

CHAPTER 1

RADIO DIRECTION FINDER AND RADAR STATIONS

PART I RADIO DIRECTION FINDER STATIONS

100A. General

Radio bearings may be employed for fixing a ship's position in the same manner as other lines of position if due regard is given to the facts that they, like other lines of position, may not be absolutely accurate, and that the bearings are portions of great circles, not rhumb lines.

Radio bearings are obtained using radio direction finder sets installed on either shore stations or ships, and also by certain special radiobeacons.

Radio direction finder (RDF) stations are equipped with apparatus for determining the direction of radio signals transmitted by ships and other stations.

SECTOR OF CALIBRATION: The sector of calibration of a direction finder station is the sector around the receiving coil in which the deviation of radio bearings is known. In this book, the sectors are measured clockwise from 000° (true north) to 359° and are given from the station to seaward. Bearings which do not fall within the sector of calibration of the station should be considered unreliable.

100B. Accuracy of Bearings Furnished by Direction Finding Stations

The bearings obtained by RDF stations and reported to ships are corrected for all determinable errors except the difference between a great circle and a rhumb line (See sec. 100F.) and are normally accurate within 2° for distances under 150 miles. However, this error may be increased by various circumstances, some of which are:

STRENGTH OF SIGNALS: The most accurate bearings result from ships whose signals are steady, clear, and strong. If the signals are too weak, accurate bearings cannot be obtained.

TRANSMITTER ADJUSTMENT: The transmitter of the ship requesting bearings should be tuned carefully to the frequency of the station. If the tuning is off, it will be difficult for the station to obtain bearings sufficiently accurate for navigational purposes.

COASTAL REFRACTION (LAND EFFECT): Bearings which cut an intervening coastline at an oblique angle, or cross high intervening land, may produce errors of 4° to 5°. RDF stations normally know the sectors in which such refraction may be expected. Such sectors may not be included in the published sectors of calibration or may be marked "sectors of uncertain calibration."

SUNRISE, SUNSET, OR NIGHT EFFECTS: Bearings obtained from about half an hour before sunset to about half an hour after sunrise are occasionally unreliable because of the polarization error introduced. Changes in the intensity of the signals received occur at sunset and sunrise.

CAUTION: When RDF stations use such words as doubtful, approximate, second-class, or the equivalents in foreign languages, the bearings reported must be treated with suspicion as considerable error may exist.

DANGER FROM RECIPROCAL BEARINGS: When a single station furnishes a bearing, there is a possibility of an error of approximately 180°, as the operator at the station cannot always determine on which side of the station the ship lies. Certain direction finder stations, particularly those on islands or extended capes, are equipped to furnish two corrected true bearings for any observation. Such bearings may differ by approximately 180° and whichever bearing is suitable should be used.

CAUTION: Mariners receiving bearings which are evidently the approximate reciprocal of the correct bearings should never attempt to correct these bearings by applying a correction of 180°, as such a correction would not include the proper correction for deviation at the direction finder station. An error as large as 30° may be introduced by an arbitrary correction of 180°. Ships receiving bearings requiring an approximate 180° correction should request both bearings from the direction finder station.

100C. Obligations of Administrations Operating Direction Finding Stations

The obligations of RDF station operators are given in Article 35 of the manual for use by the Maritime Mobile Satellite Services of the International Telecommunications Union (1992). They include the following:

- Effective and regular service should be maintained, but no responsibility is accepted for these services.
- Serviced stations shall be advised of doubtful or unreliable observations.
- RDF station operators shall make daily notification of any temporary modifications or irregularities in service. Permanent modifications shall be published as soon as possible in the relevant notices to mariners.
- All RDF stations shall be able to take bearings on 410 kHz and 500 kHz.
- When RDF service is provided in authorized bands between 1605 kHz and 2850 kHz, RDF stations

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providing that service should be able to take bearings on 2182 kHz.

- When RDF service is provided in the bands between 156 MHz and 174 MHz, the RDF station should be able to take bearings on VHF 156.8 MHz and VHF digital selective calling frequency 156.525 MHz.

100D. Procedure to Obtain Radio Direction Finder Bearings and Positions

TO OBTAIN A BEARING: The vessel should call the RDF station or the RDF control station on the designated watch frequency. Depending on the type of information wanted, the vessel should transmit the appropriate service abbreviation(s):

- QTE: What is the true bearing from you (or designated vessel)?
- QTH: Follows the above abbreviation when the request is made to a mobile RDF station.

The vessel should also indicate the frequency it will use to enable its bearing to be taken.

The RDF station called should request the vessel to transmit for the bearing by means of the service abbreviation QTG (Will you send two dashes of ten seconds each (or carrier) followed by your call sign (repeated ___ times) on ___ kHz (or MHz)?).

After shifting, if necessary, to the new transmitting frequency, the vessel should transmit as instructed by the RDF station.

The RDF station should determine the direction, sense (if possible), and classification of the bearing and transmit to the vessel in the following order:

- QTE.
- Three digits indicating true bearing in degrees from the RDF station.
- Class of bearing.
- Time of observation.

- If the RDF station is mobile, its own position preceded by QTH.

When the vessel has received this information, it should repeat it back, if considered necessary for confirmation. The RDF station should confirm or correct the information. When the RDF station is sure the information has been correctly received, it will transmit AR (end of transmission). The vessel will respond with AR.

Unless otherwise indicated, the vessel may assume that the sense of the bearing was indicated. If not, the RDF station should indicate this or report the bearing and its reciprocal.

CLASSIFICATION OF BEARINGS: To estimate the accuracy and determine the corresponding class of a bearing:

- An operator should generally, and particularly in the maritime mobile RDF service on frequencies below 3000 kHz, give the observational characteristics of bearings shown in the table below.
- The RDF station, when facilities and time permit, may take into account the probability of error in the bearing. A bearing is considered as belonging to a particular class if there is a probability of less than 1 in 20 that the bearing error would exceed the numerical values specified for that class in the table below. This probability should be determined from an analysis of the five components that make up the total variance of the bearing (instrumental, site, propagation, random sampling and observational components).

TO OBTAIN A POSITION (DETERMINED BY TWO OR MORE RDF STATIONS ORGANIZED AS A GROUP): The vessel should call the RDF control station and transmit QTF (Will you give me my position according to the bearings taken by the RDF stations you control?).

The control station shall reply and, when the RDF stations are ready, request that the vessel transmit using the service abbreviation QTG.

Classification of Bearings

Class	Bearing Error (Degrees)	Observational Characteristics					
		Signal Strength	Bearing Indication	Fading	Interference	Bearing Swing (Degrees)	Duration of Observation
A	±2°	very good or good	definite (sharp null)	negligible	negligible	less than 3°	adequate
B	±5°	fairly good	blurred	slight	slight	more than 3° less than 5°	short
C	±10°	weak	severely blurred	severe	strong	more than 5° less than 10°	very short
D	more than ±10°	scarcely perceptible	ill-defined	very severe	very strong	more than 10°	inadequate

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When the position has been determined, the control station should transmit to the vessel:

- QTF.
- The position in latitude and longitude, or in relation to a known geographic point.
- Class of position.
- Time of observation.

According to its estimate of the accuracy of the observations, the control station shall classify the position in one of the four following classes:

- Class A - positions which the operator may reasonably expect to be accurate to within 5 nautical miles.
- Class B - positions which the operator may reasonably expect to be accurate to within 20 nautical miles.
- Class C - positions which the operator may reasonably expect to be accurate to within 50 nautical miles.
- Class D - positions which the operator may not expect to be accurate to within 50 nautical miles.

For frequencies above 3000 kHz, where the distance limits specified in the preceding subparagraph may not be appropriate, the control station may classify the position in accordance with current International Telecommunications Union-Radiocommunications Sector (ITU-R) recommendations.

TO OBTAIN SIMULTANEOUS BEARINGS FROM TWO OR MORE RDF STATIONS ORGANIZED AS A GROUP: On a request for bearings, the control station of a group of RDF stations shall proceed as indicated above. It then should transmit the bearings observed by each station of the group, each bearing being preceded by the call sign of the station which observed it.

100E. Plotting Radio Bearings

A fix by radio bearings is defined as follows:

- Three or more bearings taken simultaneously.
- Two bearings and a sounding.
- Two bearings and an LOP from a celestial body.
- Two bearings and a synchronized air or submarine signal.
- Two bearings on the same station and the measure of distance run (solve as if doubling the angle on the bow) between bearings.

Radio bearings are great circle azimuths (the bearing is the angle between the meridian of the ship or station taking the bearing and the great circle, not the rhumb line). They can be plotted directly upon gnomonic charts, but they cannot be plotted on a Mercator chart without first being corrected as described in sec. 100F.

