

**VOL.
II**

WORLD METEOROLOGICAL ORGANIZATION

**MANUAL ON GLOBAL
TELECOMMUNICATION SYSTEM**

VOLUME II

REGIONAL ASPECTS

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TABLE FOR NOTING AMENDMENTS TO THE LISTS OF STATIONS
FROM WHICH REPORTS ARE TO BE EXCHANGED GLOBALLY AND REGIONALLY

Amendment	Dated	Inserted in the publication	
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VOLUME II
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INTRODUCTION

NOTE: The Manual on the Global Telecommunication System (Volumes I and II) replaces the regulatory material contained in Chapters I and II of WMO Publication No. 9, Volume C

1. The Manual on the Global Telecommunication System is issued in accordance with the decision of Sixth Congress.
2. This Manual is designed:
 - (a) To facilitate co-operation in respect of meteorological telecommunications between Members;
 - (b) To specify obligations of Members in the implementation of the World Weather Watch Global Telecommunication System;
 - (c) To ensure uniformity and standardization in the practices and procedures employed in achieving (a) and (b) above.
3. The manual is composed of:
 - (a) VOLUME I — Global Aspects, constituting Annex III to the WMO Technical Regulations. It contains the standard and recommended practices for the WWW Global Telecommunication System;
 - (b) VOLUME II — Regional Aspects, containing the regional aspects of the WWW Global Telecommunication System based on the regional meteorological telecommunication plans adopted by the regional associations concerned as well as relevant decisions of Congress, the Executive Council and the Commission for Basic Systems.
4. The material contained in Volume II does not form part of the WMO Technical Regulations and is applicable only to the Members of the regional associations concerned. The words "shall" and "should" mentioned in this volume have their dictionary meanings and do not have the regulatory character mentioned in the general introduction to the WMO Technical Regulations.
5. To avoid duplication, as far as practicable, between the contents of the two volumes of the Manual, cross-references are made in Volume II to the relevant paragraphs in Volume I whenever the texts of the global and regional provisions are identical.
6. Volume II is divided into sections corresponding to the six Regions of the World Meteorological Organization, namely:

Region I — Africa	Region IV — North and Central America
Region II — Asia	Region V — South-West Pacific
Region III — South America	Region VI — Europe
7. Each of the sections mentioned in paragraph 6 above is divided, as applicable, into three parts, namely:
 - Part I — Organization
 - Part II — Telecommunication procedures
 - Part III — Engineering of centres and circuits (except for Region VI, where Part III is entitled Technical characteristics and specifications for the regional meteorological telecommunication network in Region VI (Europe))

8. Each of the sections mentioned in paragraph 6 above includes at the end of Part III an attachment which contains the lists of stations from which reports are to be exchanged regionally (regional exchange). These lists are constructed as follows:

- (a) The list of stations from which SYNOP reports are to be exchanged regionally is given in each attachment for intermediate standard times.
- (b) The regional associations decided that all SHIP reports for main and intermediate standard times received at GTS centres up to 24 hours after the time of observation and all available AIREP/CODAR reports should be exchanged regionally; therefore, no list of SHIP and AIREP/CODAR reporting stations is included in the attachment.
- (c) TEMP/TEMP SHIP and PILOT/PILOT SHIP reporting stations are not included in the attachment, as the list of stations for global exchange includes all radiosonde and radiowind stations in the basic synoptic network for each Region.
- (d) CLIMAT/CLIMAT TEMP reporting stations are not included in the attachment as the list of stations for global exchange includes all CLIMAT/CLIMAT TEMP reporting stations in the network for each Region.

NOTE: Those stations from which reports shall be sent by mail are not included in the global exchange list.

9. For convenience, Volume II also contains a section entitled "Antarctic data telecommunication arrangements".

REGION I

AFRICA

**REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN
FOR REGION I (AFRICA)
FOR THE WORLD WEATHER WATCH (WWW)**

P A R T I

**ORGANIZATION OF THE REGIONAL METEOROLOGICAL
TELECOMMUNICATION PLAN FOR REGION I (AFRICA)
FOR THE WORLD WEATHER WATCH (WWW)**

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PART I

ORGANIZATION OF THE REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN FOR REGION I (AFRICA) FOR THE WORLD WEATHER WATCH (WWW)

1. GENERAL

1.1 The growing needs of countries in Region I for rapid and reliable reception of a large amount of various types of meteorological information from all over Africa, adjacent ocean areas and other Regions call for the establishment of a telecommunication network in the Region that will satisfy these requirements. This network will have to be linked to and coordinated with the WWW Global Telecommunication System (GTS). Therefore, the telecommunication network in the Region will have to cope with the WWW requirements and comply with the organizational and engineering principles adopted for the GTS.

2. NATIONAL METEOROLOGICAL TELECOMMUNICATION NETWORKS

2.1 Principles

2.1.1 The national meteorological telecommunication networks should be organized to ensure the rapid and reliable collection of observational data to meet the WWW requirements as defined in 2.3 and 3.3, Part I, Volume I of this *Manual*. Arrangements to meet the requirements for meteorological information within the country will be the responsibility of the Member concerned.

2.1.2 Each Member shall designate a National Meteorological Centre (NMC), or other centres as appropriate, to perform the telecommunications functions indicated in 2.2 below.

2.1.3 The NMC is responsible for the meteorological checking of all the meteorological reports it collects before they are included in bulletins for dissemination.

2.2 Telecommunication functions of NMCs

2.2.1 The telecommunication functions of NMCs, the location and meteorological functions of which are a matter for decision by the Meteorological Services concerned, should be as defined in 2.3, Part I, Volume I of this *Manual*.

2.2.2 Subject to agreement of the Members concerned, NMCs may perform such additional functions as collection and relay of observational data from other NMCs and/or isolated stations (including island stations).

2.3 National collection of observational data

2.3.1 The choice of telecommunication facilities for the collection of information from stations located within a territory or country is a matter for decision by the Member concerned. The arrangements should comply with the provisions made in 3.3, Part I, Volume I of this *Manual*.

2.3.2 Meteorological reports from surface and upper-air synoptic stations should be filed immediately upon completion of the observation, including coding. Under normal conditions, the filing time should not exceed five minutes.

2.3.3 Members using the public telecommunication system for the collection of meteorological reports should:

- (a) Make periodic checks on the regularity and efficiency of the collection of meteorological reports from their synoptic stations;
- (b) Take full advantage of applicable operational provisions for the national and international telecommunication services;
- (c) Keep close liaison at all levels with the responsible telecommunication authorities (e.g. PTT) with a view to ensuring expeditious handling of meteorological traffic.

3. REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK

3.1 Principles

3.1.1 The regional meteorological telecommunication network should ensure rapid and reliable collection, exchange and distribution of meteorological information in such a way as to satisfy the needs of Members of WMO and in particular of Members of RA I. For this purpose, reliable and modern telecommunication facilities should be employed.

3.1.2 The regional meteorological telecommunication network for Region I (Africa) should conform with the WWW plan and therefore shall perform the functions defined in 3.2.3, Part I, Volume I of this *Manual*.

3.2 Designation of RTHs in Region I

The designated RTHs in Region I are:

- (a) RTHs on the Main Telecommunication Network: Algiers, Cairo, Dakar, Nairobi;
- (b) Other RTHs: Brazzaville, Lusaka, Niamey, Pretoria;
- (c) Supporting RTH: Casablanca.

3.3 Functions of RTHs

3.3.1 RTHs in Region I should be capable of performing the functions defined in 2.1, Part I, Volume I of this *Manual*.

3.3.2 In particular, each RTH in the Region should have the following duties:

- (a) Collection of observational data and processed information within its zone of responsibility;
- (b) Exchange on point-to-point circuits of meteorological information with WMCs, RSMCs and RTHs as agreed;
- (c) Selective distribution on point-to-point circuits and/or by radio broadcasts of meteorological information from its own zone of responsibility and retransmission of data received from WMCs, RSMCs, RAFCs or other RTHs to meet primarily the requirements of the NMCs within its zone of responsibility;
- (d) Checking and correcting in order to maintain standard telecommunication transmission procedures.

3.3.3 In particular, the supporting RTH in the Region should have the following duties:

- (a) Reception of observational data as required;
- (b) Dissemination of the output products of the RSMC Tunis/Casablanca (joint operation) in pictorial form;
- (c) Reception of output products from WMCs and other RSMCs as required.

3.4 Zones of responsibility of RTHs for the collection of observational data

The RTHs in the Region will have the following zones of responsibility for the collection of observational data from NMCs, centres with similar functions or island stations:

<i>Name of RTH</i>	<i>Zone of responsibility/associated NMCs</i>
Algiers	Algiers, Casablanca, Tripoli, Tunis, adjacent sea areas
Cairo	Cairo, Khartoum, Tripoli, adjacent sea areas
Dakar	Dakar, Abidjan, Bamako, Banjul, Bissau, Casablanca, Conakry, Freetown, Lagos, Monrovia, Nouakchott, Western Sahara, Ascension Island, Canary Islands, Madeira, Sal, St. Helena, adjacent ocean areas
Nairobi	Nairobi, Addis Ababa, Bujumbura, Dar-es-Salaam, Djibouti, Entebbe, Kigali, Mogadiscio and St. Denis, adjacent ocean areas
Brazzaville	Brazzaville, Douala, Bangui, Libreville, Malabo, Sao Tome, Kinshasa, adjacent ocean areas
Lusaka	Lusaka, Harare, Lilongwe
Niamey	Niamey, Accra, Cotonou, Lagos, Lome, Ndjamen, Ouagadougou
Pretoria	Pretoria, Harare, Maputo, Luanda, Gaborone, Lilongwe, Maseru, Manzini, Windhoek, St. Denis, and the following centres via St. Denis: Antananarivo, Moroni, Vacaos, Seychelles, New Amsterdam, Kerguelen, adjacent ocean areas

3.5 Configuration of the regional meteorological telecommunication network

3.5.1 The regional meteorological telecommunication network interconnecting the centres is composed of the types of circuit defined in 3.2.2, Part I, Volume I of this *Manual*.

3.5.2 To make use of the existing facilities, main regional circuits may be established through relay centres subject to an agreement between the Members responsible for the centres concerned and provided that the efficiency of the exchange is not impaired.

3.5.3 Each NMC should be connected with the associated RTH (see 3.4 above) by point-to-point circuits to transmit its collected observational data and to receive the required observational as well as processed information in alphanumeric, binary and pictorial form. NMCs may be connected to more than one RTH.

3.5.4 If the point-to-point circuits are not available, and until such circuits are established, the exchange of meteorological information between the NMCs and the associated RTH should be made by radio broadcasts. In this case:

- (a) The NMC should beam its territorial transmission to the associated RTH to ensure more reliable reception of its collected data at the associated RTH;
- (b) Each NMC should be equipped with at least one facsimile and two RTT receiving sets complete with directional antennae to be able to receive the required information primarily from the associated RTH (see 3.6 below).

3.5.5 The NMC may be connected to the associated RTH via another NMC, subject to the agreement of the Members concerned.

3.5.6 Figure 1 shows the regional meteorological telecommunication network for Region I (Africa).

3.6 Transmission programmes between RTHs and NMCs

3.6.1 The programmes transmitted by NMCs, or centres with similar functions, to the associated RTHs should be composed of the following data:

- (a) Surface synoptic reports for main and intermediate standard hours and all upper-air data, TEMP and PILOT, Parts A, B, C and D from all stations included in the regional basic synoptic network of the respective countries. Reports from additional stations may be included as agreed between Members concerned;
- (b) All weather reports received from ships and aircraft;
- (c) CLIMAT and CLIMAT TEMP once per month;
- (d) Priority messages, such as warnings of dangerous weather conditions;
- (e) BATHY and TESAC reports, as available;
- (f) Satellite data, as available;
- (g) Other types of information, as agreed.

3.6.2 The transmission of observational data to the associated RTH should start as soon as possible and in any case not later than 20 minutes after the observing station's filing time. Every effort should be made to complete this transmission within 35 minutes of the observing station's filing time to enable the RTHs/RSMCs to meet their obligations in implementing the WWW.

3.6.3 Each RTH is responsible for providing the NMCs within its zone of responsibility (see 3.4 above) with the observational and processed information required by the Member concerned on point-to-point circuits and/or by radio broadcasts. For this purpose, the transmission programmes of the RTH should be established jointly by the Members responsible for the RTH and associated NMCs, and included in WMO Publication No. 9, Volume C – Transmissions.

3.6.4 To meet the requirements of those Members not yet connected with the associated RTHs by point-to-point circuits, a maximum of five centres should establish and maintain a radio broadcast where transmission programmes are based on the following principles:

- (a) Each NMC should be able to receive the observational and processed information it needs from the associated RTH;
- (b) If this is not feasible, the NMC should be able to receive the information it needs from not more than two centres;
- (c) Each RTH/RSMC operating a radio broadcast should ensure reliable reception of its radio broadcast at least in its zone of responsibility for collection (see 3.4 above).

3.6.5 The supporting RTH is responsible for the distribution in pictorial form of output products of the RSMC it serves, to meet the requirements of the Members.

3.6.6 The RTH/RSMC operating radio broadcasts shall be jointly responsible for the broadcast of coded information from Region I and retransmission of selected data from other Regions, to meet the requirements of the Members.

3.7 Exchange and distribution of processed meteorological information in Region I

3.7.1 The regional telecommunication network should be capable of exchanging and distributing the processed information produced by WMCs and RSMCs and also by WAFS centres where the regional meteorological telecommunication network can accommodate the additional traffic, to meet the requirements of Members of RA I.

3.7.2 The exchange of processed information (including satellite data) between centres should be carried out on point-to-point circuits in alphanumeric or binary form (grid-point values) or in pictorial form.

3.8 Transmission programmes between RTHs

3.8.1 RTHs should exchange observational data and processed information from Region I and other Regions in order to meet the needs of the Members of the Region as well as the WWW. RTHs located on the main telecommunication network are responsible for the exchange of observational data and processed information with other RTHs in Region I, as indicated in Volume I, Part I, Attachment 1–3, in the table of paragraph 1.

3.8.2 Figure 2 and Table A show the exchange programmes of meteorological information of Region I on the loop Algiers–Dakar–Niamey–Nairobi–Cairo.

3.8.3 In the event of a breakdown of a main regional circuit, the alternative routing of the traffic through other main regional circuits and/or regional circuits shall be arranged between the RTHs concerned.

3.9 Collection and transmission time of observational data and processed information exchanged by RTHs

3.9.1 The transmission times for exchange of data for RTHs should be as follows:

- (a) The exchange and distribution of observational data within the Region should start as soon as possible but not later than 20 minutes after the observing station's filing time;
- (b) The transmission of observational data to the RTHs on the main telecommunication network in Region I should be completed not later than 45 minutes after the observing station's filing time.

3.9.2 The schedules for transmission of processed information in pictorial (facsimile) or digital form should be established in consultation between Members concerned, taking into account the requirements set forth in the WWW plan.

3.10 Regional facsimile plan

In addition to the point-to-point transmissions, the designated RTHs and RSMCs should establish and maintain radio-facsimile broadcasts as follows:

- (a) Cairo – Products of RSMC Cairo; products of WMCs, other RSMCs and WAFS centres as required;
- (b) Nairobi – Products of RSMC Nairobi; products of WMCs, other RSMCs and WAFS centres as required;
- (c) Dakar – Products of RSMC Dakar; products of WMCs, other RSMCs and WAFS centres as required;
- (d) Pretoria – Products of RSMC Pretoria; products of WMCs, other RSMCs and WAFS centres as required;
- (e) St Denis – Products of RSMC St Denis; products of WMCs, other RSMCs and WAFS centres as required.

3.11 Satellite-based communication systems

3.11.1 Data collection systems and associated data retransmission systems operated via METEOSAT geostationary meteorological satellites operated by EUMETSAT constitute an integral part of the RMTN for the collection of observations (see also 3.4, Part I, Volume I of this *Manual*).

3.11.2 The METEOSAT geostationary meteorological satellites operated by EUMETSAT provide a meteorological data distribution (MDD) service as part of the RMTN. RTHs Bracknell, Rome and Toulouse operate MDD uplink Earth stations and ensure the input of selected meteorological information, including selected data and products from RTHs and RSMCs in Region I.

4. INTERREGIONAL EXCHANGES

4.1 Exchanges of meteorological information between Regions I and II

Exchanges of meteorological information between Regions I and II are made through the circuit of the main telecommunication network and the interregional circuits.

4.2 Exchanges of meteorological information between Regions I and VI

Exchanges of meteorological information between Regions I and VI are made through the circuits of the main telecommunication network, the interregional circuits and the supplementary interregional circuits.

5. ARRANGEMENTS FOR THE EXCHANGE OF OBSERVATIONAL DATA

5.1 Ships' reports

5.1.1 Members should take appropriate action with the authorities responsible for the operation of designated coast stations with a view to ensuring that all ships' weather reports received at the coast stations are transmitted without delay to the NMC so that the transit time between the reception of the message from the ship at the coast station and the reception at the NMC does not exceed 15 minutes.

5.1.2 All ships' weather reports received at the NMCs should be sent as soon as possible to the appropriate RTHs.

5.1.3 Members responsible for the operation of RTHs and NMCs in Africa shall ensure that all ships' reports which they receive up to 24 hours after the time of observation are included in their respective transmissions and broadcasts.

5.1.4 Every possible effort should be made to bring to the attention of ships' masters the considerable value of weather reports from all ships in the ocean areas around Africa, no matter how brief, noting that if reports at the synoptic hours are not possible, they may be made at other times convenient to themselves.

5.1.5 To ensure and facilitate adequate contact with ships, Members operating coast stations not making a 24-hour watch shall take into consideration the watch hours of radio officers aboard ships when fixing watch hours for their coast stations.

5.1.6 Members operating coast stations shall take the necessary measures to ensure a prompt response from those stations to ships calling them and arrange to forward the received ships' reports to the relevant NMC without delay.

5.1.7 The RTHs should exchange and distribute without delay within Region I and on the interregional circuits all ships' weather reports received.

5.2 Aircraft reports

5.2.1 Each collecting centre designated by ICAO shall transmit the aircraft reports it receives to the NMC of the country in which the collecting centre is situated. The NMC transmits these aircraft reports to the appropriate regional collecting centre. The appropriate regional collecting centre is the RTH in Region I in whose zone of responsibility the NMC is located.

5.2.2 Aircraft reports received in the RTHs acting as regional AIREP collecting centres are disseminated at three-hourly intervals on the main regional and regional circuits and are also included in the RTH/AFMET broadcasts.

5.2.3 Members receiving at their respective centres (NMCs or RTHs) ASDAR aircraft reports should make appropriate arrangements to ensure that these reports will be exchanged over the GTS in accordance with established procedures.

5.2.4 Members making meteorological reconnaissance flights over the Region shall include the resulting observations as soon as possible in the appropriate point-to-point transmissions or broadcasts.

5.2.5 The NMCs should convert aircraft reports used for synoptic purposes into CODAR form prior to their transmission to the associated RTHs.

5.3 Ground weather radar observations

Ground weather radar observations should be exchanged by arrangements made between Members concerned and by their inclusion in national transmissions and, where there is a need, in transmissions and broadcasts made by RTHs.

5.4 Meteorological satellite data

5.4.1 Satellite data issued by WMCs/RSMCs or special satellite centres concerning Region I and extending to neighbouring Regions should be included by RTHs in Region I in their respective point-to-point transmissions and/or broadcasts.

5.4.2 Members operating RTHs in Region I should include messages containing orbital information (e.g. APT PREDICT) and other information on the operation of polar-orbiting and geostationary satellites in their respective transmissions and broadcasts.

5.5 Buoy data

5.5.1 Data from drifting and anchored buoys in the southern hemisphere should be distributed by the RTHs in Region I, as required.

5.5.2 Members operating drifting or anchored buoys should transmit these data to the associated RTH for further regional and global distribution, as required.

5.6 CLIMAT and CLIMAT TEMP reports

5.6.1 CLIMAT and CLIMAT TEMP reports should be transmitted as soon as possible after the end of the month and not later than the fifth day of the following month.

5.6.2 CLIMAT and CLIMAT TEMP reports should be included by NMCs and RTHs at the end of the transmission schedule at the main synoptic hours.

5.6.3 The RTHs Algiers, Cairo, Dakar and Nairobi shall ensure the regular transmission of CLIMAT and CLIMAT TEMP reports from Region I on the MTN.

5.6.4 A NIL report is transmitted whenever a CLIMAT or CLIMAT TEMP report is not available on the scheduled time.

5.6.5 The transmission schedules of CLIMAT and CLIMAT TEMP reports should be published in Volume C of WMO Publication No. 9.

6. METNO AND WIFMA MESSAGES

6.1 The RTHs Algiers, Cairo, Dakar and Nairobi should make arrangements to obtain advance notification of changes in Volumes A and C of WMO Publication No. 9 (METNO messages) and in Volume D of the same publication (WIFMA) of messages through their interregional circuits with Region VI. These messages should be disseminated to the RTH Kano by Cairo, to the RTH Lusaka by Nairobi and to the RTH Niamey by Dakar.

6.2 Members operating RTHs in Region I should include METNO and WIFMA messages in their respective transmissions and broadcasts.

7. MONITORING THE OPERATION OF THE GTS

7.1 Besides participating in the Plan for Monitoring the Operation of the WWW, as included in Attachment I-5 to Part I, Volume I of this *Manual*, each Member of RA I should carry out its own monitoring at its own meteorological telecommunication centre(s) regarding:

- (a) The availability and timely reception of observational data for regional and global exchange from observing stations in the zone or area of responsibility of each centre;
- (b) Adherence to WMO standard meteorological telecommunication procedures and contents of bulletins;
- (c) Quality of observational data.

7.2 Each Member of RA I responsible for the operation of an RTH should carry out periodic surveys on the availability of bulletins transmitted from its associated NMCs. The results of these surveys should be exchanged among the centres concerned and, when necessary, sent to the WMO Secretariat, in order to initiate remedial action for improving shortcomings revealed from the results.

7.3 Each Member of RA I responsible for the operation of an RTH should arrange, in consultation with the centres concerned, to use the international Q code in the text of addressed messages in order to overcome language difficulties between the centres concerned.

7.4 Members of RA I should monitor their meteorological broadcasts by intercepting the radio emission. Provision should also be made for an easy changeover of monitoring from one frequency to another.

7.5 Members of RA I should send once a week, on Wednesday, a consolidated reception report to those broadcast centres in Region I whose broadcasts are regularly intercepted, concerning the quality of reception of all scheduled broadcasts monitored during the preceding 24 hours.

7.6 Reception reports should be transmitted in the RECEP code which is given in Attachment II-10 to Part II, Volume I of this *Manual*.

7.7 Where a station is receiving poor traffic, it should send to the originating station as soon as possible a report of the reception quality in SINPO code. This SINPO report should be repeated every 24 hours until traffic improves.

7.8 The originator should arrange for the SINPO message to be sent to the addresses by meteorological, AFTN or PTT circuits.

7.9 In the case of persistent poor reception, a report giving details of the conditions experienced should be sent by post to the Meteorological Service concerned.

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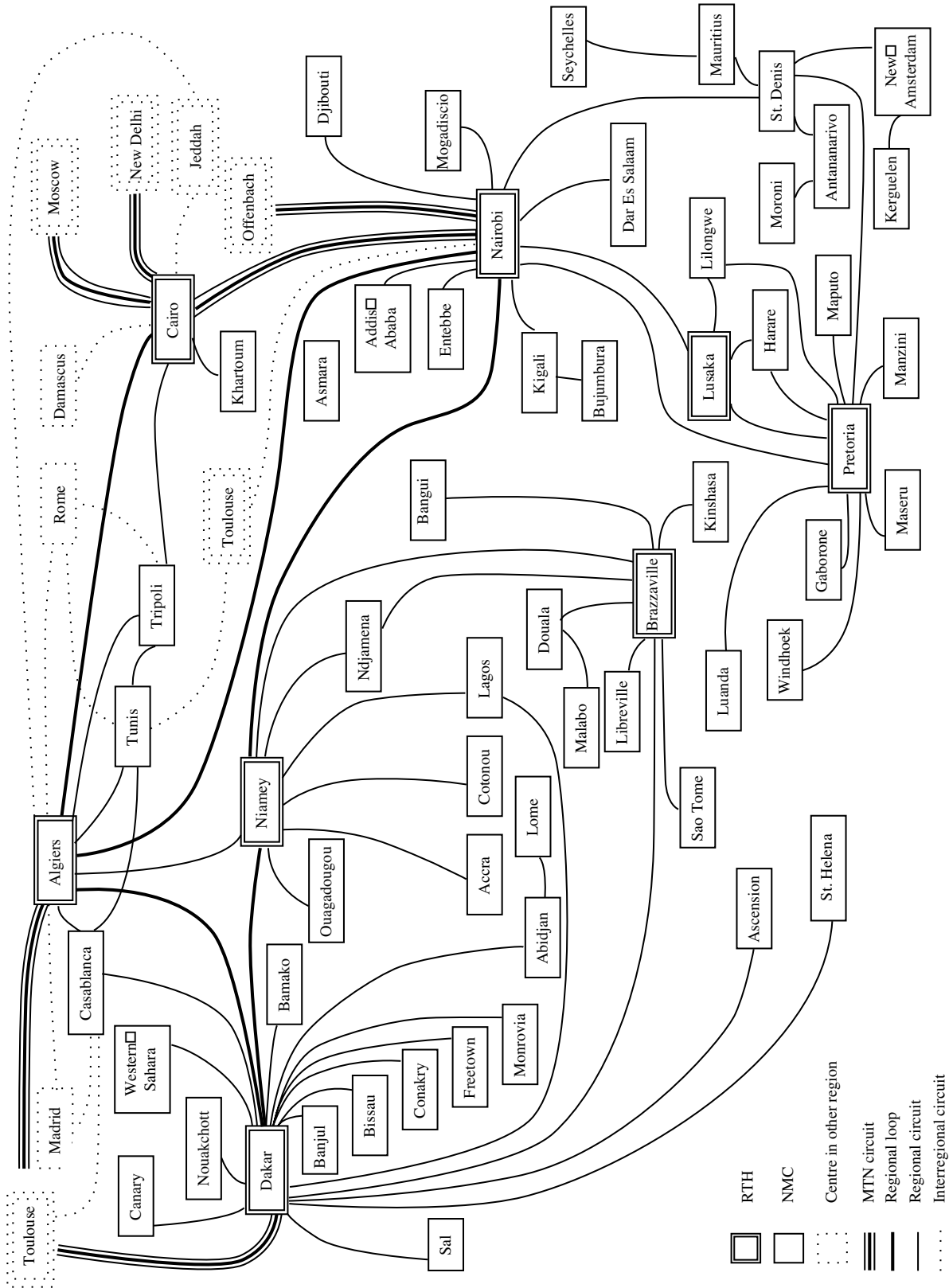


Figure 1 — Regional meteorological telecommunication network for Region I (Africa)

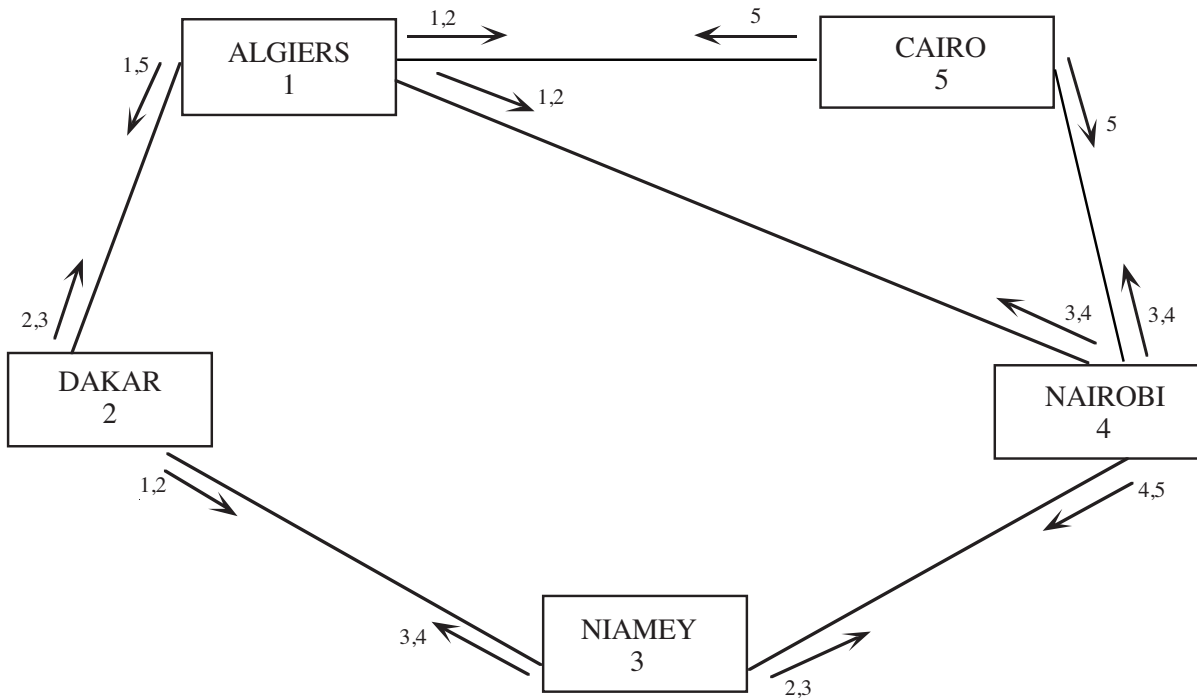


Figure 2 — Exchange programmes of meteorological information of Region I on the loop Algiers–Dakar–Niamey–Nairobi–Cairo (see Table A for the content of programmes 1 to 5)

NOTE 1: Programmes 1 to 5 are defined in Table A.

NOTE 2: On a circuit, according to the requirements, the exchange programme can be limited to a part of the programme.

NOTE 3: The RTHs located on the MTN (Algiers, Dakar and Nairobi) should receive the meteorological information routed on the MTN in accordance with Figure 1 of Attachment I-3 of Part I of Volume I. The information required at RTH Niamey should therefore be relayed by RTHs Dakar and Nairobi on circuits Dakar–Niamey and Nairobi–Niamey.

TABLE A

Content of the exchange programmes of meteorological information of Region I on the loop Algiers–Dakar–Niamey–Nairobi–Cairo

<i>Programmes</i>	<i>Observational data from the zone of responsibility of:</i>	<i>Selection of products from:</i>
Programme 1 (Algiers)	RTH Algiers	RSMCs Algiers, Casablanca/Tunis
Programme 2 (Dakar)	RTHs Dakar, Brazzaville	RSMC Dakar
Programme 3 (Niamey)	RTH Niamey	ACMAD
Programme 4 (Nairobi)	RTHs Nairobi, Lusaka, Pretoria	RSMCs Nairobi, Pretoria, St. Denis
Programme 5 (Cairo)	RTH Cairo	RSMC Cairo

P A R T I I

TELECOMMUNICATION PROCEDURES FOR REGION I (AFRICA)

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P A R T I I

TELECOMMUNICATION PROCEDURES FOR REGION I (AFRICA)

1. GENERAL

1.1 Compilation of bulletins

The NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this *Manual*). Separate bulletins should be compiled for the global and regional exchanges and, as agreed between the RTHs and NMCs concerned, for the exchange of data for national use or bilateral use. If this is done correctly by the responsible NMC, re-editing or compiling of new bulletins is neither necessary nor permitted.

