

UNCLASSIFIED

AD NUMBER	
AD020266	
CLASSIFICATION CHANGES	
TO:	unclassified
FROM:	confidential
LIMITATION CHANGES	
TO:	Approved for public release, distribution unlimited
FROM:	Distribution authorized to DoD only; Foreign Government Information; FEB 1953. Other requests shall be referred to British Embassy, 3100 Massachusetts Avenue, NW, Washington, DC 20008.
AUTHORITY	
DSTL, AVIA 18/1478, 18 Nov 2008; DSTL, AVIA 18/1478, 18 Nov 2008	

THIS PAGE IS UNCLASSIFIED

Armed Services Technical Information Agency

AD

20266

NOTICE: WHEN GOVERNMENT OR OTHER DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE U. S. GOVERNMENT THEREBY INCURS NO RESPONSIBILITY, NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

Reproduced by
DOCUMENT SERVICE CENTER
KNOTT BUILDING, DAYTON, 2, OHIO

CONFIDENTIAL

The following ESPIONAGE NOTICE can be disregarded unless this document is plainly marked RESTRICTED, CONFIDENTIAL, or SECRET.

NOTICE: THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C., SECTIONS 793 and 794. THE TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

CONFIDENTIAL

THE RECIPIENT IS WARNED THAT INFORMATION
CONTAINED IN THIS DOCUMENT MAY BE SUBJECT
TO PRIVATELY-OWNED RIGHTS.
9th Part of AAE/866/1



MINISTRY OF SUPPLY

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT

BOSCOMBE DOWN

SHACKLETON MK.2 WB. 333
(4 GRIFFON 57)

RADIO ACCEPTANCE TRIALS

1. THIS INFORMATION IS DISTRIBUTED FOR OFFICIAL USE
BY THE H.M. GOVERNMENT. IT IS NOT TO BE
OTHERWISE DISCLOSED TO ANY
PERSON OR ORGANISATION IN THE
ARMED FORCES OF THE CROWN
OR IN THE H.M. GOVERNMENT
UNLESS IT IS SO ORDERED BY
THE H.M. GOVERNMENT.
2. THE INFORMATION CONTAINED IN THIS REPORT
IS TO BE KEPT SECRET AND NOT
DISCLOSED TO ANY OTHER
PERSON OR ORGANISATION
WITHOUT THE PRIOR PERMISSION
OF THE H.M. GOVERNMENT.
3. THE INFORMATION CONTAINED IN THIS REPORT
SHOULD NOT BE CIRCULATED
OUTSIDE THE H.M. GOVERNMENT
WITHOUT THE PRIOR PERMISSION
OF THE H.M. GOVERNMENT.

ATTENTION IS CALLED TO THE PENALTIES ATTACHING
TO ANY INFRINGEMENT OF THE OFFICIAL SECRETS ACT.

THIS DOCUMENT IS THE PROPERTY OF H.M. GOVERNMENT.

It is intended for the use of the recipient only, and for communication to such officers under him as may require to be acquainted with the contents of the report in the course of their duties. The officers exercising this power of communication will be held responsible that such information is imparted with due caution and reserve.

Any person other than the authorised holder, upon obtaining possession of this document, by finding or otherwise, should forward it, together with his name and address, in a closed envelope to:—

THE SECRETARY, MINISTRY OF SUPPLY,
T.P.A.3/T.I.B., LEYSDOWN ROAD, MOTTINGHAM, S.E.9.

Letter postage need not be prepaid: other postage will be refunded.

All persons are hereby warned that the unauthorised retention or destruction of this document is an offence against the Official Secrets Acts, 1911-1939.

CONFIDENTIAL

9th Part of Report No. A.A.E.E./866/1

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT
ROSCOMB DOWN

17 FEB 1953

Shackleton Mk.2 WB.833
(4 Griffon 57)

Radio Acceptance Trials

A.& A.E.E. Ref: AAEE/411/31/Radio
M. O. S. Ref: 39th Joint Meeting, Ministry of Supply.
Period of Trials: 31st July, 1952 to 7th November, 1952.

Progress of issue of Report	
Report No.	Title
4th Part AAEE/866/1	VW.126' Handling Trials at a Forward C.G. Position.
5th - do -	WG.530 Brief Engine & Oil Cooling Trials made under near ICAN Conditions.
6th - do -	WB.833 Handling Trials on the First Production Aircraft.
7th - do -	WB.833 Cockpit Appraisal.
8th - do -	WB.833 Comments on Crew Comfort during Flights WG.530 of Long Duration.

Summary

Acceptance trials on a Shackleton Mk.2 were required in accordance with the 39th Joint Meeting, Ministry of Supply, covering the following equipments:-

A.S.V. Mk.13 (with retractable radome)
A.R.I. 5487 (Sono-buoy)

Also included in this report are comments made by a Coastal Command Navigator who participated in the trials.

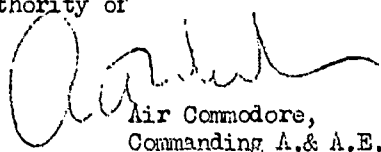
The Radio Compass installation will be cleared by R.A.E. and is therefore not included in this report.

The following equipments are cleared by analogy with those in the Shackleton Mk.1 and are covered in that report.

GEE Mk.2	T.1154/1155
Loran Mk.1	TR.1920 (Two)
I.F.F. Mk.3 G.R.	A.1134A (Intercomm.)
Rebecca Mk.4	A.R.I.5388 (i/c Switching)
A.Y.F.	

It is considered as a result of these trials, that the Shackleton Mk.2 installations are acceptable for service use, subject to rectification wherever possible of the criticisms listed in paras. 4.1.1 to 4.1.12, and that the A.R.I. 5487 Aerial polar diagram covers tactical requirements.

This report is issued with the authority of


Air Commodore,
Commanding A.& A.E.E.

CONFIDENTIAL

- 2 -

List of Contents

	<u>Page</u>
1. Introduction	3
2. Object of Trials	3
3. Reports Issued	3
4. A.S.V. Mk.13	3
5. A.R.I.5487	8
6. Inter-equipment Interference	10
7. Conclusions	

List of Illustrations

	<u>Figure</u>
Full view of Shackleton Mk.2 Aircraft	1
A.R.I.5487 Aerial position	2
Looking into the Scanner Well	3
Radome in 1st Search position	4
" " 2nd Search "	5
" " Attack position	6
Bulkhead plugs	7
A.S.V. T/R 3523 E. position	8
A.S.V. Mod. Unit, Power Unit and Amp. A.3621 positions	9
A.S.V. Operators Station	10
Invertors type 4B and V.C.P. type 11	11
Invertors type 3A and 100A	12
Position of Junction box type 340	13
A.R.I.5487 Operating positions	14 & 15
Various photographs of A.S.V. Indicator tube	16 to 24
A.R.I.5487 Aerial polar diagram	25
A.R.I.5487 Aerial polar diagram with 20° bank	26
A.R.I.5487 Range curves	27

/1. Introduction.....

CONFIDENTIAL

1. Introduction

1.1 Radio Acceptance Trials have been carried out on a Shackleton Mk.2 aircraft covering the following equipments:-

A.S.V. Mk.13 (With retractable radome)
A.R.I. 5487 (Sono Buoy, three stations)

1.2 No trials were carried out on the Radio Compass installation as it was understood that R.A.E. would give the necessary clearance; or on the following installations which were cleared by analogy with those in the Shackleton Mk.1 and were covered in the 17th part of A. & A.E.E. Report No. 866.

GEE Mk.2	T. 1154/1155
Loran Mk.1	T.R. 1920 (Twin)
I.F.F. Mk.3 G.R.	A. 11341 (Inter-comm.)
Rebecca Mk.4	A.R.I. 5388 (i/c Switching)
A.Y.F.	

