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Doc 8499, SP/NAT (1965)



INTERNATIONAL CIVIL AVIATION ORGANIZATION

A faint, light blue map of the North Atlantic region is visible in the background, showing the outlines of North America, Europe, and Africa, with a dashed line indicating a flight path or boundary.

**SPECIAL
NORTH ATLANTIC MEETING (1965)**

Montreal, 23 February - 20 March 1965

REPORT OF THE MEETING

Approved by the Meeting
and issued by authority of the Secretary General

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SPECIAL NORTH ATLANTIC MEETING, 1965

Montreal, 23 February - 20 March 1965

Supplement No. 3 - 8 December 1965

The Council at the Fifteenth Meeting of its Fifty-sixth Session on 8 December 1965, took further action as indicated hereunder on that part of Recommendation 7/6 concerning the implementation of Recommendation 6iii/2, item 4.

Recommendation 7/6 (page 7-2)

The Council:

Approved the time and date of 0001 hours GMT, 13 January 1966, for the introduction of 90 nautical miles minimum lateral separation, in accordance with SP NAT Recommendation 6iii/2, item 4;

Noted that the United Kingdom was continuing its studies on track-keeping performance of North Atlantic traffic and would bring to the attention of the Secretary General any information it considered relevant;

Asked the Secretary General to investigate the possibility of obtaining data on operations other than those of IATA carriers, to permit a more complete analysis of track-keeping accuracy over the North Atlantic.

- END -

INTERNATIONAL CIVIL AVIATION ORGANIZATIONSPECIAL NORTH ATLANTIC MEETING, 1965Montreal, 23 February - 20 March 1965Supplement No. 1 - 15 April 1965

The Council, at the twentieth Meeting of its Fifty-fourth Session on 15 April 1965 took action as indicated hereunder on selected recommendations of the Special North Atlantic Meeting, 1965 on which urgent action was necessary.

The Council:Recommendation 4/1 (page 4-4)

Approved this recommendation with the understanding that Secretariat services will be provided to the extent indicated in the corresponding provisions proposed by the Special NAT Meeting. It was further understood that the proposals referred to in paragraph b) of this Recommendation will be submitted to all North Atlantic States.

Recommendation 6 i/7 (page 6i-11)

Approved this recommendation and directed the Secretary General to bring it to the attention of all States concerned and the International Air Transport Association.

Recommendation 6 iii/2 (pages 6iii-6 to 6iii-15)

Approved the amendments listed under items 3), 11), 13), 15) and 20) (paragraph 7.2.5.4 only) of this recommendation. Regarding item 2) the Council approved the intent of the Recommendation on the understanding that the implementing countries would be invited to agree on a common date for implementation.

Recommendation 7/6 (page 7-2)

Approved the intent of subparagraph a) of this recommendation and established 0001 hours GMT on 3 June 1965 as the date for implementation of the Regional Supplementary Procedures set forth in Recommendation 6 iii/2, Items 3), 11), 13), 15) and 20) (paragraph 7.2.5.4 only).

INTERNATIONAL CIVIL AVIATION ORGANIZATIONSPECIAL NORTH ATLANTIC MEETING, 1965Montreal, 23 February - 20 March 1965Supplement No. 2 - 11 June 1965

The Council at the Sixth Meeting of its Fifty-fifth Session on 11 June 1965, took action as indicated in Part I hereunder, on the Report of the Special North Atlantic Meeting, 1965.

Certain recommendations were acted upon directly by the Air Navigation Commission at the 2nd, 3rd and 4th Meetings of its Forty-ninth Session under Authority delegated by the Council. The action taken by the Air Navigation Commission on those recommendations is set forth hereunder in Part II.

PART I

1. The Council:
Agenda Item 2a)

Noted the conclusions of the Meeting with regard to the production, updating and coverage of the long term air traffic forecasts and directed the Secretary General to invite Canada, the United Kingdom and the United States to continue to produce and update the forecasts in coordination with the ICAO Secretariat.

Agenda Item 2b)

Noted that amendments to the AGA Plan and consequential amendments to the COM and MET Plans are necessary in view of the Table of Aircraft Operations accepted by the Meeting, and noted that the Air Navigation Commission had requested the Secretary General to consult States by correspondence on amendment of the Plan to bring the AGA Plan up to date and to align the related elements of the COM and MET Plans.

2. The Council approved without comment the following recommendations:

Recommendations:

3b/1 (page 3b-6)
6ii/1 and 6ii/2 (page 6ii-8)
6iii/1 (page 6iii-4)
6iii/5 (page 6iii-17)
6iii/7 (page 6iii-19)
6iv/3 (page 6iv-4)
6v/3 (page 6v-8)
6vi/3 (page 6vi-5)
6vi/6 to 6vi/8 inclusive (page 6vi-7)
6vi/12 and 6vi/13 (pages 6vi-11 and 6vi-12)
6viii/2 (page 6viii-2)
6viii/8 and 6viii/9 (pages 6viii-4 and 6viii-6)
6ix/2 (page 6ix-5)
6ix/4 (page 6ix-6)

3.

The Council:Recommendation 5/1 (page 5-2)

Approved this Recommendation and noted that together with Recommendation 4/1, it superseded Recommendation 2/2 of the NAT IV RAN Meeting.

Recommendation 6i/1 (page 6i-2)

Approved this recommendation and directed the Secretary General to refer it to the six States of the North Atlantic Systems Planning Group.

Recommendations 6i/2 to 6i/4 inclusive (page 6i-6)

Approved these recommendations on the understanding that they were directed to States of registry of aircraft operating or to be operated within the Gander Oceanic, Lisboa Oceanic, New York Oceanic, Reykjavik and Shanwick Oceanic Control Areas and within the part of Sondrestrom Control Area south of 70°N. The Council also noted that the action recommended is related to that on Recommendation 6i/6.

Recommendation 6i/5 (page 6i-8)

Approved this recommendation, noting that action had already been initiated by IATA and directed the Secretary General to:

- 1) invite IATA to transmit the data collected to the United Kingdom for analysis by 1 August 1965.
- 2) invite the United Kingdom to forward the results of its analysis to ICAO by 15 September 1965.
- 3) circulate by 1 October 1965 the data and the results of the United Kingdom analysis to North Atlantic States and appropriate international organizations for comment.

Recommendation 6i/6 (page 6i-9)

Approved the intent of this recommendation, agreed to make tentative provision for the convening of a Limited NAT (RAC) Meeting from 10 - 20 January 1966, and directed the Air Navigation Commission to present detailed proposals for the convening of such meeting in due course; these proposals to include a review of the results of the period of trials approved by the Council under Recommendation 7/6.

Recommendation 6i/8 (page 6i-13)

Approved this recommendation and requested States to forward the results of such evaluations to ICAO.

Recommendation 6i/9 (page 6i-14)

Approved this recommendation and directed the Secretary General to request the States of Registry to bring it to the attention of operators engaged in North Atlantic operations.

Recommendation 6ii/3 (page 6ii-9)

Approved this recommendation noting that it superseded Recommendation 14/4 of the NAT IV RAN Meeting.

Recommendation 6iii/2 (pages 6iii-6 to 6iii-15 inclusive)

Approved Items 4) to 6), 8) to 10), 12), 14), 17), 19), 20) (except para. 7.2.5.4, already approved), and 21) to 24).

Approved Items 1) and 7) in principle subject to the following amendment and directed the Secretary General to include these procedures in Doc 7030 at such time as regional agreement is reached on a recommendation for a common implementation date and, meanwhile, to request States concerned and IATA to ensure that all operators and ground personnel be informed of the procedures so as to facilitate early implementation following approval of such recommendation.

- Amend the proposed paragraph 4.1.2 to read:

"4.1.2 The phrase "ABL 1000" shall be inserted in Item 1 of the flight plan for any aircraft intended to be operated within the airspace specified in 4.1.1 and which is qualified for the application of 1000 feet vertical separation."

Approved Item 16) noting that it superseded Recommendation 16/1 of the NAT IV RAN Meeting.

Approved Item 18) noting that it superseded Recommendation 16/3 of the NAT IV RAN Meeting.

Recommendation 6iii/4 (page 6iii-16)

Approved this recommendation with the understanding that the Ad Hoc ATC Coordination and Evaluation Team would operate technically independent from ICAO and that ICAO would not bear any expenses that may be entailed by its activities and noted that together with Recommendations 6iii/2 and 4/1, it effectively superseded Recommendation 16/2 of the NAT IV RAN Meeting.

Recommendation 6iii/6 (page 6iii-18)

Approved this recommendation and directed the Secretary General to consult the relevant States on the means of achieving most expeditiously the objective of part b) of the recommendation.

Recommendation 6iv/1 (page 6iv-3)

Approved this recommendation noting that together with Recommendations 6iv/2, 6iv/5, 6iv/6, 6iv/7 and 6iii/2 it superseded Recommendation 8/1 of the NAT IV RAN Meeting.

Recommendation 6iv/2 (page 6iv-10)

Approved this recommendation noting that the Air Navigation Commission had requested the Secretary General to make proposals in due course in the light of experience with the new designation procedure given in Recommendation 6iv/5.

Recommendation 6iv/4 (page 6iv-4)

Approved this recommendation, noting that it was closely related to Recommendation 6viii/7 and that these two recommendations superseded Recommendation 8/2 of the NAT IV RAN Meeting.

Recommendation 6iv/5 (page 6iv-6/7)

Approved this recommendation with the MET SUPPs amended to read as given below, on the understanding that they would apply only within NAT FIRs and noting that the implementation date for MET SUPPs was dealt with in Recommendation No. 7/7. (See also action on Recommendation 6iv/1).

"2.3.1 Routine aircraft meteorological observations

All aircraft flying in the Gander, Shanwick, New York and Lisboa Oceanic FIRs between North America and Europe, in either direction, shall make and record routine meteorological observations* at each 10° meridian from 10° to 70°W, except that from 03-09 GMT and from 15-21 GMT turbo jet aircraft flying in the Gander and Shanwick Oceanic FIRs shall make and record routine meteorological observations only at alternate 10° meridians, as follows:

a) Aircraft registered in States west of 30°W:

on eastbound flights - at 50°, 30° and 10°W;
on westbound flights - at 20° and 40°W;

#b) Aircraft registered in States east of 30°W:

on eastbound flights - at 40° and 20°W;
on westbound flights - at 10°, 30° and 50°W.

* Subject to exemptions in accordance with 2.3.1.4 b) or 2.3.1.5 a) of the PANS-MET.

For the purposes of this procedure, Australia, which is partly east and partly west of 150°E, is regarded as being east of 30°W.

Note: Meteorological observations by aircraft flying on predominantly north-south tracks or in other NAT FIRs are covered by the provisions of the PANS-MET without regional exemption or designation procedures."

"2.3.3 Reporting of routine aircraft observations during flight

Routine aircraft meteorological observations made where the applicable air traffic services procedures require a position report shall be reported with that position report. Routine aircraft meteorological observations made where the air traffic services procedures do not require a position report shall be reported as soon as practicable, using appropriate general purpose air-ground channels, except that:

when aircraft are making meteorological observations at alternate 10° meridians (in accordance with 2.3.1), transmission of certain reports shall be delayed as follows:

<u>Eastbound aircraft</u>	<u>Westbound aircraft</u>
Observations made at.....50°W 30°W	10°W 30°W
to be transmitted at same time as position report for.....40°W 20°W	20°W 40°W"

Recommendation 6iv/6 (page 6iv-8)

Approved this recommendation, noting that the implementation date for MET SUPPs is dealt with in Recommendation No. 7/7. (See also action on Recommendation 6iv/1).

Recommendation 6iv/7 (page 6iv-9)

Approved this recommendation. (See also action on Recommendation 6iv/1).

Recommendation 6v/1 (page 6v-6)

Approved this recommendation with the following understandings:

- a) the North American part of the system will be incorporated in the NAT Regional Plan only after the agreement of Canada, Denmark and the United States has been obtained;
- b) the date of implementation of each part of the system will be the earliest practicable date but not before 10 March 1966, the expected date of applicability of amendments to Annex 3 and the PANS-MET permitting the dissemination of forecasts in chart form.

In taking this action the Council noted that the Air Navigation Commission had requested the Secretary General to initiate the consultations required to reach the necessary agreements, including those required by parts b), d) & f) of the recommendation. The Council also noted that the implementation date for MET SUPPs is dealt with in Recommendation 7/7.

Recommendation 6v/2 (page 6v-8)

Approved this recommendation noting that it supersedes the first part of Recommendation 10/4 of the NAT IV RAN Meeting, (i.e., the part requiring reference to WMO).

Recommendation 6v/4 (page 6v-8)

Approved this recommendation noting that the Air Navigation Commission had indicated its readiness to advise the Joint Support Committee on the coordination of action to implement associated observation programmes under ICAO Joint Financing Agreements with implementation plans agreed upon by WMO for upper air observation in the NAT Region, taking into account the current state of development of relevant aeronautical requirements for meteorological information. It further noted that this recommendation supersedes the second part of NAT IV Recommendation 10/4 (i.e., the part requiring follow-up action by ICAO).

Recommendation 6v/5 (page 6v-9)

Approved this recommendation noting that the implementation date for MET SUPPs is dealt with in Recommendation 7/7.

Recommendation 6vi/1 (page 6vi-3)

Approved this recommendation, noting that it superseded a) of Recommendation 6/1 of the Fourth NAT RAN Meeting and that no early need could be foreseen for implementation of the second part of b) of that recommendation.

Recommendation 6vi/2 (page 6vi-4)

Approved this recommendation noting that it superseded Recommendation 8/5 of the Fourth NAT RAN Meeting and that the question of the implementation date for COM SUPPs was dealt with in Recommendation 7/8

Recommendation 6vi/4 (page 6vi-5)

Approved this recommendation noting that it superseded Recommendation 6/2 of the Fourth NAT RAN Meeting.

Recommendation 6vi/5 (pages 6vi-5 to 6vi-7)

Approved this recommendation noting that it superseded Recommendations 6/3, 6/5 and 6/6 of the Fourth NAT RAN Meeting.

Recommendation 6 vi/11 (page 6vi-9)

Approved this recommendation noting that it superseded Recommendation 6/13 of the Fourth NAT RAN Meeting.

Recommendation 6 vi/14 (page 6vi-12)

Approved this recommendation and noted that it, in effect, superseded Recommendation 12/2 of the Fourth NAT RAN Meeting.

Recommendation 6 viii/1 (page 6viii-1)

Noted that this recommendation reiterated Recommendation 9/1 of the Fourth NAT RAN Meeting, and approved the recommendation and requested the Secretary General to bring it to the attention of the States concerned.

Recommendation 6 viii/3 (page 6viii-2)

Approved this recommendation, noting that it superseded Recommendations 7/15 to 7/20 inclusive of the Fourth NAT RAN Meeting.

Recommendations 6 viii/4 to 6 viii/7 inclusive (page 6viii-3)

Approved these recommendations noting that they were all aimed at improving the general efficiency of the NAT Radio-telephony Networks. It was recognized that the question of reducing the number of airline operational control messages had been dealt with in Rec. 6 iv/4. The Council noted that Recommendations 6 viii/4, 6 viii/5 and 6 viii/6 re-stated Recommendations 8/2, 8/3 b) and 8/6 respectively of the Fourth NAT RAN Meeting.

Recommendation 6 ix/5 (pages 6ix-6/7)

Noting that this recommendation superseded Recommendations 7/3, 7/4, 7/5 and 7/8 of the Fourth NAT RAN Meeting, approved this recommendation on the understanding that in order to reflect correctly the intent of the Meeting, the amendment to Table COM 2A for United Kingdom would read:

"1) Prestwick

Col. 4 - Delete U127.65 † *
Amend U126.25 ** ‡ to read
U126.25 ‡

Col. 5 - Replace L127.9* ‡ by 127.65 †

Col. 6 - Replace 123.85 ✕ by 127.65 †

Col. 8 - Delete the second, third and fourth notes (*, **, and ✕) on Page 3-2-16 and the first note (*) on Page 3-2-17.

Add - "**available via telephone
'patch thru' to GP facility"
on Page 3-2-17.

Recommendations 6 ix/6 and 6 ix/7 (page 6ix-8)

Approved these recommendations and requested the Secretary General to bring them to the attention of Denmark.

Recommendations 7/1 and 7/2 (page 7-1)

Approved these recommendations and noted that they superseded in part, sub-paragraph b) of Recommendation 24/1 of the NAT IV RAN Meeting.

Recommendation 7/3 (page 7-1)

Approved this recommendation and noted that it superseded sub-paragraphs f) g), h) i), j) and k) of Recommendation 24/1 of the NAT IV RAN Meeting.

Recommendation 7/4 (page 7-1)

Approved this recommendation and noted that it superseded sub-paragraphs c), d) and e) of Recommendation 24/1 of the NAT IV RAN Meeting.

Recommendation 7/5 (page 7-1)

Noted this recommendation and observed that implementation of the NAT Area Forecast System had been dealt with in the action taken on Recommendation 6v/1.

Recommendation 7/6 (page 7- 2)

Approved the intent of part b) of this recommendation, noting that further action in this respect would be required in due course;

-approved the intent of part c) of this recommendation and established 0001 hours GMT on 21 October 1965 as the date of implementation of the amendments to the Regional Supplementary Procedures (SUPPs) set forth in Recommendation 6 iii/2, Items 5) to 6), 8) to 10), 12), 14) 16) to 19), 20) (except para. 7.2.5.4) and 21) to 24).

-with respect to item 4), the Council established as the date of implementation, 21 October 1965 or as soon as possible thereafter but in any case not later than 13 January 1966.

-noted that this recommendation superseded sub-paragraph e) of Recommendation 24/2 of the NAT IV RAN Meeting.

Recommendation 7/7 (page 7-2)

Approved the intent of this recommendation and established 0001 hours GMT on 21 October 1965 as the date of implementation of the amendments to the Regional Supplementary Procedures (SUPPs) set forth in Recommendations 6iv/5, 6iv/6 and 6v/5. With respect to the MET SUPPs set forth in Recommendation 6v/1 e) the Council approved the date on which any part of the NAT Area Forecast System is implemented as the date of implementation of these procedures. The Council further noted that this recommendation superseded sub-paragraph d) of Recommendation 24/2 of the NAT IV RAN Meeting.

Recommendation 7/8 (page 7-2)

Approved the intent of this recommendation and established 0001 hours GMT on 21 October 1965 as the date of implementation of the amendments to the Regional Supplementary Procedures (SUPPs) set forth in Recommendations 6 vi/2 and 6 viii/2, noting that this recommendation superseded sub-paragraphs b) and c) of Recommendation 24/2 of the NAT IV RAN Meeting.

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PART II

1. The Air Navigation Commission acting under authority delegated by the Council:

Recommendation 6 iii/3 (page 6iii-15)

Noted the intent of this recommendation but concluded that no amendment of Part III, paragraph 11.2 of the PANS-RAC was necessary inasmuch as the Meeting, through its further action on supplementary procedures, had developed a complete system of reporting points covering the description of any route through the NAT Region; consequently position reporting in the Region would henceforth be governed by PANS-RAC, Part III, paragraph 11.1 (renumbered as para. 12.1 in Amendment 7 to the Seventh Edition).

Recommendations 6 vi/9 and 6 vi/10 (page 6vi-8)

Noted these recommendations and requested the Secretary General to bring them to the attention of the States forming the NAT Systems Planning Group.

Recommendation 6 vi/15 (page 6vi-13)

Approved the intent of this recommendation and requested the Secretary General to consult initially with Canada, the United Kingdom and the United States with a view to arriving at an early solution to the problem.

Recommendation 6 vii/1 (page 6vii-2)

Noted that this recommendation largely re-stated and therefore superseded Recommendation 7/32 of the Fourth NAT RAN Meeting, approved the intent of the recommendation and requested the Secretary General to bring it to the attention of the States forming the NAT Systems Planning Group.

Recommendation 6 viii/10 (page 6viii-6)

Approved the intent of this recommendation and requested the Secretary to take it into consideration when proposing an Agenda for the COM/OPS Meeting or Air Navigation Conference tentatively planned for the third quarter of 1966.

Recommendations 6 ix/1 and 6 ix/3 (pages 6ix-4 and 6ix-5)

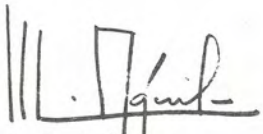
Approved the intent of these two recommendations and requested the Secretary to take them into consideration when proposing an Agenda for the COM/OPS Meeting or Air Navigation Conference tentatively planned for the third quarter of 1966. The Air Navigation Commission noted that Recommendation 6 ix/3 superseded Recommendation 7/12 of the Fourth NAT RAN Meeting.

LETTER OF TRANSMITTAL

To: President of the Council

From: Chairman of the General Committee,
Special North Atlantic Regional Meeting

I have the honour to submit herewith the Report of the Special North Atlantic Regional Meeting held in Montreal, Canada, from 23 February to 20 March 1965.



M.L.C. Agésilas

Montreal, 20 March 1965

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iii - CHAIRMAN'S REPORTSECTION iii-1: HISTORICALiii-1.1 Place and duration of the Meeting

The Special North Atlantic Meeting, 1965, was convened by the International Civil Aviation Organization on 23 February 1965 at its Headquarters in Montreal and completed its agenda on 20 March 1965. All meetings were open to the public.

iii-1.2 Organization, Officers, Officials and Tasks

Following are the major components of the Meeting and their officers, technical secretariat and tasks:

iii-1.2.1 General Committee

Chairman	- Mr. M.L.C. Agésilas (France)
1st Vice-Chairman	- Mr. F.A.H. Diego (Iceland)
2nd Vice-Chairman	- Mr. E.V. Shores United States of America)
Secretary	- Dr. J.H. Heierman

The Secretary of the Meeting was assisted by Mr. P.J. Ludgate.

The General Committee met on three occasions. During its opening Plenary Meeting the General Committee was addressed by the President of the Council, Mr. Walter Binaghi, and the First Vice-President of the Air Navigation Commission, Mr. K. Ekling.

The General Committee noted that the Council had emphasized the special character of the Meeting in approving an organization of and directives to the Meeting designed to exploit and develop the techniques of Systems Planning. The Meeting was to be of a policy making and programming character rather than a technical meeting of the customary Regional Air Navigation type, although the opportunity should be taken to consider current requirements for amendments to the existing Regional Plan and Supplementary Procedures.

Following the directives of the Council, the General Committee and its subordinate components conducted their business to the extent practicable in accordance with the provisions in Doc 8144-AN/874 (Rules of Procedure for the Conduct of Air Navigation Meetings and Directives to Regional Air Navigation Meetings). The Committee also noted additional directives of the Council and the Air Navigation Commission found in the pre-Meeting documentation.

The Committee adopted the Agenda and the organization plan for the Meeting, as established by the Council.

The Committee considered Agenda Item 1, a review of action taken on Recommendation 2/2 of the Fourth North Atlantic Regional Air Navigation Meeting, which formed a useful background to discussions on the other agenda items.

During its closing plenary meeting the General Committee approved the Report of the Meeting for transmittal to the President of the Council.