WEIGHT TO BE GIVEN TO RADIO BEARINGS: Before using a radio bearing for navigational purposes, the mariner should consider the conditions under which it was taken and should compare the conditions with those given in sec. 100B on accuracy.

Land-based marine radiobeacon signals received by ships may only provide a bearing accuracy relative to vessel heading of $\pm 3^\circ - 10^\circ$. This is not satisfactory for navigation in restricted channels or harbors.

TRANSMITTERS AND RECEIVERS: Bearings reported by a direction finding station ashore must be

plotted from the geographical position of the receiving antenna of the station. Bearings taken by a ship on a shore station must be plotted from the geographical position of the station's transmitting antenna.

CAUTION: These two positions are not the same for all stations.

SHIP'S PROBABLE POSITION: As radio bearings are not absolutely accurate, lines should be drawn on both sides of each radio bearing at an angular distance from the bearing equal to the estimated probable error. In the case of intersecting radio bearings, the ship's most probable position is the area enclosed by these outer lines.

In figure 1 the broken lines are radio bearings obtained on a ship by three radio stations. The solid lines are drawn at angles of 2° from the bearings (it is assumed that all the bearings are probably accurate within 2°). The black triangle in the illustration lies within the 2° error of all three bearings and is the most probable position of the ship. However, with the possibility that one of the bearings may be off by more than 2° , the areas shaded with parallel lines give other possible positions. If one of the bearings is suspected to be less accurate, the outer lines should be offset from this bearing the same number of degrees as the estimated error, and the area or areas partially enclosed by these lines should be given less weight than the other areas.

In figure 2, a ship on course 000° obtains bearings of 031° and 065° on a radio station. The lines drawn as long dashes show the bearings and the continuous lines are their limits of accuracy. It is assumed that the bearings are both accurate within 2° . The lines AB drawn with dashes and dots are equal to the distance run between bearings. The distance run is fitted to the lines showing the limits of accuracy of the bearings. This can be done easily by means of parallel rulers and dividers. The shaded quadrilateral shows the ship's probable position at the time of the second bearings, if both bearings are accurate within 2° .

Information on various kinds of land-based radiobeacons, their accuracy, and use may be found in the NGA Lists of Lights (LLPUB110 - 116), Coast Guard Light Lists (COMDTM165021 - 165027), and "The American Practical Navigator" (Bowditch) (NVPUB9).

100F. Radio Bearing Conversion

The table on pg. 1-7 may be used to convert radio or great circle bearings into Mercator bearings for plotting on a Mercator chart. The table should be used when the distance between the ship and station is over 50 miles. The arguments used to find the correction are the middle latitude (Lm) and the difference of longitude (DLo) between the position of the radio station and the dead reckoning (DR) position of the vessel.

EXAMPLE: A vessel in DR position $56^\circ 04'N$, $142^\circ 43'W$ takes a bearing on the radiobeacon at Cape Spencer Light Station at $58^\circ 12.0'N$, $136^\circ 38.3'W$. The bearing observed is 057.5° . Find the Mercator bearing.

Lm (to nearest whole degree) = 57°

DLo (to nearest half degree) = 6°

With Lm 57° and the DLo 6° enter the conversion table and extract the correction 2.5° . The receiver (ship) is in N

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latitude; the transmitter (radiobeacon) is eastward. Following the rule given at the bottom of the table, the correction is to be added:

Great circle bearing	057.5°
Correction	+2.5°
Mercator bearing	060.0°

To plot the bearing, add 180° to Mercator bearing, giving 240°, the rhumb line bearing of the ship from the radiobeacon.

EXAMPLE: A vessel in DR position 42°20'N, 66°14'W requests a bearing from a direction finder station at 42°08'N, 70°42'W. The bearing given is 081°. Find the Mercator bearing.

Lm (to nearest whole degree) = 42°

DLo (to nearest half degree) = 4.5°

With Lm 42° and DLo 4.5°, enter the conversion table and extract the correction 1.5°. The receiver (RDF station)

is in N latitude; the transmitter (ship) is eastward. Following the rule given at the bottom of the table, the correction is to be added:

Great circle bearing	081.0°
Correction	+1.5°
Mercator bearing	082.5°

100G. Direction Finding Station List

The station list starting on pg. 1-8 shows the names, positions, and characteristics of radio direction finding stations. The frequencies used are broken down as follows:

- A—Frequency on which station (or control station) keeps watch.
- B—Frequency for transmission of signals on which bearings are observed.
- C—Frequency on which results are transmitted.

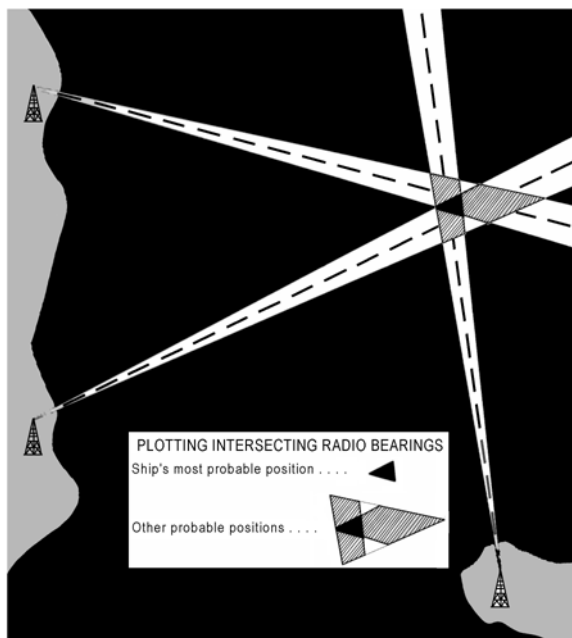


Figure 1.

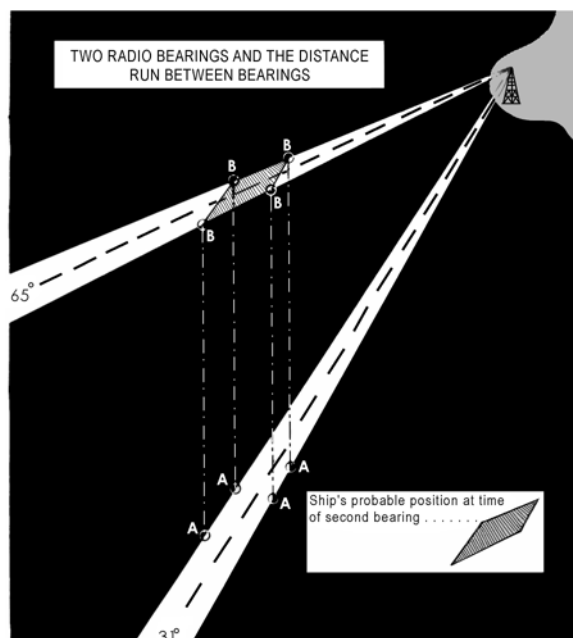


Figure 2.