1.3 Included in this report are comments made by a Coastal Command Navigator who participated in the trials.

2. Object of Trials

2.1 To clear the Shackleton Mk.2 radio installations as detailed in para. 1.1 which differed from those in the Mk.1.

2.2 To make recommendations for modification, either to the installation or service equipment as considered necessary.

3. Reports Issued

3.1 Already issued:- Shackleton Mk.1: 17th part of A. & A.E.E. Report No. 866.

3.2 Included in this report:- A.S.V. Mk.13 and A.R.I. 5487 only.

3.3 Reports to follow:- Nil.

4. A.R.I. 5729 (A.S.V. 15)

4.1 Installation Details

4.1.1 Scanning Unit Type 85 with its associated equipment was mounted in a retractable radome amidships on the underside of the fuselage, with switching facilities for three different extended positions, i.e. "1st Search", "2nd Search" and "Attack" (Figs. 4 to 6).

4.1.1.1 It was found that the safety precautions for personnel working in the scanner compartment when extended on the ground were inadequate.

4.1.1.2 If the override switch was operated the radome traversed towards the position selected by the main selector switch only as long as the override switch was held, and hydraulic power was available; thus if the scanner was lowered to "2nd Search" position it would only remain at this point if no hydraulic power was available, or the override switch was held. Should hydraulic power be applied when the override switch was unattended, then the radome would automatically retract. This was dangerous to anyone working within the scanner compartment.

4.1.1.3 In addition to this danger, it was possible to select the "attack" position by means of the override switch, on the ground, and, unless the aircraft was jacked fore and aft there was insufficient ground clearance to allow the radome to extend fully. As there was no need

/in.....

CONFIDENTIAL

- 4. -

in normal servicing to lower the radome below the "second search" position, which was allowable when the tail only was jacked, it is suggested that the present override switch be deleted, and a two position switch be fitted under the scanner hatch covers in such a position as to prevent accidental operation, preferably with some form of guard flap.

4.1.1.4 The operation of this switch to be as follows:-

- (a) When in "test" position, the radome to be lowered to "2nd search" position independently of the main selector switch position and independent also of all interlocks on the undercarriage.
- (b) When in "normal" position the radome to be returned to the retracted position and control of the hydraulic system to be returned to the main selector switch and undercarriage interlocks.

This system would then provide adequate safety when in the test position, assuming that the hydraulic action is dead, should the electrical supply fail.

It is understood that action is being taken to overcome this bad feature. See Form 555 dated 27th October, 1952.

4.1.1.5 It was also found desirable to have a 24 volt supply available near the scanner hatch for use when servicing the scanner. A standard inspection socket may possibly be incorporated on the panel situated to the rear of the port observation window; this socket would also serve as an Aldis lamp supply which again was not available in the Mk. II aircraft.

4.1.1.6 It may be mentioned also that during flight trials in which Coastal Command participated, no use was found operationally for the "1st search" position of the scanner, and it was considered that this position was unnecessary, (This position was useful only for setting up the heading marker on the ground).

4.1.1.7 In case of emergency a secondary system of raising the retractable radome by the use of emergency air was provided and it was not thought necessary for a third system to be incorporated.

4.1.1.8 The cables to the scanner loom have P.V.C. covering to prevent chafing. This sleeving should pass under the metal cable clamps to prevent wear at these points. (Fig.3).

4.1.1.9 A strap should be attached under the central floor support channel to take the weight of the directive feed and waveguide when the T/R Unit was removed.

4.1.1.10 In the event of a scanner change it was thought advisable to provide a scanner frame to ease positioning of the scanner in the radome.

4.1.1.11 The heavy duty cable from the bulkhead to the scanner junction box (Fig.3) should be re-routed to the opposite end of the clamp on the bracket tube above the scanner to increase the radius of the bend to the socket.

4.1.1.12 The bulkhead plugs for the cable loom to the scanner well were mounted under the floor to port and forward of the radome, and could only be reached by lowering the radome (Fig.7), this bad feature being one reason why maintenance personnel may be inside the radome when it is extended; para. 4.1.1.2 refers.

4.1.2 The Transmitter-Receiver Type TR. 3523E W/V was positioned on top and to the rear of the retractable radome platform (Fig.8), in a

CONFIDENTIAL

/satisfactory....

satisfactory position for maintenance. The signal lead need a clip to secure the plug in its socket to prevent it falling off in flight.

4.1.3 The Modulator Unit Type 196 W/W was mounted just forward of the port radome hydraulic ram (Fig.9), and was satisfactory for maintenance.

4.1.4 The Servo Amplifier Type A. 3621 was positioned just aft and to port of the radome hydraulic ram (Fig.9). The cables to this amplifier were pulling the unit to one side; more play in the cable form should be provided to prevent this. The equiflex mountings are either of insufficient weight capacity or have fatigued.

4.1.5 The Indicator Type 211 was mounted on its tray in the centre of the A.S.V. Operator's table (Fig.10), in a good operating position. The screen edge lighting on the Indicator tested had recently been modified by the Contractor, but as can be seen in Fig. 17, was still unsatisfactory. Providing the indicator was thoroughly dry internally, no misting of the tube screen was experienced.

4.1.6 Amplifier Type A. 3644 was fitted on the port side of the A.S.V. Operator's table (Fig.10), and was satisfactorily positioned for servicing.

4.1.7 The Oscillator Unit Type 231 was mounted under the A.S.V. Operator's table on the port side (Fig.10), and was satisfactory for operation.

4.1.8 The Power Unit Type 567 W/W was mounted immediately behind the port radome hydraulic ram (Fig.9). The equiflex mountings are again either of insufficient weight capacity or have fatigued.

4.1.9 The A.C. and D.C. switches were mounted on the A.S.V. Operator's switch panel (Fig.10), and were satisfactory for operation.

4.1.10 The two Inverters Type 4B and their associated V.C.P's were mounted on the port side of the galley floor (Fig.12), and were satisfactory for maintenance.

4.1.11 Junction Box Type 340 was mounted on the port fuselage wall near the floor under the A.S.V. Operator's table (Fig.13), and was satisfactory for maintenance.

4.2 Object of Trials

4.2.1 To assess the performance of the equipment with the scanner mounted in a retractable radome in a new position aft of the bomb doors, and with all accepted Coastal Command modifications fitted to the equipment.

4.2.2 To determine whether any shielding exists from either the aircraft fuselage or bomb doors, when looking forward.

4.3 Procedure for Trials

4.3.1 To obtain the maximum ranges on various sizes of target, the aircraft was flown over the sea at heights between 500 and 2,000 ft., the size of the target being estimated on making visual contact.

4.3.2 Range checks were also made on a submarine, fully surfaced, and with conning tower only showing; photographs of the responses are shown in Figs. 19 and 20.

4.3.3 To ascertain whether any blanking existed when looking forward through the bomb doors, a number of runs were made tracking a target dead ahead, noting the accuracy of the track by visual plotting.

CONFIDENTIAL

- 6 -

4.3.4 To determine whether any shielding from the aircraft fuselage was present, two runs were made on to targets with the aircraft attacking in a shallow dive, the first run at 50 and the second at 100.

4.3.5 To assess the efficiency of the radome and scanner stabilisation, flights were made at 300 knots observing a coast line pattern all the time on the C.R.T.

4.3.6 To determine the accuracy of the heading marker using the present method of jacking up the tail for setting up, a radar bearing was taken on the Needles, Isle of Wight, and cross checked by taking a Gee fix and computing the bearing on a map.

4.4 Results

4.4.1 Range Test. With the aircraft flying over the sea at heights varying between 500 feet and 2,000 feet the following ranges on targets were obtained, and were considered satisfactory.