The ICAO Representative, European Office, Mr. J. Hutchison, attended for the duration of the Meeting.

iii-1.2.2 Policy and Programming Committee

Chairman	- Mr. J.G. Karlsson	(Sweden)
Vice-Chairman	- Mr. A. A. da Silva Barreira	(Portugal)
ICAO Adviser	- Mr. J.R. Park	

The Policy and Programming Committee was charged specifically with Agenda Items 3, 4, 5, 7 and 8 and additionally reviewed the action taken by other committees on Agenda Items assigned to them.

iii-1.2.3 Traffic Forecasting Committee

Chairman	- Mr. I.G. Barrowman	(Canada)
Vice-Chairman	- Mr. G.P. Hunter	(United States of America)
ICAO Adviser	- Mr. G. Gamacchio	

The Traffic Forecasting Committee was charged with Agenda Item 2.

iii-1.2.4 Navigation and Air Traffic Services Committee

Chairman	- Mr. J. Glickman	(Israel)
Vice-Chairman	- Mr. M. Moloney	(Ireland)
ICAO Advisers	- Messrs. P.G. Berger and B. Gaustad	

The Navigation and Air Traffic Services Committee was charged with Agenda Items 3 c), as appropriate, 6.i), 6 ii), 6 iii) and appropriate parts of 6 iv) and 6 v), and 7.

iii-1.2.5 Communications and Meteorological Committee

Chairman	- Mr. H. Starr	(United Kingdom)
Vice-Chairman	- Mr. R.R. Dodds	(Canada)
ICAO Advisers	- Messrs. C.C.E. Bellringer and G.J.W. Oddie	

The Communications and Meteorology Committee was charged with Agenda Items 3 c) as appropriate, 6 iv) and 6 v) as appropriate, 6 vi), 6 vii), 6 viii), 6 ix) and 7.

iii-1.3 Working languages

The working languages of the Meeting were English and French. The documentation of the Meeting was issued in both languages.

iii-1.4 Administrative Services

The Officers in charge of administrative services for the Meeting were:

Chief Interpreter	- Mr. F. Cordier
Administrative Officer	- Dr. L.O. d'Apollonia

SECTION iii-2: REPRESENTATION

Twenty-two Contracting States, Members of the Region, one Contracting State not Member of the Region and eight International Organizations were represented:

Contracting States, Members of the Region

Australia, Belgium, Canada, Cuba, Czechoslovak S.R., Denmark, France, Germany (Federal Republic of), Iceland, Ireland, Israel, Italy, Japan, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States

Contracting State - not Member of the Region

Nicaragua

International Organizations

European Organization for the Safety of Air Navigation (EUROCONTROL)
International Airline Navigators Council (IANC)
International Air Transport Association (IATA)
International Council of Aircraft Owner and Pilot Associations (IAOPA)
International Federation of Air Line Pilots' Associations (IFALPA)
International Radio Air Safety Association (IRASA)
International Telecommunication Union (ITU)
World Meteorological Organization (WMO)

A list of the accredited Representatives who attended the Meeting follows hereafter.

LIST OF REPRESENTATIVES
LISTE DES DELEGUES

Name/Nom	Position in Delegation Qualité dans la délégation*	General Committee/ Comité général	Committees/ Comités			
			PP	TF	NA	CM
<u>Contracting States/ Etats contractants</u>						
<u>AUSTRALIA/AUSTRALIE</u>						
Fogarty, J.T.	D	x	x			
Crampton, R.	Alt.		x		x	
<u>BELGIUM/BELGIQUE</u>						
Pirson, A.X.	D	x	x			x
<u>CANADA</u>						
Dodd, R.W.	D.	x	x		x	
Smith, R.H.	Alt.	x	x		x	
Banfield, R.B.	Adv.	x	x			
Barrowman, I.G.	Adv.	x	x	x	x	
Beak, A.K.	Adv.		x		x	
Cornick, W.B.	Adv.		x		x	
Dodds, R.R.	Adv.	x	x			x
Elliott, A.L.	Adv.	x	x	x	x	
English, E.T.	Adv.		x		x	x
Ernst, R.C.	Adv.		x		x	
Faulkner, D.A.	Adv.	x	x			x
Gill, F.A.	Adv.	x	x	x	x	
McNaughton, M.K.	Adv.	x				
Murphy, A.J.	Adv.		x		x	
Porter, W.R.L.	Adv.	x	x			x
Powell, E.B.	Adv.	x	x			x
Rowell, C.R.	Adv.				x	
Stachtchenko, L.	Adv.				x	
Taylor, R.M.	Adv.					
<u>CUBA</u>						
Torres-Menier, M.	D		x		x	
Porto, M.	Alt.		x			x
Valladares, J.A.	Alt.		x			x

*D : Delegate/Délégué
Alt.: Alternate/Suppléant

Adv.: Adviser/Conseiller
O : Observer/Observateur

Name/Nom	Position in Delegation Qualité dans la délégation*	General Committee/ Comité général	Committees/ Comités			
			PP	TF	NA	CM
<u>CZECHOSLOVAKIA/</u> <u>TCHECHOSLOVAQUIE</u>						
Vranský, P.	D		x		x	
Závodský, K.	Alt.		x			x
<u>DENMARK/DANEMARK</u>						
Mølgaard, H.T.	D	x	x			x
Hansen, A.	Alt.		x		x	
Jensen, B.	Alt.		x			x
Larsen, C.	Adv.	x	x		x	
Laursen, P.	Adv.		x			x
<u>FRANCE</u>						
Agésilas, M.L.C.	D	x	x			x
Artola, J.G.	Alt.	x	x			
Barberon, J.P.	Alt.	x	x			x
Boisseau, P.	Alt.	x	x		x	
Chef, M.	Alt.	x	x			x
Duvergé, P.	Alt.	x	x	x		x
Hubert, J.	Alt.	x	x			x
Lescure, P.	Adv.			x		
<u>GERMANY</u> <u>ALLEMAGNE</u>						
Engler, J.	D	x	x			x
Breidenbach, O.E.	Alt.	x	x			
Karwath, K.E.	Alt.	x	x		x	
<u>ICELAND/ISLANDE</u>						
Diego, F.A.H.	D	x	x		x	x
Arndal, S.G.J.	Alt.					x
Magnusson, L.	Alt.	x	x		x	x
Sigtryggsson, H.	Alt.		x			x
<u>IRELAND/IRLANDE</u>						
O'Sullivan, R.W.	D	x	x		x	x
Enright, G.E.	Alt.	x	x			x
Moloney, M.	Alt.	x	x		x	
O'Neill, D.J.	Alt.	x				x
Rohan, P.K.	Alt.		x			x

Name/Nom	Position in Delegation Qualité dans la délégation*	General Committee/ Comité général	Committees/ Comités			
			PP	TF	NA	CM
<u>ISRAEL</u>						
Glickman, J.	D	x	x		x	
<u>ITALY/ITALIE</u>						
Rossetti, E.	D	x	x		x	
<u>JAPAN/JAPON</u>						
Enomoto, Y.	O	x	x			
<u>MEXICO/MEXIQUE</u>						
Francoz-Rigalt, A.	D	x	x			
<u>NETHERLANDS/PAYS-BAS</u>						
Rombouts, P.J.C.	D	x	x			
Postma, K.R.	Alt.		x			x
Ten Velden, J.	Alt.	x	x		x	
Witte, W.	Alt.		x			
Lakeman, C.	Adv.					
Leunis, J.	Adv.	x	x			x
Suttorp, J.	Adv.	x	x			x
<u>NICARAGUA</u>						
Montoya, S.J.	O		x			
<u>NORWAY/NORVEGE</u>						
Grinde, B.	D	x	x			
Holsten, S.	Alt.	x				
Thesen, F.W.	Alt.	x	x		x	
<u>PORTUGAL</u>						
da Silva Barreira, A.A.	D	x	x		x	
Espiritu Santo, T.R.	Alt.	x	x			x
<u>SPAIN/ESPAGNE</u>						
Freile, J.J.	D		x		x	
Lacalle, F.	Alt.	x	x			
<u>SWEDEN/SUEDE</u>						
Karlsson, J.G.	D	x				
Persson, K.W.B.	Alt.	x	x			x

Name/Nom	Position in Delegation Qualité dans la délégation*	General Committee/ Comité général	Committees/ Comités			
			PP	TF	NA	CM
<u>SWITZERLAND/</u> <u>SUISSE</u>						
Meister, P.	D		X			
Avi, A.G.	Alt.		X		X	
Auberson, P.	Adv.	X	X		X	
<u>UNITED KINGDOM/</u> <u>ROYAUME-UNI</u>						
Jessell, A.H.	D	X	X			X
Baird, F.R.	Alt.		X			
Brambleby, E.J.	Alt.	X				X
Broughton, R.J.	Alt.	X	X		X	
Collins, K.R.	Alt.	X	X		X	
Gratton, B.	Alt.		X	X		
Harley, D.G.	Alt.	X	X			X
Harrison, T.H.	Alt.	X	X		X	
Hemming, P.H.	Alt.	X	X		X	
Job, B.	Alt.		X			
Peacock, G.P.	Alt.	X	X			X
Reich, P.G.	Alt.	X	X			
Starr, H.	Alt.		X			X
Bradley, F.C.	Adv.					
King, V.H.	Adv.	X	X		X	
Lee, L.	Adv.	X	X		X	
<u>UNITED STATES/</u> <u>ETATS-UNIS</u>						
Shores, E.V.	D		X			X
Budge, L.K.	Alt.	X	X			X
Craig, A.	Alt.		X	X		
Cummins, S.S.	Alt.					
Grimm, S.O.	Alt.	X	X			X
Hunter, G.P.	Alt.	X	X	X		
Kelly, C.	Alt.	X	X	X		
Lebel, A.L.	Alt.					
McFarlane, H.H.	Alt.	X	X	X	X	
Wolfe, G.M.	Alt.	X	X			
Bowman, J.M.	Adv.		X		X	
Child, D.K.	Adv.		X			X
Dunmire, C.E.	Adv.	X	X		X	
Lorenz, H.F.	Adv.	X	X	X	X	
Peridier, P.	Adv.	X	X			X
Skaggs, A.H.	Adv.	X	X			
Taylor, T.H.	Adv.	X	X			X

Name/Nom	Position in Delegation Qualité dans la délégation*	General Committee/ Comité général	Committees/ Comités			
			PP	TF	NA	CM
<u>International Organizations/ Organisations internationales</u>						
<u>EUROPEAN ORGANIZATION FOR THE SAFETY OF AIR NAVIGATION/ ORGANISATION EUROPEENNE POUR LA SECURITE DE LA NAVIGATION AERIENNE (EUROCONTROL)</u>						
Soward, R.M.	O	x	x		x	x
<u>INTERNATIONAL AIRLINE NAVIGATORS COUNCIL/ CONSEIL INTERNATIONAL DES NAVIGATEURS DE LIGNE (IANC)</u>						
Gwin, M.	O				x	
Henderson, W.K.	O	x	x		x	
Waldman, R.	O	x	x			
<u>INTERNATIONAL AIR TRANSPORT ASSOCIATION/ ASSOCIATION DU TRANSPORT AERIEN INTERNATIONAL (IATA)</u>						
Aagaard, A.	O					
Brown, R.F.	O		x			
Chambers, E.	O					
Champie, O.L.	O	x	x		x	x
Cole, R.L.	O					
Enderlein, L.	O	x	x		x	
Heitmeyer, R.	O			x		
Hoeveler, W.	O					
Johnston, F.J.H.	O	x				
Kearvell, P.	O		x	x	x	x
Lensing, A.	O	x				
Loke, A.W.	O	x				x
Meline, J.	O	x	x			
Miller, S.H.	O					
Olhede, S.G.	O					
Piculell, S.A.	O					x
Powell, P.G.	O					
Reynolds, P.R.J.	O	x	x		x	
Simpson, J.F.	O	x			x	
Smith, H.E.	O		x			
Townsend, T.J.	O		x			
Van der Aa, A.G.	O	x	x		x	
Williams, V.N.	O					x
Winship, R.	O	x				x
Woodman, J.	O				x	

Name/Nom	Position in Delegation <u>Qualité dans la</u> <u>délégation*</u>	General Committee/ <u>Comité général</u>	Committees/ <u>Comités</u>			
			PP	TF	NA	CM
INTERNATIONAL COUNCIL OF AIRCRAFT OWNER AND PILOT ASSOCIATIONS/CONSEIL INTERNATIONAL DES ASSOCIATIONS DE PROPRIETAIRES ET DE PILOTES D'AERONEFS (IAOPA)						
Armstrong, N.S.	O	x				
Bodkin, D.	O	x	x			
Logsdon, C.S.	O	x				x
Peppler, B.	O	x				
INTERNATIONAL FEDERATION OF AIR LINE PILOTS' ASSOCIATIONS/ FEDERATION INTERNATIONALE DES ASSOCIATIONS DE PILOTES DE LIGNE (IFALPA)						
Bartling, J.H.	O		x			x
Basnight, T.A. Jr.	O		x			
Foy, J.H.	O	x				
Hutchings, R.	O	x				
Masland, W.	O	x	x			
Rodgers, W.G.	O	x				x
INTERNATIONAL RADIO AIR SAFETY ASSOCIATION (IRASA)						
Feinberg, R.	O					x
INTERNATIONAL TELECOMMUNICATION UNION/ UNION INTERNATIONALE DES TELECOMMUNICATIONS (ITU/UIT)						
Gracie, J.	O	x				x
WORLD METEOROLOGICAL ORGANIZATION/ ORGANISATION METEOROLOGIQUE MONDIALE (WMO/OMM)						
Weiss, G.K.	O		x			x

Agenda Item 1: Review of Progress on Recommendation 2/2 of the Fourth North Atlantic Regional Air Navigation Meeting

SECTION 1-1: ACTION BY THE GENERAL COMMITTEE ON AGENDA ITEM 1

Introduction

1.1.1 The Special North Atlantic Meeting, 1965, commenced the work on its Agenda with a review of the progress made on Recommendation 2/2 of the Fourth North Atlantic Regional Air Navigation Meeting, held in 1961. The text of this Recommendation is as follows:

"NAT IV RECOMMENDATION No. 2/2 - SYSTEMS PLANNING APPROACH FOR AIR TRAFFIC CONTROL AND RELATED SERVICES IN THE NORTH ATLANTIC REGION"

That the Council, with a view to promoting safer, more efficient, or more economical service, initiate suitable action for further study on the following long-term technical goals and on the international cooperation required to achieve them.

2.1.7.1.2 General long-term technical goals to govern NAT planning should include, inter alia:

- 2.1.7.1.2.1 Consolidation, wherever feasible, of FIR's and control areas;
- 2.1.7.1.2.2 Coordinated alignment of the NAT communications system (the AFS, the AFTN and the aeromobile service) with any steps which may be taken toward consolidating air traffic services;
- 2.1.7.1.2.3 A single integrated system for navigation (which may include both ground-based and self-contained aids) aligned with the requirements of the ATS system;
- 2.1.7.1.2.4 The possibility of obtaining the meteorological service related to flight planning from a reduced number of meteorological centres;
- 2.1.7.1.2.5 A compatible and efficient application wherever necessary of automation to the NAT ATS and related services, to be achieved by coordination between the NAT States actively engaged in the development and application of automated devices on both sides of the North Atlantic."

The review of progress was conducted by the General Committee so as to enable all participants in the Meeting to attend.

1.1.2 The item had been included in the Agenda for the purpose of recapitulating for the benefit of delegates from all North Atlantic States the full history of the subject so far. The review in the General Committee provided an opportunity for all participants to familiarize themselves with the follow-up of Recommendation 2/2 until the convening of the Special NAT Meeting. The discussions on the history of the subject thus set the stage for productive work on the remainder of the Agenda.

1.1.3 The review was made on the basis of a working paper presented by the Secretariat. In introducing this working paper, the Secretariat highlighted major features in the history of the subject which are recorded in the following paragraphs.

History

1.1.4 A systems planning approach* for the North Atlantic Region had first been proposed by the United States at the Fourth North Atlantic Regional Air Navigation Meeting in Paris in 1961, and had resulted in its Recommendation 2/2.

1.1.5 The main points of the Air Navigation Commission's initial conclusions on that recommendation were that by "principal area" the Commission had meant the area where at that time the chief problem - the need for economy in airspace utilization - presented itself. Also, whereas regional air navigation meetings usually planned about five years ahead, the study to be undertaken was intended to look perhaps twice as far into the future. The Commission had thought that the study should include financial aspects, but that it should initially not go into these aspects.

* Early in the discussion of Items assigned to it, the Policy and Programming Committee agreed on the following definition of "Systems Planning":

"Systems planning is a method of planning designed to achieve as far as possible the optimum allocation of resources necessary to provide the fully integrated facilities and services required to satisfy regional operational requirements and should therefore:

- a) ensure close integration of the various components of the system so that ground-based facilities and services, the characteristics of aircraft and air-borne equipment and the associated procedures are compatible and form a coherent whole;
- b) be based on a continuous, evolutionary and flexible planning process able to meet changes in requirements or to accommodate technical developments, planning should cover a 10-year period and would be progressively renewed as implementation of the plan progresses and continuing review reveals the need for modification of the plan;
- c) give close attention at all stages of planning to the effectiveness of system changes in relation to their cost."

1.1.6 The Council, in reviewing the Air Navigation Commission's conclusions, had directed that States' forecasts of NAT traffic development would be sought. Council had also asked the six States* providing the basic air navigation services in the principal area to examine the long-term goals of Recommendation 2/2 and to propose amendments to them if necessary.

1.1.7 Subsequent communications from States had caused the Air Navigation Commission to agree that the whole NAT area would be affected, although the greatest problem attached to the main traffic flow area. Any specific detailed planning should therefore be undertaken by all NAT States, not by the six providers alone. Also the financial and economic aspects affected all NAT States.

1.1.8 The informal meetings that had been held in London and Miami Beach had been meetings not of States as such, but more specifically of national aviation authorities. Their reports had no formal status, and no recommendations for action by ICAO had been made. Work pursued after the meetings by the United States of America was described in the so-called "SPANAT Report".

1.1.9 The need for a formal ICAO meeting had become evident at the second informal meeting and some views on the draft agenda for the Special NAT Meeting that ICAO had subsequently circulated to all NAT States were the following. Because one or two States wished it to have very thorough treatment, the item on the establishment of operational requirements, on criteria for measuring present systems and on possible future developments had assumed greater proportions than was usual for such an item at ordinary regional air navigation meetings. Specific technical issues that States had raised when presenting their comments on the agenda had been grouped together under Item 6. States had made more use of the opportunity to submit proposals for action under this Item than had originally been expected and this had caused some overlapping between Items 3, 6 and possibly others. A majority of States had believed that substantive discussion of financial aspects would be premature.

Summary of discussion in the General Committee

1.1.10 This introduction to the subject was followed by contributions of individual Delegations, summarized below, with the Delegations of some of the six States most closely involved in work so far performed describing their additional activities.

1.1.11 Work done in the United States since the Miami Beach Meeting had been documented in working papers now before the Meeting. The continuing exchanges of views between aviation administrations of the six provider States had been most valuable in stimulating a continuing awareness and hence a much sharper, clearer view of the existing North Atlantic situation and foreseeable changes in requirements.

* Canada, Denmark, Iceland, Ireland, United Kingdom, United States.

1.1.12 The United Kingdom Administration had gained a much clearer understanding of the nature of systems planning, its scope and its objectives. The relationship and relative importance of the different elements had thus come into focus. In addition to its working papers, the United Kingdom would distribute other documentation in the course of the Meeting. These related to the areas that seemed to be of greatest immediate significance in the determination on the one hand of the relation between navigation safety and separation standards, and on the other hand of the severity of the congestion and its effect upon operators. The United Kingdom believed that a proper balance had to be struck between the interests of administrations and those of users and, being representative of both, had been studying this.

1.1.13 The General Committee was informed of the amalgamation of Shannon and Prestwick oceanic control centres, Air traffic control services to NAT air traffic in the Shanwick FIR had for some years been provided on a joint basis by oceanic control centres at Prestwick and Shannon, with communication centres at Birdlip and Ballygirreen respectively. This system, which involved complex procedures to ensure coordination between the two centres, was already giving rise to difficulty in maintaining an efficient ATC service - a difficulty that would increase as the volume of NAT traffic grew. Thus the Governments of both countries concerned had agreed to consolidate the control in the oceanic ATC Centre at Prestwick for the handling of all en-route NAT traffic within the Shanwick FIR, with the communications centre at Shannon. The new scheme could not be fully implemented immediately and in the meantime the arrangements instituted for the summer of 1964, which had given the Prestwick Oceanic Control Centre responsibility for all en-route NAT air traffic, using both communication centres, would continue to operate. A formal agreement embodying the new arrangements would be concluded between the two Governments.

1.1.14 Canada's support of the systems planning approach concept was based upon the understanding that Recommendation 2/2 arose not from evident deficiencies in the safety of NAT operations, but rather from the need to examine the efficiency of the whole NAT system and plan its further development to meet the needs of coming generations of aircraft. There were still relatively few deficiencies in the services which now supported the en-route phase of North Atlantic operations.

Since NAT IV, Denmark, Iceland, Ireland, the United Kingdom, the United States and Canada had devoted considerable time and effort to a systems planning approach study of North Atlantic air traffic control and related services. The meeting's greatest task probably was to increase NAT system capacity in order to accommodate all anticipated traffic with safety and greater efficiency.

The Meeting was assured that Canada would continue to participate wholeheartedly in any further planning that it might be asked to undertake in the North Atlantic, and work towards improving the efficiency of the system to the greatest extent possible.

1.1.15 In IFALPA's view two areas of particular interest to it represented probably the focal point of the Meeting: how to make a more thrifty use of available airspace and how to ensure a high level of safety; those two areas represented the two horns of a dilemma. In present practice, an aircraft fuelled and departed according to a given flight plan, but it was not until 300 - 1000 miles later that the pilot learnt what the actual route and altitude would be that he should maintain. Recent experience showed that during peak periods, it would eleven times out of twelve be something other than the route and altitude for which the request had been filed and the aircraft fuelled. No proposals had yet been made that would alter this unhappy situation. That was the first horn of the dilemma and it led to the second: every proposal for fitting more aircraft into the route called for a reduction in separation and hence a lowering of safety standards.

The problem of accommodating more aircraft over the North Atlantic was acute. To meet so immediate a need while at least maintaining the present standard of safety, IFALPA would make a number of proposals which could be implemented immediately or very soon. All would provide immediate relief, and with no lowering of the present standard of safety. They were short-range projects but most had enduring value.

1.1.16 IATA had found the comments interesting though in part disappointing. IATA's own views would be presented in connexion with individual agenda items.

1.1.17 The French opinion was that although a great deal of work had been done in connexion with Recommendation 2/2, attention seemed to be riveted on amendments to the Plan and SUPPS for short-term improvements, rather than on development of policy guidelines and preparation of a programme for future action. It was disappointing that three years work had not yielded more definite conclusions. It appeared that there were serious differences of opinion among the group of six provider States, and the Meeting might, in order to pursue systems planning, have to look for radically different solutions.

1.1.18 In the view of the United States there were indeed differences of opinion on important matters amongst the group of States that had attempted to carry out some approach to systems planning but the degree of understanding was far greater.

Conclusion

1.1.19 It was the general opinion that the exchange of views that had preceded the commencement of the work on the substantive items of the Agenda had served its intended purpose of creating a common understanding on which the work to be accomplished in the following weeks would be based.

Agenda Item 2a: Preparation of guidance for forecasting future North Atlantic traffic - statistical material

SECTION 2a-1: ACTION BY THE TRAFFIC FORECASTING COMMITTEE ON AGENDA ITEM 2a

2 a-1.1 The TF Committee reviewed the forecasts of aircraft traffic over the North Atlantic for the years 1964 through 1972 as presented by the United States on the basis of joint statistical analyses by Canada, United Kingdom, and United States.

2 a-1.2 The Committee endorsed the traffic forecasts appearing in Tables 1 and 2 of Appendix B for the present technical planning of North Atlantic air traffic facilities and services.

2 a-1.3 The Committee also accepted the assumptions and endorsed the statistical techniques employed in producing the forecasts as guidance for developing and updating future traffic forecasts. These techniques and the associated assumptions are described in Appendix A.

