals over the range of 155 to 235 mc. and 460 to 570 mc.

Antennas may be connected to the r-f jacks for monitoring permanently installed equipments. When connected in this way the voltage indicating detectors and frequency meters are actuated by both internal and external generated signals. The r-f jacks may also be interconnected with the equipment under test through a 6-foot cable and shielded diode head. The probe is provided with a detector for indicating peak voltages (or power) at the output terminals of the probe. Both sensitivity and power output of associated equipment may be measured.

The equipment is mounted in an all metal case with compartments provided for storing accessories and cordage.

POWER INPUT	200 WATTS @ 80/115/ 230 VOLTS; 50-60 CPS
FREQUENCY	155-235 MC AND 460-570 MC.
TYPE OF SIGNAL	PULSE

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
10	6SN7GT	3	6C4
1	2X2	3	9005
2	6SH7	2	9006
1	6AG7	2	6J6
1	OD3/VR-150	1	3BP1
		1	5U4G

RADAR MAINTENANCE EQUIPMENT AN/UPM-1A TOTAL WEIGHT 140 LBS.

Component	Nomenclature	Size	Weight
Detector Junction Box	J-94/UPM-1	4" x 3" x 3"	
Console Rack	MT-189/UPM-1	16" x 26" x 12"	
Dust Cover	CW-24/UPM-1		
Oscillator (155-235 mc)	O-12/UPM-1		
Oscillator (460-570) mc)	O-13/UPM-1		
Wavemeter (155-235 mc)	TS-133/UPM-1		
Wavemeter (460-570) mc)	TS-134/UPM-1		
Antenna	AT-50/U		
Cord Set	AT-51/U		
Diode Head	CV-11/UPM-1		

All the above listed components are mounted or stored with Console Rack MT-189/UPM-1

RESTRICTED

TS-10/APN

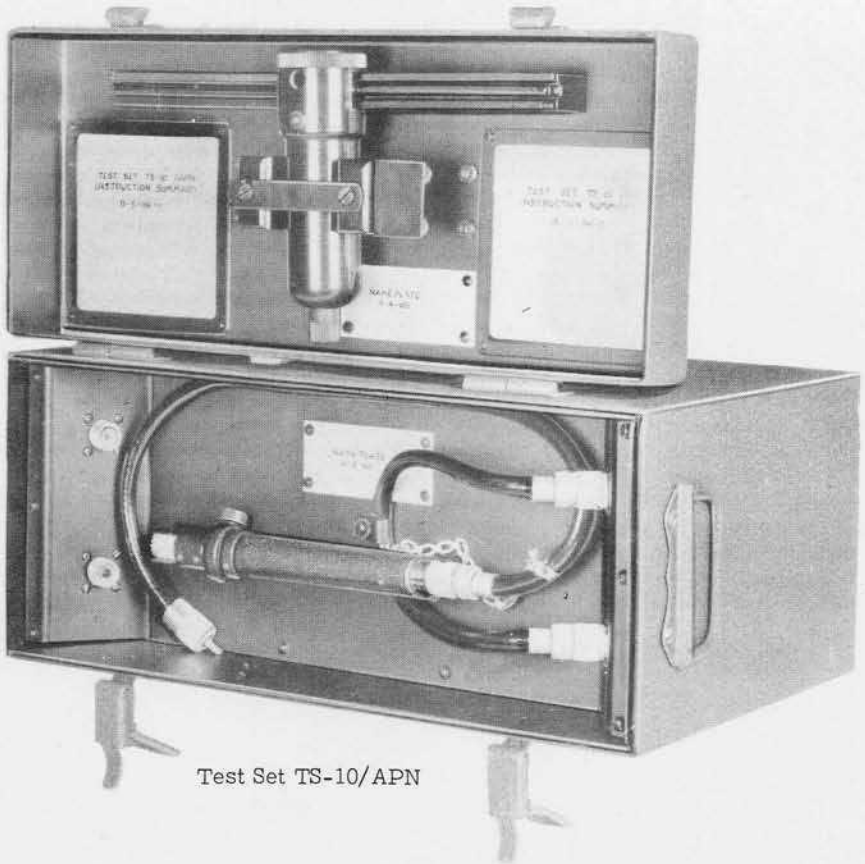
Test Set TS-10/APN is designed for testing various radio altimeter systems such as Radio Set *AN/-APN-1 and SCR-718. It will check low range calibration, will give rough check of antenna condition and power output, and will measure or check loop sensitivity and receiver alignment.