Target	Height of Aircraft	Range
Liner, 10,000 tons	1,000 ft.	45 N.M.
Destroyer	500 ft.	30 N.M.
Tanker 3,000 tons	1,000 ft.	35 N.M.
Aircraft Carrier	500 ft.	45 N.M.
Tug, 200 tons	500 ft.	22 N.M.
Submarine, Surfaced	500 ft.	20 N.M. Sea State 1
Submarine, Conning Tower only.	500 ft.	8 N.M. Sea State 1
Weather Ship	2,000 ft.	(50 N.M. Intermittent (30 N.M. Continuous
Fishing Marker Buoys	500 ft.	5 N.M.
Coastlines	2,000 ft.	50 N.M.
High Ground	2,000 ft.	140 N.M. Intermittent

4.4.2 The all round cover was extremely good on both "2nd Search" and "Attack" positions of the scanner, except when banking when considerable blanking from the wings was noticed. Owing to bad cut off experienced on the "1st Search" position with the scanner tilt at -10, it did not seem to have any useful operational application, but was useful for setting up the heading marker on the ground.

4.4.3 Flights were made tracking a ship target, with the aircraft in a shallow dive from 1,500 ft. to 500 ft, scanner tilt at -10, the small amount of bomb door shadow did not prevent tracking a target right to the point of attack. Interference to the picture was present due to the bomb doors but tracking accuracy was not impaired. Photographs of the C.R.T. picture were taken and are shown in Figs. 16, 17 and 18.

4.4.5 During the scanner stabilisation tests it was noticed on the first flight that after banking at about 20° the scanner was slow in recovering. After alteration to the feedback control settings in Amplifier A. 3621, subsequent flights showed the recovery time to be much improved. The pre-set feedback controls in Amplifier A. 3621 are mounted inside the pressurised unit, and for ease of servicing and adjustment, it would be much more satisfactory if they were mounted on the front panel so that adjustments can be made without first having to remove the unit from its pressure case.

4.4.6 Throughout the tests on this equipment the radome was altered in position some 120 times, and no trouble was experienced either mechanically or electrically due to cables fracturing or being chaffed at

/the.....

CONFIDENTIAL

the flexible point of entry to the radome. At one time it was thought that the radome which was set in the "Attack" position did not retract when the undercarriage was selected "Down", but after further tests it was found that, due to the additional load on the hydraulic system, the undercarriage did not start coming down until 45 seconds after the radome had started to retract.

4.4.7 During the high speed flights, i.e. 300 knots, the vibration experienced on the scanner assembly was very slight and it was not considered necessary to make any special tests.

4.4.8 To line up the heading marker the aircraft tail was jacked up and the radome lowered to "1st Search" position. A field strength meter was then taken to a point in front of the aircraft and lined up with the bomb door centre line. The scanner was then adjusted for maximum signal on the field strength meter, and the heading marker set to the scanner heading. This method of setting up was quite satisfactory and proved quite accurate when checked by a bearing obtained on a landmark after taking a Gee fix.

4.4.9 A general aircraft assessment flight was made to Gibraltar, and the A.S.V. equipment was run continuously for 14 hours on the outward run and 8 hours on the return run, no unserviceability was experienced and the performance was considered very satisfactory by the Coastal Command Operator who took part in this flight.

4.4.10 The R.A.M. installation in the Radome to prevent reflections off the fuselage when testing on the ground, was quite satisfactory. No change in crystal current or magnetron current was noticed at any point through the full 360° rotation of the scanner. It is understood that modifications are in hand to improve the method of fixing the R.A.M. to the radome framework (Form 555 dated 9.10.52).

4.4.11 No assessment of the usefulness of the T.S.X.634 and Neon Wattmeter for overall performance measurements in the aircraft was made owing to the test set not being available.

4.4.12 After some 64 hours flying including the trip to Gibraltar, and most of this flying time being at low altitudes over the sea, including many flights in heavy rain, no damage was caused to the radome due to rain erosion.

4.4.12 Photographs were taken of the Indicator Cathode Ray Tube to illustrate effects due to bomb door shadowing, submarine response and with the scanner in its different positions. They are shown in the following order:-

Fig. 16 Subject:- Showing bomb door shadow

Aircraft Course	090°
Altitude	1,000 feet.
Range Scale	10 miles
Tilt Setting	-1°
Scanner Position	Attack

Fig. 17 Subject:- Contact within bomb door shadow

Aircraft course	270°
Altitude	500 feet
Range Scale	10 miles
Range on Target	6 miles
Target	Ship
Tilt Setting	-1°
Scanner Position	2nd Search

/Fig. 18.....

CONFIDENTIAL

- 8 -

Fig. 18 Subject:- Bomb door shadow but contacts not hidden

Aircraft Course	270°
Altitude	500 feet
Range Scale	10 miles
Range on Target	5 and 7 miles
Target	Ship contacts
Tilt Setting	-10
Scanner Position	2nd Search

Fig. 19 Subject:- Submarine Response

Aircraft Course	072°
Altitude	500 feet
Range Scale	20 miles
Range on Target	7 miles
Target	Surfaced submarine
Tilt setting	-10
Scanner Position	Attack

Fig. 20 Subject:- Submarine Response

Aircraft Course	080°
Altitude	500 feet
Range Scale	10 miles
Range on Target	3 miles
Target	Submarine Conning Tower only
Tilt Setting	-10
Scanner Position	2nd Search

Fig. 21 Subject:- General Definition I.O.W. and the Solent

Aircraft Course	060°
Altitude	1,500 feet
Range Scale	10 miles
Tilt Setting	-10
Scanner Position	Attack

Fig. 22 Subject:- Max. Range over land with scanner in 1st Search

Aircraft Course	220°
Altitude	1,200 feet
Range Scale	10 miles
Tilt Setting	-10
Scanner Position	1st Search

Figs. 23 Subject:- West Sector Scan with and without range rings
and 24

Aircraft Course	250°
Altitude	1,000 feet
Range Scale	20 miles
Range on target	16 miles
Scanner Tilt	-10
Scanner Position	2nd Search

4.5 Remarks

4.5.1 The performance of the equipment is satisfactory and the layout of the installation acceptable subject to the bad features outlined in paras. 4.1.1 to 4.1.12 being rectified wherever possible.

5. A.R.I. 5487 (Sonobuoy)

5.1 Installation Details for Stations 1, 2 and 3 (numbered fore to aft)

/5.1.1.....

CONFIDENTIAL

5.1.1 Receiver Type 1933 and power unit Type 759 at station 1 were mounted at the forward end of the equipment rack (Fig. 15), and at station 2 mid-way along the equipment rack (Fig. 15), for station 3 they were mounted at the aft end of the equipment rack (Fig. 14), all positions being satisfactory for maintenance and operation.

5.1.2 Indicator Type 1 for station 1 was positioned at the forward end of the Navigation table (Fig. 15) and for station 2 mid-way along the Navigation table (Fig. 15), for station 3 the Indicator was positioned at the aft end of the Navigation table (Fig. 15), all being suitably positioned for operation and maintenance.

5.1.3 The Control Units Type 391 for each station were positioned immediately underneath the respective indicator units (Figs. 14 and 15), and were satisfactory for maintenance and operation.

5.1.4 The Junction Boxes Type 151 were fitted on the equipment racking immediately above each Indicator Unit (Figs. 14 and 15), all in satisfactory positions for servicing.

5.2 Equipment common to all Stations

5.2.1 Amplifier Unit Type X. 1150 was mounted at the aft end of the equipment racking (Fig. 15) in a satisfactory position for operation and maintenance.

5.2.2 Distribution Box Type 34 was fitted behind the port panelling at the Navigator's position.

5.2.3 The aerial was mounted 3 feet 6 inches aft of the Astra-dome and 1 foot 2 inches starboard of the aircraft centre line (Fig. 2).

