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EXTRAORDINARY ADMINISTRATIVE RADIO CONFERENCE
FOR THE PREPARATION OF A REVISED ALLOTMENT PLAN
FOR THE AERONAUTICAL MOBILE (R) SERVICE - GENEVA

REPORT

OF THE FIRST SESSION

(GENEVA 1964)



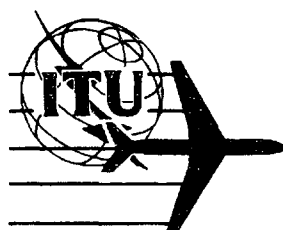
GENEVA, FEBRUARY 1964

EXTRAORDINARY ADMINISTRATIVE RADIO CONFERENCE
FOR THE PREPARATION OF A REVISED ALLOTMENT PLAN
FOR THE AERONAUTICAL MOBILE (R) SERVICE - GENEVA

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LIST OF PARTICIPANTS

A. ADMINISTRATIONS

MEMBERS

ALGERIA (Democratic Popular Republic of)

ARGENTINE (Republic)

AUSTRALIA (Commonwealth of)

AUSTRIA

BELGIUM

BRAZIL

BULGARIA (People's Republic of)

CAMEROON (Federal Republic of)

CANADA

CEYLON

CHINA

COLOMBIA (Republic of)

CONGO (Republic of the) (Léopoldville)

COSTA RICA

CUBA

DENMARK

GROUP OF TERRITORIES REPRESENTED BY THE FRENCH OVERSEAS POST AND
TELECOMMUNICATION AGENCY

SPAIN

UNITED STATES OF AMERICA

ETHIOPIA

FINLAND

FRANCE

GUATEMALA

GUINEA (Republic of)

INDIA (Republic of)

INDONESIA (Republic of)

IRAQ (Republic of)

IRELAND

ITALY

JAMAICA

JAPAN

KUWAIT (State of)

LEBANON
LUXEMBOURG
MEXICO
MONACO
NORWAY
NEW ZEALAND
NETHERLANDS (Kingdom of the)
POLAND (People's Republic of)
FEDERAL REPUBLIC OF GERMANY
ROUMANIA (People's Republic)
UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND
SWEDEN
SWITZERLAND (Confederation)
CZECHOSLOVAKIA (Socialist Republic)
TERRITORIES OF THE UNITED STATES OF AMERICA
OVERSEAS TERRITORIES FOR THE INTERNATIONAL RELATIONS OF WHICH THE
GOVERNMENT OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND
ARE RESPONSIBLE
THAILAND
TURKEY
UNION OF SOVIET SOCIALIST REPUBLICS
VENEZUELA (Republic of)
VIET-NAM (Republic of)

B. SPECIALIZED AGENCIES

INTERNATIONAL CIVIL AVIATION ORGANIZATION (I.C.A.O.)

C. INTERNATIONAL ORGANIZATIONS

INTERNATIONAL AIR TRANSPORT ASSOCIATION (I.A.T.A.)

INTERNATIONAL BROADCASTING AND TELEVISION ORGANIZATION (I.B.T.O.)

D. INTERNATIONAL TELECOMMUNICATION UNION

GENERAL SECRETARIAT

INTERNATIONAL FREQUENCY REGISTRATION BOARD (I.F.R.B.)

INTERNATIONAL RADIO CONSULTATIVE COMMITTEE (C.C.I.R.)

PREAMBLE

In accordance with Resolution No. 13 of the Administrative Radio Conference, Geneva (1959), Decision No. D282 of the 17th Session (1962) of the Administrative Council and Resolution No. 525 of the 18th Session (1963) of the said Council, the Aeronautical Extraordinary Administrative Radio Conference held its first session at Geneva from 27 January to 20 February 1964.

In accordance with its terms of reference, this First Session of the Conference :

- decided to adopt the criteria contained in this Report;
- recommends that administrations submit to the Union, in the form shown in Chapter IV, data relating to the requirements for frequencies for communications within the high frequency bands of the Aeronautical Mobile (R) Service;
- refers this Report to the 2nd Session of this Conference for its use;
- recommends that the Administrative Council adopt the arrangements for the Second Session of the Conference suggested in Chapter VI of this Report; and
- requests the Secretary-General to bring this Report to the attention of administrations.

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REPORT OF THE FIRST SESSION OF THE AERONAUTICAL
EXTRAORDINARY ADMINISTRATIVE RADIO CONFERENCE (GENEVA, 1964)

CHAPTER I

TECHNICAL CRITERIA ON WHICH ANY REVISION OF THE
FREQUENCY ALLOTMENT PLAN FOR THE AERONAUTICAL MOBILE (R) SERVICE,
CONTAINED IN APPENDIX 26 TO THE RADIO REGULATIONS (GENEVA, 1959)
AND THE PROVISIONS RELATING THERETO,
SHOULD BE BASED

1. Classes of emission

In the Aeronautical Mobile (R) Service the use of emissions such as listed below is permissible, provided that such use;

- complies with the applicable provisions of Chapter I, paragraphs 4.5 and 6;
- does not cause harmful interference to other users of the frequency.

1.1 Telephony - Amplitude modulated

- double sideband (A3)
- single sideband, reduced carrier (A3A)
- single sideband, full carrier (A3H)
- single sideband, suppressed carrier (A3J)
- two independent sidebands (A3B)

1.2 Telegraphy (including automatic data systems)

1.2.1 Amplitude modulation

without the use of a modulating frequency
(by on-off keying) (A1)

*) In this Report the abbreviation "Aeronautical E.A.R.C." means the "Aeronautical Extraordinary Administrative Radio Conference".

- on-off keying of an amplitude-modulating audio frequency or audio frequencies, or by the on-off keying of the modulated emission (A2)
- multichannel voice frequency telegraphy, single sideband, reduced carrier (A7A)
- multichannel voice frequency telegraphy, single sideband, full carrier (A7H)
- multichannel voice frequency telegraphy, single sideband, suppressed carrier (A7J)

1.2.2 Frequency modulation

- frequency shift keying without the use of a modulating audio frequency, one of two frequencies being emitted at any instant. (F1)
- by the on-off keying of a frequency modulating audio frequency or by the on-off keying of a frequency-modulated emission (F2)

1.3 Facsimile

- with modulation of the main carrier either directly or by a frequency modulated sub-carrier (A4)

2. Power

2.1 Unless otherwise indicated in Part II of Appendix 26 to the Radio Regulations (Geneva, 1959), the maximum peak envelope power supplied to the antenna transmission line is assumed to be in accordance with the following:

Class of Emission	Stations	Maximum Peak Envelope Power
A1 F1	Aeronautical Stations Aircraft Stations	1.5 kW 75 W
A3 A3H (100% modulated)	Aeronautical Stations Aircraft Stations	6 kW 300 W
Other classes of emission	Aeronautical Stations Aircraft Stations	6 kW 300 W

For the purpose of indicating mean power for notification of A3 and A3H emissions, used in the Aeronautical Mobile (R) Service, mean power will be considered equal to 0.375 peak envelope power in the case of A3 emissions and equal to 0.5 peak envelope power in the case of A3H emissions, based on a single sine-wave oscillation modulating the emission at 100%.

2.2 Aeronautical stations serving MWARA's may, when necessary, employ directional antennas and a transmitter power, in association with such directional antennas, greater than that specified in 2.1 above, in order to provide satisfactory communication with aircraft. Whenever this is so, the administration having jurisdiction over the transmitting station shall ensure:

- a) that harmful interference is not caused to stations using frequencies in accordance with the applicable provisions of the Allotment Plan;
- b) that the power transmitted into other MWARA's or RDARA's allotted the same frequency(s) is not greater than that permitted under the technical criteria on which the plan is based;
- c) that the radiation pattern of the directional antenna be known, or that the antenna is of a type for which a typical radiation pattern is available;
- d) that the directional characteristics of the antenna is such as to minimize radiation in unnecessary directions, particularly into other MWARA's or RDARA's which have been allotted the same frequencies.

2.3 It is recognized that the power employed by aircraft transmitters may, in practice, exceed the limits specified in paragraph 2.1 above. However, the use of such increased power shall not cause harmful interference to stations using frequencies in conformity with the Allotment Plan.

3. Propagation criteria - Frequency sharing between areas - Service ranges - Interference ranges - Protection ratios

3.1 Recommendation No. 1 relating to service ranges and interference ranges, protection ratios and to interference range contours and maps for polar areas.

The First Session of the Aeronautical E.A.R.C. (Geneva 1964) recommends:

1. that conclusions drawn from the basic technical criteria employed by the I.A.A.R.C. in developing the present Mobile (R) Service HF Allotment Plan should continue to be used, i.e.

a) Service and Interference Ranges

Frequency band in kc/s	Service range in km		Interference range in km	
	Day	Night	Day	Night
2 850 - 3 025	100	500	700	3 500
3 400 - 3 500	100	800	700	4 000
4 650 - 4 700	350	1 400	1 200	5 500
5 450 - 5 480	450	1 800	1 500	6 500
5 480 - 5 680	450	1 800	1 500	6 500
6 525 - 6 685	650	2 200	1 900	8 000
8 815 - 8 965	1 000	3 400	3 800	11 000
10 005 - 10 100	1 250	-	5 500	-
11 275 - 11 400	1 500	-	6 000	-
13 260 - 13 360	1 900	-	7 700	-
17 900 - 17 970	2 600	-	>10 000	-

Interference ranges used in the establishment of the present allotment plan should continue to be used in the establishment of a revised plan, but some reduction could perhaps be made in the interference ranges in the 8, 10, 11, 13 and 17 Mc/s bands by day and in the 6 and 8 Mc/s by night, should it be found essential to obtain additional sharing on these frequencies (Document No. I-14, of the First Session refers).

- b) A protection ratio of 15 db is satisfactory. The interference ranges in paragraph a) above are based on a 15 db ratio between wanted and unwanted co-channel signals when the aircraft is at the limit of its service range, consequently, the protection ratio is actually much higher under more typical conditions.
- c) Sharing conditions between areas, as shown in Appendix 26 to the Radio Regulations (Geneva 1959) (Part I, Section II, B, para.4) are satisfactory.

2. that the interference range contours for latitudes between 60°N and 60°S which were included in that Appendix 26 should be retained without revision;

3. that interference range contours and charts for the Polar areas should be developed and the charts for these areas should be based on a Polar gnomonic projection (see Chapter I, para. 3.2.2).

3.2 Implementation of Recommendation No. 1

In order to give effect to this Recommendation, changes and additions to Appendix 26 to the Radio Regulations (Geneva, 1959) will be required as follows :

3.2.1 Amendments to Appendix 26 to the Radio Regulations (Geneva 1959)

B. Interference Range Contours

1. 15. Definition of Contours

15.1 The transparencies inserted in the pocket at the end of this Appendix show contours which indicate the minimum acceptable distance separating two aeronautical stations each having an effective radiated power of 1 kW (unmodulated) for the frequencies stated and for producing a protection ratio of 15 db of desired signal to interfering signal on the same frequency in an aircraft operating at the limit of the service range of the desired ground transmitter. This limit is generally assumed to be at the boundary of the area concerned.

15.2 Two types of transparencies are provided for use respectively with the Mercator projection world maps and the Gnomonic projection for the polar areas. The Mercator projection transparencies encompass the area between latitude 60° North and 60° South. The Gnomonic projection transparencies encompass the areas north of Latitude 30° North and south of Latitude 30° South. The Gnomonic projection overlaps the Mercator projection between Latitudes 30° - 60° North and 30° - 60° South. This over-lap is included to provide continuity between transparencies of the two projections.

~~The service range is not included in the contour.~~

2- 16. Type of Maps Used

16.1 These transparencies can be used only on a ~~Mercator's projection~~ world or polar map of the projection and scales given on each transparency, and will not be suitable for use on any other scale ~~of Mercator's projection~~ or any other projection. The world and polar maps accompanying this Appendix, depicting RDARA and MWARA boundaries, are to the correct scale and the transparencies carrying the interference range contours can be directly used on these maps.

3- 17. Change of Scale or Projection

17.1 Should any other ~~Mercator~~ scale be desired, then, by using the co-ordinates given in the tables shown below, new interference range contours can be drawn to fit the new scales.

17.2 It must be remembered that when the new transparencies are constructed, the intersection of the vertical line of symmetry, i.e. the meridian of longitude and the horizontal line of latitude should be at 00° latitude for the 00° contour, 20° N for the 20° contour, 40° N for 40° contour, etc.

17.3 The co-ordinates shown in the above-mentioned tables are given with reference to the 180° meridian taken as the axis of symmetry for the construction of the contours.

4- 18. Sharing Conditions Between Areas

18.1 The transparencies are constructed on the basis of the following sharing conditions: ~~agreed at the International Administrative Aeronautical Radio Conference (I.A.A.R.C.) of 1948-1949, namely:~~

Areas	Bands between:	Sharing Conditions
	Mc/s	
MWARA to MWARA	3 - 6.6 9 - 11.3 13 - 18	night propagation day propagation time separation Note : 6.6 Mc/s and 5.6 Mc/s sharing conditions con- sidered the same
MWARA to RDARA	3 - 5.6 6.6 - 11.3 13 - 18	night propagation day propagation time separation
RDARA to RDARA	3 - 4.7 5.6 - 11.3 13 - 18	night propagation day propagation time separation

18.2 The additional contours for day included for 3 Mc/s, 3.5 Mc/s and 4.7 Mc/s are for determining daylight sharing possibilities.

NOTE : The material in "Minimum and Maximum Range Charts for Use as a Guide to the Allotment of Frequencies" Annex 1 to Volume 1 of the Report of the First Session of the I.A.A.R.C. (Geneva, 1948) was used in the preparation of the allotment plan. The First Session of the Aeronautical E.A.R.C. (Geneva-1964), reviewed the conclusions drawn from this material and found them to have continuing validity.

5. 19. Method of Use

19.1 Take the MWARA or the RDARA maps accompanying this Appendix and select the transparency for the frequency order and sharing conditions under consideration.

19.2 The Gnomonic projections are applicable in the polar areas north of 60° N and south of 60° S; and the Mercator projections are applicable between 60° N and 60° S.

19.3 Place the centre of the transparency (i.e. the intersection of the axis of symmetry and the latitude line) over the boundary of the area or at the location of the transmitter. Note the latitude of this point and select the contour corresponding to this latitude.

19.4 A transmitter located at any point outside the contour will result, as defined in paragraph 15.1 above, in a protection ratio of better than 15 db.

19.5 Any transmitter at a point inside the contour will result in a protection ratio of less than 15 db.

19.6 Mercator projection : For the Northern Hemisphere, the contours should be used in their natural position as published, but for the Southern Hemisphere, the transparency should be inverted. This point should be carefully observed when following the boundaries of the areas which involve the transition of the equator.

19.7 Gnomonic projection : For either the north or south polar areas, the transparency should be positioned so that the north-south line (terminated with an arrow) is parallel to the meridian of longitude, with the arrow pointing towards the pole.

6.20 Data for tracing interference contours

*
* *

3.2.2 Data for plotting interference contours, gnomonic projection maps of polar areas, and interference range contours.

3,0 et 3,5 DHz Jour - DONNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 700 km
 3.0 & 3.5 Mc/s day - DATA FOR PLOTTING 700 km INTERFERENCE CONTOURS
 3,0 y 3,5 Mc/s día - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 700 km

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	6,3	180,0	16,3	180,0	26,3	180,0	36,3	180,0	46,3
	178,9	6,2	173,9	16,2	178,8	26,2	178,6	36,2	178,4	46,2
	177,8	5,9	177,8	15,9	177,6	25,9	177,3	35,9	176,9	45,9
	176,8	5,5	176,7	15,4	176,5	25,4	176,1	35,4	175,5	45,4
	175,9	4,8	175,8	14,8	175,5	24,8	175,1	34,7	174,3	44,7
	175,2	4,0	175,0	14,0	174,7	24,0	174,2	33,9	173,3	43,9
	174,5	3,1	174,4	13,1	174,1	23,0	173,5	33,0	172,5	42,9
	174,1	2,2	173,9	12,1	173,6	22,0	173,0	32,0	172,0	41,9
	173,8	1,1	173,7	11,0	173,4	21,0	172,8	30,9	171,8	40,8
	173,7	0,0	173,6	9,9	173,3	19,9	172,7	29,8	171,8	39,7
	173,8	-1,1	173,7	8,8	173,4	18,8	172,9	28,7	172,0	38,6
	174,1	-2,2	174,0	7,8	173,8	17,7	173,3	27,7	172,5	37,6
	174,5	-3,1	174,5	6,8	174,3	16,8	173,9	26,7	173,2	36,6
	175,2	-4,0	175,2	5,9	175,0	15,9	174,6	25,8	174,1	35,8
	175,9	-4,8	175,9	5,2	175,8	15,1	175,5	25,1	175,1	35,1
	176,8	-5,5	176,8	4,5	176,8	14,5	176,5	24,5	176,2	34,5
	177,8	-5,9	177,8	4,1	177,8	14,1	177,6	24,1	177,4	34,0
	178,9	-6,2	178,9	3,8	178,9	13,8	178,8	23,8	178,7	33,8
	180,0	-6,3	180,0	3,7	180,0	13,7	180,0	23,7	180,0	33,7
Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	56,3	180,0	66,3	180,0	76,3	180,0	86,3	Toutes longitudes All longitudes Todas las longitudes	83,7
	178,0	56,2	177,3	66,2	175,4	76,2	163,9	86,1		83,7
	176,2	55,9	174,7	65,8	171,2	75,8	152,2	85,4		83,7
	174,5	55,3	172,5	65,3	167,7	75,1	145,2	84,5		83,7
	173,0	54,6	170,6	64,5	164,9	74,3	141,9	83,4		83,7
	171,8	53,8	169,1	63,6	162,9	73,4	140,8	82,4		83,7
	171,0	52,8	168,1	62,7	161,6	72,3	141,3	81,3		83,7
	170,4	51,8	167,5	61,6	161,3	71,2	142,8	80,2		83,7
	170,2	50,7	167,3	60,5	161,5	70,1	144,9	79,2		83,7
	170,3	49,6	167,5	59,4	162,1	69,1	147,6	78,2		83,7
	170,6	48,5	168,1	58,3	163,2	68,0	150,5	77,3		83,7
	171,2	47,5	169,0	57,4	164,6	67,1	153,8	76,5		83,7
	172,1	46,6	170,1	56,4	166,4	65,2	157,3	75,8		83,7
	173,1	45,7	171,4	55,6	168,3	65,5	160,8	75,2		83,7
	174,3	45,0	172,9	55,0	170,4	64,9	164,6	74,6		83,7
	175,6	44,5	174,6	54,4	172,7	64,4	168,4	74,2		83,7
	177,0	44,0	176,3	54,0	175,1	64,0	172,2	73,9		83,7
	178,5	43,8	178,2	53,8	177,5	63,8	176,1	73,8		83,7
	180,0	43,7	180,0	53,7	180,0	63,7	180,0	73,7		83,7

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	31,5	180,0	41,5	180,0	51,5	180,0	61,5	180,0	71,5
	173,9	31,0	173,1	40,9	171,7	50,8	169,3	60,7	164,3	70,4
	168,2	29,4	166,7	39,2	164,2	48,9	160,1	58,4	152,1	67,5
	163,0	26,9	161,1	36,4	158,0	45,8	153,0	54,9	144,2	63,5
	158,5	23,6	156,4	32,8	153,2	41,9	148,0	50,6	139,7	58,7
	154,9	19,6	152,9	28,6	149,8	37,4	144,9	45,8	137,5	53,6
	152,0	15,1	150,3	23,9	147,6	32,5	143,3	40,7	137,0	48,4
	150,1	10,3	148,7	18,9	146,4	27,4	142,9	35,5	137,6	43,2
	148,9	5,2	148,0	13,7	146,3	22,1	143,4	30,3	139,1	38,1
	148,5	0,0	148,1	8,5	146,9	17,0	144,7	25,2	141,3	33,2
	148,9	-5,2	149,0	3,4	148,3	11,9	146,7	20,9	144,1	28,6
	150,1	-10,3	150,6	-1,6	150,3	7,1	149,3	15,8	147,4	24,3
	152,0	-15,1	152,9	-6,3	153,1	2,6	152,5	11,5	151,1	20,4
	154,9	-19,6	156,0	-10,5	156,4	-1,4	156,2	7,8	155,3	16,9
	158,5	-23,6	159,7	-14,2	160,3	-4,8	160,3	4,6	159,8	14,0
	163,0	-26,9	164,1	-17,3	164,7	-7,7	164,8	2,0	164,5	11,6
	168,2	-29,4	169,1	-19,6	169,6	-9,8	169,7	0,1	169,5	9,9
	173,9	-31,0	174,4	-21,0	174,7	-11,1	174,8	-1,1	174,7	8,9
	180,0	-31,5	180,0	-21,5	180,0	-11,5	180,0	-1,5	180,0	8,5

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	81,5	0,	88,5	0,	78,5	0,	68,5	Toutes longitudes All Longitudes Todas las longitudes	58,5
	149,5	79,7	78,0	84,7	25,3	77,7	14,2	68,3		58,5
	133,9	75,6	90,4	79,7	46,5	75,7	28,0	67,7		58,5
	127,6	70,7	97,5	74,7	62,9	72,9	41,3	66,7		58,5
	125,7	65,6	103,3	69,8	75,9	69,7	53,8	65,4		58,5
	126,0	60,3	108,7	65,0	86,6	66,4	65,5	63,9		58,5
	127,6	55,2	118,9	60,3	95,8	62,9	76,4	62,3		58,5
	129,9	50,2	118,9	55,9	104,1	59,6	86,7	60,5		58,5
	132,9	45,4	124,1	51,6	111,9	56,3	96,5	58,8		58,5
	136,4	40,8	129,2	47,6	119,2	53,2	105,8	57,1		58,5
	140,2	36,5	134,5	43,9	126,2	50,4	114,8	55,5		58,5
	144,4	32,6	139,8	40,5	133,1	47,7	123,4	54,0		58,5
	148,8	29,0	145,3	37,4	139,9	45,4	131,9	52,6		58,5
	153,6	25,9	150,8	34,8	146,6	43,3	140,1	51,4		58,5
	158,5	23,3	156,5	32,6	153,3	41,6	148,2	50,4		58,5
	163,7	21,2	162,3	30,8	160,0	40,3	156,2	49,6		58,5
	169,1	19,7	168,1	29,5	166,6	39,3	164,2	49,0		58,5
	174,5	18,8	174,1	28,8	173,3	38,7	172,1	48,6		58,5
	180,0	18,5	180,0	28,5	180,0	38,5	180,0	48,5		58,5

3,0 MHz nuit - DONNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 3500 km
 3.0 Mc/s night - DATA FOR PLOTTING 3500 km INTERFERENCE CONTOURS
 3,0 Mc/s noche - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 3500 km

3,5 MHz nuit - DONNEES POUR LE TRACE DES COURBES DE BROUILLAGE A 4000 kc
 3,5 Mc/s night - DATA FOR PLOTTING 4000 kc INTERFERENCE CONTOURS
 3,5 Mc/s noche - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 4000 kc

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
	180,0	36,0	180,0	46,0	180,0	56,0	180,0	66,0	180,0	76,0
	172,8	35,4	171,7	45,3	169,7	55,1	166,1	64,9	157,6	74,5
	166,0	33,5	164,0	43,2	160,6	52,7	154,7	62,0	142,8	70,6
	160,0	30,6	157,5	39,9	153,4	49,0	146,6	57,7	134,9	65,5
	155,0	26,8	152,3	35,7	148,1	44,4	141,5	52,6	131,2	59,9
	150,9	22,2	148,4	30,8	144,5	39,2	138,7	47,0	129,9	54,0
	147,8	17,1	145,7	25,5	142,3	33,6	137,4	41,2	130,2	48,2
Coordonnées pour le tracé des courbes	145,7	11,6	144,1	19,8	141,4	27,7	137,4	35,4	131,6	42,4
Coordinates for plotting of contours	144,4	5,9	143,4	13,9	141,4	21,9	138,3	29,5	133,8	36,7
Coordenadas para el trazado de las curvas	144,0	0,0	143,6	8,1	142,3	16,1	140,0	23,9	136,5	31,3
	144,4	- 5,9	144,6	2,3	143,9	10,4	142,4	18,4	139,8	26,2
	145,7	-11,6	146,4	- 3,3	146,3	5,0	145,4	13,3	143,6	21,5
	147,8	-17,1	149,0	- 8,6	149,4	0,0	149,0	8,6	147,8	17,2
	150,9	-22,2	152,4	-13,4	153,1	- 4,5	153,2	4,4	152,4	13,3
	155,0	-26,8	156,6	-17,6	157,5	- 8,4	157,8	0,8	157,4	10,1
	160,0	-30,6	161,6	-21,2	162,5	-11,6	162,9	- 2,1	162,8	7,5
	166,0	-33,5	167,3	-23,8	168,0	-14,0	168,4	- 4,2	168,3	5,6
	172,8	-35,4	173,5	-25,4	173,9	-15,5	174,1	- 5,6	174,1	4,4
	180,0	-36,0	180,0	-26,0	180,0	-16,0	180,0	- 6,0	180,0	4,0