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Mid Lat.	Radio Bearing Conversion Table															Mid Lat.
	<i>Correction to be applied to radio bearing to convert to Mercator bearing</i>															
	Difference of Longitude															
	0.5°	1°	1.5°	2°	2.5°	3°	3.5°	4°	4.5°	5°	5.5°	6°	6.5°	7°	7.5°	
4					0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	4
5		0.1	0.1	0.1	.1	.1	.2	.2	.2	.2	.2	.3	.3	.3	.3	5
6		.1	.1	.1	.1	.2	.2	.2	.2	.3	.3	.3	.3	.4	.4	6
7		.1	.1	.1	.2	.2	.2	.3	.3	.3	.3	.4	.4	.4	.5	7
8		.1	.1	.1	.2	.2	.2	.3	.3	.4	.4	.4	.5	.5	.5	8
9		.1	.1	.1	.2	.2	.2	.3	.3	.4	.4	.5	.5	.6	.6	9
10		.1	.1	.1	.2	.2	.3	.4	.4	.4	.5	.5	.6	.6	.6	10
11		.1	.1	.2	.2	.3	.3	.4	.4	.5	.5	.6	.6	.7	.7	11
12	0.1	.1	.1	.2	.3	.3	.4	.4	.5	.5	.6	.6	.7	.7	.8	12
13	.1	.1	.2	.2	.3	.3	.4	.4	.5	.6	.6	.7	.7	.8	.8	13
14	.1	.1	.2	.2	.3	.4	.4	.5	.6	.6	.7	.7	.8	.8	.9	14
15	.1	.1	.2	.3	.3	.4	.4	.5	.6	.6	.7	.8	.8	.9	1.0	15
16	.1	.1	.2	.3	.4	.4	.5	.6	.6	.7	.8	.8	.9	1.0	1.0	16
17	.1	.2	.2	.3	.4	.4	.5	.6	.6	.7	.8	.9	1.0	1.0	1.1	17
18	.1	.2	.2	.3	.4	.5	.5	.6	.7	.8	.8	.9	1.0	1.1	1.2	18
19	.1	.2	.2	.3	.4	.5	.6	.6	.7	.8	.9	1.0	1.1	1.1	1.2	19
20	.1	.2	.2	.3	.4	.5	.6	.7	.8	.8	.9	1.0	1.1	1.2	1.3	20
21	.1	.2	.3	.4	.5	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.2	1.4	21
22	.1	.2	.3	.4	.5	.6	.6	.8	.8	.9	1.0	1.1	1.2	1.3	1.4	22
23	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	23
24	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	24
25	.1	.2	.3	.4	.5	.6	.7	.8	1.0	1.1	1.2	1.3	1.4	1.5	1.6	25
26	.1	.2	.3	.4	.6	.6	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	26
27	.1	.2	.3	.4	.6	.7	.8	.9	1.0	1.1	1.2	1.4	1.5	1.6	1.7	27
28	.1	.2	.4	.5	.6	.7	.8	.9	1.1	1.2	1.3	1.4	1.5	1.6	1.8	28
29	.1	.2	.4	.5	.6	.7	.8	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	29
30	.1	.2	.4	.5	.6	.8	.9	1.0	1.1	1.2	1.4	1.5	1.6	1.8	1.9	30
31	.1	.2	.4	.5	.6	.8	.9	1.0	1.2	1.3	1.4	1.6	1.7	1.8	1.9	31
32	.1	.3	.4	.5	.7	.8	.9	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2.0	32
33	.1	.3	.4	.6	.7	.8	1.0	1.1	1.2	1.4	1.5	1.6	1.8	1.9	2.0	33
34	.1	.3	.4	.6	.7	.8	1.0	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	34
35	.1	.3	.4	.6	.7	.9	1.0	1.2	1.3	1.4	1.6	1.7	1.9	2.0	2.2	35
36	.1	.3	.4	.6	.7	.9	1.0	1.2	1.3	1.5	1.6	1.8	1.9	2.1	2.2	36
37	.2	.3	.4	.6	.8	.9	1.1	1.2	1.4	1.5	1.6	1.8	2.0	2.1	2.2	37
38	.2	.3	.5	.6	.8	.9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.2	2.3	38
39	.2	.3	.5	.6	.8	1.0	1.1	1.2	1.4	1.6	1.7	1.9	2.1	2.2	2.4	39
40	.2	.3	.5	.6	.8	1.0	1.1	1.3	1.4	1.6	1.8	1.9	2.1	2.2	2.4	40
41	.2	.3	.5	.6	.8	1.0	1.2	1.3	1.5	1.6	1.8	2.0	2.1	2.3	2.5	41
42	.2	.3	.5	.7	.8	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.2	2.3	2.5	42
43	.2	.3	.5	.7	.8	1.0	1.2	1.4	1.5	1.7	1.9	2.1	2.2	2.4	2.6	43
44	.2	.4	.5	.7	.9	1.1	1.2	1.4	1.6	1.7	1.9	2.1	2.2	2.4	2.6	44
45	.2	.4	.5	.7	.9	1.1	1.2	1.4	1.6	1.8	2.0	2.1	2.3	2.5	2.6	45
46	.2	.4	.5	.7	.9	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7	46
47	.2	.4	.6	.7	.9	1.1	1.3	1.5	1.7	1.8	2.0	2.2	2.4	2.6	2.8	47
48	.2	.4	.6	.8	.9	1.1	1.3	1.5	1.7	1.8	2.1	2.2	2.4	2.6	2.8	48
49	.2	.4	.6	.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.6	2.8	49
50	.2	.4	.6	.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	50
51	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0	2.1	2.3	2.5	2.7	2.9	51
52	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	52
53	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	53
54	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	54
55	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	2.1	2.2	2.4	2.7	2.9	3.1	55
56	.2	.4	.6	.8	1.0	1.2	1.4	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	56
57	.2	.4	.6	.8	1.1	1.2	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.2	57
58	.2	.4	.6	.8	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.6	2.8	3.0	3.2	58
59	.2	.4	.6	.8	1.1	1.3	1.5	1.7	1.9	2.2	2.4	2.6	2.8	3.0	3.2	59
60	.2	.4	.6	.9	1.1	1.3	1.5	1.7	2.0	2.2	2.4	2.6	2.8	3.0	3.2	60
	0.5°	1°	1.5°	2°	2.5°	3°	3.5°	4°	4.5°	5°	5.5°	6°	6.5°	7°	7.5°	
Receiver (latitude)	Transmitter (direction from receiver)			Correction Sign			Receiver (latitude)			Transmitter (direction from receiver)			Correction Sign			
North	Eastward			+			South			Eastward			—			
North	Westward			—			South			Westward			+			

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(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
CANADA							
The VHF direction finding stations of Canada are for emergency use only. All stations are remotely controlled by a Marine Communications and Traffic Services Center (MCTS). The following details of operation are common to all of these stations:							
A. Ch.16. B. Ch.16 (distress only). C. Ch.16 (distress only).							
	1001 Cap-aux-Meules.	RDF	47 23 14 N 61 51 40 W				MCTS Riviere-au-Renard (VCG).
	1001.3 Fortune Head. 2-4326	RDF	47 03 54 N 55 51 04 W				MCTS Placentia (VCP).
	1001.35 Grosses-Roches. 2-4326	RDF	48 54 51 N 67 06 38 W				MCTS Les Escoumins (VCF).
	1001.45 Havre St.-Pierre. 2-4326	RDF	50 16 15 N 63 40 44 W				MCTS Riviere-au-Renard (VCG).
	1001.6 Lac D'aigle (Sept 2-4326 Iles).	RDF	50 17 21 N 66 18 43 W				MCTS Les Escoumins (VCF).
	1001.85 Mont-Louis. 2-4326	RDF	49 12 48 N 65 46 27 W				MCTS Les Escoumins (VCF).
	1001.9 Montmagny. 2-4326	RDF	46 55 42 N 70 30 45 W				MCTS Quebec (VCC).
	1001.95 Natashquan. 2-4326	RDF	50 08 40 N 61 48 00 W				MCTS Riviere-au-Renard (VCG).
	1002 Newport. 2-4326	RDF	48 13 37 N 64 47 33 W				MCTS Riviere-au-Renard (VCG).
	1002.1 Pointe Heath. 2-4326	RDF	49 05 05 N 61 42 09 W				MCTS Riviere-au-Renard (VCG).
	1002.15 Riviere-au-Renard. 2-4326	RDF	49 00 29 N 64 24 00 W				MCTS Riviere-au-Renard (VCG).
	1002.2 Riviere du Loup. 2-4326	RDF	47 45 26 N 69 36 14 W				MCTS Quebec (VCC).
	1002.35 Twillingate. 2-4326	RDF	49 41 16 N 54 48 03 W				MCTS St. Anthony (VCM).
	1002.36 Banks.	RDF	44 28 30 N 80 20 56 W				MCTS Thunder Bay (VBA).
	Seasonal operation: April 1-December 31.						
	1002.37 Brougham.	RDF	43 55 13 N 79 06 51 W				MCTS Prescott (VBR).
	Seasonal operation: April 1-December 31.						
	1002.38 Cape Croker.	RDF	44 57 30 N 80 57 53 W				MCTS Thunder Bay (VBA).
	Seasonal operation: April 1-December 31.						
	1002.4 Cobourg.	RDF	44 04 02 N 78 12 38 W				MCTS Prescott (VBR).
	Seasonal operation: April 1-December 31.						
	1002.45 Pointe au Baril.	RDF	45 33 50 N 80 19 18 W				MCTS Thunder Bay (VBA).
	Seasonal operation: April 1-December 31.						
	1002.5 Tobermory.	RDF	45 09 42 N 81 29 55 W				MCTS Thunder Bay (VBA).
	Seasonal operation: April 1-December 31.						