2 a-1.4 The Committee agreed that future forecasts covering a period of ten years would be appropriate for long-term system planning requirements although it would involve a degree of uncertainty with regard to the possible effects of the introduction of new types of aircraft in the latter part of the period.

2 a-1.5 The Committee considered that it would be necessary to update the traffic forecasts annually toward the end of each year and at other times as appropriate in order to reflect developments in air transport and associated changes in its environment.

2 a-1.6 The Committee gave consideration to the organization of future work with regard to production and updating of forecasts. It was considered that this was an essential part of the program for future action on North Atlantic systems planning. It was noted that Canada, the United Kingdom, and the United States have readily available to them the necessary basic data and have already developed the requisite techniques and procedures for its processing. Therefore, the Committee considered that this task should be continued by those States, in co-ordination with the ICAO Secretariat, within the framework of the planning mechanism established under Agenda Item 4.

APPENDIX ANOTES ON THE TRAFFIC FORECAST

1. This Appendix summarizes the construction of the annual and peak traffic forecasts set forth in Appendix B to this report.

2. ANNUAL FLIGHTS

2.1 Assumptions. The task of forecasting was viewed not simply as a mathematical exercise, but as one which must also involve a substantial element of judgement. The forecasters applied their judgement in the first instance by making several general assumptions respecting the environment in which future air transport would be undertaken in the North Atlantic. These were:

- a) That the present status of international relations will not be disrupted by major conflict and that the North Atlantic community will continue to trade with one another in much the same way as they are trading today.
- b) That the change in population will be reasonably normal and that the economic growth of the North Atlantic community will continue to be progressive.
- c) That no new cargo or passenger aircraft developed as a result of a major breakthrough in technology (such as a supersonic transport or a substantially enlarged subsonic aircraft capable of accommodating 300 to 400 passengers) would be introduced on the North Atlantic routes during the forecast period.
- d) That no new major passenger markets would emerge during the forecast period, and that existing markets would continue to hold their relative portion of the total traffic.
- e) That civil operations will continue their transition from piston to turbo-jet equipment during the forecast period.

2.2 Additional assumptions underlying the forecasts can be found in ICAO Doc 8087-C/925, "The Technical, Economic and Social Consequences of the Introduction into Commercial Service of Supersonic Aircraft," as they relate to North Atlantic demand estimates.

2.3 Forecast annual flights include all flights expected to file ICAO flight plans each year up to and including 1972, and are divided between jet and non-jet operations in each of the major North Atlantic traffic flows, which are defined as follows:

- a) Flights crossing the Principal Area (i.e., for this purpose, the Gander and Shanwick OCA's) of the North Atlantic between Europe and North America, consisting of flights making intermediate stops in Greenland and Iceland, as well as non-stop flights between the European and North American continents. Flights between the United Kingdom and Bermuda are also included.
- b) Flights crossing the North Atlantic between Europe and North America outside the Principal Area, consisting of flights that make intermediate stops at the Azores, Polar flights, and flights between North America and Spain, Portugal and Africa.
- c) Flights in the Principal Area of the North Atlantic not crossing between Europe and North America, consisting of flights between:
 - i) Greenland and Europe or North America;
 - ii) Iceland and Europe or North America.
- d) Flights over the North Atlantic outside the Principal Area not crossing between Europe and North America, consisting of flights between North America and Bermuda, Caribbean Islands, and South America.

2.4 Forecast for Principal Area. The so-called Principal Area was dealt with first since it was the only area for which existed reasonably detailed historical series on the volume and characteristics of North Atlantic air activity. In general, scheduled passenger and cargo flights were projected separately by the application of forecast aircraft capacities and load factors to ICAO estimates of passenger and cargo demand. To the end that future technical planning will wish to take into consideration the total traffic likely to file ICAO flight plans, both non-scheduled and State air traffic have also been included in the forecast.

2.5 Forecast for Other Areas. The only comprehensive survey of air traffic activity covering the entire North Atlantic Region was conducted during the twelve months ending 30 June 1962. Certain of these data were utilized by the forecasters in developing indices of traffic distribution among the four major NAT traffic flows defined above. By the application of these indices to the Principal Area traffic forecast, estimates of the remaining three flows were constructed.

3. PEAK PERIOD FLIGHTS

3.1 The highest concentration of air activity in the North Atlantic occurs in the Principal Area through which traverses nearly all flights operating between major terminals in Europe and North America. Accordingly, more detailed forecasts have been developed for operations in this critical control location, these being related in a defined way to the traffic expected during the peak season.

3.2 Busy Day Flights. Forecasting absolute peak day flights was found to be impracticable since those for any one year (or season) are the result of special events peculiar to that period. For this reason an average figure, having reasonable stability, has been chosen as representative of a Busy Day in the peak season. Consequently, Busy Day estimates of the flow of traffic in the Principal Area between Europe and North America may be defined as the sum of the total traffic in July and August divided by 62, i.e., the total number of days in those two months.

3.3 Busy Hour Flights. The System Design for the North Atlantic will presumably be predicated on the need to meet sustained rather than occasional hourly peak demands. For this reason an average figure, having reasonable stability, has been chosen as representative of a Busy Hour in the peak season. It is defined as an average of the largest hourly flows of each week during July and August. For example, if the busiest hour of the week for Westbound flights is 1300 - 1400 G.M.T. on each Friday, the Busy Hour figure for Westbound traffic would be the average of the flights in this hour on all the Fridays that occur in July and August.

3.4 It should be emphasized that both Busy Day and Busy Hour figures are, by definition, averages, and should not be mistaken as representing absolute peak traffic.

3.5 Forecast of Busy Day and Busy Hour Flights. It was observed that the growth in the number of flights in 1964 compared with that for 1963 was 14.9% for annual flights, but only 10%, 4% and 7% for Busy Day, Busy Hour (eastbound peak) and Busy Hour (westbound peak) respectively. It seemed probable that the lower percentage growth in the Busy Day flights was the result of spreading of the seasonal and weekly peak. This would also have affected the growth in the Busy Hour flights, but here growth must have been reduced still further by some equalization of the traffic between the days of the week and by some spreading of the peaks over the hours of the day. It was assumed that these various spreading processes would continue but that eventually a stable pattern would be reached so that growth in the Busy Day and Busy Hour flights eventually would become the same as that in the annual flights. It was further assumed that the approach to stability would be reached by a linear increase in the ratio of the Busy Day or Busy Hour growths to the growth in annual flights.

APPENDIX B

TABLE 1

Estimated Annual Flights Operating in the North Atlantic Region by Flow Category and Aircraft Class

Year and Aircraft Class	Crossing Between Europe and North America in the			Not Crossing Between Europe and North America in the			Total All Flows
	Principal Area	Other Areas		Principal Area	Other Areas		
1964	Jet Non-Jet Total	48000 13500 61500	6200 6500 12700	900 3900 4800	16400 9000 25400		71500 32900 104400
1965	Jet Non-Jet Total	54500 13300 67800	7000 6000 13000	1200 3400 4600	19300 8700 28000		82000 31400 113400
1966	Jet Non-Jet Total	61000 13000 74000	8300 5100 13400	1700 2800 4500	22800 8000 30800		93500 29000 122500
1967	Jet Non-Jet Total	67300 12500 79800	9900 3900 13800	2400 2000 4400	26100 7000 33100		105600 25400 131000
1968	Jet Non-Jet Total	75000 12200 87200	11400 2900 14300	3000 1300 4300	29800 6300 36100		119200 22700 141900
1969	Jet Non-Jet Total	82900 11600 94500	12400 2500 14900	3100 1100 4200	33300 5900 39200		131700 21100 152800
1970	Jet Non-Jet Total	90800 10900 101700	13200 2200 15400	3200 900 4100	36400 5800 42200		143700 19800 163500
1971	Jet Non-Jet Total	96900 9800 106700	13800 2000 15800	3200 800 4000	38700 5600 44300		152600 18100 170700
1972	Jet Non-Jet Total	103200 8600 111800	14300 1800 16100	3200 700 3900	41100 5300 46400		161800 16400 178200

TABLE 2

Estimated Busy Day and Busy Hour Flights (Both Directions) Crossing
Between Europe and North America in the Principal Area

Year and Aircraft Class		Busy Day	Busy Hour	
			Eastbound	Westbound
1964	Jet	164	19	19
	Non-Jet	46	4	0
	Total	210	23	19
1965	Jet	181	20	20
	Non-Jet	46	4	0
	Total	227	24	20
1966	Jet	201	21	22
	Non-Jet	44	4	0
	Total	245	25	22
1967	Jet	221	23	24
	Non-Jet	43	4	0
	Total	264	27	24
1968	Jet	247	25	27
	Non-Jet	40	3	0
	Total	287	28	27
1969	Jet	273	28	30
	Non-Jet	37	3	0
	Total	310	31	30
1970	Jet	299	31	32
	Non-Jet	36	3	0
	Total	335	34	32
1971	Jet	319	33	35
	Non-Jet	32	3	0
	Total	351	36	35
1972	Jet	340	35	37
	Non-Jet	29	2	0
	Total	369	37	37

SECTION 2a-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING
COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 2a

2a-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 2a and made no comment.

SECTION 2a-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION TAKEN
ON AGENDA ITEM 2a

2a-3.1 The General Committee reviewed the material presented to it under Agenda Item 2a and made no comment.

Agenda Item 2b: Preparation of Short-term Air Route TableSECTION 2b-1: ACTION BY THE TRAFFIC FORECASTING COMMITTEE ON AGENDA ITEM 2b

2b-1.1 The TF Committee reviewed the draft tabulation of scheduled aircraft operations as presented by the Secretariat on the basis of the information received from States and IATA relating to traffic anticipated for the summer months 1965, 1967 and 1969.

2b-1.2 The draft tabulation of scheduled aircraft operations was approved with the inclusion of further amendments which were received from State Delegations. The final table is incorporated in the present Report.

2b-1.3 The Committee expressed reservations on the reliability of the forecasts contained in the tabulation since it consists solely of a reproduction of information received from States and IATA and may be incomplete. The Committee considered, nevertheless, that the tabulation would be of value in providing perspective as to the anticipated network of scheduled North Atlantic operations. The Committee felt that future implementation of short-term improvements to the NAT Regional Plan should take into account forecasts based upon sound statistical techniques.

NOTES ON THE TABULATIONS

1. Route segments wholly contained within the area to be considered by the Meeting are listed for both directions. Inter-regional route segments are shown in one direction only.

2. Data concerning route segments originating in but extending outside the area to be considered by the Meeting and data concerning routes wholly contained within and more appropriate to another region are consolidated and the routes are identified solely by use of the abbreviation for the adjacent region. Future data for these segments are not shown.

3. Information concerning weekly frequencies of operations and types of aircraft is divided into the following categories:

- P - Piston engined aircraft
- TP - Turbo-propeller aircraft
- TJ - Turbo-jet aircraft

Columns have been left blank where no information is available.

4. The frequency of the flights operated once every two weeks is indicated by the figure 1/2; a question mark appears in the tabulation where uncertainty exists as to the category of aircraft to be used; the symbol (N) is used in column 1 to indicate routes on which some flights depart during hours of darkness.

5. Where no future information is available, entries for 1967 and/or 1969 are omitted. Where future information is available only for some of the airlines operating on a route segment, the information given for 1965 for the remaining airlines is extended through 1967 and 1969 to give a reasonable approximation of the situation.

6. The total number of flights per week in one direction is indicated in column 8.

Abbreviations of Aircraft Types

AVR0748 - A.V. Roe 748	F27 - Fokker F27
BAC 111 - British Aircraft Corp. 111	HERALD - Handley Page Herald
B707 - Boeing 707	IL-18 - Ilyushin IL-18
B720 - Boeing 720	IL-62 - Ilyushin IL-62
B727 - Boeing 727	
BR - Bristol Britannia	L188 - Lockheed L188 Electra
	L749 - Lockheed Constellation L749
C46 - Curtiss Commando C46	L1049 - Lockheed L1049 Super Constellation
CL44 - Canadair CL-44	
COMET - Hawker Siddeley (De Havilland) Comet 4	SE.210 - Sud-Aviation SE.210 Caravelle
CV440 - Convair 440 Metropolitan	TRI - Hawker Siddeley (De Havilland) Trident
CV880 - Convair 880	
CV990 - Convair 990 Coronado	TU-104 - Tupolev TU-104
	TU-114 - Tupolev TU-114
DC3 - Douglas DC3 (Dakota C47)	TU-124 - Tupolev TU-124
DC4 - Douglas DC4/Skymaster	
DC6B - Douglas DC6B	VAN - Vickers Vanguard 950
DC7 - Douglas DC7	VIS - Vickers Viscount
DC7B - Douglas DC7B	VC10 - Vickers VC10
DC7C - Douglas DC7C	
DC7F - Douglas DC7F	
DC8 - Douglas DC8	
DC8F - Douglas DC8F	

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
BELGIUM/BELGIQUE										
BRUXELLES	MONTREAL	2997	1965 1967 1969			4 7 7	4 7 7			B707
	N NEW YORK	3176	1965 1967 1969	3	1 2	13 15 18	17 17 18	DC7F	CL-44	B707 B707/DC8
	EUM	1755	1965				261	CV440 DC6 DC7C	IL-18 L188 VIS	B707/B720 COMET/DC8 SE.210 TRI
BERMUDA/BERMUDES										
KINDLEY FIELD	BOSTON	671	1965 1967 1969			3 3 5	3 3 5			B707/DC8
	N LONDON	2979	1965 1967 1969			6 9 10	6 9 10			B707 B707 VC10
	N MADRID	2933	1965 1967 1969			2 2 3	2 2 3			DC8
	MONTREAL	891	1965 1967 1969		2 2 2	1 2 2	3 4 4		VAN	DC8
	N NEW YORK	661	1965 1967 1969			24 29 31	24 29 31			B707/DC8 VC10
	TORONTO	977	1965 1967 1969		4 4 4	1 2 3	5 6 7		VAN	DC8
	WASHINGTON	716	1965 1967 1969	3			3 7 9	DC7B	L188	
	N CAR	2001	1965				9			B707/DC8
CANADA										
CALGARY	AMSTERDAM	3869	1965 1967 1969			1 2 3	1 2 3			DC8
	NAM	241	1965				7		L188	
EDMONTON	N AMSTERDAM	3740	1965 1967 1969			2 3 3	2 3 3			DC8

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
CANADA (Cont'd - suite)										
GANDER	N HABANA	2038	1965 1967 1967		4		4		BR	
	MADRID	2190	1965 1967 1969		1		1		BR	
	PRAHA	2584	1965 1967 1969		2		2		BR	
	N PRESTWICK	1836	1965 1967 1969			1 1 1	1 1 1			DC8
	N SHANNON	1715	1965 1967 1969		2 2 3		2 2 3		BR CL-44 CL-44	
HALIFAX	N LONDON	2475	1965 1967 1969			1 1 1	1 1 1			DC8
	N PRESTWICK	2276	1965 1967 1969			3 3 3	3 3 3			DC8
	NAM	356	1965				4		VIS	
MONTREAL	N AMSTERDAM	2971	1965 1967 1969			6 8 9	6 8 9			DC8
	N BRUXELLES	2997	1965 1967 1969			4 7 7	4 7 7			B707
	CHICAGO	648	1965 1967 1969			23 25 25	23 25 25			B707/DC8 B707/DC8 B720
	DETROIT	465	1965 1967 1969			3 3 3	3 3 3			DC8
	FRANKFURT	3160	1965 1967 1969			1 4 7	1 4 7			B707
	HOUSTON	1588	1965 1967 1969			3 3 3	3 3 3			DC8
	KINDLEY FIELD	891	1965 1967 1969		2 2 3	1 1 1	3 3 4		VAN	DC8
	N KANSAS CITY	3151	1965 1967 1969			6 6 7	6 6 7			DC8

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
MONTREAL (Cont'd -suite)	N LISBON	2826	1965 1967 1969			2 3 3	2 3 3			DC8
	N LONDON	2815	1965 1967 1969			8 7 10	8 7 10			B707/DC8 B707/DC8 VC10
	LOS ANGELES	2143	1965 1967 1969			2 5 5	2 5 5			B707 B707/DC8
	MADRID	2997	1965 1967 1969			2 4 4	2 4 4			DC8
	N MILANO	3299	1965 1967 1969			3 3 3	3 3 3			DC8
	NEW YORK	289	1965 1967 1969	2 3 4		10 14 15	12 17 19	DC7F		B707/DC8F
	N PARIS	2983	1965 1967 1969			19 18 19	19 18 19			B707/DC8
	N PRESTWICK	2593	1965 1967 1969			8 8 8	8 8 8			B707/DC8
	ROMA	3566	1965 1967 1969			2 4 4	2 4 4			DC8
	SAN FRANCISCO	2199	1965 1967 1969	- - -	- - -	4 - -	4 - -	- - -	- - -	B707 - -
	SANTA MARIA	2215	1965 1967 1969			1 1 1	1 1 1			DC8
	N SHANNON	2496	1965 1967 1969			2 5 6	2 5 6			DC8 B720/DC8
	N TORONTO	273	1965 1967 1969			26 29 31	26 29 31			B707/DC8
	N ZURICH	3236	1965 1967 1969			3 4 5	3 4 5			DC8
	CAR	1804	1965				6		VAN	B707/DC8
	N NAM	289	1965				113	DC6B DC7B	VAN VIS	B720 B727
TORONTO	KINDLEY FIELD	977	1965 1967 1969		4 4 4	1 2 3	5 6 7		VAN	DC8
	N LONDON	3080	1965 1967 1969			7 9 11	7 9 11			DC8

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
TORONTO(Cont'd- suite) N	MONTREAL	273	1965 1967 1969			26 29 31	26 29 31			B707/DC8
	PRESTWICK	2853	1965 1967 1969			1 1 1	1 1 1			DC8
	CAR	2110	1965				35		VAN	DC8
	NAM	375	1965				152	CV240 CV440 M404	L188 VAN VIS	B727
VANCOUVER	AMSTERDAM	4160	1965 1967 1969			1 1 1	1 1 1			DC8
	NAM	694	1965				42 1/2	DC6		B707 B720 DC8
	PAC	4080	1965				10		BR	DC8
WINNIPEG	LONDON	3394	1965 1967 1969			2 2 3	2 2 3			DC8
	PRESTWICK	3129	1965 1967 1969			2 3 3	2 3 3			DC8
	NAM	118	1965				21	DC7C	L188	
CZECHOSLOVAKIA/ TCHÉCOSLOVAQUIE										
PRAHA	HABANA *	4597	1965 1967 1969	-	-	- 1 1	- 1 1	-	-	IL-62
	NEW YORK	3535	1965 1967 1969	-	-	- 1 1	- 1 1	-	-	- ?
DENMARK/DANEMARK										
KØBENHAVN	ANCHORAGE	3745	1965 1967 1969			6 7 8	6 7 8			B707/DC8
	LOS ANGELES	4872	1965 1967 1969	-	-	- 3 3	- 3 3	-	-	DC8
	N MONTREAL	3131	1965 1967 1969	2 3 4		6 6 7	8 9 11	DC7F		DC8
	NEW YORK	3339	1965 1967 1969			16 17 18	16 17 18			DC8
	SØNDRE STRØMFJORD	1850	1965 1967 1969	1		4 3 3	5 3 3	DC7C		DC8
	EUM	1697	1965				436	CV440 DC6B DC7C	IL-18 L188 VIS	B707/DC8 B727/TRI CV990 SE.210 TU-104 TU-124

* Both terminals of this route segment lie outside the NAT Region.

* Les deux extrémités de ce tronçon de route sont situées en dehors de la Région NAT.

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
SØNDRE STRØMFJORD (GREENLAND/ GROENLAND)	KØBENHAVN	1850	1965			4	4			DC8
			1967			3	3			
			1969			3	3			
	LOS ANGELES	3026	1965			3	3			DC8
			1967			2	2			
			1969			2	2			
VAGAR(Faroe Is. I. Féroé)	BERGEN	376	1965		1		1		F27	
			1967							
			1969							
	GLASGOW	382	1965		1		1		F27	
			1967							
			1969							
	REYKJAVIK	416	1965		1		1		F27	
			1967							
			1969							
FRANCE										
PARIS	ANCHORAGE	4072	1965			2	2			B707
			1967			3	3			
N	BOSTON	2987	1965			10	10			B707/DC8
			1967			13	13			
			1969			17	17			
N	CHICAGO	3599	1965			1	1			B707
			1967			8	8			
			1969			8	8			
N	DETROIT	3439	1965			2	2			B707
			1967			4	4			
			1969			4	4			
N	LOS ANGELES	4918	1965			6	6			B707/DC8
			1967			7	7			
			1969			9	9			
	MEXICO	4965	1965			4	4			B707
			1967							
			1969							
	MONTREAL	2983	1965			19	19			B707/DC8
			1967			18	18			
			1969			19	19			
N	NEW YORK	3148	1965			72	72			B707/DC8
			1967			75	75			
			1969			79	79			
	PHILADELPHIA	3229	1965			2	2			B707/DC8
			1967			3	3			
			1969			3	3			
	POINTE-A-PITRE	3648	1965			2	2			B707
			1967							
			1969							
N	SAN FRANCISCO	4844	1965			2	2			B707
			1967			6	6			
			1969			8	8			
N	WASHINGTON	3332	1965			4	4			B707/DC8
			1967			6	6			
			1969			6	6			

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
PARIS (Cont'd N - suite)	AFI	3272	1965				23		IL-18	B707/DC8 SE.210
	EUM	1776	1965				621	CV440 DC4 DC6	F.27 HERALD IL-18 Vah VIS	B707/DC8 B720 COMET TU-104 TU-124 SE.210
GERMANY (FEDERAL REPUBLIC)/ ALLEMAGNE (REP.FED. D')										
FRANKFURT	BOSTON	3178	1965				2			B720
			1967				3			B707
			1969				4			
	CHICAGO	3762	1965				6			B707
			1967				7			
			1969				7			
	MONTREAL	3160	1965				1			B707
			1967				4			
			1969				7			
	NEW YORK	3340	1965			3	28		CL-44	B707/DC8
			1967			?	?			
			1969			?	?			
	SAN FRANCISCO	4936	1965	-	-	-	-	-	-	-
			1967			3	3			B707
			1969			3	3			
	AFI	3409	1965				9			B720 DC8 VC10
	EUM	1572	1965				566	CV440 DC3 DC4 DC6B	F27 IL-18 L188 VIS	B707 B720 B727 COMET DC8 SE.210 TRI TU-124 VC10
HAMBURG	ANCHORAGE	3728	1965 1967 1969				3			B707
	NEW YORK	3301	1965				1			DC8
			1967				1			
			1969				1			
	EUM	630	1965				210	CV440 DC6B	L188 VIS	B707/DC8 SE.210 TRI
KÖLN	NEW YORK	3269	1965 1967 1969				7 7 7			B707
	EUM	1053	1965				106	CV440 DC6B	VIS	SE.210

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
ICELAND / ISLANDE										
KEFLAVIK	LUXEMBOURG	1260	1965 1967 1969		5		5		CL-44	
	N NEW YORK	2246	1965 1967 1969		5 5 5	1 1 1	6 6 6		CL-44	B707/DC8
	PRESTWICK	741	1965 1967 1969			1 1 1	1 1 1			B707/DC8
REYKJAVIK	BERGEN	787	1965 1967 1969	1			1	DC6B		
	GLASGOW	719	1965 1967 1969	2	7		9	DC6B	VIS	
	LONDON	1015	1965 1967 1969	3			3	DC6B		
	OSLO	940	1965 1967 1969	5			5	DC6B		
	VAGAR	416	1965 1967 1969	1			1		F27	
IRELAND / IRLANDE										
SHANNON	BOSTON	2508	1965 1967 1969			5 9 11	5 9 11			B707/720 B707/720 DC8
	N GANDER	1715	1965 1967 1969		4		4		BR	
	MONTREAL	2496	1965 1967 1969			2 5 6	2 5 6			DC8 B720/DC8
	N NEW YORK	2669	1965 1967 1969		2 3 4	32 41 45	34 44 49		CL-44	B707/DC8 B720 DC8F
	EUM	878	1965				8		BR VIS	B707/DC8