1.2 Optimum length of message

The optimum length of message should be as defined in 2.7, Part II, Volume I of this *Manual*.

1.3 Exchange of regional observational data

1.3.1 In order to facilitate the rapid exchange of regional observational data, the NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this *Manual*).

1.3.2 Telecommunication centres (RTHs, RSMCs and NMCs) which are not at present capable of separating the regional sections of the report from the global section should compile bulletins for international exchange containing reports in which the global and regional sections of the code for surface observations (FM 12-IX Ext. and FM 13-IX Ext.) are included.

1.3.3 The further relay of global data messages by the RTHs concerned should be given high priority.

1.4 Transmission of upper-air reports in Region I

The transmission to the extent permitted by the available circuits of Parts A, B, C and D of upper-air reports (TEMP, TEMP SHIP, PILOT, PILOT SHIP, etc.) over the regional meteorological telecommunication network of Region I and in the RTH/AFMET broadcasts of Region I is mandatory. Parts A, B, C and D of these reports shall be transmitted separately.

2. MESSAGE FORMAT FOR ROUTINE TRANSMISSION OF ALPHANUMERIC DATA

The transmission sequence number nnn in the starting line shall be cyclic, 000 to 999 inclusive, regardless of time.

3. ACKNOWLEDGEMENT OF ADDRESSED ADMINISTRATIVE MESSAGES

When an addressed administrative message is received, the addressed centre should send an addressed message to the originating centre, containing the following text:

QSL YYGGgg

where YYGGgg is the date-time group from the message received. The data designator $T_1T_2 = AB$ may be used in the abbreviated heading of this message.

4. DATA COMMUNICATION PROTOCOLS

Data communication protocols to be used on the RMTN should be elements of procedures as specified in CCITT Recommendations X.25 and X.224, which are indicated in 2.12.3, Part II, Volume I of this *Manual*.

5. RE-ROUTEING PROCEDURES FOR THE REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK FOR REGION I

5.1 The re-routeing procedures in cases of outages of centres and circuits to be applied in the regional meteorological telecommunication network for Region I should, as far as possible, comply with the provisions included in Attachment II-11, Part II, Volume I of this *Manual* and in the annex to this section.

5.2 Service messages concerning important operational matters (including outages of centres and circuits) should be exchanged between centres concerned. When no GTS circuit is available for the transmission of such service messages, they can be routed on the AFTN (in this case, service messages shall conform to the format prescribed by ICAO).

6. REQUESTS FOR REPETITION

Requests for the repetition of meteorological messages and analogue facsimile transmission should be transmitted as soon as possible, as indicated in 2.5, Part II, Volume I of this *Manual*.

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ANNEX

**ROUTEING OF TRAFFIC IN CASE OF BREAKDOWN
OF A MAIN REGIONAL CIRCUIT IN REGION I**

<i>Interrupted main regional circuit</i>	<i>Re-routeing of traffic</i>	
	<i>Programmes</i>	<i>Main regional circuit</i>
Algiers—Cairo Cairo—Algiers	V + VI + VIII I + II + selection from RA II and RA VI	Kano—Cairo Kano—Algiers
Cairo—Nairobi Nairobi—Cairo	I + VI + selection from RA II and RA III II + III	Kano—Nairobi Kano—Cairo
Nairobi—Kano Kano—Nairobi	II + selection from RA III IV + V + VIII	Cairo—Kano Brazzaville—Nairobi
Cairo—Kano Kano—Cairo	I + selection from RA II and RA VI Selection from RA III IV + VII	Algiers—Kano Nairobi—Kano Nairobi—Cairo
Nairobi—Lusaka Lusaka—Nairobi	I + II + VIII + selection from RA II, RA III and RA V III	Brazzaville—Lusaka Brazzaville—Nairobi
Nairobi—Brazzaville Brazzaville—Nairobi	I + II VII	Lusaka—Brazzaville Lusaka—Nairobi
Lusaka—Brazzaville Brazzaville—Lusaka	III IV + V + VI + VII	Nairobi—Brazzaville Nairobi—Lusaka
Brazzaville—Kano Kano—Brazzaville	III + VII IV + VI	Nairobi—Kano Dakar—Brazzaville
Brazzaville—Dakar Dakar—Brazzaville	III + VII V + VIII + selection from RA VI	Kano—Dakar Kano—Brazzaville
Kano—Dakar Dakar—Kano	II + IV Selection from RA III V	Algiers—Dakar Cairo—Algiers—Dakar Algiers—Kano
Kano—Algiers Algiers—Kano	III + IV VI	Dakar—Algiers Dakar—Kano
Dakar—Algiers Algiers—Dakar	V + VII I + VI + selection from RA VI	Kano—Algiers Kano—Dakar
Dakar—Casablanca	III + IV + V + VII + VIII	Algiers—Casablanca
Algiers—Casablanca	I + II + VI	Dakar—Casablanca
Niamey—Algiers Algiers—Niamey	VIII VI	Dakar—Algiers Dakar—Niamey
Niamey—Kano Kano—Niamey	VIII I + II + IV	Dakar—Kano Dakar—Niamey
Niamey—Dakar Dakar—Niamey	VIII III + V + VII	Kano—Dakar Kano—Niamey

PART III

ENGINEERING OF CENTRES AND CIRCUITS IN REGION I (AFRICA)

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PART III

ENGINEERING OF CENTRES AND CIRCUITS IN REGION I (AFRICA)

1. ENGINEERING OF CENTRES

1.1 Engineering of RTHs in Region I

The RTHs in Region I shall be engineered so as to be capable of performing the functions laid down in 2.1, Part I, Volume I of this *Manual* and in 3.3, Part I of this section (Region I).

1.2 Engineering of NMCs in Region I

The NMCs in Region I shall be engineered so as to be capable of performing the functions laid down in 2.3, Part I, Volume I of this *Manual* and in 2.2 and 2.3, Part I of this section (Region I).

2. TECHNICAL SPECIFICATIONS OF MAIN REGIONAL AND REGIONAL CIRCUITS IN REGION I

2.1 The main regional and regional circuits shall in general be engineered by making use of cable, satellite or microwave facilities.

2.2 For data transmission at data-signalling rates of 2 400, 4 800 and 9 600 bit/s on telephone-type dedicated circuits, preference should be given to using modems in accordance with CCITT Recommendation V.29 including multiplexing. When using V.29 modem type, independent channels provided by multiplexing techniques should be used for the transmission of data and facsimile. Further guidance for the application of multiplexing techniques provided by modems conforming to CCITT Recommendation V.29 is given in the annex.

3. ENGINEERING PRINCIPLES OF HF RADIO CIRCUITS

3.1 Introductory note

In addition to the guiding principles for the engineering of centres and circuits given in 1 and 2 above and the technical characteristics and specifications contained in Part III, Volume I of this *Manual*, the material given below is intended to provide further information and guidance relating to the maintenance of radio point-to-point telegraph circuits and radio broadcasts in Region I in accordance with good engineering practice.

3.2 General engineering principles of HF radio circuits

3.2.1 *Signal-to-noise ratio*

The signal-to-noise ratio should not be less than that recommended by CCIR for the mode of operation. The factors contributing to a satisfactory signal-to-noise ratio are:

- (a) Choice of frequency;
- (b) Selection of receiving site;
- (c) Types of antennae;
- (d) Adequate transmitted power.

3.2.2 *Frequencies*

Transmitter and receiver facilities should be provided with radio frequencies necessitated by diurnal and seasonal variations as well as solar activity.

3.2.3 *Siting*

The receiving stations should be located in an area relatively free from local radio and electrical interference so that a signal of reasonable field strength will provide the desired signal-to-noise ratio.

3.2.4 *Antennae*

Efficient directional antennae for the frequency bands concerned should be employed at both transmitting and receiving stations.

3.2.5 *Transmitted power*

The power output of a transmitter should be adequate to the circuit for which it is used. The power should be calculated by the methods given in standard publications, taking into consideration the following:

- (a) The location of the transmitter and the distance from the receiving station;
- (b) The noise level at the receiving site;
- (c) The type of transmission and system of reception used;
- (d) The gain of the transmitting and receiving antennae;
- (e) The time of transmission;
- (f) The allowances to be made for the fading of the received signal;
- (g) The frequency used.

3.2.6 *Diversity systems*

To improve the average signal strength and to minimize the effects of fading, diversity systems should be employed. Of the various systems, space diversity offers the greatest advantages and should be employed wherever possible. If space is limited, however, polarized diversity should be employed.

3.3 **Engineering of HF radio circuits and broadcasts**

In order to ensure reliable and efficient communication on HF radio circuits connecting RTH/AFMET centres and reliable reception of RTH/AFMET broadcasts, the CCIR specifications should be applied. The following guidelines were established in order to help the Members of the Regional Association for Africa to plan the installations.

3.3.1 *Main regional circuits*

3.3.1.1 *Transmission*

- (a) Mode of operation ISB. On one side-band, low-speed or medium-speed data channels, and on the other side-band one or two facsimile channels. For the establishment of VFT equipment, two-tone keying should be used;
- (b) Transmitter output power adequate to provide the proper signal-to-noise ratio at the receiving site according to the CCIR recommendation. An average example is about 10 kW PEP;
- (c) Modulation rate 50 bauds (an alternative higher modulation rate may be used as agreed bilaterally);
- (d) Directional antenna system (e.g. rhombic, log periodic or dipole arrays).

3.3.1.2 *Reception*

Receivers for ISB operation with the necessary VFT equipment (channelling to be agreed bilaterally).

3.3.1.3 *Error detection and correction systems*

Error detection and correction systems should be employed, as stipulated in 2.2 of Part III, Volume I of this *Manual*.

3.3.2 *Regional circuits*

The technical specifications for the main regional circuits should be applied, as far as practicable, to the regional circuits.

3.3.3 *Interregional and supplementary interregional circuits*

The technical specifications for the main regional circuits should be applied, as far as practicable, to the interregional and supplementary interregional circuits.

3.3.4 *RTH/AFMET broadcasts*

3.3.4.1 *Transmission*

- (a) Employing at least two radio frequencies simultaneously;
- (b) Transmitter output power adequate to provide the proper signal-to-noise ratio at the receiving centres in the area in which the broadcast is intended to be intercepted. An average example is about 10 kW PEP;
- (c) Mode of operation F_1 for telegraphy and F_4 for facsimile according to WMO standards;
- (d) Modulation rate 50 bauds (alternative higher modulation rate 75 bauds subject to agreement by all Members concerned);
- (e) Signal distortion of outgoing signals less than 10 per cent.

3.3.4.2 *Reception*

Receivers for F_1 and F_4 mode of operation; diversity systems should preferably be used for F_1 reception.

3.3.5 *Multiplexing of point-to-point channels on the same radio circuits*

The standards employed should conform with the CCIR specifications and be subject to an agreement between the two terminals concerned.

3.3.6 *Purchase of new equipment*

It should be noted that when new equipment has to be purchased for the recommended scheme, such equipment should be capable of being easily adapted to ISB operation.

3.4 *Engineering of radio transmission and reception facilities at NMCs*

The following minimum telecommunication equipment should be available at an NMC having one HF point-to-point radio circuit to its associated RTH. This list does not include standby equipment.

(a) *Transmitting station*

One directional transmitting antenna system for the frequency bands concerned;
One transmitter with minimum power of 3–5 kW PEP (see 3.3.4 above).

(b) *Receiving station*

One diversity directional receiving antenna system for the frequency bands concerned;
Two receivers for diversity operation (see 3.3.4 above);
One VFT equipment, equipped for the number of channels to be received;
One FM/AM converter.

(c) *Terminal equipment*

One receive teleprinter with reperforator attachment on the receive line;
One send teleprinter with auto-transmitter attachment on the send line;
One send/receive teleprinter with reperforator and auto-transmitter attachments, as standby;
One perforator with back-spacing facilities;
One facsimile recorder.

ANNEX

APPLICATION OF MULTIPLEXING TECHNIQUES IN ACCORDANCE WITH MODEMS CONFORMING TO CCITT RECOMMENDATION V.29

1. GENERAL

- (a) Dedicated circuits should be terminated at both ends with the same modem, in accordance with CCITT Recommendation V.29;
- (b) A telephone-type circuit refers to a cable, landline, UHF or satellite link with a bandwidth of 300 Hz to 3400 Hz;
- (c) The modem conforming to CCITT Recommendation V.29 is intended to be used primarily on special quality leased circuits, e.g. Recommendations M.1020 or M.1025 circuits, but this does not preclude the use of this modem over circuits of lower quality;
- (d) All channels provided by multiplexing have an interface according to CCITT Recommendations V.24 and V.28.

2. POSSIBLE ARRANGEMENTS FOR CHANNELLING

- (a) A telephone-type circuit with a data-signalling rate of 9 600 bit/s;
- (b) A telephone-type circuit with a data-signalling rate of 9 600 bit/s subdivided into $2 \times 4\,800$ bit/s channels;
- (c) A telephone-type circuit with a data-signalling rate of 9 600 bit/s subdivided into $4 \times 2\,400$ bit/s channels;
- (d) A telephone-type circuit with a data-signalling rate of 9 600 bit/s subdivided into $1 \times 4\,800$ and $2 \times 2\,400$ bit/s channels;
- (e) In addition to the above specified channelling, one or two low speed channels can be provided in some models of modems. Since these channels are not specified in CCITT Recommendation V.29, their operation is subject to agreement between adjacent centres.

3. USE OF MULTIPLEXED CHANNELS

- (a) All channels can be used for data transmission;
- (b) All channels can be used for coded or non-coded digital facsimile transmission. A data-signalling rate of 4 800 bit/s is recommended for non-coded digital facsimile with drum speed of 120 rpm;
- (c) All channels with a minimum data-signalling rate of 2 400 bit/s can be used for asynchronous data transmission with a speed ranging from 50 to 600 bit/s (distortion of a 2 400 bit/s channel used for asynchronous transmission with 600 bit/s equals 25 per cent).

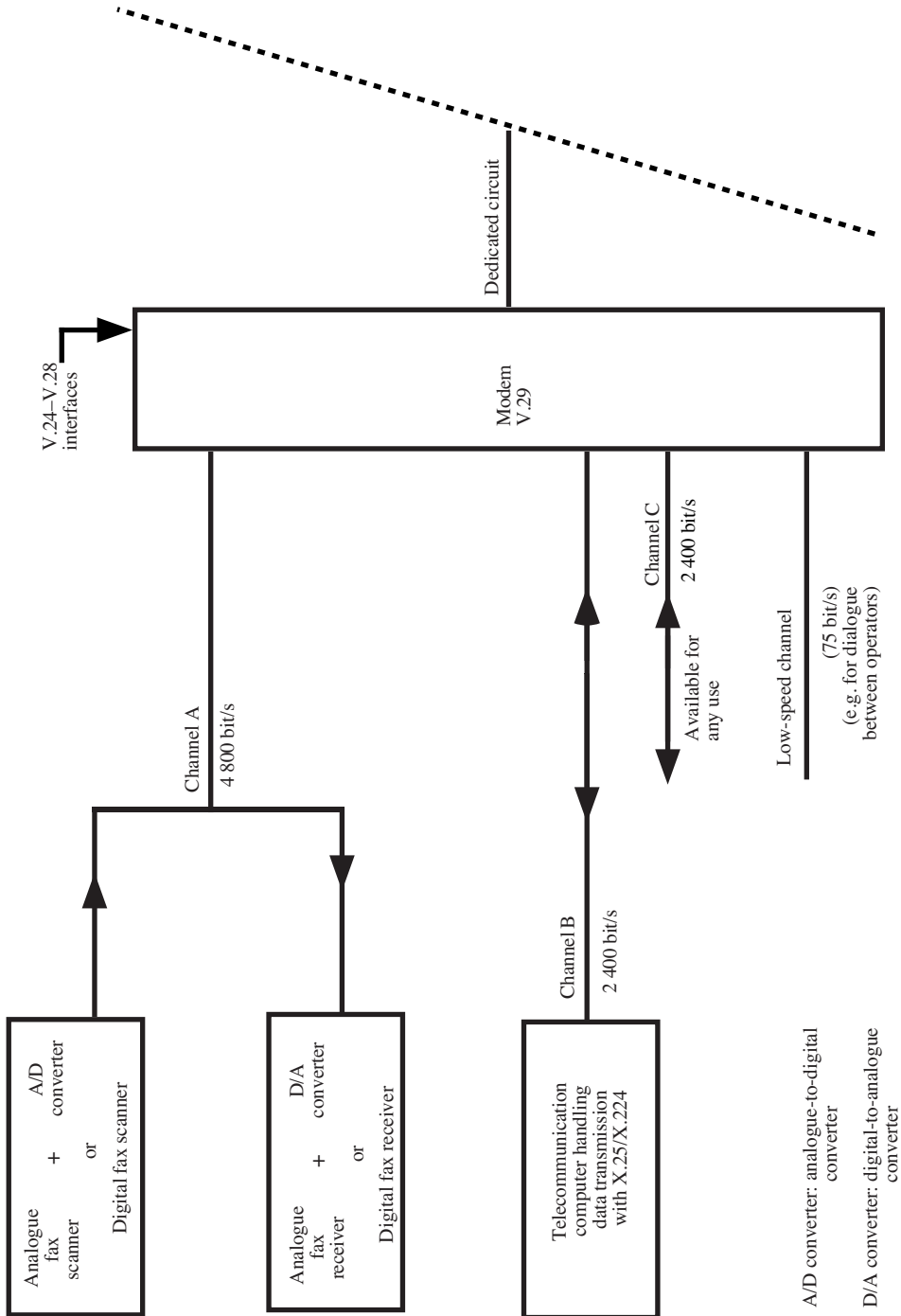
NOTE: An example of the use of multiplexed channels is given in the appendix to this annex.

4. OPERATIONAL CONDITIONS

- (a) The conventional type of analogue facsimile scanners and recorders can be used for non-coded digital facsimile transmissions with the addition of low-cost analogue-to-digital or digital-to-analogue converters;
- (b) The automatic line equalizers incorporated into the modems according to CCITT Recommendation V.29 are suitable to cope with marginal circuit conditions of links according to CCITT Recommendation M.1020;
- (c) Data transmission carried out with an EDC procedure requiring a separate backward channel (WMO software and hardware EDC procedures as specified in Part II, Volume I of this *Manual*) will occupy two channels provided by multiplexing or one channel provided by multiplexing and another one of the channels described in 2(e) above.

APPENDIX TO ANNEX

EXAMPLE OF USE OF MULTIPLEXED CHANNELS



REGION II

ASIA

**REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN
FOR REGION II (ASIA)
FOR THE WORLD WEATHER WATCH (WWW)**

PART I

**ORGANIZATION OF THE REGIONAL METEOROLOGICAL
TELECOMMUNICATION PLAN FOR REGION II (ASIA)
FOR THE WORLD WEATHER WATCH (WWW)**

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PART I

ORGANIZATION OF THE REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN FOR REGION II (ASIA) FOR THE WORLD WEATHER WATCH (WWW)

1. GENERAL

The growing needs of countries in Region II for rapid and reliable reception of a large number of various types of meteorological information from all over Asia, adjacent ocean areas and other Regions call for the establishment of a telecommunication network in the Region that will satisfy these requirements. This network will have to be linked to and coordinated with the WWW Global Telecommunication System (GTS). Therefore, the telecommunication network in the Region will have to cope with the WWW requirements and comply with the organizational and engineering principles adopted for the GTS.

2. NATIONAL METEOROLOGICAL TELECOMMUNICATION NETWORKS

2.1 Principles

2.1.1 The national meteorological telecommunication networks should be organized to ensure the rapid and reliable collection of observational data to meet the WWW requirements as defined in 2.3 and 3.3, Part I, Volume I of this *Manual*. Arrangements to meet the requirements for meteorological information within the country will be the responsibility of the Member concerned.

2.1.2 Each Member shall designate a National Meteorological Centre (NMC), or other centres as appropriate, to perform the telecommunication functions indicated in 2.2 below.

2.1.3 Each NMC is responsible for the meteorological checking of all the meteorological reports it collects before they are included in bulletins for dissemination.

2.2 Telecommunication functions of NMCs

2.2.1 The telecommunication functions of NMCs, the location and meteorological functions of which are a matter for decision by the Meteorological Services concerned, should be as defined in 2.3, Part I, Volume I of this *Manual*.

2.2.2 Subject to agreement of the Members concerned, NMCs may perform such additional functions as collection and relay of observational data from other NMCs and/or isolated stations (including island stations).

2.3 National collection of observational data

2.3.1 The choice of telecommunication facilities for the collection of information from stations located within a territory or country is a matter for decision by the Member concerned. The arrangements should comply with the provisions made in 3.3, Part I, Volume I of this *Manual*.

2.3.2 Meteorological reports from surface and upper-air synoptic stations should be filed immediately upon completion of the observation, including coding. Under normal conditions, the filing time should not exceed five minutes.

2.3.3 Members using the public telecommunication system for the collection of observational reports should:

- (a) Make periodic checks on the regularity and efficiency of the collection of meteorological reports from their synoptic stations;
- (b) Take full advantage of the CCITT operational provisions which accord priorities to the transmission of meteorological messages for the international public telegram service;
- (c) Keep close liaison at all levels with the responsible telephone and telegraph authorities (e.g. PTT) with a view to ensuring expeditious handling of meteorological traffic.

3. REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK

3.1 Principles

3.1.1 The regional meteorological telecommunication network should ensure rapid and reliable collection, exchange and distribution of meteorological information in such a way as to satisfy, as far as possible, the needs of Members of WMO and in particular of Members of RA II. For this purpose, available, reliable and modern telecommunication facilities should be employed.

3.1.2 The regional meteorological telecommunication network for Region II should conform with the WWW plan and therefore shall perform the functions defined in 3.2.3, Part I, Volume I of this *Manual*.

3.2 Designation of RTHs in Region II

The designated RTHs in Region II are:

- (a) RTHs with receiving and transmitting capabilities on the main telecommunication network: Beijing, Jeddah, New Delhi, Tokyo;
- (b) Other RTHs: Bangkok, Khabarovsk, Novosibirsk, Tashkent, Tehran.

3.3 Functions of RTHs

3.3.1 RTHs in Region II should be capable of performing the functions defined in 2.1, Part I, Volume I of this *Manual*.

3.3.2 In particular, each RTH in the Region should have the following duties:

- (a) Collection of observational and processed data within its zone of responsibility;
- (b) Exchange on point-to-point circuits of meteorological information with WMCs, RSMCs and RTHs as agreed;
- (c) Selective distribution on point-to-point circuits and/or radio broadcasts of the meteorological information from its own zone of responsibility and retransmission of data received from WMCs, RSMCs or other RTHs to meet, in the first instance, the requirements of the NMCs within its zone of responsibility;
- (d) Checking and correcting in order to maintain standard transmission procedures.

3.4 Zones of responsibility of RTHs for the collection of observational data

The RTHs in the Region will have the following zones of responsibility for collection of observational data:

<i>Name of RTH</i>	<i>Zone of responsibility</i>
Bangkok	Cambodia, Lao People's Democratic Republic, Myanmar, Thailand, Viet Nam (Socialist Republic of), adjacent sea and ocean areas
Beijing	China, Democratic People's Republic of Korea, Viet Nam (Socialist Republic of), adjacent sea and ocean areas
Jeddah	Bahrain, Kuwait, Oman, Qatar, Republic of Yemen, Saudi Arabia, other Arabian territories, adjacent sea and ocean areas
Khabarovsk	Democratic People's Republic of Korea, Russian Federation, adjacent sea and ocean areas
New Delhi	Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal, Pakistan, Sri Lanka, adjacent sea and ocean areas
Novosibirsk	Mongolia, Russian Federation
Tashkent	Afghanistan, Kazakstan, Kyrgyz Republic, Mongolia, Russian Federation, Tajikistan, Turkmenistan and Uzbekistan
Tehran	Iran (Islamic Republic of), Iraq, Pakistan, Republic of Yemen, other Arabian territories, adjacent sea and ocean areas
Tokyo	Hong Kong, Japan, Macao, Republic of Korea, adjacent sea and the Pacific Ocean areas

3.5 Configuration of the regional meteorological telecommunication network

3.5.1 The regional meteorological telecommunication network interconnecting the centres is composed of the types of circuit defined in 3.2.2, Part I, Volume I of this *Manual*.

3.5.2 To make use of the existing facilities, main regional circuits may be established through relay centres subject to agreement between the Members responsible for the centres concerned and provided that the efficiency of the exchange is not impaired.

3.5.3 Each NMC should be connected with the associated RTHs (see 3.4 above) by point-to-point circuits to transmit its collected observational data and to receive required observational data as well as processed information in both alphanumeric, binary and pictorial form; NMCs may be connected to more than one RTH.

3.5.4 If the point-to-point links are not available, and until such links are established, the exchange of meteorological information between the NMCs and the associated RTH should be made by radio broadcasts. In this case:

- (a) The NMC should beam its territorial transmission to the associated RTH to ensure more reliable reception of its collected data at the associated RTH;
- (b) Each NMC should be equipped with at least one facsimile and two RTT receiving sets complete with directional antennae to be able to receive the required information initially from the associated RTH (see 3.6 below).

3.5.5 The NMC may be connected to the associated RTH via another NMC, subject to the agreement of the Members concerned.

3.5.6 The configuration of the target regional meteorological telecommunication network in Region II should be as shown in Figure 1.

3.6 Transmission programmes between RTHs and NMCs

3.6.1 The programmes transmitted by NMCs, or centres with similar functions, to the associated RTHs should comprise the following data:

- (a) Surface synoptic reports for main and intermediate standard hours and all upper-air data, TEMP and PILOT, Parts A, B, C and D, from all stations included in the regional basic synoptic network of the relevant country;
- (b) All weather reports received from ships and aircraft;
- (c) Priority messages, such as warnings of dangerous weather conditions;
- (d) CLIMAT and CLIMAT TEMP once per month;
- (e) Satellite data as available;
- (f) BATHY and TESAC reports as available;
- (g) Other types of information as agreed.

3.6.2 The transmission of observational data to the associated RTH should start as soon as possible and in any case not later than 20 minutes after the observing station's filing time. Every effort should be made to complete this transmission within 35 minutes of the observing station's filing time to enable the RTHs/RSMCs to meet their obligations in implementing the WWW.

3.6.3 Each RTH is responsible for providing the NMCs within its zone of responsibility (see 3.4 above) with the observational and processed data required by the Members concerned on point-to-point circuits and/or radio broadcasts. For this purpose, the transmission programmes of the RTH should be established jointly by the Member responsible for the RTH and the associated NMCs, and included in WMO Publication No. 9, Volume C—Transmissions.

3.6.4 To meet the requirements of those Members not yet connected with the associated RTHs by point-to-point circuits, each RTH should establish and maintain a radio broadcast where transmission programmes are based on the following principles:

- (a) An NMC should be able to receive the observational data and processed information it needs from the associated RTH;
- (b) If this is not feasible, the NMC should be able to receive the data it needs from not more than two RTHs;
- (c) Each RTH should ensure reliable reception of its radio broadcasts at least in its zone of responsibility for collection (see 3.4 above).

3.6.5 The nine RTHs shall be jointly responsible for the broadcast of all coded information from Region II and retransmission of selected data from other Regions, to meet the requirements of the Members.

3.6.6 Table A gives in general terms the contents of transmission programmes of the RTHs in Region II by regional RTT broadcasts.

3.7 Exchange and distribution of processed meteorological information in Region II

3.7.1 The regional telecommunication network should be capable of exchanging and distributing the processed information produced by WMCs and RSMCs to meet the requirements of Members of RA II and, where the regional meteorological telecommunication network can accommodate the additional traffic by using spare capacity, WAFS products as required.

3.7.2 The exchange of processed information (including satellite data) between centres should be carried out on point-to-point circuits in alphanumeric or binary form (grid-point values) or in pictorial form.

3.8 Transmission programmes between RTHs

3.8.1 RTHs should exchange observational data and processed information from Region II and other Regions in order to meet the needs of the Members of the Region as well as the WWW. RTHs located on the main telecommunication network are responsible for the exchange of observational data and processed information with other RTHs in Region II, as indicated in Volume I, Part I, Attachment 1–3, in the table in paragraph 1.

3.8.2 Figures 2 and 3 show the basic exchange programmes of observational data and processed information from RA II on circuits linking RTHs in RA II, respectively. Figure 4 shows the actual exchange programmes of observational data.

3.8.3 In the event of a breakdown of one of the circuits used for the exchange of data between RTHs in Region II, alternative routing of the traffic through other circuits should be arranged between RTHs concerned, as indicated in Table B.

3.9 Collection and transmission time of observational data and processed information exchanged by RTHs

3.9.1 The transmission times for the exchange of data for RTHs should be as follows:

- (a) The exchange and distribution of observational data within the Region should start as soon as possible, but not later than 20 minutes after the observing station's filing time;
- (b) The transmission of observational data to the RTHs on the main telecommunication network in Region II should be completed not later than 45 minutes after the observing station's filing time.

3.9.2 The schedules for transmission of processed information in pictorial (facsimile) or digital form should be established by consultation between Members concerned, taking into account the requirements set forth in the WWW plan.

3.10 Regional facsimile plan

In addition to the point-to-point transmissions, the following designated RTHs and RSMCs should establish and maintain radio-facsimile broadcasts for dissemination of products of WMCs, RSMCs and WAFS as required: Bangkok, Beijing, Jeddah, Khabarovsk, New Delhi, Novosibirsk, Tashkent, Tehran, Tokyo.

3.11 Satellite-based communication systems

The satellite-based communication system (VSAT) operated by China is an element of the regional meteorological network for the exchange and distribution of meteorological information within the area of coverage of the AsiaSat II satellite (Ku band).

4. INTERREGIONAL EXCHANGES

Exchanges of meteorological information should be made through the main telecommunication network and interregional circuits as follows:

between RA II and RA I:

Jeddah–Cairo,
New Delhi–Cairo,
Jeddah–Algiers.

between RA II and RA IV:

Tokyo–Washington.

between RA II and RA V:

Bangkok–Kuala Lumpur,
New Delhi–Melbourne,
Tokyo–Melbourne,
Tokyo–Manila,
Tokyo–Honolulu.

between RA II and RA VI:

Beijing–Moscow,
Beijing–Offenbach,
Hanoi–Moscow,
Jeddah–Offenbach,
New Delhi–Moscow,
Khabarovsk–Moscow,
Novosibirsk–Moscow,
Tashkent–Moscow,
Tehran–Moscow.

5. ARRANGEMENTS FOR THE EXCHANGE OF OBSERVATIONAL DATA

5.1 Ships' reports

5.1.1 Members should take appropriate action with the authorities responsible for the operation of designated coast stations with a view to ensuring that all ships' weather reports received at the coast stations are transmitted without delay to the NMC so that the transit time between the reception of the message from the ship at the coast station and the reception at the NMC does not exceed 15 minutes.

5.1.2 All ships' weather reports received at the NMCs should be sent as soon as possible to the appropriate RTHs.

5.1.3 Members responsible for the operation of RTHs and NMCs in Asia shall ensure that all ships' reports which they receive up to 24 hours after the time of observation are included in their respective transmissions and broadcasts.