The set consists essentially of a delay unit, a variable attenuator and either one or two indicators.

The delay unit consists of two coils which can be used separately for short delay or in series for long delay. The signal delay obtained by use of the short coil is equivalent to a 65-foot altitude. The long coil gives the equivalent of a 297-foot altitude. When both coils are used in series a signal delay equivalent to a 350-foot altitude is obtained. The known delay periods provide a means for checking the calibration of the altimeter systems under test, by observing their altitude indications.

The variable attenuator, calibrated in decibels from 30 to 100 and used in conjunction with the delay lines, provides a voltage attenuation equivalent to actual signal loss and allows a check of overall system sensitivity and tuning. The indicator used with Test Set TS-10/APN and TS-10A/APN consists of a tuned dipole with a lamp, which can be attached to or used in close proximity to the altimeter antenna. Indicator ID-98/APN or ID-98A/APN used in TS-10B/APN and TS-10C/APN respectively contains a 1.5 volt battery, variable resistor, lamp and pickup dipole. The lamp indicates the approximate power being fed to the antenna. It is used for checking the condition of the antenna system.

POWER SOURCE	BA-30 (1.5V) REQUIRED FOR ID-98/APN & ID-98A/APN
FREQUENCY	420 - 460 MC
INPUT IMPEDANCE	50 OHMS
OVERALL ATTENUATION	60 TO 130 DB (APPROX.)
DELAY	0.7 MICROSECOND (APPROX.)



Test Set TS-10/APN

TEST SET TS-10/APN

TOTAL WEIGHT 38 LBS.

Component	Nomenclature	Size	Weight
Delay Unit		16" x 14" x 7"	
Attenuator and Cord Assy.		20" long	
Output Indicators (2)		10" long	
Cord (2) CD-800	CG-107/APN or CG-108/APN	8' long	
Cord CD-800	CG-107/APN or CG-108/APN	1' long	
Spare Lamps (2) for indicators			

TS-16/APN

Test Set TS-16/APN is a portable equipment designed for aligning and calibrating various radio altimeters such as Radio Set AN/APN-1, AN/ARN-1 and Altimeter Equipment RC-24-B

This equipment consists essentially of a precision audio frequency oscillator and a precision UHF frequency meter for checking and aligning FM altimeters. When the necessary connecting cables are attached, the counter circuits of the altimeter can be calibrated, the frequency modulating oscillator can be checked and the band width of the altimeter transmitter can be set.

It is self-contained in a wooden case with handle. A compartment within the case is provided for storing the accessory cordage. The phantom antenna and spare fuses are mounted inside the top cover of the test set.

AAF requirements as of 1 February 1945 were 2903 for 1945.

POWER INPUT	38 WATTS @ 28 VOLTS
FREQUENCY RANGE	410 TO 470 MC
ACCURACY	ERROR NOT TO EXCEED PLUS OR MINUS .3 MC
AUDIO OSCILLATOR RANGE	340 TO 7250 CYCLES
MODULATOR FREQUENCY ACCURACY	.5 CYCLES PLUS OR MINUS
AUDIO ACCURACY	1 % UP TO 5000 CPS. 2 % 5000 TO 7250 CPS
INPUT IMPEDANCE	50 OHMS

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	9002	1	12A6
2	12SJ7	2	12J5GT

Test Set TS-16/APN

Test Unit With Tee Connector On Cord CX-35/APN

TEST SET TS-16/APN

TOTAL WEIGHT 45 LBS.

Component	Nomenclature	Size	Weight
Test Set	TS-16/APN	16" x 11" x 17"	40 Lbs.
Cord	CX-35/APN	8 Feet	2 Lbs.
Phantom Antenna Unit	TS-63/AP	2" x 1"	*

*Weight less than one pound.

July 1945

TS-23/APN

Test Set TS-23/APN an altimeter test set is used for depot testing of certain operational characteristics of Radio Set SCR-718-( ).