5.3 Object of Trials

5.3.1 To determine the polar diagram of the aerial when flying straight and level, and also under conditions of orbit with the aircraft banking up to 20°, and performance tests of the airborne equipment, using a representative directional sonobuoy for range measurements.

5.4 Procedure for Trials

(a) Polar Diagrams

5.4.1 To obtain the polar diagram of the aerial with the aircraft flying straight and level at an altitude of 1,400 feet above sea level, a clover leaf pattern was carried out over a pin-point 24 nautical miles from the ground transmitter which was situated at Cove, Nr. Fernborough, Hants. Recordings of signal strength were taken off an "S" meter fitted in the aircraft.

5.4.2 To determine the polar diagram of the aerial with the aircraft banking at 20°, one turn to port and one to starboard were carried out, using the same pin point and procedure outlined in para. 5.4.1.

(b) Range Test

5.4.3 To check the performance of the equipment, a representative directional buoy was dropped into the sea off Lyme Regis and the aircraft carried out a series of runs at different heights, recording carrier strength in Db's above a known reference level of 1 μ v.

5.5 Results

5.5.1 The aerial polar diagram with the aircraft flying straight and level is shown in Fig. 25. The head and tail aspects are satisfactory; a drop of 7 Db's is apparent on both port and starboard aft aspects, this

/represents.....

CONFIDENTIAL

- 10 -

a drop in range from 9 to 6 miles as shown in Fig. 27.

5.5.2 The polar diagrams for the port and starboard 20° bank turns are shown superimposed in Fig. 26. The decrease in signal strength on a number of bearings on the diagram indicate that a reduction in range from 9 to 6 miles can be expected at these points.

5.5.3 The range runs were carried out with the aircraft flying at 500 and 1,000 feet above sea level, using an average performance directional buoy for providing the carrier for recording purposes; the results of these tests are shown in Fig. 27.

5.6 Remarks

5.6.1 The installation and layout is satisfactory.

5.6.2 The aerial polar diagrams on the head and tail aspects are satisfactory, a reduction in range can be expected at a number of points on the port and starboard beams as shown in Figs. 25 and 26.

6. Inter-equipment interference

6.1 Only slight interference was noticed on the A.R.I. 5487 Indicators, when the T. 1154/R.1155 and T.R. 1934/34 were transmitting, this did not affect the operational efficiency of the installation. Strong V.H.F. breakthrough was present on the audio channel of the A.R.I. 5487 over the full V.H.F. frequency range.

6.2 No interference A.S.V. 13 and A.R.I. 5487 was noticed throughout the trials.

6.3 The inter-communication system was satisfactory. No interference was experienced when all radio services were operating.

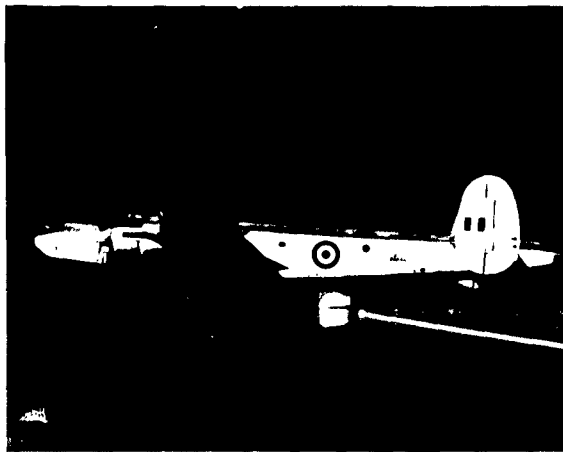
7. Conclusions

7.1 A.S.V. 13. The performance and layout of this installation is considered satisfactory and is acceptable for service use providing the bad features outlined in paras. 4.1.1 to 4.1.12 are investigated and rectified wherever possible.

7.2 A.R.I. 5487. The aerial polar diagram is not considered entirely satisfactory but may fulfil operational requirements. The layout of the installation for maintenance is considered satisfactory. Severe interference from the V.H.F. is present on the audio channel. This installation is suitable for Service use providing the above limitations are made known and accepted.

Circulation List

R.D.C.10 2 Copies 1 for Action
ADRD/L2 2 Copies
TPA3/TIB+c 75 Copies
R.T.O. A.V. Roe 4 Copies



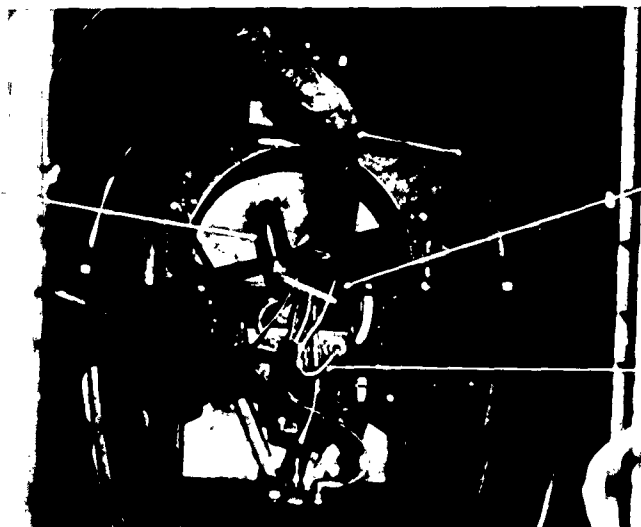
A.S.V Retractable
Radome.

FIG 1



A.R.I, 5487.Æ.

FIG 2



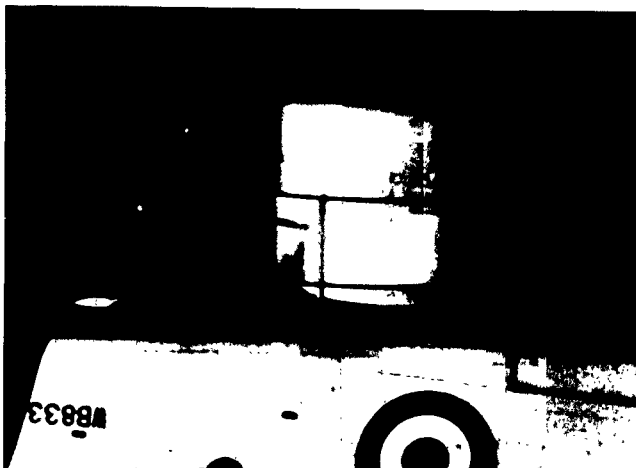
Scanner Type 85
in well.

See para.
4.1.1.8.

Bend too acute
see para 4.1.1.11.