5.1.4 Every possible effort should be made to bring to the attention of ships' masters the considerable value of weather reports from all ships in the ocean areas around Asia, no matter how brief, noting that, if reports at the synoptic hours are not possible, they may be made at other times convenient to themselves.

5.1.5 To ensure and facilitate adequate contact with ships, Members operating coast stations not making a 24-hour watch shall take into consideration the watch hours of radio officers aboard ships when fixing watch hours for their coast stations.

5.1.6 Members operating coast stations shall take the necessary measures to ensure the prompt response of those stations to ships calling them and arrange to forward the received ships' reports to the relevant NMC without delay.

5.1.7 The RTHs should exchange and distribute without delay within Region II and on the interregional circuits all ships' weather reports received.

5.2 Aircraft reports

5.2.1 Each collecting centre, designated by ICAO, transmits aircraft reports to the NMC of the country in which the collecting centre is situated. The NMC transmits these aircraft reports to the appropriate regional collecting centre. The appropriate regional collecting centre is the RTH in Region II in whose zone of responsibility the NMC is located.

5.2.2 All aircraft reports received in the RTHs acting as regional AIREP collecting centres are disseminated at intervals not greater than three hours on the main regional, regional, supplementary regional and interregional circuits and also included in the RTH broadcasts.

5.2.3 Members receiving at their respective centres (NMCs or RTHs) ASDAR aircraft reports from satellite operating agencies should make appropriate arrangements to ensure that these reports will be exchanged over the GTS in accordance with established procedures.

5.2.4 Members making meteorological reconnaissance flights over the Region should include the resulting observations as soon as possible in the appropriate point-to-point transmissions or broadcasts.

5.2.5 The NMCs should, if possible, convert aircraft reports used for synoptic purposes into AIREP form prior to their transmission to the associated RTHs.

5.3 Ground weather radar observations

Ground weather radar observations should be exchanged by arrangements made between Members concerned and by their inclusion in national transmissions and, where there is a need, in transmissions and broadcasts made by RTHs.

5.4 Meteorological satellite data

5.4.1 Satellite data issued by WMCs/RSMCs or special satellite centres concerning Region II and extending to neighbouring Regions should be included by RTHs in Region II in their respective point-to-point transmissions and/or broadcasts.

5.4.2 Members operating RTHs in Region II should include messages containing orbital information (e.g. APT PREDICT) and other information on the operation of polar-orbiting and geostationary satellites, as available, in their respective transmissions and broadcasts.

5.5 Buoy data

5.5.1 Data from drifting and anchored buoys should be distributed by the RTHs in Region II, as required.

5.5.2 Members operating drifting or anchored buoys or receiving buoy data should transmit these data to the associated RTH for further regional and global distribution, as required.

5.6 CLIMAT and CLIMAT TEMP reports

5.6.1 CLIMAT and CLIMAT TEMP reports should be transmitted as soon as possible after the end of the month and not later than the fifth day of the following month.

5.6.2 CLIMAT and CLIMAT TEMP reports should be included by NMCs and RTHs at the end of the transmission schedule at the main synoptic hours.

5.6.3 The RTHs Beijing, Jeddah, New Delhi and Tokyo shall ensure the regular transmission of CLIMAT and CLIMAT TEMP reports on the MTN.

5.6.4 A NIL report is transmitted whenever a CLIMAT or CLIMAT TEMP report is not available at the scheduled time.

5.6.5 The transmission schedules of CLIMAT and CLIMAT TEMP reports should be published in Volume C of WMO Publication No. 9.

6. METNO AND WIFMA MESSAGES

6.1 The RTHs in Region II should make arrangements to obtain advance notification of changes in Volumes A and C (METNO messages) of WMO Publication No. 9 and Volume D (WIFMA messages) of the same publication through the MTN and the interregional circuits.

6.2 Members operating RTHs in Region II should disseminate the METNO and WIFMA messages to the NMCs in the Region through the respective transmissions and broadcasts.

7. MONITORING THE OPERATION OF THE GTS

7.1 Besides implementing the Plan for Monitoring the Operation of the WWW, as given in Attachment 1–5 to Part I, Volume I of this *Manual*, each Member of RA II should carry out monitoring at its own meteorological telecommunication centre(s) regarding:

- (a) The availability and timely reception of observational data for regional and global exchange from observing stations in the zone or area of responsibility of each centre;
- (b) Adherence to WMO standard meteorological telecommunication procedures and contents of bulletins;
- (c) Quality of observational data.

7.2 Each Member of RA II responsible for the operation of an RTH should carry out periodic surveys on the availability of bulletins transmitted from its associated NMCs. The results of these surveys should be exchanged among the centres concerned and, when necessary, sent to the WMO Secretariat in order to initiate remedial action for improving shortcomings revealed by the results.

7.3 Each Member of RA II responsible for the operation of an RTH should arrange, in consultation with the centres concerned, to use the international Q code in the text of addressed messages in order to overcome language difficulties between the centres concerned.

7.4 Members of RA II should monitor their meteorological broadcasts by intercepting the radio emission. Provision should also be made for an easy changeover of monitoring from one frequency to another.

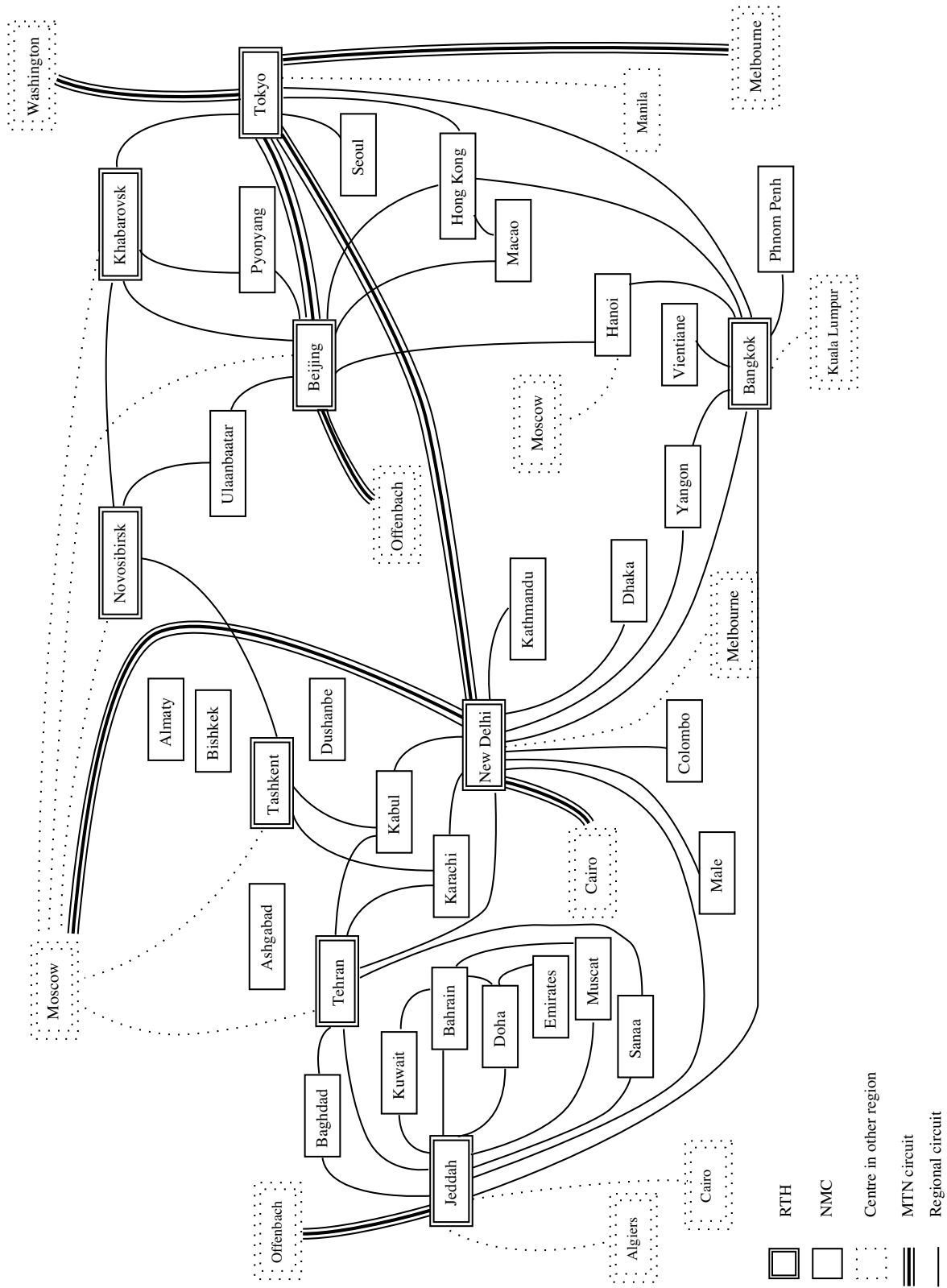


Figure 1 — Regional meteorological telecommunication network for Region II (Asia)

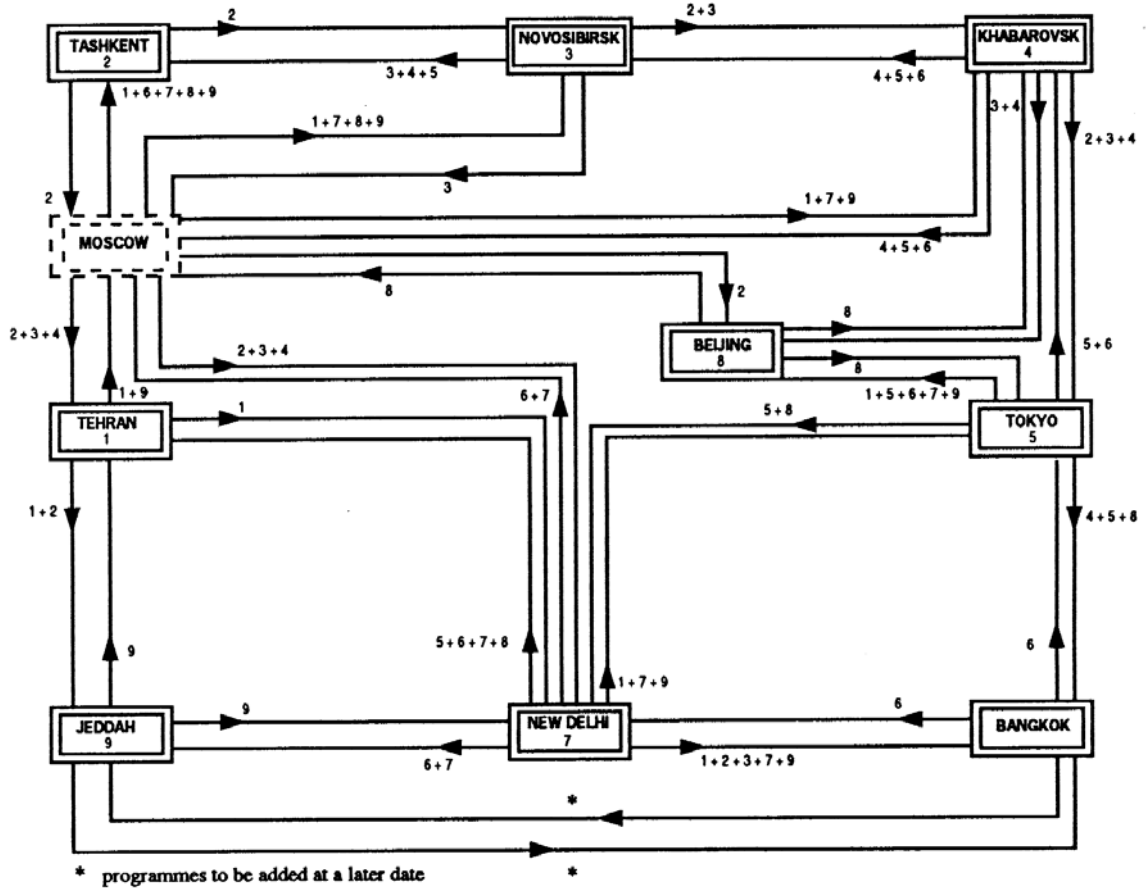


Figure 2 — Basic exchange programmes of observational data (RA II) between RTHs in Region II

NOTE: The number mentioned on the circuits indicates that the exchange programmes include the observational data collected from the zone of responsibility of the corresponding RTH, or a selection, as agreed upon by centres concerned.

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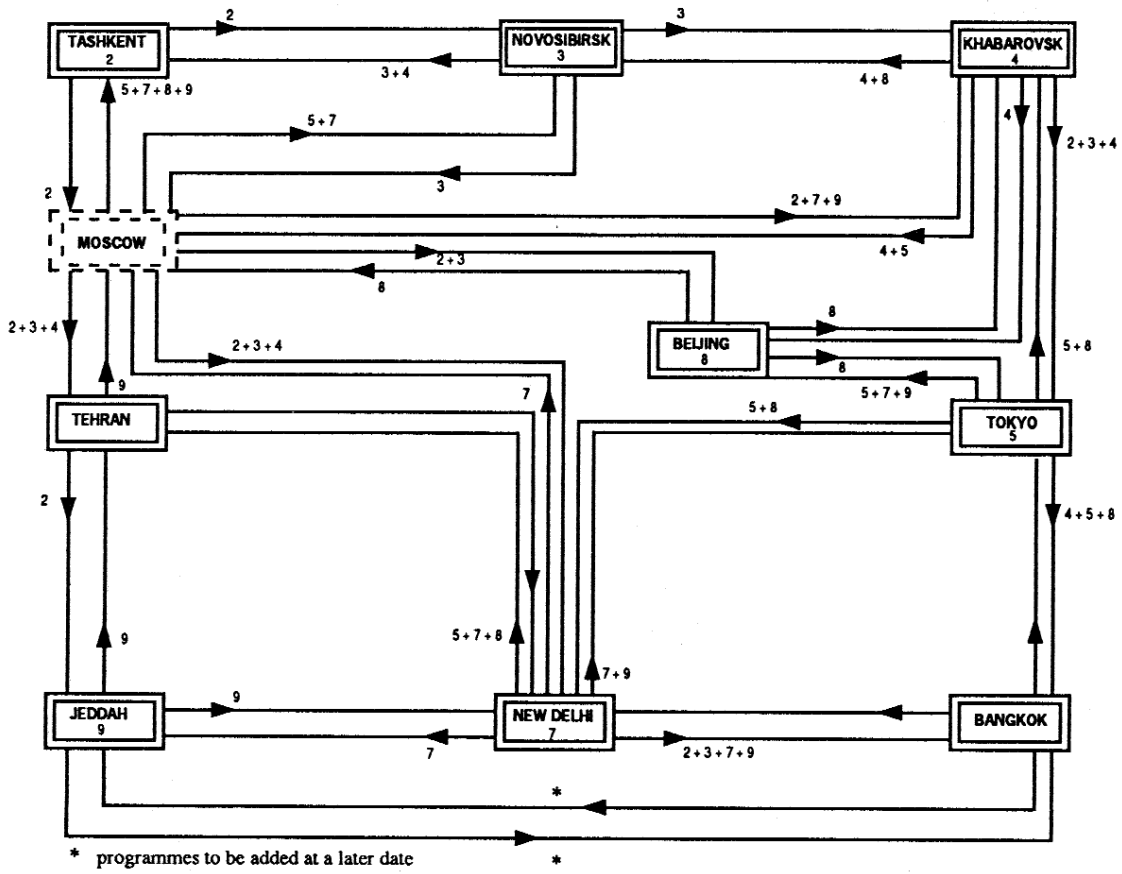


Figure 3 — Basic exchange programmes of processed information (RA II) between RTHs in Region II

NOTE: The number mentioned on the circuits indicates that the exchange programmes includes processed information from the corresponding RMC, or a selection, as agreed upon by centres concerned.

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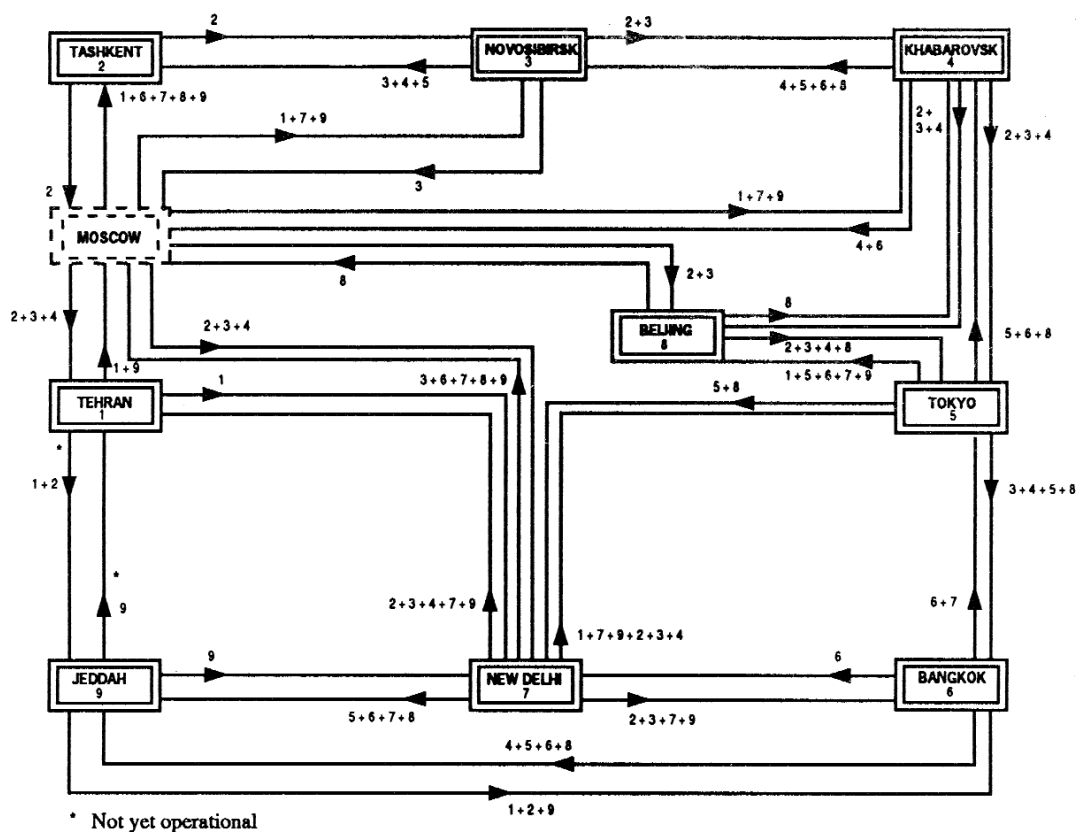


Figure 4 — Actual exchange programmes of observational data (RA II) between RTHs in Region II

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TABLE A

Contents of transmission programmes of RTHs in Region II (Asia) by RTT broadcasts

<i>Name of RTH</i>	<i>Zone of responsibility</i>
Bangkok	Cambodia, China (southern part), Hong Kong, India, Japan, Lao People's Democratic Republic, Macao, Myanmar, Thailand, Viet Nam (Socialist Republic of), selections from Region V, adjacent sea and ocean areas
Beijing	China, Democratic People's Republic of Korea, Viet Nam (Socialist Republic of), selections from Region II and Region VI, adjacent sea and ocean areas
Jeddah	Bahrain, Iran (Islamic Republic of), Iraq, Oman, Qatar, Saudi Arabia, other Arabian territories, selections from Region I, adjacent sea and ocean areas
Khabarovsk	Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, USSR (Asian part), adjacent sea and ocean areas
New Delhi	Afghanistan, Bahrain, Bangladesh, Bhutan, Cambodia, China (south-western part), India, Iraq, Islamic Republic of Iran, Kuwait, Lao People's Democratic Republic, Maldives, Myanmar, Nepal, Pakistan, Republic of Yemen, Saudi Arabia, Sikkim, Sri Lanka, Thailand, USSR (Central Asian Republics), Viet Nam (Socialist Republic of), selections from Region I and Region V, adjacent sea and ocean areas
Novosibirsk	Mongolia, USSR (west of 115°E)
Tashkent	Afghanistan, Bahrain, India, Iran (Islamic Republic of), Iraq, Kuwait, Pakistan, Republic of Yemen, Saudi Arabia, USSR (west of 90°E), selections from the eastern part of Region I and the south-eastern part of Region VI, adjacent sea and ocean areas
Tehran	Afghanistan, Bahrain, Iran (Islamic Republic of), Iraq, Kuwait, Pakistan, Republic of Yemen, Saudi Arabia, USSR (Central Asian Republics) selections from Region I and Region VI, adjacent sea and ocean areas
Tokyo	Cambodia, China, Hong Kong, Japan, Lao People's Democratic Republic, Macao, Mongolia, Republic of Korea, Thailand, USSR (south-eastern part), Viet Nam (Socialist Republic of), selections from Region V, adjacent sea and the Pacific Ocean areas

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TABLE B

Re-routing of traffic between RTHs in Region II in case of breakdown of a circuit

(Exchange will be restricted to limited observational data when there is not enough spare capacity on circuits involved in re-routing)

<i>Interrupted circuit</i>	<i>Basic exchange programmes (see Figures 2 and 3)</i>	<i>Alternate routing</i>
Bangkok–New Delhi New Delhi–Bangkok	6 1 + 2 + 3 + 7 + 9	Bangkok–Tokyo–New Delhi New Delhi–Tokyo–Bangkok
Beijing–Khabarovsk Khabarovsk–Beijing	8 3 + 4	Beijing–Tokyo–Khabarovsk Khabarovsk–Tokyo–Beijing
Beijing–Tokyo Tokyo–Beijing	8 1 + 5 + 6 + 7 + 9	Beijing–Khabarovsk–Tokyo Tokyo–Khabarovsk–Beijing
Jeddah–Bangkok Bangkok–Jeddah	* *	Jeddah–New Delhi–Bangkok Bangkok–New Delhi–Jeddah
Jeddah–New Delhi New Delhi–Jeddah	9 6 + 7	Jeddah–Bangkok–New Delhi New Delhi–Bangkok–Jeddah
New Delhi–Moscow Moscow–New Delhi	6 + 7 2 + 3 + 4	New Delhi–Tokyo–Khabarovsk–Moscow Moscow–Khabarovsk–Tokyo–New Delhi (1)
New Delhi–Tehran Tehran–New Delhi	5 + 6 + 7 + 8 1	New Delhi–Jeddah–Tehran Tehran–Jeddah–New Delhi
Novosibirsk–Khabarovsk Khabarovsk–Novosibirsk	2 + 3 4 + 5 + 6	Novosibirsk–Moscow–Khabarovsk Khabarovsk–Moscow–Novosibirsk
Novosibirsk–Tashkent Tashkent–Novosibirsk	3 + 4 + 5 2	Novosibirsk–Moscow–Tashkent Tashkent–Moscow–Novosibirsk
Tashkent–Moscow Moscow–Tashkent	2 1 + 6 + 7 + 8 + 9	Tashkent–Novosibirsk–Moscow Moscow–Novosibirsk–Tashkent
Tehran–Jeddah Jeddah–Tehran	1 + 2 9	Tehran–New Delhi–Jeddah Jeddah–New Delhi–Tehran
Tehran–Moscow Moscow–Tehran	1 + 9 2 + 3 + 4	Tehran–New Delhi–Moscow Moscow–New Delhi–Tehran
Tokyo–Bangkok Bangkok–Tokyo	4 + 5 + 8 6	Tokyo–New Delhi–Bangkok Bangkok–New Delhi–Tokyo
Tokyo–Khabarovsk Khabarovsk–Tokyo	5 + 6 2 + 3 + 4	Tokyo–New Delhi–Moscow–Khabarovsk (1) Khabarovsk–Moscow–New Delhi–Tokyo
Tokyo–New Delhi New Delhi–Tokyo	5 + 8 1 + 7 + 9	Tokyo–Bangkok–New Delhi New Delhi–Bangkok–Tokyo

* Programmes to be added at a later date.

NOTE:

(1) Subject to study and confirmation by centre concerned.

P A R T II

TELECOMMUNICATION PROCEDURES FOR REGION II (ASIA)

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P A R T I I

TELECOMMUNICATION PROCEDURES FOR REGION II (ASIA)

1. GENERAL

1.1 Compilation of bulletins

The NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this Manual). Separate bulletins should be compiled for the global and regional exchanges and, as agreed between RTHs and NMCs concerned, for the exchange of data for national use or bilateral use. If this is done correctly by the responsible NMC, re-editing or compiling of new bulletins is unnecessary and is not allowed.

1.2 Optimum length of message

The optimum length of message should be as defined in 2.7, Part II, Volume I of this Manual.

1.3 Message format for routine transmission of alphanumeric data

The use of the following groups in the world-wide message format relating to routine transmission of alphanumeric data, as given in Part II, Volume I of this Manual, shall be as follows:

- (a) The use of the transmission sequence number nnn shall be mandatory in International Telegraph Alphabet No. 2 and International Alphabet No. 5. Unless otherwise agreed, the number shall be cyclic 000 to 999 inclusive, regardless of time;
- (b) Requests for repetition of meteorological messages and analogue facsimile transmissions shall be made as soon as possible, as defined in 2.5, Part II, Volume I of this Manual.

1.4 Exchange of regional observational data

1.4.1 In order to facilitate the rapid exchange of regional observational data, the NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this Manual).

1.4.2 Telecommunication centres (WMCs, RSMCs, RTHs and NMCs), which at present are not capable of separating the regional sections of the report from the global section, should compile bulletins for international exchange containing reports in which the global and regional sections of the code for surface observations (FM 12-IX Ext. and FM13-IX Ext.) are included.

1.4.3 The further relay of global data messages by the RTHs concerned should be given high priority.

NOTE: Lists of stations to be included in global exchanges are found in Attachment I-4 to Part I, Volume I of this Manual.

1.5 Format of SYNOP and SHIP bulletins

The presentation of bulletins containing SYNOP reports and SHIP reports should be in one of the formats (a) or (b) as given in Attachment II-4, paragraph 4, Volume I, Part II.

1.6 Transmission of upper-air reports in Region II

The transmission to the extent permitted by the available circuits of Parts A, B, C and D of upper-air reports (TEMP, TEMP SHIP, PILOT, PILOT SHIP, etc.) over the regional meteorological telecommunication network of Region II and in the RTH broadcasts of Region II is mandatory. Parts A, B, C and D of these reports shall be transmitted separately.

2. ACKNOWLEDGEMENT OF ADDRESSED ADMINISTRATIVE MESSAGES

When an addressed administrative message is received, the addressed centre should send an addressed message to the originating centre, containing the following text:

QSL YYGGgg

where YYGGgg is the data-time group from the message received.

3. DATA COMMUNICATION PROTOCOLS

Data communication protocols to be used on the RMTN should be elements of procedures as specified in CCITT Recommendation X.25 which are given in section 2.12.3, Part II, Volume I of the present Manual.

4. RE-ROUTEING PROCEDURES FOR THE REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK FOR REGION II

4.1 The re-routeing procedures in cases of outages of centres and circuits to be applied in the regional meteorological telecommunication network for Region II should, as far as possible, comply with the provisions included in Attachment II-11 to Part II, Volume I of this Manual and with Table B, Part I of this section (Region II).

4.2 Service messages concerning important operational matters (including outages of centres and circuits) should be exchanged between centres concerned. When no GTS circuit is available for the transmission of such service messages, they can be routed on the AFTN (in this case service messages shall conform to the format prescribed by ICAO).

P A R T I I I

ENGINEERING OF CENTRES AND CIRCUITS IN REGION II (ASIA)

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PART III

ENGINEERING OF CENTRES AND CIRCUITS IN REGION II (ASIA)

1. ENGINEERING OF CENTRES

1.1 Engineering of RTHs in Region II

The RTHs in Region II shall be engineered so as to be capable of performing the functions laid down in 2.1, Part I, Volume I of this Manual.

1.2 Engineering of NMCs in Region II

The NMCs in Region II shall be engineered so as to be capable of performing the functions laid down in 2.3, Part I, Volume I of this Manual.

2. TECHNICAL SPECIFICATIONS OF MAIN REGIONAL AND REGIONAL CIRCUITS IN REGION II

2.1 The main regional and regional circuits shall in general be engineered by making use of cable, satellite or microwave facilities. If these facilities are not available, HF radio circuits with the technical specifications given in paragraph 3.2 below should be used.

2.2 For data transmission at data-signalling rates of 2400, 4800 and 9600 bit/s on telephone-type dedicated circuits, preference should be given to use of modems in accordance with CCITT Recommendation V.29, including multiplexing. When using V.29-type modems, independent channels provided by multiplexing techniques should be used for the transmission of data and facsimile. Further guidance for the application of multiplexing techniques provided by modems conforming to CCITT Recommendation V.29 is given in the annex.

3. ENGINEERING PRINCIPLES OF RADIO CIRCUITS

3.1 Introductory note

In addition to the guiding principles for the engineering of centres and circuits given in 1 and 2 above and to the technical characteristics and specifications contained in Part III, Volume I of this Manual, the material given below is intended to provide further information and guidance relating to the maintenance of radio point-to-point telegraph circuits and radio broadcasts in Region II in accordance with the relevant CCIR specification and good engineering practice.

3.2 General engineering principles of radio circuits

3.2.1 *Signal-to-noise ratio*

The signal-to-noise ratio should not be less than that recommended by the CCIR for the mode of operation. The factors contributing to a satisfactory signal-to-noise ratio are:

- (a) Choice of frequency;
- (b) Selection of receiving site;
- (c) Types of antenna;
- (d) Adequate transmitted power.

3.2.2 *Frequencies*

The radio frequencies used should be selected to suit diurnal and seasonal variations as well as solar activity.

3.2.3 *Siting*

The receiving station should be located in an area relatively free from local radio and electrical interference so that a signal of reasonable field strength will provide the desired signal-to-noise ratio.

3.2.4 *Antennae*

Efficient directional antennae (e.g. rhombic, log periodic or dipole arrays) for the frequency bands concerned should be employed at both transmitting and receiving stations.

3.2.5 *Transmitted power*

The power output of a transmitter should be adequate for the circuit for which it is used. The power should be calculated by the methods given in standard publications, taking into consideration the other relevant factors:

- (a) The location of the transmitter and the distance from the receiving station;
- (b) The noise level at the receiving site;
- (c) The type of transmission and system of reception used;
- (d) The gain of the transmitting and receiving antennae;
- (e) The time of transmission;
- (f) The allowances to be made for the fading of the received signal;
- (g) The frequency used;
- (h) The acceptable percentage of time for reliable reception.

3.2.6 *Diversity systems*

To improve the average signal strength and to minimize effects of fading, diversity systems should be employed. Of the various systems, space diversity offers the greatest advantages and should be employed wherever possible. If space is limited, however, polarization diversity should be employed.

3.2.7 *Mode of operation*

3.2.7.1 The mode of operation should be independent side-band (ISB). Provision should be made according to the traffic density so that one 3-kHz channel can be used for facsimile (analogue) transmission while telegraph signals are carried on another 3-kHz side-band. For the establishment of voice frequency telegraph (VFT) equipment, two-tone keying should be used.

3.2.7.2 The modulation rate should be 75 bauds (alternative modulation rates may be used as agreed bilaterally, using the International Telegraph Alphabet No. 2).