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
1002.55	Trafalgar.	RDF	43 29 41 N 79 43 47 W				MCTS Prescott (VBR).
Seasonal operation: April 1-December 31.							
1002.6 <i>2-3510</i>	Barry Inlet.	RDF	52 34 30 N 131 45 13 W				MCTS Prince Rupert (VAJ).
1002.65 <i>2-3510</i>	Calvert Island.	RDF	51 35 21 N 128 00 43 W				MCTS Prince Rupert (VAJ).
1002.7 <i>2-3510</i>	Cumshewa.	RDF	53 09 33 N 131 59 47 W				MCTS Prince Rupert (VAJ).
1002.75 <i>2-3510</i>	Dundas Island.	RDF	54 31 16 N 130 54 55 W				MCTS Prince Rupert (VAJ).
1002.8 <i>2-3510</i>	Klemtu.	RDF	52 34 45 N 128 33 45 W				MCTS Prince Rupert (VAJ).
1002.85 <i>2-3510</i>	Mount Gil.	RDF	53 15 46 N 129 11 42 W				MCTS Prince Rupert (VAJ).
1002.9 <i>2-3510</i>	Mount Hays.	RDF	54 17 12 N 130 18 49 W				MCTS Prince Rupert (VAJ).
1002.95 <i>2-3510</i>	Naden Harbor.	RDF	53 57 18 N 132 56 30 W				MCTS Prince Rupert (VAJ).
1003 <i>2-3510</i>	Van Inlet.	RDF	53 15 08 N 132 32 31 W				MCTS Prince Rupert (VAJ).

UNITED KINGDOM

The VHF direction finding stations of the United Kingdom are for emergency use only. Except for Guernsey and Jersey, all are remotely controlled by a HM Coast Guard Maritime Rescue Coordination Center or Sub-Center (MRCC/MRSC). The following details of operation are common to all of these stations:

- A. Ch.16.
- B. Ch.16 (distress only).
Ch.67. Ch.82 (Jersey only).
- C. Ch.16 (distress only).
Ch.67. Ch.82 (Jersey only).