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
ITALY/ITALIE										
MILANO	BOSTON	3300	1965 1967 1969			2 3 3	2 3 3			DC8
	CHICAGO	3917	1965 1967 1969	-	-	- 3 3	- 3 3	-	-	- DC8
	MONTREAL	3299	1965 1967 1969			3 4 4	3 4 4			DC8
	N NEW YORK	3460	1965 1967 1969		2	11 14 18	11 16 18		CL-44	B707/DC8
	N EUM	1414	1965				172		IL-18 L188 VIS	B707/DC8 B727/TRI SE.210 TU-124
ROMA	MONTREAL	3566	1965 1967 1969			1 2 2	1 2 2			DC8
	NEW YORK	3718	1965 1967 1969		2	25 28 45	25 30 45		CL-44	B707/DC8
	N AFI	4168	1964				25	DC7C		B707/DC8 COMET VC10
	N EUM	1277	1965				350	C46 CV440 DC6B	BR IL-18 L188 VIS	B707/DC8 B720 B727/TRI COMET SE.210 TU-104 VC10
	N MID	3342	1965				10			B707/DC8 CV990 VC10
	N SEA	3186	1965				1			B707
LUXEMBOURG										
LUXEMBOURG	N KEFLAVIK	1260	1965 1967 1969		5		5		CL-44	
	N EUM	904	1965				43	CV440	F.27 VIS	SE.210

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
NETHERLANDS/ PAYS-BAS										
AMSTERDAM	ANCHORAGE	3885	1965 1967 1969			2	2			DC8
	CALGARY	3869	1965 1967 1969			1 2 3	1 2 3			DC8
	EDMONTON	3740	1965 1967 1969			3 4 4	3 4 4			DC8
	N MONTREAL	2971	1965 1967 1969			10 13 14	10 13 14			DC8/DC8F
	N NEW YORK	3156	1965 1967 1969			29 32 34	29 32 34			B707/DC8 B707 DC8/DC8F
	N EUM	1172	1965				360	CF440 DC3 DC6B DC7F	AVRO748 IL-18 L188 VIS	B707/DC8 BAC111 COMET SE.210 TU-104 TU-124
NORWAY/NORVEGE										
BERGEN	N NEW YORK	3024	1965 1967 1969			3 3 3	3 3 3			DC8
	N REYKJAVIK	787	1965 1967 1969	1			1	DC6B		
	VAGAR	376	1965 1967 1969		1		1		F27	
OSLO	N NEW YORK	3192	1965 1967 1969			1 3 3	1 3 3			B707/DC8
	N REYKJAVIK	940	1965 1967 1969	5			5	DC6B		
	N EUM	651	1965				86	CV440 DC6B DC7C	VIS	B707 COMET DC8 SE.210

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
PORTUGAL										
LISBOA	FUNCHAL	528	1965 1967 1969	7			7	L1049		
	MIAMI	3603	1965 1967 1969			3 3 3	3 3 3			B707/DC8
	MONTREAL	2826	1965 1967 1969			2 2 2	2 2 2			DC8
	NEW YORK	2916	1965 1967 1969			22 23 26	22 23 26			B707/DC8
N	SANTA MARIA	766	1965 1967 1969			3 3 3	3 3 3			B707/DC8
N	AFI	4423	1965				16	DC7C L1049		BAC111 B707 CV990 SE.210 VC10
N	CAR	3507	1965				8			B707/DC8
	EUM	306	1965				62	CV440		B707/DC8 COMET CV990 SE.210
N	SAM/SAT	4163	1965				3			DC8
SANTA MARIA AÇORES	N BOSTON	2116	1965 1967 1969			2 2 2	2 2 2			B707/DC8
	N LISBOA	766	1965 1967 1969			2 2 2	2 2 2			B707/DC8
	MADRID	1031	1965 1967 1969	1 2		2	1 2	L1049		DC8
	MONTREAL	2215	1965 1967 1969			1 1 1	1 1 1			DC8
N	CAR	3043	1965				1	L1049		

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
SPAIN/ESPAGNE										
MADRID	N BOSTON	2955	1965 1967 1969	-	-	- 1 1	- 1 1	-	-	- B707
	KINDLEY FIELD	2933	1965 1967 1969			2 2 3	2 2 3			DC8
	MIAMI	3835	1965 1967 1969			1 3 3	1 3 3			DC8
	MONTREAL	2997	1965 1967 1969			1 2 2	1 2 2			DC8
	N NEW YORK	3109	1965 1967 1969			11 13 16	11 13 16			B707/DC8
	SANTA MARIA	1031	1965 1967 1969	1 2			1 2 2	L1049		DC8
	N APT	2887	1965				31	L1049		B707/DC8 COMET SE.210 VC10
	N CAR	3780	1965				3			B720 DC8
	N EUM	1273	1965				120	CV440	L188 VAN	B707/DC8 B720 B727 SE.210
	N SAN/SAT	4396	1965				4			B707/DC8

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
UNITED KINGDOM/ ROYAUME-UNI										
GLASGOW	N REYKJAVIK	719	1965 1967 1969	2	7		9	DC6B	VIS	
	VAGAR	382	1965 1967 1969		1		1		F27	
	SUN	382	1965				14	DC6B	F. 27	
LONDON	N BOSTON	2828	1965 1967 1969			17 21 21	17 21 21			B707/DC8
	N CHICAGO	3425	1965 1967 1969			14 14 16	14 14 16			B707/DC8 B707
	KINDLEY FIELD	2979	1965 1967 1969			6 9 10	6 9 10			B707 B707 VC10
	LOS ANGELES	4727	1965 1967 1969			5 5 7	5 5 7			B707/DC8
	N MONTREAL	2815	1965 1967 1969			7 7 10	7 7 10			B707/DC8 B707/DC8 VC10
	N NEW YORK	2939	1965 1967 1969		6 ? ?	0 1/4 ? ?	100 114 127		CL-44	B707/DC8 B720 VC10
	PHILADELPHIA	3070	1965 1967 1969			5 5 7	5 5 7			B707/DC8
	REYKJAVIK	1015	1965 1967 1969	3			3	DC6B		
	SAN FRANCISCO	4650	1965 1967 1969			2 4 5	2 4 5			B707/DC8
	SEATTLE	4157	1965 1967 1969			3 3 4	3 3 4			B707/DC8
	TORONTO	5080	1965 1967 1969			10 15 18	10 15 18			B707/DC8
	N WASHINGTON	517 1/4	1965 1967 1969			12 12 12	12 12 12			B707/DC8

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
UNITED KINGDOM/ ROYAUME-UNI (Cont'd - suite)										
LONDON (Cont'd- suite) N	AFI	4896	1965				18		BR	B707 VC10
N	EUM	1937	1965				843	04/40 1DC3	BR IL-18 VAN V19	B707/DC8 B720 B727/TRI BAC111 COMET CV990 TU-104 VC10
N	MID	2731	1965				3			VC10
PRESTWICK	GANDER	1836	1965 1967 1969			1 1 1	1 1 1			DC8
	HALIFAX	2276	1965 1967 1969			3 3 3	3 3 3			DC8
	MONTREAL	2593	1965 1967 1969			12 12 13	12 12 13			B707/DC8
N	NEW YORK	2785	1965 1967 1969	1 3 ?	27 28 ?	28 31 37		CL-44		B707/DC8
	KEFLAVIK	741	1965 1967 1969			1 1 1	1 1 1			B707/DC8
	TORONTO	2853	1965 1967 1969			1 1 1	1 1 1			DC8
	WINNIPEG	3129	1965 1967 1969			2 3 4	2 3 4			DC8
	EUM	658	1965				8	DC6B		B707/DC8

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT														
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ												
TRONÇON DE ROUTE		DIST. NM	ANNEE	Nº DE VOLS PAR SEMAINE				AERONEF														
DE	A			P	TP	TJ	TOTAL	P	TP	TJ												
1	2	3	4	5	6	7	8	9	10	11												
UNITED STATES OF AMERICA/ ETATS- UNIS D'AMERIQUE	AMSTERDAM	3885	1965 1967 1969			2	2			DC8												
ANCHORAGE (ALASKA)																						
HAMBURG											3728	1965 1967 1969	3	3			B707					
KØBENHAVN																		3745	1965 1967 1969	6 7 8	6 7 8	B707/DC8
PARIS																						
NAM	2478	1965				25			B720B													
PAC	3004	1965				17			B707/B720B DC8													
BALTIMORE	KINDLEY FIELD	711	1965 1967 1969	3			3	DC7B														
	CAR	1362	1965				7			B707/DC8												
BOSTON	CHICAGO	751	1965 1967 1969			2 2 3	2 2 3			B707												
	N DETROIT	548	1965 1967 1969			16 16 16	16 16 16			B707/DC8												
	FRANKFURT	3178	1965 1967 1969			2 3 4	2 3 4			B720 B707												
	KINDLEY FIELD	671	1965 1967 1969			3 3 5	3 3 5			B707/DC8												
	N LISBOA	2766	1965 1967 1969			1 1 1	1 1 1			B707												
	N LONDON	2828	1965 1967 1969			17 21 21	17 21 21			B707/DC8												
	N MADRID	2955	1965 1967 1969	-	-	- 1 1	- 1 1	-	-	- B707												
	N MILANO	3300	1965 1967 1969			3 4 4	3 4 4			B707/DC8												
	N NEW YORK	161	1965 1967 1969			11 11 14	11 11 14			B707/DC8 B720												

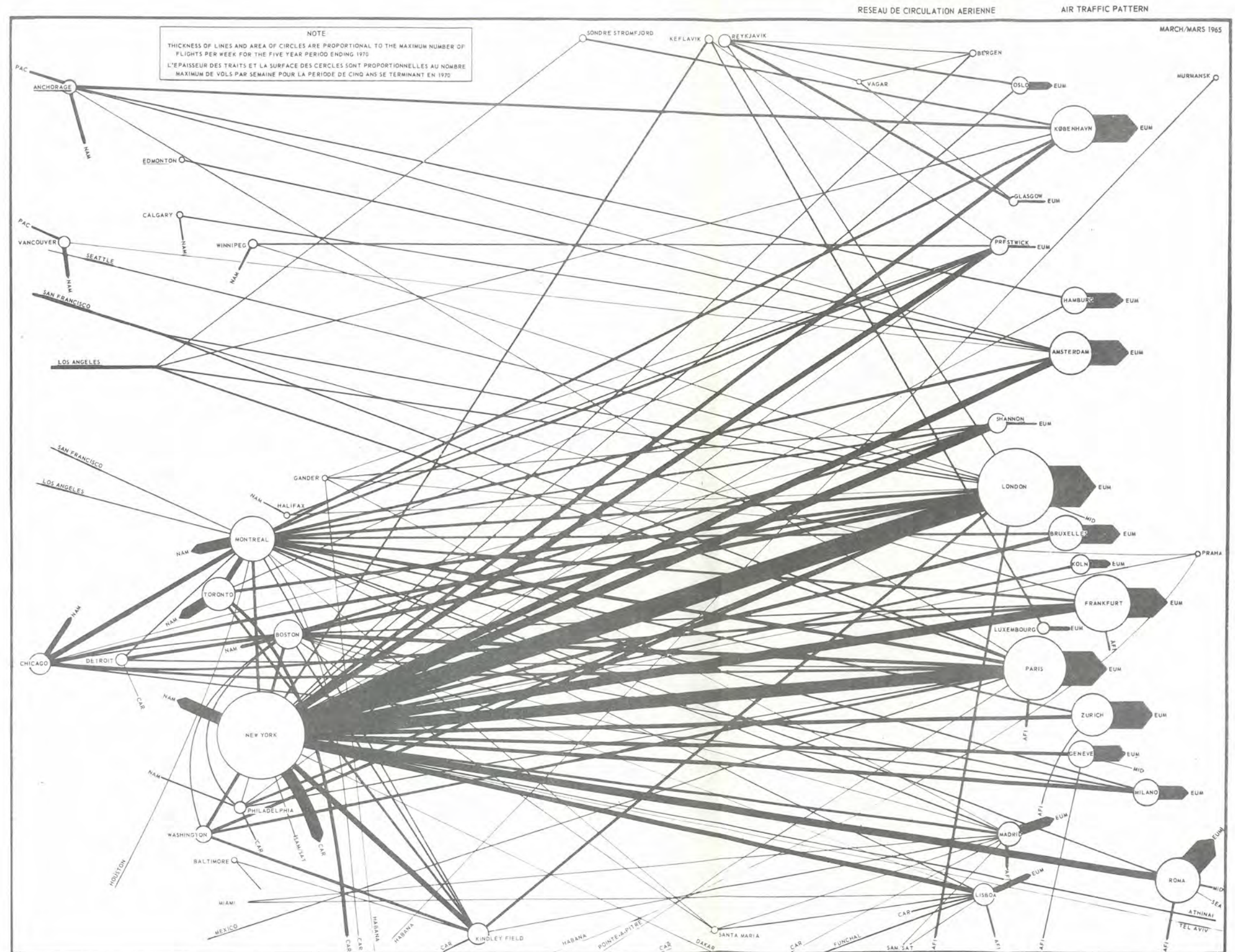
ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
UNITED STATES OF AMERICA/ ETATS-UNIS D'AMERIQUE (Cont'd - suite)										
BOSTON (Cont'd - suite)	N PARIS	2987	1965 1967 1969			10 13 17	10 13 17			B707/DC8
	PHILADELPHIA	242	1965 1967 1969			2 3 4	2 3 4			B720 B707
N	SANTA MARIA	2116	1965 1967 1969			1 1 1	1 1 1			B707/DC8
N	SHANNON	2508	1965 1967 1969			5 6 8	5 6 8			B707/B720
	WASHINGTON	359	1965 1967 1969			3	3			B707
	NAM	356	1965				37	DC6B	VIS	
CHICAGO	FRANKFURT	3762	1965 1967 1969			6 7 7	6 7 7			B707
N	LONDON	3425	1965 1967 1969			14 14 16	14 14 16			B707/DC8
N	MILANO	3917	1965 1967 1969	-	-	- 3 3	- 3 3	-	-	DC8
N	MONTREAL	648	1965 1967 1969			23 25 25	23 25 25			B707/DC8 B707/DC8 B720
N	PARIS	3599	1965 1967 1969			1 8 8	1 8 8			B707
N	SHANNON	3111	1965 1967 1969			1 1 1	1 1 1			B707/DC8
N	NAM	375	1965				41		VAN VIS	
DETROIT	BOSTON	548	1965 1967 1969			16 16 16	16 16 16			B707/DC8
	MONTREAL	465	1965 1967 1969			3 3 3	3 3 3			DC8
	PARIS	3453	1965 1967 1969			2 2 2	2 2 2			B707
	CAR	1560	1965				3			DC8

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
UNITED STATES OF AMERICA/ETATS- UNIS D'AMERIQUE (Cont'd - suite)										
NEW YORK	N AMSTERDAM	3156	1965			34	34			B707/DC8 DC8F
			1967			37	37			
			1969			39	39			
	N ATHINAI	4273	1965			1	1			B707
			1967			8	8			
			1969			8	8			
	N BERGEN	3024	1965			3	3			DC8
			1967			3	3			
			1969			3	3			
	N BOSTON	161	1965			12	12			B707/DC8 B720
			1967			12	12			
			1969			15	15			
	N BRUXELLES	3176	1965	3		12	15	DC7F		B707
			1967			14	14			
			1969			14	14			
	DAKAR	3302	1965			2	2			B707/DC8
			1967			3	3			
			1969			3	3			
	N FRANKFURT	3340	1965		1	28	29	CL-44		B707/DC8
			1967		2	35	37			
			1969		?	?	46			
	N GENEVE	3346	1965			5	5			DC8
			1967			7	7			
			1969			11	11			B707/DC8
	N HAMBURG	3301	1965			1	1			DC8
			1967			1	1			
			1969			1	1			
	KEFLAVIK	2246	1965		5	1	6	CL-44		B707/DC8
			1967		5	1	6			
			1969		5	1	6			
	N KINDLEY FIELD	661	1965			24	24			B707/DC8 VC10
			1967			29	29			
			1969			31	31			
	N KØBENHAVN	5339	1965	2		16	18	DC7F		DC8
			1967	3		17	20			
			1969	4		18	22			
	N KÜLN-BONN	5269	1965			7	7			B707
			1967			7	7			
			1969			7	7			
	N LISBOA	2916	1965			22	22			B707/DC8
			1967			16	16			
			1969			19	19			
	N LONDON	2959	1965		10	97	107	CL-44		B707/DC8
			1967		12	108	120			VC10
			1969		?	?	134			
	N MADRID	3109	1965			11	11			B707/DC8
			1967			13	13			
			1969			16	16			

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
UNITED STATES OF AMERICA/ETATS- UNIS D'AMERIQUE (Cont'd - suite)										
NEW YORK (Cont'd - suite)	N MILANO	3460	1965			11	11			B707/DC8F
			1967			15	15			
			1969			15	15			
	N MONTREAL	289	1965			2	2			B707
			1967			5	5			
			1969			5	5			
	N OSLO	3192	1965			1	1			B707/DC8
			1967			3	3			
			1969			3	3			
	N PARIS	3148	1965			71	71			B707/DC8
			1967			74	74			
			1969			78	78			
	N PHILADELPHIA	81	1965			3	3			B707
			1967			3	3			
			1969			4	4			
	PRAHA	3535	1965			-	-	-	-	-
			1967			1	1			?
			1969			1	1			
	N PRESTWICK	2785	1965			21	21			B707/DC8
			1967			26	26			
			1969			28	28			
	N ROMA	3718	1965			27	27			B707/DC8
			1967			29	29			DC8F
			1969			43	43			
	N SHANNON	2669	1965		1	29	30	CL-44		B707/DC8
			1967		2	37	39			B720
			1969		4	40	44			
	N TEL AVIV	4920	1965			2	2			B707
			1967			2	2			
			1969			2	2			
	WASHINGTON	197	1965			17	17			B707
			1967			17	17			
			1969			17	17			
	N ZURICH	3404	1965			8	8			DC8
			1967			17	17			B707/DC8
			1969			21	21			
	N CAR	2161	1965				163	DC7 L1049		B707/DC8 B720 COMET CV850
	N SAN/SAT	4605	1965				8			B707/DC8
	NAM	318	1965				155	DC7B L188 V.1N V15		B720 B727

ROUTE SEGMENT		DIST. NM	YEAR	WEEKLY FREQUENCY				AIRCRAFT		
FROM	TO			P	TP	TJ	TOTAL	P	TP	TJ
TRONÇON DE ROUTE		DIST. NM	ANNEE	N° DE VOLS PAR SEMAINE				AERONEF		
DE	A			P	TP	TJ	TOTAL	P	TP	TJ
1	2	3	4	5	6	7	8	9	10	11
UNITED STATES OF AMERICA/ETATS-UNIS D'AMERIQUE (Cont'd - suite)										
PHILADELPHIA	BOSTON	242	1965 1967 1969			2 3 4	2 3 4			B720 B707
N	LONDON	3070	1965 1967 1969			6 6 9	6 6 9			B707/DC8
N	PARIS	3229	1965 1967 1969			2 3 3	2 3 3			B707/DC8
	PRESTWICK	2865	1965 1967 1969			2 2 2	2 2 2			B707
	CAR	1372	1965				14			B707/DC8
	NAM	341	1965				7			DC7B
WASHINGTON	BOSTON	359	1965 1967 1969			3	3			B707
	KINDLEY FIELD	716	1965 1967 1969	3	7 9		3 7 9	DC7B	L188	
N	LONDON	3174	1965 1967 1969			12 12 12	12 12 12			B707/DC8
N	NEW YORK	197	1965 1967 1969			17 17 17	17 17 17			B707
N	PARIS	3332	1965 1967 1969			2 2 9	2 2 9			B707/DC8

[illegible]



SECTION 2b-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING
COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 2b

2b-2.1 The Policy and Programming Committee reviewed the material
presented to it under Agenda 2b and made no comment.

SECTION 2b-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION TAKEN
ON AGENDA ITEM 2b

2b-3.1 The General Committee reviewed the material presented to
it under Agenda Item 2b and made no comment.

Agenda Item 3: Operational Requirements

- a) Establishment of basic system requirements through the early 1970's

SECTION 3a-1: ACTION BY THE PP COMMITTEE ON AGENDA ITEM 3a

3a-1.1 The Policy and Programming Committee examined a statement of operational requirements presented to the Meeting and developed the following statement of basic operational requirements for planning in the North Atlantic Region at this Meeting and for initial use in continuing planning thereafter.

3a-1.2 Where of particular significance to the NAT Region, it has been found desirable to incorporate some material of world-wide application but in general the statement of operational requirements should be viewed against the background of the basic requirements as formulated in the ICAO Standards, Recommended Practices and Procedures.

Statement of Basic Operational Requirements1. GENERAL

1.1 A standardized and efficient system of air traffic control and related services should be provided, on an evolutionary basis, in the ICAO North Atlantic Region to serve the needs of all users for safe, regular, efficient and economic international air operations. To achieve this, it is essential that:

- a) The number of control areas and control centres should be the practicable minimum consistent with the state of the art and the related services be similarly consolidated insofar as practicable.
- b) The system be capable of serving the needs of all users in an impartial manner.
- c) Procedures, services and facilities be compatible with those for operations in adjacent regions and continental areas.
- d) The workload upon any aircrews and ground personnel employed in the system not exceed a level where safety or efficiency is impaired.
- e) Minimum performance criteria be established for critical equipments, both ground and air, and provision be made to ensure that such equipment is maintained to the required level of performance and reliability.

- f) An adequate number of technically trained and competent personnel be provided to supervise, maintain and operate air navigation facilities and services in the Region.
- g) The proficiency of aircrews in the use of the system and its airborne components be maintained to prescribe minimum standards,
- h) Facilities and services be provided on a basis which will permit a safe and efficient flow of traffic on a 24-hour basis.
- i) Operators have access to information necessary to exercise effective operational control over their aircraft.
- j) When prescribing facilities, services and procedures, consideration be given to the aircraft limitations and operational environment in relation to the required carriage of airborne equipment.
- k) The intended establishment of danger areas and temporary airspace reservations (aircraft operating within a given block of airspace) always be the subject of notification to the operator, preferably after prior consultation.

2. AIR NAVIGATION SYSTEM

2.1 A system of air navigation should be provided to meet the needs of the operators as well as providing an adequate basis for ATS procedures. The system should:

- a) Be fully reliable under all conditions.
- b) Provide the pilot with continuously available information to determine his position and enable him to continue his flight and carry out any corrections or changes required to complete the flight.
- c) Provide information suitable for transmission to air traffic control.
- d) Provide the navigational capability needed throughout the area to permit the application of the horizontal separation minima necessary to accommodate present and forecast traffic volume by means of any appropriate system or combination of systems, separately or together as necessary.
- e) Be reasonably available to all users of the system, with respect to size, weight and cost of airborne components.
- f) Be capable of evolutionary development and expansion.
- g) Be compatible with continental navigation systems with respect to navigational performance and capability.