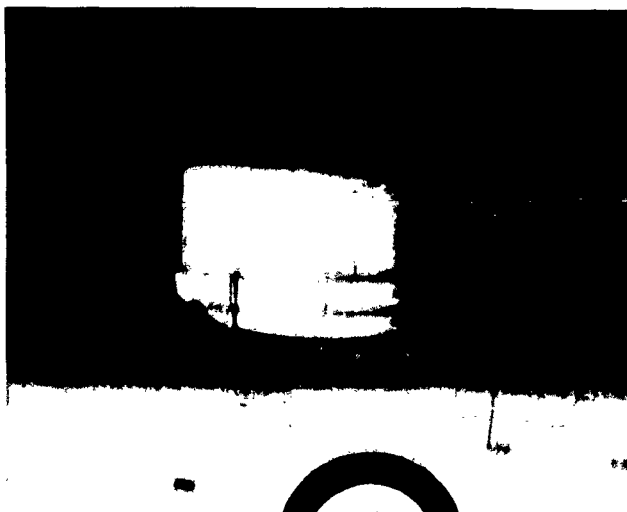
FIG 3

Attack position
Radome in



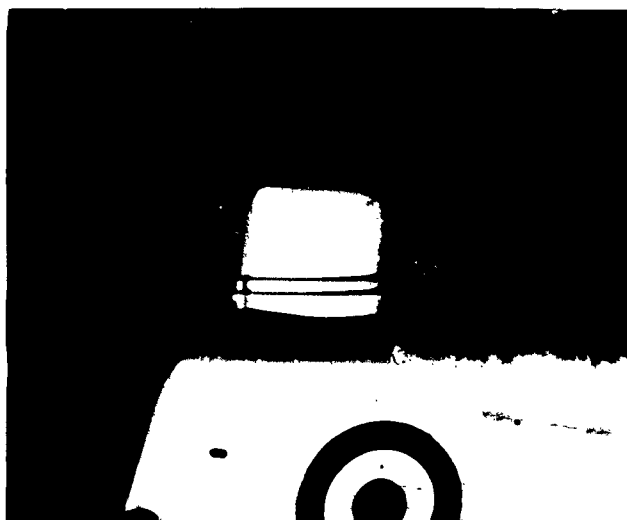
PC 5

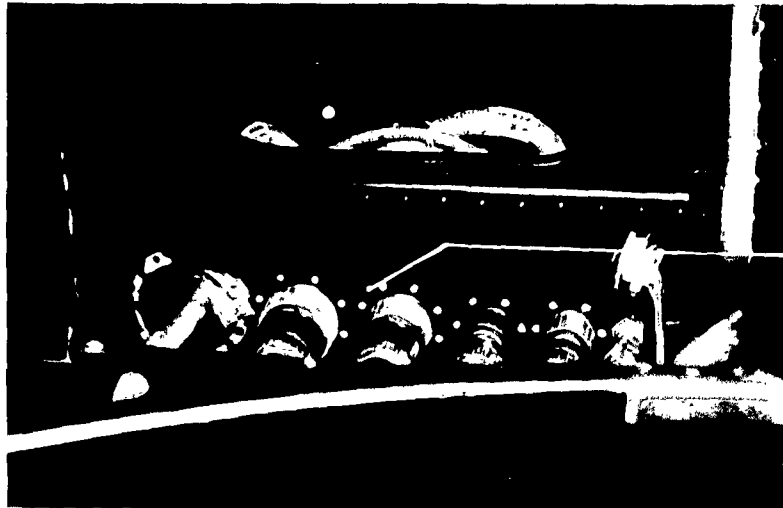
2nd Search position
Radome in



PC 4

1st Search position
Radome in





See para.
4.1.1.12.

FIG. 7



TR.3523.E.

FIG. 8.



Mod. Unit
Type 196.w.w.

Amplifier
A.3621.

Power Unit
Type 567 ww.

FIG. 9

A.S.V. Radome
Position Swks.



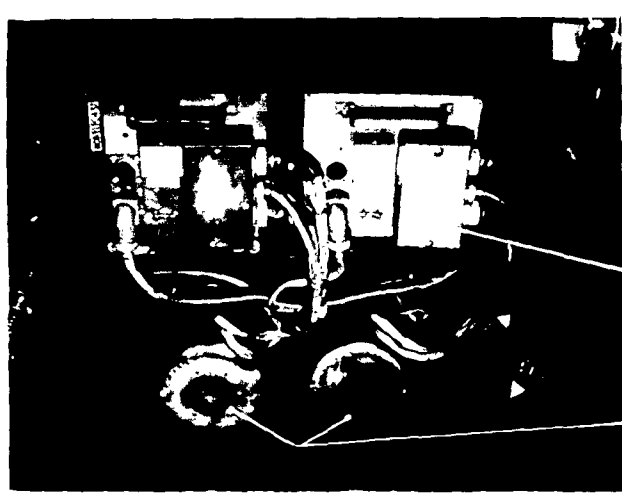
A.S.V. A.C. & D.C.
Switches.

Indicator
Type 211.

Amp. Unit
A3644.

Oscillator Unit
Type 231.

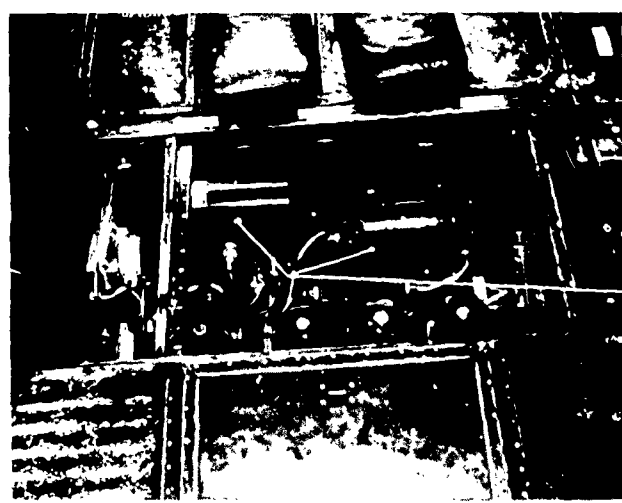
FIG 10



YCP
Type II.

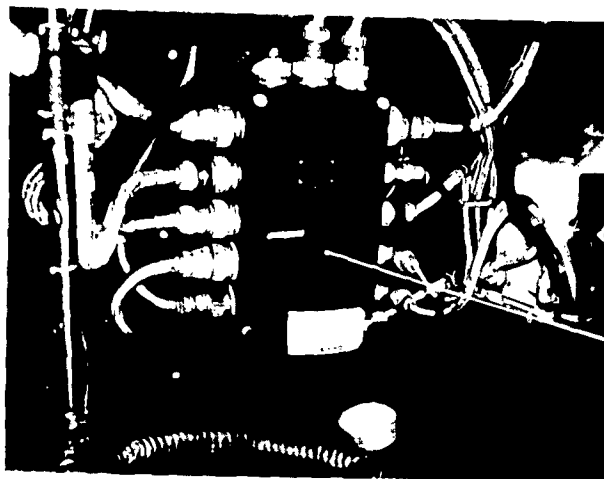
Invertors 4 B.

FIG 11



Invertors Type 8 A
and Type 100. A

FIG 12



Junction Box
Type. 340

FIG. 13

Rec. T. 1933 & Power.
Unit T.759.No.3.

Junction Box
151 No3.

Control Unit
391 No3.

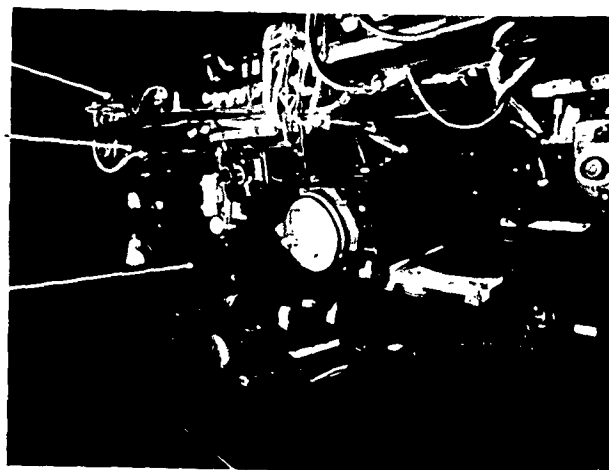


FIG. 14

Rec. T. 1933 & Power
Unit T.759 No 2

Amplifier
X.1150

Indicator
Type.I.No3.

Rec. T. 1933 & Power.
Unit T.759.No.1.

Junction Box
151 No1.

Indicator
Type.I.No1.

Junction Box
151 No.2.

Indicator
Type.I.No2.