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
	180,0	86,0	0,	84,0	0,	74,0	0,	64,0	Toutes longitudes All longitudes Todas las longitudes	54,0
	126,9	82,7	46,5	81,9	20,9	73,4	13,4	63,8		54,0
	115,7	77,1	69,8	77,6	39,7	71,6	26,5	63,2		54,0
	113,9	71,3	83,0	72,8	55,5	69,1	39,2	62,3		54,0
	114,9	65,4	92,2	67,8	68,8	66,1	51,3	61,0		54,0
	117,1	59,6	99,7	62,8	80,1	62,8	62,8	59,6		54,0
	120,1	54,0	106,4	57,9	90,1	59,4	73,7	58,0		54,0
Coordonnées pour le tracé des courbes	123,5	48,5	112,6	53,2	99,0	56,0	84,1	56,3		54,0
Coordinates for plotting of contours	127,4	43,3	118,6	48,7	107,3	52,7	93,9	54,5		54,0
Coordenadas para el trazado de las curvas	131,5	38,3	124,5	44,5	115,2	49,5	103,4	52,8		54,0
	135,9	33,7	130,4	40,5	122,8	46,5	112,6	51,2		54,0
	140,7	29,4	136,3	36,9	130,1	43,7	121,5	49,6		54,0
	145,7	25,5	142,3	33,6	137,4	41,3	130,2	48,2		54,0
	150,9	22,1	148,4	30,8	144,5	39,1	138,7	47,0		54,0
	156,4	19,3	154,6	28,4	151,6	37,3	147,1	45,9		54,0
	162,1	17,0	160,8	26,5	158,7	35,9	155,4	45,1		54,0
	168,0	15,3	167,2	25,1	165,8	34,8	163,6	44,5		54,0
	174,0	14,3	173,6	24,3	172,9	34,2	171,8	44,1		54,0
	180,0	14,0	180,0	24,0	180,0	34,0	180,0	44,0		54,0

4,7 MHz jour - DONNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 1200 kHz
 4,7 Mc/s day - DATA FOR PLOTTING 1200 kHz INTERFERENCE CONTOURS
 4,7 Mc/s día - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 1200 kHz

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180.0	10.8	180.0	20.8	180.0	30.8	180.0	40.8	180.0	50.8
	178.1	10.6	178.0	20.6	177.8	30.6	177.5	40.6	177.1	50.6
	176.3	10.1	176.1	20.1	175.8	30.1	175.2	40.1	174.3	50.0
	174.6	9.3	174.3	19.3	173.8	29.2	173.1	39.2	171.8	49.1
	173.0	8.3	172.7	18.2	172.2	28.1	171.2	38.0	169.7	47.8
	171.7	6.9	171.4	16.8	170.3	26.7	169.7	36.5	168.0	46.4
	170.6	5.4	170.3	15.2	169.7	25.1	168.6	34.9	166.8	44.7
	169.8	3.7	169.6	13.5	168.9	23.3	167.9	33.1	166.1	42.9
	169.4	1.9	169.1	11.7	168.6	21.5	167.5	31.3	165.8	41.0
	169.2	0.0	169.0	9.8	168.5	19.6	167.6	29.4	166.0	39.2
	169.4	-1.9	169.3	8.0	168.8	17.8	168.0	27.6	166.6	37.3
	169.8	-3.7	169.8	6.2	169.4	16.0	168.7	25.8	167.5	35.6
	170.6	-5.4	170.6	4.5	170.4	14.4	169.8	24.2	168.7	34.0
	171.7	-6.9	171.7	3.0	171.5	12.9	171.0	22.8	170.2	32.6
	173.0	-8.3	173.1	1.7	172.9	11.6	172.6	21.5	171.9	31.4
	174.6	-9.3	174.6	0.6	174.5	10.6	174.3	20.5	173.8	30.5
	176.3	-10.1	176.3	-0.2	176.3	9.8	176.1	19.8	175.8	29.8
	178.1	-10.6	178.1	-0.6	178.1	9.4	178.0	19.3	177.9	29.3
	180.0	-10.8	180.0	-0.8	180.0	9.2	180.0	19.2	180.0	29.2

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180.0	60.8	180.0	70.8	180.0	80.8	0.	89.2	Toutes longitudes All Longitudes Todas las longitudes	79.2
	176.2	60.6	174.4	70.6	168.7	80.5	71.1	88.0		79.2
	172.6	60.0	169.3	69.8	159.4	79.5	87.5	86.3		79.2
	169.5	59.0	165.0	68.7	152.9	78.1	96.6	84.6		79.2
	167.0	57.6	161.8	67.3	149.1	76.4	103.6	82.9		79.2
	165.1	56.1	159.6	65.6	147.2	74.6	109.9	81.2		79.2
	163.8	54.4	158.4	63.8	146.8	72.8	115.8	79.6		79.2
	163.2	52.5	158.0	62.0	147.4	70.9	121.4	78.1		79.2
	163.1	50.7	158.3	60.1	148.9	69.1	126.9	76.7		79.2
	163.5	48.8	159.1	58.3	150.8	67.4	132.3	75.3		79.2
	164.3	47.0	160.4	56.6	153.3	65.8	137.7	74.1		79.2
	165.5	45.3	162.1	54.9	156.0	64.3	143.0	73.0		79.2
	167.0	43.8	164.2	53.5	159.1	63.0	148.3	72.0		79.2
	168.3	42.5	166.4	52.2	162.3	61.9	153.6	71.2		79.2
	170.3	41.3	168.9	51.2	165.7	60.9	158.9	70.5		79.2
	172.9	40.4	171.6	50.3	169.1	60.2	164.2	69.9		79.2
	175.8	39.7	174.3	49.7	172.7	59.6	169.4	69.5		79.2
	177.6	39.3	177.1	49.3	176.3	59.3	174.7	69.3		79.2
	180.0	39.2	180.0	49.2	180.0	59.2	180.0	69.2		79.2

4,7 MHz nuit et 10,0 MHz jour - DONNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 5500 kHz
 4,7 Mc/s night & 10,0 Mc/s day - DATA FOR PLOTTING 5500 kHz INTERFERENCE CONTOURS
 4,7 Mc/s noche y 10,0 Mc/s día - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 5500 kHz

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	49,5	180,0	59,5	180,0	69,5	180,0	79,5	178,7	89,5
	168,5	48,5	165,5	58,2	159,6	67,8	144,9	76,7	97,0	82,4
	158,2	45,6	153,2	54,7	144,6	63,3	128,3	70,7	98,4	74,8
	149,7	41,2	144,1	49,6	135,4	57,2	121,5	63,5	101,0	67,2
	143,0	35,6	137,8	43,3	130,1	50,3	119,0	56,0	104,1	59,7
	138,1	29,3	136,6	36,5	127,3	43,0	118,6	48,4	107,5	52,4
	134,6	22,3	131,1	29,2	126,1	35,4	119,5	40,8	111,0	45,1
	132,3	15,1	129,8	21,6	126,1	27,8	121,2	33,4	114,8	38,1
	130,9	7,6	129,5	14,1	127,0	20,3	123,5	26,0	118,9	31,2
	130,5	0,0	130,1	6,5	128,7	12,8	128,5	18,9	123,2	24,7
	130,9	-7,6	131,5	-1,0	131,2	5,6	130,0	12,1	127,9	18,4
	132,3	-15,1	133,8	-8,2	134,4	-1,3	134,1	5,7	132,9	12,6
	134,6	-22,3	137,0	-15,2	138,3	-7,8	138,8	-0,3	138,4	7,3
	138,1	-29,3	141,2	-21,6	143,2	-13,7	144,2	-5,7	144,3	2,5
	143,0	-35,6	146,6	-27,4	148,9	-19,0	150,2	-10,4	150,7	-1,6
	149,7	-41,2	153,2	-32,4	155,5	-23,4	156,9	-14,2	157,6	-5,0
	158,2	-45,6	161,2	-36,2	163,1	-26,7	164,2	-17,1	164,8	-7,5
	168,5	-48,5	170,3	-38,7	171,3	-28,8	172,0	-18,9	172,3	-9,0
	180,0	-49,5	180,0	-39,5	180,0	-29,5	180,0	-19,5	180,0	-9,5

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	0,	80,5	0,	70,5	0,	60,5	0,	50,5		40,5
	40,2	78,2	22,2	69,5	15,3	60,0	11,9	50,3		40,5
	63,5	73,1	41,5	66,9	30,1	58,7	23,8	49,8		40,5
	77,1	67,0	57,1	63,1	43,8	56,7	35,4	48,9		40,5
	86,6	60,7	69,8	58,6	56,4	54,0	46,7	47,8		40,5
	94,2	54,3	80,4	53,8	67,8	51,0	57,7	46,4		40,5
	100,8	47,9	89,6	48,8	78,4	47,8	68,3	44,9		40,5
	107,0	41,7	97,9	43,8	88,2	44,4	78,7	43,2		40,5
	112,9	35,6	105,7	38,9	97,5	41,0	88,7	41,5		40,5
	118,8	29,8	113,1	34,2	106,3	37,6	98,4	39,8		40,5
	124,7	24,4	120,4	29,8	114,8	34,4	108,0	38,1		40,5
	130,8	19,3	127,6	25,6	123,1	31,4	117,3	36,5		40,5
	137,1	14,7	134,8	21,9	131,3	28,7	126,5	35,0		40,5
	143,7	10,6	142,1	18,5	139,5	26,3	135,6	33,7		40,5
	150,5	7,1	149,5	15,7	147,6	24,3	144,5	32,6		40,5
	157,6	4,3	157,0	13,5	155,7	22,6	153,5	31,7		40,5
	164,9	2,2	164,6	11,8	163,8	21,5	162,3	31,0		40,5
	172,4	0,9	172,3	10,8	171,9	20,7	171,2	30,6		40,5
	180,0	0,5	180,0	10,5	180,0	20,5	180,0	30,5		40,5

Toutes longitudes
All longitudes
Todas las longitudes

5,6 Hz jour - DONNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 1500 km
 5,6 Hz/s day - DATA FOR PLOTTING 1500 km INTERFERENCE CONTOURS
 5,6 Hz/s día - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 1500 km

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	13,5	180,0	23,5	180,0	33,5	180,0	43,5	180,0	53,5
	177,6	13,3	177,5	23,3	177,2	33,3	176,8	43,3	176,1	53,2
	175,3	12,7	175,0	22,6	174,6	32,6	173,8	42,5	172,5	52,5
	173,2	11,7	172,8	21,6	172,1	31,5	171,0	41,4	169,3	51,3
	171,2	10,3	170,8	20,2	170,0	30,0	168,7	39,9	166,6	49,6
	169,6	8,6	169,1	18,5	168,3	28,3	166,9	38,0	164,6	47,7
	168,3	6,7	167,8	16,5	167,0	26,2	165,5	36,0	163,2	45,6
	167,3	4,6	166,9	14,3	166,1	24,1	164,7	33,7	162,4	43,3
	166,7	2,3	166,4	12,1	165,7	21,8	164,4	31,4	162,3	41,0
	166,5	0,0	166,3	9,7	165,7	19,4	164,5	29,1	162,6	38,7
	166,7	- 2,3	166,6	7,4	166,1	17,1	165,1	26,8	163,4	36,4
	167,3	- 4,6	167,3	5,2	166,9	14,9	166,0	24,6	164,6	34,3
	168,3	- 6,7	168,3	3,1	168,0	12,9	167,3	22,6	166,1	32,4
	169,6	- 8,6	169,7	1,2	169,5	11,0	169,0	20,9	168,0	30,7
	171,2	-10,3	171,4	-0,4	171,2	9,5	170,8	19,3	170,1	29,2
	173,2	-11,7	173,3	-1,7	173,2	8,2	172,9	18,1	172,4	28,0
	175,3	-12,7	175,4	-2,7	175,4	7,3	175,2	17,2	174,8	27,2
	177,6	-13,3	177,7	-3,3	177,7	6,7	177,6	16,7	177,4	26,7
	180,0	-13,5	180,0	-3,5	180,0	6,5	180,0	16,5	180,0	26,5

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	63,5	180,0	73,5	180,0	83,5	0,	86,5	Toutes longitudes All Longitudes Todas las longitudes	76,5
	174,8	63,2	172,0	73,1	160,8	82,9	35,2	86,0		76,5
	170,1	62,4	164,9	72,1	147,7	81,4	59,4	84,7		76,5
	166,1	61,0	159,4	70,6	140,7	79,4	75,5	83,1		76,5
	162,9	59,3	155,6	68,7	137,6	77,1	87,2	81,4		76,5
	160,7	57,3	153,3	66,5	137,0	74,8	96,7	79,6		76,5
	159,3	55,1	152,3	64,2	137,8	72,5	104,9	77,9		76,5
	158,7	52,8	152,3	61,9	139,6	70,2	112,4	76,3		76,5
	158,8	50,4	153,0	59,6	142,0	68,1	119,3	74,7		76,5
	159,5	48,1	154,4	57,4	144,9	66,0	125,9	73,3		76,5
	160,7	46,0	156,2	55,3	148,2	64,1	132,2	71,9		76,5
	162,3	43,9	158,4	53,3	151,7	62,4	138,4	70,7		76,5
	164,2	42,1	161,0	51,6	155,4	60,9	144,5	69,6		76,5
	166,4	40,4	163,8	50,1	159,3	59,6	150,5	68,7		76,5
	168,9	39,0	166,8	48,8	163,3	58,5	156,5	67,9		76,5
	171,5	37,9	170,0	47,8	167,4	57,6	162,4	67,3		76,5
	174,3	37,1	173,3	47,1	171,6	57,0	168,3	66,9		76,5
	177,1	36,7	176,6	46,6	175,8	56,6	174,1	66,6		76,5
	180,0	36,5	180,0	46,5	180,0	56,5	180,0	66,5		76,5

5,6 et 6,6 MHz nuit - DONNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 6500 km
 5,6 & 6,6 Mc/s night - DATA FOR PLOTTING 6500 km INTERFERENCE CONTOURS
 5,6 y 6,6 Mc/s día - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 6500 km

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	58,5	180,0	68,5	180,0	78,5	180,0	88,5	0	81,5
	164,2	57,1	158,1	66,6	144,0	75,4	102,4	81,3	46,7	78,3
	150,8	53,2	142,2	61,6	126,6	68,7	100,1	72,8	68,5	71,7
	140,8	47,6	132,2	54,9	119,2	60,8	101,1	64,3	80,1	64,4
	133,6	40,8	126,2	47,2	116,0	52,4	102,9	55,8	88,0	56,7
	128,7	33,2	122,7	39,1	114,9	43,9	105,3	47,4	94,2	49,1
	125,3	25,2	120,8	30,7	115,1	35,4	108,0	39,1	99,7	41,5
	123,1	17,0	120,1	22,2	116,0	26,9	110,9	30,9	104,9	34,0
	121,9	8,5	120,2	13,7	117,7	18,5	114,3	22,9	110,0	26,7
	121,5	0,0	121,1	5,2	119,9	10,3	118,0	15,1	115,1	19,6
	121,9	-8,5	122,8	-3,2	122,8	2,3	122,1	7,6	120,5	12,9
	123,1	-17,0	125,2	-11,3	126,4	-5,5	126,8	0,5	126,3	6,5
	125,3	-25,2	128,6	-19,2	130,8	-12,8	132,0	-6,2	132,4	0,5
	128,7	-33,2	133,0	-26,7	136,1	-19,7	138,0	-12,3	139,0	-4,8
	133,6	-40,8	138,9	-33,5	142,5	-25,8	144,9	-17,7	146,2	-9,5
	140,8	-47,6	146,4	-39,5	150,2	-31,0	152,6	-22,2	154,0	-13,3
	150,8	-53,2	156,0	-44,3	159,1	-35,0	161,1	-25,6	162,3	-16,1
	164,2	-57,1	167,4	-47,4	169,2	-37,6	170,4	-27,8	171,0	-17,9
	180,0	-58,5	180,0	-48,5	180,0	-38,5	180,0	-28,5	180,0	-18,5

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	0	71,5	0	61,5	0	51,5	0	41,5		31,5
	25,7	70,1	17,6	60,7	13,6	51,1	11,4	41,3		31,5
	46,4	66,2	34,0	58,6	26,9	49,9	22,7	40,8		31,5
	61,7	61,0	43,4	55,3	39,6	48,0	33,8	40,0		31,5
	73,3	55,1	61,0	51,2	51,6	45,6	44,8	38,9		31,5
	82,7	48,8	71,9	46,6	62,8	42,7	55,5	37,6		31,5
	90,7	42,4	81,7	41,7	73,3	39,6	66,0	36,1		31,5
	98,0	36,0	90,6	36,7	83,2	36,2	76,2	34,4		31,5
	104,8	29,7	99,0	31,8	92,7	32,8	86,2	32,7		31,5
	111,6	23,6	107,0	26,9	101,8	29,4	96,1	31,0		31,5
	115,1	17,8	114,9	22,2	110,7	26,1	105,7	29,3		31,5
	124,9	12,3	122,7	17,9	119,5	23,0	115,3	27,6		31,5
	131,8	7,3	130,5	13,8	128,1	20,2	124,7	26,1		31,5
	139,2	2,7	138,4	10,3	136,7	17,7	134,0	24,9		31,5
	146,8	-1,1	146,5	7,2	145,3	15,5	143,3	23,6		31,5
	154,7	-4,3	154,7	4,8	154,0	13,8	152,5	22,7		31,5
	162,9	-6,6	163,0	3,0	162,6	12,5	161,7	22,1		31,5
	171,4	-8,0	171,5	1,9	171,3	11,8	170,8	21,6		31,5
	180,0	-8,5	180,0	1,5	180,0	11,5	180,0	21,5		31,5

Toutes longitudes
All Longitudes
Todas las longitudes

6,6 Hz Jour - DONNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 1900 km

6.6 Hz/day - DATA FOR PLOTTING 1900 km INTERFERENCE CONTOURS

6,6 Hz día - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 1900 km

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	17,1	180,0	27,1	180,0	37,1	180,0	47,1	180,0	57,1
	176,9	16,8	176,7	26,8	176,3	36,8	175,7	46,8	174,7	56,7
	174,0	16,0	173,6	26,0	172,9	35,9	171,7	45,8	169,7	55,7
	171,3	14,8	170,7	24,6	169,7	34,5	168,1	44,3	165,5	54,0
	168,8	13,0	168,2	22,8	167,0	32,6	165,2	42,3	162,2	51,9
	166,7	10,9	166,1	20,6	164,9	30,3	162,9	39,9	159,8	49,4
	165,1	8,5	164,5	18,1	163,3	27,7	161,3	37,2	158,2	46,6
	163,9	5,8	163,3	15,4	162,3	24,9	160,4	34,4	157,5	43,7
	163,1	2,9	162,7	12,5	161,8	22,0	160,2	31,5	157,5	40,8
	162,9	0,0	162,7	9,6	161,9	19,1	160,4	28,5	158,1	37,9
	163,1	-2,9	163,1	6,6	162,4	16,2	161,3	25,7	159,3	35,1
	163,9	-5,8	163,9	3,8	163,5	13,4	162,5	23,0	160,9	32,5
	165,1	-8,5	165,2	1,2	165,0	10,9	164,2	20,5	162,9	30,1
	166,7	-10,9	167,0	-1,2	166,8	8,6	166,3	18,3	165,2	28,0
	168,8	-13,0	169,1	-3,2	169,0	6,6	168,6	16,4	167,8	26,2
	171,3	-14,8	171,5	-4,9	171,5	5,0	171,2	14,9	170,7	24,8
	174,0	-16,0	174,2	-6,1	174,2	3,9	174,1	13,8	173,7	23,7
	176,9	-16,8	177,1	-6,8	177,1	3,1	177,0	13,1	176,8	23,1
	180,0	-17,1	180,0	-7,1	180,0	2,9	180,0	12,9	180,0	22,9
Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	67,1	180,0	77,1	180,0	87,1	0,	82,9	Toutes longitudes All Longitudes Todas las longitudes	72,9
	172,6	66,7	167,3	76,5	137,0	85,7	23,2	82,5		72,9
	166,0	65,5	157,1	75,0	123,8	83,1	43,5	81,6		72,9
	160,7	63,6	150,3	72,8	120,8	80,1	60,0	80,2		72,9
	156,8	61,3	148,2	70,1	121,4	77,2	73,5	78,6		72,9
	154,4	58,6	144,4	67,3	123,5	74,3	84,9	76,9		72,9
	153,1	55,8	144,0	64,3	126,5	71,5	94,8	75,2		72,9
	152,8	52,8	144,7	61,4	130,1	68,8	103,6	73,5		72,9
	153,3	49,9	146,3	58,6	133,9	66,3	111,8	71,8		72,9
	154,4	47,1	148,4	55,9	138,0	63,9	119,4	70,3		72,9
	156,1	44,4	151,0	53,3	142,3	61,7	126,8	68,8		72,9
	158,2	41,9	153,9	51,0	146,7	59,7	133,8	67,5		72,9
	160,7	39,6	157,2	49,0	151,3	58,0	140,7	66,3		72,9
	163,5	37,6	160,7	47,2	155,9	56,5	147,4	65,3		72,9
	166,5	36,0	164,3	45,7	160,7	55,2	154,0	64,4		72,9
	169,7	34,6	168,1	44,5	165,4	54,2	160,6	63,8		72,9
	173,1	33,7	172,0	43,6	170,3	53,5	167,1	63,3		72,9
	176,5	33,1	176,0	43,1	175,1	53,0	173,5	63,0		72,9
	180,0	32,9	180,0	42,9	180,0	52,9	180,0	62,9		72,9

9,0 MHz jour - DONNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 3800 km
 9,0 Mc/s day - DATA FOR PLOTTING 3800 km INTERFERENCE CONTOURS
 9,0 Mc/s día - DATOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 3800 km

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	34,2	180,0	44,2	180,0	54,2	180,0	64,2	180,0	74,2
	173,3	33,6	172,3	43,5	170,6	53,4	167,5	63,2	160,6	72,9
	166,9	31,9	165,1	41,6	162,1	51,2	157,0	60,6	146,8	69,4
	161,2	29,1	158,9	38,5	155,3	47,8	149,3	56,6	138,8	64,8
	156,4	25,5	154,0	34,6	150,2	43,4	144,2	51,9	134,6	59,5
	152,5	21,2	150,2	30,0	146,6	38,5	141,2	46,6	133,0	53,9
	149,5	16,3	147,6	24,9	144,4	33,2	139,8	41,1	132,9	48,3
	147,4	11,1	145,9	19,4	143,4	27,6	139,6	35,5	134,0	42,8
	146,2	5,6	145,2	13,9	143,3	22,0	140,3	29,9	135,9	37,3
	145,8	0,0	145,4	8,3	144,1	16,4	141,9	24,4	138,4	32,1
	146,2	-5,6	146,3	2,7	145,7	11,0	144,1	19,2	141,5	27,2
	147,4	-11,1	148,1	-2,6	147,9	5,9	147,0	14,3	145,1	22,6
	149,5	-16,3	150,6	-7,7	150,9	1,1	150,4	9,8	149,1	18,4
	152,5	-21,2	153,9	-12,3	154,5	-3,2	154,4	5,8	153,6	14,8
	156,4	-25,5	157,9	-16,3	158,7	-7,0	158,8	2,3	158,4	11,6
	161,2	-29,1	162,6	-19,6	163,4	-10,1	163,7	-0,5	163,5	9,1
	166,9	-31,9	169,0	-22,1	168,7	-12,3	168,9	-2,5	168,8	7,3
	173,3	-33,6	173,9	-23,7	174,2	-13,7	174,4	-3,8	174,4	6,2
	180,0	-34,2	180,0	-24,2	180,0	-14,2	180,0	-4,2	180,0	5,8

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	34,2	0	85,8	0	75,8	0	65,8	Toutes longitudes All longitudes Todas las longitudes	55,8
	137,8	81,6	56,0	83,2	22,4	75,1	13,7	65,6		55,8
	123,5	76,7	77,1	73,6	42,0	73,3	27,0	65,0		55,8
	119,5	71,2	88,4	73,7	58,2	70,7	39,9	64,0		55,8
	119,2	65,6	96,4	68,7	71,4	67,6	52,2	62,8		55,8
	120,6	60,0	103,2	63,8	82,5	64,3	63,8	61,3		55,8
	123,0	54,5	109,3	59,0	92,2	60,8	74,7	59,7		55,8
	126,0	49,2	115,1	54,3	101,0	57,5	85,1	58,0		55,8
	129,5	44,1	120,7	49,9	109,1	54,2	94,9	56,2		55,8
	133,4	39,9	126,3	45,7	116,7	51,0	104,3	54,5		55,8
	137,6	34,8	132,0	41,9	124,1	48,1	113,4	52,9		55,8
	142,1	30,7	137,7	38,3	131,3	45,4	122,2	51,4		55,8
	146,9	26,9	143,5	35,2	138,3	42,9	130,8	50,0		55,8
	152,0	23,7	149,3	32,4	145,3	40,8	139,2	48,7		55,8
	157,2	20,9	155,3	30,1	152,3	39,0	147,5	47,7		55,8
	162,7	13,7	161,4	28,2	159,2	37,6	155,7	46,9		55,8
	168,4	17,1	167,6	26,9	166,1	36,6	163,8	46,3		55,8
	174,2	16,1	173,3	26,1	173,1	36,0	171,9	45,9		55,8
	180,0	15,8	180,0	25,8	180,0	35,8	180,0	45,8		55,8

11,3 MHz jour - BOHNEES POUR LE TRACÉ DES COURBES DE BROUILLAGE A 6000 kHz
 11,3 Mc/e day - DATA FOR PLOTTING 6000 kHz INTERFERENCE CONTOURS
 11,3 Mc/e día - DAIOS PARA EL TRAZADO DE CURVAS DE INTERFERENCIA A 6000 kHz

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	180,0	54,0	180,0	64,0	180,0	74,0	180,0	84,0	0	86,0
	166,8	52,3	162,3	82,5	153,3	71,9	128,2	79,7	66,2	81,2
	154,8	49,5	148,2	58,3	136,6	66,3	115,0	72,2	82,1	73,8
	145,5	44,5	138,5	52,4	127,7	59,3	111,4	64,2	90,0	66,1
	138,5	39,3	132,2	45,4	123,2	51,8	111,0	58,2	95,7	68,5
	133,5	31,3	128,2	37,9	121,1	43,6	111,9	48,1	100,6	50,9
	130,0	23,9	126,0	30,0	120,6	35,5	113,6	40,1	105,2	43,4
	127,7	16,1	124,9	22,0	121,1	27,5	116,0	32,2	109,7	36,1
	126,4	8,1	124,8	13,9	122,3	19,5	118,8	24,6	114,3	29,0
	126,0	0,0	125,6	5,9	124,3	11,6	122,2	17,1	119,1	22,2
	126,4	- 8,1	127,1	- 2,1	127,0	4,0	126,0	9,9	124,2	15,7
	127,7	-16,1	129,5	- 9,8	130,4	- 3,4	130,4	3,1	129,6	9,5
	130,0	-23,9	132,8	-17,2	134,6	-10,3	135,4	- 3,2	135,4	3,9
	133,5	-31,3	137,2	-24,2	139,7	-16,7	141,1	- 9,0	141,7	- 1,2
	138,5	-38,3	142,9	-30,5	145,8	-22,4	147,6	-14,1	148,5	- 5,6
	145,5	-44,5	150,0	-36,0	152,9	-27,2	154,8	-10,2	155,8	- 9,1
	154,8	-49,5	158,7	-40,3	161,2	-30,9	162,7	-21,4	163,6	-11,8
	166,6	-52,8	163,9	-43,0	170,3	-33,2	171,2	-23,3	171,7	-13,4
	180,0	-54,0	180,0	-44,0	180,0	-34,0	180,0	-24,0	180,0	-14,0

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordonnées pour le tracé des courbes Coordinates for plotting of contours Coordenadas para el trazado de las curvas	0	75,0	0	66,0	0	56,0	0	46,0	Tous longitudes All longitudes Todas las longitudes	36,0
	31,1	74,2	19,5	65,1	14,4	55,6	11,6	45,8		36,0
	53,5	69,9	37,2	62,8	28,3	54,3	23,2	45,3		36,0
	68,6	64,2	52,3	59,2	41,5	52,4	34,5	44,5		36,0
	79,4	58,1	65,0	55,0	53,7	49,8	45,7	43,4		36,0
	88,1	51,7	75,8	50,3	65,1	46,9	56,5	42,0		36,0
	95,5	45,3	85,4	45,3	75,7	43,7	67,1	40,5		36,0
	102,3	38,9	94,1	40,3	85,6	40,3	77,4	38,3		36,0
	108,7	32,7	102,2	35,4	95,0	36,9	87,4	37,1		36,0
	115,0	26,3	110,8	30,6	104,0	33,5	97,2	35,4		36,0
	121,4	21,1	117,5	26,0	112,7	30,3	106,8	33,7		36,0
	127,8	15,8	125,1	21,8	121,2	27,2	115,2	32,1		36,0
	134,5	11,0	132,6	17,9	129,7	24,5	125,5	30,6		36,0
	141,4	6,7	140,2	14,4	138,1	22,0	134,7	29,2		36,0
	148,6	3,0	148,0	11,5	146,4	19,9	143,9	23,1		36,0
	156,1	- 0,0	155,8	9,1	154,8	18,2	152,9	27,2		36,0
	163,9	- 2,2	163,8	7,4	163,2	17,0	162,0	26,5		36,0
	171,0	- 3,5	171,9	6,4	171,6	16,3	171,0	26,1		36,0
	180,0	- 4,0	180,0	6,0	180,0	16,0	180,0	26,0		36,0

Gnomonic polar area maps - Pages 23 - 25

These maps are applicable at latitudes north of 60°N and south of 60°S.