Planning to satisfy these requirements should take into account the need for keeping the workload imposed on the flight crew within acceptable limits. The use of the system should therefore require only normal operating manipulations and should not call for a high degree of concentration either in the use of the system or in the interpretation of the data presentation nor should these two activities be very time-consuming.

3. ALTIMETRY SYSTEM

3.1 Safe application of minimum vertical separation should be ensured by use of an aircraft altimetry system of a sufficient level of accuracy.

4. APPROACH AND LANDING AIDS

4.1 A system of aids to approach and landing should be provided which will permit the pilot to effect the transition from the en-route configuration and accomplish a landing. The system, including equipment and procedures, should be improved progressively towards the ultimate objective of all weather operations.

5. AIR TRAFFIC SERVICES

Area Control, Flight Information and Alerting Services

5.1 Flight Information Service and Alerting Service shall be provided throughout North Atlantic Region. In addition, Air Traffic Control Service shall be provided within the limits of control areas. The Air Traffic Services should be so devised as to:

- a) Establish a practicable minimum number of FIR/CTA's;
- b) Establish separation minima which will permit the most efficient use of the airspace;
- c) Be procedurally "fail-safe";
- d) Enable aircraft to fly preferred, or as near as possible preferred, routes and levels with sufficient flexibility to permit both planned and unplanned changes in flight situations; relevant flight planning information should be provided to operators as early as possible;
- e) Provide for safe and expeditious handling of air traffic including the ability adequately to process and clear peak traffic flows;
- f) Assign responsibility to a single authority for the provision of air traffic services within any delineated area; and
- g) Require a minimum of air-ground communications and a minimum of intercenter coordination.

ATS Communications

5.2 Rapid and highly reliable communications must be provided between adjacent control centres and between pilots and controllers.

a) Air Reports (Position)

Aircraft position reports should be limited from the ATS point of view to that number and content necessary to provide the controller with an adequate knowledge of all aircraft in his area of responsibility.

Control of Air Traffic

5.3 The system should provide and adequately display to the controller the accurate position and intention of the aircraft in his area of responsibility.

Transition between Continental and Oceanic Airspace

5.4 Air traffic control procedures, airspace organization, and air-ground communications should be so devised as to ensure transition between continental and oceanic control areas which permits:

- a) early in-flight determination of the oceanic entry point, track, and flight level;
- b) preferred, or as near as possible preferred, track and flight level to be followed to the assigned oceanic entry point; and
- c) easy integration of oceanic traffic into the continental system.

6. METEOROLOGY

6.1 The meteorological information necessary should be provided to operators, pilots, air traffic service units and others directly concerned in such a manner as to provide a uniform basis for planning and for the safe, regular and efficient conduct of flight operations.

6.2 Meteorological reports (surface, upper air), and air reports should be made and distributed with sufficient geographical distribution and frequency of observation to serve operations at levels utilized in the provision of traffic service.

NOTE: WHO has taken action on MET/OPS Recommendation 8/26 with a view to ensuring the dissemination of upper air data up to the 10 mb surface (approximately 30,000 m - 100,000 ft).

6.3 SIGMET information shall receive timely dissemination.

6.4 Landing forecasts should be available on a routine basis.

6.5 Climatological data should be collected to accommodate future supersonic operations in the Region.

NOTE: Supersonic flights are expected to operate up to 24,000 m (80,000 ft).

The meteorological system should provide a consistently high standard of wind, temperature and significant weather forecasting over the whole area concerned, and should aid the air traffic system by enabling consistent planning of oceanic flights by different operators. Precision is needed in forecasting time, place and probability of occurrence of significant weather.

In general, no two MET Offices should produce forecasts for the same purpose if users can be satisfied by a common service, assuming it is technically practicable and economically reasonable to provide that service.

7. SEARCH AND RESCUE

7.1 Provision should be made for adequate search and rescue service in the Region, covering both land and water areas.

8. AERONAUTICAL INFORMATION SERVICE

Charts

8.1 Up-to-date and accurate charts are essential and should be provided for the planning and conduct of flight operations and air traffic services.

NOTAMS

8.2 The system should provide for fast and accurate transmission, receipt and posting of new or amended information essential to the safe and efficient conduct of flight operations.

The time between the origination of a NOTAM and its availability throughout the region should be as short as possible. A target of 15 minutes is desirable. In addition, NOTAMs promulgating information which might be of operational significance to aircraft in flight should be made available to the ATS unit and to the aircraft concerned as soon as practicable and in any case early enough so that any possible decision by a pilot based on such NOTAM can be taken in good time.

9. COMMUNICATIONS SERVICES

9.1 The aeronautical communications services should provide rapid and reliable communications capable of meeting the needs of the operator, the pilot, the controller and other services directly involved. In the operation of the system, consideration should be given to the potential of automatic devices and associated procedures where significant improvement in safety, efficiency and workload can be demonstrated to be economically justified. These services should provide:

- a) For transmission of information between ground organizations for the planning, initiation, control and termination of flights, including facsimile meteorological charts;

- b) Air-ground communications (including voice) for the purpose of
 - i) Air Traffic Services (ATS, FIS, Alerting Service);
 - ii) Operational Control; and
 - iii) Search and Rescue.
- c) An air-ground service for transmission of meteorological information;
- d) For adequate and reliable communications between ATC Centres and associated Rescue Coordination Centres; and
- e) For adequate and reliable communications between appropriate Rescue Coordination Centres.

Both the aeronautical fixed and aeronautical mobile communication services should meet the following technical criteria as appropriate:

Cover of the services must be adequate for the routes flown. The reliability of the services should be such that communication is ensured at all times. To this extent alternative means of communications should be made available so that sufficient redundancy in the overall service is available to cater for any possible mal-function of any individual facility provided in the system. Speed and/or transit times in the services should be such that messages handled can be exchanged in sufficient time to ensure receipt and analysis or, if necessary, reply to messages in sufficient time in order to effect necessary action. Communication services should be such as to minimize the possibility of errors in messages and to detect promptly any errors which occur.

As regards simplicity of operation, the communication services should not require more than normal operating manipulations and should not require a high degree of concentration or be unnecessarily time-consuming.

The communication services should be capable of evolutionary expansion both in respect to quantitative and qualitative improvements.

SECTION 3a-2: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 3a

3a-2.1 The General Committee reviewed the material presented to it under Agenda Item 3a and made no comment.

Agenda Item 3: Operational Requirements

- b) Establishment of criteria for the assessment of systems requirements

SECTION 3b-1: ACTION BY THE PP COMMITTEE ON AGENDA ITEM 3b3b-1.1 GENERAL

3b-1.1.1 The Committee, when considering this part of Agenda Item 3, agreed that its intent was in fact to establish criteria which might assist in the assessment of the system as a whole, now in being or planned for use in the NAT Region, rather than for the assessment of the requirements of such a system.

3b-1.1.2 During the general discussion regarding the approach to this subject, it was acknowledged that criteria for assessment of system performance should be simple, direct, easy to apply and meaningful when applied. There existed a number of possible ways of attempting to do this. After a thorough exchange of views it became clear that only a start could be made on this subject further progress was dependent upon experience gained by States in the further development and use of this new technique as applied to the assessment of the system as a whole.

3b-1.2 Development of Criteria

3b-1.2.1 When considering the development of criteria which could be used in assessing the system, the Committee found that three basic factors are involved:-

- i) safety
- ii) economy
- iii) capacity

Of these factors safety could not be subject to any degree of negotiation and economy and capacity were closely related.

3b-1.2.2 It was agreed that the immediate objective was to provide warnings which would serve to alert States concerned to the need to initiate a detailed and thorough technical review of the various components of the system with a view to timely corrective action. In this respect it was noted that it might be useful to conduct surveys at regular and fairly frequent intervals. Apart from the usefulness of such a review it might also serve to establish rates of change of the various values over certain periods of time. Other methods of assessing the effects of increased traffic flow rates and system changes also merited attention.

3b-1.2.3 It was particularly stressed by the Committee that the criteria intended to be developed for the assessment of system performance in terms of capacity over the North Atlantic were not to be applied in practical day-to-day operations in the field of air traffic services. They are intended as a tool for application in any joint efforts to develop an optimum system for the NAT region and are therefore primarily an instrument for the development of future plans.

3b-1.3 Vertical/Lateral/Time measurements of deviations

3b-1.3.1 As it was agreed that criteria of system performance or capacity should be simple it was conceivable that they could best be expressed directly in terms which reflected the extent to which the system modified the requests of its users, i.e., by quantitative measurement of deviations from desired flight plan. For this purpose, it would be necessary to define in precise terms what should be considered as significant alterations, as once the number of aircraft entering the system exceeds even a comparatively low flow rate some deviation from flight plan intention might be inevitable.

3b-1.3.2 Such deviations can be expressed in vertical and horizontal displacement from the planned profile and/or in time delays which affect estimated flight progress. For the purpose of comparison it would also be necessary to relate the displacements to peak traffic periods.

3b-1.3.3 Consideration of this method indicated that it would be necessary to specify limits for deviations due to the system in the North Atlantic Region in the following respects:

- i) Percentage of traffic in a given period which is deviated by more than a specified number of flight levels from the intended flight level.
- ii) Percentage of traffic in a given period which is deviated by more than a specified number of nautical miles left or right of the intended track.
- iii) Percentage of traffic in a given period which is delayed by more than a specified number of minutes.
- iv) Percentage of traffic in a given period subjected to more than one of the deviations included in (i) to (iii) above.

3b-1.3.4 A suggestion was made that the following order of deviations might be related to the parameters in paragraph 3b-1.3.3 above, expressing it as percentages of the traffic which is deviated from filed flight plan:-

- i) No more than 5% deviated more than 4,000 feet vertically, or
- ii) No more than 5% deviated more than 120 miles laterally, or
- iii) No more than 2% deviated more than 3 minutes in time, or
- iv) No more than 5% deviated in two or more of the dimensions above.

3b-1.3.5 It was apparent that assessment of systems performance in this way highlighted the complicated nature of the problem, particularly as additional parameters would have to be inserted as both the spread of deviations within acceptable limits, and those outside those limits, would be important to the operator. There is a further disadvantage in that some types of aircraft are more sensitive than others to height deviations. Although other methods of arriving at criteria of system performance or capacity should be examined, this method might warrant further investigation.

3b-1.4 Cost as a measure of system performance

3b-1.4.1 The Committee considered whether the establishment of criteria on a basis of cost was possible. Given that the requirement of safety is satisfied, one of the vital considerations is that of operators cost and benefit, and one might attempt to measure the performance of the system in these terms.

3b-1.4.2 The cost of deviations from preferred flight plan varies approximately with the number of aircraft hours of delay and/or additional fuel consumed. Such considerations would take into account not only the extra fuel used but also any consequent increase in fuel reserves, and hence any effect on payload/capacity. Other penalties incurred by the users of the system include loss of productive time of ground support personnel and facilities, salaries of flight crews, direct maintenance of flight equipment and depreciation. However, this combination of factors is not amenable to simple treatment because of the difficulty in establishing a common approach. Nevertheless, the Committee took note of the work done on this aspect of the assessment of system performance and considered that it might be further examined.

3b-1.5 Criteria expressed in terms of excess time and fuel

3b-1.5.1 The Committee also considered the possibility of defining criteria on the basis of time and fuel penalties. In this connection two of the most essential factors, both of which are physical measurements, are extra fuel consumed and additional flight time. With this kind of information it is thought possible to determine a yardstick of system performance such as is shown in Fig. 1

3b-1.5.2 In the diagram the line AB marks the limit of the shaded region within which adverse system effects might be considered significant. If the combination of average extra time fuel during "busy hours", as defined in the Report under Agenda Item 2(a), falls above the line AB it might be considered that a warning has been given and ways and means of effecting an improvement should be investigated. Obviously the placing of this line in the diagram is most important. This is difficult to do in an entirely objective manner at present and consequently its position is thought to be somewhat arbitrary. Nevertheless, as estimates of 1964 "busy hour" penalties, based on actual traffic measurements, indicate that an improvement is already overdue, and as this would appear to reflect the general view of operators, the line AB may have some validity.

3b-1.5.3 From digital simulation of higher movement rates it is thought that relative effects of traffic density and system improvements can be inferred. In this way the implications of traffic forecasts might be taken into account. A mixture of equal numbers of Boeing 707-320B and DC8/40 aircraft has been assumed throughout in the examples noted in Fig. 1. This could be considered as giving added value to the fundamental warning facility which is desired.

3b-1.5.4 It is necessary to make a number of other observations on this method. Firstly, it is intended that the effects shown should reflect the difference between the intended flight profile and the ATC Clearances; in particular it should be noted that the mean increases in flight time include ground holding delays attributed to operations in the Oceanic area. They do not include purely terminal delays. Quite clearly the object would be to eliminate the unshaded area, subject to a proper assessment of the costs entailed in achieving this. Efforts should continually be made towards this end. The amount of fuel reserves which is related to system characteristics and the fact that fuel will be burned in carrying this has been borne in mind. However, the relative position of points in the figures would be only slightly changed if this additional factor were included.

3b-1.5.5 The Committee accepted that load restrictions due to the system characteristics should be very rare. Indications from operators that payload was being significantly affected in this way would be an additional sign that unacceptable penalties were being incurred. In this connection it was important that they are not only aware of the mean effects of the system at "busy hours" but also they be able to have a measure of the worst effects on individual flights. The object of Figure 2 is to indicate the type of presentation which could be used for this purpose, i.e., in supplementing the overall picture of performance given in Figure 1. The percentage of the traffic in the unshaded area to which the criteria would relate should be high enough to reflect the larger penalties but must not be so high as to require a prohibitive amount of data to be collected. A figure of 99%, although somewhat arbitrary, is considered to be a reasonable compromise between these two requirements.

3b-1.5.6 In order to make this method more complete it should be possible to analyse samples of North Atlantic flights in such a way as to separate those which do not constitute part of the main flow throughout their length, sometimes referred to as 'fringe' operations. It is recognized that undue penalty to this type of operation would similarly not be acceptable and indications that this was occurring should also constitute a warning of the need for improvement.

Fig. 1 System performance in respect of mean fuel/time measurements at "busy hours".

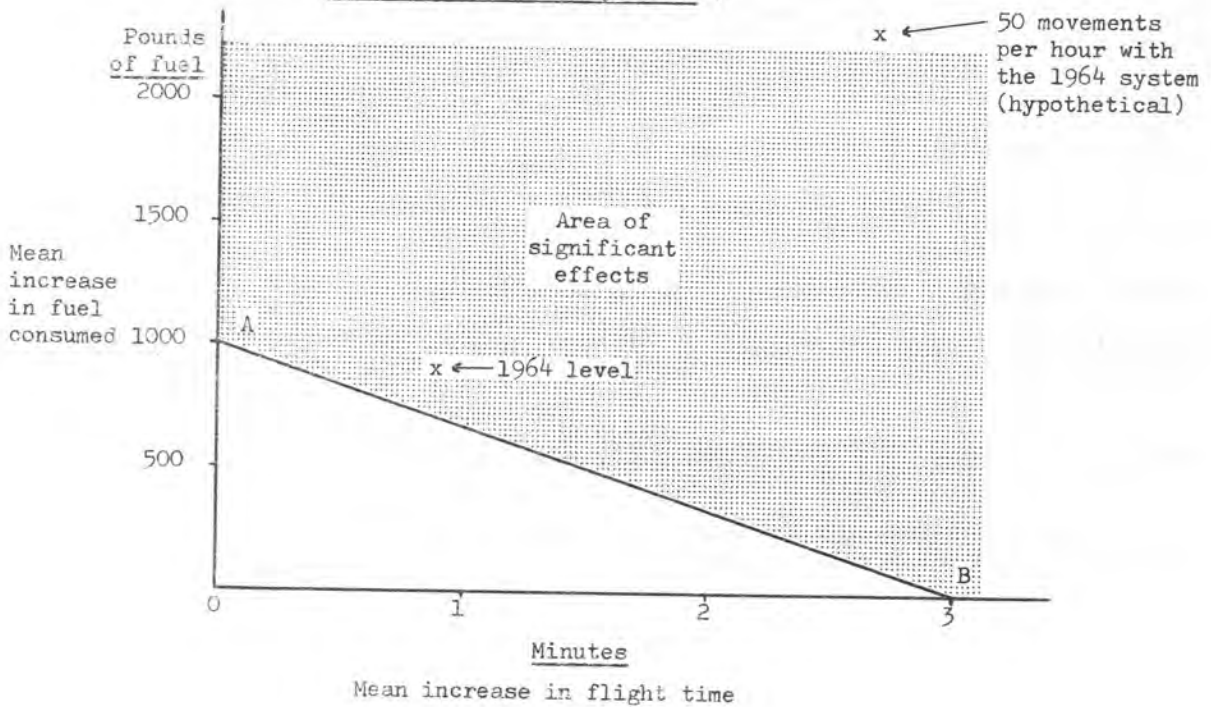
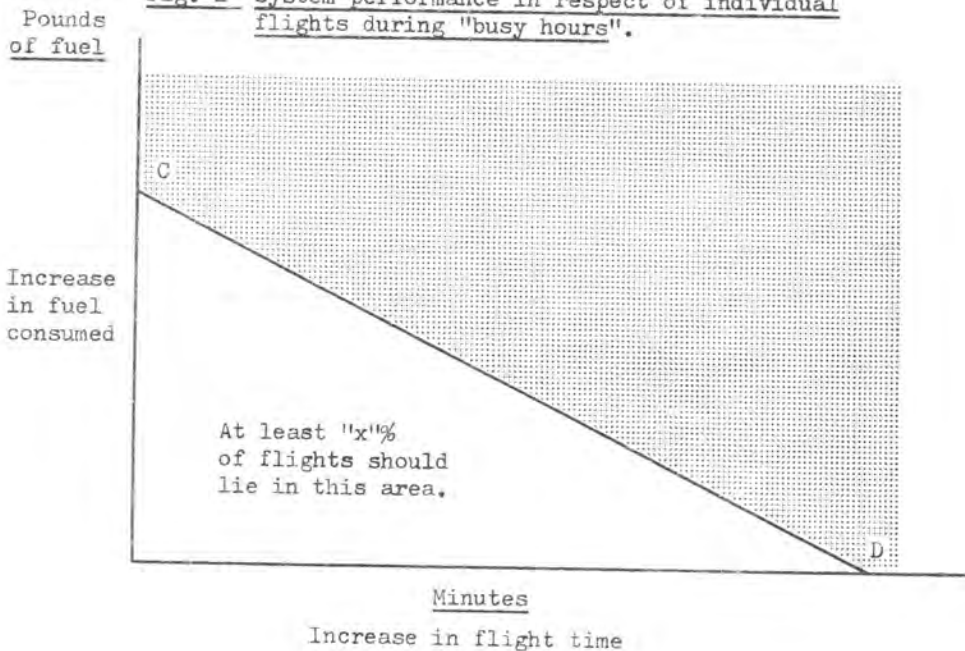


Fig. 2 System performance in respect of individual flights during "busy hours".



3b-1.6 Conclusions

3b-1.6.1 The Committee considered that the method of using excess time and fuel as a basis for a simple criterion of system performance or capacity showed promise for early attention. However, the Committee agreed that all three methods covered in paragraphs 3b-1.3, 1.4 and 1.5 should be reviewed. The Committee also noted that any one of the three methods would involve a co-operative programme of data collection.

3b-1.6.2 In applying any such criteria attention should be given not only to the total traffic but also to identifiable sections.

RECOMMENDATION 3b/1 FURTHER DEVELOPMENT OF SYSTEMS CRITERIA

That within the general framework of the North Atlantic Systems Planning Group, studies be pursued towards the further development of criteria for the assessment of systems performance.

SECTION 3b-2: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 3b

3b-2.1 The General Committee reviewed the material presented to it under Agenda Item 3b and made no comment.

Agenda Item 3: Operational Requirements

- c) Review of existing and alternative systems in the light of the criteria established under Agenda Item 3b

SECTION 3c-1: ACTION BY THE FP COMMITTEE ON AGENDA ITEM 3c3c-1.1 Introduction

3c-1.1.1 It was the understanding of the FP Committee that the intent of this Agenda Item was an evaluation of the extent to which the present and possible future North Atlantic System would be capable of meeting the operational requirements as established under Agenda Item 3a, in terms of criteria for such assessment developed under Agenda Item 3b. By this means it was expected that modifications could be recommended which would serve to meet the requirements more effectively and/or economically, now and in the future. It was recognized that certain redundancy in the system is inevitable to cover failure of various components and to allow evolutionary development.

3c-1.1.2 The Committee experienced considerable difficulty in establishing meaningful and immediately applicable criteria (under Item 3b) that would permit detailed assessment of systems components. When developed, these criteria would be a tool for use in any joint efforts to develop system improvements in the future.

3c-1.1.3 It was therefore necessary at this time to fall back on simpler, more pragmatic measures of the systems capacity to accept and handle traffic efficiently, i.e. to apply a combination of experience and technical and economic judgement as in the past. In consequence, the Committee reviewed all the working papers and referred relevant ones to the Technical Committees with the directive to examine all matters with a "long term view", i.e. without any breakdown into precise phases, to concentrate on what was needed and attainable immediately and what could be attainable later. The latter material would then provide a basis for development of Agenda Item 5 in the FP Committee. In this connection the Committee reserved for itself certain subjects and made its own overall assessment of the system with a view to providing further guidance in the development of plans for major long term improvements.

3c-1.2 Analysis of the system

3c-1.2.1 The Committee noted a number of factors which were characteristic of the North Atlantic and which largely condition the choice of separation minima and/or the air traffic service system employed. The following

factors are additional to the basic long range navigational and communications problems:

- a) The bulk of traffic is composed of turbo-jet aircraft of common operating characteristics.
- b) Distribution of traffic is uneven both diurnally and seasonally causing congestion at certain times and periods.
- c) There is competition for altitudes on preferred flight paths in the principal area.
- d) Use of different MET forecasts by different operators and ATS creates inconsistencies in the calculation of flight planning detail.
- e) Different techniques for the planning, operation and operational control of flights are used by various operators thus complicating the tactical control situation.
- f) There are problems in transition between domestic and oceanic airspace due to crossing tracks and use of different rules in the domestic areas.
- g) General aviation operations frequently create trouble for lack of adequate flight planning and adequate communication, navigational and survival capability.

3c-1.2.2 The Committee noted, however, that the present system is fundamentally a free or random track system with an organized track system being employed in the principal area only when traffic is heavy. Normally traffic clearances are given for the entire route and company filed flight plans are deviated only to the extent necessary to ensure separation and expeditious handling of the traffic. There is no regulation of departure times except in the case of airports near an oceanic area boundary and rarely are flights directly delayed in continental transition areas. Although deviations are experienced by a large percentage of the total traffic, only a few of these deviations are really significant. Of these few, most can be associated with operations crossing the main flow within the principal area. This was the subject of a particular recommendation under Agenda Item 6 iii (Ref. Rec. 6 iii/1).

3c-1.2.3 The present system is generally non-discriminatory. The efficiency of the system is marginal in the following respects and these may become more significant as traffic increases and supersonic transport aircraft are introduced.

- a) Aircraft navigational performance.
- b) Fast and reliable communications capability - particularly aeromobile services.
- c) The timely issue, transmission and receipt of aeronautical information and the supply of information to aircraft in flight.
- d) Promulgation of airspace restrictions with adequate consultation and notification.
- e) Adequate data on runway conditions.
- f) Inconsistencies in the issue of MET forecast charts by numerous MET offices.
- g) Work load and organization of ATC centres with particular reference to oceanic area control and continental transition planning.