3.2.8 *Reception*

Receivers for ISB operation with the necessary VFT equipment should be used (channelling to be agreed bilaterally).

3.2.9 *Error detection and correction systems*

Error detection and correction systems should be employed as agreed bilaterally.

3.3 *Engineering of radio circuits and broadcasts*

In order to ensure reliable and efficient communication of HF radio circuits connecting RTH centres and reliable reception of RTH broadcasts, the CCIR specifications should be applied. The following guidelines were established in order to help the Members of the Regional Association for Asia to plan the installations.

3.3.1 *Main regional circuits*

3.3.1.1 *Transmission*

- (a) Mode of operation ISB. On one side-band, low-speed or medium-speed data channels and on the other side-band, one or two facsimile channels. For the establishment of VFT equipment, two-tone keying should be used;

- (b) The transmitter output power should be adequate to provide the proper signal-to-noise ratio at the receiving site according to the CCIR recommendation;
- (c) Modulation rate 75 bauds (an alternative higher modulation rate may be used as agreed bilaterally);
- (d) Directional antenna systems (e.g. rhombic, log periodic or dipole arrays).

3.3.1.2 *Reception*

Receivers for ISB operation with the necessary VFT equipment (channelling to be agreed bilaterally).

3.3.1.3 *Error detection and correction systems*

Error detection and correction systems should be employed as agreed bilaterally.

3.3.2 *Regional circuits*

The technical specifications for the main regional circuits should be applied, as far as practicable, to the regional circuits.

3.3.3 *Interregional and supplementary interregional circuits*

The technical specifications for the main regional circuits should be applied, as far as practicable, to the interregional and supplementary interregional circuits.

3.3.4 *RTH broadcasts*

3.3.4.1 *Transmission*

- (a) Employing at least two radio frequencies simultaneously;
- (b) The transmitter output power should be adequate to provide the proper signal-to-noise ratio at the receiving centres in the area in which the broadcast is intended to be intercepted;
- (c) Mode of operation F1D for telegraphy and F3C for facsimile according to WMO standards;
- (d) Modulation rate 75 bauds (alternative higher modulation rates subject to agreement by all Members concerned using the International Telegraphic Alphabet No. 2);
- (e) Signal distortion of outgoing signals less than 10 per cent.

NOTE: When the same broadcast is used to serve shipping, any change should take into account the reception capabilities of ships.

3.3.4.2 *Reception*

Receivers for F1D and F3C mode of operation: diversity systems should preferably be used for F1D reception.

3.3.5 *Multiplexing of point-to-point channels on the same radio circuits*

The standards employed should conform to the CCIR specifications and be subject to an agreement between the two terminals concerned.

3.3.6 *Purchase of new equipment*

It should be noted that when new equipment has to be purchased for the recommended scheme, such equipment should be capable of being easily adapted to ISB operation.

3.4 *Engineering of radio transmission and reception facilities at NMCs*

The following minimum telecommunication equipment should be available at an NMC with one HF point-to-point circuit to its associated RTH. This list does not include standby equipment.

(a) *Transmitting station*

- One directional transmitting antenna system for the frequency bands concerned;
- One transmitter.

(b) *Receiving station*

- One diversity directional receiving antenna system for the frequency bands concerned;
- Two receivers for diversity operation;
- One radio-facsimile receiver;
- One VFT equipment, equipped for the number of channels to be received;
- One FM/AM converter.

(c) *Terminal equipment*

- One receive teleprinter with reperforator attachment;
 - One send teleprinter with auto-transmitter attachment;
 - One send/receive teleprinter with auto-transmitter and perforator attachments, as standby;
 - One perforator with back-spacing facilities;
 - One facsimile recorder;
 - One tone keyer for FSK keying.
-

ANNEX

**APPLICATION OF MULTIPLEXING TECHNIQUES PROVIDED BY MODEMS
CONFORMING TO CCITT RECOMMENDATION V. 29****1. GENERAL**

- (a) Dedicated circuits should be terminated at both ends with modems, in accordance with the CCITT Recommendation V.29;
- (b) A telephone-type circuit refers to a cable, landline, UHF or satellite link with a bandwidth of 300 Hz to 3400 Hz;
- (c) The modem conforming to CCITT Recommendation V.29 is intended to be used primarily on special quality leased circuits, e.g. Recommendations M.1020 or M.1025 circuits, but this does not preclude the use of this modem over circuits of lower quality;
- (d) All channels provided by multiplexing have an interface according to CCITT Recommendations V.24 and V.28.

2. POSSIBLE ARRANGEMENTS FOR CHANNELLING

- (a) A telephone-type circuit with a data-signalling rate of 9600 bit/s;
- (b) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 2 x 4800 bit/s channels;
- (c) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 4 x 2400 bit/s channels;
- (d) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 1 x 4800 and 2 x 2400 bit/s channels;
- (e) In addition to the above specified channelling, one or two low-speed channels can be provided in some models of modems. Since these channels are not specified in CCITT Recommendation V. 29, their operation is subject to agreement between adjacent centres.

3. USE OF MULTIPLEXED CHANNELS

- (a) All channels can be used for data transmission;
- (b) All channels can be used for coded or non-coded digital facsimile transmission. A data-signalling rate of 4800 bit/s is recommended for coded digital facsimile or non-coded digital facsimile with a scanning frequency of 120 lines/mn;
- (c) As an interim measure, all channels with a minimum data-signalling rate of 2400 bit/s can be used for asynchronous data transmission with a speed ranging from 50 to 600 bit/s (distortion of a 2400 bit/s channel used for asynchronous transmission with 600 bit/s equals 25%).

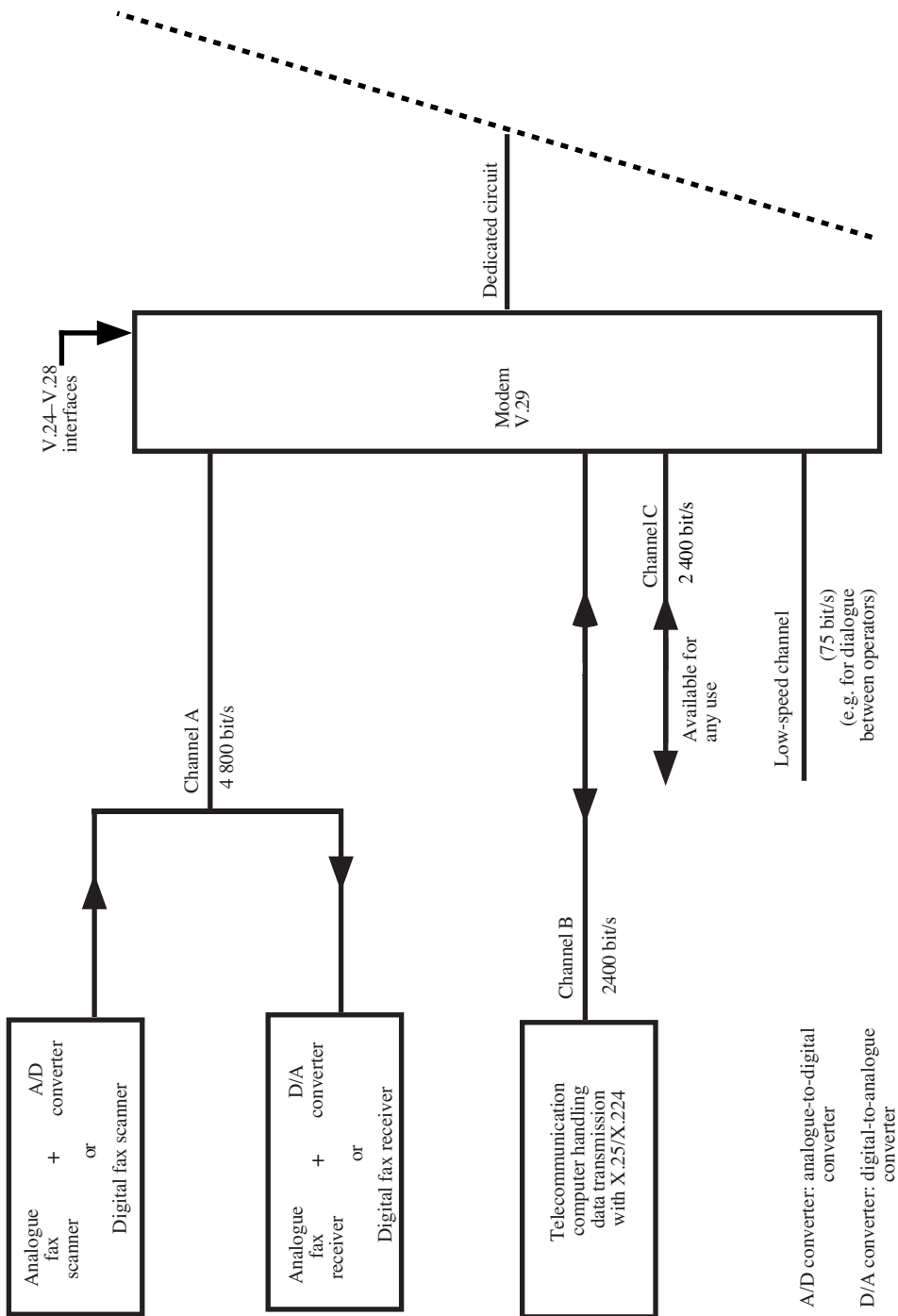
NOTE: An example of the use of multiplexed channels is given in the appendix to this annex.

4. OPERATIONAL CONDITIONS

- (a) The conventional types of analogue facsimile scanners and recorders can be used for non-coded digital facsimile transmissions with the addition of low-cost analogue-to-digital or digital-to-analogue converters;
- (b) The automatic line equalizers incorporated into the modems according to CCITT Recommendation V. 29 are suitable to cope with marginal circuit conditions of links according to CCITT Recommendation M.1020;
- (c) Data transmission carried out with an EDC procedure requiring a separate backward channel (WMO software and hardware EDC procedures as specified in Volume I of the Manual on the GTS, Part II) will occupy two channels provided by multiplexing or one channel provided by multiplexing and another channel as described in 2(e) above.

APPENDIX TO ANNEX

EXAMPLE OF USE OF MULTIPLEXED CHANNELS



REGION III

SOUTH AMERICA

**REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN
FOR REGION III (SOUTH AMERICA)
FOR THE WORLD WEATHER WATCH (WWW)**

P A R T I

**ORGANIZATION OF THE REGIONAL METEOROLOGICAL
TELECOMMUNICATION PLAN FOR REGION III (SOUTH AMERICA)
FOR THE WORLD WEATHER WATCH (WWW)**

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P A R T I

ORGANIZATION OF THE REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN FOR REGION III (SOUTH AMERICA) FOR THE WORLD WEATHER WATCH (WWW)

1. GENERAL

The growing needs of countries in Region III for rapid and reliable reception of a large number of various types of meteorological information from all over South America, adjacent ocean areas and other Regions call for the establishment of a telecommunication network in the Region that will satisfy these requirements. This network will have to be linked to and co-ordinated with the World Weather Watch Global Telecommunication System (GTS). Therefore, the telecommunication network in the Region will have to cope with the WWW requirements and comply with the organizational and engineering principles adopted for the GTS.

2. NATIONAL METEOROLOGICAL TELECOMMUNICATION NETWORKS

2.1 Principles

2.1.1 The national meteorological telecommunication networks should be organized to ensure the rapid and reliable collection of observational data to meet the WWW requirements as defined in 2.3 and 3.3, Part I, Volume I of this Manual. Arrangements to meet the requirements for meteorological information within the country will be the responsibility of the Member concerned.

2.1.2 Each Member shall designate a National Meteorological Centre (NMC), or other centres as appropriate, to perform the telecommunication functions indicated in 2.2 below.

2.1.3 Each NMC is responsible for the meteorological checking of all the meteorological reports it collects before they are included in bulletins for dissemination.

2.2 Telecommunication functions of NMCs

2.2.1 The telecommunication functions of NMCs, the location and meteorological functions of which are a matter for decision by the Meteorological Services concerned, should be as defined in 2.3, Part I, Volume I of this Manual.

2.2.2 Subject to agreement of the Members concerned, NMCs may perform such additional functions as collection and relay of observational data from other NMCs or isolated stations (including island stations).

2.3 National collection of observational data

2.3.1 The choice of telecommunication facilities for the collection of information from stations located within a territory or country is a matter for decision by the Member concerned. The arrangements should comply with the provisions made in 3.3, Part I, Volume I of this Manual.

2.3.2 Meteorological reports from surface and upper-air synoptic stations should be filed immediately upon completion of the observation, including coding. Under normal conditions, the filing time should not exceed five minutes.

2.3.3 Members using the public telecommunication system for the collection of meteorological reports should:

- (a) Make periodic checks on the regularity and efficiency of the collection of meteorological reports from their synoptic stations;
- (b) Take full advantage of the CCITT operational provisions which accord priorities to the transmission of meteorological messages for the international public telegram service (these provisions are given in the annex to this part);

- (c) Keep close liaison at all levels with the responsible telephone and telegraph authorities (e.g. PTT) with a view to ensuring expeditious handling of meteorological traffic.

3. REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK

3.1 Principles

3.1.1 The regional meteorological telecommunication network should ensure rapid and reliable collection, exchange and distribution of meteorological information in such a way as to satisfy the needs of Members of WMO and in particular of Members of RA III. For this purpose, reliable, modern telecommunication facilities should be employed.

3.1.2 The regional meteorological telecommunication network for Region III should conform to the WWW plan and therefore shall perform the functions defined in 3.2.3, Part I, Volume I of this Manual.

3.2 Designation of RTHs in Region III

The designated RTHs in Region III are:

- (a) RTHs with receiving and transmitting capabilities on the Main Telecommunication Network: Brasilia and Buenos Aires;
- (b) Other RTH: Maracay.

3.3 Functions of RTHs

3.3.1 RTHs in Region III should be capable of performing the functions defined in 2.1, Part I, Volume I of this Manual.

3.3.2 In particular, each RTH in the Region should have the following duties:

- (a) Collection of observational data and processed information within its zone of responsibility;
- (b) Exchange on point-to-point circuits of meteorological information with WMCs, RSMCs and RTHs as agreed;
- (c) Selective distribution on point-to-point circuits and/or by radio broadcasts of meteorological information from its own zone of responsibility and retransmission of data received from WMCs, RSMCs or other RTHs to meet, in the first instance, the requirements of the NMCs within its zone of responsibility;
- (d) Checking and correction in order to maintain standard telecommunication transmission procedures.

3.4 Zones of responsibility of RTHs for collection of observational data

The RTHs in the Region will have the following zones of responsibility for collection of observational data:

<i>Name of RTH</i>	<i>Zone of Responsibility</i>
Brasilia	Brazil, ships' and aircraft reports
Buenos Aires	Argentina, Bolivia, Chile, Paraguay, Peru, Uruguay, ships' and aircraft reports
Maracay	Colombia, Ecuador, French Guyana, Guyana, Suriname, Venezuela, ships' and aircraft reports

3.5 Configuration of the regional meteorological telecommunication network

3.5.1 The regional meteorological telecommunication network interconnecting the centres is composed of the types of circuit defined in 3.2.2, Part I, Volume I of this Manual.

3.5.2 To make use of the existing facilities, main regional circuits may be established through relay centres subject to an agreement between the Members responsible for the centres concerned and provided that the efficiency of the exchange is not impaired.

3.5.3 Each NMC should be connected with the associated RTH (see 3.4) by point-to-point circuits to transmit its collected observational data and to receive required observational as well as processed information in alphanumeric, binary and pictorial form; NMCs may be connected to more than one RTH.

3.5.4 If the point-to-point circuits are not available, and until such circuits are established, the exchange of meteorological information between the NMCs and the associated RTH should be made by radio broadcasts. In this case:

- (a) The NMC should beam its territorial transmission to the associated RTH to ensure more reliable reception of its collected data at the associated RTH;
- (b) Each NMC should be equipped with at least two RTTs and one facsimile receiving set complete with directional antennae to be able to receive the required information initially from the associated RTH (see 3.6 below).

3.5.5 The NMC may be connected to the associated RTH via another NMC, subject to the agreement of the Members concerned.

3.5.6 The configuration of the target regional meteorological telecommunication network in Region III should be as shown in Figure 1.

3.6 Transmission programmes between RTHs and NMCs

3.6.1 The programmes transmitted by NMCs, or centres with similar functions, to the associated RTHs should be composed of the following data:

- (a) Surface synoptic reports for main and intermediate standard hours and all upper-air data, TEMP and PILOT, Parts A, B, C and D, from all stations included in the regional basic synoptic network of the respective countries. Reports from additional stations may be included as agreed between Members concerned provided this does not affect the time for transmission given in 3.6.2 below;
- (b) All weather reports received from ships (see 5.1 below) and all aircraft reports for synoptic purposes (see 5.2 below), unless agreed otherwise bilaterally;
- (c) CLIMAT and CLIMAT TEMP once per month;
- (d) Priority messages, such as warnings of dangerous weather conditions;
- (e) Satellite data, as available;
- (f) BATHY and TESAC reports, as available;
- (g) Other types of information, as agreed.

3.6.2 The transmission of observational data to the associated RTH should start as soon as possible and in any case not later than 20 minutes after the observing station's filing time. Every effort should be made to complete this transmission within 35 minutes of the observing station's filing time to enable the RTHs/RSMCs to meet their obligations in implementing the WWW.

3.6.3 Each RTH is responsible for providing the NMCs within its zone of responsibility with the observational and processed data required by the Member concerned on point-to-point circuits and/or by radio broadcasts. For this purpose the transmission programmes of the RTH should be established jointly by the Members responsible for the RTH and the associated NMCs, and included in WMO Publication No. 9, Volume C — Transmissions.

3.6.4 To meet the requirements of those Members not yet connected with the associated RTHs by point-to-point circuits, each RTH should establish and maintain a radio broadcast where transmission programmes are based on the following principles:

- (a) An NMC should be able to receive the observational data and processed information it needs from the associated RTH;
- (b) If this is not feasible, the NMC should be able to receive the data it needs from not more than two RTHs;
- (c) Each RTH should ensure reliable reception of its radio broadcast at least in its zone of responsibility for collection (see 3.4 above).

3.6.5 The three RTHs shall be jointly responsible for the broadcast of coded information from Region III and retransmission of selected data from other Regions, to meet the requirements of the Members.

3.7 Exchange and distribution of processed meteorological information in Region III

3.7.1 The regional telecommunication network should be capable of exchanging and distributing the processed information produced by WMCs and RSMCs and also by WAFS centres where the regional meteorological telecommunication network can accommodate the additional traffic, to meet the requirements of Members of RA III.

3.7.2 The exchange of processed information (including satellite data) between centres should be carried out on point-to-point circuits in alphanumeric or binary form (grid-point values) or in pictorial form.

3.8 Transmission programmes between RTHs

3.8.1 RTHs should exchange observational data and processed information from Region III and other Regions in order to meet the needs of the Members of the Region as well as the WWW. RTHs located on the Main Telecommunication Network are responsible for the exchange of observational data and processed information with other RTHs in Region III, as indicated in Volume I, Part I, Attachment 1-3, paragraph 1.

3.8.2 Figure 2 shows the exchange programmes of the observational data (RA III) on the main regional circuits.

3.8.3 In the event of a breakdown of a main regional circuit, the alternative routing of the traffic through other main regional circuits and/or regional circuits shall be arranged between the RTHs concerned.

3.9 Collection and transmission time of observational data and processed information exchanged by RTHs

3.9.1 The transmission times for the exchange of data for RTHs should be as follows:

- (a) The exchange and distribution of observational data within the Region should start as soon as possible but not later than 20 minutes after the observing station's filing time;
- (b) The transmission of observational data to the RTHs Brasilia and Buenos Aires situated on the Main Telecommunication Network in Region III should be completed not later than 45 minutes after the observing station's filing time.

3.9.2 The schedules for transmission of processed information in pictorial (facsimile) or digital form should be established by consultation between Members concerned, taking into account the requirements set forth in the WWW plan.

3.10 Regional data dissemination systems

In addition to the point-to-point transmissions, the designated RTHs should establish and maintain regional data dissemination systems as follows:

Brasilia	satellite-based dissemination system	products of RSMC Brasilia; WMCs' and other RSMCs' and WAFS centres' products as required;
Buenos Aires	radio-facsimile	products of RSMC Buenos Aires; WMCs' and other RSMCs' and WAFS centres' products as required.

4. INTERREGIONAL EXCHANGES

The interregional exchanges with the neighbouring Regions should be made through:

- (a) The Main Telecommunication Network: Brasilia—Washington;
- (b) The Main Telecommunication Network: Buenos Aires—Washington;
- (c) The supplementary interregional circuit: Georgetown—Port of Spain.

5. ARRANGEMENTS FOR THE EXCHANGE OF OBSERVATIONAL DATA

5.1 Ships' reports

5.1.1 Members should take appropriate action with the authorities responsible for the operation of designated coast stations with a view to ensuring that all ships' weather reports received at the coast stations are transmitted without delay to the NMC so that the transit time between the reception of the message from the ship at the coast station and the reception at the NMC does not exceed 15 minutes.

5.1.2 All ships' weather reports received at the NMCs should be sent as soon as possible to the appropriate RTHs.

5.1.3 Members responsible for the operation of RTHs and NMCs in South America shall ensure that all ships' reports which they receive up to 24 hours after the time of observation are included in their respective transmissions and broadcasts.

5.1.4 Every possible effort should be made to bring to the attention of ships' masters the considerable value of weather reports from all ships in the ocean areas around South America, no matter how brief, noting that if reports at the synoptic hours are not possible, they may be made at other times convenient to themselves.

5.1.5 To ensure and facilitate adequate contact with ships, Members operating coast stations not making a 24-hour watch shall take into consideration the watch hours of radio officers aboard ships when fixing watch hours for their coast stations.

5.1.6 Members responsible for the collection and distribution of ships' weather reports should take appropriate action with the agencies responsible for operating coast stations, with a view to ensuring a prompt response from those stations to ships calling them and arrange to forward the received ships' reports to the relevant NMC without delay.

5.1.7 The RTHs should exchange and distribute without delay within Region III and on the interregional circuits all ships' weather reports received.

5.2 Aircraft reports

5.2.1 Each collecting centre, designated by ICAO, transmits aircraft reports to the NMC of the country in which the collecting centre is situated. The NMC transmits these aircraft reports to the appropriate regional collecting centre. The appropriate regional collecting centre is the RTH in Region III in whose zone of responsibility the NMC is located.

NOTE: The collecting centres designated by ICAO for this purpose are included in Table MET-1 of the CAR/SAM Air Navigation Plan.

5.2.2 Aircraft reports received in the RTHs acting as regional AIREP collecting centres are disseminated at intervals not greater than three hours on the main regional, regional and interregional circuits and also included in the RTH broadcasts.

5.2.3 Members receiving at their respective centres (NMCs or RTHs) ASDAR aircraft reports should make appropriate arrangements to ensure that these reports will be exchanged over the GTS in accordance with established procedures.

5.2.4 Members making meteorological reconnaissance flights over the Region shall include the resulting observations as soon as possible in the appropriate point-to-point transmissions or broadcasts.

5.2.5 The NMCs should convert aircraft reports used for synoptic purposes in AIREP form prior to their transmission to the associated RTHs.

5.3 Ground weather radar observations

Ground weather radar observations should be exchanged by arrangements made between Members concerned and by their inclusion in national transmissions and, where there is a need, in transmissions and broadcasts made by RTHs.

5.4 Meteorological satellite data

5.4.1 Satellite data issued by WMCs/RSMCs or special satellite centres concerning Region III and extending to neighbouring Regions should be included by RTHs in Region III in their respective point-to-point transmissions and/or broadcasts.

5.4.2 Members operating RTHs in Region III should include messages containing orbital information (e.g. APT PREDICT) and other information on the operation of polar-orbiting and geostationary satellites in their respective transmissions and broadcasts.

5.5 Buoy data

5.5.1 Data from drifting and anchored buoys in the southern hemisphere should be distributed by the RTHs in Region III, as required.

5.5.2 Members operating drifting or anchored buoys should transmit these data to the associated RTH for further regional and global distribution, as required.

5.6 CLIMAT and CLIMAT TEMP reports

5.6.1 CLIMAT and CLIMAT TEMP reports should be transmitted as soon as possible after the end of the month and not later than the fifth day of the following month.

5.6.2 CLIMAT and CLIMAT TEMP reports should be included by NMCs and RTHs at the end of the transmission schedule at the main synoptic hours.

5.6.3 The RTHs Brasilia and Buenos Aires shall ensure the regular transmission of CLIMAT and CLIMAT TEMP reports from Region III on the MTN to the WMC Washington.

5.6.4 A NIL report is transmitted whenever a CLIMAT or CLIMAT TEMP report is not available at the scheduled time.

5.6.5 The transmission schedules of CLIMAT and CLIMAT TEMP reports should be published in Volume C of WMO Publication No. 9.

6. METNO AND WIFMA MESSAGES

6.1 The RTHs Brasilia and Buenos Aires should make arrangements to obtain advance notification of changes in Volumes A and C of WMO Publication No. 9 (METNO messages) and in Volume D of the same publication (WIFMA messages) through the MTN. These messages should be disseminated by the RTH Brasilia to the RTH Maracay.

6.2 Members operating RTHs in Region III should include METNO and WIFMA messages in their respective transmissions and broadcasts.

7. MONITORING THE OPERATION OF THE GTS

7.1 Besides participating in the Plan for Monitoring the Operation of the WWW, as included in Attachment 1-5 to Part I, Volume I of this Manual, each Member of RA III should carry out its own monitoring at its own meteorological telecommunication centre(s) regarding:

- (a) The availability and timely reception of observational data for regional and global exchange from observing stations in the zone or area of responsibility of each centre;
- (b) Adherence to WMO standard meteorological telecommunication procedures and contents of bulletins;
- (c) Quality of observational data.

7.2 Each Member of RA III responsible for the operation of an RTH should carry out periodic surveys on the availability of bulletins transmitted from its associated NMCs. The results of these surveys should be exchanged among the centres concerned and, when necessary, sent to the WMO Secretariat, in order to initiate remedial action for improving shortcomings revealed from the results.

7.3 Each Member of RA III responsible for the operation of an RTH should arrange, in consultation with the centres concerned, to use the international Q code in the text of addressed messages in order to overcome language difficulties between the centres concerned.

7.4 Members of RA III should monitor their meteorological broadcasts by intercepting the radio emission. Provision should also be made for an easy changeover of monitoring from one frequency to another.

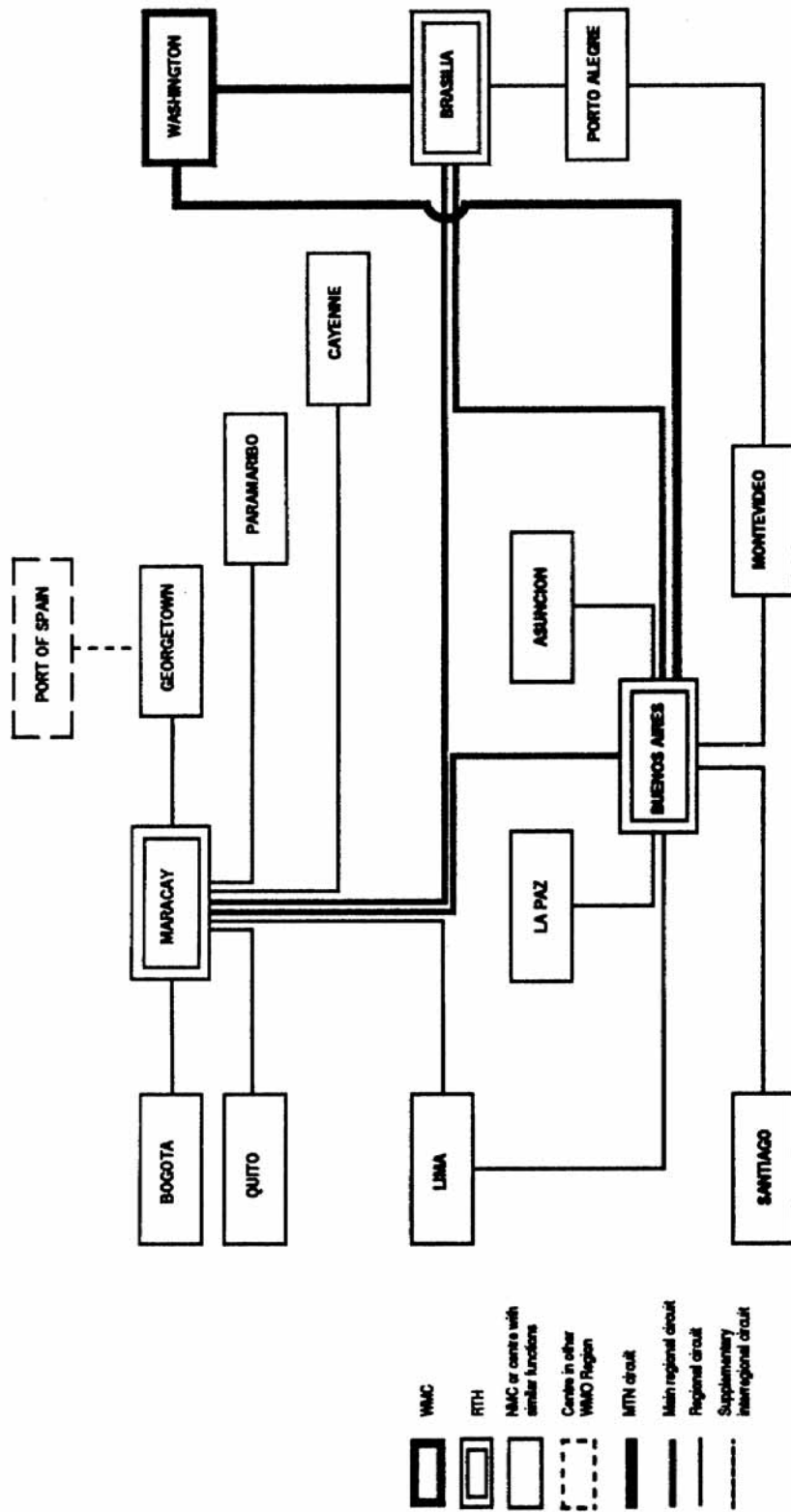


Figure 1 — Target regional meteorological telecommunication network for Region III (South America)

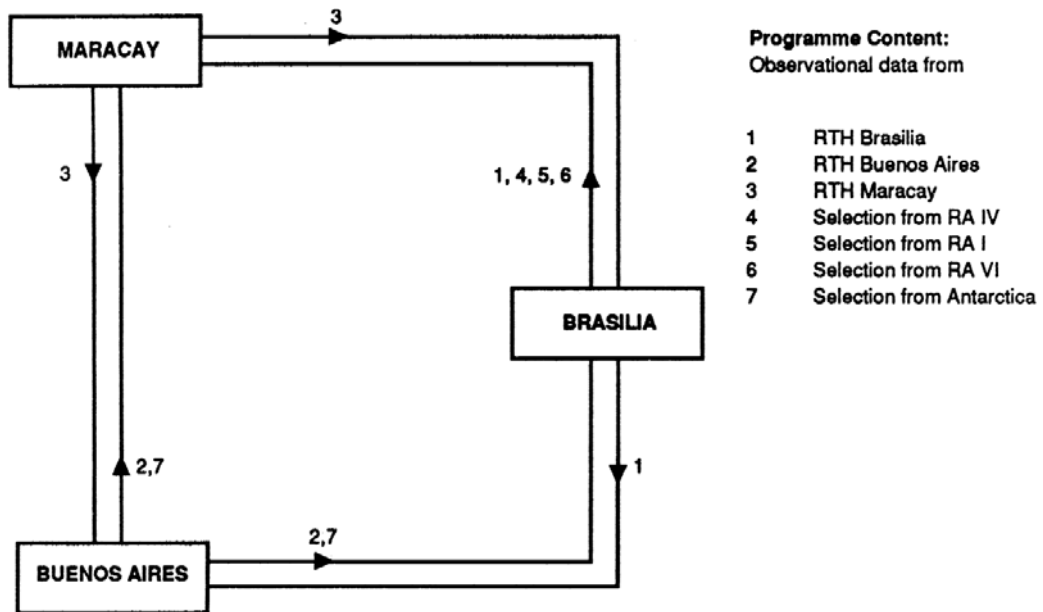


Figure 2 — Exchange programmes of observational data (RA III) on the main regional circuits

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ANNEX

PRIORITY OF METEOROLOGICAL TELEGRAMS

(Extract from the CCITT Red Book, Volume II, Fascicle II.4,
Recommendation F.1 — Operational provisions for the international
public telegram service. Geneva 1985)

VI. Transmission of telegrams

1. *Order of transmission of telegrams*
- A138 1.1 The transmission of telegrams shall take place in the following order except when technically impracticable:
- A139 1.1.1 telegrams relating to the safety of life;
- A140 1.1.2 telegrams relative to the application of the United Nations Charter;
- A141 1.1.4 government telegrams with priority;
- A141 *bis* 1.1.5 meteorological telegrams;
- A142 1.1.7 ordinary private telegrams and RCT telegrams when urgent transmission and delivery for such telegrams has been requested;
- A143 1.1.8 service telegrams and service advices;
- A144 1.1.9 government telegrams, ordinary private telegrams, and RCT telegrams;
- A145 1.1.10 letter telegrams (including government letter telegrams).
- A146 1.2 Every office that receives, on an international circuit, a telegram presented as an SVH telegram, a government telegram (see A220 and A221), a service telegram or a meteorological telegram shall forward it as such.
- A147 1.3 Except where technically impracticable, telegrams having the same priority shall be transmitted by the sending office in the order of their time of handing in, and by transit offices in the order of their time of receipt.
- A148 1.4 At transit offices, originating telegrams and transit telegrams to be transmitted over the same routes shall, except where technically impracticable, be placed together and transmitted according to the time of handing in or receipt, subject to the order laid down in A138 to A147.
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P A R T I I

TELECOMMUNICATION PROCEDURES FOR REGION III
(SOUTH AMERICA)

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P A R T I I

TELECOMMUNICATION PROCEDURES FOR REGION III (SOUTH AMERICA)

1. GENERAL

1.1 Compilation of bulletins

The NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this Manual). Separate bulletins should be compiled for the global and regional exchanges and, as agreed between RTHs and NMCs concerned, for the exchange of data for national use or bilateral use. If this is done correctly by the responsible NMC, re-editing or compiling of new bulletins is unnecessary and is not permitted.