1055 <i>2-0001</i>	Barra.	RDF	57 00 49 N 7 30 25 W				MRSC Stornoway.
1060 <i>2-0001</i>	Bawdsey.	RDF	51 59 36 N 1 25 00 E				MRSC Thames.
1065 <i>2-0001</i>	Berry Head.	RDF	50 23 58 N 3 29 03 W				MRSC Brixham.
1066 <i>2-0001</i>	Boniface.	RDF	50 36 13 N 1 12 02 W				MRSC Solent.
1070 <i>2-0001</i>	Compass Head.	RDF	59 52 03 N 1 16 18 W				MRSC Shetland.
1072 <i>2-0001</i>	Crosslaw.	RDF	55 54 29 N 2 12 19 W				MRSC Forth.
1073 <i>2-0001</i>	Cullercoats.	RDF	55 04 00 N 1 28 00 W				MRSC Humber.
1075 <i>2-0001</i>	Dunnet Head.	RDF	58 40 19 N 3 22 31 W				MRCC Aberdeen.
1080 <i>2-0001</i>	Easington.	RDF	53 39 08 N 0 05 54 E				MRSC Humber.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
1082 <i>2-0001</i>	East Prawle.	RDF	50 13 06 N 3 42 30 W				MRSC Brixham.
1086 <i>2-0001</i>	Fairlight.	RDF	50 52 11 N 0 38 44 E				MRCC Dover.
1087 <i>2-0001</i>	Fife Ness.	RDF	56 16 42 N 2 35 18 W				MRSC Forth.
1088 <i>2-0001</i>	Flamborough.	RDF	54 07 05 N 0 05 13 W				MRSC Humber.
1089 <i>2-0001</i>	Great Ormes Head.	RDF	53 19 58 N 3 51 15 W				MRSC Holyhead.
1090 <i>2-0001</i>	Grove Point.	RDF	50 32 56 N 2 25 12 W				MRSC Portland.
1090.5 <i>2-0155</i>	Guernsey.	RDF	49 26 16 N 2 35 46 W				
1091 <i>2-0001</i>	Hartland.	RDF	51 01 13 N 4 31 24 W				MRCC Swansea.
1091.2 <i>2-0001</i>	Hartlepool.	RDF	54 41 47 N 1 10 34 W				MRSC Humber.
1092 <i>2-0001</i>	Hengistbury Head.	RDF	50 42 57 N 1 45 38 W				MRSC Portland.
1093 <i>2-0001</i>	Inverbervie.	RDF	56 51 06 N 2 15 39 W				MRSC Forth.
1093.5 <i>2-0155</i>	Jersey.	RDF	49 10 51 N 2 14 18 W				
1094 <i>2-0001</i>	Kilchiaran.	RDF	55 45 54 N 6 27 11 W				MRCC Clyde.
1094.1 <i>2-0001</i>	Lands End.	RDF	50 08 08 N 5 38 11 W				MRCC Falmouth.
1094.2 <i>2-0001</i>	Langdon Battery.	RDF	51 07 58 N 1 20 35 E				MRCC Dover.
1094.5 <i>2-0001</i>	Law Hill.	RDF	55 41 46 N 4 50 28 W				MRCC Clyde.
1095 <i>2-0001</i>	Lizard.	RDF	49 57 36 N 5 12 04 W				MRCC Falmouth.
1095.5 <i>2-0001</i>	Lowestoft.	RDF	52 28 36 N 1 42 12 E				MRCC Yarmouth.
1096 <i>2-0001</i>	Newhaven.	RDF	50 46 56 N 0 03 01 E				MRSC Solent.
1097 <i>2-0001</i>	Newton.	RDF	55 31 01 N 1 37 06 W				MRSC Humber.
1098 <i>2-0001</i>	North Foreland.	RDF	51 22 32 N 1 26 43 E				MRCC Dover.
1098.2 <i>2-0001</i>	Noss Head.	RDF	58 28 48 N 3 03 00 W				MRCC Aberdeen.
1098.3 <i>2-0001</i>	Portnaguran.	RDF	58 14 49 N 6 09 44 W				MRSC Stornoway.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position		(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
			Rx	Tx				
1098.5 Orlock Head. <i>2-0175</i>		RDF	54 40 25 N 5 34 58 W					MRSC Belfast.
1105 Rame Head. <i>2-0001</i>		RDF	50 19 02 N 4 13 12 W					MRSC Brixham.
1105.2 Rhiw. <i>2-0001</i>		RDF	52 50 00 N 4 37 49 W					MRSC Holyhead.
1106 Rodel. <i>2-0001</i>		RDF	57 44 54 N 6 57 25 W					MRSC Stornoway.
1108 St. Ann's Head. <i>2-0001</i>		RDF	51 40 58 N 5 10 31 W					MRSC Milford Haven.
1109 St. Mary's, Isles of Scilly. <i>2-0001</i>		RDF	49 55 44 N 6 18 15 W					MRCC Falmouth.
1115 Selsey. <i>2-0001</i>		RDF	50 43 48 N 0 48 13 W					MRSC Solent.
1116 Shoeburyness. <i>2-0001</i>		RDF	51 31 23 N 0 46 30 E					MRSC Thames.
1117 Skegness. <i>2-0001</i>		RDF	53 09 00 N 0 21 00 E					MRCC Yarmouth.
1120 Snaefell. <i>2-0001</i>		RDF	54 15 50 N 4 27 40 W					MRSC Liverpool.
1150 Tiree. <i>2-0001</i>		RDF	56 30 37 N 6 57 41 W					MRCC Clyde.
1155 Trevoze Head. <i>2-0001</i>		RDF	50 32 55 N 5 01 59 W					MRCC Falmouth.
1160 Trimmingham. <i>2-0001</i>		RDF	52 54 34 N 1 20 36 E					MRCC Yarmouth.
1165 Tynemouth. <i>2-0001</i>		RDF	50 01 04 N 1 24 59 W					MRSC Humber.
1170 Walney Island. <i>2-0001</i>		RDF	54 06 37 N 3 16 00 W					MRSC Liverpool.
1171 West Torr. <i>2-0175</i>		RDF	55 11 42 N 6 05 12 W					MRSC Belfast.
1172 Whitby. <i>2-0001</i>		RDF	54 29 24 N 0 36 18 W					MRSC Humber.
1175 Wideford Hill. <i>2-0001</i>		RDF	58 59 17 N 3 01 24 W					MRSC Shetland.
1180 Windyhead. <i>2-0001</i>		RDF	57 38 54 N 2 14 30 W					MRCC Aberdeen.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
FRANCE							
<p>The VHF direction finding stations of France are for emergency use only. The following details of operation are common to all of these stations:</p> <p style="margin-left: 40px;">CROSS Stations: A. Ch.11, 16 (67 when 11 is in use for distress traffic). B. Ch.11, 16 (67). C. Ch.11, 16 (67). Signal and lookout stations: A. Ch.16 and 7 additional frequencies (swept by scanner) from Ch.1-29, 36, 39, 48, 50, 52, 55, 56, 60-88. B. Ch.11, 16. C. Ch.11, 16.</p>							
	1182 Gris-Nez. <i>2-0815</i>	RDF	50 52 12 N 1 35 00 E				Controlled by CROSS.
	1182.1 Jobourg. <i>2-0815</i>	RDF	49 41 06 N 1 54 36 W				Controlled by CROSS.
	1182.2 Roches-Douvres. <i>2-0815</i>	RDF	49 06 30 N 2 48 48 W				Controlled by CROSS-Jobourg.
	1182.3 Dunkerque. <i>2-0815</i>	RDF	51 03 24 N 2 20 24 E				Controlled by signal station.
	1182.4 Boulogne. <i>2-0815</i>	RDF	50 44 00 N 1 36 00 E				Controlled by signal station. Day service only.
	1182.5 Ault. <i>2-0815</i>	RDF	50 06 30 N 1 27 30 E				Controlled by signal station. Day service only.
	1182.6 Dieppe. <i>2-0815</i>	RDF	49 56 00 N 1 05 12 E				Controlled by signal station. Day service only.
	1182.7 Fecamp. <i>2-0815</i>	RDF	49 46 06 N 0 22 12 E				Controlled by signal station.
	1182.8 La Heve. <i>2-0815</i>	RDF	49 30 36 N 0 04 12 E				Controlled by signal station.
	1182.9 Villerville. <i>2-0815</i>	RDF	49 23 12 N 0 06 30 E				Controlled by signal station. Day service only.
	1183 Port-en-Bessin. <i>2-0815</i>	RDF	49 21 06 N 0 46 18 W				Controlled by signal station.
	1183.05 Saint-Vaast. <i>2-0815</i>	RDF	49 34 30 N 1 16 30 W				Controlled by signal station. Day service only from Jun. 1 to Sep. 30.
	1183.1 Barfleur. <i>2-0815</i>	RDF	49 41 54 N 1 15 54 W				Controlled by signal station.
	1183.2 Homet. <i>2-0815</i>	RDF	49 39 30 N 1 37 54 W				Controlled by lookout station.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
1183.25 <i>2-0815</i>	La Hague.	RDF	49 43 36 N 1 56 18 W				Controlled by signal station. Day service only.
1183.3 <i>2-0815</i>	Carteret.	RDF	49 22 24 N 1 48 18 W				Controlled by signal station.
1183.35 <i>2-0815</i>	Le Roc.	RDF	48 50 06 N 1 36 54 W				Controlled by signal station. Day service.
1183.45 <i>2-0815</i>	Le Grouin (Cancale).	RDF	48 42 36 N 1 50 36 W				Controlled by signal station. Day service only from Jun. 1 to Sep. 15.
1183.5 <i>2-0815</i>	Saint-Cast.	RDF	48 38 36 N 2 14 42 W				Controlled by signal station. Day service only.
1183.55 <i>2-0815</i>	S. Quay Portrieux.	RDF	48 39 18 N 2 49 30 W				Controlled by signal station.
1183.6 <i>2-0815</i>	Brehat.	RDF	48 51 18 N 3 00 06 W				Controlled by signal station. Day service only.
1183.65 <i>2-0815</i>	Ploumanach.	RDF	48 49 30 N 3 28 12 W				Controlled by signal station.
1183.7 <i>2-0815</i>	Batz.	RDF	48 44 48 N 4 00 36 W				Controlled by signal station. Day service only.
1183.75 <i>2-0815</i>	Brignogan.	RDF	48 40 36 N 4 19 42 W				Controlled by signal station.
1183.8 <i>2-0815</i>	Le Stiff (Ile d'Ouessant).	RDF	48 28 36 N 5 03 06 W				Controlled by CROSS-Corsen.
1183.85 <i>2-0815</i>	Saint-Mathieu.	RDF	48 19 48 N 4 46 12 W				Controlled by lookout station.
1183.9 <i>2-0815</i>	Toulinguet (Camaret).	RDF	48 16 48 N 4 37 30 W				Controlled by signal station. Day service only.
1183.95 <i>2-0815</i>	Cap de la Chevre.	RDF	48 10 12 N 4 33 00 W				Controlled by signal station. Day service only.
1184 <i>2-0815</i>	Pointe du Raz.	RDF	48 02 18 N 4 43 48 W				Controlled by signal station.
1184.05 <i>2-0815</i>	Penmarc'h.	RDF	47 47 54 N 4 22 24 W				Controlled by signal station.
1184.1 <i>2-0815</i>	Beg-Meil.	RDF	47 51 18 N 3 58 24 W				Controlled by signal station. Day service only.
1184.15 <i>2-0815</i>	Etel.	RDF	47 39 48 N 3 12 00 W				Controlled by CROSS.
1184.2 <i>2-0815</i>	Beg Melen.	RDF	47 39 12 N 3 30 06 W				Controlled by signal station. Day service only.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position		(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
			Rx	Tx				
1184.3 <i>2-0815</i>	Saint-Julien.	RDF	47 29 42 N	3 07 30 W				Controlled by signal station. Day service only.
1184.4 <i>2-0815</i>	Le Talut.	RDF	47 17 42 N	3 13 00 W				Controlled by signal station.
1184.45 <i>2-0815</i>	Piriac.	RDF	47 22 30 N	2 33 24 W				Controlled by signal station. Day service only.
1184.5 <i>2-0815</i>	Chemoulin.	RDF	47 14 06 N	2 17 48 W				Controlled by signal station.
1184.55 <i>2-0815</i>	Saint-Sauveur.	RDF	46 41 42 N	2 18 48 W				Controlled by signal station.
1184.6 <i>2-0815</i>	Les Baleines.	RDF	46 14 36 N	1 33 42 W				Controlled by signal station. Day service only.
1184.65 <i>2-0815</i>	Chassiron.	RDF	46 02 48 N	1 24 30 W				Controlled by signal station.
1184.75 <i>2-0815</i>	Pointe de Grave.	RDF	45 34 18 N	1 03 54 W				Controlled by signal station.
1184.8 <i>2-0815</i>	Cap Ferret.	RDF	44 37 30 N	1 15 00 W				Controlled by signal station.
1184.82 <i>2-0815</i>	Messanges.	RDF	43 48 48 N	1 24 00 W				Controlled by signal station. Day service only.
1184.85 <i>2-0815</i>	Socoa.	RDF	43 23 42 N	1 41 06 W				Controlled by signal station.
1185.5 <i>2-1040</i>	La Garde.	RDF	43 06 18 N	5 59 30 E				Controlled by CROSS.
1185.6 <i>2-1040</i>	Cap Bear.	RDF	42 30 48 N	3 08 00 E				Controlled by signal station.
1185.7 <i>2-1040</i>	Cap Leucate.	RDF	42 55 06 N	3 03 42 E				Controlled by signal station.
1185.8 <i>2-1040</i>	Sete.	RDF	43 29 54 N	3 41 30 E				Controlled by signal station.
1185.9 <i>2-1040</i>	L'Espiguette.	RDF	43 23 54 N	3 41 36 E				Controlled by signal station.
1186 <i>2-1040</i>	Cap Couronne.	RDF	43 20 06 N	5 03 18 E				Controlled by signal station.
1186.2 <i>2-1040</i>	Bec de L'Aigle.	RDF	43 10 30 N	5 34 36 E				Controlled by signal station. Day service only.
1186.3 <i>2-1040</i>	Cap Cepet.	RDF	43 04 48 N	5 56 30 E				Controlled by lookout station.
1186.4 <i>2-1040</i>	Porquerolles.	RDF	43 00 00 N	6 13 42 E				Controlled by signal station.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position		(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
			Rx	Tx				
1186.5 2-1040	Cap Camarat.	RDF	43 12 06 N 6 40 30 E					Controlled by signal station.
1186.6 2-1040	Cap du Dramont.	RDF	43 24 48 N 6 51 12 E					Controlled by signal station. Day service only.
1186.7 2-1040	La Garoupe.	RDF	43 34 00 N 7 08 12 E					Controlled by signal station.
1186.8 2-1040	Cap Ferrat.	RDF	43 41 12 N 7 19 30 E					Controlled by signal station.
1186.9 2-1040	Cap Corse.	RDF	43 00 18 N 9 21 36 E					Controlled by signal station. Day service only.
1187 2-1040	Ile Rousse.	RDF	42 37 54 N 8 55 24 E					Controlled by signal station. Day service only.
1187.1 2-1040	La Parata.	RDF	41 54 06 N 8 36 48 E					Controlled by signal station. Day service only.
1187.2 2-1040	Pertusato.	RDF	41 22 24 N 9 10 42 E					Controlled by signal station.
1187.3 2-1040	La Chiappa.	RDF	41 35 36 N 9 21 54 E					Controlled by signal station.
1187.4 2-1040	Alistro.	RDF	42 15 36 N 9 32 30 E					Controlled by signal station.
1187.5 2-1040	Sagro.	RDF	42 47 48 N 9 29 24 E					Controlled by signal station.
BULGARIA								
1187.61 2-1282	Nos Galata Lt.	RDF	43 10 17 N 27 56 49 E		297.5 kHz, A2A.	5	On request to Hydrographic Service, Varna.	Transmits DG.
PAKISTAN								
1188 2-2147	Karachi (ASK).	RDF	24 52 44 N 67 09 50 E	24 51 05 N 67 02 32 E	A. 410, 500 kHz, A1A. B. 410, 500 kHz, A1A. C. 410, 500 kHz, A1A, A2A, 1.5 kW.			CALIBRATED SECTOR: 360°.