3c-1.3

Concluding Notes

3c-1.3.1 In periodically reviewing regional plans a criterion has always been applied, i.e. simply that any proposal for a change in the system be based on improvement over the present system and be economically and technically feasible. Attempts have been made at this Meeting to explore other, more precise means for measuring the efficacy of various alternative solutions for improvements to the system. In the meantime the work on relatively short term improvements must continue and evolutionary steps into the future planned. The former are primarily the subject of Agenda Item 6, the latter of Agenda Item 5.

3c-1.3.2 It can be foreseen that evolutionary changes to the various component parts of the present system will enable essential improvements to be made and that such improvements can match the traffic increases expected. However when more information is available on SST operations, specific attention may need to be directed to that operation.

3c-1.3.3 Some of the goals which appeared to warrant attention in the coming years were considered to be further rationalization of the FIR structure, expansion of automation, additional radar coverage in transition areas, static free aeromobile communications and improved navigational ability.

3c-1.3.4 The degree of achievement of these and other related goals will largely determine separation standards and the overall system efficiency.

SECTION 3c-2: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 3c

3c-2.1 The General Committee reviewed the material presented to it under Agenda Item 3c and made no comment.

Agenda Item 4: Development of policy guidelines and preparation of
a programme for future action on North Atlantic
Systems Planning

SECTION 4-1: ACTION BY THE PP COMMITTEE ON AGENDA ITEM 4

4-1 Introduction

4-1.1 In discussing this item of the Agenda, the Committee took note of the valuable work that had been done, prior to the convening of the Special NAT Meeting, by a group of NAT civil aviation administrations pursuant to Recommendation 2/2 of the Fourth North Atlantic Regional Air Navigation Meeting (see PART 1 of this Report). It accepted as a principal basis for consideration of action required in the future, a working paper presented by the French Delegation.

4-1.2 Need for continuity of systems planning between regional meetings

4-1.2.1 The Committee recognized that one of the essential characteristics of systems planning, the principle of which has been accepted by the States of the North Atlantic Region and endorsed by Council, is the need for a continuous effort to adapt installations and services to operational requirements, taking into account traffic development and technological progress. This concept, it was noted, is incorporated in the definition of Systems Planning adopted by the Meeting (see PART 1, page 1-2 of this Report) which stipulates that Systems Planning should "...be based on a continuous, evolutionary and flexible planning process, able to meet changes in requirements or to accommodate technical developments...". This continuity could not be obtained if the planning effort was limited to holding a regional meeting at the customary intervals of 4 or 5 years. Even if this interval were reduced, continuity would not be achieved and it was therefore necessary to develop machinery to ensure continuity of international cooperation in the period between successive regional meetings. National studies related to such continuing planning required early coordination within the framework of ICAO, particularly in view of the large proportion of the airspace of the North Atlantic Region that is situated over the high seas, prior to the formulation by States of proposals for amendment of the regional plan to be presented for consideration by all North Atlantic States.

4-1.3 Continuing systems planning machinery

4-1.3.1 In the light of the foregoing, the Committee agreed that between the basic studies made by the States and the adoption of major amendments to the Plan by a full-scale or limited Regional Meeting there would be room for an intermediate stage in which an initial synthesis of the studies undertaken nationally or collectively would be made and which would ensure continuity of planning and maintenance of the necessary balance between different tendencies.

4-1.3.2 The work envisaged should, the Committee believed, be undertaken by a NAT Systems Planning Group of States, with terms of reference, in conformity with the definition of Systems Planning referred to earlier (see PART 1, page 1-2 of this Report), as follows:

To continuously study, monitor and evaluate the system in the light of changing traffic characteristics, technological advances and up-dated traffic forecasts, to the end that the North Atlantic Regional Plan may be adjusted on a timely, evolutionary basis. Throughout this work the group shall give close attention to the effectiveness of any suggested changes in relation to their cost

4-1.4 Composition of the Group

4-1.4.1 The Committee was in agreement that to ensure the Group's effectiveness it was essential that the States that composed it should be prepared to make available the resources necessary to permit the experts they appointed to the Group to make effective technical contributions to its work and thus to the further development of the system. Since Systems Planning required "... close integration of ground based facilities and services, characteristics of aircraft and airborne equipment and the associated procedures...", it was desirable that its composition should be such as to ensure that all aspects of its task should be carefully evaluated both from the point of view of provision of facilities and their use. Nevertheless in appreciating objectively the varying degrees of, and reasons for, the interest of different States in the North Atlantic Region, the over simplified view that two groups of States, the providers and the users, have opposite positions, should be rejected.

4-1.4.2 Furthermore, the number of States forming the Group should be small since a large Group would be unwieldy and not suited to the performance of its task and it was agreed that 5 would be the desired number. After very detailed discussion of various possibilities the Committee considered that 6 represented the maximum number of States that should compose the Group since any proposed enlargement of this figure would inevitably lead to more proposals for further considerable additions, in particular those of provider States which had refrained from pressing for membership in the sole interest of keeping the Group down to a workable size.

*Definition of Systems Planning.

4-1.4.3 In the light of the foregoing considerations the Committee agreed that Canada, Ireland, France, the Netherlands, the United Kingdom and the United States should compose the Group and be invited to designate suitably qualified experts to participate on their behalf in the Group's work on a continuing basis. In the development of its task the Group would, however, invite other States, not members of the Group, to designate experts to assist the Group when it considered that examination of a particular problem would benefit from attendance by representatives of other States having a particular experience, knowledge, or interest in the problem involved. For similar reasons the Committee agreed that the Group may invite the cooperation and participation in its work public or private international organizations, such as EUROCONTROL and IATA, selected as appropriate from the list of international organizations that may be invited to attend ICAO meetings as observers.

4-1.5 Method of operation of the NAT Systems Planning Group

4-1.5.1 The Committee considered that essential features of the method of operation of the Group were that:

- a) It should operate with a maximum of flexibility and in such a manner as to reduce to a minimum the administrative burden on participating States and ICAO. To achieve this objective working methods should be simple and reduce to the greatest extent possible the usual requirements for language and other supporting secretarial services;
- b) Secretariat assistance to the Group should be provided by ICAO to the extent necessary to ensure liaison with the Group, assist in the convening and conduct of its meetings and keep all North Atlantic States informed of progress;
- c) Its work should be conducted by meetings and through correspondence, as required, between meetings. Such correspondence to be sent directly to other members of the Group and the Secretariat by the originator;
- d) While the frequency of its meetings would vary with circumstances, they should be held approximately once a year and at least once every eighteen months either at the Paris Regional Office, ICAO Headquarters in Montreal, or elsewhere at the invitation of a State;
- e) It should keep all States of the North Atlantic Region informed through the ICAO Secretariat, on progress, by the circulation, at approximately half-yearly intervals, of summaries of work done and to be undertaken, and of reports of meetings of the Group.

As indicated by its terms of reference the Group's principal task would be to coordinate studies and exchange views that may result in proposals for improvement to the Regional Plan that would be submitted by States to NAT regional meetings, or if not of a major nature, be processed by existing correspondence procedure. The Committee considered that, to assist the Group in its task, all North Atlantic States and concerned international organizations should be encouraged to submit ideas or suggestions relating to systems planning for consideration by the Group.

RECOMMENDATION 4/1 - NORTH ATLANTIC SYSTEMS PLANNING GROUP

That, in order to ensure continuity in systems planning in the North Atlantic Region between successive North Atlantic Regional Meetings:

- a) The governments of Canada, Ireland, France, the Netherlands, the United Kingdom and the United States be invited to designate suitably qualified experts to participate on their behalf in the work of a North Atlantic Systems Planning Group with the following terms of reference:

"To continuously study, monitor and evaluate the system in the light of changing traffic characteristics, technological advances and up-dated traffic forecasts, to the end that the North Atlantic Regional Plan may be adjusted on a timely, evolutionary basis. Throughout this work the group shall give close attention to the effectiveness of any suggested changes in relation to their cost."
- b) Proposals by States for amendment of the North Atlantic Regional Plan that may be developed as a result of studies undertaken by the Group, be submitted for consideration by other North Atlantic States, either at ICAO North Atlantic Regional Meetings convened for the purpose, or by correspondence in accordance with established procedures;
- c) The Group work with the flexibility and informality required to reduce to a minimum the administrative burden imposed on States and on ICAO;
- d) The Group may invite, as and when it considers necessary or desirable, the cooperation and participation of other States and of public or private international organizations;
- e) The Group meet approximately once a year and at least once every eighteen months either at the ICAO Paris Office, the ICAO Headquarters or elsewhere at the invitation of a State and pursue its work by correspondence between successive meetings;
- f) All States of the North Atlantic Region be kept informed of the progress of work in the Group and be encouraged, as well as the international organizations concerned, to submit suggestions to assist the Group in its task.

SECTION 4-2: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 4

4-2.1 The General Committee reviewed the material presented to it under Agenda Item 4 and made no comment.

Agenda Item 5: Preparation of plans for major long term improvements extending through the early 1970's

SECTION 5-1: ACTION BY THE PP COMMITTEE ON AGENDA ITEM 5

5-1.1 INTRODUCTION

5-1.1.1 The Policy and Programming Committee based its consideration of this Agenda Item on the operational requirements and traffic forecasts developed under Agenda Item 3a and 2a respectively and on material developed by the CM and MA Committees in respect of short term improvements with long term implications under Agenda Item 6.

5-1.1.2 It was considered that at this stage of development, the agreed operational requirements were generally applicable to supersonic transport operations.

5-1.1.3 The Committee took cognizance of the proposals under Agenda Item 4 relative to the establishment of a North Atlantic Systems Planning Group, recognizing that that group would be addressing itself primarily to long range planning and would be basing its initial endeavours on the proposals of this Meeting. The Committee therefore developed general guide lines for long term systems planning and drew attention to some specific areas for development.

5-1.1.4 The report on Agenda Item 3b indicates that the present state of the art merely permitted a start to be made in developing related criteria. In the absence of specific criteria the Committee developed its own assessment under Agenda Item 3c of the adequacy of the present system and the need for long range improvements. Three possible lines of approach towards the establishment of criteria for systems performance are included in the report and merit consideration by the North Atlantic Systems Planning Group in its further development of such criteria (Ref. 3b-1.3 to 1.5).

5-1.1.5 The body of the Report, which follows, has been developed in three main parts:

- a) A statement of basic concepts and environmental factors involved in long term planning;
- b) An outline of the major elements of the long term plan, together with related discussion material - this includes such indications of long term planning action as were developed by the meeting;
- c) An indication of the programme which would form the basis for initial study by the North Atlantic Systems Planning Group.

RECOMMENDATION 5/1 - LONG TERM PLANNING

- That a) the material in the report on Item 5 be regarded as the initial text of a long term plan for the provision of air navigation facilities and services in the North Atlantic Region;
- b) this text be used by the NAT Systems Planning Group as a basis for the commencement of its work;
- c) any comment States of the North Atlantic Region wish to offer on the initial text be communicated through ICAO to the NAT Systems Planning Group for its use.

5.1.2 BASIC CONCEPTS AND ENVIRONMENTAL FACTORS5.1.2.1 General

5.1.2.1.1 The need for a long-term plan arises from:

- a) changes in traffic demand;
- b) the continuing requirement to provide a system which satisfactorily meets the operational requirements;
- c) the need to give close attention throughout all stages of planning to the effectiveness of system changes in relation to their cost; and
- d) the need to cater for new types of traffic, e.g. super-sonic transport aircraft.

5.1.2.1.2 In respect of some of the long-term elements of a system design it is not possible to predict exactly whether or when they should be introduced, because the status of equipment and techniques, for example, is still uncertain. Nevertheless for some others, e.g. automation, it is necessary to come to an early decision because of the time normally required to work-up computer equipment for full operational use.

5.1.2.1.3 There is a need for a periodic revision and amendment or revalidation of the programme in the light of updated forecasts, technological changes, etc. Clearly this will necessitate timely updating of long range forecasts. Bearing in mind that failure to make decisions between alternative avenues of approach at the proper time will prejudice timely implementation and the effectiveness of the whole plan, it is necessary to outline the elements of a long-term plan for ATC and the related services.

5.1.2.1.4 Such a plan must take the whole of the North Atlantic Region into account, although it may concentrate on those parts which constitute the principal problem area, together with those adjacent areas where compatibility of procedures will be essential.

5.1.2.1.5 In addition to determining the geographic area which is of predominating interest, it will also be necessary to determine the traffic demand and flow pattern which the system must accommodate and the characteristics of aircraft using the system, before establishing specific elements of the plan.

5.1.2.2 Progression of the Plan

5.1.2.2.1 In order to meet changing requirements imposed by changes in traffic flow and in aircraft characteristics, and to make most effective use of technical developments, the systems planning process will need to be of a continuing and flexible character thus ensuring that systems development is evolutionary.

5.1.2.2.2 The need for continuing review of all elements of the Plan and their interrelationships, with a view to updating, validating, augmenting or revising its component parts cannot be over emphasized.

5-1.2.2.3 The time element related to the period undergoing continuous review is 10 years. Within such review, time phases associated with traffic demand and necessary technical progress will dictate the need for specifying particular planning and implementation goals.

5-1.2.2.4 This will take the form of specifying where and when changes in the facilities, services and procedures will be needed. More precision can be given to those elements required during the early part of the planning period but lack of precision, particularly in the time element, should not inhibit planning for the 10 year period under review.

5-1.2.3 Geographical area

5-1.2.3.1 Long term system planning will cover the whole of the North Atlantic Region (Attention is drawn to the Report on Item 2a which indicates the general traffic flows).

5-1.2.3.2 Attention should be directed to the principal area, i.e. the northern part of the North Atlantic between the North American and Irish/United Kingdom terminal areas. Broadly this area is contained within the greater part of the Gander and Shanwick FIRs and contains a high proportion of the air traffic in the Region.

5-1.2.3.3 Despite this concentration of attention upon the "principal area", it is always important to safeguard the interests of operators making flights either wholly or partially outside that area. Therefore, it is stressed that systems planning does not commence nor end at the boundaries of the "principal area".

5-1.2.3.4 In the interest of overall efficiency of the system, it is also necessary to consider the adjoining continental airspaces, e.g. the overlap areas between the NAT and EUM Regions, insofar as the requirements of the NAT system need to be considered in planning for those areas, and to the extent that problems of those areas need to be taken into account in NAT planning.

5-1.2.4 Traffic Demand

5-1.2.4.1 The traffic forecasts to be found at Appendix B to the Report on Agenda Item 2a coupled with the air route patterns indicated in the tabulation of anticipated scheduled operations given in the Report on Agenda Item 2b should be used as the basis for long term planning.

5-1.2.5 Aircraft Characteristics

5-1.2.5.1 The significant characteristics of conventional aircraft now flying, and expected to be flying, over the Atlantic are tabulated below along with tentative data for civil supersonic aircraft. It is expected that civil supersonic transport aircraft will commence flights over the Atlantic by the mid 1970's.

	OPERATIONAL CAPABILITY	NORMAL OPERATING PARAMETERS
<u>CONVENTIONAL AIRCRAFT</u>		
<u>Cruising Air Speed (TAS)</u>		
Reciprocating Engines		
- Non-pressurized	220 kt	140-210 kt
- Pressurized	315 kt	190-295 kt
Turboprop Engines	440 kt	250-400 kt
Turbojet Engines	600 kt	440-490 kt
<u>Cruising Altitude</u>		
Reciprocating Engines		
- Non-pressurized	4500 m (15000 ft)	2700 $\pm$ 1200 m (9000 $\pm$ 4000 ft)
- Pressurized	7600 m (25000 ft)	5800 $\pm$ 1800 m (19000 $\pm$ 6000 ft)
Turboprop Engines	11000 m (37000 ft)	9400 $\pm$ 1800 m (31000 $\pm$ 6000 ft)
Turbojet Engines	13000 m (42000 ft)	10700 $\pm$ 1800 m (35000 $\pm$ 6000 ft)
<u>Climb Performance</u>		
Reciprocating Engines	4 m/s (800 f/m)	3 m/s (700 f/m)
Turboprop Engines	8 m/s (1500 f/m)	5 m/s (1000 f/m)
Turbojet Engines	10 m/s (2000 f/m)	8 m/s (1500 f/m)
<u>Descent Performance</u>		
Non-pressurized	5 m/s (1000 f/m)	2,5 m/s (500 f/m)
Pressurized	25 m/s (5000 f/m)	10 m/s (2000 f/m)
<u>Passenger Load Capacity</u>		
Reciprocating Engines	100	
Turboprop Engines	210	
Turbojet Engines	210	
<u>CIVIL SUPERSONIC AIRCRAFT</u>		
Cruising Air Speed	Mach 3	Mach 2 to Mach 3
Operational Range	4200 NM	
Passenger Load Capacity	220	
Cruising Altitude	23000 m (75000 ft)	16000 to 23000 m (51000 to 75000 ft)

5-1.2.5.2 Information available to date indicates that SST aircraft will possess subsonic performance characteristics which will be compatible with takeoff and landing traffic patterns and approach, departures and holding procedures utilized by subsonic jet transports.

5-1.2.5.3 The great bulk of traffic moving across the North Atlantic, now and for a long time to come, will consist of subsonic turbojet aircraft of the B 707/DC8 type cruising at some 475 kt and normally requesting flight altitudes in the neighbourhood of 10,500 to 12,500 m (32,000 to 38,000 ft).

5-1.2.6 System Capacity

5-1.2.6.1 The Committee developed certain guidance material for systems planning purposes, including the following for system capacity.

5-1.2.6.2 For system planning purposes, the capacity of the NAT system can be defined as the volume of traffic which can be regularly accommodated in a given time period, e.g. one hour, without exceeding a significant level of diversion from flight plan intention.

5-1.2.6.3 A method is needed for estimating the improvements in system capacity which accompany reductions in separation criteria, so that on the basis of traffic forecasts minimum requirements for reduction in separation criteria throughout the planning period may be determined.

5-1.2.6.4 The Committee has taken note of technical publications and other information afforded by States which show a number of possible approaches to the estimation of capacity. Some of these are included in the Report on Agenda Item 3b as well as in the SPANAT Staff Study circulated by the U.S.A. and in the RAE Technical Report No. 64034 circulated by the United Kingdom, as background material. While these tend to produce minor differences in estimates of the actual capacity attainable they are generally consistent in estimating the relative increases in capacity accompanying different combinations of separations criteria.

5-1.2.6.5 All of these approaches recognize the fact that traffic arrives for clearance in a random manner. Additionally, jet traffic presented to the ATS system, particularly during busy periods, usually prefer routes and flight levels within a relatively small band of common airspace. It is considered feasible, therefore, to assess maximum capacity requirements within a limited geometric framework of airspace having defined dimensions. At least one of the possible techniques, for example, assumes that the single direction traffic demand is cleared on all tracks/levels available within a block of airspace measuring 240-270 NM wide and 6,000 ft in height.

5-1.2.6.6 Using the 1964 busy hour jet traffic datum, and the broad assumption that this represented the 1964 Oceanic capacity (i.e. without exceeding the significant level of diversions referred to in 5-1.2.6.2 above),

estimates of gain in capacity can therefore be made for different combinations of separation criteria, as follows:

Oceanic Separation Criteria	Theoretical % increase in capacity
Longitudinal (same or diverging tracks) - <u>15 minutes</u> Lateral - 120 NM Vertical - 2000 ft	33%* above 1964 estimated capacity
Longitudinal (as above) - 15 minutes Lateral - <u>90 NM</u> Vertical - 2000 ft	90% - 100%* above 1964 estimated capacity
Longitudinal (as above) - 15 minutes Lateral - 90 NM Vertical - 1000 ft	At least 250%* above 1964 estimated capacity

5-1.2.6.7 The above figures marked by asterisks should of course be used with caution because of a number of optimistic assumptions which are made; in particular the assumption throughout that all the airspace will be available for a single direction air traffic flow should be noted. Nevertheless, while this is an imperfect method of estimating oceanic capacity, it is helpful for the purposes of establishing an initial guideline, whereby the capacity attainable in the oceanic system can be compared against the capacity needs implied by forecast traffic figures.

Note: It should be noted that the above figures are based on the organized track system. There is considerable difficulty in expressing capacity values numerically for the free system. However, in view of the desirability of providing, insofar as practicable for operators to attain their flight planned tracks in a "free system", efforts to establish these values should be pursued.

5-1.2.6.8 Using the forecast busy hour flow rates, included in the Report on Agenda Item 2a, and estimated capacity values, it might be inferred, for example, that a change in longitudinal separation from 20 minutes to 15 minutes (on same or diverging tracks) would result in no deterioration in the impact of diversions from desired flight profile prior to 1968. The technique of using excess time and fuel in a criterion of system performance, noted in the Report on Agenda Item 3b, which is an example of a single technique, yields a similar result.

5-1.2.6.9 It is important to note that the capacity estimates illustrated in para. 5-1.2.6.6 above, relate to oceanic airspace capacity. Since any limitation on the expeditious movement of traffic, regardless of where it occurs, governs the attainable capacity, system planners should not overlook the need for comparable traffic handling capabilities in transition areas adjacent to the oceanic regions, or elsewhere in the overall system of aviation services.

5-1.2.6.10 Factors which may take the form of restraints on traffic flow rates, regardless of the capacity prevailing in oceanic airspace, may include, for example, the following:

- a) The clearance rate equivalent to the estimated capacity per hour may not be realisable by the ATS authorities because of limitations in the Navaid, surveillance or communications services in continental airspace, or because of the lack of data processing facilities available to ATS units serving the NAT Region.
- b) Differences in ATC procedures or separation criteria in oceanic vs transition areas may inhibit a smooth transfer of traffic between such areas to the extent that traffic movement rates are significantly affected.

5-1.2.6.11 If the technological state-of-the-art, at any period in time, permits system modification which minimize economic penalties on the part of the operators, such modifications should be implemented regardless of whether a gain in capacity is immediately required, provided that the cost of implementing these modifications do not exceed the economic benefits associated with the improved technology. For example, if the existing state of the art of altimetry or navigation permits reduction in separation criteria these should be implemented with the intention of reducing aircraft diversions from the desired profile, regardless of whether there is any apparent need to increase capacity.

5-1.2.6.12 The Committee agreed that refinement of methods used for the purposes of estimating practical increases in oceanic airspace capacity was necessary.

5-1.3 MAJOR PLANNING CONSIDERATIONS

5-1.3.1 Organization of Airspace

5-1.3.1.1 The systems planning approach to this question envisages the use of an agreed set of principles set out in the Report on Agenda Item 6, upon which the examination of the organization of airspace in the NAT Region, and deployment of the associated ATS units should be based. It is fundamental to the application of these principles that changes would not be justified if they do not lead to operational or economic benefits (Ref. 6 ii-1.2 to 1.4).

5-1.3.1.2 Attention is being given to possible airspace adjustments in the south-eastern corner of the Shanwick FIR and along the eastern seaboard of USA and Canada, between Nantucket and $46^{\circ}\text{N}50^{\circ}\text{W}$. Implementation proposals have not yet been made. In order to better accommodate the needs of aircraft flying close to the North Pole it is also intended to review the existing boundaries of the Goose FIR and the Fairbanks FIR in the light of operational experience (Ref. 6 ii-1.5).

5-1.3.1.3 In respect of the principal traffic area, a north-south division of the airspace in mid ocean, i.e. at about 30° West longitude will continue to be desirable. This is due to the considerable influence upon Oceanic ATS centre operation occasioned by procedures and facilities used in the adjoining Continental transition airspaces on both sides of the North Atlantic.

5-1.3.1.4 It may be feasible to amalgamate some FIRs not only so that the enlarged areas would be more in line with the speeds of modern aircraft but also to take account of technological advances in the provision of air traffic control and communications. These would include the introduction of automatic data processing and data transfer equipment.