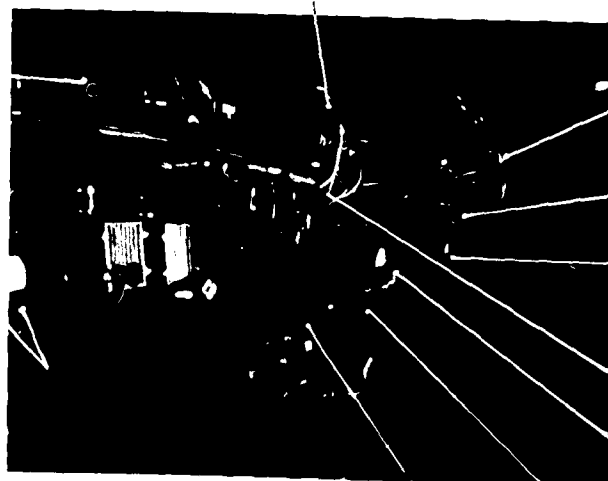


FIG. 15

Control Unit
391, No2.

Control Unit
391 No1.



FIG 16



FIG.17.



FIG. 18.



FIG. 19



FIG 20



FIG 21



FIG 22



FIG 23

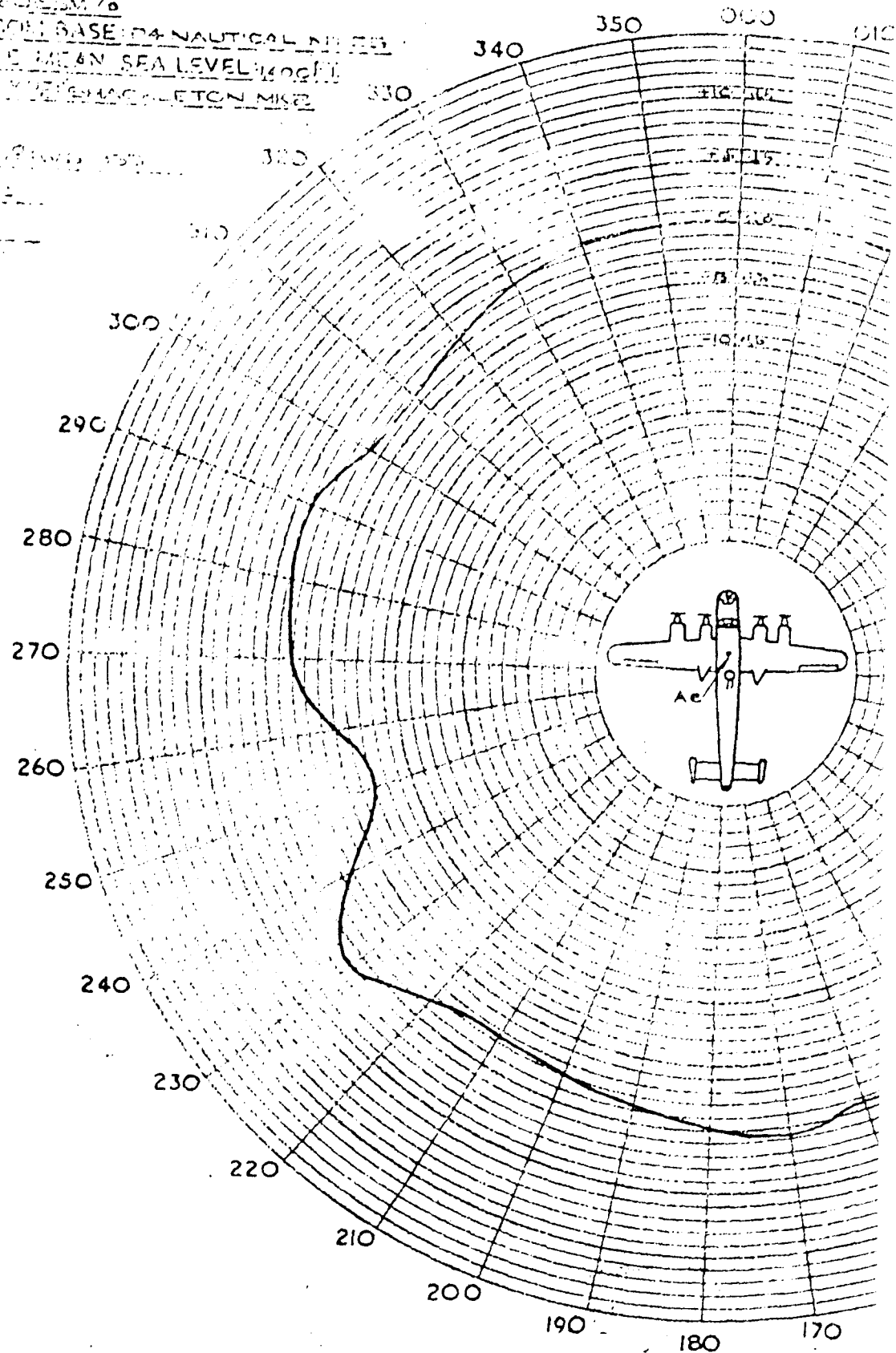


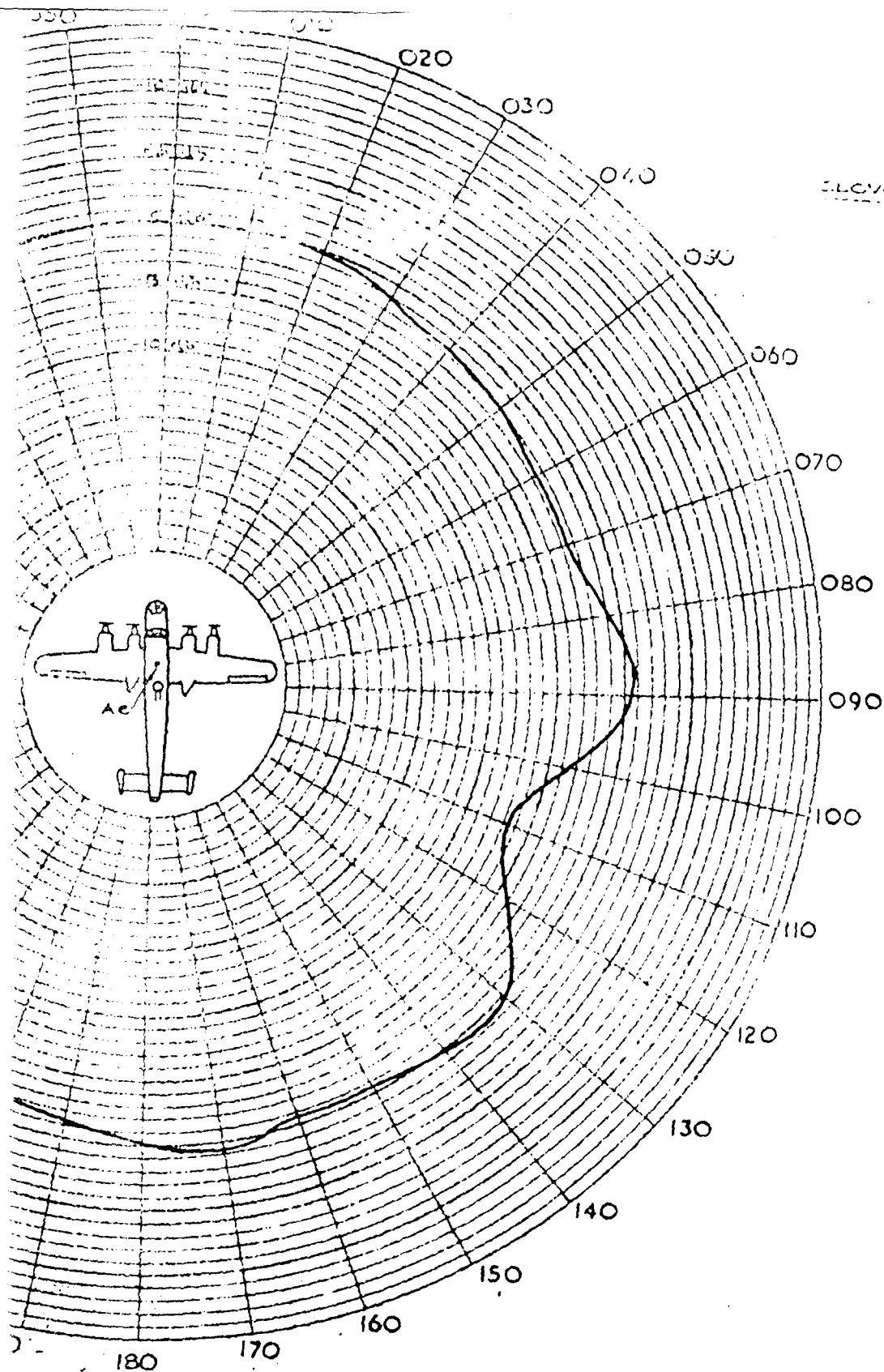
FIG 24

5K N9A4333 PART OF REPORT N9A2AEE 866/1 SHACKLETON WB833 TR M. & CH. C. MITHERS APP 1/1/1 for 504 P. 13

ONE LITNOY 0.5M%
DISTANCE FROM BASE 04 NAUTICAL MILES
HEIGHT ABOVE MEAN SEA LEVEL 1400 FT