Interference range contours

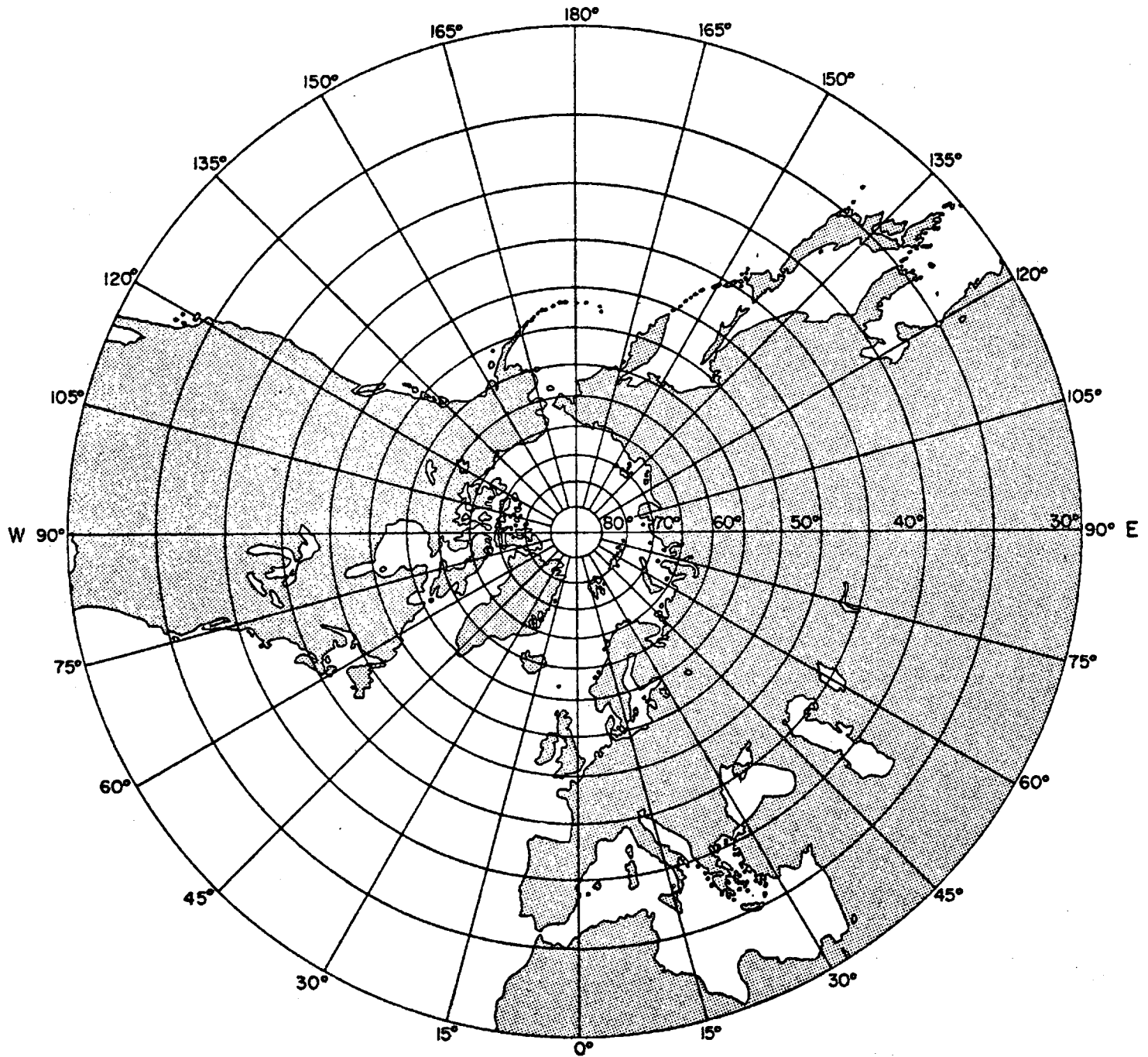
These contours are entitled as follows :

Frequency Band	Day or Night	Pages
3.0)	Day	27
3.5)	Day	
4.7	Day	29
5.6	Day	31
6.6	Day	33
3.0	Night	35
9.0	Day	37
3.5	Night	39
4.7)	Night	41
10.0)	Day	
11.3	Day	43
5.6)	Night	45
6.6)	Night	

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Pôle Nord - North Pole - Polo Norte

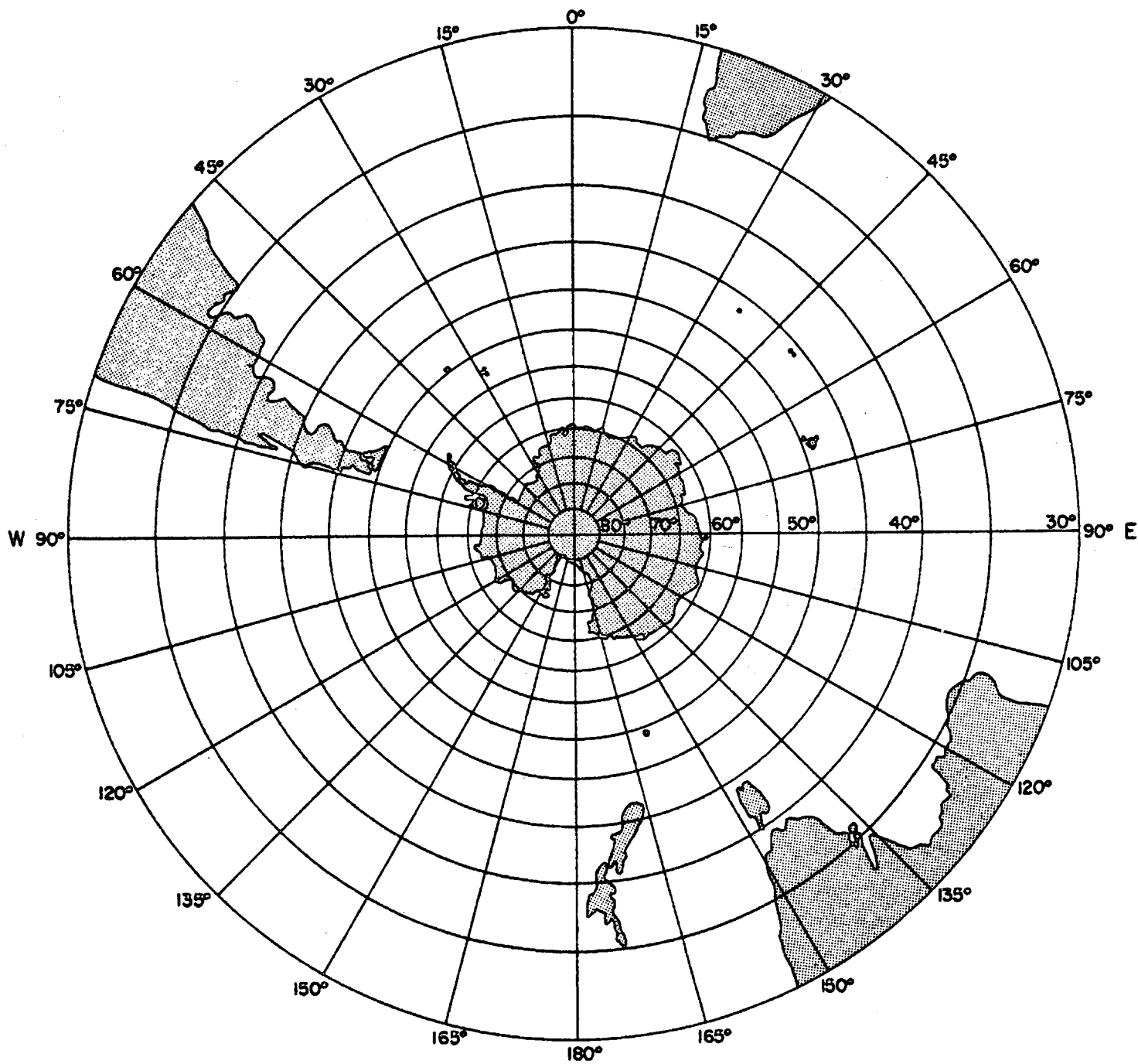


PROJECTION GNOMONIQUE
GNOMONIC PROJECTION
PROYECCIÓN GNOMÓNICA

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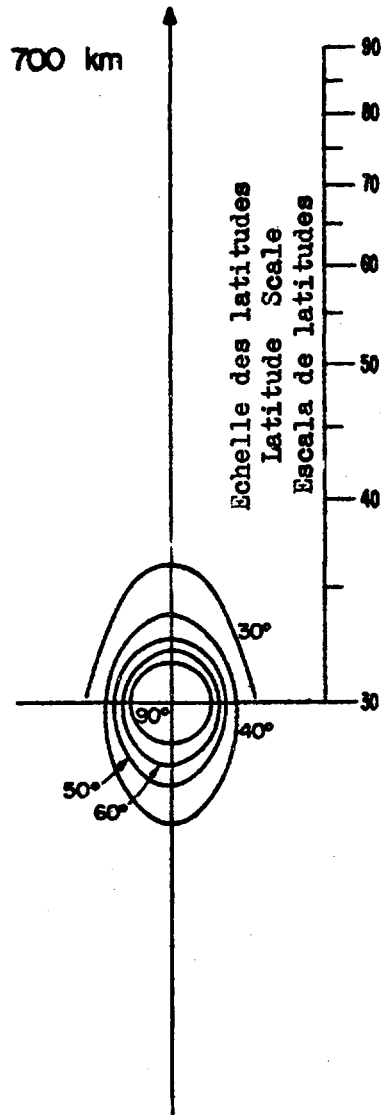
Pôle Sud - South Pole - Polo Sur



PROJECTION GNOMONIQUE
GNOMONIC PROJECTION
PROYECCIÓN GNOMÓNICA

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3.0

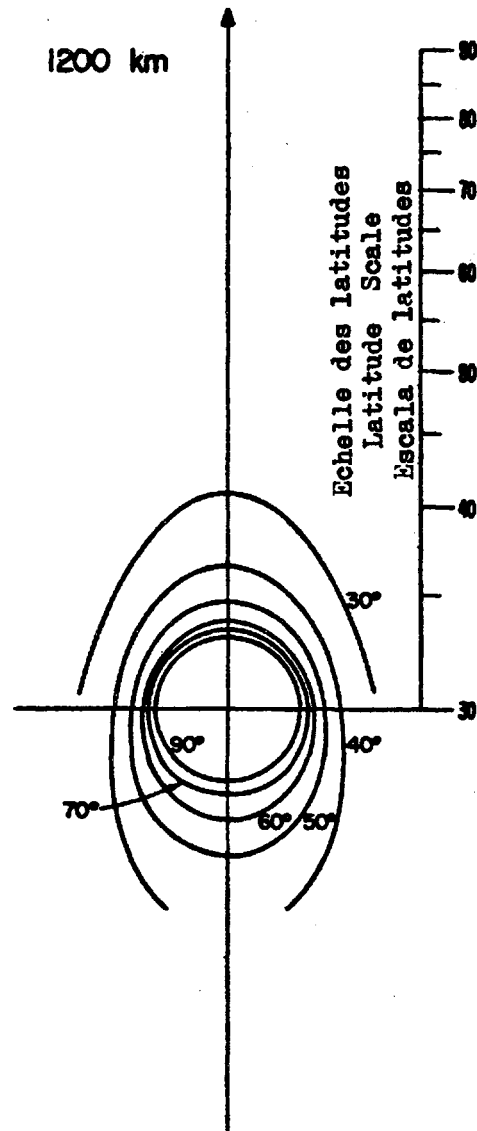
3.5

MHz
Mo/s
Mo/s

JOUR
DAY
DIA

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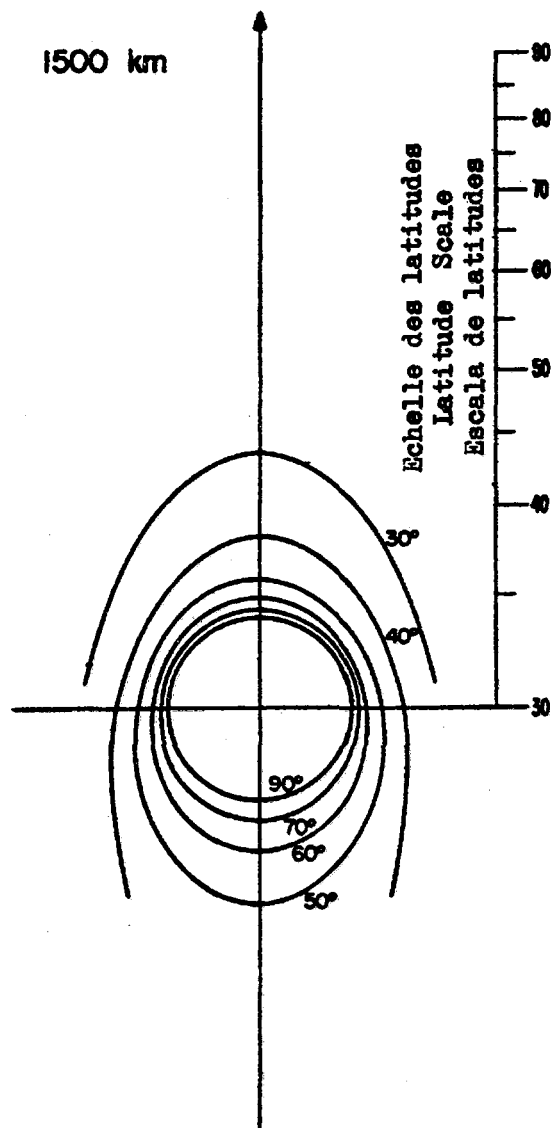
4.7

MHz
Mc/s
Mc/s

JOUR
DAY
DÍA

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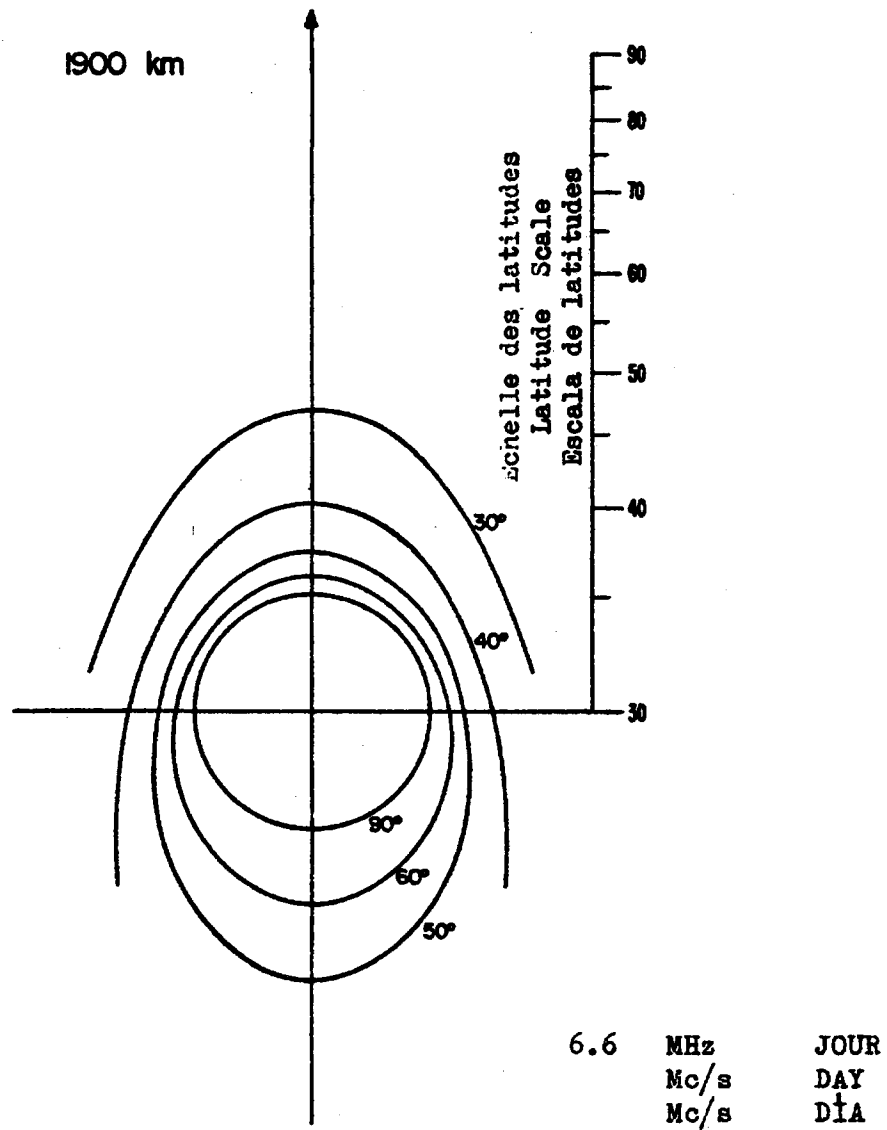
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5.6 MHz JOUR
 Mc/s DAY
 Mc/s DIA