RADIO DIRECTION FINDER AND RADAR STATIONS

PART II RADAR STATIONS

110A. Coast and Port Radar Station List

Details concerning shore-based radar stations rendering navigational assistance to ships on request are given in the listings which follow. These stations are indicated on charts by the abridged description: Ra.

These stations provide information of interest to the mariner. They have a limited range of transmission and usually broadcast traffic, navigational, weather and other information concerning only their port limits and approaches. The provision of such information does not

relieve the Master of his responsibility for the safe navigation of his ship.

Mariners are warned that port radar stations may suspend operation without notice for varying periods because of minor defects, maintenance work, etc.

Many of these stations provide radar information in conjunction with Vessel Traffic Service (VTS) operations. In many ports participation in VTS may be compulsory for certain classes of vessels. For further information on VTS in specific ports, refer to National Ocean Service Coast Pilots (NOSPBCP1 - 9), NGA Sailing Directions (SDPUB or CDPUBSD 120 - 200), and other applicable guides.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
RUSSIA							
1190	Sankt-Peterburg.	RA		Ch.12.		Call Sankt-Peterburg Radio-12.	Vessels can obtain assistance between sea buoy and heads of Severnaya and Yuzhnaya Dambas.
1192	Novorossiysk.	RA		Ch.09,95.		Call Novorossiysk 17.	Continuous radar guidance is compulsory for vessels over 200 GRT. Covers area N of 44-37.7N, between 37-48.0E 37-52.9E.
1194	Nakhodka.	RA		Ch.12,16.		Call Traffic Control Center (Kamenskiy 17).	Mandatory radar control of vessels N of line joining 42-44.0N 132-51.6E and 42-42.9N 132-59.9E.
1196	Murmansk.	RA		Ch.12,18,67.		Call Coast Radar Station (Murmansk Radio 9).	When visibility is less than 0.5M, navigation will only be conducted under radar control. Covers area S of 60-02.7N and should be requested 2 hrs. in advance.
LATVIA							
1198	Ventspils.	RA		Ch.14,16.		Call Radio 9.	Compulsory when visibility is less than 2M or vessel is over 150m in length or 12000 DWT.
LITHUANIA							
1199	Klaipeda.	RA		Ch.09.		Call Radio 17.	Compulsory when visibility is less than 0.5M or for ferries, tankers, vessels with dangerous cargos and vessels constrained by their draft.
POLAND							
1200	Leba.	RA		Ch.12,16.		Call Leba Port Radar.	Covers area of port and roads.
1201	Darlowo.	RA		Ch.12,16; or Witowo Radio (SPS) 2182kHz.		Call Darlowo Port Radar Station.	
1202	Kolobrzeg.	RA		Ch.12,16.		Call Kolobrzeg Port Radar Station.	Covers area of port and roads.
SWEDEN							
1203	Goteborg.	RA		Ch.09,13,16.		Call Goteborg Trafik.	Available on request for large tankers and other vessels with defective radar in poor visibility. Covers the area seaward of Alvsborgsbron (57-41.5N 11-54.2E).
NORWAY							
1204	Fedje.	RA		Ch.16,80.			Compulsory for all vessels over 200 GRT or 24m. in length (including tows) or carrying dangerous cargos. Permission to navigate within the VTS area should be obtained at least 1 hr. before entering the area. Covers the approaches of the Sture and Mongstad oil terminals.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
GERMANY							
1205	Die Elbe.	RA		Cuxhaven Control: Elbe Approach West Ch.65. Elbe Approach East Ch.19. Scharhorn Ch.18. Neuwerk Ch.05. Cuxhaven Ch.21. Belum Ch.03. Brunsbuttel Control: Brunsbuttel I Ch.04. II Ch.67. S. Margarethen Ch.18. Freiburg Ch.22 Rhinplatte Ch.05 Pagensand Ch.66 Hetlingen Ch.21 Wedel Ch.60.		Call Cuxhaven Elbe Traffic on Ch.71,16; Brunsbuttel Elbe Traffic on Ch.68,16; or the appropriate Control Area.	Radar information provided on request. Vessels exempt from compulsory pilotage should use this service when visibility is less than 2000m (on the Lower Elbe, W of Seemannshoft, less than 3000m).
1210	Hamburg.	RA		Light buoy No.123 to 129 Ch.19. Light buoy No.129 to Seemannshoft Ch.03. Seemannshoft to Vorhafen Ch.63. Parkhafen to Kuhwerder Vorhafen Ch.07. Kuhwerder Vorhafen to Norderelbbrucke Ch.05. Kohlbrand to Harburger harbors Ch.80.		Call Cuxhaven Elbe Traffic on Ch.71; Brunsbuttel Elbe Traffic on Ch.68; or Hamburg Radar.	Radar service provided on request. Vessels exempt from compulsory pilotage should use this service when visibility is less than 2000m (W of Seemannshoft, less than 3000m).
1215	Die Weser.	RA		Alte Weser Ch.22. Hohe Weg I,II Ch.02. Robbenplate I,II Ch.04. Blexen Ch.07. Luneplate I Ch.05. II Ch.82. Dedesdorf Ch.82. Sandstedt Ch.21. Harriersand I Ch.21. II Ch.19. Elsflether Ch.19. Ronnebeck, Ritzenbutteler, Schonebecker Ch.78. Ochtumer, Seehausen, Lankenau Ch.81. All stations Ch.16.		Call Bremerhaven Weser Radar or Bremen Weser Radar on Ch.16.	Radar information is provided on request or if instructed by the VTS Center (in German and English). Radar service is provided when visibility is less than 3000m (Bremerhaven Weser) or 2000m (Bremen Weser); when pilot vessel is in a sheltered position; when light buoys are withdrawn due to ice; when required by traffic situation or when requested by a vessel. VTS compulsory for all vessels over 50m in length and all vessels carrying dangerous cargo.
1216	Die Jade.	RA		Jade I,II: Light buoy 1b/Jade 1 to 33 Ch.63. Light buoy 33 to 60 Ch.20.		Call Jade Radar Ch.16.	Radar information provided when visibility is less than 3000m; when pilot vessel is in a sheltered position; when light buoys are withdrawn due to ice; when required by traffic situation or when requested by a vessel. VTS compulsory for vessels (including tows) over 50m in length and all vessels carrying dangerous cargo.
1217	Die Ems.	RA		Borkum: Light buoy No.1 to 35 Ch.18. Knock: Light buoy No.35 to 57 Ch.20. Wybelsum: Light buoy No.57 to Emden harbor entrance Ch.21.		Call Ems Traffic.	Radar information is provided on request or if instructed by the VTS Center (in German and English). Radar service is provided when visibility is less than 2000m; when pilot vessel is in a sheltered position; when light buoys are withdrawn due to ice; when required by traffic situation or when requested by a vessel. VTS compulsory for all vessels over 40m in length and all vessels carrying dangerous cargo.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
NETHERLANDS							
1218	Eemshaven.	RA		Ch.19.		Available on request of the pilot 1 hr. in advance to Verkeersdienst Eemsmoeding on Ch.14 or Delfzijl Pilot Vessel on Ch.06,16. Call Eemshaven Radar.	Covers Lt buoy 31 or 35 to Eemshaven.
1218.5	Delfzijl.	RA		Ch.66.		Requests should be made by the master of any sea going or inland vessel through the VHF Channel appropriate for the port. Call Delfzijl Radar.	When visibility falls below 2000m within the jurisdiction of the Delfzijl VTS area. Under special circumstances assistance can be given when visibility is good, for example if navigational aids are not working correctly.
1219	Den Helder.	RA		Ch.12.		Call Yerkeerscentrale, Den Helder.	Vessels equipped with VHF are requested to participate. Vessels should make notification when navigating in area or passing Moormanbrug.
1220	Ijmuiden.	RA		West of Ijmuiden light buoy Ch.12. Ijmuiden light buoy to North Sea Locks Ch.09.		Call Traffic Center Ijmuiden west of Ijmuiden light buoy; call Ijmuiden Port Control from Ijmuiden light buoy to North Sea Locks.	Radar information provided to vessels within 13M of Ijmuiden light buoy (52-28.7N 04-23.9E) which do not have a pilot aboard.
1225	Scheveningen.	RA		Ch.21.	9.5	Call Radar Scheveningen.	In reduced visibility vessels may request information on their position and traffic.
1226	Dordrecht.	RA		Ch.19.		Call Post Dordrecht.	