1.2 Optimum length of message

The optimum length of message should be as defined in 2.7, Part II, Volume I of this Manual.

1.3 Message format for routine transmission of alphanumeric data

The use of the following groups in the world-wide message format relating to routine transmission of alphanumeric data, as given in Part II, Volume I of this Manual, in Region III shall be as follows:

- (a) The use of the transmission number nnn shall be mandatory in International Telegraph Alphabet No. 2 and International Alphabet No. 5. Unless otherwise agreed, the number shall be cyclic 000 to 999 inclusive, regardless of time;
- (b) Requests for repetition of meteorological messages and analogue facsimile transmissions shall be made as soon as possible, as defined in 2.5, Part II, Volume I of this Manual.

1.4 Exchange of regional observational data

1.4.1 In order to facilitate the rapid exchange of regional observational data, the NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this Manual).

1.4.2 Telecommunication centres (WMCs, RSMCs, RTHs and NMCs), which at present are not capable of separating the regional sections of the report from the global section, should compile bulletins for international exchange containing reports in which the global and regional sections of the code for surface observations (FM 12-IX Ext. and FM 13-IX Ext.) are included.

1.4.3 The further relay of global data messages by the RTHs concerned should be given high priority.

NOTE: Lists of stations to be included in global exchanges are found in Attachment I-4 to Part I, Volume I of this Manual.

1.5 Transmission of upper-air reports in Region III

The transmission to the extent permitted by the available circuits of Parts A, B, C and D of upper-air reports (TEMP, TEMP SHIP, PILOT, PILOT SHIP, etc.) over the regional meteorological telecommunication network of Region III and in the RTH broadcasts of Region III is mandatory. Parts A, B, C and D of these reports shall be transmitted separately.

2. ACKNOWLEDGEMENT OF ADDRESSED ADMINISTRATIVE MESSAGES

When an addressed administrative message is received, the addressed centre should send an addressed message to the originating centre, containing the following text:

OSL YYGGgg

where YYGGgg is the data-time group from the message received. The data designator $T_1T_2 = AB$ may be used in the abbreviated heading of this message.

3. DATA COMMUNICATION PROTOCOLS

Data communication protocols to be used on the RMTN should be elements of procedures as specified in CCITT Recommendations X.25 and X.224 which are indicated in Volume I, Global Aspects, Part II, section 2.12.3 of the present Manual.

4. RE-ROUTEING PROCEDURES FOR THE REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK FOR REGION III

4.1 The re-routeing procedures in cases of outages of centres and circuits included in the regional meteorological telecommunication network for Region III should, as far as possible, comply with the provisions included in Attachment II-11 to Part II, Volume I of this Manual.

4.2 Service messages concerning important operational matters (including outages of centres and circuits) should be exchanged between centres concerned. When no GTS circuit is available for the transmission of such service messages, they can be routed on the AFTN (in this case service messages shall conform to the format prescribed by ICAO).

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P A R T I I I

ENGINEERING OF CENTRES AND CIRCUITS IN REGION III (SOUTH AMERICA)

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PART III

ENGINEERING OF CENTRES AND CIRCUITS IN REGION III (SOUTH AMERICA)

1. ENGINEERING OF CENTRES

1.1 Engineering of RTHs in Region III

The RTHs in Region III shall be engineered so as to be capable of performing the functions as laid down in 2.1, Part I, Volume I of this Manual.

1.2 Engineering of NMCs in Region III

The NMCs in Region III shall be engineered so as to be capable of performing the functions laid down in 2.3, Part I, Volume I of this Manual.

2. TECHNICAL SPECIFICATIONS OF MAIN REGIONAL AND REGIONAL CIRCUITS IN REGION III

2.1 The main regional and regional circuits shall in general be engineered by making use of cable, satellite or microwave facilities. If these facilities are not available, HF radio circuits with the technical specifications given in paragraph 3.2 below should be used.

2.2 For data transmission at data-signalling rates of 2400, 4800 and 9600 bit/s on telephone-type dedicated circuits, preference should be given to use of modems in accordance with CCITT Recommendation V. 29, including multiplexing. When using V.29-type modem, independent channels provided by multiplexing techniques should be used for the transmission of data and facsimile. Further guidance for the application of multiplexing techniques provided by modems conforming to CCITT Recommendation V.29 is given in the annex.

3. ENGINEERING PRINCIPLES OF RADIO CIRCUITS

3.1 Introductory note

In addition to the guiding principles for the engineering of centres and circuits given in 1 and 2 above and to the technical characteristics and specifications contained in Part III, Volume I of this Manual, the material given below is intended to provide further information and guidance relating to the maintenance of radio point-to-point telegraph circuits and radio broadcasts in Region III in accordance with good engineering practice.

3.2 General engineering principles of radio circuits

3.2.1 *Signal-to-noise ratio*

The signal-to-noise ratio should not be less than that recommended by the CCIR for the mode of operation. The factors contributing to a satisfactory signal-to-noise ratio are:

- (a) Choice of frequency;
- (b) Selection of receiving site;
- (c) Types of antenna;
- (d) Adequate transmitted power.

3.2.2 *Frequencies*

The radio frequencies used should be selected to suit diurnal and seasonal variations as well as solar activity.

3.2.3 *Siting*

The receiving station should be located in an area relatively free from local radio and electrical interference so that a signal of reasonable field strength will provide the desired signal-to-noise ratio.

3.2.4 *Antennae*

Efficient directional antennae for the frequency bands concerned should be employed at both transmitting and receiving stations.

3.2.5 *Transmitted power*

The power output of a transmitter should be adequate for the circuit for which it is used. The power should be calculated by the methods given in standard publications, taking into consideration the following:

- (a) The location of the transmitter and the distance from the receiving station;
- (b) The noise level at the receiving site;
- (c) The type of transmission and system of reception used;
- (d) The gain of the transmitting and receiving antennae;
- (e) The time of transmission;
- (f) The allowances to be made for the fading of the received signal;
- (g) The frequency used;
- (h) The acceptable percentage of time for reliable reception.

3.2.6 *Diversity systems*

To improve the average signal strength and to minimize effects of fading, diversity systems should be employed. Of the various systems, space diversity offers the greatest advantages and should be employed wherever possible. If space is limited, however, polarization diversity should be employed.

3.2.7 *Mode of operation*

3.2.7.1 The mode of operation should be independent side-band (ISB). Provision should be made according to the traffic density so that one 3-kHz channel can be used for facsimile (analogue) transmission while telegraph signals are carried on another 3-kHz side-band. For the establishment of voice frequency telegraph (VFT) equipment, two-tone keying should be used.

3.2.7.2 The modulation rate should be 75 bauds (alternative modulation rates may be used as agreed bilaterally, using the International Telegraph Alphabet No. 2).

3.2.8 *Reception*

Receivers for ISB operation with the necessary VFT equipment should be used (channelling to be agreed bilaterally).

3.2.9 *Error detection and correction systems*

Error detection and correction systems should be employed as agreed bilaterally.

3.3 *Engineering of radio circuits and broadcasts*

In order to ensure reliable and efficient communication of HF radio circuits connecting RTH centres and reliable reception of RTH broadcasts, the CCIR specifications should be applied. The following guidelines were established in order to help the Members of the Regional Association for South America to plan the installations.

3.3.1 *Main regional circuits*

3.3.1.1 *Transmission*

- (a) Mode of operation ISB. On one side-band, low-speed or medium-speed data channels and on the other side-band, one or two facsimile channels. For the establishment of VFT equipment, two-tone keying should be used;

- (b) The transmitter output power should be adequate to provide the proper signal-to-noise ratio at the receiving site according to the CCIR recommendation;
- (c) Modulation rate 75 bauds (an alternative higher modulation rate may be used as agreed bilaterally);
- (d) Directional antenna systems (e.g. rhombic, log periodic or dipole arrays).

3.3.1.2 *Reception*

Receivers for ISB operation with the necessary VFT equipment should be used (channelling to be agreed bilaterally by those concerned).

3.3.1.3 *Error detection and correction systems*

Error detection and correction systems should be employed as agreed by those concerned.

3.3.2 **Regional circuits**

The technical specifications for the main regional circuits should be applied, as far as practicable, to the regional circuits.

3.3.3 **Interregional and supplementary interregional circuits**

The technical specifications for the main regional circuits should be applied, as far as practicable, to the interregional and supplementary interregional circuits.

3.3.4 **RTH broadcasts**

3.3.4.1 *Transmission*

- (a) Employing at least two radio frequencies simultaneously;
- (b) The transmitter output power should be adequate to provide the proper signal-to-noise ratio at the receiving centres in the area in which the broadcast is intended to be intercepted. It is considered that, when frequency modulation of the sub-carrier is employed, the average value of this power should be 5–10kW PEP. When direct frequency modulation (FSK) is employed, the value of this power should be 5–10kW;
- (c) Mode of operation F1D for telegraphy and F3C for facsimile according to WMO standards;
- (d) Modulation rate 50 bauds (alternative higher modulation rates subject to agreement by all Members concerned);
- (e) Signal distortion of outgoing signals less than 10 per cent.

3.3.4.2 *Reception*

Receivers for F1D and F3C mode of operation: diversity systems should preferably be used for F1D reception.

3.3.5 **Multiplexing of point-to-point channels on the same radio circuits**

The standards employed should conform to the CCIR specifications and be subject to an agreement between the two terminals concerned.

3.3.6 **Purchase of new equipment**

When new equipment has to be purchased for the recommended scheme, such equipment should be capable of being easily adapted to ISB operation.

3.4 **Engineering of radio transmission and reception facilities at NMCs**

The following *minimum* telecommunication equipment should be available at an NMC with one HF point-to-point circuit to its associated RTH. This list does not include standby equipment.

(a) *Transmitting station*

- One directional transmitting antenna system for the frequency bands concerned;
- One transmitter minimum power of 3–5 kW PEP.

(b) *Receiving station*

One diversity directional receiving antenna system for the frequency bands concerned;
Two receivers for diversity operation;
One VFT equipment, equipped for the number of channels to be received;
One FM/AM converter.

(c) *Terminal equipment*

One receive teleprinter with reperforator attachment;
One send teleprinter with auto-transmitter attachment;
One send/receive teleprinter with auto-transmitter and perforator attachments, as standby;
One perforator with back-spacing facilities;
One facsimile recorder;
One tone keyer for FSK keying.

ANNEX

**APPLICATION OF MULTIPLEXING TECHNIQUES PROVIDED BY MODEMS
CONFORMING TO CCITT RECOMMENDATION V. 29****1. GENERAL**

- (a) Dedicated circuits should be terminated at both ends with modems, in accordance with the CCITT Recommendation V.29;
- (b) A telephone-type circuit refers to a cable, landline, UHF or satellite link with a bandwidth of 300 Hz to 3400 Hz;
- (c) The modem conforming to CCITT Recommendation V.29 is intended to be used primarily on special quality leased circuits, e.g. Recommendations M.1020 or M.1025 circuits, but this does not preclude the use of this modem over circuits of lower quality;
- (d) All channels provided by multiplexing have an interface according to CCITT Recommendations V.24 and V.28.

2. POSSIBLE ARRANGEMENTS FOR CHANNELLING

- (a) A telephone-type circuit with a data-signalling rate of 9600 bit/s;
- (b) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 2 x 4800 bit/s channels;
- (c) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 4 x 2400 bit/s channels;
- (d) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 1 x 4800 and 2 x 2400 bit/s channels;
- (e) In addition to the above specified channelling, one or two low-speed channels can be provided in some models of modems. Since these channels are not specified in CCITT Recommendation V. 29, their operation is subject to agreement between adjacent centres.

3. USE OF MULTIPLEXED CHANNELS

- (a) All channels can be used for data transmission;
- (b) All channels can be used for coded or non-coded digital facsimile transmission. A data-signalling rate of 4800 bit/s is recommended for coded digital facsimile or non-coded digital facsimile with a scanning frequency of 120 lines/mn;
- (c) As an interim measure, all channels with a minimum data-signalling rate of 2400 bit/s can be used for asynchronous data transmission with a speed ranging from 50 to 600 bit/s (distortion of a 2400 bit/s channel used for asynchronous transmission with 600 bit/s equals 25%).

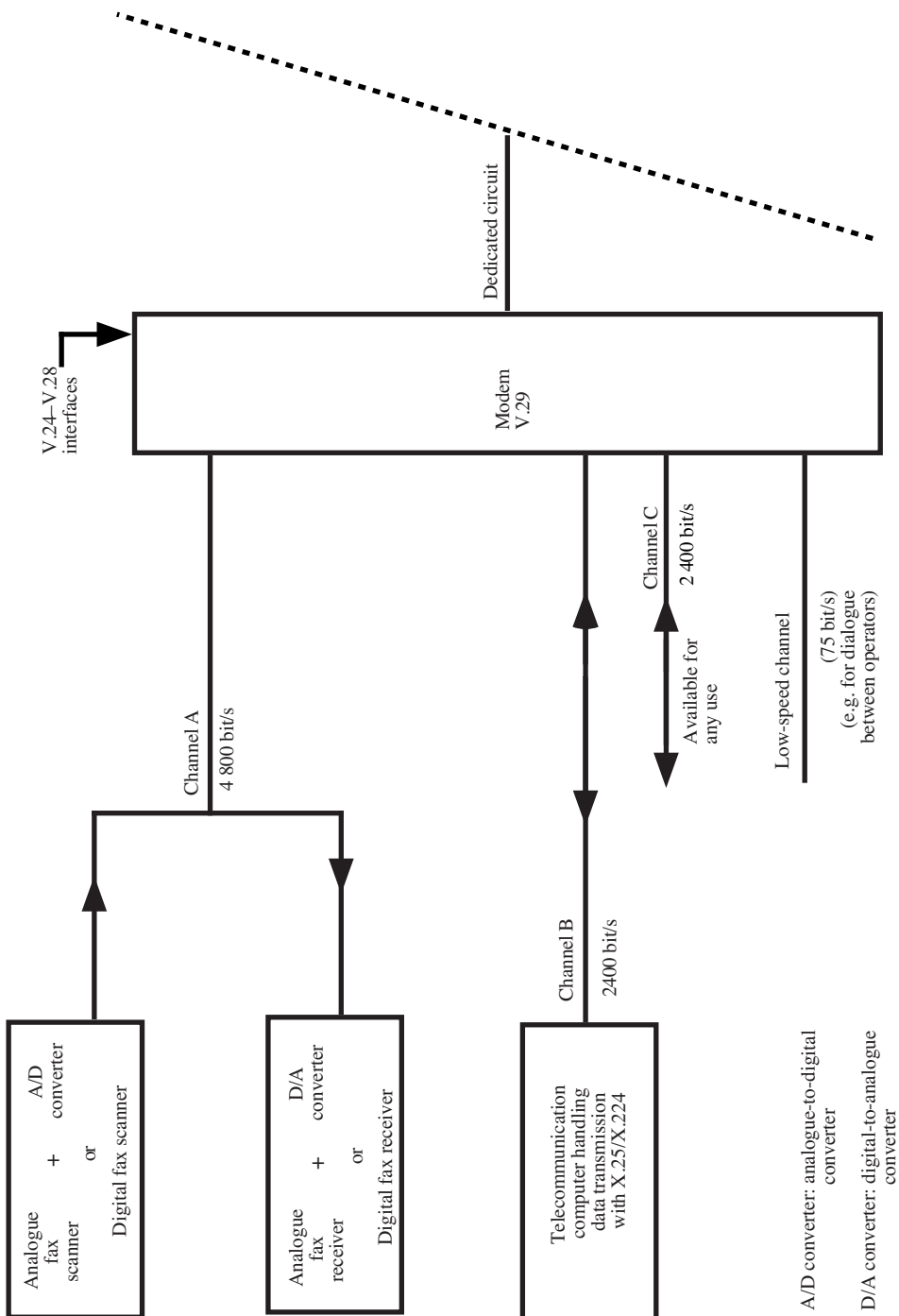
NOTE: An example of the use of multiplexed channels is given in the appendix to this annex.

4. OPERATIONAL CONDITIONS

- (a) The conventional type of analogue facsimile scanners and recorders can be used for non-coded digital facsimile transmissions with the addition of low-cost analogue-to-digital or digital-to-analogue converters;
- (b) The automatic line equalizers incorporated into the modems according to CCITT Recommendation V. 29 are suitable to cope with marginal circuit conditions of links according to CCITT Recommendation M.1020;
- (c) Data transmission carried out with an EDC procedure requiring a separate backward channel (WMO software and hardware EDC procedures as specified in Volume I of the Manual on the GTS, Part II) will occupy two channels provided by multiplexing or one channel provided by multiplexing and another channel as described in 2(e) above.

APPENDIX TO ANNEX

EXAMPLE OF USE OF MULTIPLEXED CHANNELS



REGION IV

NORTH AND CENTRAL AMERICA

**REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN
FOR REGION IV (NORTH AND CENTRAL AMERICA)
FOR THE WORLD WEATHER WATCH (WWW)**

P A R T I

**ORGANIZATION OF THE REGIONAL METEOROLOGICAL
TELECOMMUNICATION PLAN FOR REGION IV
(NORTH AND CENTRAL AMERICA)
FOR THE WORLD WEATHER WATCH (WWW)**

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P A R T I

**ORGANIZATION OF THE REGIONAL METEOROLOGICAL
TELECOMMUNICATION PLAN FOR REGION IV
(NORTH AND CENTRAL AMERICA)
FOR THE WORLD WEATHER WATCH (WWW)****1. GENERAL**

The growing needs of countries in Region IV for rapid and reliable reception of a large number of various types of meteorological data and products from all over North and Central America, adjacent ocean areas and other Regions call for the establishment of a telecommunication network in the Region that will satisfy these requirements. This network must be integrated into the WWW Global Telecommunication System (GTS) in order to exchange meteorological information with other Members of WMO outside the Region. Therefore, the telecommunication network in the Region will have to be compatible with the organizational and engineering principles adopted for the GTS.

2. NATIONAL METEOROLOGICAL TELECOMMUNICATION NETWORKS**2.1 Principles**

2.1.1 The national meteorological telecommunication networks should be organized to ensure the rapid and reliable collection of observational data to meet the WWW requirements as defined in 2.3 and 3.3, Part I, Volume I of this *Manual*. Arrangements to meet the requirements for meteorological information within the country will be the responsibility of the Member concerned.

2.1.2 Each Member shall designate a National Meteorological Centre (NMC), or other centres as appropriate, to perform the telecommunication functions indicated in 2.2 below.

2.1.3 Each Member, through its NMC as appropriate, is responsible for the meteorological checking of all the meteorological reports it collects before these are included in bulletins for transmission to the RTH.

2.2 Telecommunication functions of NMCs

2.2.1 The telecommunication functions of NMCs, the location and meteorological functions of which are a matter for decision by the Meteorological Services concerned, should be as defined in 2.3, Part I, Volume I of this *Manual*.

2.2.2 Subject to agreement of the Members concerned, NMCs may perform such additional functions as collection and relay of observational data from other NMCs or isolated stations (including island stations).

2.3 National collection of observational data

2.3.1 The choice of telecommunication facilities for the collection of information from stations located within a territory or country is a matter for decision by the Member concerned. The arrangements should comply with the provisions made in 3.3, Part I, Volume I of this *Manual*.

2.3.2 Meteorological reports from surface and upper-air synoptic stations should be filed immediately upon completion of the observation, including coding. Under normal conditions, the filing time should not exceed five minutes.

2.3.3 Members using the public telecommunication system for the collection of meteorological reports should:

- (a) Make periodic checks on the regularity and efficiency of the collection of meteorological reports from their synoptic stations;
- (b) Take full advantage of applicable operational provisions for the national and international telecommunication services;
- (c) Keep close liaison at all levels with the responsible telecommunication authorities (e.g. PTT) with a view to ensuring expeditious handling of meteorological traffic.

3. REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK

3.1 Principles

3.1.1 The regional meteorological telecommunication network should ensure rapid and reliable collection, exchange and distribution of meteorological information in such a way as to satisfy, as far as possible, the needs of Members of WMO and, in particular, of Members of RA IV. For this purpose, reliable, modern telecommunication facilities should be employed.

3.1.2 The regional meteorological telecommunication network for Region IV should conform to the WWW plan and shall perform the functions defined in 3.2.3, Part I, Volume I of this *Manual*.

3.2 Designation of an RTH in Region IV

The WMC Washington is designated as the RTH in Region IV.

3.3 Functions of the RTH

3.3.1 The RTH in Region IV should be capable of performing the functions defined in 2.1, Part I, Volume I of this *Manual*.

3.3.2 In particular, the RTH in the Region should have the following duties:

- (a) Collection of observational and processed data within its zone of responsibility;
- (b) Exchange on point-to-point/multipoint circuits of meteorological information with WMCs, RSMCs and RTHs as agreed;
- (c) Selective distribution on point-to-point/multipoint circuits and/or by satellite broadcasts of meteorological information from its own zone of responsibility and from WMCs, RSMCs or other RTHs to meet, in the first instance, the requirements of the NMCs within its zone of responsibility;
- (d) Checking and correcting in order to maintain standard transmission procedures.

3.4 Zone of responsibility of the RTH for the collection of observational data

The RTH Washington will have the responsibility for the collection of observational data; including reports from ships and aircraft, from the whole of Region IV.

3.5 Configuration of the regional meteorological telecommunication network

3.5.1 The regional meteorological telecommunication network interconnecting the centres is composed of the types of circuit defined in 3.2.2, Part I, Volume I of this *Manual*.

3.5.2 The regional meteorological telecommunication network consists of two-way multipoint circuits based on telecommunication services via satellite which interconnect WMC/RTH Washington with NMCs and centres with similar functions; it also includes point-to-point circuits.

3.5.3 Each NMC should be connected with the associated RTH by point-to-point/multipoint circuits to transmit its collected observational data and to receive required observational as well as processed information in alphanumeric, binary and pictorial form.

3.5.4 If the point-to-point/multipoint circuits are not available and where other cost-effective transmission means are available, the exchange of meteorological information between the NMCs concerned should be made by such means. In this case:

- (a) Wherever feasible, multiple, independent paths will ensure reliability;
- (b) Wherever feasible, each NMC should be equipped with sufficient back-up and receiving and recording equipment.

3.5.5 The NMC may be connected to the RTH in the Region via another NMC, subject to the agreement of the Members concerned.

3.5.6 Figure 1 shows the regional meteorological telecommunication network for Region IV.

3.6 Transmission programmes between the RTH and NMCs

3.6.1 The programmes transmitted by NMCs, or centres with similar functions, to the RTH should be composed of the following data:

- (a) Surface synoptic reports for main and intermediate standard hours and all upper-air data, TEMP and PILOT, Parts A, B, C and D, from all stations included in the regional basic synoptic network of the respective countries. Reports from additional stations may be included as agreed between Members concerned;
- (b) All weather reports received from ships and aircraft;
- (c) CLIMAT and CLIMAT TEMP once per month;
- (d) Priority messages, such as warnings of dangerous weather conditions;
- (e) Satellite data, as available;
- (f) BATHY and TESAC reports, as available;
- (g) Other types of information, as agreed.

3.6.2 The transmission of observational data to the RTH should start as soon as possible and in any case not later than 20 minutes after the observing station's filing time. Every effort should be made to complete this transmission within 35 minutes of the observing station's filing time to enable the RTHs/WMCs to meet their obligations in implementing the WWW.

3.6.3 The RTH is responsible for providing the NMCs within its zone of responsibility (see 3.4 above) with the observational and processed data required by the Members concerned on point-to-point/multipoint circuits and/or by radio or satellite broadcasts. For this purpose, the transmission programmes of the RTH should be established jointly by the Members responsible for the RTH and the associated NMCs, and included in WMO Publication No. 9, Volume C – Transmissions.

3.7 Exchange and distribution of processed meteorological information in Region IV

3.7.1 The regional telecommunication network should be capable of exchanging and distributing the processed information produced by WMCs and RSMCs and also by WAFS centres where the regional meteorological telecommunication network can accommodate the additional traffic, to meet the requirements of Members of RA IV.

3.7.2 The exchange of processed information (including satellite data) between centres should be carried out on point-to-point/multipoint circuits in alphanumeric or binary form (grid-point values) or in pictorial form.

3.8 Collection and transmission time of observational data and processed information exchanged by the RTH

3.8.1 The transmission times for the exchange of observational data for the RTH should be as follows:

- (a) The exchange and distribution of observational data within the Region should start as soon as possible, but not later than 20 minutes after the observing station's filing time;
- (b) The transmission of observational data to the RTH Washington situated on the main telecommunication network in Region IV should be completed not later than 45 minutes after the observing station's filing time.

3.8.2 The schedules for transmission of processed data in pictorial or alphanumeric form should be established in consultation between Members concerned, taking into account the requirements set forth in the WWW plan.

4. INTERREGIONAL EXCHANGES

4.1 Principles

The interregional exchanges of observational data and processed information with the neighbouring Regions should be made by the main telecommunication network and by interregional circuits.

4.2 Exchange of meteorological information between Regions IV and III

Exchanges of meteorological information between Regions IV and III are made through:

- (a) The main telecommunication network Washington–Brasilia;
- (b) The main telecommunication network Washington–Buenos Aires;
- (c) The extensions of the two-way multipoint circuits via satellite.

4.3 Exchange of meteorological information between Regions IV, II and V

Exchanges of meteorological information between Regions IV, II and V are made through:

- (a) The main telecommunication network Washington–Tokyo–Melbourne;
- (b) The supplementary interregional circuit Washington–Honolulu.

4.4 Exchange of meteorological information between Regions IV and VI

Exchanges of meteorological information between Regions IV and VI are made through the main telecommunication network Washington–Bracknell.

5. ARRANGEMENTS FOR THE EXCHANGE OF OBSERVATIONAL DATA

5.1 Ships' reports

5.1.1 Members should take appropriate action with the authorities responsible for the operation of designated coast stations with a view to ensuring that all ships' weather reports received at the coast stations are transmitted without delay to the NMC or RTH so that the transit time between the reception of the message from the ship at the coast station and the reception at the NMC or RTH does not exceed 15 minutes.

5.1.2 All ships' weather reports received at the NMCs should be sent as soon as possible to the RTH.

5.1.3 Members responsible for the operation of RTH, RSMC and NMCs in North and Central America shall ensure that all ships' reports which they receive up to 24 hours after the time of observation are included in their respective transmissions.

5.1.4 Every possible effort should be made to bring to the attention of ships' masters the considerable value of weather reports from all ships in the ocean areas, no matter how brief, noting that if reports at the synoptic hours are not possible, they may be made at other times convenient to themselves.

5.1.5 To ensure and facilitate adequate contact with ships, Members operating coast stations not making a 24-hour watch shall take into consideration the watch hours of radio officers aboard ships when fixing watch hours for their coast stations.

5.1.6 Members responsible for the collection and distribution of ships' weather reports should take appropriate action with the agencies responsible for operating coast stations, with a view to ensuring prompt response from those stations to ships calling them and arrange to forward the received ships' reports to the RTH or the relevant NMC without delay.

5.1.7 The RTH should exchange and distribute without delay, within Region IV and on the interregional circuits, all ships' weather reports received.

5.2 Aircraft reports

5.2.1 Each collecting centre, designated by ICAO, transmits aircraft reports to the regional collecting centre. The regional collecting centre in Region IV is the RTH Washington.

5.2.2 Aircraft reports received at the RTH acting as regional AIREP collecting centre should be disseminated at intervals not greater than three hours on the main regional, interregional and supplementary interregional circuits and also included in the RTH broadcasts.

5.2.3 Members receiving at their respective centres (NMCs or RTH) ASDAR aircraft reports should make appropriate arrangements to ensure that these reports will be exchanged over the GTS in accordance with established procedures.

5.2.4 Members making meteorological reconnaissance flights over the Region shall include the resulting observations as soon as possible in the appropriate point-to-point/multipoint transmissions or broadcasts.