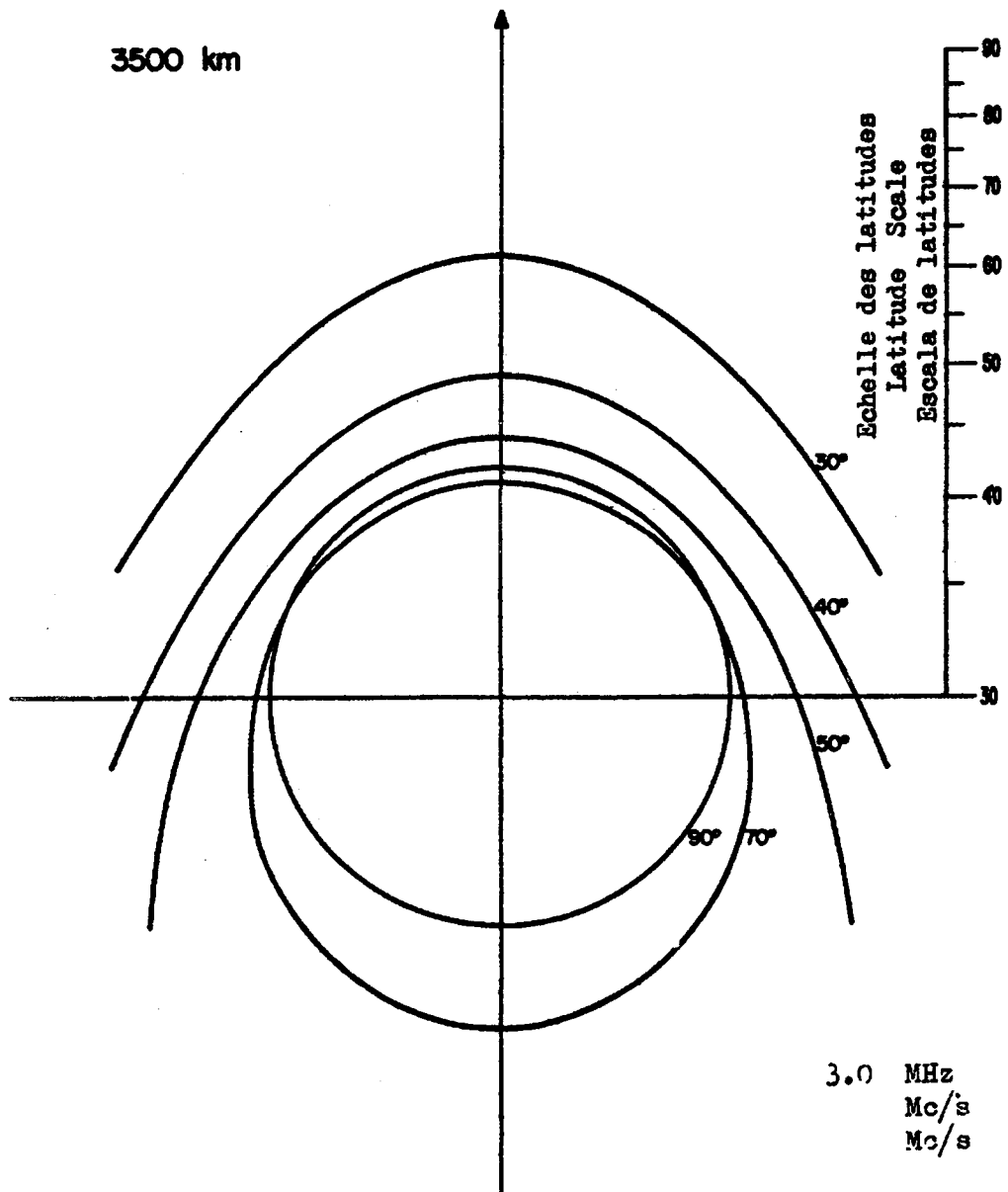
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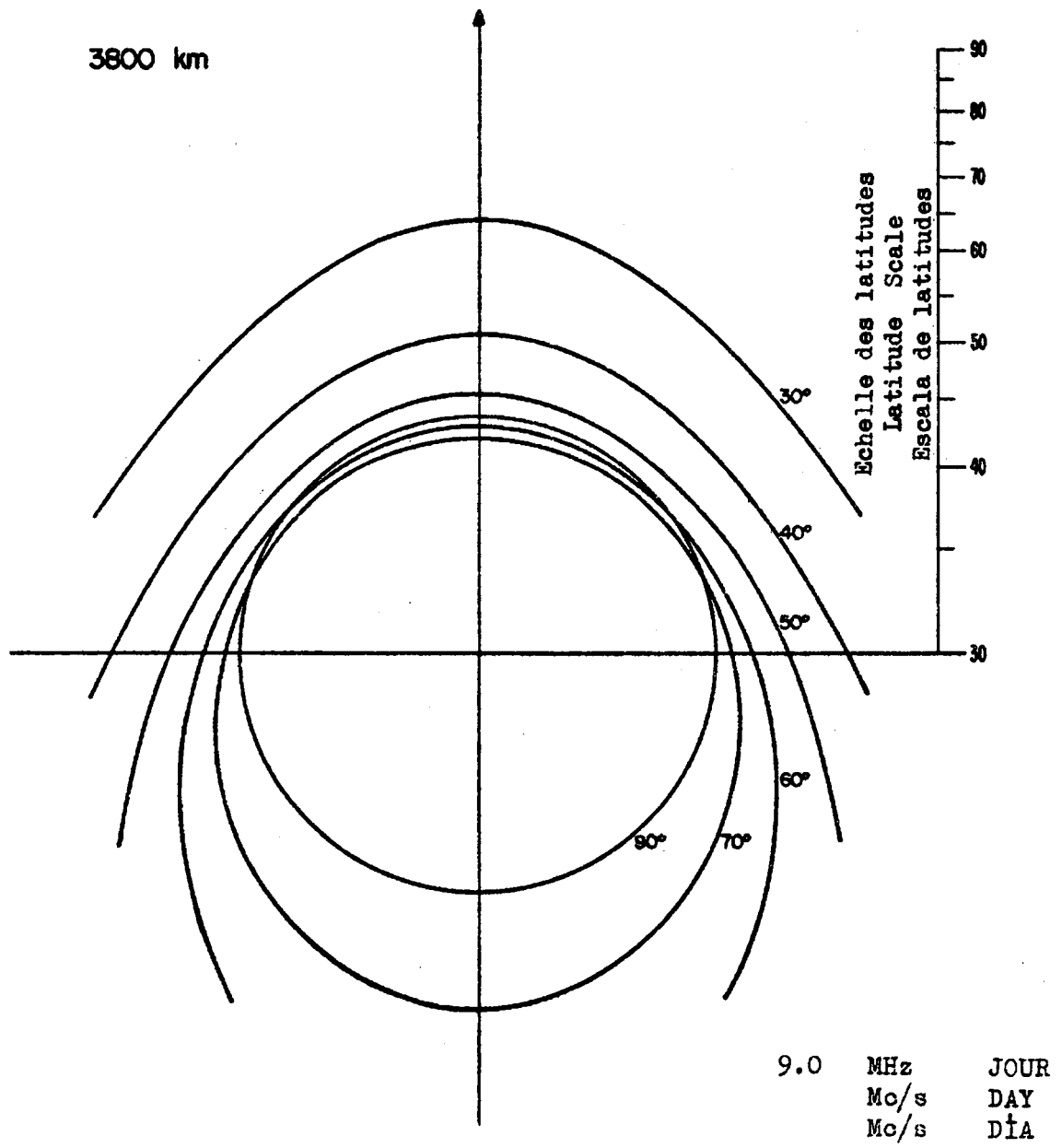
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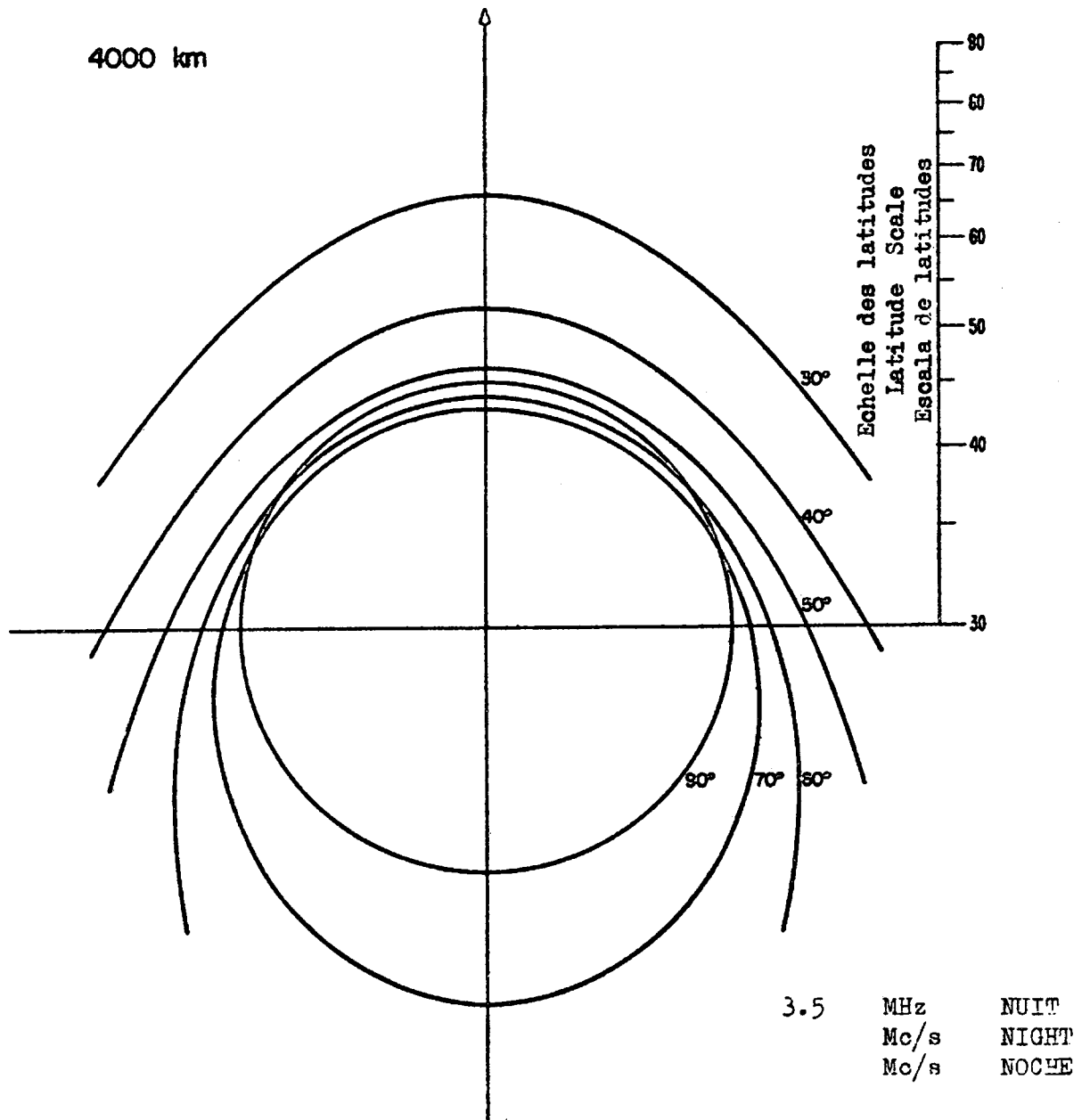
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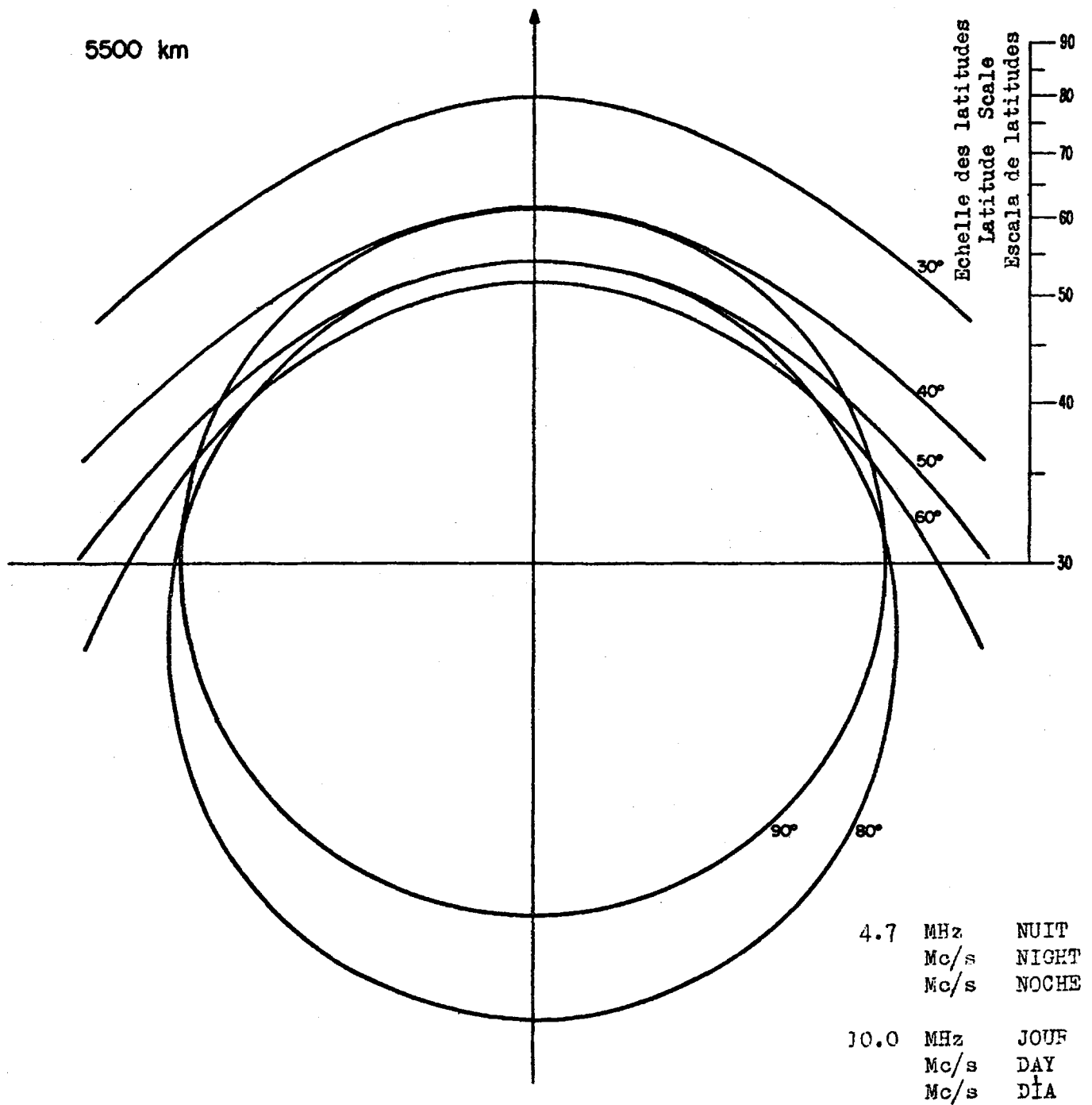
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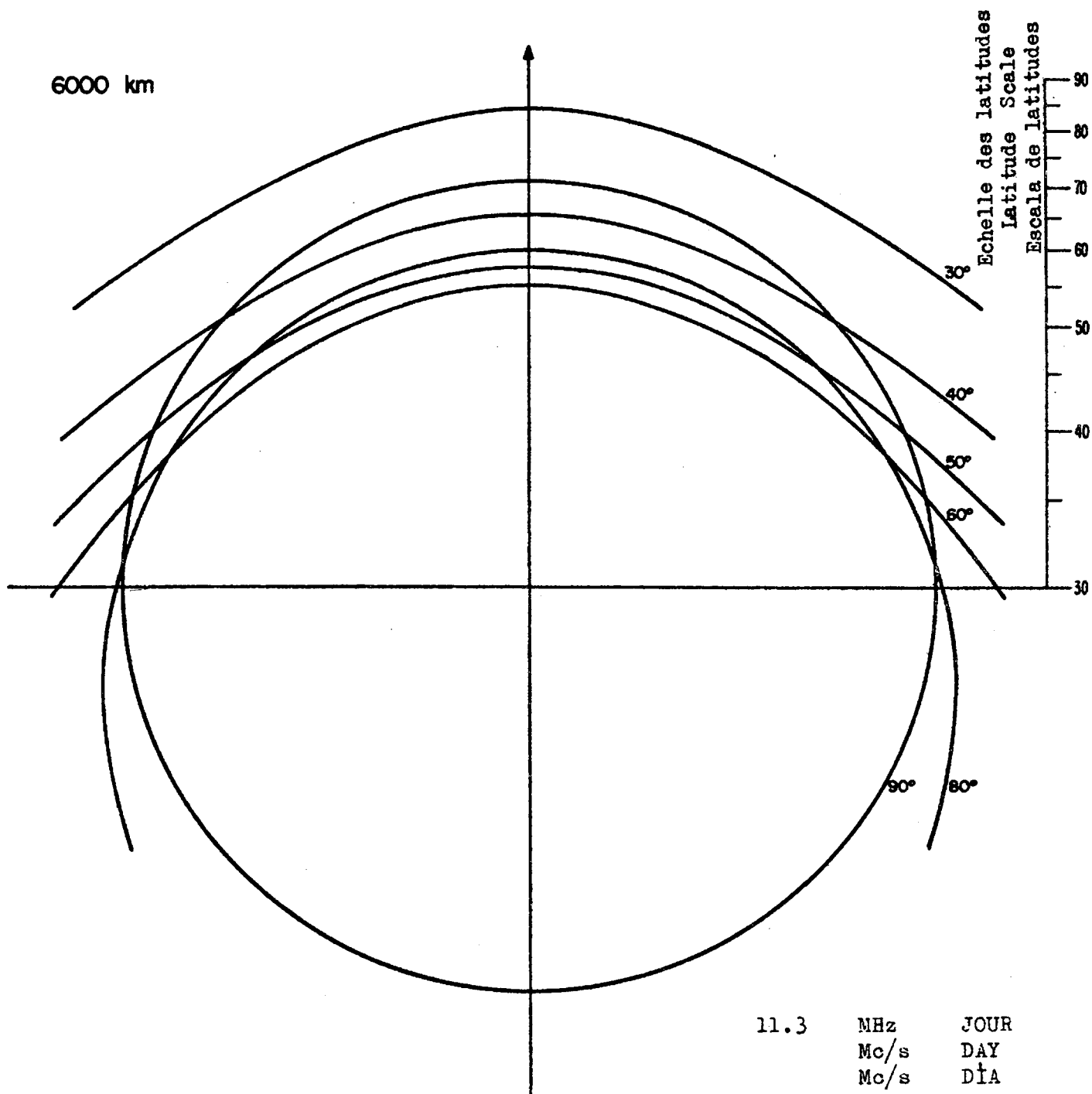
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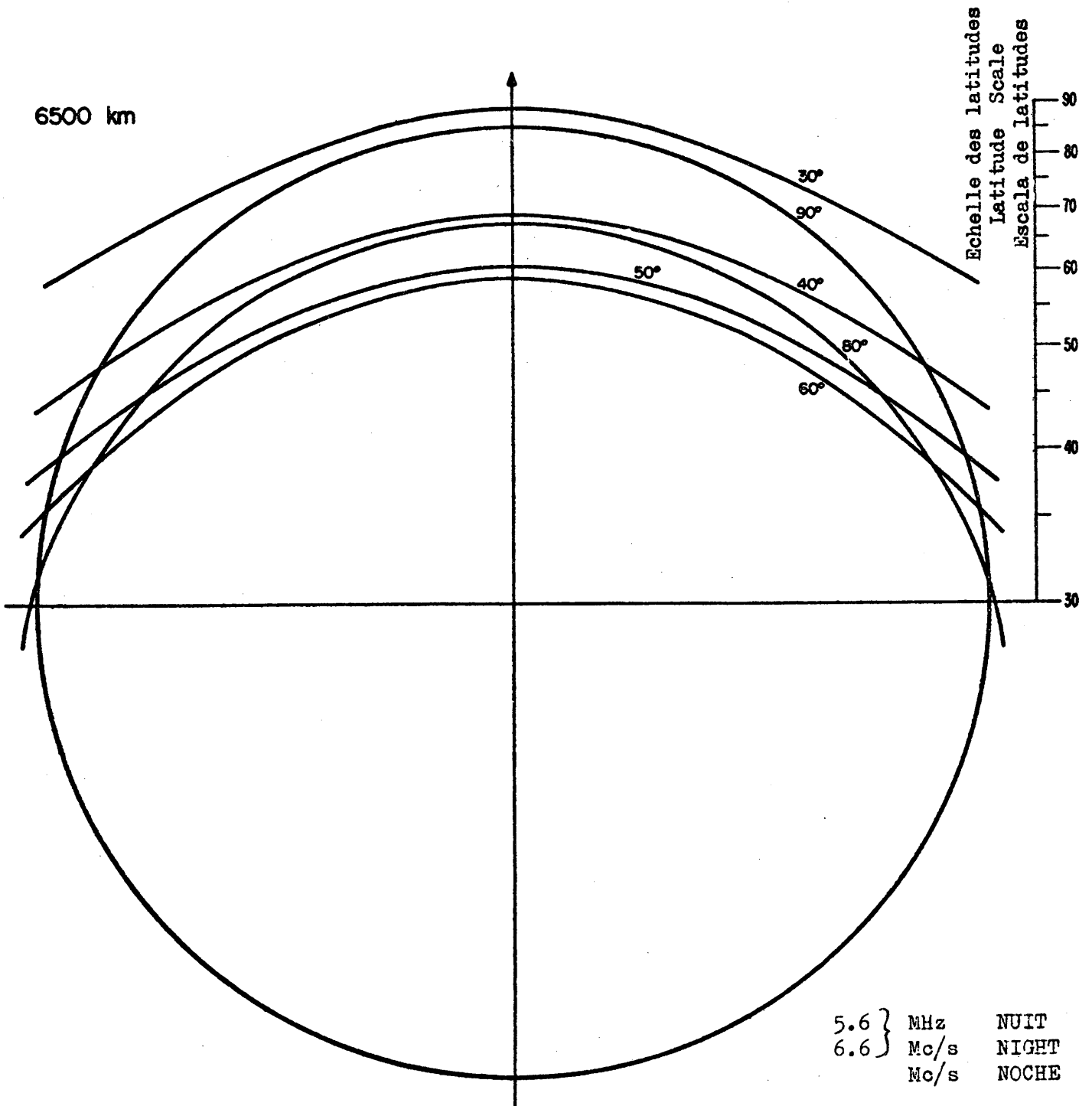
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4. Planning Principles - Use of Single Sideband

4.1 The First Session of the Aeronautical E.A.R.C. (Geneva, 1964) is of the view that it is premature to decide that the Aeronautical Mobile (R) Service must convert its operations to single sideband (SSB).

4.2 Nevertheless this Session proceeded on the assumption that at some future date SSB may be required by the Aeronautical Mobile (R) Service.

4.3 As a consequence it was agreed that planning principles must be prepared by this Session by means of which the Second Session of the Aeronautical E.A.R.C. is enabled to plan so as to ensure the continued operation of double sideband (DSB) and also to permit the introduction of single sideband when it is required.

4.4 The question of fixing a date for the systematic use of single sideband emissions is one to which the Second Session of the Aeronautical E.A.R.C. should give further consideration in the light of the requirements which will emerge from the analysis of statistics to be submitted and of the technical characteristics of other radio communication systems.

4.5 Particulars relating to Assignment

4.5.1 It is assumed that the modulation frequencies of A3 emissions will be limited to 3 000 cycles per second and that the sideband radiation of other authorized emissions will not exceed that of A3 emissions.

4.5.2 The use of channels for various classes of emission (see paragraph "Classes of emissions") will be subject to special arrangements by the administrations concerned in order to avoid the interference which may result from the simultaneous use of the same channel for several classes of emission. No inherent priority is given to any particular class of emission.

4.5.3 It is recognized that two or more channels can be derived from each of the channels provided under the frequency separation plan.

4.5.4 The arrangements contemplated in 4.5.2 and 4.5.3 above should be made under the provisions of Article 43 (Special Agreements) of the International Telecommunication Convention (Geneva, 1959) and Article 4 of the Radio Regulations (Geneva, 1959).

- 4.5.5 The International Civil Aviation Organization (I.C.A.O.) co-ordinates aeronautical (R) communications with international air operations for a large part of the world and this organization should be consulted in appropriate cases, particularly in the use of the frequencies in the Plan.
- 4.5.6 A single SSB emission, employed on a channel used in accordance with paragraph 4.5.5, shall be accommodated only in the upper half of that channel, the channel being designated by the centre frequency according to the Table.
- 4.5.7 A station using SSB emissions under the provisions of paragraph 4.5.3 may operate either in the upper half or in the lower half of the channels designated by the centre frequency in the Plan.
- 4.5.7.1 A station using SSB emissions in the upper half of the channel shall use upper sideband emissions with its carrier (reference) frequency at the value listed in the Plan;
- 4.5.7.2 A station using SSB emissions in the lower half of the channel shall use upper sideband emissions with its carrier (reference) frequency at the following value below the centre frequency listed in the Plan :

<u>Band</u>	<u>Carrier (Reference) Frequency Relative to Centre Frequency of Channel</u>
2, 3, 4, 5, 6 and 8 Mc/s	- 3 500 cycles
10, 11, 13 and 17 Mc/s	- 4 000 cycles

Resolution No. 1 - Relating to the basic objectives of the new frequency allotment plan for the Aeronautical Mobile (R) Service.

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
considering

- a) that it is essential that the frequency plan to be devised by the Second Session of the Aeronautical E.A.R.C. provide the means for the Aeronautical Mobile (R) Service to continue operating without interruption and with maximum efficiency;
- b) that at the same time adequate provisions should be made to permit of the smooth introduction of systems and types of emissions most likely to replace those in current use;

resolves

that the Second Session of the Aeronautical E.A.R.C. (1965) should draw up the new frequency plan on the basis of the present usage of double sideband radiotelephony with a view to permitting the introduction of single sideband radiotelephony, without excluding the use of other types of emission (see pages 3 and 4).

5. Basic Principles of Frequency Allotment

5.1 In any revision of the Frequency Allotment Plan for the Aeronautical Mobile (R) Service in the exclusive bands between 2 850 and 17 970 kc/s., the basic principle of the allotment of frequencies to geographic areas (defined as MWARAs and RDARAs in Part 1, Section I of Appendix 26 to the Radio Regulations, Geneva, 1959) should be retained.

5.2 The Aeronautical E.A.R.C. had the opportunity at its First Session of considering reports of monitoring studies and other information showing the extent to which, in certain areas, frequencies of the Aeronautical Mobile (R) Service were subject to harmful interference from stations of other services.

When dealing with Appendix 26 and related provisions in the Radio Regulations (Geneva, 1959) the Second Session (1965) should maintain Resolution No. 2, stressing the fact that the interference referred to adversely affects the safeguarding of human life in the air and regularity of air operations. The administrations and the relevant Union organs should apply all means available to ensure the elimination of this interference.

As a basic principle of frequency planning the Aeronautical E.A.R.C. must assume that all channels in the frequency bands between 2 850 and 17 970 kc/s allocated exclusively to the Aeronautical Mobile (R) Service remain fully available to that service.

5.3 Resolution No. 2 - Relating to the use of frequencies in the HF bands allocated exclusively to the Aeronautical Mobile (R) Service

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
considering

- a) that monitoring observations on the use of frequencies in the bands allocated exclusively to the Aeronautical Mobile (R) Service between 2 850 and 17 970 kc/s show that a number of frequencies in these bands are being used by stations of services other than the Aeronautical Mobile (R) Service, thus causing harmful interference to Aeronautical Mobile (R) Service communications on some international air routes;
- b) that the Aeronautical Mobile (R) Service is a safety service, to which exclusive frequency bands are specially allocated in order to ensure the safety and regularity of flight along national or international civil air routes as defined in No. 429 of the Radio Regulations (Geneva) 1959);
- c) that to protect the safety of human life and property in the air, and to develop aeronautical transportation services in a regular and effective manner, it is indispensable to have the aeronautical mobile communication channels kept free from harmful interference;

resolves

that the administrations, recognizing that the Aeronautical Mobile (R) Service is a safety service, shall abstain from the use of frequencies in the bands allocated exclusively to this service by stations of services other than the Aeronautical Mobile (R) Service, except under the express conditions prescribed in No. 115 or No. 415 of the Radio Regulations (Geneva, 1959).

6. Channel spacing in the Aeronautical Mobile (R) Service frequency bands between 2 850 kc/s and 17 970 kc/s

6.1 The present channel separation of 7 kc/s should be maintained in the bands 2 850 - 3 025 kc/s, 3 400 - 3 500 kc/s and 4 650 - 4 700 kc/s.

6.2 A reduction in channel widths in the bands between 5 480 kc/s (5 450 kc/s Region 2) and 8 965 kc/s could create a number of supplementary channels, however, this reduction will not be feasible for operational and economic reasons at the time the Revised Plan is brought into force. Therefore, the First Session of the Aeronautical E.A.R.C. (Geneva, 1964) recommends no change in the present channeling arrangements in these bands.

6.3 A channel spacing of 8 kc/s may be adopted for the bands above 10 Mc/s; the spare space resulting therefrom should be used at the top end of the 17 Mc/s band, and at the lower end of the 10 Mc/s band, to provide two additional channels of restricted bandwidth to be used by the Aeronautical Mobile (R) Service for purposes to be decided by the Second Session of the Aeronautical E.A.R.C. (1965).

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CHAPTER II

OTHER CRITERIA AND FACTORS WHICH SHOULD BE TAKEN INTO ACCOUNT IN ANY
REVISION OF THE FREQUENCY ALLOTMENT PLAN FOR THE AERONAUTICAL
MOBILE (R) SERVICE AND THE RADIO REGULATIONS (GENEVA, 1959)
TOGETHER WITH THE PROVISIONS RELATING THERETO

1. Resolution No. 3 - Relating to the grouping of major world air routes

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
having considered

- a) Resolutions Nos. 13 and 14 of the Administrative Radio Conference (Geneva, 1959) relating to : the Preparation of Revised Allotment Plans for the Aeronautical Mobile Service, the use of Frequencies of the Aeronautical Mobile (R) Service;
- b) Recommendation No. 2/1 of the I.C.A.O. Special Communications Meeting (1963), Document No. 8329, COSP/II, relating to the Adjustment of MWARA Boundaries;
- c) proposals and reports of studies submitted to the First Session of the Aeronautical E.A.R.C. (Geneva, 1964), Document Nos. I-1, I-3, I-7, I-8, I-11 and addendum, I-27, I-52, I-53, I-76;

considering

- a) the probability of a greater representation of Administrations being present at the Second Session of the Aeronautical E.A.R.C. (1965);
- b) that aircraft operational statistics for Major World Air Routes are to be submitted by Administrations for consideration by the Second Session of the Aeronautical E.A.R.C. (1965);
- c) that until the statistics referred to in b) above are available, it would not be desirable to make any revision of the grouping of International Air Routes into MWARAs or to establish new MWARAs to meet operational requirements;

resolves

- 1. not to recommend at this time any modifications to the existing MWARA boundaries as defined in Appendix 26 to the Radio Regulations (Geneva, 1959) or the establishment of boundaries for additional MWARAs;

2. that the Second Session of the Aeronautical E.A.R.C. (1965) should examine in detail all known factors, taking into account those mentioned above, to determine appropriate revisions to the MWARA boundaries and/or the establishment of additional MWARA's.