BY SHACKLETON MKE

HEIGHT 1400 FT
DISTANCE 0.5 MILES
HEIGHT 1400 FT
DISTANCE 0.5 MILES





SLOWER LINE

POLAR DIAGRAM
OF SONOBUOY
AERIAL SYSTEM USED ON AIRCRAFT SHACKLETON MK2

SK N2A4334 PART OF REPORT N° A3AEE 866/1 SHACKLETON WB 833 TRM 2 CH C. NITERS. APP 864 101 304 P

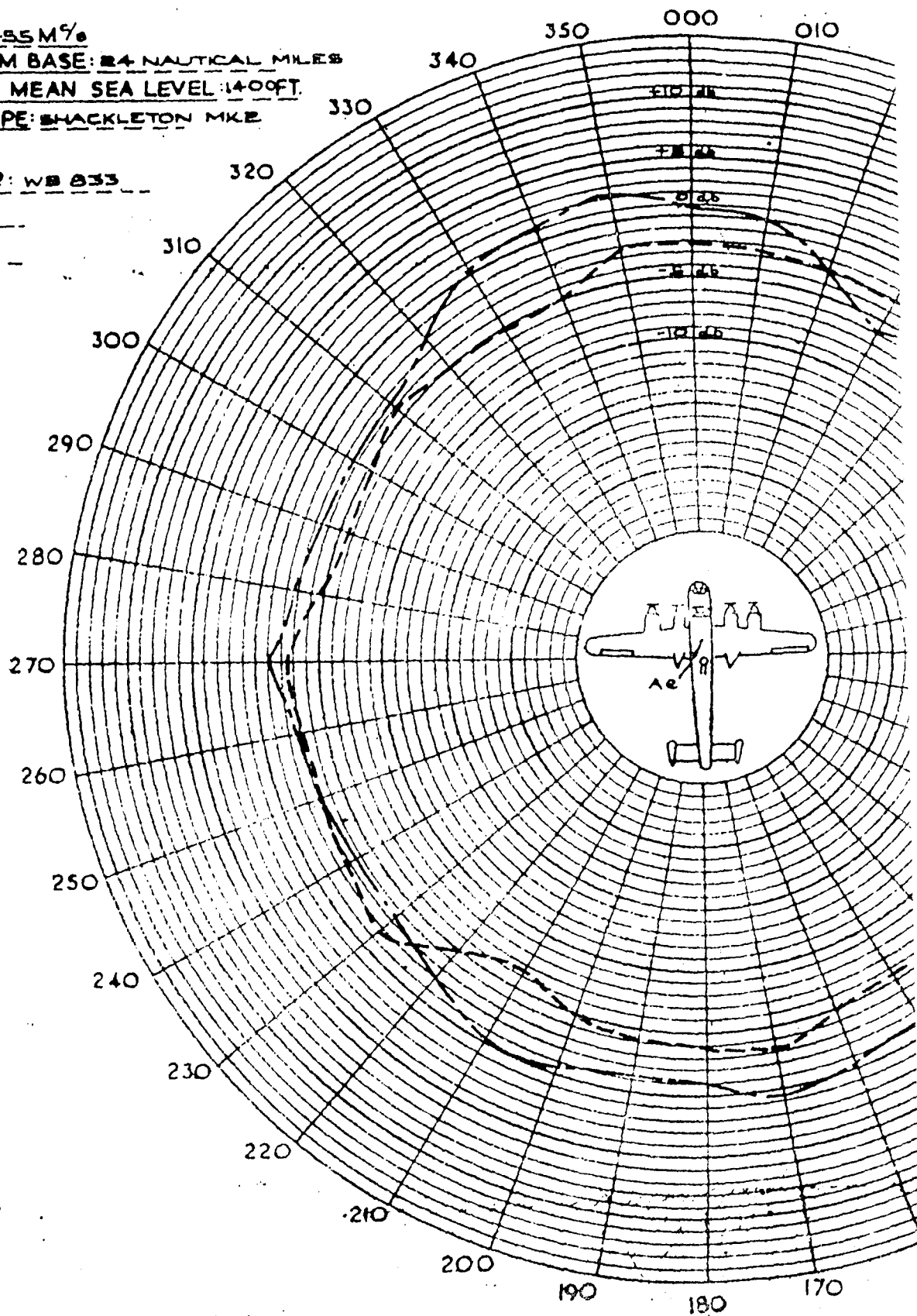
FREQUENCY: 60.55 MHz
DISTANCE FROM BASE: 24 NAUTICAL MILES
HEIGHT ABOVE MEAN SEA LEVEL: 1400 FT.
TYPE: SHACKLETON MK2

AIRCRAFT:

N°: WB 833

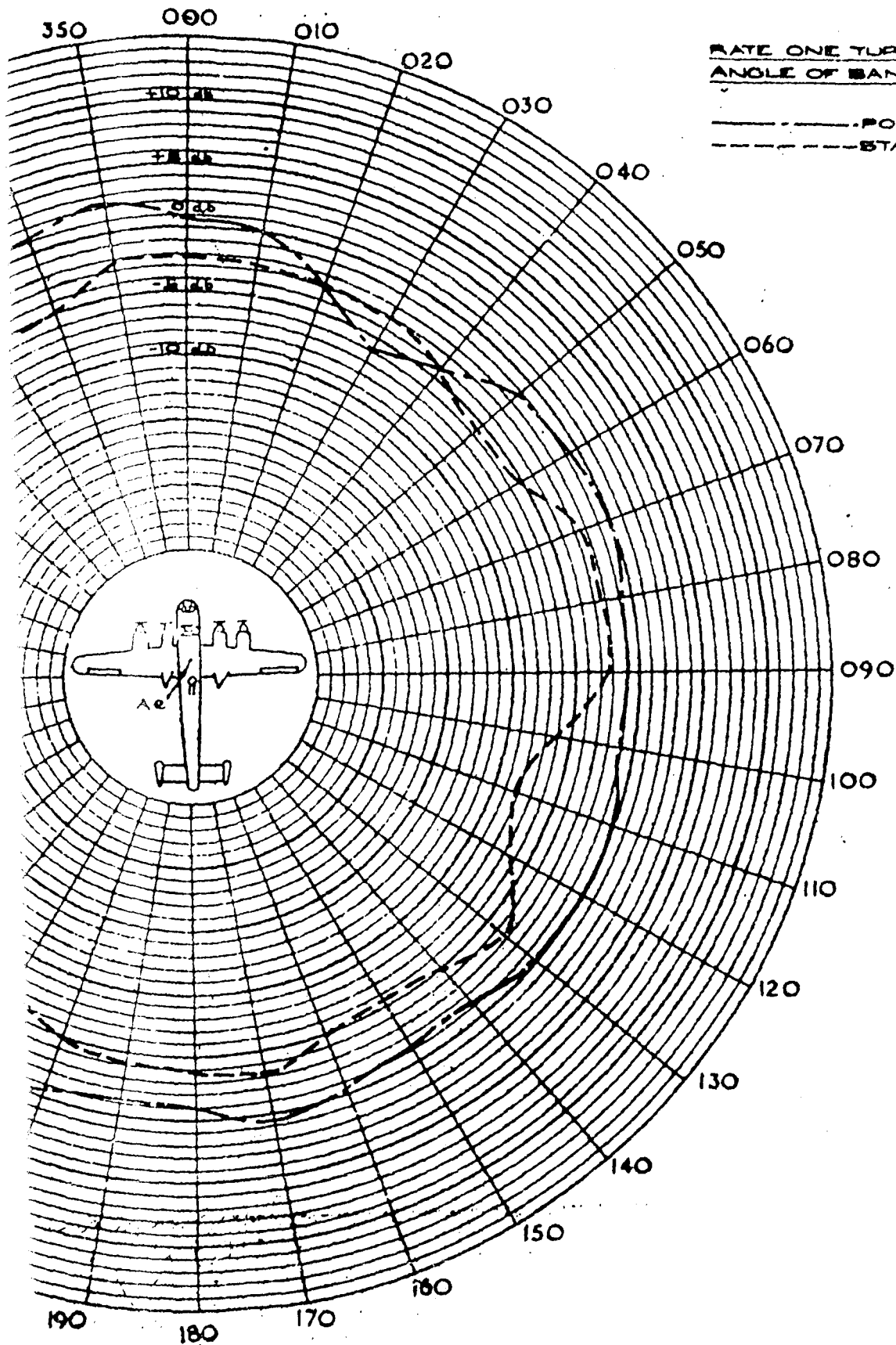
DATE: 4-11-52

A.R.I. 5487



0 db REPRESENTING
8.1 db ABOVE 1 μV

FIG. 26



RATE ONE TURNS.
ANGLE OF BANK 20° APPROX

————— PORT TURN
----- STARBOARD TURN

POLAR DIAGRAM

AERIAL SYSTEM

CONSTRUCTION
UNITED STATES AIR FORCE TONKIN

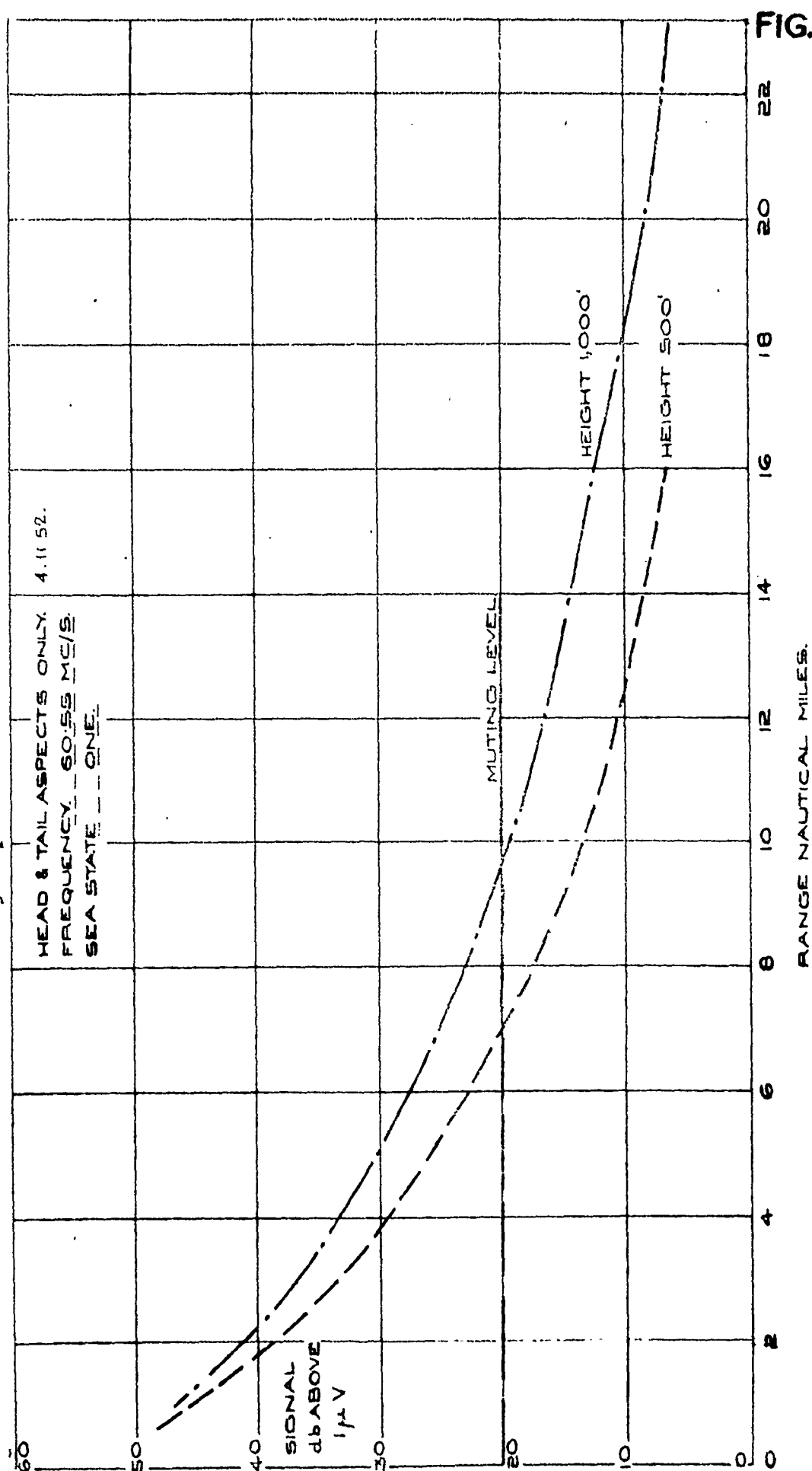


FIG. 27

SONOBOUY RANGE RUNS ON REPRESENTATIVE
DIRECTIONAL BOUY.



*Information Centre
Knowledge Services*
[dstl] *Porton Down,
Salisbury
Wiltshire
SP14 6HQ
22060-6218
Tel: 01980-613753
Fax 01980-613970*

Defense Technical Information Center (DTIC)
8725 John J. Kingman Road, Suit 0944
Fort Belvoir, VA 22060-6218
U.S.A.

AD#: AD 020266

Date of Search: 18 November 2008

Record Summary: AVIA 18/1478

Title: Shackleton Mk 2 aircraft: radio acceptance trials
Availability Open Document, Open Description, Normal Closure before FOI Act: 30 years
Former reference (Department) A & A E E/866/1 pt 9
Held by The National Archives, Kew

This document is now available at the National Archives, Kew, Surrey, United Kingdom.

DTIC has checked the National Archives Catalogue website (<http://www.nationalarchives.gov.uk>) and found the document is available and releasable to the public.

Access to UK public records is governed by statute, namely the Public Records Act, 1958, and the Public Records Act, 1967.

The document has been released under the 30 year rule.

(The vast majority of records selected for permanent preservation are made available to the public when they are 30 years old. This is commonly referred to as the 30 year rule and was established by the Public Records Act of 1967).

This document may be treated as UNLIMITED.