5.3 Ground weather radar observations

Ground weather radar observations should be exchanged by arrangements made between Members concerned and by their inclusion in national transmissions and, where there is a need, in transmissions and broadcasts made by the RTH and the RSMC.

5.4 Meteorological satellite data

5.4.1 Satellite data prepared and distributed by WMCs or special satellite centres concerning Region IV and extending to neighbouring Regions should be included by the RTH/RSMC in Region IV in its respective point-to-point/multipoint transmissions and/or broadcasts.

5.4.2 The RTH/RSMC in Region IV should include messages containing orbital information (e.g. APT PREDICT and FANAS) and other information on the operation of polar orbiting and geostationary satellites, as available, in its respective transmissions and broadcasts.

5.5 Buoy data

5.5.1 Data from drifting and anchored buoys should be distributed by the RTH/RSMC in Region IV, as required.

5.5.2 Members operating drifting or anchored buoys should transmit these data to the associated RTH for further regional and global distribution, as required.

5.6 CLIMAT and CLIMAT TEMP reports

5.6.1 CLIMAT and CLIMAT TEMP reports should be transmitted as soon as possible after the end of the month and not later than the fifth day of the following month.

5.6.2 Each NMC shall be responsible for the compilation of its CLIMAT and CLIMAT TEMP bulletins.

5.6.3 A NIL report is transmitted whenever a CLIMAT or CLIMAT TEMP report is not available at the scheduled time.

5.6.4 The transmission schedules of CLIMAT and CLIMAT TEMP reports should be published in Volume C of WMO Publication No. 9.

5.6.5 The WMC/RTH Washington shall ensure the regular transmission of CLIMAT and CLIMAT TEMP reports on the MTN.

6. METNO AND WIFMA MESSAGES

6.1 The WMC/RTH Washington should make arrangements to obtain METNO and WIFMA messages through the main telecommunication network with Region VI.

6.2 The WMC/RTH Washington should include advance notification of changes in Volume A and C of WMO Publication No. 9 (METNO messages) and Volume D of the same publication (WIFMA messages) in the respective transmissions and broadcasts.

7. MONITORING THE OPERATION OF THE GTS

7.1 Besides implementing the Plan for Monitoring the Operation of the WWW, as given in Attachment 1-5 to Part I, Volume I of this *Manual*, each Member of RA IV should carry out its own monitoring at its own meteorological telecommunication centre(s) regarding:

- (a) The availability and timely reception of observational data for regional and global exchange from observing stations in the zone or area of responsibility of each centre;
- (b) Adherence to WMO standard meteorological telecommunication procedures and contents of bulletins;
- (c) Quality of observational data.

7.2 The Member responsible for the operation of the WMC/RTH should carry out periodic surveys on the availability of bulletins transmitted from its associated NMCs. The results of these surveys should be exchanged among the centres concerned and, when necessary, sent to the WMO Secretariat to initiate remedial action for improving shortcomings revealed from the results.

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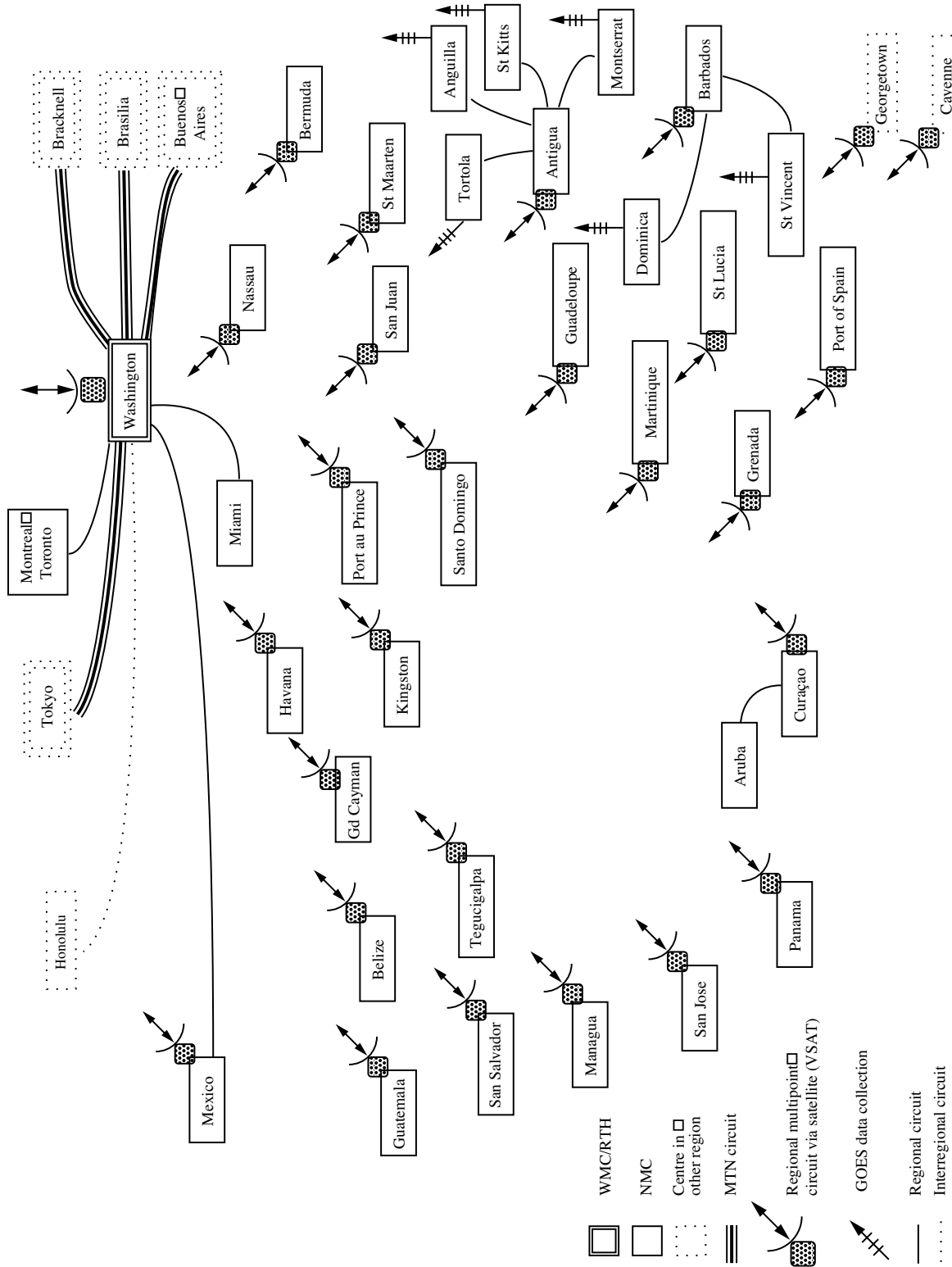


Figure 1 — Regional meteorological telecommunication network for Region IV (North and Central America)

P A R T I I
TELECOMMUNICATION PROCEDURES FOR REGION IV
(NORTH AND CENTRAL AMERICA)

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PART II

TELECOMMUNICATION PROCEDURES FOR REGION IV (NORTH AND CENTRAL AMERICA)

1. GENERAL

1.1 Compilation of bulletins

The NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this *Manual*). The compilation of bulletins should be as agreed upon between the RTH and NMC concerned.

1.2 Optimum length of message

The optimum length of message should be as defined in 2.7, Part II, Volume I of this *Manual*.

1.3 Message format for routine transmission of alphanumeric data

Alphabet No. 5 shall be used for all alphanumeric messages. The operational procedures are as defined in 2, Part II, Volume I of this *Manual*. The transmission sequence number 000 (see 2.3.1.2, Part II, Volume I) is a fixed group of three character zeros.

1.4 Exchange of global and regional data

1.4.1 In order to facilitate the rapid exchange of global data, the data from a given area (or country) should be transmitted to the RTH of Region IV by the originating NMC as separate messages as soon as possible. The further relay of these messages should also be given high priority.

1.4.2 Telecommunication centres (WMCs, RSMCs, RTHs and NMCs), which at present are not capable of separating the regional sections of the report from the global section, should compile bulletins for international exchange containing reports in which the global and regional sections of the code for surface observations (FM 12-IX Ext. and FM 13-IX Ext.) are included.

1.4.3 The further relay of global data messages by the RTH concerned should be given high priority.

2. DATA COMMUNICATION PROTOCOLS

Data communication protocols to be used on the RMTN should be elements of procedures as specified in CCITT Recommendations X.25 and X.224 which are indicated in 2.12.3, Part II, Volume I of this *Manual*. The TCP/IP (Transmission Control Protocol/Internet Protocol) could be used on the RMTN.

3. RE-ROUTEING PROCEDURES FOR THE REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK FOR REGION IV

3.1 The re-routeing procedures in cases of outages of centres and circuits to be applied in the regional meteorological telecommunication network for Region IV should, as far as possible, comply with the provisions included in Attachment II-11, Part II, Volume I of this *Manual*.

3.2 Service messages concerning important operational matters (including outages of centres and circuits) should be exchanged between the centres concerned. When no GTS circuit is available for the transmission of such service messages, they can be routed on the AFTN (in this case, service messages shall conform to the format prescribed by ICAO).

PART III

ENGINEERING OF CENTRES AND CIRCUITS IN REGION IV
(NORTH AND CENTRAL AMERICA)

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PART III

ENGINEERING OF CENTRES AND CIRCUITS IN REGION IV (NORTH AND CENTRAL AMERICA)

1. ENGINEERING OF CENTRES

1.1 Engineering of the RTH in Region IV

The RTH in Region IV shall be engineered so as to be capable of performing the functions laid down in 2.1, Part I, Volume I of this *Manual* and in 3.3, Part I of this section (Region IV).

1.2 Engineering of NMCs in Region IV

The NMCs in Region IV shall be engineered so as to be capable of performing the functions laid down in 2.3, Part I, Volume I of this *Manual* and in 2.2, 2.3, Part I of this section (Region IV).

2. TECHNICAL SPECIFICATIONS OF REGIONAL CIRCUITS IN REGION IV

2.1 The regional circuits shall, in general, be engineered by making use of cable, satellite or microwave facilities.

2.2 For data transmission at data-signalling rates of 2 400, 4 800 and 9 600 bit/s on telephone-type dedicated circuits, preference should be given to using modems in accordance with ITU-T Recommendation V.29, including multiplexing. For data-signalling rates from 14 400 to 64 000 bit/s, preference should be given to using devices in accordance with ITU-T Recommendation V.35.

REGION V

SOUTH-WEST PACIFIC

**REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN
FOR REGION V (SOUTH-WEST PACIFIC)
FOR THE WORLD WEATHER WATCH (WWW)**

P A R T I

**ORGANIZATION OF THE REGIONAL METEOROLOGICAL
TELECOMMUNICATION PLAN FOR REGION V (SOUTH-WEST PACIFIC)
FOR THE WORLD WEATHER WATCH (WWW)**

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P A R T I

ORGANIZATION OF THE REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN FOR REGION V (SOUTH-WEST PACIFIC) FOR THE WORLD WEATHER WATCH (WWW)

1. GENERAL

The growing needs of countries in Region V for rapid and reliable reception of a large number of various types of meteorological information from all over the South-West Pacific, adjacent ocean areas and other Regions call for the establishment of a telecommunication network in the Region that will satisfy these requirements. This network will have to be linked to and coordinated with the WWW Global Telecommunication System (GTS). The telecommunication network in the Region will therefore have to cope with the WWW requirements and comply with the organizational and engineering principles adopted for the GTS.

2. NATIONAL METEOROLOGICAL TELECOMMUNICATION NETWORKS

2.1 Principles

2.1.1 The national meteorological telecommunication networks should be organized to ensure the rapid and reliable collection of observational data to meet the WWW requirements as defined in 2.3 and 3.3, Part I, Volume I of this *Manual*. Arrangements to meet the requirements for meteorological information within the country will be the responsibility of the Member concerned.

2.1.2 Each Member shall designate a National Meteorological Centre (NMC), or other centres as appropriate, to perform the telecommunication functions indicated in 2.2 below.

2.1.3 Each NMC is responsible for the meteorological checking of all the meteorological reports it collects before they are included in bulletins for dissemination.

2.2 Telecommunication functions of NMCs

2.2.1 The telecommunication functions of NMCs, the location and meteorological functions of which are a matter for decision by the Meteorological Services concerned, should be as defined in 2.3, Part I, Volume I of this *Manual*.

2.2.2 Subject to agreement of the Members concerned, NMCs may perform such additional functions as collection and relay of observational data from other NMCs or isolated island stations.

2.3 National collection of observational data

2.3.1 The choice of telecommunication facilities for the collection of information from stations located within a territory or country is a matter for decision by the Member concerned. The arrangements should comply with the provisions made in 3.3, Part I, Volume I of this *Manual*.

2.3.2 Meteorological reports from surface and upper-air synoptic stations should be filed immediately upon completion of the observation, including coding. Under normal conditions, the filing time should not exceed five minutes.

2.3.3 Members using the public telecommunication system for the collection of observational reports should:

- (a) Make periodic checks on the regularity and efficiency of the collection of meteorological reports from their synoptic stations;
- (b) Take full advantage of applicable operational provisions for the national and international telecommunication services;
- (c) Keep close liaison at all levels with the responsible telecommunication authorities (e.g. PTT) with a view to ensuring expeditious handling of meteorological traffic.

3. REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK

3.1 Principles

3.1.1 The regional meteorological telecommunication network should ensure rapid and reliable collection, exchange and distribution of meteorological information in such a way as to satisfy, as far as possible, the needs of Members of WMO and, in particular, of Members of RA V. For this purpose, reliable and modern telecommunication facilities should be employed.

3.1.2 The regional meteorological telecommunication network for Region V should conform to the WWW plan and shall perform the functions defined in 3.2.3, Part I, Volume I of this *Manual*.

3.2 Designation of RTHs in Region V

The designated RTHs in Region V are:

- (a) The World Meteorological Centre Melbourne, which also performs the function of an RTH;
- (b) Other RTH: Wellington.

3.3 Functions of RTHs

3.3.1 RTHs in Region V should be capable of performing the functions defined in 2.1, Part I, Volume I of this *Manual*.

3.3.2 In particular, each RTH in the Region should have the following duties:

- (a) Collection of observational data and processed information within its zone of responsibility;
- (b) Exchange on point-to-point circuits of meteorological information with WMCs, RSMCs and RTHs as agreed;
- (c) Selective distribution on point-to-point circuits and/or by radio broadcasts of meteorological information from its own zone of responsibility and retransmission of meteorological information received from WMCs, RSMCs, WAFCs, RAFCs or other RTHs to meet, in the first instance, the requirements of the NMCs within its zone of responsibility;
- (d) Checking and correcting in order to maintain standard telecommunication transmission procedures.

3.4 Zones of responsibility of RTHs for the collection of observational data

The RTHs in the Region will have the following zones of responsibility for collection of observational data*:

<i>Name of RTH</i>	<i>Zone of Responsibility</i>
Melbourne	Australia and outlying islands, Brunei Darussalam, Fiji, French Polynesia, Indonesia, Kiribati, Malaysia, New Caledonia, Papua New Guinea, Philippines, Singapore, Solomon Islands, Tonga, Tuvalu, Vanuatu, Wallis and Futuna, Western Samoa
Wellington	New Zealand and outlying islands, Cook Islands, Niue, Pitcairn, Tokelau

* Arrangements shall be made by the RTH to ensure that all Antarctic data received shall be disseminated on the MTN and regionally as required.

3.5 Configuration of the regional meteorological telecommunication network

3.5.1 The regional meteorological telecommunication network interconnecting the centres is composed of the types of circuit defined in 3.2.2, Part I, Volume I of this *Manual*.

3.5.2 Each NMC should be connected with the associated RTH (see 3.4 above) by point-to-point circuits to transmit its collected observational data and to receive required observational as well as processed information in alphanumeric, binary and pictorial form. NMCs may be connected to more than one RTH.

3.5.3 If facsimile transmission is not possible on the point-to-point circuits, and until such capability is established, the exchange of meteorological information in facsimile between the NMCs and the associated RTH should be made by radio-facsimile broadcasts. In this case, each NMC should be equipped with at least two facsimile receiving sets complete with directional antennae to be able to receive the required information primarily from the associated RTH (see 3.6 below).

3.5.4 The NMC may be connected to the associated RTH via another NMC, subject to the agreement of the Members concerned.

3.5.5 Figure 1 shows the regional meteorological telecommunication network for Region V.

3.6 Transmission programmes between RTHs and NMCs

3.6.1 The programmes transmitted by NMCs or centres with similar functions, to the associated RTHs should contain the following data:

- (a) Surface synoptic reports for main and intermediate standard hours and all upper-air data, TEMP and PILOT, Parts A, B, C and D, from all stations included in the regional basic synoptic network of the respective countries. Reports from additional stations may be included as agreed between Members concerned;
- (b) All weather reports received from ships and aircraft;
- (c) CLIMAT and CLIMAT TEMP once per month;
- (d) Priority messages, such as warnings of dangerous weather conditions;
- (e) Satellite data, as agreed;
- (f) BATHY and TESAC reports, as available;
- (g) Other types of information, as agreed.

3.6.2 The transmission of observational data to the associated RTH should start as soon as possible and in any case not later than 20 minutes after the observing station's filing time. Every effort should be made to complete this transmission within 35 minutes of the observing station's filing time to enable the RTHs/RSMCs/WMCs to meet their obligations in implementing the WWW.

3.6.3 Each RTH is responsible for providing the NMCs within its zone of responsibility with the observational data and processed information required by the Members concerned on point-to-point circuits and/or by radio broadcasts. For this purpose, the transmission programmes of the RTH should be established jointly by the Members responsible for the RTH and the associated NMCs, and included in WMO Publication No. 9, Volume C — Transmissions.

3.6.4 To meet the requirements of those Members who are not able to receive pictorial information from the associated RTHs by point-to-point circuits, each RTH should establish and maintain a radio-facsimile broadcast where transmission programmes are based on the following principle: each NMC should be able to receive the processed information it needs from the associated RTH.

3.7 Exchange and distribution of processed meteorological information in Region V

3.7.1 The regional telecommunication network should be capable of exchanging and distributing the processed information produced by WMCs and RSMCs and also by WAFS centres where the regional meteorological telecommunication network can accommodate the additional traffic, to meet the requirements of Members of RA V.

3.7.2 The exchange of processed information (including satellite data) between centres should be carried out on point-to-point circuits in alphanumeric or binary form (grid-point values) or in pictorial form.

3.8 Transmission programmes between RTHs

3.8.1 RTHs should exchange observational data and processed information from Region V and other Regions in order to meet the needs of the Members of the Region as well as the WWW. WMC/RTH Melbourne is responsible for the exchange of observational data and processed information with the other RTH in Region V, as indicated in Volume I, Part I, Attachment 1-3, in the table of paragraph 1.

3.8.2 In the event of a breakdown of a main regional circuit, the alternative routing of the traffic through other regional circuits and/or other means shall be arranged between the WMC and the RTH.

3.9 Collection and transmission time of observational data and processed information exchanged by RTHs

3.9.1 The transmission times for the exchange of observational data for RTHs should be as follows:

- (a) The exchange and distribution of observational data within the Region should start as soon as possible, but not later than 20 minutes after the observing station's filing time;
- (b) The transmission of observational data to the RTH on the main telecommunication network in Region V should be completed not later than 45 minutes after the observing station's filing time.

3.9.2 The schedules for transmission of processed information in pictorial (facsimile) or alphanumeric/binary (grid-point) form should be established in consultation with Members concerned, taking into account the requirements set forth in the WWW plan.

3.10 Regional facsimile plan

In addition to the point-to-point transmissions, the WMC/RTH Melbourne, the RSMC Darwin and the RSMC/RTH Wellington should establish and maintain radio-facsimile broadcasts for dissemination of products of WMCs, RSMCs and WAFS centres, as required.

3.11 Areas in which reception of the RTHs' broadcasts should be ensured

To meet the requirements of 3.6.4 and 3.10 above, the designated RTHs and RSMCs should ensure reliable reception of the radio-facsimile broadcasts within the following areas:

Melbourne/Darwin	60°S – 30°N 70°E – 160°E
Wellington	60°S – 30°N 140°E – 120°W

4. INTERREGIONAL EXCHANGES

The interregional exchanges with the neighbouring Regions should be made by the Main Telecommunication Network and the following supplementary interregional circuits:

(a) Kuala Lumpur—Bangkok; (b) Manila—Tokyo; (c) Honolulu—Washington; (d) Honolulu—Tokyo.

5. ARRANGEMENTS FOR THE EXCHANGE OF OBSERVATIONAL DATA

5.1 Ships' reports

5.1.1 Members should take appropriate action with the authorities responsible for the operation of designated coast stations with a view to ensuring that all ships' weather reports received at the coast stations are transmitted without delay to the NMC so that the transit time between the reception of the message from the ship at the coast station and the reception at the NMC does not exceed 15 minutes.

5.1.2 All ships' weather reports received at the NMCs should be sent as soon as possible to the appropriate RTHs.

5.1.3 Members responsible for the operation of RTHs and NMCs in the South-West Pacific should ensure that all ships' reports which they receive up to 24 hours after the time of observation are included in their respective transmissions and broadcasts.

5.1.4 Members should make every effort to adhere to the procedures for collection of ships' weather reports from stations at sea and to bring them to the attention of ships' masters as required, in particular the additional procedures for single operator ships (see section 4 of Attachment I-1 to Part I, Volume I of this *Manual*).

5.1.5 To ensure and facilitate adequate contact with ships, Members operating coast stations not making a 24-hour watch shall take into consideration the watch hours of radio officers aboard ships when fixing watch hours for their coast stations.

5.1.6 Members responsible for the collection and distribution of ships' weather reports should take appropriate action with the agencies responsible for operating coast stations, with a view to ensuring a prompt response from those stations to ships calling them and arrange to forward the received ships' reports to the relevant NMC without delay.

5.1.7 The RTHs should exchange and distribute without delay within Region V and on the interregional circuits all ships' weather reports received.

5.2 Aircraft reports

5.2.1 Each collecting centre (designated by ICAO) transmits aircraft reports to the NMC of the country in which the collecting centre is situated. The NMC transmits these aircraft reports to the appropriate regional collecting centre. The appropriate regional collecting centre is the RTH in Region V in whose zone of responsibility the NMC is located.

NOTE: The collecting centres designated by ICAO for this purpose are included in Table MET-1 of the PAC Air Navigation Plan.

5.2.2 Aircraft reports received in the RTHs acting as regional AIREP collecting centres are disseminated at intervals not greater than three hours on the main regional, regional and supplementary interregional circuits.

5.2.3 Members receiving at their respective centres (NMCs or RTHs) ASDAR aircraft reports should make appropriate arrangements to ensure that these reports will be exchanged over the GTS in accordance with established procedures.

5.2.4 Members making meteorological reconnaissance flights over the Region shall include the resulting observations as soon as possible in the appropriate point-to-point transmissions or broadcasts.

5.2.5 The NMCs should convert aircraft reports used for synoptic purposes in AIREP form prior to their transmission to the associated RTHs.

5.3 Ground weather radar observations

Ground weather radar observations should be exchanged by arrangements made between Members concerned and by their inclusion in national transmissions and, where there is a need, in transmissions and broadcasts made by RTHs.

5.4 Meteorological satellite data

5.4.1 Satellite data issued by WMCs/RSMCs or special satellite centres concerning Region V and extending to neighbouring Regions should be included by RTHs in Region V in their respective point-to-point transmissions and/or broadcasts.

5.4.2 Members operating RTHs in Region V should include messages containing orbital information (e.g. APT PREDICT) and other information on the operation of polar-orbiting and geostationary satellites, as available, in their respective transmissions.

5.5 Buoy data

5.5.1 Data from drifting and anchored buoys in the southern hemisphere should be distributed by the WMC/RTHs in Region V, as required.

5.5.2 Members operating drifting or anchored buoys should transmit these data to the associated WMC/RTHs for further regional and global distribution, as required.

5.6 CLIMAT and CLIMAT TEMP reports

5.6.1 CLIMAT and CLIMAT TEMP reports should be transmitted as soon as possible after the end of the month and not later than the fifth day of the following month.

5.6.2 CLIMAT and CLIMAT TEMP reports should be included by NMCs and RTHs at the end of the transmission schedule at the main synoptic hours.

5.6.3 The WMC/RTH Melbourne shall ensure the regular transmission of CLIMAT and CLIMAT TEMP reports on the MTN.

5.6.4 A NIL report is transmitted whenever a CLIMAT or CLIMAT TEMP report is not available at the scheduled time.

5.6.5 The transmission schedules of CLIMAT and CLIMAT TEMP reports should be published in Volume C of WMO Publication No. 9.

6. METNO AND WIFMA MESSAGES

6.1 The WMC/RTH Melbourne should make arrangements to obtain advance notification of changes in Volumes A and C (METNO messages) of WMO Publication No. 9 and Volume D (WIFMA messages) of the same publication through the MTN. These messages should be disseminated to the RTH Wellington.

6.2 Members operating RTHs in Region V should disseminate the METNO and WIFMA messages to the NMCs in the Region through the respective transmissions.

7. MONITORING THE OPERATION OF THE GTS

7.1 Besides participating in the Plan for Monitoring the Operation of the WWW, as included in Attachment 1-5 to Part I, Volume I of this *Manual*, each Member of RA V should carry out monitoring at its own meteorological telecommunication centre(s) regarding:

- (a) The availability and timely reception of observational data for regional and global exchange from observing stations in the zone or area of responsibility of each centre;
- (b) Adherence to WMO standard meteorological telecommunication procedures and contents of bulletins;
- (c) Quality of observational data.

7.2 Members of RA V responsible for the operation of the WMC/RTHs should carry out periodic surveys on the availability of bulletins transmitted from the associated NMCs. The results of these surveys should be exchanged among the centres concerned and, when necessary, sent to the WMO Secretariat, to initiate remedial action for improving shortcomings revealed by the results.

7.3 Members of RA V responsible for the operation of the WMC/RTHs should arrange, in consultation with the centres concerned, to use the international Q code in the text of addressed messages in order to overcome language difficulties between the centres concerned.

7.4 If applicable, Members of RA V should monitor their meteorological broadcasts by intercepting the radio emission. Provision should also be made for an easy changeover of monitoring from one frequency to another.

7.5 Recipients of meteorological broadcasts should report each month to the meteorological authorities of the countries concerned on the quality of reception of these broadcasts and also inform them of all deficiencies that may occur.

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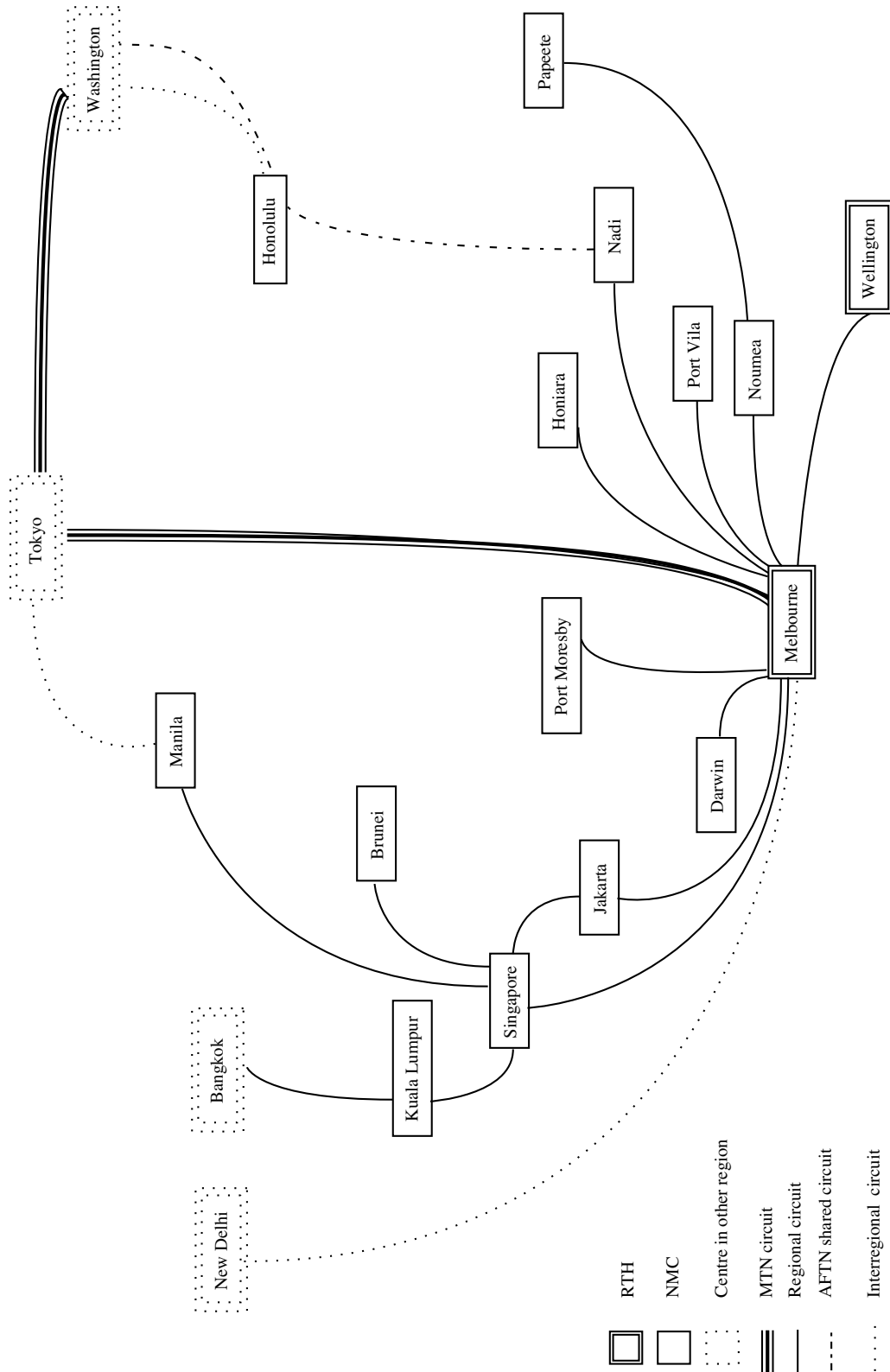


Figure 1 — Regional meteorological telecommunication network for Region V (South-West Pacific)

P A R T II

TELECOMMUNICATION PROCEDURES FOR REGION V
(SOUTH-WEST PACIFIC)

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PART II

TELECOMMUNICATION PROCEDURES FOR REGION V (SOUTH-WEST PACIFIC)

1. GENERAL

1.1 Compilation of bulletins

The NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this Manual). Separate bulletins should be compiled for the global and regional exchanges and, as agreed between RTHs and NMCs concerned, for the exchange of data for national or bilateral use.

1.2 Optimum length of message

The optimum length of message should be as defined in 2.7, Part II, Volume I of this Manual.

1.3 Message format for routine transmission of alphanumeric data

The use of the following groups in the world-wide message format relating to routine transmission of alphanumeric data, as given in Part II, Volume I of this Manual, in Region V shall be as follows:

- (a) The use of the transmission number nnn shall be mandatory in International Telegraph Alphabet No. 2 and International Alphabet No. 5. Unless otherwise agreed, the number shall be cyclic 000 to 999 inclusive, regardless of time;
- (b) Requests for repetition of meteorological messages and analogue facsimile transmissions shall be made as soon as possible, as defined in 2.5, Part II, Volume I of this Manual.