2. Resolution No. 4 - Relating to the grouping of regional and domestic air routes (RDARA's)

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
having considered

- a) Resolution No. 14 of the Administrative Radio Conference (Geneva, 1959), relating to the Use of Frequencies of the Aeronautical Mobile (R) Service;
- b) Recommendations 2/8 and 2/9 of the I.C.A.O. Special Communications Meeting (1963), Document No. 8329, COSP/II, relating to changes to RDARA's;
- c) proposals and reports of studies submitted to the First Session of the Aeronautical E.A.R.C. (Geneva, 1964), Document Nos. I-1, I-7, I-8, I-11 and its Addendum, I-75, I-110 Rev.;

considering

- a) that until any revision of the grouping of International Air Routes into MWARA's or the establishment of any new MWARA's has been completed, it would not be desirable to make any revision to RDARA boundaries;
- b) that aircraft operational statistics for Regional and Domestic Air Routes are to be submitted by Administrations for consideration by the Second Session of the Aeronautical E.A.R.C. (1965);

resolves

- 1. not to recommend, at this time, any modifications to the existing RDARA boundaries as defined in Appendix 26 of the Radio Regulations (Geneva, 1959),
- 2. that the Second Session of the Aeronautical E.A.R.C. (1965) should examine in detail all of the above items as a basis for making revisions to the RDARA boundaries.

3. Channels common to (R) and (OR) services

In any revision of the Frequency Plan for the Aeronautical Mobile (R) Service in the exclusive bands between 2 850 and 17 970 kc/s, the provision of channels common to the (R) and (OR) services, as foreseen in paragraph 3 of Section II A in Part I of Appendix 26 to the Radio Regulations (Geneva, 1959) should be retained.

4. Proposed amendments to pages 38 and 41 of Appendix 26 to the Radio Regulations (Geneva, 1959)

The First Session of the Aeronautical E.A.R.C. (February, 1964) considers that pages 38 and 41 of Appendix 26 to the Radio Regulations (Geneva, 1959) should be amended as follows :

Page 38 of Appendix 26

Frequency kc/s 1	Authorized area of use 2	Remarks 3
3023.5	World-wide	Authorized for world-wide use for the (R) and (OR) services as follows : 1) aboard aircraft for : a) communications with approach and aerodrome control; b) communication with an aeronautical station when other frequencies of the station are either unavailable or unknown; 2) at aeronautical stations for aerodrome and approach control under the following conditions : a) for approach control with power limited to a value that will produce 20 $\mu\text{V/m}$ at 100 km and in any case no more than 20 watts in the antenna circuit; b) for aerodrome control with the power limited to a value that will produce 20 $\mu\text{V/m}$ at 40 km and in any case no more than 20 watts in the antenna circuit; c) special attention must be given in each case to the type of antenna used in order to avoid harmful interference; d) the power of aeronautical stations which use this frequency in the conditions mentioned above may be increased to the extent necessary to meet certain operational requirements, subject to coordination between the administrations directly concerned and those whose services may be adversely affected. 3) for intercommunication between stations in the mobile services engaged in co-ordinated search and rescue operations; 4) the specific application of this frequency for the above purposes may be decided at regional aeronautical conferences; 5) this channel may be used for A1 or A3 emissions, in accordance with special arrangements. It shall not be subdivided.

Page 41 of Appendix 26 :

Frequency kc/s 1	Authorized area of use 2	Remarks 3
5680	World-wide	Authorized for world-wide use for the (R) and (OR) services as follows : 1) aboard aircraft for: a) communications with approach and aerodrome control, b) communication with an aeronautical station when other frequencies of the station are either unavailable or unknown; 2) at aeronautical stations for aerodrome and approach control under the following conditions: a) for approach control with power limited to a value that will produce 20 μV/m at 100 km and in any case no more than 20 watts in the antenna circuit, b) for aerodrome control with the power limited to a value that will produce 20 μV/m at 40 km and in any case no more than 20 watts in the antenna circuit, c) special attention must be given in each case to the type of antenna used in order to avoid harmful interference, d) the power of aeronautical stations which use this frequency in the conditions mentioned above may be increased to the extent necessary to meet certain operational requirements, subject to coordination between the administrations directly concerned and those whose services may be adversely affected . 3) for intercommunication between stations in the mobile services engaged in coordinated search and rescue operations; 4) the specific application of this frequency for the above purposes may be decided at regional aeronautical conferences; 5) this channel may be used for A1 or A3 emissions, in accordance with special arrangements. It shall not be subdivided.

5. Resolution No. 5 - Relating to plans for technical systems which may affect the future use of high frequencies

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
considering

- a) that several administrations are actively engaged in the development of communication systems making use of either HF or VHF or in other work intended to improve the Aeronautical Mobile (R) Service;
- b) that the systems under consideration include: extended range VHF, long range VHF, space radiocommunication techniques and other systems including automatic data transmission;
- c) that between the two sessions of the Aeronautical E.A.R.C. some of the techniques and systems mentioned above may have progressed to the point of implementation;
- d) that their implementation could have a significant impact on the requirements for high frequencies;

resolves

that administrations which have plans to meet the requirements of the Aeronautical Mobile (R) Service by means either of improved techniques and/or the use of other than high frequencies be requested to submit their plans to the Second Session of the Aeronautical E.A.R.C. (1965) and indicate their anticipated implementation dates;

6. Resolution No. 6 - Relating to the use of VHF for communication in the aeronautical mobile (R) service

The First Session of the Aeronautical Extraordinary Administrative Radio Conference (Geneva, 1964),

considering

- a) that from an aeronautical viewpoint, VHF provides a more reliable and more noise-free communication system than HF;
- b) that from a technical and operational viewpoint the use of VHF by aviation has progressed appreciably since conception of the Frequency Allotment Plan in Appendix 26 to the Radio Regulations (Geneva, 1959);
- c) that the use of VHF in its several modes could appreciably reduce the requirements for high frequencies in the Aeronautical Mobile (R) service;

d) that, due to development in the general telecommunication networks in many areas of the world, the possibilities of providing VHF coverage are rapidly increasing;

resolves

1. that administrations, to the maximum extent practicable, employ VHF frequencies to meet their requirements in the Aeronautical Mobile (R) Service;

2. that administrations, when submitting statistical data concerning aircraft operations, shall take into account the possibilities of meeting their communication requirements in the Aeronautical Mobile (R) Service by means of VHF techniques after due consideration of economic, technical and operational factors.

7. Resolution No. 7 - Relating to the use of very high frequencies for meteorological broadcasts in the aeronautical mobile (R) service

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),

considering

a) that the number of channels available for the Aeronautical Mobile (R) Service in the frequency bands between 2 850 and 17 970 kc/s is limited;

b) that the need for frequencies for Aeronautical Mobile (R) Service communications and for meteorological broadcasts to civil aircraft is increasing;

c) that the propagation characteristics of high frequencies make them essential for civil aviation communication requirements over long distances;

d) that Recommendation No. 13 of the International Administrative Aeronautical Radio Conference (Geneva, 1949) and Resolution No. 14 of the Administrative Radio Conference (Geneva, 1959) urge administrations "to make as great a use as possible of very high frequencies in order to lessen the load on the high frequency (R) bands";

e) that substantial technical progress has been made by civil aviation since 1949 in extending the useful range of very high frequencies (VHF) used for communications within the Aeronautical Mobile (R) Service;

f) that this extension of the useful range of VHF could partially meet the increasing needs for meteorological broadcasts to civil aircraft;

resolves

that administrations, to the maximum extent practicable, use very high frequencies for meteorological broadcasts to civil aircraft.

8. Resolution No. 8 - Relating to the dissemination of meteorological information

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
having considered

- a) the report and recommendations of the I.C.A.O. Special Communications Meeting (1963), Document No. 8329, COSP/II (Agenda Item 5);
- b) the proposals submitted to the First Session of the Aeronautical E.A.R.C. (Geneva, 1964) in Documents Nos. I-1, I-3, I-9, I-11 and its Addendum, I-23, I-78 and I-115;

resolves

to refer the subject to the Second Session of the Aeronautical E.A.R.C. (1965) for consideration when aircraft operation statistics provided by administrations are studied.

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CHAPTER III

OPERATIONAL PRINCIPLES ON WHICH REQUIREMENTS FOR HIGH
FREQUENCIES FOR AERONAUTICAL MOBILE (R) SERVICE
COMMUNICATIONS SHOULD BE ASSESSED

1. Number of aircraft which can be served on a high frequency or a family of high frequencies taking into account acceptable message delays

1.1 In Major World Air Route Areas (MWARA's) :

- a family of high frequencies may be expected to serve a maximum number of 12 aircraft in one hour,
- a single high frequency may be expected to serve a maximum number of 10 aircraft in one hour.

1.2 In Regional and Domestic Air Route Areas (RDARA's) :

- the maximum number of aircraft which can be served on a family of high frequencies or a single high frequency may be highly variable, hence the figures in respect of MWARA's may not be applicable in all RDARA's. Because of the uncertainty on this question, it was agreed that further consideration should be given by the Second Session (see Recommendation No. 2, Chapter IV, page 68).

2. Formula proposed for assessment of high frequency for RDARA operations

2.1 Introduction

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964) examined in detail a number of proposed formulae. In view of the different types of flight operations existing in various areas of the world, it became obvious that only a very simple and general formula could be used. The simplicity of the formula finally adopted should facilitate the collection of statistics by administrations.

It was agreed that since information on the hours flown by registered aircraft was generally available from all administrations, that this should form the basis of a simple formula.

2.2 Suggested formula

N, the number of aircraft requiring HF service in a particular RDARA area at the peak hour may be expressed by :

$$N = \frac{T_a}{52 \times 7 \times 24} K$$

where :

T_a = annual total of hours flown by HF-equipped aircraft carrying a Certificate of Airworthiness.

K = a correction factor relating the peak hour activity to the average hourly activity throughout the year.

$52 \times 7 \times 24$ = approximate number of hours in a year.

2.3

Comment

It was recognised that the requirements for HF channels submitted by administrations to the Second Session of the Aeronautical E.A.R.C. (1965) could exceed the number of channels available in the Plan. Accuracy in the value assigned to factor K, therefore, was not believed to be of prime importance. Although this factor may vary considerably from area to area, it is of paramount importance to adopt a uniform constant value for K in order to ensure the equitable distribution of frequencies between areas. The specific value of K was not considered to be critical and a value of 2.9 was tentatively adopted as being a reasonable average figure for all areas.

In its final form, the suggested formula may be written as :

$$N = \frac{2.9 T_a}{8736}$$

or

$$N = \frac{T_a}{3000} \quad (\text{approximately})$$

3. Determination of frequency requirements for operation in RDARA's

Application of the formula

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964) studied the formula (see 2 above) in the light of operational and other factors apart from the technical and mathematical considerations from which the formula had been derived.

As a result, it appeared that the inclusion of the numbers of hours flown by HF-equipped aircraft in areas where communication service was assured on VHF could result in statistics which would not be sufficiently accurate for use at the Second Session.

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964) accordingly decided that the term " T_a " in the above formula will have the following meaning :

T_a = annual total hours flown by HF-equipped aircraft less
the annual total hours during which communication service
was assured by VHF.

Accordingly a special notification form was adopted for the collection of aircraft operation statistics as set out in Chapter IV of this Report (see Resolution No. 9, page 65).

It was concluded that whereas a uniform constant value for K (the RDARA correction factor) was desirable there was not sufficient evidence on which to establish this figure nor to confirm the tentative value of 2.9. Consequently, administrations are invited to collect additional facts to enable the Second Session of the Aeronautical E.A.R.C. to examine this question (see Recommendation No. 2, page 68).

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CHAPTER IV

FORM IN WHICH DATA RELATING TO THE DETERMINATION OF REQUIREMENTS FOR
HIGH FREQUENCIES FOR AERONAUTICAL MOBILE (R) SERVICE COMMUNICATIONS
SHOULD BE SUBMITTED TO THE UNION BEFORE THE SECOND SESSION OF THE
AERONAUTICAL E.A.R.C. (1965) AND THE DATE BY WHICH THEY SHOULD BE
SUBMITTED

1. Resolution No. 9 - Relating to the forwarding by administrations of
statistical analysis on Regional and Domestic flights

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
considering

- a) the Resolution No. 525 of the Eighteenth Session of the Administrative Council (1963) relative to the establishment of the operational principles on which requirements for high frequencies for Aeronautical Mobile (R) Service communications are to be assessed;
- b) the form in which actual operational statistics should be submitted to the I.F.R.B.;
- c) that such operational statistics should be provided for a continuous period of twelve months beginning not earlier than 1 January 1963;

resolves

that administrations are asked to take the necessary steps to furnish the data on operational statistics of Regional and Domestic flights of aircraft within their jurisdictions on the prescribed form (see pages 66 and 67) so as to reach the I.F.R.B. not later than 1 November 1964.

* .

* * *

AIRCRAFT OPERATING STATISTICS
REGIONAL AND DOMESTIC AIR ROUTE AREAS
NOTIFICATION FORM*)

1. Administration providing data
2. Twelve months period of record
3. Operational information regarding the hours flown by the HF equipped aircraft carrying a valid certificate of operation of aircraft station.

RDARA, sub-RDARA or area used as a basis of reporting	Total of hours flown during the twelve months period of record by HF equipped aircraft (in hours per year) (T_{total})**)	Total of hours flown during the twelve months period of record when VHF communication was used by HF-equipped aircraft (in hours per year) (T_{vhf})**)	Total of hours flown during the twelve months period of record when high frequency communication was required (in hours per year) (T_a)
1	2	3	4

*) Instructions for completion of this form are contained on page 67.

**) In countries where the statistics of T_a are directly determined, the columns for T_{total} and T_{vhf} may be left blank.

2. Instructions for completing the notification form

The form for notifying the aircraft operating statistics over Regional and Domestic Air Routes in order to be able to determine the high frequency communication requirements can be divided into two sections from the standpoint of the information to be provided :

- the first section, Items 1 and 2, is meant for information of an administrative nature;
- the second section, Item 3, seeks information concerning the total time that high frequency communication was used for operations.

Item	Instructions
1	The administration providing the data should be identified here.
2	The twelve-month period selected by the reporting administration, for submitting operational statistics on the Regional and Domestic Air Routes should be entered here. <u>Note</u> : The data on operational statistics is required for a continuous period of twelve months, beginning not earlier than 1 January 1963. The reporting administration should thus choose the twelve-month period suitable to it noting that the desired data for the submission of data to the I.F.R.B. is 1 November 1964.
3	<u>Column 1</u> : The symbol of relevant RDARA or sub-RDARA, as shown on Map II, Appendix 26 to the Radio Regulations (Geneva, 1959) should be entered in this column. In the case where administrations find difficulty on account of the overlapping of two or more RDARA boundaries, they may choose any other suitable geographical area of reference for this purpose. Such administrations should furnish a chart showing the boundaries of selected area(s). More than one such area, however, should not be created in any country where the longest air route in the country does not exceed 1000 nautical miles. <u>Column 2</u> : The total number of hours flown during the twelve-month period of record chosen by the administration (see Item 2 above), by the HF-equipped aircraft, should be entered here.

Item	Instructions
3 (contd.)	<u>Column 3</u> : The total number of hours flown during the twelve-month period of record chosen by the administration (see Item 2 above), by the HF-equipped aircraft, when VHF communication was used, should be entered here. <u>Column 4</u> : The total number of hours flown during the twelve-month period of record chosen by the administration (see Item 2 above), by the HF-equipped aircraft, requiring high frequency communication should be entered here. <u>Note</u> : If the reporting administration can directly provide the information requested under Column 4, the Columns 2 and 3 may be left blank.

3. Recommendation No. 2 - Relating to the information on the Regional and Domestic flight operations that administrations should provide to the Second Session of the Aeronautical E.A.R.C. (1965)

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
considering

- a) that the experience of administrations with respect to the use of high frequencies for the Regional and Domestic flights can be of value to the Second Session of the Aeronautical E.A.R.C.;
- b) that the studies carried out by administrations on the traffic density in their areas can be useful for assessing the correction factor K relating the peak hour activity to the average hourly activity throughout the year;

recommends

- 1. that factor K be the same for all RDARA's, and that the Second Session should examine the feasibility of using for all RDARA's the same figures for the maximum number of aircraft which may be served :

- by a frequency, and/or
- by a family of frequencies;

2. that administrations shall continue such studies concerning the assessment of an improved approximation of the correction factor K as mentioned above, and determination of the maximum number of aircraft which can be served on a frequency or a family of frequencies in one hour, having in mind that these figures should be the same for all RDARA's

3. that administrations should supply data based on their experiences of the use of high frequencies in RDARA's (specifying the order in Mc/s) in order that the Second Session of the Aeronautical E.A.R.C. (1965) can take into account these data when allotting the frequencies for a given RDARA,

4. Resolution No. 10 - Relating to data concerning VHF usage by the Aeronautical Mobile (R) Service

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),

considering

a) the impact of very high frequencies (VHF) on the requirement for high frequencies (HF) to be allotted by the Second Session of the Aeronautical E.A.R.C. (1965);

b) that the data concerning VHF coverage of Major World Air Routes should be made available at the Second Session of the Aeronautical E.A.R.C. (1965) when the Conference examines the statistics concerning international air operations for the purpose of determining the requirement for high frequencies (HF);

c) the desirability for all administrations to use uniform criteria in reporting the VHF en route coverage provided by the facilities under their jurisdiction;

resolves

1. that during the early stages of the Second Session of the Aeronautical E.A.R.C. (1965) administrations shall be prepared to submit data for use of the Conference concerning the effective range of those VHF Aeronautical Mobile facilities in their own countries serving international air routes (Air Traffic Control and Operational Control);

2. that the effective range shall be considered to be that distance at which VHF communications are available during at least 90% of the time at a specified minimum en route altitude;

3. that the data supplied by administrations be in the form of contours on charts or by diagrams, as appropriate, indicating the orientation of the coverage areas.

5. Resolution No. 11 - Relating to the forwarding by Administrations of the statistics on international flights

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
considering

- a) the Resolution No. 525 of the Eighteenth Session of the Administrative Council, (1963), relative to the establishment of the operational principles on which requirements for high frequencies for Aeronautical Mobile (R) Service communications are to be assessed;
- b) the form in which actual operational statistics should be submitted to the I.F.R.B.;
- c) that such operational statistics should be provided for the period 0001 GMT, 2 August, 1964, to 2400 GMT, 8 August 1964;

resolves

that administrations are asked to take the necessary steps to furnish the data on operational statistics of international flights on the prescribed form*) so as to reach the I.F.R.B. not later than 1 October, 1964;

*) Annexes 1 to 8 given below are a guide to the implementation of this Resolution :

Annex 1 : Notification Form (p. 71)

Annex 2 : How the notification form should be filled in (p. 73)

Annex 3 : World map for presentation of aircraft operating statistics with the following sub-divisions :

a) areas numbered 2 to 1818

b) zones of analysis

Annex 4 : Country designators (p. 85)

Annex 5 : Airline company designators (p. 89)

Annex 6 : Table showing approximate correspondence between MWARA's and zones of analysis (p.95)

Annex 7 : List of major airports (with reference of numbered areas on world map) (p. 96)

Distances between airports in nautical miles (p. 125)

Annex 8 : Example of how the form should be filled in (p. 119)

AIRCRAFT OPERATION STATISTICS
MAJOR WORLD AIR ROUTES
NOTIFICATION FORM

Administration providing data _____

Period selected : G. M. T. 0001 2 August 1964 to 2400 8 August 1964

[illegible]

* INDICATE BY CATEGORY

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ANNEX 2 TO CHAPTER IV

INSTRUCTIONS FOR COMPLETING
THE NOTIFICATION FORM (SEE ANNEX 1 TO CHAPTER IV)

1. General Remarks

1.1 In view of the great volume of data which will have to be processed and the short time which will be available for such processing, a form has been devised which will enable the information to be punched directly on to 80 Column Data Cards without any intermediate processing. It is, therefore, very important that administrations exercise extreme care to avoid the entering of information in a faulty or inaccurate way.

1.2 The form is divided into 80 columns to correspond with the 80 Column Data Card to be used for data input to an Electronic Data Processing System. The columns are numbered from 1 to 80 and guide lines are provided to facilitate inclusion of the information to be furnished.

1.3 The form for notifying the operations of aircraft which use high frequency communications in Major World Air Routes can be broadly divided into four sections from the standpoint of the information required :

- the first section, Columns 1 to 20, provides for information of a general and administrative nature;
- the second section, Columns 21 to 26, provides for information concerning the point of origin of the flight;
- the third section, Columns 27 to 75, provides for information regarding any intermediate stops or zones of analysis overflown;
- the fourth section, Columns 76 to 80, provides for information regarding the termination of the flight.

1.4 Aircraft flights should normally be reported by the administration to which the aircraft belongs. However, in the case of leased aircraft where the administration authorizing the operation or operating the aircraft is different from the administration under which the aircraft is registered, the administration operating or authorizing the operation shall be responsible for supplying the aircraft operation statistics.

1.5 There is no need for statistics relating to flights for which the air-ground communications (ATC and OPN) are conducted on VHF exclusively. Examples are flights between London and Paris and between Chicago and Montreal.

2. Explanation of the titles and subtitles used in the Notification Form

2.1 COUNTRY - This column is provided for the country designator of the country submitting the Notification Form. A copy of the Table of Country Designators from the Preface to the International Frequency List is given in (Annex 4 to Chapter IV).

2.2 SERIAL NO. - indicates the sequential number of all flights pertaining to one country.

2.3 FLIGHT IDENTIFICATION - for airline flights, consists of the two letter airline designator followed by the flight number. Annex 5 to Chapter IV lists such designators. If the name of an airline does not appear in Annex 5, the administrations should indicate an appropriate national flight identification. Where a flight number is not available, administrations should provide a flight identification with not more than eight characters.

2.4 TYPE OF FLIGHT - Flights are grouped into two categories :

Category 1. scheduled flights;

Category 2. non-scheduled flights, including general aviation and military transports flying along international civil air routes.

2.5 AIRCRAFT SPEED - Aircraft speeds have been grouped into three categories :

Category 1. speeds less than 350 knots;

Category 2. speeds from 350 knots to 500 knots;

Category 3. speeds greater than 500 knots.

2.6 LINE CODE - This column is provided for entering the number of the line or lines on the form which contain information concerning one flight.

2.7 ORIGIN - indicates the location and day of commencement of a flight if it takes place during the week of record; if, however, the flight commenced before 0001 G.M.T., 2 August, 1964, the ORIGIN for the record will be the first departure of the aircraft which occurs after the beginning of the week of record.

2.8 NUMBER OF THE SQUARE - refers to one of the sub-divisions, numbered 2 to 1818, shown on the World Map in Annex 3 to Chapter IV.

2.9 ZA - is the abbreviation for "Zone of Analysis", A to U, as shown on the World Map in Annex 3 to Chapter IV. These Zones are used solely for the analysis of statistical data to be submitted by Administrations according to the Form given in Annex 1 to Chapter IV.

2.10 DAY OF FLIGHT (G.M.T.) - indicates the day of the week on which each stage of the flight commences.

2.11 OVERFLOWN ZA - indicates flight over a Zone of Analysis without a stop.

2.12 STAGE LENGTH - indicates the distance of each stage of flight in nautical miles.

2.13 TERMINAL - indicates the end of a flight if it takes place during the week of record; if, however, the flight ended after 2400 G.M.T., 8 August, 1964, the TERMINAL for the record will be the first stop of the aircraft which occurs after the end of the week of record.