<p>Nieuwe (Rotterdamsche) Waterweg is covered by the following five Radar Stations. The Traffic Management and Information Service is compulsory for all vessels navigating in the area. Inbound vessels with draft 20.7m and over should make notification to HCC Rotterdam through Scheveningen (PCH) 24 hrs. in advance. Vessels with draft 17.4m and over navigating Nieuwe Waterweg should make notification to Traffic Center Hook through Scheveningen 6 hrs. in advance; vessels 250m and over 4 hrs. in advance. Inbound vessels with dangerous cargo should report to Central Traffic Control (HCC) 24 hrs. in advance (1 hr. in advance of unberthing). All other vessels should make notification to Hoek van Holland 3 hrs. in advance of arrival and notify their area Radar Station 1 hr. in advance of unberthing.</p>							
1230	Hoek van Holland (VCH).	RA		Ch.01,02,03,13,65, 66; 2182kHz.		Call Traffic Center Hoek van Holland.	Covers Maas Traffic Separation Schemes, Europort and Nieuwe Waterweg to Kilometer Post 1023.
1231	Botlek (VCB).	RA		Ch.13,61,80.		Call Traffic Center Botlek.	Covers Nieuwe Waterweg to Kilometer Post 1011 Nieuwe Maas, 1005 Oude Maas.
1232	Hartel (VPH).	RA		Ch.62.		Call Traffic Center Hartel.	Covers Oude Maas to Buoy O12 and Hartelkanal.
1233	Stad (VCS).	RA		Ch.13,60,63.		Call Traffic Center Stad.	Covers Nieuwe Maas to Kilometer Post 998.
1234	Maasboulevard (VPM).	RA		Ch.21,81.		Call Traffic Center Maasboulevard.	Covers Nieuwe Maas to Kilometer Post 993.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
UNITED KINGDOM							
1237	Lerwick.	RA		Ch.12.		Call Lerwick Harbour Radio.	Vessels should report at N and S Entrances. Covers N Entrance, S Entrance and Inner Harbour.
1240	Sullom Voe Harbour.	RA		Ch.14,16.		Call Sullom Voe Harbour Radio.	Vessels arriving should make notification 24 hrs. in advance. Covers Yell Sound and Sullom Voe. VHF reception is poor W and N of Yell Sound.
1245	Tees.	RA		Ch.14,22.	10	Call Tees Harbour Radio.	All vessels navigating when "Channel Closed" signals are displayed or when visibility is less than 1000m must obtain prior permission from Harbour Master; all vessels with dangerous cargo must make 24 hr. advance notification; all vessels over 20m must make 6 hrs. advance notification. Covers Tees Bay, Tees River to tidal limits and Hartlepool.
1250	Medway.	RA		Ch.22.		Call Medway Radio.	All inbound vessels should contact Medway Navigation Service 24 hrs. in advance; outbound vessels should make 1 hr. advance notification.
1254	Gravesend Radio.	RA		Thames seaward approaches to Sea Reach No.4 light buoy Ch.13. Sea Reach No.4 light buoy to Crayford Ness Ch.12. Secondary Ch.09,16,18,20.		Call Port Control London or Gravesend Radio.	Inbound and outbound vessels should make notification 24 hrs. in advance. Covers Thames R. from Erith to seaward limits of the Port of London.
1255	Woolwich Radio.	RA		Ch.14,16,22.			Inbound and outbound vessels should make notification 24 hrs. in advance. Covers Thames R. from Crayford Ness to Greenwich.
1262	Harwich.	RA		Ch.14,20.			Inbound and outbound vessels should make notification 24 hrs. in advance.
1265	Southampton Vessel Traffic Services Centre.	RA		Ch.16(calling). Ch.18,20,22 (working).		Call Southampton VTS.	Compulsory for vessels 20m or over. Inbound vessels should contact VTS on Ch.12 when approaching the Nab or the Needles. Covers the Solent and Southampton waters.
1270	Liverpool.	RA		Ch.18,22. Ch.19(tankers to or from Tranmere).		Call Mersey Radio.	Vessels over 50 GRT carrying dangerous cargo should make notification 48 hrs. in advance of arrival/departure. All other vessels over 50 GRT should make notification 24 hrs. in advance of arrival and 4 hrs. in advance of departure. Covers River Mersey including Liverpool, Birkenhead, Eastham and Garston.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
FRANCE							
1273	Dunkerque.	RA		Dunkerque Pilots: Ch.16 (calling). Ch.72 (working). Dunkerque Port: Ch.73.		Call Dunkerque Pilots or Dunkerque Port.	Radar coverage of the pilot embarkation zone at the entrance to the Passe de l'Ouest is provided by the Pilot Station (50-59.2N 01-58.0E). Radar coverage of the access channels is provided by the port.
1274	Gris-Nez (CROSS).	RA		Ch.13,79.		Call Gris-Nez Traffic.	Radar assistance provided on request. Two radar stations at Gris-Nez (50-52.2N 01-35.1E) and Saint-Frieux (50-36.6N 01-36.6E) provide coverage extending approximately SW up to 00-30E and NE up to 30 miles from Gris-Nez.
1275	Le Havre.	RA		Ch.12.		Call Havre Port.	Radar assistance provided on request in poor visibility for Le Havre or Antifer. The area of radar coverage is a circular zone 12.5 miles radius centered on 49-39.0N 00-08.0W (approx.). Inbound vessels should make notification 48 hrs. in advance. Outbound vessels should make notification 24 hrs. in advance.
1280	La Seine.	RA		Ch.13,73.		Call Honfleur Radar.	Radar assistance provided in poor visibility and on request. The area of radar coverage extends to 20 miles W of Radar Honfleur (49-25.7N 00-14.1E) up to 00-36.2E.
1285	Rouen.	RA		Ch.13,73.		Call Radar Honfleur.	Radar assistance provided in poor visibility and on request. Coverage area extends to 20 miles W of Radar Honfleur (49-25.7N 00-14.1E) up to 00-36.2E.
1287	Corsen (CROSS).	RA		Ch.13,79.		Call Ouessant Traffic.	Coverage area is a circular zone up to 35 miles from Le Stiff Radar Tower (48-28.6N 05-03.1W).
1288	La Loire.	RA		Ch.12.		Call Saint-Nazaire Port.	Radar assistance provided on request. Coverage area from the pilot boarding point (47-07.5N 02-21.5W) to Saint-Nazaire Roads.
1290	La Gironde.	RA		Ch.16 (calling). Ch.12,14 (working).		Call Radar Verdon 3 hrs. in advance of ETA on Ch. 12.	Covers La Gironde and approaches (a circular zone 34 miles radius centered on (45-39.8N 01-07.2W). Radar information is supplied on Ch. 12 or 14 for the area between BXA lightbuoy and Le Verdon's roads. Notification of arrival should be made 48 hrs. in advance to Bordeaux Traffic through agent, 24 hrs. and 12 hrs. in advance direct to Bordeaux Traffic.
PORTUGAL							
1295	Aveiro.	RA		Ch.14,16.		Call Pilotosaveiro.	In bad weather pilot vessel assists vessel's approach to harbor entrance. Arrival notification should be made 6 hrs. in advance.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
SPAIN							
1300	Strait of Gibraltar.	RA		Ch.10,16.	19	Call Tarifa Traffic.	Tarifa Vessel Traffic Service is compulsory for VHF-equipped vessels which are Spanish flag, intend to enter Spanish territorial seas, have dangerous cargo or limitations to maneuverability or navigation. Vessels should call when within 21M of Tarifa (36-01.1N 05-34.8W) or on leaving a port within that area.
UKRAINE							
1305	Odessa.	RA		Ch.14,16.		Call Odessa Port Control.	
1310	Yuzhnyy.	RA		Ch.16,74.		Call Yuzhnyy Radio 5.	
1315	Mariupol (Zhdanov).	RA		Ch.14,16.		Call Zhdanov Radio 1.	Provides radar assistance in restricted visibility and in the absence of navigational aids. Covers from approach channel buoys 15 and 16 to berths in Port Zhdanov.
MOROCCO							
1320	Casablanca.	RA		Ch.12.		Call CNP2.	Vessels should send notification of arrival to the Port Captain through Casablanca (CNP) 24 hrs. in advance.
THAILAND							
1480	Laem Chabang.	RA		500kHz,A1A,A2A;2182 kHz,A3E,H3E;Ch.13, 14,16.			Pilotage is compulsory. ETA should be sent 24 hrs. in advance. Radar-equipped VTS station is located at Laem Krabang Hill.
REPUBLIC OF KOREA							
1520	Busan.	RA		Ch.12,14,16,20,22.		Call Busan Port Control.	Radar assistance is available during limited visibility.
JAPAN							
1530	Osaka.	RA		2182,2130,2150, 2394.5kHz,H3E,J3E; Ch.14,16,22.	8	Call Osaka Harbor Radar.	Information on position, traffic and weather provided for area within 4M of Osaka Central Pier (within 8M for vessels over 1000 GRT).
1540	Kanmon Kaikyo.	RA		1651kHz,H3E;Ch.13, 14,16,22.		Call Kanmon MARTIS.	All vessels should report on entering the Radar Service Area. Covers Kanmon Kaikyo, including W and E approaches and area N and E of Mutsure Shima.
1550	Bisan Seto.	RA		1651kHz,H3E;Ch.13, 14,16,22.		Call Bisan MARTIS.	All vessels should report on entering the Radar Service Area. Covers all traffic routes between 133-37.5E and 133-55E except Bisan Seto N traffic route W of Takami Shima.
1555	Nagoya.	RA		1665kHz,H3E;Ch.14, 16,22.	11	Call Nagoya Harbor Radar.	All vessels should report on entering the Radar Service Area. Covers Nagoya port, including its approaches.