1.4 Exchange of regional observational data

1.4.1 In order to facilitate the rapid exchange of regional observational data, the NMC should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this Manual).

1.4.2 Telecommunication centres (WMCs, RSMCs, RTHs and NMCs), which are not at present capable of separating the regional sections of the report from the global section, should compile bulletins for international exchange containing reports in which the global and regional sections of the code for surface observations (FM 12-IX Ext. and FM 13-IX Ext.) are included.

1.4.3 The further relay of global data messages by the RTHs concerned should be given high priority.

NOTE: Lists of stations to be included in global exchanges are found in Attachment 1-4 to Part I, Volume I of this Manual.

1.5 Transmission of upper-air reports in Region V

The transmission to the extent permitted by the available circuits of Parts A, B, C and D of upper-air reports (TEMP, TEMP SHIP, PILOT, PILOT SHIP, etc.) over the regional meteorological telecommunication network of Region V is mandatory. Parts A, B, C and D of these reports shall be transmitted separately.

2. DATA COMMUNICATION PROTOCOLS

Data communication protocols to be used on the RMTN should be elements of procedures as specified in CCITT Recommendations X.25 and X.224 which are indicated in Volume I, Global Aspects, Part II, section 2.12.3 of the present Manual.

3. RE-ROUTEING PROCEDURES FOR THE REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK FOR REGION V

3.1 The re-routeing procedures in cases of outages of centres and circuits to be applied in the regional meteorological telecommunication network for Region V should, as far as possible, comply with the provisions included in Attachment II-11 to Part II, Volume I of this Manual.

3.2 Service messages concerning important operational matters (including outages of centres and circuits) should be exchanged between centres concerned. When no GTS circuit is available for the transmission of such service messages, they can be routed on the AFTN (in this case service messages shall conform to the format prescribed by ICAO).

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P A R T I I I

ENGINEERING OF CENTRES AND CIRCUITS IN REGION V
(SOUTH-WEST PACIFIC)

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PART III

ENGINEERING OF CENTRES AND CIRCUITS IN REGION V (SOUTH-WEST PACIFIC)

1. ENGINEERING OF CENTRES

1.1 Engineering of RTHs in Region V

The RTHs in Region V shall be engineered so as to be capable of performing the functions as laid down in 2.1, Part I, Volume I of this Manual.

1.2 Engineering of NMCs in Region V

The NMCs in Region V shall be engineered so as to be capable of performing the functions as laid down in 2.3, Part I, Volume I of this Manual.

2. TECHNICAL SPECIFICATIONS OF MAIN REGIONAL AND REGIONAL CIRCUITS IN REGION V

2.1 The main regional and regional circuits shall in general be engineered by making use of cable, satellite or microwave facilities.

2.2 For data transmission at data-signalling rates of 2400, 4800 and 9600 bit/s on telephone-type dedicated circuits, preference should be given to use of modems in accordance with CCITT Recommendation V. 29, including multiplexing. When using V.29-type modems, independent channels provided by multiplexing techniques should be used for the transmission of data and facsimile. Further guidance for the application of multiplexing techniques provided by modems conforming to CCITT Recommendation V.29 is given in the annex.

3. RTH FACSIMILE BROADCASTS

Broadcasts should be made as follows:

- (a) Employing at least two radio frequencies simultaneously;
- (b) The transmitter output power should be adequate to provide the proper signal-to-noise ratio at the receiving centres in the area in which the broadcast is intended to be intercepted. It is considered that the average value of this power should be 10 kW PEP;
- (c) Mode of operation F4 according to WMO standards.

NOTE: When the same broadcast is used to serve shipping, any change should take into account the reception capabilities of ships.

A N N E X

APPLICATION OF MULTIPLEXING TECHNIQUES IN ACCORDANCE WITH MODEMS CONFORMING TO CCITT RECOMMENDATION V.29

1. GENERAL

- (a) Dedicated circuits should be terminated at both ends with modems, in accordance with CCITT Recommendation V.29;
- (b) A telephone-type circuit refers to a cable, landline, UHF or satellite link with a bandwidth of 300 Hz to 3400 Hz;
- (c) The modem conforming to CCITT Recommendation V.29 is intended to be used primarily on special quality leased circuits, e.g. Recommendations M.1020 or M.1025 circuits, but the use of this modem over circuits of lower quality is not precluded;
- (d) All channels provided by multiplexing have an interface according to CCITT Recommendations V.24 and V.28.

2. POSSIBLE ARRANGEMENTS FOR CHANNELLING

- (a) A telephone-type circuit with a data-signalling rate of 9600 bit/s;
- (b) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 2×4800 bit/s channels;
- (c) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 4×2400 bit/s channels;
- (d) A telephone-type circuit with a data-signalling rate of 9600 bit/s subdivided into 1×4800 and 2×2400 bit/s channels;
- (e) In addition to the above specified channelling, one or two low-speed channels can be provided in some models of modems. Since these channels are not specified in CCITT Recommendation V.29, their operation is subject to agreement between adjacent centres.

3. USE OF MULTIPLEXED CHANNELS

- (a) All channels can be used for data transmission;
- (b) All channels can be used for coded or non-coded digital facsimile transmission. A data-signalling rate of 4800 bit/s is recommended for coded digital facsimile or non-coded digital facsimile with a scanning frequency of 120 lines/mn;
- (c) As an interim measure, all channels with a minimum data-signalling rate of 2400 bit/s can be used for asynchronous data transmission with a speed ranging from 50 to 600 bit/s (distortion of a 2400 bit/s channel used for asynchronous transmission with 600 bit/s equals 25%).

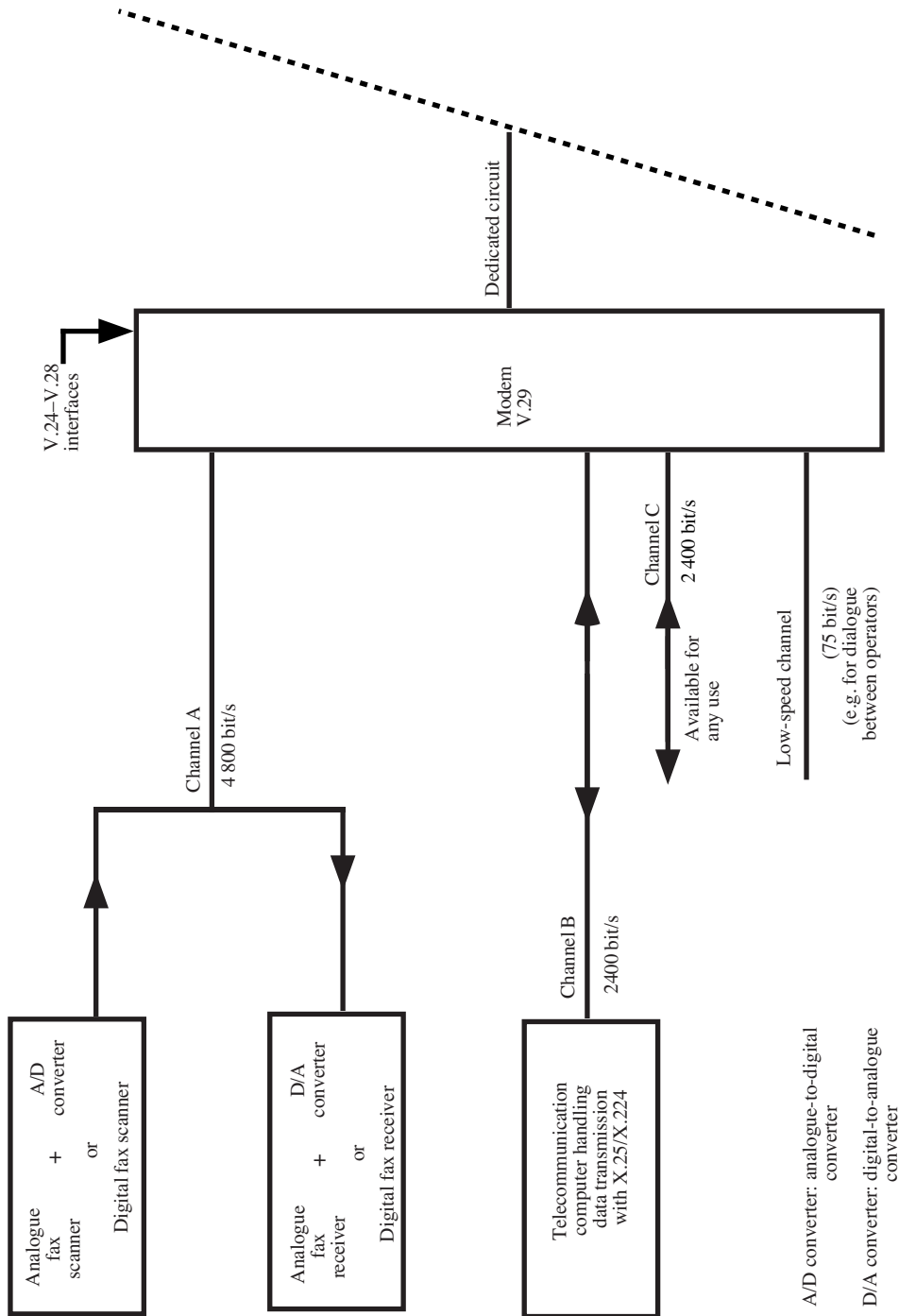
NOTE: An example of the use of multiplexed channels is given in the appendix to this annex.

4. OPERATIONAL CONDITIONS

- (a) The conventional type of analogue facsimile scanners and recorders can be used for non-coded digital facsimile transmissions with the addition of low-cost analogue-to-digital or digital-to-analogue converters;
- (b) The automatic line equalizers incorporated into the modems according to CCITT Recommendation V.29 are suitable to cope with marginal circuit conditions of links according to CCITT Recommendation M.1020;
- (c) Data transmission carried out with an EDC procedure requiring a separate backward channel (WMO software and hardware EDC procedures as specified in Volume I of the Manual on the GTS, Part II) will occupy two channels provided by multiplexing or one channel provided by multiplexing and another one of the channels as described in 2(e) above.

APPENDIX TO ANNEX

EXAMPLE OF USE OF MULTIPLEXED CHANNELS



REGION VI

EUROPE

**REGIONAL METEOROLOGICAL TELECOMMUNICATION PLAN
FOR REGION VI (EUROPE)
FOR THE WORLD WEATHER WATCH (WWW)**

P A R T I

**ORGANIZATION OF THE REGIONAL METEOROLOGICAL
TELECOMMUNICATION NETWORK IN REGION VI (EUROPE)
FOR THE WORLD WEATHER WATCH (WWW)**

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P A R T I

**ORGANIZATION OF THE REGIONAL METEOROLOGICAL
TELECOMMUNICATION NETWORK IN REGION VI (EUROPE)
FOR THE WORLD WEATHER WATCH (WWW)**

1. GENERAL

The growing needs of Members in Region VI for rapid and reliable reception of a large number of various types of meteorological information from the whole of Region VI, from adjacent ocean areas and other Regions, call for the establishment of a telecommunication network in the Region that will satisfy these requirements. This network will have to be linked to and coordinated with the WWW Global Telecommunication System (GTS). The telecommunication network in the Region will therefore have to cope with the WWW requirements and comply with the organizational and engineering principles adopted for the GTS.

2. NATIONAL METEOROLOGICAL TELECOMMUNICATION NETWORKS

2.1 Principles

2.1.1 The national meteorological telecommunication networks should be organized to ensure the rapid and reliable collection of observational data to meet the WWW requirements as defined in 2.3 and 3.3, Part I, Volume I of this *Manual*.

2.1.2 Each Member shall designate a National Meteorological Centre (NMC), or other centres as appropriate, to perform the telecommunication functions indicated in 2.2 below.

2.2 Telecommunication functions of NMCs

The telecommunication functions of National Meteorological Centres (NMCs), the location and meteorological functions of which are a matter for decision by the Meteorological Services concerned (see 2.4, Part I, Volume I of this *Manual*), should be as defined in 2.3, Part I, Volume I of this *Manual*.

2.3 Links between NMCs and associated Regional Telecommunication Hubs (RTHs)

Each NMC should be interconnected with the associated RTH by point-to-point circuits to transmit its collected observational data in accordance with 3.3.2, Part I, Volume I of this *Manual*, and to receive the required observational data as well as processed information in alphanumeric, binary and pictorial form. NMCs may be connected to more than one RTH.

2.4 Transmission programmes of NMCs to RTHs

The programmes transmitted by NMCs, or centres with similar functions, to RTHs should be composed of the following data:

- (a) Surface synoptic reports for main and intermediate standard hours (0000, 0300, 0600, 0900, 1200, 1500, 1800 and 2100 UTC), upper-wind data for 0000, 0600, 1200 and 1800 UTC and radiosonde data for 0000 and 12000 UTC (and, if available, for 0600 and 1800 UTC) from all stations included in the regional basic synoptic network of the respective country or countries and also reports from additional stations, if required regionally;
- (b) Reports received from ships and aircraft;
- (c) CLIMAT and CLIMAT TEMP reports;
- (d) Priority reports, such as warnings of dangerous weather phenomena;
- (e) BATHY and TESAC reports;
- (f) Satellite data;
- (g) Other types of information as agreed regionally or bilaterally.

3. REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK

3.1 Principles

The regional meteorological telecommunication network for Region VI should ensure rapid and reliable collection, exchange and distribution of meteorological information to satisfy, as far as possible, the needs of Members of WMO and, in particular, of Members of Region VI. It shall therefore perform the functions defined in 3.2.3, Part I, Volume I of this *Manual* and be based on up-to-date techniques.

3.2 Designation of RTHs in Region VI

The designated RTHs in Region VI are:

- (a) The World Meteorological Centre Moscow, which also performs the functions of a European RTH;
- (b) RTHs on the main telecommunication network: Bracknell; Offenbach; Toulouse; Prague; Sofia;
- (c) Other RTHs: Norrköping; Rome; Vienna.

3.3 Functions of RTHs

RTHs in Region VI should perform the telecommunication functions defined in 2.1, Part I, Volume I of this *Manual*.

3.4 Zones of responsibility of RTHs for the collection of observational data

The RTHs in the Region have the following zones of responsibility for the collection of observational data, including ships' weather reports and aircraft weather reports:

<i>Name of RTH</i>	<i>Zone of responsibility</i>
Bracknell (Programme 1)	Gibraltar, Greenland, Iceland, Ireland, Netherlands, United Kingdom, ocean weather stations (OWS)
Moscow (Programme 5)	Armenia, Azerbaijan, Belarus, Georgia, Moldova, Russian Federation (in Region VI), Ukraine
Norrköping (Programme 2)	Denmark, Estonia, Finland, Latvia, Lithuania, Norway, Sweden
Offenbach (Programme 4)	Germany, Israel, Switzerland
Toulouse (Programme 3)	Belgium, France, Portugal, Spain
Prague (Programme 7)	Czech Republic, Hungary, Poland, Slovakia
Rome (Programme 6)	Greece, Italy, Lebanon, Malta, Turkey
Sofia (Programme 9)	Albania, Bulgaria, Cyprus, Former Yugoslav Republic of Macedonia, Jordan, Romania, Syrian Arab Republic, Yugoslavia
Vienna (Programme 8)	Austria, Croatia, Slovenia

3.5 Configuration of the regional meteorological telecommunication network

3.5.1 The regional meteorological telecommunication network interconnecting the centres should comprise meteorological transmission systems and circuits as defined in 3.2.2, Part I, Volume I of this *Manual*.

3.5.2 The configuration of the regional meteorological telecommunication network for Region VI (Europe) should be as shown in Figure 1.

3.5.3 *Interregional exchanges*

Exchanges of meteorological information between Region VI and Regions I, II and IV are made:

- (a) Through the corresponding circuits of the main telecommunication network;
- (b) Through the corresponding interregional circuits;
- (c) Through the supplementary interregional circuits, as necessary.

NOTE: The RTHs concerned should coordinate their programmes to avoid duplication.

3.6 **Responsibility for the compilation of programmes of observational data from Region VI for insertion into the main telecommunication network**

The WMC Moscow and the RTHs in the Region on the Main Telecommunication Network are responsible for the compilation and insertion of observational data into the Main Telecommunication Network, as shown in Figure 2.

3.7 **Exchange and distribution of observational data within Region VI**

3.7.1 *Principles*

3.7.1.1 The exchange and distribution of observational data should meet the requirements of Members of RA VI and the WWW as a whole. The transmissions schedules should take into account:

- (a) The general WWW data requirements;
- (b) Stated requirements of Members of Region VI.

3.7.1.2 The transmission of data between WMCs, RTHs and NMCs should be made on point-to-point circuits. Radio broadcasts will be used until appropriate point-to-point circuits or other means are available.

3.7.2 *Exchange and distribution of meteorological information between RTHs*

3.7.2.1 Each RTH in the Region should have available all observational data originating in the Region and data from other Regions as required.

3.7.2.2 The programme of the exchange of observational data between RTHs shall be effected as shown in Figure 2.

3.7.3 *Transmission programmes from RTHs to NMCs*

The programmes of transmission of observational data from RTHs to NMCs are subject to bilateral or multilateral agreements.

3.7.4 *RTT broadcasts*

3.7.4.1 *RTHs operating radio broadcasts*

The following RTHs in Region VI should operate radio broadcasts (regional broadcasts) in accordance with the provisions of 3.5.3, Part I, Volume I of this *Manual*:

Moscow (WMC/RTH); Rome.

3.7.4.2 *Plan for regional broadcasts*

- (a) The designated regional broadcast centres in Region VI shall be jointly responsible for broadcasting meteorological information as follows:

Moscow	–	programmes 5, 2, 7, 8, 9;
Rome	–	programmes 6, 4, 8, 9.

NOTE: For numbering of programmes see Figure 2.

- (b) A selection of other data from the Region and data from neighbouring Regions could be inserted in the broadcast programmes to meet the requirements of Members depending on these broadcasts.

3.7.4.3 *Coordination of transmission schedules*

Members making the above broadcasts are invited to coordinate their transmission schedules as closely as practicable with territorial transmissions with the aim of eliminating all avoidable delays.

3.7.4.4 *Other radio broadcasts*

The system of territorial broadcasts should comply with the provisions included in 3.4, Part I, Volume I of this *Manual*. As regards broadcasts for shipping, full information is included in WMO Publication No. 9 – Volume D.

3.7.5 *Time of collection and transmission of observational data by WMC/RTHs*

The following transmission times should be observed:

- (a) The collection of observational data from the respective zones of responsibility should be completed 25 minutes after the observing station's filing time;
- (b) The regional exchange and distribution of observational data should start as soon as possible, but not later than 15 minutes after the observing station's filing time;
- (c) The transmission of observational data to the WMC/RTHs on the MTN in Region VI should start as soon as possible, but not later than 35 minutes after the observing station's filing time.

3.8 **Exchange and distribution of processed meteorological information (output products) in Region VI**

3.8.1 The regional meteorological telecommunication network should be capable of exchanging and distributing the processed information produced by WMCs and RSMCs, and products from WAFCs and RAFCs in areas where no other reliable arrangements exist and the regional meteorological telecommunication network can accommodate the additional traffic, to meet the requirements of Members of RA VI.

3.8.2 The exchange of processed information (including satellite data) between centres should be carried out on point-to-point circuits in alphanumeric or binary form (grid-point values) or in pictorial form.

3.9 **Radio facsimile broadcasts**

The following RTHs in Region VI operate radio facsimile broadcasts (see also 3.5, Part I, Volume I of this *Manual*).

RTH/WMC

Bracknell	One FAX broadcast
Moscow	Two FAX broadcasts
Norrköping	One FAX broadcast
Rome	One FAX broadcast
Sofia	One FAX broadcast

NOTE: In Region VI, other facsimile broadcasts exist for distributing WAFS output products.

3.10 **Satellite-based communication systems**

3.10.1 RTHs Toulouse and Offenbach should operate data-distribution systems based on point-to-multipoint telecommunication services via satellite for the distribution of meteorological data and products (see also 3.4, Part I, Volume I of this *Manual*).

3.10.2 The METEOSAT geostationary meteorological satellites operated by EUMETSAT provide a meteorological data distribution (MDD) service being a part of the GTS. RTHs Bracknell, Rome and Toulouse are responsible for the operation of MDD uplink Earth stations and for the input of selected meteorological data and products.

4. **COLLECTION AND DISTRIBUTION OF SHIPS' REPORTS IN REGION VI**

4.1 **North Atlantic ocean stations**

4.1.1 The RTH Bracknell is designated as the shore collecting centre for all North Atlantic ocean station vessels' reports and acts as shore control station for this purpose. Details of the abbreviated headings, catalogue numbers, etc., used for the collection and distribution of meteorological reports from North Atlantic ocean station vessels, are to be found in WMO Publication No. 9, Volume C, Chapter I, under the section devoted to the RTH Bracknell. The reports should be distributed, as required, throughout the Region as quickly as possible.

4.1.2 The following call signs are used by ocean station vessels when on station:

<i>OWS</i>	<i>Operated by</i>	<i>Radiotelegraphy</i>	<i>Radiotelephony</i>
L	UK	C7L	Ocean station LIMA
M	Norway	C7M	Ocean station MIKE

Reports from ocean station vessels, when in transit to and from stations, are included in normal ship collective bulletins.

4.2 Voluntary observing ships

4.2.1 *Transmission of data from ships*

Coastal radio stations in the Region should collect ships' reports only when they have adequate means of communication enabling them to relay these reports rapidly to designated centres for inclusion in the territorial and/or regional broadcasts or to centres with similar functions.

4.2.2 *Transmission of ships' reports from coastal radio stations to NMCs*

Members responsible for the collection and distribution of ships' reports should take appropriate action with the agencies responsible for operating coastal radio stations, with a view to ensuring that all ships' reports received at the coastal stations are transmitted with minimum delay to the associated NMC, so that the transit time between the reception of the message from the ship at the coastal radio station and the reception at the NMC does not exceed 15 minutes. In cases where fixed-time schedules are used for the transmission of ships' observations from the coastal radio stations(s) to the NMC, these times shall be arranged in such a way as to ensure that they will allow the inclusion of the maximum possible number of recently made ships' observations without leading to unacceptable delays.

4.2.3 *Transmission of ships' reports to the appropriate RTH*

The ships' reports received at an NMC shall be transmitted to the appropriate RTH with the minimum of delay.

5. RESPONSIBILITIES FOR TRANSMISSION OF AIR REPORTS FOR SYNOPTIC PURPOSES AND METEOROLOGICAL RECONNAISSANCE FLIGHTS

5.1 Aircraft reports for synoptic purposes

5.1.1 Each collection centre, designated by ICAO, transmits aircraft reports to the NMC of the country in which the collection centre is situated. The NMC transmits these aircraft reports to the appropriate regional collecting centre. The appropriate regional collecting centre is the RTH in Region VI in whose zone of responsibility the NMC is located.

5.1.2 Aircraft reports received in the regional collecting centres (RTHs) shall be disseminated hourly on the regional meteorological telecommunication network in Region VI and in the Bracknell regional broadcast.

5.2 Meteorological reconnaissance flights

Members making meteorological reconnaissance flights should disseminate the resulting observations within the Region as soon as possible, even in cases where such flights are not made according to a regular programme.

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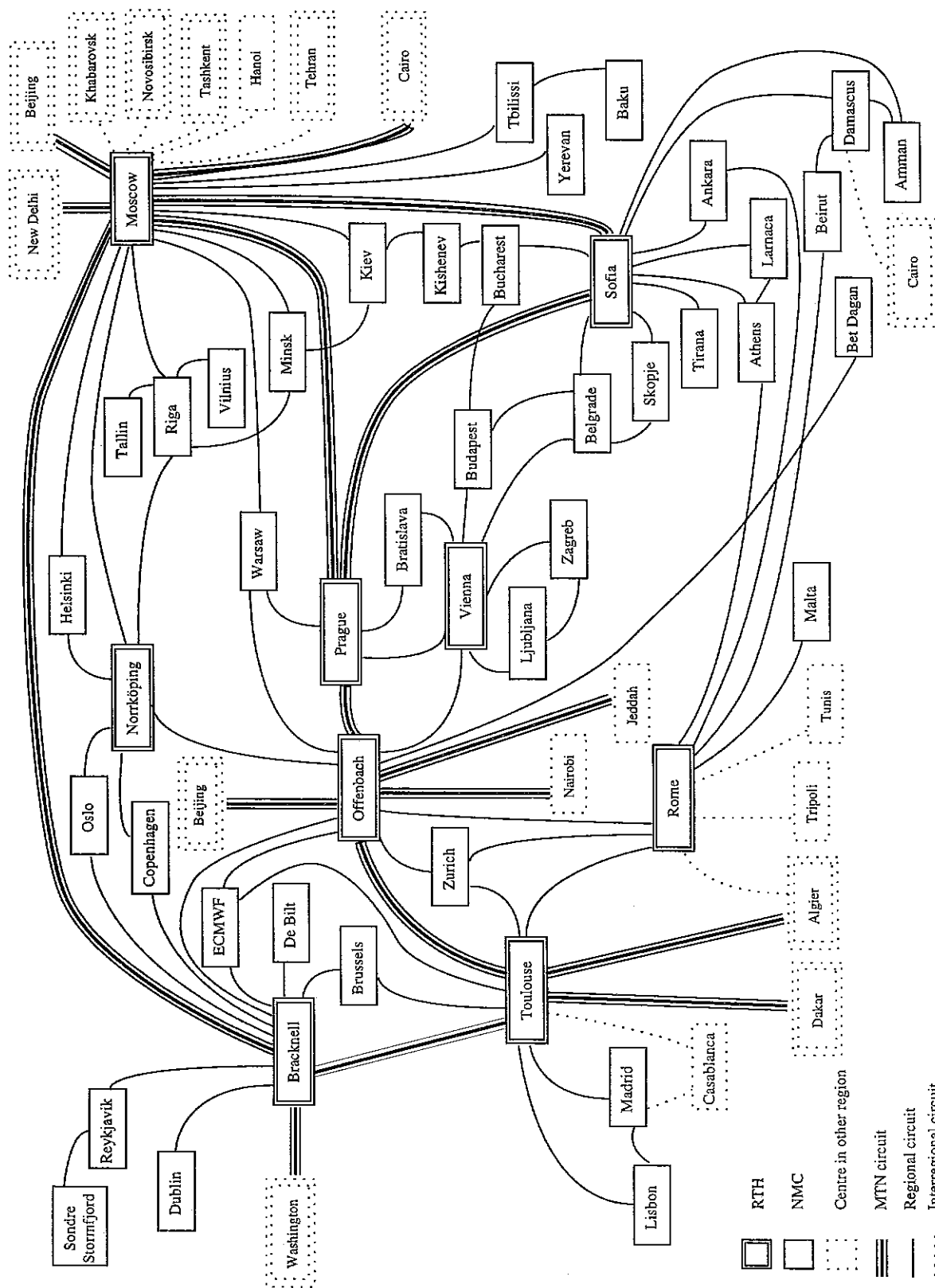
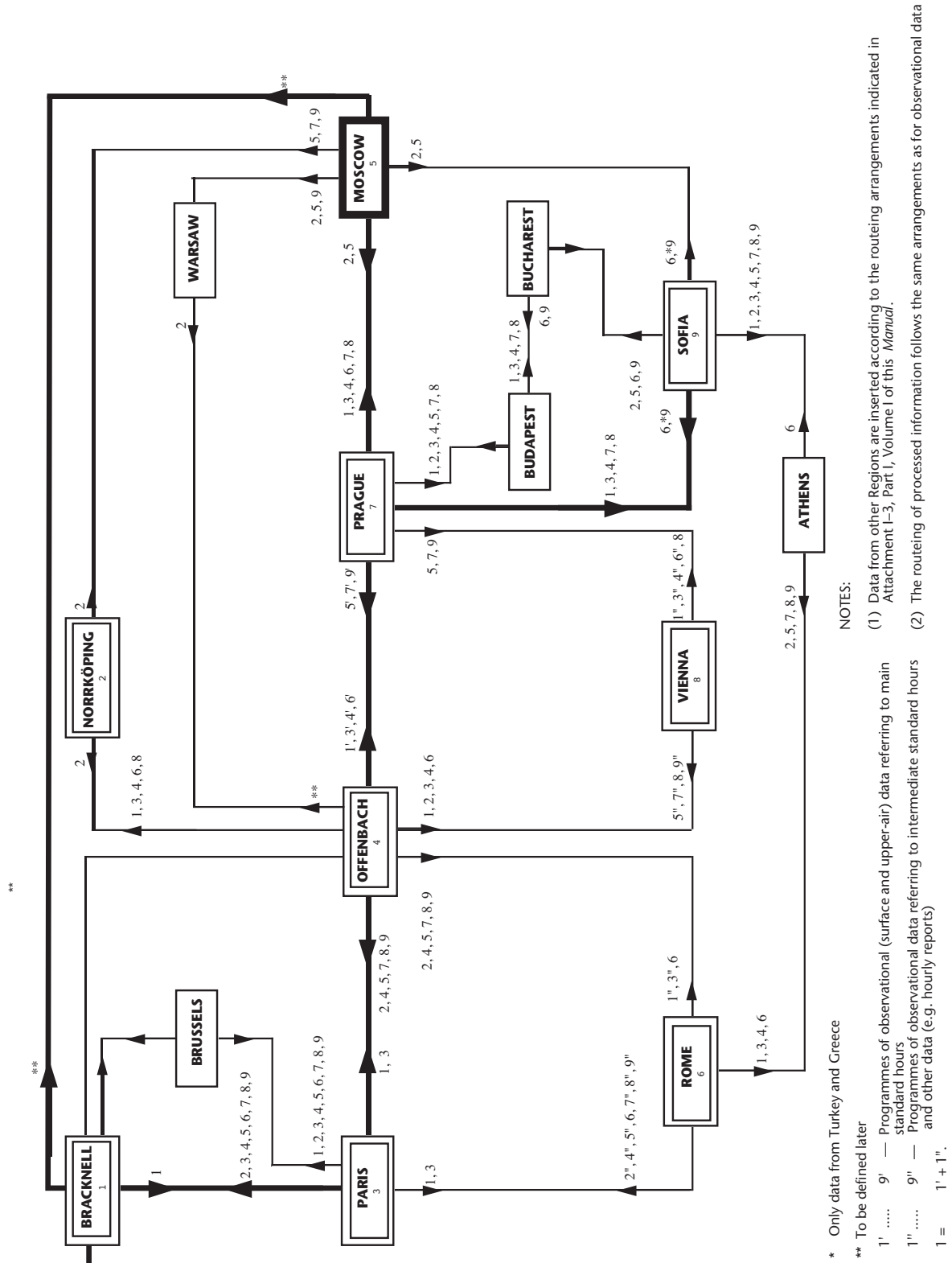


Figure 1 — Regional meteorological telecommunication network for Region VI (Europe)



* Only data from Turkey and Greece
 ** To be defined later
 1' 9' — Programmes of observational (surface and upper-air) data referring to main standard hours
 1'' 9'' — Programmes of observational data referring to intermediate standard hours and other data (e.g. hourly reports)
 1 = 1' + 1''

NOTES:
 (1) Data from other Regions are inserted according to the routing arrangements indicated in Attachment I-3, Part I, Volume I of this *Manual*.
 (2) The routing of processed information follows the same arrangements as for observational data

Figure 2 — Principles for routing of observational data in Region VI (Europe)

P A R T II

TELECOMMUNICATION PROCEDURES FOR REGION VI (EUROPE)

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P A R T I I

TELECOMMUNICATION PROCEDURES FOR REGION VI (EUROPE)

1. GENERAL

In general, telecommunication procedures applied in Region VI should conform with the operational procedures for the GTS as included in Part II, Volume I of this *Manual*.