3. Detailed Instructions concerning information to be entered in the specific columns of the form

Title	Column(s)	Instructions																														
SURVEY No.	1	This column should be left blank.																														
COUNTRY	2 to 4	The country symbol (see Annex 4 to Chapter IV) of the notifying administration should be entered in consecutive columns, commencing with Column 2. Any columns not required should be left blank. <u>Example:</u> The country symbols of, for instance, Afghanistan, France and Sweden should be written as follows : <table><tr><th colspan="3">COUNTRY</th></tr><tr><td>2</td><td>3</td><td>4</td></tr><tr><td>A</td><td>F</td><td>G</td></tr><tr><td>F</td><td></td><td></td></tr><tr><td>S</td><td></td><td></td></tr></table> Column numbers on the Notification Form }	COUNTRY			2	3	4	A	F	G	F			S																	
COUNTRY																																
2	3	4																														
A	F	G																														
F																																
S																																
SERIAL No.	5 to 9	The Serial Number of each flight should be entered in these columns, the last figure appearing in Column 9. The numbers should commence from 1 for the first flight recorded during the week of record and continue consecutively to the last flight. Any columns not required should be left blank. <u>Example:</u> <table><tr><th colspan="5">SERIAL No.</th></tr><tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td></td><td></td><td>1</td><td>6</td></tr><tr><td></td><td></td><td>3</td><td>1</td><td>5</td></tr><tr><td></td><td>4</td><td>5</td><td>7</td><td>1</td></tr></table> Column numbers on Notification Form } First flight Sixteenth flight Three hundred and fifth-teenth flight Four thousand five hundred and seventy-first flight	SERIAL No.					5	6	7	8	9					1				1	6			3	1	5		4	5	7	1
SERIAL No.																																
5	6	7	8	9																												
				1																												
			1	6																												
		3	1	5																												
	4	5	7	1																												

Title	Column(s)	Instructions																																																
FLIGHT IDENTIFICATION	10 to 17	Two letter designator and flight number should be entered in consecutive columns commencing with Column 10. (See Annex 5 to Chapter IV). Any columns not required should be left blank. <u>Example:</u> Column numbers on the Notification Form Sched. flight QANTAS No.587 Sched. flight AIR-AFRIQUE No. 3000 Sched. flight AIR-FRANCE No. 189 Non-sched. flight by a Dutch aircraft <table><tr><th colspan="8">FLIGHT IDENTIFICATION</th></tr><tr><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th><th>17</th></tr><tr><td>Q</td><td>F</td><td>5</td><td>8</td><td>7</td><td></td><td></td><td></td></tr><tr><td>R</td><td>K</td><td>3</td><td>0</td><td>0</td><td>0</td><td></td><td></td></tr><tr><td>A</td><td>F</td><td>1</td><td>8</td><td>9</td><td></td><td></td><td></td></tr><tr><td>P</td><td>H</td><td>D</td><td>C</td><td>C</td><td></td><td></td><td></td></tr></table>	FLIGHT IDENTIFICATION								10	11	12	13	14	15	16	17	Q	F	5	8	7				R	K	3	0	0	0			A	F	1	8	9				P	H	D	C	C			
FLIGHT IDENTIFICATION																																																		
10	11	12	13	14	15	16	17																																											
Q	F	5	8	7																																														
R	K	3	0	0	0																																													
A	F	1	8	9																																														
P	H	D	C	C																																														
TYPE OF FLIGHT (CATEGORY)	18	The digit 1 or 2 should be entered here according to the category of flight. In the case of a scheduled flight, the digit 1 should be entered. For non-scheduled flights, including general aviation and military transports flying along international civil air routes, the digit 2 should be entered.																																																
AIRCRAFT SPEED (CATEGORY)	19	The digits 1, 2 or 3 should be entered according to the aircraft speed category : 1 - for speeds less than 350 knots 2 - for speeds from 350 knots to 500 knots 3 - for speeds greater than 500 knots.																																																
LINE CODE	20	Where the flight is entered on one line of the Form, the digit 1 should be shown in this column. Where the number of stages requires two or more lines for the flight, the digit 1 should be shown on the first line, the digit 2 on the second line and so on.																																																

Title	Column(s)	Instructions																				
ORIGIN	21 to 26	The information relevant to the origin of the flight should be entered in Columns 21 to 26 as explained below. (See 2.7, page 74).																				
NUMBER OF THE SQUARE	21 to 24	The number of the square, in accordance with the World Map in Annex 3 to Chapter IV containing the airport from which the flight departs, should be entered in Columns 21 to 24, the last figure appearing in Column 24. Any columns not required should be left blank. <u>Example:</u> The number of the square for the flights originating, for instance, from London, Karachi and Capetown airports would be written respectively as follows : Column numbers on the Notification Form <table><tr><th colspan="4">NUMBER OF THE SQUARE</th></tr><tr><td>21</td><td>22</td><td>23</td><td>24</td></tr><tr><td></td><td>2</td><td>3</td><td>0</td></tr><tr><td></td><td>5</td><td>5</td><td>0</td></tr><tr><td>1</td><td>4</td><td>2</td><td>2</td></tr></table>	NUMBER OF THE SQUARE				21	22	23	24		2	3	0		5	5	0	1	4	2	2
NUMBER OF THE SQUARE																						
21	22	23	24																			
	2	3	0																			
	5	5	0																			
1	4	2	2																			
ZA	25	The letter corresponding to the Zone of Analysis (Annex 3 to Chapter IV) in which the flight originates should be entered. Where two Zones of Analyses overlap it is necessary to identify the correct Zone of Analysis in reporting the flight so that it will be included in, and form part of, the total of international flights in the ZA having common high frequency requirements (see Annex 1 to Chapter IV).																				
DAY OF FLIGHT	26	The day (G.M.T.) of the week on which the flight originates should be indicated by one of the digits 1 to 7 corresponding respectively to the days of the week of survey as indicated below :																				

Title	Column(s)	Instructions																
		1 - for the First day of the week of survey 2 - for the Second day, 3 - for the Third day, 4 - for the Fourth day, 5 - for the Fifth day, 6 - for the Sixth day, 7 - for the Seventh day.																
OVERFLOWN ZA	27	The letter corresponding to the Zone of Analysis should be entered in this column whenever a ZA is overflown between the ORIGIN and the first stop. This column should be left blank if there is no such overflight. If a second ZA is overflown without an intermediate stop in between, then the letter corresponding to this ZA should be entered in Column 38 and the Columns 28 to 37 should be left blank.																
STAGE LENGTH	28 to 31	The distance, in nautical miles between the two airports, corresponding to the stage under consideration, should be entered here, the last figure appearing in Column 31. The columns not required should be left blank. <u>Example:</u> The distances of 950 nautical miles and 6235 nautical miles will be shown as: Column number on the Notification Form <table><tr><th colspan="4">STAGE LENGTH</th></tr><tr><td>28</td><td>29</td><td>30</td><td>31</td></tr><tr><td></td><td>9</td><td>5</td><td>0</td></tr><tr><td>6</td><td>2</td><td>3</td><td>5</td></tr></table>	STAGE LENGTH				28	29	30	31		9	5	0	6	2	3	5
STAGE LENGTH																		
28	29	30	31															
	9	5	0															
6	2	3	5															
STOP	32 to 37	The information relevant to an intermediate stop, if any, should be entered in Columns 32 to 37, as explained below.																

Title	Column(s)	Instructions
NUMBER OF THE SQUARE	32 to 35	The number of the square on the World Map in Annex 3 to Chapter IV, of the intermediate stop, if any, should be entered here in a similar manner as explained for Columns 21 to 24.
ZA	36	The letter corresponding to the Zone of Analysis Annex 3 to Chapter IV in which the stop takes place should be entered here.
DAY OF FLIGHT	37	The day (G.M.T.) of the week on which the flight departs after the first intermediate stop should be indicated here by one of the digits 1 to 7, as explained under Column 26.
OVERFLOWN ZA	38	The letter corresponding to the Zone of Analysis should be entered in this column whenever a ZA is overflown between two consecutive stops. This column should be left blank if there is no such overflight.
STAGE LENGTH	39 to 42	The distance, in nautical miles, between the two airports, corresponding to the stage of flight, originating in the square shown in Columns 32 to 35 and terminating in the square shown in Columns 43 to 46, should be entered here. If, however, the subsequent stop is not an intermediate stop, but is the termination of flight, the figures showing the stage length should be entered in Columns 72 to 75, and Columns 39 to 42 should be left blank.
STOP	43 to 48	The particulars of the second intermediate stop, if any, should be entered in Columns 43 to 48 in the same manner as for the preceding STOP, (Columns 32 to 37).
OVERFLOWN ZA	49	The particulars of any ZA overflown should be entered here in the same manner as for Column 38.
STAGE LENGTH	50 to 53	The distance, in nautical miles, between the two airports corresponding to the stage of flight, should be entered here in the same manner as for Columns 39 to 42.
STOP	54 to 59	The particulars of the third intermediate stop, if any, should be entered in Columns 54 to 59 in the same manner as for the preceding STOP, (Columns 43 to 48).

Title	Column(s)	Instructions
OVERFLOWN ZA	60	The particulars of any ZA overflown should be entered here in the same manner as for Column 38.
STAGE LENGTH	61 to 64	The distance, in nautical miles, between the two airports corresponding to the stage of flight, should be entered here in the same manner as for Columns 39 to 42.
STOP	65 to 70	The particulars of the fourth intermediate stop, if any, should be entered in Columns 65 to 70 in the same manner as for the preceding STOP, (Columns 54 to 59).
OVERFLOWN ZA	71	The particulars of any ZA overflown should be entered in this column in the same manner as in Column 38.
STAGE LENGTH	72 to 75	The distance, in nautical miles, between the two airports corresponding to the last stage of flight should be entered here.
TERMINAL	76 to 80	The information relevant <u>only</u> to the termination of the flight should be entered in Columns 76 to 80. If the flight consists of more than four intermediate stops, then Columns 72 to 80 on the <u>first</u> line should be left blank and the particulars of subsequent Stops should appear on the <u>second</u> and following lines, if necessary; the termination should appear in Columns 76 to 80 on the <u>last</u> line only. (See 2.13, page 75).

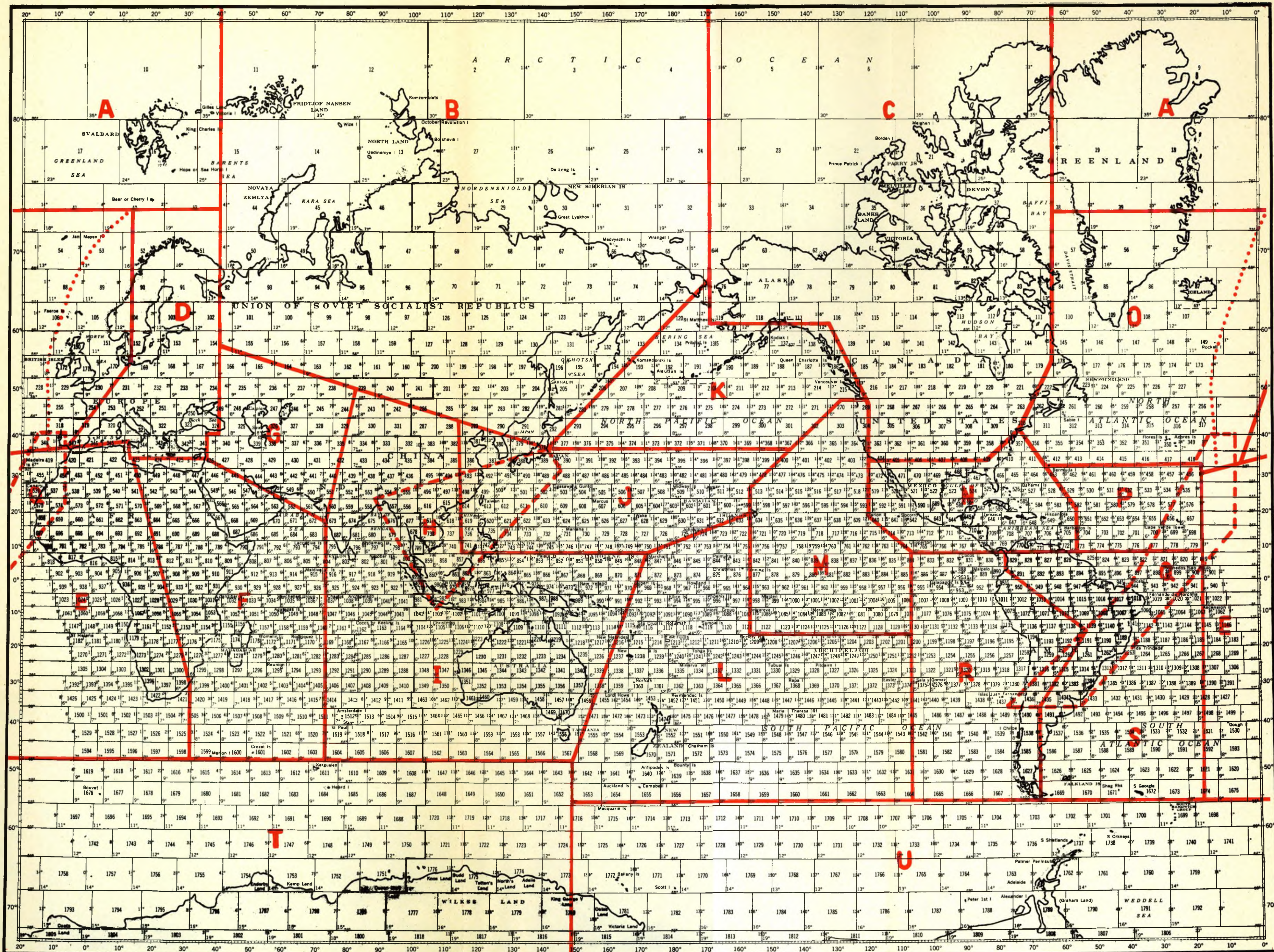
4. Instructions concerning flights with more than four intermediate stops

4.1 If the number of intermediate stops is more than four and the flight does not terminate on the first line, the particulars of subsequent stops should be entered on the second line in the following manner :

- the information contained in Columns 2 to 19 (inclusive) of the first line should be repeated in the same Columns of the second line;
- the digit 2 should be entered in Column 20 of the second line;
- the remainder of the flight information should be entered on the second line, commencing in Column 28;
- if the number of intermediate stops does not exceed eight, the information relevant to the termination of the flight should be entered in Columns 76 to 80 of the second line.

4.2 If the number of intermediate stops is more than eight and the flight does not terminate on the second line, the remainder of the flight information should be entered on the third line in the following manner :

- the information contained in Columns 2 to 19 (inclusive) of the second line should be repeated in the same columns of the third line;
- the digit 3 should be entered in Column 20 of the third line;
- the remainder of the flight information should be entered on the third line, commencing with Column 28;
- the information relevant to the termination of the flight should be entered in Columns 76 to 80 of the third line.



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ANNEX 4 TO CHAPTER IV

COUNTRY DESIGNATORS

N.B. : The following designators have a geographical significance only

Designator	Name of the country	Designator	Name of the country
ADN	Aden	BOL	Bolivia
AFG	Afghanistan	BRM	Union of Burma
AFS	Republic of South Africa and Territory of South-West Africa	BRN	Sabah (North Borneo)
AGL	Angola	BRU	Brunei
ALB	People's Republic of Albania	BUL	People's Republic of Bulgaria
ALS	State of Alaska, United States of America	CAF	Central African Republic
ALG	Algeria	CAN	Canada
AMS	New Amsterdam Island	CAR	Caroline Islands
AND	Andorra	CBG	Cambodia
AMF	French Territories in the Antarctic	CGO	Republic of the Congo (Leopoldville)
AOE	Spanish Province in West Africa	CHL	Chile (except Easter Island)
ARG	Argentine Republic	CHN	China
ARS	Saudi Arabia	CHR	Christmas Island (Indian Ocean)
ASC	Ascension	CKH	Cook Islands
ATN	Netherlands Antilles	CKN	Cook Islands (Northern Group)
AUS	Commonwealth of Australia	CLM	Republic of Colombia
AUT	Austria	CLN	Ceylon
AZR	Azores	CME	Federal Republic of the Cameroon
B	Brazil	CNR	Canaries
BAH	Bahamas	COG	Republic of the Congo (Brazzaville)
BAS	Basutoland	COM	Comores
BCH	Bechuanaland	CPV	Cape Verde Islands
BEL	Belgium	CTI	Republic of the Ivory Coast
BER	Bermuda	CTR	Costa Rica
BDI	Kingdom of Burundi	CUB	Cuba
BLR	Bielorussian Soviet Socialist Republic	CVA	Vatican City State
		CYP	Republic of Cyprus
		D	Germany
		D-D	Eastern Germany
		DAH	Republic of Dahomey

Designator	Name of the country	Designator	Name of the country
DNK	Denmark	GUI	Republic of Guinea
DOM	Dominican Republic	GUM	Guam
E	Spain	HKG	Hongkong
EGY	United Arab Republic	HNB	British Honduras
EQA	Ecuador	HND	Republic of Honduras
ETH	Ethiopia	HNG	Hungarian People's Republic
		HOL	Netherlands
F	France	HTI	Republic of Haiti
FJI	Fiji Islands	HVO	Republic of Upper Volta
FLK	Falkland Islands & Dependencies	HWA	State of Hawaii, United States of America
FNL	Finland	HWL	Howland Island
G	United Kingdom of Great Britain and Northern Ireland	I	Italy
GAB	Gabon Republic	ICO	Cocos Keeling Islands
GCA	Territories & Colonies of the United Kingdom in Region 1	IND	India
GCB	Territories & Colonies of the United Kingdom in Region 2	INP	Portuguese India
GCC	Territories & Colonies of the United Kingdom in Region 3	INS	Republic of Indonesia
GDL	French Department of Guadeloupe	IOB	British West Indies
GHA	Ghana	IRL	Ireland
GIB	Gibraltar	IRN	Iran
GIL	Gilbert & Ellice Islands Colony	IRQ	Iraq
GLP	Persian Gulf	ISL	Iceland
GMB	Gambia (Bathurst)	ISR	State of Israel
GNE	Spanish Province in the Gulf of Guinea	IWA	Iwo-Jima
GNP	Portuguese Guinea	J	Japan
GRC	Greece	JAR	Jarvis Island
GRL	Greenland	JMC	Jamaica
GTM	Guatemala	JON	Johnston Island
GUB	British Guiana	JOR	Jordan
GUF	French Department of Guiana	KEN	Kenya
		KER	Kerguelen Islands
		KOR	Republic of Korea

Designator	Name of the country	Designator	Name of the country
KRE	People's Democratic Republic of Korea	NOR	Norway
KWT	Kuwait (State of)	NPL	Nepal
LAO	Laos	NYA	Nyasaland
LBN	Lebanon	NZL	New Zealand
LBR	Liberia	OCE	French Polynesia
LBY	Libya	ONC	Stations of the "United Nations Military Observer Group in India and Pakistan"
LUX	Luxembourg		
MAC	Macao	PAK	Pakistan
MAU	Mauritius	PAP	Territories of Papua
MCO	Monaco	PAQ	Chile (Easter Island)
MCS	Marcus Island	PHL	Republic of the Philippines
MDG	Malagasy Republic	PHX	Phoenix Islands
MDR	Madeira	PLM	Palmyra Island
MDW	Midway Islands	PNR	Republic of Panama
MEX	Mexico	PNZ	Panama Canal Zone
MLA	Malaysia	POL	People's Republic of Poland
MLD	Maldives Islands	POR	Portugal
MLI	Republic of Mali	PRG	Paraguay
MLT	Malta	PRU	Peru
MNG	Mongolian People's Republic	PTC	Pitcairn Island
MOZ	Mozambique	PTR	Puerto Rico
MRA	Mariana Islands		
MRC	Kingdom of Morocco	REU	French Department of Reunion
MRL	Marshall Islands	RHN	Northern Rhodesia
MRN	Marion Island	RHS	Southern Rhodesia
MRT	French Department of Martinique	ROD	Rodrigues
MPN	Islamic Republic of Mauritania	ROU	Roumanian People's Republic
		RRW	Republic of Rwanda
		RYU	Ryu-Kyu Islands
NCG	Nicaragua		
NCL	New Caledonia & Dependencies	S	Sweden
NGR	Republic of the Niger	SDN	Republic of Sudan
NGU	Territory of New Guinea	SEN	Republic of the Senegal
NHB	New Hebrides (British-French Condominium)		
NIG	Federation of Nigeria		

Designator	Name of the country	Designator	Name of the country
SEY	Seychelles	TKL	Tokelau islands
SHN	S. Helena	TMP	Portuguese Timor
SLM	Solomon Islands	TON	Tonga
SLV	Republic of El Salvador	TRC	Tristan da Cunha (Station of the Republic of South Africa)
SMA	American Samoa	TRD	Trinidad and Tobago
SMF	French Somaliland	TUN	Tunisia
SMO	Western Samoa	TUR	Turkey
SMR	Republic of San Marino		
SNG	Singapore	UGA	Uganda
SOM	Somali Republic	UKR	Ukrainian Soviet Socialist Republic
SPM	S. Pierre and Miquelon	URG	Uruguay
SRL	Sierra Leone	URS	Union of Soviet Socialist Republics
SRW	Sarawak	USA	The 48 contiguous States of the United States of America (excludes the States of Alaska and Hawaii)
STP	S. Thome and Principe		
SUI	Switzerland		
SUR	Surinam		
SWN	Swan Island	VEN	Venezuela
SYR	Syrian Arab Republic	VIR	Virgin Islands
		VTN	Republic of Viet-Nam
TCD	Republic of the Chad		
TCH	Czechoslovak Socialist Republic	WAK	Wake Island
TGK	Tanganyika		
TGO	Togolese Republic	YEM	Yemen
THA	Thailand	YUG	Yugoslavia
		ZAN	Zanzibar

SYMBOLS DESIGNANT LES COMPAGNIES DE TRANSPORT AERIEN - AIRLINE TWO-LETTER DESIGNATORS

CUADRO DE ABREVIATURAS QUE DESIGNAN LAS EMPRESAS DE TRANSPORTE AÉREO

Sybolos Designator Distintivo	Signification Signification Significado	Sybolos Designator Distintivo	Signification Signification Significado
A	AA American Airlines Inc. AB Manila Aviation Service, Inc. AC Aerovías Nacionales de Colombia, S. A. AD Aden Airways Ltd. AE Air Ceylon Ltd. AF Air France AG Guest Aerovías México, S. A. AH Air-Algérie AI Air India AJ Aerovías Internacional Balbao, S. A. AK Alaska Coastal - Ellis Airlines AL Allegheny Airlines Inc. AM Aeronaves de México, S. A. AN Australian National Airways Pty. Ltd. / Ansett Airways Pty. Ltd. AO Aviación y Comercio, S. A. AP Belgian International Air Service Cy. AQ Schreiner Aerocontractors N. V. AR Aerolíneas Argentinas AS Alaska Airlines Inc. AT Compagnie Nationale de Transports Aériens - Royal Air Maroc AU Compañía Argentina de Transporte Aéreo S. A. C. e Y. - Austral AV Compagnie Sénégalaise de Transports Aériens AW Catalina Air Lines, Inc. AX AAXICO Airlines, Inc. AY Aero O/Y Finnish Airlines (FINNAIR) AZ ALITALIA-Aerolinee Italiane Internazionali	C	CA Caledonian Airways Ltd. CB Caribbean-Atlantic Airlines Inc. CC Lloyd Aéreo Colombiano, S. A. CD Cordova Airlines, Inc. CE Central African Airways Corporation CF Compañía de Aviación, "FAUCETT", S. A. CG Compañía Aeronáutica Uruguay, S. A. CH Chicago Helicopter Airways Inc. CI China Air Lines CJ Caribbean Air Transport Co. Inc. CK Connellan Airways Ltd. CL Capitol Airways, Inc. CM Compañía Panameña de Aviación, S. A. CN Central Airlines, Inc. CO Continental Air Lines Inc. CP Canadian Pacific Airlines Ltd. CQ (reserved - réservée - reservada) CR Rhodesian United Air Carriers CS Cambrian Airways, Ltd. CT Civil Air Transport Company Ltd. CU Empresa Consolidada Cubana de Aviación CV Campling Bros. and Vanderwall Ltd. CW Channel Airways Lt . CX Cathay Pacific Airways Ltd. CY Cyprus Airways Ltd.
B	BA British Overseas Airways Corporation BB Balair S. A. BC British Insulated Callender's Cables Ltd. BD BE British European Airways Corporation BF Bees Flight Ltd. BG British Guiana Airways Ltd. BH Bahamas Airways Ltd. BI Bharat Commerce and Industries Ltd. BJ BK B. K. S. Air Transport Ltd. BL Bonanza Air Lines Inc. BM BN Braniff International Airways Inc. BO Société Air-Brousse BP BQ Blidberg, Metcalfe & Co., A. B. BR British United Airways Ltd. BS Borneo Airways Ltd. BT BU Braathens South-American and Far East Airtransport A/S BV BW British West Indian Airways Ltd. BX BY BZ	D	DA Dan-Air Services Ltd. DB Darbhanga Aviation DC Department of Civil Aviation Australia (Aircraft) DD DE Continentale Luftreederei GmbH. DF Condor Flugdienst GmbH. DG DH DI DJ DK Scanair Ltd. DL Delta Air Lines, Inc. DM Departamento de Comunicaciones (Argentina) DN AIR LLOYD, Deutsche Nah-Luft-Verkehrs GmbH. DO Compañía Dominicana de Aviación DP Dunlop Rubber Company Ltd. (Aviation Division) DQ DR Derby Aviation Ltd. DS DT Divisão de Transportes Aéreos (Angola) DU Duncan Logan (Contractors) Ltd. DV Deutsche Taxiflug GmbH, Mannheim DW DX DY DZ

E EA Eastern Air Lines Inc. EB Avitour Air Services Ltd. EC East African Airways Corporation ED Directorate of Civil Aviation East Africa (Aircraft) EE Executair (Nigeria) Ltd. EF EG Cunard Eagle Airways Ltd. EH EI Aer Lingus Teoranta EJ EK EL Escadrille Mercure EM EN Cunard Eagle (Bahamas) Ltd. EO Eros Airline (U. K.) Ltd. EP Aerolíneas Peruanas, S. A. EQ Aerovías Ecuatorianas C. A. ER Don Everall (Aviation Ltd.) ES Solair Flying Services Ltd. ET Ethiopian Air Lines Inc. EU Compañía Ecuatoriana de Aviación, S. A. EV ELIVIE-Società italiana d'esercizio elicotteri EW East West Airlines Ltd. EX Expreso Aéreo Inter Americano EY Euravia (London) Ltd. EZ Executive Air Transport Ltd.		G GA Garuda Indonesian Airways GB Société de Transport Aérien du Gabon GC Direcção-Geral da Aeronautical Civil - Portugal (Aircraft) GD Granada TV Network Ltd. GE Transportes Aéreos da Guiné Portuguesa GF Gulf Aviation GG Globe-Air S. A. GH Ghana Airways Ltd. GI Air Guinée GJ GK GL Grønlandsfly Ltd. GM Tyne Tees Air Charter Ltd. GN J. C. Brouillet/Tranogabon GO GP Groupement d'études et de consultations aéronautiques Airnautic GQ GR GS Società ALIS Aerolinee Siciliane GT Gibraltar Airways Ltd. GU Empresa Guatemalteca de Aviación (AVIATECA) GV Government of Northern Rhodesia (Aircraft) GW GX GY Gyrafrique Nord GZ	
F FA Air America, Inc. FB Ferranti Ltd. FC FD FE Flying Enterprise FF American Flyers Airline Corp. FG Ariana Afghan Airlines FH Foshing Airlines FI Flugfélag Islands h. f. (Icelandair) FJ Fiji Airways Ltd. FK Austria-Flugdienst GmbH. FL Frontier Airlines, Inc. FM Flying Syndicate Twente FN Flota Aérea Nicaraguense, S. A. FO Fred. Olsen Flyselskap A/S FP FQ FR Flight Refuelling Ltd. FS Field Aircraft Services Ltd. FT Flying Tiger Line Inc., The FU FV Falck's Flyvetjeneste FW FX Svensk Flygtjänst AB FY Fairey Air Surveys Ltd. FZ		H HA Hawaiian Airlines Ltd. HB HC Air Esterel HD HE HF HG HH HI HJ HK HL HM Iran National Airlines Corporation HN HO HP Aerovías Panama HQ HR HS Aero Sales (Pty.) Ltd. HT TransAir Limited (Canada) HU HV HW HX HY HZ	