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
1560	Tokyo Wan.	RA		1665kHz,H3E;Ch.13, 14,16,22.		Call Tokyo MARTIS.	All vessels over 100 GRT or carrying more than 30 people should report when entering the Radar Service Area. Covers Tokyo Wan N of 35-10N.
1570	Kushiro.	RA		2182,2150,2245, 2394.5,2785.9kHz, H3E,J3E;Ch.14,16, 22.	10	Call Kushiro Harbor-Radar.	Radar assistance provided within 2M of 42-58.0N 144-22.6E (within 10M for vessels over 1000 GRT).
NEW ZEALAND							
1625	Auckland.	RA		2182,2012kHz,H3E, J3E; Ch.12,16.	45		Provides vessel's range and bearing from Signal Station (36-51S 174-49E) in restricted visibility. Vessels over 100 NRT should make notification 24 hrs. in advance of arrival.
1630	Otago Harbour.	RA		2182,2012,2045,2129, 2162,4125,4417, 6215,6224kHz,H3E, J3E;Ch.12,14,16.	20	Call ZMH32 (Taiaroa Head).	Provides range and bearing from Taiaroa Head Signal Station (0.1M S of lighthouse) in restricted visibility. Vessels over 100 NRT should make notification 72 hrs. in advance of arrival, through Wellington (ZLW) or Awarua (ZLB).
1635	Wanganui.	RA		2012,2045,2162,2182, 4125,4417,6215, 6224kHz,H3E,J3E; Ch.09,12,14,16,67, 69.	20	Call Wanganui Harbour Radio (ZMH211).	Provides range and bearing from Pilot Station (39-56.9S 174-59.5E).
1640	Westport.	RA		2012,2045,2162,2182, 4125,4417kHz,H3E, J3E;Ch.12,16.	15		Provides range and bearing from Signal Station (41-44.9S 171-35.7E) in restricted visibility. Vessels should make notification 12 hrs. in advance of arrival.
AUSTRALIA							
1665	Port Hedland.	RA			Ch.06,08,09,12,13, 16,67. 64		Provides range and bearing from Control Tower (20-19.0S 118-34.5E). All foreign vessels and Australian vessels over 6500 GRT should make notification 48 hrs. in advance of arrival.
1675	Port Dampier.	RA		Ch.11,13,16,68,78, 79. Ch.67(emergency).		Call Dampier Port Control.	Provides range and bearing from Port Control (20-37.2S 116-45.0E). All vessels over 150 GRT should make notification of arrival 72 hrs. in advance (7 days for vessels arriving from overseas).

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
UNITED STATES							
<p>United States VTS Vessel Movement Reporting System (VMRS) rules, VTS frequency monitoring requirements and General VTS operating rules are mandatory for power-driven vessels 40 meters or more in length, vessels certificated to carry 50 or more passengers for hire, and towing vessels 8 meters or more in length engaged in towing. VTS frequency monitoring requirements and General VTS operating rules are mandatory for vessels covered by the Vessel Bridge-to-Bridge Radiotele- phone Act.</p>							
1720	New York, NY.	RA		Ch.11,12,13,14,16.		Call New York Traffic.	Vessels should make notification 15 mins. before navigating within the VTS area and upon entering or getting underway within the VTS area. Covers the Upper New York Bay E to the Brooklyn Bridge in the East River and N to 40-43.7N and 74-01.6W in the Hudson River, and includes the Kill Van Kull S to the AK Railroad Bridge, Newark Bay N to the Lehigh Valley Draw Bridge, and portions of the Lower New York Bay S to the entrance buoys at Ambrose, Sandy Hook, and Swash Channels.
1730	Berwick Bay, LA.	RA		Ch.11,13,16.			Vessels should make notification 15 mins. before navigating within the VTS area and upon entering or getting underway within the VTS area. Covers various Intracoastal Waterway Routes converging at Berwick and Morgan City.
1735	LOOP Deepwater Port (Louisiana Offshore Oil Port).	RA		Ch.10,16,74.		Call LOOP Radar.	Compulsory for all vessels; tankers must report to COTP and Vessel Traffic Supervisor 24 hrs. before arrival. Covers vicinity of port (28-53.2N 90-01.5W), anchorage and safety fairway to SE and S.
NOTE: LOOP Deepwater Port is not a VTS.							
1740	Houston-Galveston , TX.	RA		Ch.11,12,13,16.		Call Houston Traffic.	Vessels should make notification 15 mins. before navigating within the VTS area and upon entering or getting underway within the VTS area. Covers the Galveston Bay Channels and Houston Ship Channel to the Houston Turning Basin.
1750	San Francisco, CA.	RA		Ch.12,13,14,16.		Call San Francisco Traffic.	Vessels should make notification 15 mins. before navigating within the VTS area and upon entering or getting underway within the VTS area. Covers the waters of San Francisco Bay and its approaches S of 38N, E of 123-07W and N of 37-27N, and its tributaries as far as Stockton and Sacramento.
1760	Puget Sound, WA.	RA		Ch.05A,13,14,16.		Call Seattle Traffic.	Vessels should make notification 15 mins. before navigating within the VTS area and upon entering or getting underway within the VTS area. Covers the Strait of Juan de Fuca E of 124-40W, Rosario Strait, the San Juan Islands, Admiralty Inlet, and Puget Sound.
NOTE: Puget Sound Vessel Traffic Service is one sector of a Cooperative Vessel Traffic Management System (CVTMS), which is a joint U.S. and Canadian vessel traffic management effort. Canada administers the two remaining sectors of CVTMS.							

RADIO DIRECTION FINDER AND RADAR STATIONS

(1) No.	(2) Name	(3) Type	(4) Position Rx Tx	(5) Frequency	(6) Range	(7) Procedure	(8) Remarks
1770	Prince William Sound, AK.	RA		Ch.13,16.		Call Valdez Traffic.	Vessels should make notification 15 mins. before navigating within the VTS area and upon entering or getting underway within the VTS area. Covers Prince William Sound North of Cape Hinchinbrook, including Valdez Arm, Valdez Narrows and Port Valdez.
COLOMBIA							
1850	Puerto Covenas, Floating Storage Unit.	RA		Ch.10,13,16.		Call FSU Covenas.	Compulsory for all vessels. Vessels should contact FSU 30M from terminal.
CHILE							
1895	Valparaiso.	RA		2182,2738kHz,H3E, J3E; 4143.6kHz,J3E; Ch.09,14,16.		Call CBV 20 (Port Captain).	Radar assistance provided on request in fog.
1900	Primera Angostura.	RA		Ch.11,13,16,68.		Eastbound vessels requiring radar assistance should call Magallanes Zonal Radio (CBM), Ch.16, when abeam Punta Arenas, or call CBM5 (Punta Delgada), Ch.68,11,13, when 20M from Punta Baxa. Westbound vessels should call Magallanes 24 hrs. before arrival at 52-35.0S 68-10.5W, or call CBM71 (Punta Dungeness), Ch.16, or CBM72 (Cabo Espiritu Santo), Ch.16, when 20M from that point.	Covers area between Banco Triton and E approaches to the Strait of Magellan.