The set consists essentially of a fixed-tuned wavemeter, diode detector and a d-c microammeter. The Transmitter frequency is set by tuning for a maximum deflection on the meter. Relative power output measurements are also indicated on the same meter at a calibrated marking of 375 volts. The other calibrated marking of 320 volts is for measuring low voltage B+ in Radio Set SCR-718-( ).

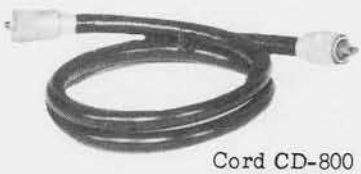
The equipment is self-contained in a metal case with all operating controls on front panel. There are four accessory operating cables; three are permanently attached to the unit and the fourth is detachable. The test set is normally mounted within a wooden carrying case but may be removed if desired.

AAF requirements as of 8 March 1945 were 386 for the calendar year 1945.

POWER INPUT	1.5 WATTS @ 115 VOLTS
FREQUENCY	440 MC

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	9004		

Case



Cord CD-800

Test Unit

TEST SET TS-23/APN

TOTAL WEIGHT 14 LBS.

Component	Nomenclature	Size	Weight
Test Set	TS-23/APN	9" x 4" x 4"	5 Lbs.
Cord	CD-800	34"	
Carrying Case		12" x 9" x 8"	7 Lbs.
Allen Wrench			

July 1945

TS-111/CP

Test Set TS-111/CP is an adjustable coaxial cavity wavemeter designed to test airborne radar or beacon systems. It is used with the AN/CPN-3 and AN/CPN-8.

This equipment will measure or check the frequency of pulsed, CW or modulated radar transmitters or signal generators. The wavemeter sensitivity is such as to require 2 milliwatts of CW RF power to give full scale deflection of the microammeter.

The RF attenuator is continuously variable from a minumum of zero DB attenuation to a maximum of approximately 25 DB attenuation.

A dc mircoammeter is used to indicate resonance, and frequency is read from a calibration chart supplied with the wavemeter. The set is enclosed in a waterproof plywood transit case.

AAF requirements as of 3 March 1945 were 334 for 1945.

FREQUENCY	3000 TO 3600 MC
TYPE OF SIGNAL	PULSE OR CW
INPUT IMPEDANCE	50 OHMS

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	IN21 B		

Case CY-167/CP

Wavemeter TS-111/CP

Cord CG-114/U

Attenuator CN-15/CP

Cord CG-99/AP

TEST SET TS-111/CP

TOTAL WEIGHT 22 LBS.

Component	Nomenclature	Size	Weight
Wavemeter	TS-111/CP	7" x 5" x 5"	8 Lbs.
Attenuator	CN-15/CP	6" x 3" x 3"	*
Cord	CG-244/AP	5 Feet	1 Lb.
Cord	CG-100/U	5 Feet	1 Lb.
Case	CY-167/CP	10" x 10" x 12"	10 Lbs.

July 1945

CONFIDENTIAL

TS-251/UP

Test Set TS-251/UP (Loran Test Set) is a portable RF signal generator. Various RF channels and output voltages are indicated and selected by rotary switches located on the front panel. All visual indications appear on the receiver indicator. A table of correct readings is posted on the signal generator panel for comparison.

This equipment is designed to measure or check time performance (including crystal frequency adjustment), stability of sweep generating circuits, receiver alignment, possible video distortion and accuracy of time delay measurements on Loran Sets AN/APN-4, AN/APN-9, SCR-722A, DAS-1, and LRN.

POWER INPUT	23 WATTS @ 100-130 VOLTS
FREQUENCY	1750 KC TO 2000 KC
TYPE OF SIGNAL	PULSED OR CW

TUBE COMPLEMENT			
NO.	TYPE	NO.	TYPE
1	6J5	1	6SN7GT
1	6SK7	1	6X5/GT
1	6SJ7	1	6SL7

CX-404/UP

CG-223/UP

CQ-222/UP

PL-258

Navy Type 49544

U-46/U

U-45/U

TEST SET TS-251/UP

TOTAL WEIGHT 11 LBS.

Component	Nomenclature	Size	Weight
Test Set	TS-251/UP	10" x 12" x 8"	11 Lbs.

Includes: Cords, plugs, adapter etc.