I IA IB IC ID IE IF IG IH II IJ IK IL IM IN IO IP IQ IR IS IT IU IV IO IX IY IZ	Iraqi Airways Líneas Aéreas de España, S.A. (IBERIA) Indian Airlines Corporation Aerolíneas IDI Gesellschaft für Internationalen Flugverkehr - D.B.H. (INTERFLUG) Airways (India) Ltd. Air Links Ltd. International Airlines Inc. Aerlínte Eireann Interocean Airways, S.A. Transportes Aéreos da Índia Portuguesa Iranian Airways Company Air Survey Company of India Ltd. Société AIR INTER Intercontinental U.S., Inc. Arktio Inland Airlines	K KA KB KC KD KE KF KG KH KI KJ KK KL KM KN KO KP KQ KR KS KT KU KV KW KX KY KZ	Kalinga Airlines Korean Air Lines, Inc. Aero-Transport, Flugbetriebsgesellschaft mbH., Ltd. Crescent Air Transport K. L. M. Royal Dutch Airlines (Koninklijke Luchtvaart Maatschappij N. V.) Korean National Airlines Kodiak Airways Inc. KAR-AIR O/Y (KAR-AIR) Trans Arabia Airways Kuwait Airways Modern Air Transport Inc.
J JA JB JC JD JE JF JG JH JI JJ JK JL JM JN JO JP JQ JR JS JT JU JV JW JX JY JZ	Trans-Asiatic Airlines (Siam) Ltd. Aero-Nord AB Jamair Company Ltd. Johnsons Flying Service Inc. Aerovías Sud Americana Inc. African Air Cars Ltd. Japan Air Lines Company, Ltd. Air Jamaica JORDANIAN (Jordan Airways) Adria Aviopromet Service des Transports et de Travail Aérien Jamaica Air Services Jugoslovenski Aerotransport (JAT) Aero Club of East Africa Trek Airways (Pty.) Ltd. Aero Exploration British United (C.I.) Ltd.	L LA LB LC LD LE LF LG LH LI LJ LK LL LM LN LO LP LQ LR LS LT LU LV LW LX LY LZ	Línea Aérea Nacional (LAN) Lloyd Aéreo Boliviano, S. A. Lake Central Airlines, Inc. Líneas Aéreas del Estado Lebanese International Airways (LIA) Linjeflyg AB Luxembourg Airlines (Compagnie luxembourgeoise de Navigation aérienne) - Luxair Deutsche Lufthansa A. G. Air Laos Sierra Leone Airways Ltd. Air Ferry Ltd. Lofleidir, Icelandic Airlines Ltd. Air Liban Polskie Linie Lotnicze (LOT) Transports Aériens Libanais Líneas Aéreas Costarricenses, S. A. Atlas Air Express Lufttransport Unternehmen, GmbH. Línea Internacional Aéreo "LIA" Línea Aeropostal Venezolana Lloyd International Airways Ltd. Los Angeles Airways Inc. EL AL-Israel Airlines Ltd. Transport Aérien Civil Bulgare - TABSO

M	MA Hungarian Air Transport (MALEV) MB Malaysia Air Charter Company Ltd. MC Civil Aviation Flying Unit MD Société Nationale Malgache de Transports Aériens - Air-Madagascar ME Middle East Airlines (MEA) MF Marshall's Flying Services Ltd. MG MacRobertson Miller Airlines Ltd. MH Macau Air Transport (H. K.) Ltd. MI Mercury Airlines Ltd. MJ Manchester Airport Agencies MK Mackey Airlines, Inc. ML Malayan Airways Ltd. MM Sociedad Aeronáutica de Medellín, S. A. (SAM) MN Commercial Air Services (Pty.) Ltd. MO Mohawk Airlines Inc. MP Martin's Air Charter MQ Società Aerea Mediterranea MR Maritime Central Airways Ltd. MS United Arab Airlines MT Morton Air Services Ltd. MU Malta Aviation Services MV MW Maya Airways MX Compañía Mexicana de Aviación, S. A. MY Air Mali MZ	O	OA Olympic Airways S. A. OB OC Aircraft Operating Co. (Aerial Surveys) Ltd. OD "Aerocondor" Aerovías Condor de Colombia Ltda. OE OF OG OH San Francisco and Oakland Helicopter Airlines Inc. OI OJ OK Československé Aerolinie OL OM ON OO OP OQ OR OS Austrian Airlines OT Servicio de Transportes Aéreos de S. Tomé OU AUTAIR (Luton) Ltd. OV Overseas National Airways Inc. OW Owenair (Pty.) Ltd. OX OY OZ Ozark Airlines, Inc.
N	NA National Airlines Inc. NB Sterling Airways Ltd. NC Northern Consolidated Airlines Inc. ND Nordair Ltd. NE Northeast Airlines Inc. NF NG NH All Nippon Airways Co., Ltd. NI Líneas Aéreas de Nicaragua, S. A. NJ NK Nordic Airways, Nordair Ltd. NL Liberian National Airlines NM NN NO North Central Airlines Inc. NP Nuclear Power Group NQ New Zealand Civil Aviation Administration Operations Fleet NR Northern Rhodesia Aviation Services Ltd. NS North Sea Air Transport Ltd. NT NU NV NW Northwest Airlines Inc. NX NY New York Airways, Inc. NZ New Zealand National Airways Corporation	P	PA Pan American World Airways Inc. PB Panair do Brasil, S. A. PC Pacific Airlines, Inc. PD PE N. V. Philips' Gloeilampenfabrieken, Flight Division PF PG Pan American Grace Airways Inc. PH Polynesian Airlines Ltd. PI Piedmont Aviation, Inc. PJ Polar-Air O/Y PK Pakistan International Airlines Corporation PL Plymouth Aero Club Ltd PM PN Pacific Northern Airlines Inc. PO Protea Lugdiens (Edms.) Bpk. PP Pilatus S. A. Air Service PQ South Pacific Airlines of New Zealand Ltd. PR Philippine Air Lines Inc. PS Pacific Southwest Airlines PT Provincetown-Boston Airlines Inc. PU Primeras Líneas Uruguayas de Navegación Aérea (PLUNA) PV Eastern Provincial Airways Ltd. PW Pacific Western Airlines Ltd. PX Pressed Steel Co. Ltd. (Aviation Division) Oxford PY Surinaamse Luchtvaart Maatschappij N. V. PZ Persian Air Services

Q QA Aerovías "Q", S. A. QB Quebecair, Inc. QC Société Air Congo (Léopoldville) QD Sadiá Transportes Aéreos S. A. QE QF Qantas Empire Airways Ltd. QG QH QI QJ QK QL QM QN QO QP Caspair Ltd. QQ QR Paraense Transportes Aéreos S. A. QS Transportes Aéreos Salvador S. A. QT Transportes Aéreos Catarinense QU Air Couriers Ltd. QV Viação Aérea Gaúcha S. A. QW QX Transair S. A. QY QZ	S SA South African Airways SB Seaboard World Airlines Inc. SC Serviços Aéreos Cruzeiro de Sul S. A. SD Sudan Airways SE Sociedad de Transportes Aéreos Ltd. (ALA) SF South Pacific Airlines Inc. SG Aerotransportes Litoral Argentino, S. A. SH Servicio Aéreo de Honduras, S. A. SI Slick Airways SJ Southern Air Transport Inc. SK Scandinavian Airlines System SL Scottish Airlines SM Southend Municipal Flying School SN Société Anonyme Belge d'Exploitation de la Navigation Aérienne (SABENA) SO Southern Airways, Inc. SP Sociedade Açoriana de Transportes Aéreos SQ Saskatchewan Government Airways SR SWISSAIR (Société Anonyme Suisse pour la Navigation Aérienne) SS Standard Airways Inc. ST Société Transports Aériens en Extrême-Orient SU AEROFLOT SV Saudi Arabian Airlines SW South West Air Transport (Pty.) Ltd SX Samoan Airlines Limited SY Skyways Ltd. SZ Suddeutsche Fluggesellschaft mbH. (Sudflug)
R RA RB Syrian Arab Airlines RC Royal Air Cambodge RD Riddle Airlines Inc. RE RF Rhodesian Air Services (Private) Ltd. RG Viação Aéreo Rio Grandense S. A. (VARIG) RH RI Rutas Internacionales Peruanas S. A. (RIPSA) RJ RK Air Afrique RL Real Aerovias Nacional S. A. RM Rotterdamse Luchtvaart Expeditie Maatschappij RN Rutas Aéreas Nacionales, S. A. RO Roumanian Air Transport RP M. Robert Petrelluzzi, Antilles Air Services RQ Compagnie Aérienne "AIR CONGO" (Brazzaville) RR Aircarries Ltd. RS Rutas Aéreas de Colombia Limitada RT Transportes Aéreos de Timor RU RV Reeve Aleutian Airways Inc. RW RX RY Royal Air Laos RZ	T TA TACA International Airlines, S. A. TB Transair Sweden AB TC Trans-Canada Air Lines (TCA) TD "Taxader" Líneas Aéreas Taxader S. A. TE Tasman Empire Airways Ltd. (TEAL) TF Compagnie Air Transport TG Thai Airways International, Ltd. TH Thai Airways Co. Ltd. TI TJ Transair Copenhagen TK Turk Hava Yollari (Turkish Airlines) TL Trans Mediterranean Airlines (TMA) TM Divisão de Exploração dos Transportes Aéreos (Moçambique) TN Trans-Australia Airlines TO Trans-Meridian Flying Services Ltd. TP Transportes Aéreos Portugueses, S. A. R. L. TQ Tradair Ltd. TR Trans Caribbean Airways Inc. TS Aloha Airlines Inc. TT Trans-Texas Airways TU Société Tunisienne de l'Air (TUNIS-AIR) TV Trans International Airlines Inc. TW Trans World Airlines Inc. TX Transportes Aéreos Nacionales, S. A. TY Société Calédonienne de Transport Aérien-Transpac TZ

U UA UB UC UD UE UF UG UH UI UJ UK UL UM UN UO UP UQ UR US UT UU UV UW UX UY UZ	United Air Lines Inc. Union of Burma Airways Universal Flying Services Ltd. United States Overseas Airlines Inc. Stuttgarter Flugdienst GmbH. Uraba, Medellín and Central Airways Union des Transports Aériens (UTA) United Steel Companies Ltd. Air Transport	W WA WB WC WD WE WF WG WH WI WJ WK WL WM WN WO WP WQ WR WS WT WU WV WW WX WY WZ	Western Airlines Inc. West Coast Airlines, Inc. Wardair Canada Ltd. Wien Alaska Airlines Widerøes Flyveselskap A/S Wilken Air Services Ltd. Western Alaska Airlines, Inc. Woods of Colchester Malta Metropolitan Airlines Ltd. Western Airways Ltd. World Airways Inc. Westpoint Airlines Ltd. Sky Van Airways Wiltshire School of Flying Ltd. W. A. A. C. (Nigeria) Ltd. Nigeria Airways Starways Ltd.
V VA VB VC VD VE VF VG VH VI VJ VK VL VM VN VO VP VQ VR VS VT VU VV VW VX VY VZ	Venezolana Internacional de Aviación S. A. Société Générale d'affrètement Aérien SGAA Aerovías Venezolanas, S. A. British United Air Ferries Ltd. Panamá Aeronautica Société Aérotechnique Société commerciale aérienne du Littoral Société aéronautique "Air Caen" Air Viet-Nam Navegação Aérea Brasileira S. A. Viação Aérea São Paulo, S. A. Société Aérienne de Transporto Guyane- Antilles Société de Liaison et Transports Aériens Servicios Aéreos, S. A. Réseau Aérien Interinsulaire Air Ivoire Société Algérienne de constructions aéronau- tiques "AFRIC AIR" SACA Viêt-Nam Air Transport (VIAT) Société Anonyme des Avions Meyer et Co. (Air Cameroun)	X XA XB XC XD XE XF XG XH XI XJ XK XL XM XN XO XP XQ XR XS XT XU XV XW XX XY XZ	Aeronautical Radio Inc. International Air Transport Association (IATA) Compañía Radio Aeronáutica Costarricense, S. A. Special Handling Service for aircraft International Aeradio Ltd. Radio Aeronáutica de México, S. A. (RAMSA) Radio Aeronáutica Paraguaya (RAPSA) Radio Aeronáutica de Cuba, S. A. (RACSA) Société Internationale de Télécommunications Aéronautiques, Société Coopérative (S. I. T. A.) Serviços Auxiliares de Transportes Aéreos (SATA) Empresa Consolidada de Servicios Aeronáuticos Civiles (ECSAC)

ANNEX 6 TO CHAPTER IV

TABLE SHOWING APPROXIMATE CORRESPONDENCE
BETWEEN MWARA'S AND ZONES OF ANALYSIS

Zones of analysis	MWARA	Comments
A	NAT	Arctic routes
B		Outside MWARA or I.C.A.O. Plan
C	NAT & NP	Arctic routes and North American continent
D	EU	
E	NSA 1	
F	NSA 2	
G	ME	
H	FE 2	
I	FE 1	
J	CWP	
K	NP	Sea routes
L	SP	
M	CEP	
N	CAR	I.C.A.O. Plan
O	NAT	Central routes
P	NAT	Southern routes
Q	SA	
R	NSAM 1	
S	NSAM 2	
T		E. Antartic Area
U		W. Antartic Area

N.B. : The above is a mere indication, offered to facilitate classification of flights in the zones of analysis, especially those which overlap (D and O, H and I or J), (Q and S or E).

Thus : Flight from LISBON to LONDON is in Zone D.
Flight from LISBON to DAKAR is in Zone Q.
Flight from LONDON to NEW YORK is in Zone O.

ANNEXE 7 AU CHAPITRE IV

ANNEX 7 TO CHAPTER IV

ANEXO 7 AL CAPITULO IV

LISTE DES AEROPORTS PRINCIPAUX

LIST OF MAJOR AIRPORTS

LISTA DE LOS PRINCIPALES AEROPUERTOS

Nom des aéroports principaux Name of major airport Nombre de los aeropuertos principales	Symbole du pays *) Country symbol *) Símbolo del país *)	Numéro de la case Number square Número del cuadro	Zone d'analyse**) Zone of analysis **) Zona de análisis **)
1	2	3	4
Aalborg	DNK	151	D - O
Abadan	IRN	444	G
Abbotsford	CAN	216	K
Abidjan	CTI	817	E
Accra	GHA	816	E
Adana	TUR	341	D
Addis Ababa	ETH	789	F
Aden	ADN	687	F
Ahmedabad	IND	560	G
Ajaccio	F	320	D
Akyab	BRM	557	H-- I
Aleppo	SYR	341	G
Alexandria	EGY	448	F
Alger	ALG	346	E
Alicante	E	346	D - E

*) Les symboles de cette colonne ont une signification purement géographique.

*) The symbols in this column are of geographical significance only.

*) Los símbolos de esta columna sólo tienen un significado geográfico.

**) Voir la note insérée au bas de la page 95 relative aux indications à retenir dans le choix de la zone d'analyse pour un vol intéressant un aéroport principal situé dans une partie du monde comprise dans deux zones d'analyse qui se recouvrent.

**) See the footnote to page 95 regarding the data to be considered in selecting the zone of analysis for a flight concerning a major airport in a part of the world lying between two overlapping zones of analysis.

**) Véase la nota al pie de la página 95 relativa a las indicaciones que se han de seguir para elegir las zonas de análisis de un vuelo concerniente a un aeródromo principal, situado en una parte del mundo comprendida entre dos zonas de análisis que se superpongan.

1	2	3	4
Amapa	B	895	S
Amman	JOR	447	F
Amritsar	IND	440	G
Amsterdam	HOL	170	D - O
Anchorage	AKS	118	C
Ankara	TUR	323	D
Antigua	IOB	649	N
Antofagasta	CHL	1258	R
Anvers	BEL	230	D - O
Apia	SMO	1119	L
Arad	ROU	251	D
Arica	CHL	1194	R
Aruba	ATN	707	N
Asmara	ETH	688	F
Assab	ETH	687	F
Asunción	PRG	1314	S - Q
Athinai	GRC	343	D
Auckland	NZL	1474	L
Bagdad	IRQ	427	G
Bahía Blanca	ARG	1491	S
Bahrain	GLP	547	F
Bakersfield Cal	USA	404	C
Bâle-Mulhouse	F	231	D
Baltimore Md	USA	357	C
Bamako	MLI	696	E
Bangkok	THA	678	I - H
Bangui	CAF	813	E

1	2	3	4
Barcelona	E	319	D
Barcelona	VEN	771	N
Barranquilla	CLM	770	N
Basrah	IRQ	445	G
Bastia	F	320	D
Bata	GNE	905	E
Bathurst	GMB	697	E - Q
Batouri	CME	906	E
Beira	MOZ	1276	F
Beirut	LBN	426	D - G
Belem	B	946	S
Belet Uen	SOM	809	F
Belfast	G	172	D - O
Belize	HNB	645	N
Belo Horizonte	B	1189	S - Q
Benghazi	LYY	424	F
Benjamin Constant	B	1013	R
Beograd	YUG	251	D
Bergen	NOR	105	D - O
Berlin/Schönefeld		169	D
Berlin/Tempelhof		169	D
Phuj	IND	561	G
Biak	INS	975	I
Biarritz	F	319	D - O
Bilbao	E	319	D - O
Birmingham	G	171	D - O
Bissau	GNP	780	E

1	2	3	4
Blantyre	NYA	1154	F
Bloemfontein	AFS	1397	E
Boa Vista	B	893	S
Bocas del Toro	PNR	768	N
Bodoe	NOR	90	D
Bogotá	CLM	828	S
Boke	GUI	780	E
Bombay	IND	673	G
Bône	ALG	345	E
Bora Bora	OCE	1208	L
Bordeaux	F	254	D - O
Boston Mass	USA	310	O
Bouar	CAF	814	E
Bournemouth	G	230	D - O
Brasilia	B	1140	Q - S
Bratislava	TCH	232	D
Brazzaville	COG	1027	E
Bremen	D	170	D - O
Bridgetown	IOB	705	N
Brindisi	I	321	D
Brisbane	AUS	1340	I
Bruxelles	BEL	230	D - O
Bucuresti	ROU	251	D
Budapest	HNG	251	D
Buenos Aires	ARG	1434	U - S
Buffalo Ny	USA	309	C
Bujumbura	BDI	933	F

1	2	3	4
Bulawayo	RHS	1275	F
Burbank Cal	USA	404	C
Burlington Vt	USA	310	C
Cagliari	I	345	D
Cairo	EGY	447	F
Calama	CHL	1258	R
Calcutta	IND	558	I
Cali	CLM	890	R - S
Camagney	CUB	586	N
Campo Grande	B	1261	Q - S
Caracas	VEN	771	N
Cardiff	G	229	D - O
Carmen	MEX	644	N
Cartagena	CLM	770	N
Casablanca	MRC	420	Q - E
Catania	I	344	D
Cayenne	GUF	825	S
Cebu	PHL	742	H - J
Changuinola	PNR	768	N
Charlotte Amalie	VIR	649	N
Cherbourg	F	230	D - O
Chetumal	MEX	645	N
Chicago Ill	USA	308	C
Chiclayo	PRU	1011	R
Chitose	J	292	B
Chittagong	PAK	557	H - I
Christchurch	NZL	1553	L

1	2	3	4
Christiansted	VIR	648	N
Cienfuegos	CUB	586	N
Clark Air Base	PHL	735	H - J
Cleveland Ohio	USA	309	C
Cochabamba	BOL	1193	R
Cocos I	ICO	1164	I
Cold Bay	ALS	190	K
Colombo	CLN	803	I
Colonia	URG	1434	S - Q
Conakry	GUI	780	E
Córdoba	ARG	1382	R
Cork	IRL	229	D - O
Corrientes	ARG	1315	S - Q
Corumba	B	1192	R
Cotonou	DAH	816	E
Cozumel	MEX	587	N
Cuenca	EQA	951	R
Curaçao	ATN	707	N
Curitiba	B	1313	Q - S
Dacca	PAK	557	I - H
Dakar	SEN	697	Q - E
Dallas Tex	USA	407	N
Daly Waters	AUS	1221	I
Damas	SYR	426	G
Dar-es-Salaam	TGK	1031	F
Darwin	AUS	1109	I
David	PNR	768	R
Deauville	F	230	D - O

1	2	3	4
Delhi	IND	440	I
Detroit Mich	USA	309	C
Dhahran	ARS	547	F
Dili	TMP	1100	I
Dinard	F	229	D - O
Dire Dawa	ETH	789	F
Djakarta	INS	982	H - I
Djerba	TUN	422	E
Djibouti	SMF	790	F
Doha	GLP	547	F
Douala	CME	815	E
Dublin	IRL	172	D - O
Dubrovnik	YUG	321	D
Durban	AFS	1398	E
Duesseldorf	D	230	D - O
Edinburgh	G	171	D - O
Edmonton	CAN	184	C
Eilat	ISR	447	F
Elisabethville	CGO	1055	F
Entebbe	UGA	909	F
Esmeraldas	EQA	890	R
Espiritu Santo	NHB	1115	L
Fairbanks	ALS	77	C
Foz do Iguacu	B	1314	S - Q
Frankfurt Main	D	231	D
Freetown	SRL	780	E
Fresno Cal	USA	363	C

1	2	3	4
Frobisher Bay	CAN	111	C
Formosa	ARG	1315	S - Q
Ft Archambault	TCD	785	E
Ft de France	MRT	705	N
Ft Lamy	TCD	692	E
Ft Lauderdale Fla	USA	525	N
Fukuoka	J	388	H - J
Galveston Tex	USA	468	N
Gander	CAN	223	O
Garoua	CME	785	E
Gaya	IND	553	I
Genève	SUI	253	D
Georgetown	GUB	826	S
Gibraltar	GIB	347	E
Gizan	ARS	668	F
Glasgow	G	171	D - O
Goa	GOA	682	I
Goeteborg	S	152	D - O
Golfito	CTR	768	R
Goose	CAN	178	O
Graz	AUT	252	D
Gr Cayman	IOB	646	N
Grenada	IOB	705	N
Groningen	HOL	170	D - O
Guam	GUM	731	J
Guatemala City	GTM	710	N
Guayaquil	EQA	951	R

1	2	3	4
Habana	CUB	586	N
Halifax	CAN	262	O
Hamburg	D	170	D - O
Hannover	D	170	D - O
Hanoi	VTN	616	H
Hargeisa	SOM	790	F
Helsinki	FNL	103	D
Herat	AFG	430	G
Hilo	HWA	634	M
Hodeida	YEM	687	F
Hong Kong	HKG	614	I - H
Honiara	SLM	1087	L
Honolulu	HWA	599	J
Houston Tex	USA	468	N
I do Pascua	PAQ	1323	L
Indianapolis Ind	USA	359	C
Innsbruck	AUT	252	D
Iraklion	GRC	342	D
Isfahan	IRN	428	G
Isle of Man	G	171	D - O
Istambul	TUR	323	D
Iwakuni	J	388	H - J
Izmir	TUR	342	D
Jacksonville Fla	USA	466	N
Jack Tar	BAH	526	N
Jaffna	CLN	796	I
Jedda	ARS	566	F
Jersey	G	229	D - O

1	2	3	4
Jerusalem	JOR	447	F
Johannesburg	AFS	1300	E
Kaboul	AFG	431	G
Kagoshima	J	491	H - J
Kahului	HWA	599	M
Kalgoorlie	AUS	1352	I
Kamaran I	ADN	687	F
Kandahar	AFG	442	G
Kan Kan	GUI	781	E
Kano	NIG	693	E
Karachi	PAK	550	G
Kathmandu	NPL	553	I
Keflavik	ISL	87	O
Kemi	FNL	91	D
Kermanshah	IRN	428	G
Key West Fla	USA	525	N
Khartoum	SDN	689	F
Kiev	UKR	233	D
Kindley Field	BER	412	N - O - P
King Salmon	ALS	136	K
Kingston	JMC	647	N
Kissidougou	GUI	781	E
Klagenfurt	AUT	252	D
Kodiak	ALS	136	K
Koebenhavn	DNK	169	D - O
Koeln	D	231	D - O
Kota Baru	INS	974	I

1	2	3	4
Kristiansand	NOR	151	D - O
Kuala Lumpur	MLA	920	H - I
Kuching	SRW	861	H - I
Kuwait	KWT	444	F
La Baule	F	254	D - O
La Paz	BOL	1194	R
La Serena	CHL	1381	R
L Charles La	USA	468	N
Labuan	BRN	857	H - I
Lae	NGU	988	I
Lagos	NIG	816	E
Lahore	PAK	440	G
Lajes	AZR	350	O
Laoag	PHL	620	H - J
Las Palmas	CNR	536	Q - E
Las Vegas Nev	USA	363	C
Léopoldville	CGO	1027	E
Le Touquet	F	230	D - O
Leticia	CLM	1013	R
Libreville	GAB	905	E
Lima	PRU	1135	R
Linz	AUT	231	D
Lisboa	POR	347	Q - O - D
Liverpool	G	171	D - O
Livingstone	RHN	1177	E
Lomé	TGO	816	E
London	G	230	D - O

1	2	3	4
Long Beach Cal	USA	404	N
Los Angeles Cal	USA	404	N
Lourenço Marques	MOZ	1299	F
Luanda	AGL	1057	E
Lucknow	IND	552	I
Lumbo	MOZ	1155	F
Luxembourg	LUX	230	D - O
Luxor	EGY	544	F
Lvov	UKR	232	D
Lyon	F	253	D
Maastricht	HOL	230	D - O
Mactan I.	PHL	742	H - J
Madras	IND	681	I
Madrid	E	319	D - O
Mafrag	JOR	426	F
Mahebourg	MAU	1280	F
Majunga	MDG	1156	F
Málaga	E	347	D
Malakal	SDN	789	F
Malmoe	S	169	D
Malta	MLT	423	D
Managua	NCG	710	N
Manaus	B	948	S
Manchester	G	171	D - O
Mandalay	BRM	556	H - I
Mangalore	AUS	1470	I
Manila	PHL	735	H - J