5-1.3.1.5 In considering changes to FIR boundaries, the possible advantages of establishing different boundaries at different levels in the appropriate areas should not be overlooked (for instance in relation to SST operations).

5-1.3.2 Principles of ATC System Operation

5-1.3.2.1 In future plans consideration has to be given to the character of the ATC system, whether it should be predominantly tactical, i.e. relying on short-term clearances and very good air/ground Communications (not at present available), or whether it should be mainly strategic, i.e. based on long-term clearances. In its extreme form the latter becomes a Flow Control system in which planning control extends back to take-off at the departure airport, but this concept is manifestly not achievable with subsonic jet aircraft. It is equally impracticable for the extreme form of tactical control to be exercised, in which Oceanic clearances given to aircraft before entering the Oceanic CTA would be to the first reporting point only. This is not only because of the absence of sufficiently good communications but also because pilots require assurance of adequate clearance before commencing the crossing.

5-1.3.2.2 Ignoring the extremes mentioned above, features of a possible North Atlantic tactical system may be summed up as follows:

- a) Quick and reliable pilot/controller communications with frequent availability of position information to the ground organisation.
- b) Comparatively low occupancy of available airspace in the system, e.g. by the use of low separation criteria, thus allowing re-clearances en route.
- c) Limited control of timing along track.

5-1.3.2.3 Similarly, features of a strategic-type system may be

- a) Accurate forecasting (estimating) of flight progress, including early and accurate forecasting of initial boundary estimates.
- b) A minimum of routine en-route communications.
- c) Comparatively high occupancy of available airspace in the system, in relation to the separation standards applied, whenever traffic demand is heavy.
- d) Accurate entry into the Oceanic Area in the three dimensions of altitude, track and time.

5-1.3.2.4 The present Oceanic ATC system embodies features of both types of control but with emphasis on strategic methods. The organized track system, when implemented, is one example of the use of this method. It is necessary, however, to establish future trends which may be either towards one or other of these. For subsonic jet aircraft much will depend on the state-of-the-art in navigation and communications in oceanic airspace, and the possible benefits to be derived from developments aimed at more tactical methods, e.g. Ocean Stable Platforms, or Satellites.

5-1.3.2.5 As far as can be foreseen at present there may be need for greater emphasis on strategic clearance in the case of, for example, the Supersonic Transport aircraft, because of its exacting operating characteristics. On the other hand, from what is known of these aircraft, it will probably be essential to provide limited freedom in the vertical plan during acceleration and deceleration phases, which will enable aircraft to achieve the cleared flight profile. Similarly it is, perhaps, inconceivable that what will then be quite a short flight across the North Atlantic should be conducted in a manner which will be markedly different from that in busy continental airspace. In addition occasional radiation and other hazards en route, which will dictate a need for rapid reclearance, would seem to support a requirement for tactical control.

5-1.3.2.6 In a preliminary assessment, therefore, it seemed possible that while the means of controlling by strategic methods will probably be maintained, increasing attention will need to be given to the means of efficient tactical control in Oceanic control areas.

5-1.3.3 Continental Transition Airspace

5-1.3.3.1 Maximum efficiency, and hence maximum usable capacity, in Oceanic airspace is inhibited if there are inadequate facilities, services or procedures in adjoining Continental airspace. Put simply, a maximum Oceanic area capacity, for example, 60 movements per hour will effectively

be reduced to 40 movements per hour if this is the maximum capacity of adjacent airspace. Broadly the requirement placed upon the latter in respect of Oceanic traffic is stated in the Operational Requirements (3a-5.3). To these may be added, if deemed necessary, the ability to arrange small adjustments in the arrival time(s) at designated Oceanic area entry points, for the purpose of facilitating Oceanic clearances.

5-1.3.3.2 Although the overall requirement in Continental transition airspace for facilities, procedures and services will be at least partly dependent on the needs of flights originating or terminating in that area, it should also take into account the needs of Oceanic traffic. Due to variations in weather conditions transition might occur fairly randomly over a wide range of latitude, e.g. in Northern latitudes one day and in Southern latitudes the next. The requirements may therefore be summed up, in respect of airspace within such latitudes as a large proportion of the overall Oceanic traffic may, from time to time, be expected to transit, as follows:

- a) A comprehensive and/or flexible upper airspace route structure capable of sustaining peak traffic.
- b) Primary and/or secondary radar services to provide means of expediting and regulating the traffic, coupled if necessary to automatic data processing equipment.
- c) Expansion of direct pilot/controller VHF communications.
- d) Compatible assignment of flight levels in Oceanic and domestic continental airspace.
- e) Adequate short-range navigational aid coverage.
- f) Efficient data transfer between centres, if necessary by automated means.
- g) Optimum procedures for the rapid issue of Oceanic clearances.

5-1.3.4 Application of ATC computers to Oceanic Control

5-1.3.4.1 The Committee developed the following guidance material on this subject.

5-1.3.4.2 If, as seems likely, Oceanic clearances will continue to be given strategically, i.e. before aircraft enter the Oceanic area, the clearance procedure should have the capacity to process at least 45 clearances an hour during peaks by about 1970. Manual means of increasing Planning Controller Capacity will probably be exhausted and the need for reliable computer assistance will arise. The volume of traffic may also dictate the need for computer-driven displays for the Oceanic tactical control positions.

5-1.3.4.3 Unless great care is taken to provide extensive redundancy in automated procedures or equipment, initial applications of a computer for Oceanic control will be largely in support of the ATC system rather than integral with it. For this reason any operational service provided would have to be at a level which permits of smooth reversion to manual procedures in the event of computer malfunction or withdrawal. It follows, therefore, that the tasks vested in the computer should result in an end product which entails no radical alteration in the ATC display content or layout and would be limited in scope. The possible range of computer operational application in these circumstances might be:

- a) The provision of ATC calculated times (based on Mach Number) in either an Organized or Random track structure.
- b) Providing a "clear path" indication to the Planning Controller where an Organized track system is in operation, by maintaining a record of track utilization and presenting a continuous display of boundary estimate "acceptance times" for each track and flight level, with a notation of the Mach. No. of preceding aircraft;
- c) Reducing the tactical controller's task by holding full flight record and routine information in store and only alerting the Controller in the event of conflict or significant deviation from flight path or flight progress (estimates).

5-1.3.4.4 With a sufficiently reliable computer, the range of application of automatic data processing might be extended to:

- a) For the Planning Controller, full Conflict Resolution, either automatically or on request (organized or Random track systems);
- b) Provide automatic interchange of essential control information between the controllers concerned and automatic data transfer to other centres, both Oceanic and domestic.
- c) Provide Conflict Prediction and Resolution, on request, to the tactical controller;
- d) Provide the basic control data display, possibly by tabular electronic data display systems or by radar-type displays.
- e) Automatic processing of position information, possibly from data link.

5-1.3.4.5 The availability of reliable ATC automatic data processing facilities would open the door to on-line cooperation with meteorological computers. In this environment extension of the computer task may be made to allow computation of daily organized track structures, where these are necessary due to anticipated traffic demand.

5-1.3.4.6 A long term plan for automation in Oceanic control must take into account the predominantly strategic or tactical nature of the eventual system. Additionally the opportunity may be taken, if this is practicable, to associate it directly with automated facilities provided for the continental airspace system. However, as there are signs of impending weaknesses in the present unautomated Oceanic system, no time should be lost in evaluating these weaknesses and formulating a phased automation plan at an early date.

5-1.3.5 Automated Flight Planning (AFP)

5-1.3.5.1 It is recognized that each operator has different requirements in regard to flight planning, flight operation, and operational control. Undoubtedly, the choice between manual and automated techniques will be made by each operator after giving due consideration to the economic as well as all related operational factors. It is known that some operators have found it expedient in meeting their collective needs to make joint use of automated flight planning facilities. Others have established their own AFP facility. Still other operators may be expected to continue to use manual techniques.

5-1.3.5.2 In order for the flight planning computers to most effectively perform their basic function, there should be direct interfacing between the AFPs and MTT computers.

5-1.3.5.3 At such time as ATC centers are automated, there may be advantages in arrangements whereby AFP facilities would file flight plans (after review and acceptance by the operator) directly with ATC using on-line (computer/computer) transmission techniques. Additionally, it may prove to be advantageous to establish procedures wherein the AFP facilities would exchange information with ATC centers (computer/computer) on the volume and probably airspace needs of anticipated traffic in order to facilitate planning.

5-1.3.6 ATS Procedures (Oceanic centres)

5-1.3.6.1 The Committee noted the progress made towards improvements in ATS procedures, included in the Report on Agenda Items 6 iii and 6 iv.

5-1.3.6.2 It was considered that the organized track procedures used by Gander and Shanwick centres had proved adequate as a means of accommodating peak traffic flows. Depending upon the speed with which reduced separation minima are implemented, in relation to the forecast increase in traffic, and the future traffic handling capability of ATS units, it will probably continue to be necessary to implement an organized track system in the principal area when traffic is heavy. The future frequency of such implementation cannot be estimated at present.

5-1.3.6.3 Under these circumstances it would continue to be desirable for operators to receive advance notification of track information and for them, where practicable, to brief aircrews with data on time and fuel variations for different tracks and flight levels (6 iii - 1.1.11). The latter information should be in a form which ensures rapid assessment and would still be valuable even if organized tracks were not in use. Supplementary information to aircraft in flight, e.g. ATC calculated estimates, could be made available if, for example, an LF RTT broadcast service was generally adopted.

5-1.3.6.4 The future application of automatic data processing facilities for Oceanic Control may be of direct benefit for the purpose of:

- a) Updating of ATC estimated times as required (also in random or free tracking systems) - (6 iii - 1.1.10 (b)).
- b) Determination of datum line(s) and organized track structures (6 iii - 1.1.11 (c) and (d)).
- c) Optimum clearance of traffic into, out of and across main traffic flows (6 iii - 1.1.10 (e)).

5-1.3.6.5 It was believed that procedures for the clearance of traffic into Oceanic airspace would continue to warrant close attention. The efficiency of this operation may depend heavily on automated facilities, as might procedures for the monitoring of traffic during the Oceanic crossing (5-1.3.5). It is expected that Mach No. techniques for clearing traffic on similar or diverging tracks will continue to be applicable. The frequency of updating flight progress on the basis of position reports will require review from time to time, in conjunction with the use of prevailing longitudinal separation standards. There is currently a need to further rationalize position reporting procedures with the aim of eliminating routine reports at alternate 10° meridians, if this proves to have continuing validity (Ref. 6 iv 1.1.8 and 1.1.9).

5-1.3.6.6 The Committee acknowledged that, subject to satisfactory initial results, the general alignment of ATS procedures in the North Atlantic would benefit from the activities of an ATC Co-ordination and Evaluation Team (6iii-1.2).

5-1.3.7 Navigation System

5-1.3.7.1 It is well established that the critical requirement associated with navigation capability is related to meeting the necessary demand for system capacity rather than any individual aircraft requirement. This situation is in no way expected to be changed by the introduction of SST aircraft.

5-1.3.7.2 It is considered unlikely that reduction in vertical separation to less than 1000 feet can be realized and it is therefore necessary to emphasize that horizontal plan navigation must be the field in which research and development must concentrate to meet increased capacity and general improvement demands.

5-1.3.7.3 In addition, combined horizontal/vertical plane navigation must be improved in the areas of climbing and descending traffic and equipment ability which will enable an aircraft to integrate rate of descent and forward speed and thereby more precisely follow a flight path clearance warrants particular research and development. This is not considered to be just a SST requirement.

5-1.3.7.4 When developing new navigation techniques the effect on flight deck management (work load) must be considered.

5-1.3.7.5 Within the oceanic FIRs, navigation is based upon the use of LORAN A, NDBs, CONSOL, self-contained and celestial systems. In the transition areas the standard short range navigational aid (VOR/DME) is being progressively introduced.

5-1.3.7.6 Examination of the accuracy with which aircraft are able to adhere to the route specified in the ATC clearance and estimate their position ahead indicates that the navigational accuracy in the NAT Region has improved over the last few years and further improvement can be anticipated in the future. This should result from the increased use of better navigation equipment on board aircraft, standardized techniques of navigation and a more concerted effort to maintain track to the highest degree of accuracy.

5-1.3.7.7 Doppler systems, in varying configurations, have become increasingly wide spread in their use. This trend is expected to continue. In addition, it is anticipated that inertial navigation systems will be introduced into the NAT Region during 1965-66 on an operational basis. Hence here is a noticeable trend by operators to rely on self-contained systems monitored as necessary by ground based aids as the principal means of navigation within the Region.

5-1.3.7.8 There is a lack of complete LORAN A coverage in the principal area particularly south of 52°N and east of 30°W . This situation could be partially remedied by the provision of continuous LORAN A coverage in the area of the Bay of Biscay providing administrative difficulties of implementation could be overcome in order to make these facilities available on a 24-hour basis. (6i-1.3.19, 6iii-1.3). Nevertheless, there will remain a substantial area south of 52°N in which position fixing may continue to be a problem.

5-1.3.7.9 For the next few years it would appear that the developing self-contained navigational ability of turbo-jet aircraft in conjunction with existing interim aids will prove adequate. However the total traffic concerned and a possible need of improved support for the self-contained aids merit continued research and development in this field. Among the systems under active consideration are DECTRA, LORAN C, Omega, Satellites and Auto-Astro. Participation by IATA and interested States in the operational evaluation of these systems for possible future civil application is considered desirable.

5-1.3.7.10 The feasibility of reducing the incidence of gross navigational errors in oceanic airspace by the use of short range navigation systems or secondary surveillance radar on ocean stable platforms will require review at the appropriate time.

5-1.3.8 Separation Minima

Vertical

5-1.3.8.1 The Report on Agenda Item 6 i contains an outline of the sequence of action required for implementation of 1000 ft vertical separation above FL 290 in the NAT Region (6 i - 1.2.15). It appears that the earliest possible date for implementation of 1000 ft vertical separation is 1 April 1966. The effectiveness of this improvement of system capacity will be related to the number of aircraft which can participate and action is required by all States concerned to ensure that the maximum number of aircraft have this capability in the shortest possible time. Comments on the possibility of further reduction of vertical separation after 1000 ft is attained is contained in 5-1.3.7.2 of this report.

Lateral

5-1.3.8.2 The anticipated reduction in lateral separation to 90 NM will have a significant effect upon the capacity of Oceanic airspace. In general, further reductions, which are dependent upon considerations mentioned in 5-1.3.7.3, should be accomplished in steps which are consistent with system capacity, and traffic demands. (6i-1.3.12).

Longitudinal separation

5-1.3.8.3 Mach Number techniques (6i-1.3.3) for estimating flight progress, coupled with a minimum but related number of en route position reports, will probably suffice to permit the safe application of the reduced longitudinal separation.

5-1.3.9 Aircraft Equipment

Altimetry System

5-1.3.9.1 The fast approaching feasibility of 1000 ft vertical separation above FL 290 using ICAO type II and type III altimeters is generally acknowledged.

5-1.3.9.2 The Report on Agenda Item 6i outlines technical measures to be taken by States and Operations to cover accuracy, calibrations and maintenance. Such measures are related to the immediate time scale as is also the collection of additional air data. This should in normal circumstances enable 1000 ft vertical separation above FL 290 to be introduced not later than 1 January 1967.

Mach Meter System

5-1.3.9.3 Under Agenda Item 6i the NA Committee proposed that the current trials using Mach No. as the speed unit, should be continued. It also called for the establishment of Supplementary Procedures covering:

- a) Mach Number in clearances
- b) Adherence by pilots to Mach Numbers within agreed limits
- c) Mach Number inclusion in Air Reports.

Finally, the NA Committee recommended that States' and Operators' attention be drawn to "careful calibration" requirements. (6i-1.3.6).

5-1.3.10 Communication Services

Aeromobile Services

5-1.3.10.1 Comprehensive VHF coverage of the Region, to the extent to which this can be realized within practicable limitations, to provide static free pilot controller and general purpose communication channels, should be the objective. The provision of extended range VHF facilities, where these are required, is a step towards this goal. Towards this end the provision of such facilities in Greenland at Prins Christian Sund, Thule and Nord should be pursued. A more complete solution to the overall problem however is required. The creation of an aeromobile communication system that bears favourable comparison with that now provided over continental airspace should be the aim. There appears to be considerable potential for improvement in certain technical developments such as Ocean Stable Platforms and Satellites. Such developments need to be kept under close surveillance to determine their suitability, economic practicability and capability for timely introduction

into the system. States involved should pursue their studies into these projects with a view to determining their practicability and possible time scale for implementation.

5-1.3.10.2 The potential of data links for reducing communication channel congestion and providing the means for increased data rate of routine communications should be appraised.

5-1.3.10.3 Continued employment of HF R/T communications will be necessary for the foreseeable future. All practicable means within reasonable economic limitations to both States and Air Operators, should be taken to improve the operation of this network. On determining the extent to which SSB can be introduced into the HF aeromobile system, account will be taken of the results of the operational evaluation of SSB scheduled to commence not later than 1 January 1968. If the full potential is to be realized by operation in the suppressed carrier mode in a complete SSB system, as distinct from operation in a compatible DSB/SSB system, then in order to retain the desirable application of SELCAL principles, further development of SELCAL techniques will be required. However these considerations need not delay the introduction of SSB since it would be necessary to provide for compatible DSB/SSB operation for some years to come.

Fixed Services

5-1.3.10.4 The recommended short term engineering improvements to the ICAO Cable System should provide adequate capacity up to 1968 and beyond, if additional capacity is required, this could be provided by the provision of fully automatic relay capability in Iceland to permit cooperative operation of the cable channels 2, 3 and 4. This could be provided with the period 1968-1970. Consideration will need to be given also to the provision of permanent circuitry between Iceland and Greenland, to link Greenland's proposed internal network to the ICAO Cable System. This would possibly be required (within the above time scale) from about 1970 onwards.

5-1.3.10.5 In general, planning must take into account that the importance of efficient aeronautical fixed services will inevitably become more significant as aircraft speeds increase and flight times consequently are reduced. The availability to the pilot, prior to flight, of important information relating to the conduct of the entire flight is a fundamental requirement in what will become, in the SST era, virtually "short-haul" operations. The improved aeronautical fixed services required to meet this goal should be available by 1973. Planning and evolutionary development should be such as to accommodate, as and when necessary, the introduction of high speed communications between North America and Europe. In this connexion the provision of a high speed cable channel between Canada and United Kingdom possibly replacing one or more of the existing cable channels will need to be considered.

5-1.3.11 Meteorological Services

5-1.3.11.1 The Committee agreed under Agenda Item 6 v that an Area Forecast System would be a means of satisfying the operational requirements for the supply of meteorological information to all concerned "in such a manner as to provide a uniform basis for planning". This has long-term implications not only in Meteorological Services but in Air Traffic Services and Communications. (Ref. 6v-1.1).

5-1.3.11.2 Complete consistency between forecasts issued for westbound and eastbound flights is not considered necessary at this time. This permits the planning of a relatively simple system in which forecasting is carried out independently in North America and Europe for eastbound and westbound flights respectively. The expansion of forecast capability on the European side may make possible the production of forecasts over greatly extended areas, thus eliminating the need of forecast exchanges across the Atlantic.

5-1.3.11.3 It was recognized that within the next few years there may be, to a limited extent initially, a requirement for the dissemination of forecasts in digital form for direct input into Flight Planning Computers. Two methods were suggested for the exchange of forecast charts between MET centres (Ref. 6v-1.3.1):

- a) Transmission in a digital form to a second computer which would then convert the data into chart form by a line drawing process.
- b) Facsimile distribution of charts, including high speed transmission.

5-1.3.11.4 The Committee recognized that the increase in general aviation activity, primarily in the lower layers, may lead to an increase in requirements.

5-1.3.11.5 The advent of supersonic aircraft and their coexistence with existing types of aircraft will increase the number of upper air charts required for the higher levels and meteorological data should be collected to facilitate accommodation of such operations.

5-1.3.11.6 Although it was not possible to be precise in relation to detail it could be foreseen that there would be an increase in amount of information to be exchanged, and that the number and rapidity of such exchanges would need to be greatly increased.

5-1.3.11.7 The potentialities of automatic recording and reporting equipment for future development in aircraft meteorological observations and reports should be studied (6iv-1.2.6).

5-1.3.12 Aeronautical Information Services

5-1.3.12.1 Reductions in flight time has not yet affected significantly requirements in this field but it can be foreseen that in a SST era the timely provision of essential information must be in phase with the aircraft speed and flight time. This factor warrants the attention, in due course, of the permanent group.

5-1.3.13 Search and Rescue Services

5-1.3.13.1 It is believed that no major changes are required in this field and that SAR provision should continue to be based, in general, on the facilities that are at present available to the authorities concerned with the NAT Region.

5-1.3.13.2 Any system plan for the North Atlantic should provide for the inclusion of these existing facilities and should be compatible with ship reporting and control methods, e.g. AMVER, and other relevant maritime rescue organizations. As there are many common factors in search and rescue operations for marine craft and aircraft, the closest liaison should be maintained between ICAO and IMCO with a view to devising procedures recognized by both organizations.

5-1.3.13.3 In planning the expansion of SAR services in Polar or similarly remote areas, attention should be given to the unique characteristics of SAR requirements for such area to assure that appropriate training, equipment and procedures are provided.

5-1.4 ELEMENTS OF THE PLAN - LONG RANGE IMPROVEMENTS*5-1.4.1 General

To a large extent the following material is a condensed version the preceding part of this Report and includes on page 5-23, a chronological diagram of items of long term nature, envisaged for the coming 10 year period, which may need to be considered by the North Atlantic Systems Planning Group. Implementation dates for short term improvements in the regional plan and for associated recommendations are set forth under Agenda Item 7.

5-1.4.2 Organization of Airspace

Amalgamation of some Oceanic FIRs, possibly only at the higher levels, may need to be made from 1972 onwards to facilitate control of traffic, particularly SST traffic.

5-1.4.3 Continental Transition Airspace

The following development is envisaged within Continental Transition Airspace adjoining the principal area Oceanic Airspace, due regard being paid to the requirements of intra-continental flights.

- a) Completion of upper air route structure and provisions of area control service.
- b) Completion of primary/secondary radar coverage, and the possible later incorporation of automatic radar data processing facilities.
- c) Expansion of pilot/controller VHF radiotelephony communications as necessary.
- d) Adequate coverage by short range navigational aids.
- e) Data transfer between domestic/oceanic centres.

5-1.4.4 Application of ATC Computers to Oceanic Control

Initial and partial application of ATC computers in Oceanic Control will continue until about 1970. It is then envisaged that the range of application may be extended to include interface with meteorological and

*Note: This part of the Report does not necessarily contain all elements of the plan and due regard should be taken of the former part of the Report on this Agenda Item.

possibly flight planning computers. Fully automated automatic data processing for Oceanic control may then become available including:

- a) conflict prediction and resolution;
- b) basic control displays;
- c) internal data transfer (Oceanic/domestic centres)
- d) automatic data transfer (Oceanic centres)

At a later date, automatic processing of position information, possibly derived from data link, may be accommodated.

5-1.4.5 Automated Flight-Planning

A number of operators are engaged in assessing computer-assisted flight-planning. These trials will continue but the extent and effect on the System cannot be foreseen at this time.

5-1.4.6 ATS Procedures (Oceanic centres)

Future changes in ATS procedures will increasingly involve automated facilities, for which approximate time-scales are included in the section dealing with the application of ATC computers to Oceanic Control.

5-1.4.7 Navigation System

Four main action items are included in the diagram appended and cover LORAN A in the Bay of Biscay, implementation of Regional Plans for the standard short-range navigational aids, development and use of self-contained systems and research and development, including evaluation, in the field of ground based long range aids.