1.1 Surface observation reports

1.1.1 *Compilation of bulletins*

The NMCs should compile and edit their data and transmit them in standard message format (see 2.1, 2.2 and 2.3, Part II, Volume I of this *Manual*). Separate bulletins should be compiled for the global and regional exchanges and, as agreed between RTHs and NMCs concerned, for the exchange of data for national use or bilateral use.

1.1.2 *Selected special reports for aviation*

Selected special reports for aviation are not normally disseminated over the GTS. Where there is a requirement for the exchange of such reports, bilateral or multilateral arrangements shall be made.

1.1.3 *Reports from ships*

1.1.3.1 All surface reports from ships, with the exception of those mentioned in 1.1.3.3 and 1.1.3.4 below, are retransmitted in the form in which they have been received.

1.1.3.2 Ships' reports received within 24 hours of the time of observation should be retransmitted by telecommunication centres with minimum delay. Ships' reports received 24 hours or more after the time of observation need not be transmitted by telecommunication centres.

1.1.3.3 When a ship's report does not include the four-letter call sign of the ship, the meteorological telecommunication centre will, if possible, insert this call sign at the beginning of the message before retransmission.

1.1.3.4 Ships equipped only for radiotelephonic communication and which prepare their weather reports in plain language should forward them to the responsible meteorological telecommunication centre if such a centre exists, so that they may be edited and coded before transmission over the Global Telecommunication System.

1.1.4 *Format of SYNOP and SHIP bulletins*

The presentation of bulletins containing SYNOP reports and SHIP reports should be the format (a) as given in paragraph 4, Attachment II-4 to Part II, Volume I of this *Manual*.

1.2 Transmission of upper-air reports in Region VI

The transmission to the extent permitted by the available circuits of Parts A, B, C and D of upper-air reports (TEMP, TEMP SHIP, PILOT, PILOT SHIP, etc.) over the RMTN and in their regional broadcasts of Region VI is mandatory. Parts A, B, C and D shall be transmitted separately.

1.3 Transmission of radar reports

Meteorological information obtained by ground radar equipment should be exchanged in accordance with bilateral or multilateral arrangements, using the appropriate symbolic code form.

1.4 Transmission of CLIMAT and CLIMAT TEMP reports

1.4.1 CLIMAT and CLIMAT TEMP reports should normally be transmitted on the fourth day of each month, but not later than the fifth day of each month, preferable insertion times on the RMTN being 0800–0900 UTC and 2000–21000 UTC.

1.4.2. CLIMAT and CLIMAT TEMP reports shall be transmitted according to the published schedules.

1.5 Transmission of BATHY and TESAC reports

BATHY and TESAC reports, as available, should be exchanged regionally, as agreed upon, to meet the IGOSS requirements as far as possible; preferable insertion times on the RMTN are between four hours and six hours after the main synoptic standard times.

2. RE-ROUTEING PROCEDURES FOR THE RMTN

2.1 The re-routeing procedures in cases of outage of centres and circuits included in the RMTN should comply with the provisions made in Attachment II–11, Part II, Volume I of this *Manual*.

2.2 Service messages concerning outages

2.2.1 When no GTS circuit is available for the transmission of such service messages, they can be routed on:

- (a) The European telex network; and/or possibly,
- (b) The AFTN (in this case, service messages should conform to the format prescribed by ICAO).

2.2.2 Call numbers and AFTN addresses to be used for the exchange of service messages concerning outages of the meteorological telecommunication network of Region VI are included in Table A.

3. SUPPLEMENTARY TELECOMMUNICATION PROCEDURES

3.1 The use of the transmission sequence number nnn shall be mandatory, irrespective of the alphabet used.

3.2 Data banks for observational data and processed information operated by Members of Region VI can be interrogated by Members of Region VI. The characteristics of these data banks are included in Attachment VI–1.

3.3 When an addressed administrative message is received, the addressed centre should send an addressed administrative message to the originating centre, containing the following text:

QSL YYGGgg

where YYGGgg is the date-time group from the message received. The data designator $T_1T_2 = AB$ may be used in the abbreviated heading of this message.

4. DATA COMMUNICATION PROTOCOLS

Data communication protocols to be used on the EMTN should be elements of procedures as specified in CCITT Recommendations X.25 and X.224 which are indicated in Volume I, Global Aspects, Part II, section 2.12.3 of this *Manual*.

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TABLE A
Call numbers

Name of country	Type of centre and where situated (e.g. RTH, NMC, etc.)	Answer back	Telex call number	AFTN address	Telecopier call number	Other call number
Albania	NMC	—	—	—	—
Austria	(1) NMC Vienna, Zentralanstalt für Meteorologie und Geodynamik (2) Vienna, Civil Aviation Weather Service (3) RTH/MOTNE Vienna	131837 A METW A 135681 WRZWN A 135681 WRZWN A	131837 07-135681 07-135681	LOWMYB LOWMYB	43 1 3691233 —	—
Belgium	(1) NMC (Institut royal météorologique) (2) NTC (Régie des voix aériennes)	21315 METEOR B 24480 REVADI B	21 315 24 480	EBUMYMYX EBVAYMYX	— 32 2 2122288	—
Bulgaria	(1) RTH Sofia (2) RTH Sofia, data bank (3) MOTNE Centre Sofia	RTHSF BG RTHSF BG BALKAN BG	22 490 23 402 22 394	LZSO ..	35 92 884494	—
Cyprus	(1) Nicosia Civil Airport (2) Larnaca International Airport (Airport, APP, TWR, MET, NOF)	— 4099 METLKA CY	— 4099	LCNCYM LCLKYM	357 46 52953	—
Czechoslovakia	(1) Hydrometeorological Institute (Director of) (2) RTH Prague (also valid for MOTNE Centre) RTH Supervisory RTH Message Switch System (3) Aviation Metservice (Prague Airport)	123335 HMUC 123409 OKPR C 128712 OKPR C 120319 YMC C	123335 123409 128712 120319	LKPRYM	—	—
Denmark	(1) NMC Copenhagen (2) MOTNE Loop-centre Copenhagen	27138 METIN DK 31203 EKCH DK	27138 31203	EKCHYT —	—	—
Finland	NMC Helsinki Telecommunication Centre	124436 EFKL SF	124436	EFHKYM	358 0 179581	—
France	RTH Paris	METEO PARIS	200061	LFPWYT	33 1 45567128	—
Germany	RTH Offenbach Also valid for: MOTNE Centre Offenbach RSMC Offenbach RAF Frankfurt	4152817 OFDW D 4152871 OFDW D	4 152 817 4 152 871	EDZWYT EDZOYB EDZWYM EDZWYM	49 69 8062673	—
Greece	Meteorological Telecommunication Centre	—	215255	LGATYM	—	—
Hungary	(1) NMC Telecommunication Centre Budapest and MOTNE Centre (2) Aeronautical Meteorological Office Budapest-Ferihegy (3) National Meteorological Service, Budapest	224871 BPMET H 224872 BPMET H 224823 FEMET H	224871 224872 224823	LHBPYM — LHBPYL	—	—
Iceland	(1) Keflavik Airport (2) Reykjavik	— —	— —	BIKF .. BIRK ..	—	—
Ireland	NMC Dublin Also valid for MOTNE Centre Dublin	33128 MTCP EI	33128	EIDBYM EIDBYB	35 31 424411	—

TABLE A (continued)

Name of country	Type of centre and where situated (e.g. RTH, NMC, etc.)	Answer back	Telex call number	AFTN address	Telecopier call number	Other call number
Israel	Meteorological Telecommunication Centre	341764 METEO IL	0341764	LLBDYM		
Italy	RTH Rome Also valid for : MOTNE Centre Rome RSMC Rome RAFC Rome	ITAVRM I	611088	LIIBYT LIIBYB LIIBYM LIIBYM	3965910415 39649865703	39649865085 3965910415
Jordan	NMC	—	—	OJAMYM	—	
Lebanon	NMC	—	—		
Luxembourg	To be contacted via Belgium/Brussels (NTC)	—	—		
Malta	NMC. Also valid for MOTNE Centre Malta	—	—	LMMMYYM		
Netherlands	(1) NMC De Bilt, Telecommunication Centre (2) MOTNE Centre Amsterdam	47096 KNMI NL 11286 METEO NL	47096 11286	EHDBYM EHAMYM	31 30 210407	
Norway	(1) NMC Oslo (2) Telecommunication Centre, Oslo	21564 METEO N 21563 ENMI N	21564 21563	ENNCYMYX ENMIYMYX	47 2 69251 5	Teletex: 8180480
Poland	(1) NMC Warsaw EMTN (2) MOTNE Centre Warsaw	814331 HMPL 813409 HMPL	814331 813409	—	
Portugal	Meteorological Telecommunication Centre	DIRMET P	12742	LPMGYM	—	
Romania	(1) Meteorological Telecommunication Centre (2) International Airport Otopeni-Bucharest	11514 IMH R 10460 IMH R 11480 AIROP R 11378 AIROP R 11491 BUHRO R 11181 AIRBK H R 11379 AIROP R	011514 10460	— LRBBYF	—	
Russian Federation	Moscow Centre	RUMS SU	411117		
Spain	NMC Madrid Also valid for MOTNE Centre Madrid	LEMMC E	22427	LEMMYM	—	
Sweden	RTH Norrköping Also valid for MOTNE Centre Norrköping	64400 SMHI S	64400	ESWIYT	46 11 170207 46 11 170208	Teletex: 815 5050
Switzerland	Meteorological Telecommunication Centre	SMACH	816816	LSZWYT	256 9339	
Syrian Arab Republic	NMC	—	413204	OSDIYM	—	
Turkey	Meteorological Service	42671 ANKM TR	42671	LTAAYM		
United Kingdom	Meteorological Telecommunication Centre,	WEABKA G WEABKB G WEABKC G	849801 849802 849803	EGRRYT	44 344 422907	
Yugoslavia	Meteorological Service	YU MET 1 YU HIDRO	11404 11141		

NOTE : As regards the country-to-country TELEX indicator, the national TELEX directory should be consulted.

P A R T I I I

**TECHNICAL CHARACTERISTICS AND SPECIFICATIONS FOR THE
REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK
IN REGION VI (EUROPE)**

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PART III

TECHNICAL CHARACTERISTICS AND SPECIFICATIONS FOR THE REGIONAL METEOROLOGICAL TELECOMMUNICATION NETWORK IN REGION VI (EUROPE)

1. GENERAL

The technical characteristics and specifications for the Regional Meteorological Telecommunication Network in Region VI should conform with the provisions of Part III, Volume I of this *Manual*.

2. TRANSMISSION ON TELEPHONE-TYPE CIRCUITS

2.1 For data transmission at data-signalling rates of 2 400, 4 800 and 9 600 bit/s on telephone-type dedicated circuits, preference should be given to the use of modems in accordance with CCITT Recommendation V.29 including multiplexing.

2.2 When using V.29 type modem, independent channels provided by multiplexing techniques should be used for the transmission of data and facsimile.

NOTES: (1) Transmission of data and facsimile in the same bit stream is under study.
(2) For further guidance see annex.

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A N N E X

**APPLICATION OF MULTIPLEXING TECHNIQUES IN ACCORDANCE WITH
MODEMS CONFORMING TO CCITT RECOMMENDATION V.29****1. GENERAL**

- (a) Dedicated circuits should be terminated at both ends with modems, in accordance with CCITT Recommendation V.29;
- (b) A telephone-type circuit refers to a cable, landline, UHF or satellite link with a bandwidth of 300 Hz to 3 400 Hz;
- (c) The quality of the circuit shall correspond to the requirements laid down in CCITT Recommendation M.1020. However, if the quality of the circuit does not considerably exceed the standards of CCITT Recommendation M.1040, then there may be no call for the use of the special quality circuit of CCITT Recommendation M.1020;
- (d) All channels provided by multiplexing have an interface according to CCITT Recommendations V.24 and V.28.

2. POSSIBLE ARRANGEMENTS FOR CHANNELLING

- (a) A telephone-type circuit with a data-signalling rate of 9 600 bit/s;
- (b) A telephone-type circuit with a data-signalling rate of 9 600 bit/s subdivided into $2 \times 4\,800$ bit/s channels;
- (c) A telephone-type circuit with a data-signalling rate of 9 600 bit/s subdivided into $4 \times 2\,400$ bit/s channels;
- (d) A telephone-type circuit with a data-signalling rate of 9 600 bit/s subdivided into $1 \times 4\,800$ and $2 \times 2\,400$ bit/s channels;
- (e) In addition to the channelling specified above, one or two low-speed channels can be provided in some models of modems. Since these channels are not specified in CCITT Recommendation V.29, their operation is subject to agreement between adjacent centres.

3. USE OF MULTIPLEXED CHANNELS

- (a) All channels can be used for data transmission;
- (b) All channels can be used for coded or non-coded digital facsimile transmission. A data-signalling rate of 4800 bit/s is recommended for non-coded digital facsimile with drum speed of 120 rpm;
- (c) All channels with a minimum data-signalling rate of 2 400 bit/s can be used for asynchronous data transmission with a speed ranging from 50 to 600 bit/s (distortion of a 2 400 bit/s channel used for asynchronous transmission with 600 bit/s equals 25 per cent).

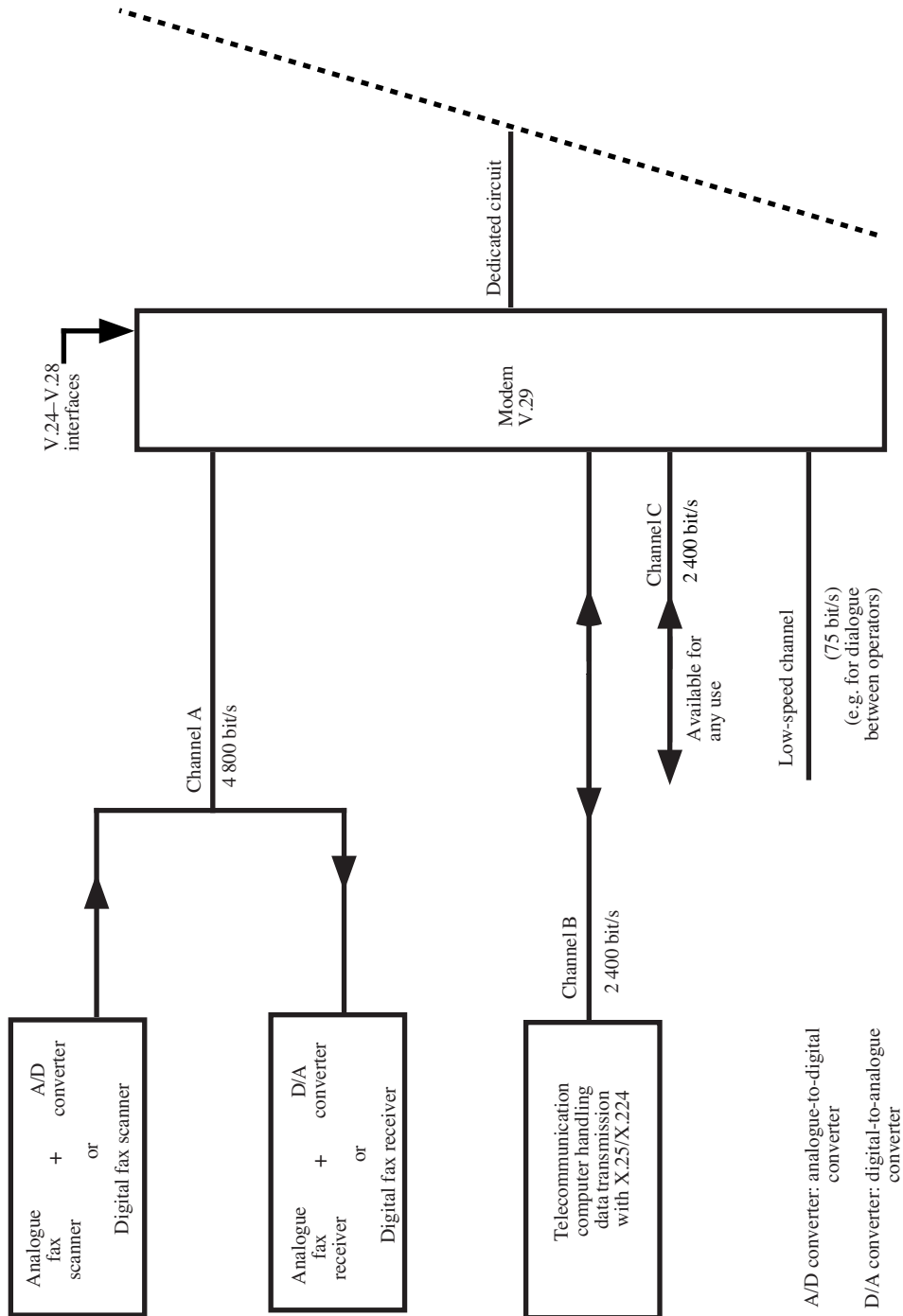
NOTE: An example of the use of multiplexed channels is given in the appendix to this annex as an interim measure until the *Guide on the GTS* is published.

4. OPERATIONAL CONDITIONS

- (a) The conventional type of analogue facsimile scanners and recorders can be used for non-coded digital facsimile transmissions with the addition of low-cost analogue-to-digital or digital-to-analogue converters;
- (b) The automatic line equalizers incorporated into the modems according to CCITT Recommendation V.29 are suitable to cope with marginal circuit conditions of links according to CCITT Recommendation M.1020;
- (c) Data transmission carried out with an EDC procedure requiring a separate backward channel (WMO software and hardware EDC procedures as specified in Part II, Volume I of this *Manual*) will occupy two channels provided by multiplexing or one channel provided by multiplexing and another one of the channels described in 2(e) above.

APPENDIX TO ANNEX

EXAMPLE OF USE OF MULTIPLEXED CHANNELS



ATTACHMENT VI-1

CHARACTERISTICS OF DATA BANKS OPERATED BY MEMBERS OF RA VI

<i>Name of country/centre</i>	<i>Type of information available</i>	<i>Geographical coverage</i>	<i>Means of access</i>
Austria: RTH Vienna	OPMET, SYNOP, TEMP	Europe and surrounding area	GTS, AFTN, telex
Belgium: NMC Brussels	OPMET, SYNOP, TEMP	Global	AFTN, telex
Bulgaria: RTH Sofia	SYNOP, TEMP, selected GRID	Europe, Asia, North Africa, North America	GTS, telex
Czechoslovakia: RTH Prague	All	Global	GTS, telex
Germany: RTH Offenbach	All	Global	GTS
Hungary: RTH Budapest	SYNOP, TEMP, selected GRID	Europe, North Africa, Western Asia	GTS, telex
Ireland: NMC Dublin	OPMET, SYNOP, TEMP	Europe, North America	AFTN, telex
Italy: RTH Rome	OPMET, SYNOP, TEMP, GRID	Europe, Middle East	GTS
Poland: NMC Warsaw	SYNOP, TEMP, GRID	Europe	GTS, telex
Romania: NMC Bucharest	SYNOP, TEMP	Europe	GTS
Russian Federation: WMC Moscow	All	Global	GTS
Spain: NMC Madrid	SYNOP, TEMP, GRID	21°N-66°N, 28°E-60°W	GTS, AFTN
Sweden: RTH Norrköping	OPMET, SYNOP, TEMP, GRID	Northern hemisphere	GTS (bilateral agreement), AFTN, telex
United Kingdom: RTH Bracknell	All	Global	GTS

ANTARCTIC

ANTARCTIC DATA TELECOMMUNICATION ARRANGEMENTS

Note: The Antarctic is not a WMO Region and the information contained in this section is included in the Manual purely for convenience in accordance with the decision of the thirty-sixth session of the Executive Council (1984).

1991 edition

ANTARCTIC DATA TELECOMMUNICATION ARRANGEMENTS

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ANTARCTIC DATA TELECOMMUNICATION ARRANGEMENTS

1. GENERAL

1.1 The telecommunication network within the Antarctic and the interconnecting links between the Antarctic and the GTS should ensure the rapid and reliable collection, exchange and further distribution of Antarctic meteorological data to satisfy the needs of Members of WMO.

1.2 Meteorological Services at many Antarctic stations are run by National Antarctic Programmes and not by the Meteorological Authority of the operating country.

2. DATA TO BE TRANSMITTED

The data transmitted from the Antarctic should be composed of:

- (a) Surface synoptic reports for main and intermediate standard hours (0000, 0300, 0600, 0900, 1200, 1500, 1800 and 2100 UTC), radiosonde data for 0000 and 1200 UTC (and, if available, for other hours) from all stations in the Antarctic basic synoptic network and also reports from additional stations, as available;
- (b) All reports from ships, aircraft and buoys;
- (c) CLIMAT and CLIMAT TEMP reports;
- (d) Priority reports, such as warnings of dangerous weather phenomena;
- (e) Other types of information, as agreed.

3. COLLECTION AND DISTRIBUTION OF DATA

3.1 The responsibility of collecting centres for the collection of observational data from Antarctic stations is as follows:

Collecting centre	Station index numbers
Davis	89571, 89573
Frei	89054, 89056, 89057, 89058, 89059, 89251
Hobart	89564, 89611
Marambio	88963, 88968, 89034, 89053, 89055, 89066
McMurdo	89009, 89664
Moscow (see note)	89050, 89512, 89542, 89592, 89606
New Delhi	89514
Darmstadt (EUMETSAT)	89002, 89022, 89064, 89532
Rome	89662
Rothera	89061, 89062, 89063
Toulouse	89642
Toulouse (ARGOS)	89004, 89014, 89568, 89612, 89757, 89758, 89762, 89767, 89774, 89803, 89805, 89812, 89813, 89816
Landover (ARGOS)	89108, 89208, 89257, 89261, 89262, 89264, 89266, 89269, 89272, 89314, 89325, 89327, 89332, 89345, 89371, 89376, 89377, 89667, 89744, 89768, 89769, 89799, 89828, 89832, 89834, 89847, 89864, 89865, 89866, 89868, 89869, 89872, 89873, 89879
NOTE: Molodezhnaya is a backup collecting centre.	

3.2 The existing links for the daily international exchange of meteorological data within the Antarctic are shown in Figure 1. The principal routes by which Antarctic meteorological data enter the GTS are given in Figure 2.

4. SPECIFIC ARRANGEMENTS FOR THE EXCHANGE OF OBSERVATIONAL DATA

4.1 As regards ship reports, Antarctic collecting stations should make every effort to collect reports from ships which do not otherwise transmit to GTS centres outside Antarctica.

4.2 Data from buoys and automatic weather stations in the Antarctic are normally collected by ARGOS and disseminated by reception centres located in Toulouse (France) and Landover (United States).

5. MONITORING THE OPERATION OF THE GTS

In addition to participating in the annual specific monitoring on the exchange of Antarctic data, Members may carry out their own monitoring. When shortcomings are identified, the results of such a survey should be communicated to the relevant GTS centres, including the Antarctic collecting centres, and to the WMO Secretariat, to take appropriate action.

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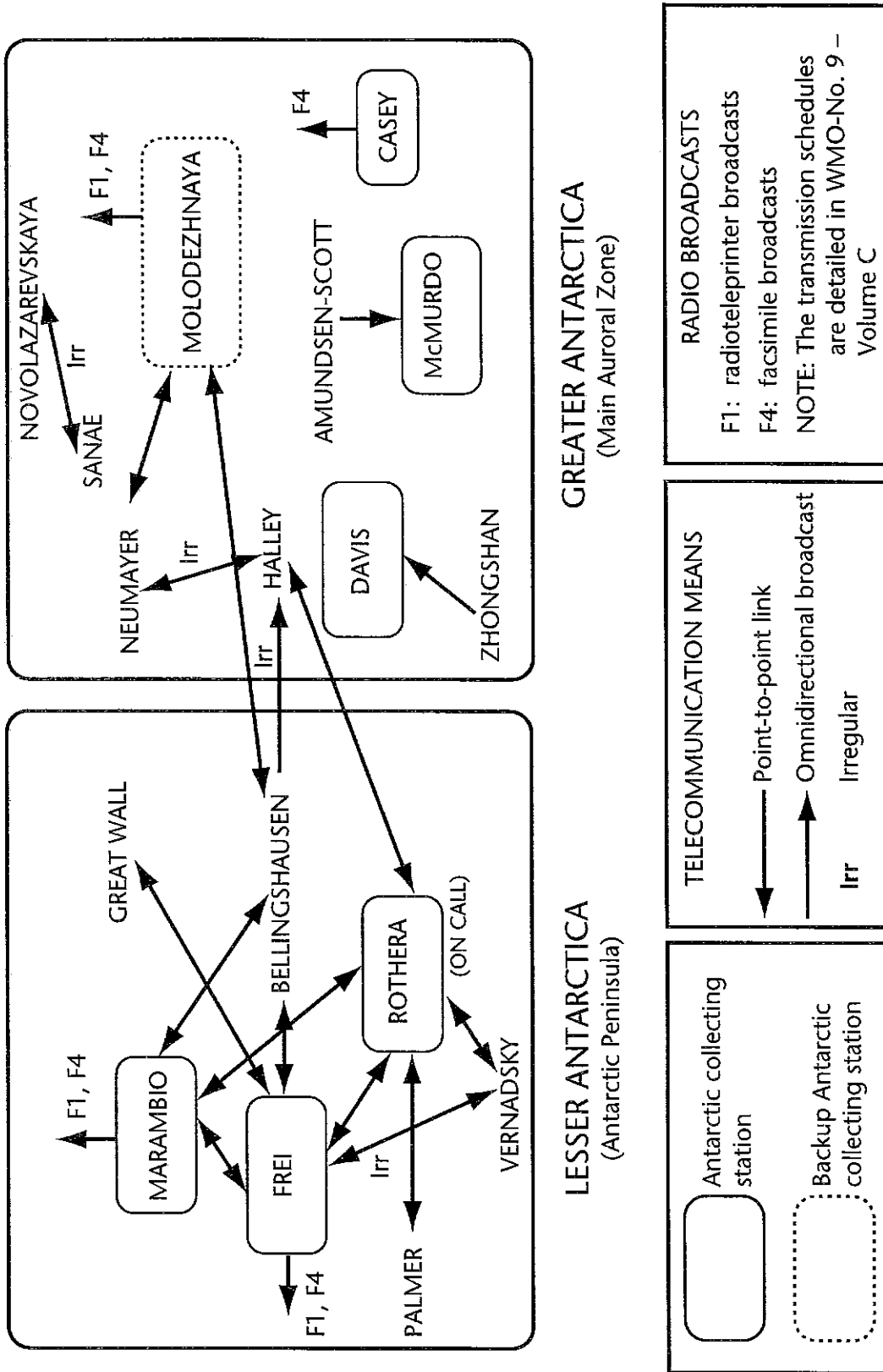


Figure 1 — The links for the daily international exchange of meteorological data within the Antarctic

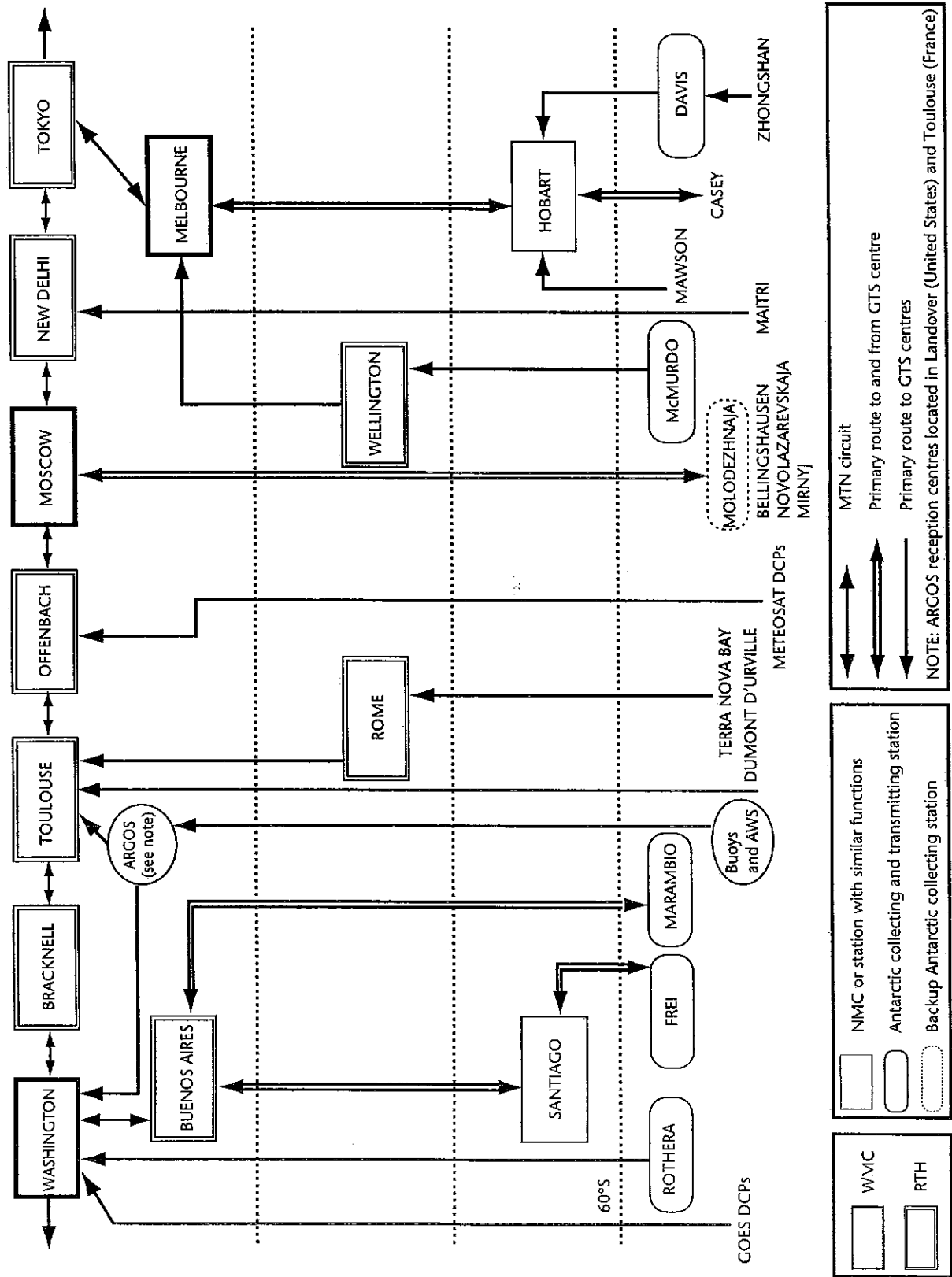


Figure 2 — The principal routes by which Antarctic meteorological data enter the GTS