1	2	3	4
Manta	EQA	951	R
Maracaibo	VEN	770	N
Mar del Plata	ARG	1492	S
Mariehamn	FNL	104	D
Maroua	CME	785	E
Marrakech	MRC	454	Q - E
Marseille	F	320	D
Mashhad	IRN	338	G
Maturin	VEN	772	N
Medan	INS	920	I
Medellín	CLM	829	S
Medina	ARS	545	F
Meknes	MRC	420	E
Melbourne	AUS	1469	I
Memphis Tenn	USA	408	C
Mendoza	ARG	1435	R - Q
Mérida	MEX	588	N
Mersa Matruh	EGY	448	F
Mexicali	MEX	404	N
México City	MEX	643	N
Miami Fla	USA	525	N
Milano	I	253	D
Milwaukee Wis	USA	308	C
Minya	EGY	447	F
Misawa	J	292	B
Mobile Ala	USA	467	N
Mogadiscio	SOM	911	F

1	2	3	4
Mombasa	KEN	1031	F
Monrovia	LBR	818	E
Montego Bay	JMC	647	N
Monterrey	MEX	522	N
Montevideo	URG	1434	S - Q
Montreal	CAN	263	C
Moskva	URS	167	D
Moulmein	BRM	677	H - I
Mtwara	TGK	1053	F
Muenchen	D	231	D
Multan	PAK	441	G
Munda	SLM	1095	I
Muskat	GLP	563	F
N'gaoundéré	CME	814	E
N'zerekore	GUI	818	E
Nador	MRC	420	E
Nagoya	J	388	H - J
Nairobi	KEN	932	F
Nandi	FJI	1213	L
Napoli	I	321	D
Nassau	BAH	526	N
Natal	B	1018	S - Q
Nawabshah	PAK	550	G
Ndola	RHN	1153	F
New Orleans La	USA	468	N
New York NY	USA	310	C - N - O
Newark NJ	USA	310	C - N

1	2	3	4
Nha-Trang	VTN	737	H
Niamey	NGR	694	E
Nico	F	320	D
Nicosia	CYP	426	D
Norfolk I.	AUS	1360	L
Nouakchott	MTN	658	Q - E
Noumea	NCL	1230	L
Nuernberg	D	231	D
Odessa	UKR	250	D
Oiapoque	B	946	S
Okinawa	RYU	500	H - J
Ontario Cal	USA	404	C
Oradea	ROU	251	D
Oran	ALG	421	E
Osaka	J	388	H - J
Oslo	NOR	151	D - O
Ostende	BEL	230	D - O
Ottawa	CAN	263	C
Ouagadougou	HVO	695	E
Oujda	MRC	421	E
Pago Pago	SMA	1119	L
Pakse	LAO	738	H - I
Pala	TCD	785	E
Palembang	INS	980	H - I
Palermo	I	344	D
Palma Son	E	346	D
Palmdale Cal	USA	404	C
Panamá City	PNR	769	N

1	2	3	4
Paramaribo	SUR	825	S
Paris	F	230	D - O
Patna	IND	553	I
Patrai	GRC	343	D
Pelotas	B	1384	Q - S
Penang	MLA	859	H - I
Perth	AUS	1351	I
Philadelphia PA	USA	357	N
Pisa	I	320	D
Pisco	PRU	1135	R
Pittsburg Pa	USA	309	C
Pnom Penh	CBG	739	H - I
Pnt à Pitre	GDL	649	N
Pnt Arenas	CHL	1668	R
Pnt del Este	URG	1433	S - Q
Pnt Noire	COG	1027	E
Pori	FNL	103	D
Portland Ore	USA	269	M
Porto	POR	318	D - O
Poznan	POL	169	D
Praha	TCH	231	D
Prestwick	G	171	D - O
Pt Alegre	B	1384	S - Q
Pt Armuelles	PNR	768	R
Pt au Prince	HTI	648	N
Pt Gentil	GAB	936	E
Pt Limon	CTR	768	N

1	2	3	4
Pt of Spain	TRD	772	N
Pt Saïd	EGY	447	F
Pt Santo	MDR	419	Q - E
Pt Sudan	SDN	667	F
Pt Vila	NHB	1215	L
Quebec	CAN	263	C
Quito	EQA	951	R
Rabat	MRC	420	E
Rabaul	RGU	989	I
Rangoon	BRM	677	H - I
Rarotonga	CKH	1243	L
Récife	B	1066	Q - S
Reims	F	230	D - O
Resistencia	ARG	1315	Q - S
Reykjavik	ISL	87	O
Rhodos	GRC	342	D
Riga	URS	153	D
Rio de Janeiro	B	1263	Q - S
Rio Gallegos	ARG	1627	R
Rio Grande	ARG	1668	R
Robore	BOL	1192	R
Roma	I	321	D
Rotterdam	HOL	230	D - O
S Andres	CLM	709	N
S Antonio Tex	USA	469	N
S Cruz	BOL	1193	R
S Domingo	DOM	648	N

1	2	3	4
S Denis	REU	1280	F
S Diego Cal	USA	404	N
S Francisco Cal	USA	364	M
S Isabel	GNE	905	E
S José	CTR	768	N
S José	GTM	710	N
S Juan	PTR	649	N
S Kitts	IOB	649	N
S Louis Mo	USA	359	C
S Lucia	IOB	705	N
S Luis	B	945	S
S Maarten	ATN	649	N
S María	AZR	350	O
S Nazaire	F	254	D - O
S Paulo	B	1262	Q - S
S Pedro Sula	HND	710	N
S Salvador	SLV	710	N
S Tomé	STP	905	E
Saigon	VTN	739	H - I
Sal I	CPV	657	P - Q
Salalah	GLP	670	F
Salisbury	RHS	1176	F
Salta	ARG	1316	R
Salzburg	AUT	252	D
Santiago	CHL	1436	R - Q
Santiago de Cuba	CUB	647	N
Saudarkrokur	ISL	87	O

1	2	3	4
Seattle Wash	USA	269	M
Sebha	LBY	541	E
Seoul	KOR	380	J
Seno	LAO	617	H - I
Sevilla	E	347	D - O
Sfax	TUN	422	E
Shannon	IRL	172	D - O
Sharjah	GLP	548	G - F
Shemya	ALS	193	K
Sidi Ifni	AOE	454	Q - E
Siem Reap	CBG	738	H - I
Singapore	SNG	860	H - I
Skopje	YUG	322	D
Soendrestroem-Fjord	GRL	85	O
Sofia	BUL	322	D
Songkhla	THA	859	H - I
Spokane Wash	USA	269	C
Stanleyville	CGO	908	F
Stavanger	NOR	151	D - O
Stephenville	CAN	223	O
Stockholm	S	152	D
Stockton Cal	USA	364	M
Strasbourg	F	231	D
Stuttgart	D	231	D
Sundsvall	S	104	D
Suva	FJI	1213	L
Sydney	AUS	1456	I

1	2	3	4
Sydney	CAN	261	O
Taegu	KOR	387	J
Tahiti	OCE	1208	L
Tainan	CHN	613	H - J
Taipei	CHN	499	H - J
Taiz	YEM	687	F
Talara	PRU	1011	R
Tampa Fla	USA	525	N
Tampere	FNL	103	D
Tampico	MEX	589	N
Tananarive	MDG	1173	F
Tanger	MRC	420	E
Tapachula	MEX	711	N
Tarbes	F	319	D - O
Tavoy	BRM	678	H - I
Tegucigalpa	HND	710	N
Téhéran	IRN	428	G
Tel Aviv	ISR	426	F
Tenerife	CNR	455	Q - E
Tetuan	MRC	420	Q - E
Thessaloniki	GRC	322	D
Thies	SEN	697	Q - E
Tijuana	MEX	404	N
Tirana	ALB	322	D
Tiruchirapalli	IND	795	I
Tokyo	J	389	H - J
Tongatabu I.	TON	1241	L

1	2	3	4
Torino	I	253	D
Toronto	CAN	309	C
Toulouse	F	319	D - O
Tourane	VTN	738	H
Tours	F	254	D - O
Townsville	AUS	1219	I
Treviso	I	252	D
Tripoli	LBY	423	E
Tunis	TUN	345	E
Turku	FNL	103	D
Udon Thani	THA	617	H - I
Uruguaiana	B	1384	Q - S
Vaasa	FNL	103	D
Valencia	E	346	D
Vancouver	CAN	215	K
Varadero	CUB	586	N
Veneçia	I	252	D
Veracruz	MEX	644	N
Vichy	F	253	D
Vientiane	LAO	617	H - I
Vilnius	URS	168	D
Villa Cisneros	AOE	575	Q - E
Visby	S	152	D
Vitoria	B	1263	Q - S
W Palm Beach Fla	USA	525	N
Wadi Halfa	SDN	567	F
Wake I.	WAK	627	J
Wallis I.	NCL	1118	L

1	2	3	4
Warszawa	POL	169	D
Washington DC	USA	357	C
Wellington	NZL	1553	L
Wewak	NGU	974	I
Wien	AUT	252	D
Windhoek	AFS	1273	E
Winnipeg	CAN	218	C
Yacuiba	BOL	1259	R
Yagoua	CME	785	E
Yaoundé	CME	905	E
Zagreb	YUG	252	D
Zahedan	IRN	442	G
Zamboanga	PHL	856	H - I
Ziguinchor	SEN	697	Q - E
Zurich	SUI	253	D

MAJOR WORLD AIR ROUTES

NOTIFICATION FORM

Administration providing data _____

Period selected : G. M. T. 0001 2 August 1964 to 2400 8 August 1964

[illegible]

* INDICATE BY CATEGORY

**** Examples 3, 4 and 5 should appear separately on forms submitted by different Administrations**

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ANNEX 8 TO CHAPTER IV

EXPLANATION

Example 1: It is the first of the flights reported by Switzerland (column 9) and has the following specifications :

1. The flight identification is SR 800 (Columns 10 to 14);
2. It is a scheduled flight (Column 18);
3. The aircraft speed is more than 500 knots (Column 19);
4. The flight originates, on the first day of the week of record (Column 26) in Zürich which is in the Square Number 253 (Columns 22 to 24) and Zone of Analysis "D" (Column 25);
5. There are no intermediate stops between the origin and termination of the flight (Columns 27 to 71 left blank);
6. The flight terminates, after covering a distance of 3410 nautical miles (Columns 72 to 75) in New York, which is in the Square Number 310 (Columns 77 to 79) and Zone of Analysis "O" (Column 80).

(By way of clarification, references to columns are inserted in Example 1 only.)

Example 2: It is the second of the flights reported by Switzerland and has the following specifications :

1. The flight identification is SR 800;
2. It is a scheduled flight;
3. The aircraft speed is more than 500 knots;
4. The flight originates, on the second day of the week of record, in Zürich which is situated in the Square Number 253 and Zone of Analysis "D";
5. There are no intermediate stops between the origin and termination of the flight;
6. The flight terminates, after covering a distance of 3410 nautical miles, in New York which is in the Square Number 310 and Zone of Analysis "O".

Note : Example 1 and Example 2, taken together, indicate that the flight SR 800 operated on the first and second day of the week of record.

Example 3: It is the 202nd of the flights reported by France and has the following specifications :

1. The flight identification is AF 140;
2. It is a scheduled flight;
3. The aircraft speed is between 350 and 500 knots;
4. The flight originates, on the seventh day of the week of record, in Paris which is in the Square Number 230 and Zone of Analysis "D";
5. There is one intermediate stop between the origin and termination of the flight;
 - 5.1.1 The intermediate stop takes place in Rome which is in the Square Number 321 and Zone of Analysis "D";
 - 5.1.2 The distance between the point of origin and the intermediate stop is 597 nautical miles;
 - 5.1.3 The flight departs, after this stop, on the seventh day of the week of record;
6. The flight terminates, after covering a distance of 1203 nautical miles from the last stop, in Beirut which is in the Square Number 426 and Zone of Analysis "D".

Example 4: It is the 25th of the flights reported by Italy and has the following specifications :

1. The flight identification is AZ 770;
2. It is a scheduled flight;
3. The aircraft speed is more than 500 knots;
4. The flight originates, on the fourth day of the week of record, in Rome which is in the Square Number 321 and Zone of Analysis "D";

5. There are six intermediate stops between the origin and termination of flight;

5.1.1 - The first intermediate stop takes place in Teheran which is situated in the Square Number 428 and Zone of Analysis "G";

5.1.2 - The distance between the point of origin and the first intermediate stop is 1853 nautical miles;

5.1.3 - The flight departs, after this stop, on the fourth day of the week of record;

5.2.1 - The second intermediate stop takes place in Karachi which is in the Square Number 550 and Zone of Analysis "G";

5.2.2 - The distance between the first and second intermediate stops is 1044 nautical miles;

5.2.3 - The flight departs, after this stop, on the fifth day of the week of record;

5.3.1 - The third intermediate stop takes place in Bombay which is in the Square Number 673 and Zone of Analysis "G";

5.3.2 - The distance between the second and third intermediate stops is 472 nautical miles;

5.3.3 - The flight departs, after this stop, on the fifth day of the week of record;

5.4.1 - The fourth intermediate stop takes place in Bangkok which is in the Square Number 678 and Zone of Analysis "I";

5.4.2 - The distance between the third and fourth intermediate stops is 1627 nautical miles;

5.4.3 - The flight departs, after this stop, on the fifth day of the week of record;

5.5.1 - The fifth intermediate stop takes place in Singapore which is in the Square Number 860 and Zone of Analysis "I";

5.5.2 - The distance between the fourth and fifth intermediate stops is 775 nautical miles;

5.5.3 - The flight departs, after this stop, on the fifth day of the week of record;

5.6.1 - The sixth intermediate stop takes place in Darwin which is in the Square Number 1109 and Zone of Analysis "I";

5.6.2 - The distance between the fifth and sixth intermediate stops is 1820 nautical miles;

5.6.3 - The flight departs, after this stop, on the fifth day of the week of record;

6. The flight terminates, after covering a distance of 1705 nautical miles from the last stop, in Sydney which is in the Square Number 1456 and Zone of Analysis "I".

Example 5 : It is the 31st of the flights reported by the United Kingdom of Great Britain and Northern Ireland and has the following specifications :

1. The flight identification is BA 910;

2. It is a scheduled flight;

3. The aircraft speed is more than 500 knots;

4. The flight originates, on the sixth day of the week of record, in San Francisco which is in the Square Number 364 and Zone of Analysis "M";

5. The Zone of Analysis "C" is overflown between the origin and the first stop;

6. There is one intermediate stop between the origin and termination of the flight;

6.1.1 - The intermediate stop takes place in New York which is situated in the Square Number 310 and Zone of Analysis "O";

6.1.2 - The distance between the point of origin and the point of intermediate stop is 2244 nautical miles;

6.1.3 - The flight departs, after the stop, on the sixth day of the week of record;

7. The flight terminates, after covering a distance of 2984 nautical miles, from the last stop, in London which is in the Square Number 230 and Zone of Analysis "O".

6. Distances between major airports

A tabulation showing great circle distances, in statute miles, between airports of the world, is issued by the Traffic Director, International Air Transport Association (I.A.T.A.), Montreal, under the name TABULATION OF GREAT CIRCLE DISTANCES, and may be used by the administrations, when determining the relevant information to be entered in the columns titled "Stage Length N.M." on the Notification Form for Major World Air Routes (Annex 1 to Chapter IV). Care should, however, be taken to convert the distance obtained from this tabulation into nautical miles by using the formula:

$$1 \text{ statute mile} = 0.86841 \text{ nautical mile}$$

7. Determination of the requirements in MWARA operations

The Conference took note of the recommendation of the International Civil Aviation Organization that within MWARA's the expected peak number (N) of aircraft that would require communication in any one hour might be given by the following formula:

$$N = \frac{K(L - L_{vhf})}{7 \times 24} \left(\frac{F_s + F_{ns}}{V_s V_{ns}} \right)$$

where:

K = Concentration factor

L = total route length

L_{vhf} = route length covered by VHF

V_s = aircraft speed of scheduled flights

V_{ns} = aircraft speed of unscheduled flights

F_s = number of scheduled flights per week

F_{ns} = number of non-scheduled flights per week

} expressed in
same
system units

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964) considered the foregoing formula in the light of known technical and mathematical factors and confirmed its suitability for use at the Second Session of the Aeronautical E.A.R.C. (1965). It was recognized, when considering the operational factors bearing upon the collection of statistics, that ~~that~~ element of the formula ($L - L_{\text{vhf}}$) presented certain difficulties.

As a result the instructions for completing the notification form contain a specific mention concerning flights conducted entirely within VHF coverage and Resolution 10 was framed to cater for the situation where communications for part of the flights are conducted on VHF.

It was emphasized that the factor K = Concentration factor in the above formula is not the same as that to be found in the formula for RDARA operations appearing on page 61. The considerations of I.C.A.O. leading to a recommendation that further studies were necessary regarding the value for factor K in the MWARA formula were noted but in the absence of alternative proposals at this Session the value of 2.4 was confirmed.

8. Resolution No. 12 - Relating to the information about actual use of high frequencies on Major World Air Routes

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
considering

1. that the experience of administrations operating international flights with respect to the use of high frequencies can be of value to the Second Session of the Aeronautical E.A.R.C. (1965), when it considers the allotment of high frequencies;

2. that the availability of such information will be useful to other administrations while considering the problems of high frequency allotment;

resolves

that administrations shall provide available data based on their experience on the use of high frequencies for Aeronautical Mobile (R) Service communication under their authority, to the Second Session of the Aeronautical E.A.R.C. (1965).

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CHAPTER V

MANNER IN WHICH THE INFORMATION MENTIONED IN CHAPTER IV SHOULD BE
ANALYZED AND THE RESULTS OF THIS ANALYSIS PRESENTED TO THE
SECOND SESSION OF THE AERONAUTICAL E.A.R.C. (1965)

1. Resolution No. 13 - Relating to the forwarding of the results of the
statistical analysis on international flights by
the International Frequency Registration Board to
the Administrations

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),
considering

- a) the Resolution No. 525 of the Eighteenth Session of the Administrative Council, (1963), relative to the establishment of the operational principles on which requirements for high frequencies for Aeronautical Mobile (R) Service communications are to be assessed;
- b) the form in which actual operational statistics should be submitted to the I.F.R.B.;
- c) that such operational statistics should be provided for the period 0001 GMT, 2 August, 1964, to 2400 GMT, 8 August, 1964;

resolves

1. that the I.F.R.B. process the data received from the Administrations and prepare the following documents :

- 1.1 Master List by Countries

The statistics of international flights, requiring the use of high frequencies, listed according to the country submitting the data. This list would serve as basic information of the flights reported to the I.F.R.B. for the week of record and as a check by the Administrations concerned that the data submitted had been correctly recorded.

- 1.2 Numerical Square Master List

The statistics of international flights requiring the use of high frequencies listed according to the number of the square in which the flight or stage of flight commences. This list would provide information on flights commencing from the international airports in each country and would assist in the detailed analysis of the data.

1.3 Numerical Square Flight Density List

The statistics of international flights requiring the use of high frequencies listed according to the number of the squares in which the flight or stage of flight commences and terminates. The numbers of flights in both directions between any two squares would be added together in order to provide the volume of air traffic between the two squares.

1.4 Flight Density Chart

A graphic representation of the information shown in the Numerical Square Flight Density List (See 1.3) and may consist of a number of charts in which the volume of flights is shown by means of lines joining the squares concerned, each line being endorsed with the number of flights made during the week.

1.5 List of Flights by Zones of Analysis

The statistics of international flights requiring the use of high frequencies grouped according to the zones of analysis. This list would serve as information on the broad grouping of flights which, together with operational information, would assist in the determination of any revision of existing boundaries of MWARA's in the creation of new MWARA's or the adjustment of the boundaries of existing MWARA's and with the allotment of the frequencies that will be required in these areas.

2. that the I.F.R.B. should despatch these documents to the Administrations by 15 December, 1964.

2. Resolution No. 14 - Relating to the forwarding by the International Frequency Registration Board to the Administrations of the results of statistical analysis on Regional and Domestic flights

The First Session of the Aeronautical E.A.R.C., (Geneva, 1964),
considering

- a) the Resolution No. 525 of the Eighteenth Session of the Administrative Council (1963) relative to the establishment of the operational principles on which requirements for high frequencies for Aeronautical Mobile (R) Service communications are to be assessed;
- b) the form in which actual operational statistics should be submitted to the I.F.R.B.;

c) that such operational statistics should be provided for a continuous period of twelve months beginning not earlier than 1 January, 1963;

resolves

1. that the I.F.R.B. process the data received from the administrations and draw up the following documents:

1.1 Master List by Countries

The tabulation of the total number of hours flown by Regional and Domestic flights requiring the use of high frequency communication during the twelve months period of record, listed according to the country submitting the data.

1.2 Master List by Reporting Area

The statistical record of Regional and Domestic flights during the twelve months period of record. This list shall contain the following information:

- the hours flown by aircraft, requiring HF communications, within each area of reporting, during the twelve months period of record;
- taking the formula for assessment of frequency requirement for RDARA operations, the number of aircraft requiring HF communications in a particular RDARA or area of reporting at the peak hour.

2. that the I.F.R.B. should despatch these documents to the administrations before 15 December, 1964.

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CHAPTER VI

ARRANGEMENTS FOR THE ORGANIZATION OF THE SECOND
SESSION OF THE AERONAUTICAL E.A.R.C. (1965)

1. Recommendation No. 3 - Regarding the time and duration of the Second Session
of the Aeronautical E.A.R.C. (1965)

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964) :

considering

1. that the First Session has been compelled to remit to the Second Session of the Conference a number of important technical and operational problems which can only be solved in the light of a prior analysis of additional statistical information which has been requested from Administrations;
2. that this analysis, and the subsequent consideration and application of the results, will be a lengthy process even with the maximum assistance of the I.F.R.B.'s electronic computer;
3. that a solution of these problems, by the Second Session, is an essential pre-requisite to the evolution of a revised high frequency Allotment Plan for the Aeronautical Mobile (R) Service;
4. that, while recognising the need for the exercise of the maximum economy in expenditure, it is nevertheless in the over-all interest of the Union that the duration of the Second Session should be adequate to ensure the establishment of a revised high frequency Allotment Plan which will provide, to the maximum possible extent, for the requirements of all Administrations;

recommends to the Administrative Council

1. that in order to provide adequate time for the study of the Report of the First Session and for the collection, processing and analysis of the technical and operational data required by the Second Session, the latter Session of the Conference should not convene prior to 1 February, 1965;
2. that the Second Session should not last more than ten weeks.

2. Recommendation No. 4 - Relating to the amendment of Appendix 26 to the Radio Regulations (Geneva, 1959) and Associated Provisions.

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964) :

recognizing

- a) that under its terms of reference, changes to the Aeronautical Mobile (OR) Plan and its associated provisions are outside the competence of the Aeronautical E.A.R.C.
- b) that a number of the technical and operational principles used for the establishment of the present Plan, as now contained in Appendix 26 to the Radio Regulations (Geneva, 1959) are common to the Aeronautical Mobile (R) and (OR) Services and that certain of these principles with respect to the Aeronautical Mobile (R) Service will need to be revised by the Second Session.

being of the opinion

that the best procedure would be to dissociate the revised Plan for the Aeronautical Mobile (R) Service, and the provisions relating thereto, from the Plan for the Aeronautical Mobile (OR) Service to which the relevant provisions of Appendix 26 could continue to apply;

recommends

that the Second Session, when revising Appendix 26 and the associated provisions pertaining to the Aeronautical Mobile (R) Service, should ensure that the new Appendix and provisions are separate from, and independent of, those pertaining to the Aeronautical Mobile (OR) Service.

3. Recommendation No. 5 - Relating to the examination of technical conditions governing the use of frequencies 3 023.5 kc/s and 5 680 kc/s

The First Session of the Aeronautical E.A.R.C. (Geneva, 1964),

considering

that some anomalies appear to exist in the conditions prescribed for the use of the frequencies 3 023.5 kc/s and 5 680 kc/s as contained in Column 3, clauses 2(a) and 2(b) of the frequency allotment plan in Appendix 26 to the Radio Regulations (Geneva, 1959), pages 38 and 41 respectively;

noting

that the particular channels in question are common to the Aeronautical Mobile (R) and (OR) Services and therefore the Aeronautical E.A.R.C. is not competent to make alterations to the above-mentioned provisions which might adversely affect the use by the Aeronautical Mobile (OR) Service of the channels concerned;

recommends

that administrations should establish their position with respect to possible changes to these provisions, in order to permit further consideration of the matter at the Second Session of the Aeronautical E.A.R.C. (1965).

4. Resolution No. 15 - Relating to HF requirements for supersonic transport aircraft and aero-space transport vehicles

The First Session of the Aeronautical E.A.R.C. (Geneva) 1964),

having considered

- a) Recommendation No. 6A of the Extraordinary Administrative Space Radio Conference (Geneva, 1963), relating to the frequency requirements in the HF bands exclusively allocated to the Aeronautical Mobile (R) Service;
- b) Recommendation No. 3/2 of the I.C.A.O. Special Communications Meeting (1963) relating to the revision of HF Allotment Plan to provide for supersonic transport aircraft use of frequencies and which noted that there was no requirement, at that time, for the allotment of high frequencies exclusively for communications with supersonic transport aircraft;
- c) the proposals and recommendations submitted to the First Session of the Aeronautical E.A.R.C. (Geneva, 1964) in Documents Nos. I-1, I-4, I-30;

notes

that at this time there is no known requirement for the allotment of Aeronautical Mobile (R) Service high frequencies exclusively for communications with supersonic transport aircraft and aero-space transport vehicles;

and resolves

to refer the subject to the Second Session of the Aeronautical E.A.R.C. (1965) for further and more detailed study.