The latter two are intended to include Satellites, Ocean Platforms and Auto-astro in addition to LF and VLF systems.

5-1.4.8 Separation Minima

Separation minima for the SST aircraft in Oceanic airspace should be developed by 1971.

5-1.4.9

Communications

5-1.3.9.1

Aeromobile Services - To the extent practical, peripheral VHF coverage, employing as necessary Extended Range VHF facilities should be available for the region by 1969.

5-1.4.9.2

Aeronautical Fixed Services - As the need arises, provision should be made for availability, possibly by 1970, of

- a) Fully automatic relay capabilities in Iceland for cable channels 2, 3 and 4.
- b) A new cable channel between Greenland and Iceland.
- c) A wide band high-speed cable channel between Gander and London.

The need for aeronautical fixed services to keep in step with the speed of supersonic flight is recorded in para. 5-1.3.10.5. The improvements required to ensure that this goal will be met should be available by 1973.

5-1.4.9.3

General - Improvements to aeromobile and aeronautical fixed communications services which may be possible through use of Ocean Stable Platforms, Satellites or both should be taken into account during the period 1970-75.

5-1.4.10

Meteorological Services

Four action areas are noted for consideration. They are, continued meteorological research in the upper atmosphere, Area forecast system for Westbound flights, digital form transmission of forecast information and facsimile transmission including high speed transmission. The latter three items are progressive developments for existing operations but will nevertheless effect the efficiency of SST operations. The meteorological research should be related directly to specific problem areas associated with SST operations.

5-1.4.11

Aeronautical Information Services

Although no precise direction can be suggested at this time it is apparent that these services will be particularly important in an SST operation and procedures for the dissemination of required information will need to be reviewed in the late 1960's.

TENTATIVE LONG TERM PLANNING SCHEDULE

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
<u>Organization of Airspace</u>										
Airspace/Adjustments - Upper level (SST)										
<u>Continental Transition Airspace</u>										
Upper air route structure										
Primary/Secondary Radar coverage										
Primary/Secondary Radar coverage with automatic radar data processing										
Expansion of pilot/controller VHF R/T										
Adequate short-range navigational aid coverage										
Automated data transfer between domestic/oceanic centres										
<u>Application of ATC Computers to Oceanic Control</u>										
Initial oceanic computer system										
Fully integrated oceanic computer system										
<u>Navigation System</u>										
Expansion of LORAN A Coverage										
Adequate short-range Navaid coverage										
Continued development and use of self-contained systems										
Continued evaluation of alternative long range ground based aids										
<u>Separation Minima</u>										
Determination of Separation minima for SST aircraft										
<u>Aircraft Equipment</u>										
Adequate maintenance and calibration of altimeter equipment										
Development of guidance material from the above										
Turbo-jet aircraft suitably equipped										
<u>Communication Services</u>										
Peripheral VHF coverage										
Incorporation of SSB into HF aeromobile system										
Decision on requirement for LF RTT										
Additional cable channel - Greenland/Iceland										
Wide band high speed cable channel - Gander/London										
Fully automatic relay - Iceland - Cable channels 2, 3 and 4										
Continued research and development fixed and mobile services										
Over-water VHF Coverage (Ocean Platforms or Satellites)										
<u>Meteorological Services</u>										
Continued meteorological research in upper atmosphere										
Area forecast scheme for westbound flights										
Digital form transmission of forecasts and equipment for reception and conversion to chart form										
Facsimile transmission including some high speed transmission										
<u>Aeronautical Information Services</u>										
Development of procedure for dissemination of essential information(SST)										
<u>BUSY HOUR TRAFFIC -</u>	24	24	27	28	31	34	36	37	-	-

SECTION 5-2: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 5

5-2.1 The General Committee reviewed the material presented to it under Agenda Item 5 and made no comment.

SECTION 5-3: STATEMENTS BY DELEGATIONS ON THE ACTION TAKEN ON
AGENDA ITEM 5

5-3.1 STATEMENT BY THE DELEGATION OF IATA

Preparation of plans for major long-term improvements

IATA appreciates the attempt made by the Special NAT Meeting to prepare plans for major long-term improvements, as represented by its report under Agenda Item 5.

Unfortunately, lack of time precluded thorough consideration of the principles and methods suggested as the basis for further planning and of the elements which now appear in the Tentative Long-Term Planning Schedule. Accordingly IATA considers it essential that the NAT Systems Planning Group carefully examine all these elements before decisions are reached concerning those to be designated for development under the Systems Planning Programme.

IATA wishes to express its willingness to participate in the activities of the NAT Systems Planning Group, to assist in the study and evaluation of those items which are of interest to Member Airlines, or which may affect their operations.

5-3.2 STATEMENT BY THE DELEGATION OF THE UNITED STATES

The United States foresees no need for any new ground based aid in the North Atlantic at least through the early 1970's. The United States nevertheless intends to participate with the United Kingdom in evaluation of DECTRA as well as in evaluation of other systems mentioned in 5-1.3.7.9. Our participation is not directed towards an operational evaluation of DECTRA but merely to assess for ourselves the extent to which the previously noted deficiencies may have been overcome.

Should a new aid prove to be necessary at some later date in the North Atlantic, we would wish it to be noted that the LORAN C system presently provides substantial coverage in the North Atlantic and will by the end of this year be providing virtually complete coverage in the oceanic portion north of 45°N. Airborne receivers are presently available from a number of manufacturers. The LORAN C provides an accuracy of better than one mile throughout the area of cover. A development program is well underway within the Federal Aviation Agency by which it will soon be possible, using the LORAN C system, for an aircraft to obtain continuously displayed position information, bearing and distance to go, to any selected destination. These developments have not been documented for this meeting for the reason just stated, i.e., the United States sees no requirement for introduction into the North Atlantic Regional Plan of any new ground based aid. The reductions in separation minima which we have supported here have been put forward on that basis. We foresee the possibility of eventual attainment of 60 nautical miles lateral separation on the same basis.

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Agenda Item 6: Preparation of Amendments to the North Atlantic Plan and
Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 i - Separation Minima

The short-term air route table, and the statement of regionally agreed operational requirements, established by the Policy and Programming Committee, as contained in the Report on Agenda Item 2 b) and in paragraphs 2, 3 and 5 of the Report on Agenda Item 3 a), governed the consideration of Agenda Item 6 i.

SECTION 6 i-1: ACTION BY THE NA COMMITTEE ON AGENDA ITEM 6 i

Separation Minima

6i-1.1 General

6i-1.1.1 The Navigation and Air Traffic Services Committee had before it substantive documentation containing the results of extensive studies and evaluations carried out by Canada, the United Kingdom and the United States during the period 1962-1964 with a view to assessing the navigational and height-keeping accuracies of turbo-jet aircraft operating over the North Atlantic. In addition, a study made by IATA in 1963 regarding vertical separation above FL 290, the conclusions drawn by IFALPA from a study of available data concerning horizontal as well as vertical separation, and the preliminary results of an investigation by IANC into track-keeping accuracies were also made available to the Committee.

6i-1.1.2 The Committee agreed that it would be desirable to reduce the current separation minima in order to increase the capacity of the air traffic system in the "principal area" of the NAT Region.

6i-1.1.3 The United Kingdom presented to the Committee detailed documentation describing a method of assessing the risks inherent in separation minima. The method relied on the use of a mathematical model, although operational judgement at all significant points in the assessment must be exercised. The U.K. stated that the mathematical process presented the operational decisions required in a form which could be understood by operational personnel and showed the implications of such decisions. It further stated that, with suitable adjustments, fully reflecting variations in the traffic distribution, this process offered great potential as a management decision tool to be used when considering any forecast traffic density. In particular, the method relied upon defining an operational determination of the level of acceptable collision risk against which the validity of using particular separation minima could be judged.

6i-1.1.4 The Committee noted with gratification the work done by the United Kingdom and discussed the method. It found it premature, however, to use such a method as the sole basis for establishment of separation minima in the NAT Region, bearing in mind the continuing work following Recommendation 7/1 of the RAC/OPS Division, 1963 to formulate a world-wide mathematical basis on which to premise the establishment of separation minima.

6i-1.1.5 In the light of the foregoing, the Committee decided to review the separation minima in the NAT Region on the basis of operational experience gained by States, supplemented by the results of statistical and mathematical studies as indicated in para. 6i-1.1.1 above.

RECOMMENDATION 6 i/1: CONTINUED WORK ON RECOMMENDATION 7/1 OF THE RAC/OPS DIVISION, 1963 *

That, within the general framework of the NAT Systems Planning Group, studies be pursued towards improving logical methods for the assessment of reductions in separation minima, so as to further the work now in progress with respect to Recommendation 7/1 of the RAC/OPS Division.

6i-1.2 Vertical Separation

Introduction

6i-1.2.1 The Committee noted that the application of 1000 feet vertical separation above flight level 290 in the NAT Region would allow the system to accommodate approximately double the number of aircraft above that flight level during any given period of time. It would also have considerable economic benefits for the operators of aircraft flying in the North Atlantic airspace, since more aircraft could be assigned their preferred cruising levels.

6i-1.2.2 When considering the feasibility of applying 1000 feet vertical separation between aircraft above FL 290, the Committee noted that, within the last few years significant technical progress had been achieved in the production, installation, calibration and maintenance of altimeter equipment. In fact, a number of studies by States and IATA both on the technical aspects of altimetry and the operational use of improved altimeter systems indicated the possibility of reducing vertical separation from the present 2000 feet to 1000 feet between aircraft which were suitably equipped and calibrated and maintained in accordance with the specified methods contained in paras. 6i-1.2.8 and 6i-1.2.9. This situation had

* See Statements by the Delegations of the United Kingdom and Ireland, Section 6i-4, paragraphs 6i-4.3 and 6i-4.4.

recently been acknowledged by the Air Navigation Commission when, in the light of these studies, it recommended to the Council of ICAO an amendment to Annex 2 which provided that, under specified conditions and based on regional agreement, vertical separation above FL 290 could be reduced to 1000 feet. In addition, the ANC recently approved provisional acceptable means of compliance (PAMC s) for type II altimeters.

61-1.2.3 During the discussions in the Committee it became apparent that, while there existed a large measure of agreement with regard to the accuracy values quoted and the methods applied for their determination, a number of States felt that the amount of operational and technical data which had been used in the studies mentioned above was not yet large enough to come to definite conclusions. They felt that it would therefore be necessary to collect and evaluate more data before a definite decision in the matter of vertical separation in the NAT Region could be taken.

61-1.2.4 The Committee then considered the effects of implementation of 1000 feet vertical separation in the Region. These could be subdivided into three parts:

- i) effects on States and operators;
- ii) effects on existing ATC procedures;
- iii) effects on operations in adjacent regions.

With regard to i) it was noted that these effects would essentially be of a technical nature and would result in additional requirements regarding the installation, maintenance and calibration of altimeter systems in aircraft. In addition they would require pilots to exercise a high degree of accuracy in keeping to an assigned level. As to ii) above, it was found that it would be necessary to develop supplementary procedures which catered for the identification of those aircraft to which 1000 feet vertical separation could not or no longer be applied, either because of lack of adequate equipment on board the aircraft or for other reasons. With regard to the effects on operations in adjacent regions, as mentioned in iii) above, it was noted that the USA anticipated the introduction of 1000 feet vertical separation above FL 290 within the airspace over its territory during 1965. There would therefore remain the question of transition on both borders of the region on the one hand with Canada and on the other hand with the EUM Region, where it might not be possible to introduce 1000 feet vertical separation above FL 290 for some time.

61-1.2.5 It seemed evident that there were four basic aspects which required consideration before 1000 feet separation above FL 290 in the NAT Region could be implemented. They were:

- i) Definition of the area of application of the 1000 feet separation minimum.

- ii) Definition of the measures to be taken by States and operators and development of necessary procedures in order to allow application.
- iii) Definition of the data which would still be required in order to come to a definite decision on this matter.
- iv) Establishment of a coordinated programme of implementation of the new minima.

Area of Application

6i-1.2.6 The Committee agreed that laterally the area of application of 1000 feet vertical separation should be limited initially to that encompassed by the CTA's Gander Oceanic, Lisboa Oceanic, New York Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N). Vertically, the area of application should extend from FL 290 to FL 450 inclusive. In addition, it was agreed that no difference should be made in the application by types of air traffic other than those prescribed in para. 6i-1.2.10 below which were based upon equipment limitations or temporary inability by pilots to maintain the assigned cruising level within specified tolerances.

Measures by States and operators

6i-1.2.7 In view of the importance which must be placed on the continuous, highly accurate operation of the altimeter systems in aircraft, where 1000 feet vertical separation is applied above FL 290, the Committee found it necessary to specify a number of technical measures which must be taken by States and operators in this respect. These comprised:

- i) measures required prior to the application of 1000 feet vertical separation, and
- ii) measures required both prior to and following the application of 1000 feet vertical separation.

6i-1.2.8 With regard to the measures required prior to implementation it was agreed that these should consist of the following:

- i) States of registry should ensure that aircraft intended to be used in the NAT Region where 1000 feet vertical separation above FL 290 is applied, are equipped with Type II or better altimeters which are corrected either by a correction device or a correction card and with automatic pilots including an altitude hold device (height-lock).

ii) States of registry should ensure that operators accomplish the following ground check on each aircraft that is to be eligible for application of 1000 feet vertical separation above FL 290:

- a) Conduct a full range static system leak check.
- b) Check the aircraft's altimeters (and air data system, if used) and recalibrate as necessary.
- c) Conduct a survey of static port area contours.
- d) Conduct an inspection of the static system piping and hoses.

Provision should be made to ensure that the accuracy of altimeter systems is such that errors do not exceed a maximum of ± 250 feet, considering the static system and altimeter instrument errors and the calibration technique error factor.

Note:- Experience gained in the USA indicates that the value can be achieved when the root mean square method is used to determine the total figure.

6i-1.2.9 In respect of the measures to be applied both prior to and following the application of 1000 feet vertical separation, the Committee agreed that these should include the following:

- i) States of registry should ensure that pertinent maintenance programmes on altimeters and aircraft static systems conform with requirements equivalent to the following:
 - a) Pertinent PAMC s;and, in addition,
 - b) IATA and ATA published practices concerning barometers used for altimeter and/or air data system calibration;
 - c) IATA and ATA published practices for calibration and maintenance of Type II altimeters;
 - d) Manufacturer's recommendations for the maintenance of servo-compensated altimeters and/or air data systems;

- e) IATA and ATA published practices for the maintenance of flush static ports and aircraft static systems.
- ii) States of registry of aircraft operating in that part of the NAT Region where 1000 feet vertical separation is applied above FL 290 should conduct sufficient flight tests of altimeter static systems, in order to obtain additional assurance that calibration and maintenance techniques are achieving the required results.
- iii) States concerned should exchange information gained by the application of ii).

Note: It was noted that the USA has already obtained such data for a number of aircraft of US registry and additional data is expected to become available within the next few months.

RECOMMENDATION 6 i/2: TECHNICAL MEASURES BY STATES AND OPERATORS

That States of registry of aircraft intended to be used for operation in that part of the NAT Region where 1000 feet vertical separation is applied above FL 290:

- i) ensure as soon as possible that operators are taking all necessary measures for installation, calibration and maintenance of altimeter systems (and air data systems, where used) and auto-pilots in accordance with the latest available methods;
- ii) assure themselves as soon as possible by means of flight tests, as appropriate, that calibration, maintenance and operating techniques used by the operators are such as to achieve the necessary degree of reliability and accuracy of altimeters (and air data systems where used) and auto-pilots.

RECOMMENDATION 6 i/3: MEASURES FOR STATE AIRCRAFT

That States, whose State aircraft are intended to be operated in that part of the NAT Region where 1000 feet vertical separation is applied, should be encouraged to ensure that such aircraft meet the technical and operational specifications established for civil aircraft so as to be also eligible for the application of 1000 feet vertical separation.

RECOMMENDATION 6 i/4: INVITATION TO NON-ICAO STATES TO COMPLY WITH AGREED TECHNICAL MEASURES

That non-contracting States, whose operators are flying, or are planning to fly, in that part of the NAT Region where 1000 feet vertical separation is applied above FL 290, be invited to apply the technical measures specified in Recommendation 6 i/2 so that their aircraft will also be eligible for the application of 1000 feet vertical separation.

6i-1.2.10 As regards the procedural measures required for the implementation of 1000 feet vertical separation, it was agreed that these should be covered by appropriate Regional Supplementary procedures and that they should cover the method by which a pilot would indicate:

- i) when filing a flight plan, that his aircraft is not eligible for the application of 1000 feet vertical separation;
- ii) that the application of 1000 feet vertical separation was no longer possible or could again be applied to a specific aircraft.

With regard to i), the negative method was chosen since it was expected that the majority of turbo-jet aircraft operating in the Region would be suitably equipped and maintained. As regards ii), it was believed necessary to cover those exceptional cases when the pilot was no longer able to maintain his assigned flight level within a tolerance of + 250 feet (turbulence etc.). The provision should also cover the case when these conditions ceased to exist and it was agreed that these conditions should be notified immediately to ATC so that appropriate action could be taken.

Data Collection and Evaluation

6i-1.2.11 As already indicated in para. 6i-1.2.3, some States felt that it would be desirable to have a larger sample of altitude error information in order to supplement the information contained in the various studies on vertical separation above FL 290, before it was possible for them to arrive at a decision. It was therefore agreed that the data on approximately 10,000 North Atlantic flights should be collected as soon as possible in accordance with the following.

- i) the data should cover both East- and Westbound flights;
- ii) the data should be provided by the largest possible number of air carriers operating in the North Atlantic;
- iii) the data should cover readings from the pilot's and co-pilot's altimeters using independent static systems while operating at FL 290 and above in the NAT Region and should indicate the following:
 - a) altimeter readings at 25°, 35° and 45° W;
 - b) whether the altitude hold device was engaged at the time of the observation and, if not, the reason.

61-1.2.12 It was agreed that this information would, when used in conjunction with available data on altimeter systems, be acceptable statistically and would adequately increase the sample size at present available to an extent that firm decisions could be taken as to whether vertical separation above FL 290 could be safely reduced to 1000 feet.

61-1.2.13 The United Kingdom offered its facilities to carry out necessary statistical work on this subject once the data had been collected by the operators.

61-1.2.14 In so far as practicable, States should make use of data obtained by flight recorders in the evaluation process.

RECOMMENDATION 6 1/5: COLLECTION OF SUPPLEMENTARY DATA ON ALTIMETER ERROR

That, as soon as possible, IATA undertake the collection of additional data for the evaluation of altimeter errors on approximately 10,000 North Atlantic flights and make this information available to assist States in the assessment of the feasibility of application of 1,000 feet vertical separation above FL 290 in specified portions of the NAT Region.

Programme of actions required for the implementation of 1000 feet vertical separation

61-1.2.15 The Committee agreed to the following sequence of actions required for the implementation of 1000 feet vertical separation above FL 290 in the NAT Region:*

- i) Preparation of data collection (expected duration 1 month).
- ii) Collection of data (expected duration 3 months).
- iii) Data analysis and exchange of information between States on results obtained (expected duration 1 month).
- iv) Preparation and distribution of final results obtained by States (expected duration 1 month).
- v) Convening of a meeting to decide on a date of implementation and to review the situation regarding technical measures and procedures taken and to be taken by user and provider States, and, as necessary, measures for the transition of aircraft between the NAT Region and adjacent regions or areas (expected duration 10 working days).

* See comment by the PP Committee, Section 61-2, paragraph 61-2.1.1.

- vi) Implementation of vertical separation of 1000 feet above FL 290 in specified parts of the NAT Region if considered feasible in accordance with v) above. (Earliest possible date 1 April 1966).

61-1.2.16 The Committee was of the opinion that in view of the considerable responsibilities which were placed both on provider and user States with the implementation of 1000 feet vertical separation in the NAT Region above FL 290, it would be essential that the meeting mentioned in v) above should be held in order to provide States with the opportunity to agree on latest techniques and future developments, mainly in the technical field of altimetry.

RECOMMENDATION 6 i/6: CONVENING OF A MEETING TO DECIDE ON THE INTRODUCTION OF 1000 FEET VERTICAL SEPARATION ABOVE FL 290 *

That upon conclusion of the required studies on the suitability of the application of 1000 feet vertical separation above FL 290 in the NAT Region and prior to its implementation, ICAO convene a meeting of all NAT States in order to:

- i) decide on the feasibility of the application of 1000 feet vertical separation above FL 290 in specified parts of the NAT Region;
- ii) obtain agreement on necessary measures and techniques, especially in the technical field of altimetry, to be taken by States and operators with respect to aircraft to which this separation will be applied;
- iii) agree on a common date of application.

61-1.3 Horizontal Separation

61-1.3.1 The Committee noted that there existed indications that the degree of accuracy with which turbo-jet aircraft are able to navigate in the North Atlantic area has increased through the introduction of improved navigation equipment such as doppler, etc. and the implementation of additional LORAN A facilities. This was further assisted by the better environment conditions which exist in the higher levels of the atmosphere and at which these aircraft operate. In addition, the navigational surveillance which was exercised in the NAT Region in connexion with the operation "Accordion" and during the associated and continuing radar surveillance programmes of Canada and the United Kingdom resulted in an enhanced appreciation by operators and air crews of the need for achieving best possible navigational accuracy, which in turn had the effect of improving navigational procedures. It was therefore agreed that it would be possible to reduce some of the horizontal separation minima now applied in the NAT Region subject to a number of specified conditions.

* See comment by the PP Committee, Section 61-2, paragraph 61-2.1.2.

Longitudinal Separation

61-1.3.2 The Committee's attention was drawn to the application of longitudinal separation minima by ATC in the NAT Region as it had evolved in the ACCs concerned, based on practical experience. It had been found that, because of the manner in which air traffic in the NAT Region was organized by ATC, and because ATC had normally obtained experience from preceding air traffic along a given track, it was generally able to estimate the progress of aircraft along such a track in the NAT Region with a degree of precision which was in many cases better than that of the pilot concerned. Position reports and estimates for the next reporting position by pilots therefore often indicate an apparent minor deviation from longitudinal separation minima between successive aircraft following the same track, while information available to ATC on existing meteorological conditions and other relevant factors indicate that such apparent deviations are caused by slight inaccuracies in position reporting or by differences in appreciation of wind and other influences on the progress of flight. It was therefore agreed that the application of longitudinal separation in the NAT Region should be based primarily on times estimated by ATC and that pilots' position reports should be considered in making these estimates. It should be left to the ATC authorities concerned to specify the permissible tolerance in time between pilots' position reports and estimates and comparable data calculated by ATC for the maintenance of longitudinal separation.

Application of the Mach Number Technique

61-1.3.3 The adoption of certain operating techniques for turbo-jet aircraft and their use by ATC had shown that this was likely to materially improve the accuracy of navigation of aircraft along their flight path. In fact, it has been indicated that two or more turbo-jet aircraft, when maintaining a common mean Mach value and operating along the same route, remain at a distance from each other which, for all practical purposes, can be considered constant. This is due to the fact that the aircraft concerned are normally subject to about the same wind and temperature conditions, and minor variations in speed which might increase or decrease the interval between them tend to neutralize each other over long periods of flight. It was therefore believed that, if successive aircraft operating along the same route and at the same flight level, maintained agreed or assigned mean Mach number values, it would be possible to reduce the time interval at which they were estimated to cross successively specified reporting points along their route.

61-1.3.4 The Committee noted that Canada, Ireland and the United Kingdom had, for some time, applied this technique on a trial basis and operating experience so far obtained indicated that the above conclusions are justified, provided the requirements specified in paragraph 61-1.3.5 are met. It was, however, felt that further trials were required for the confirmation of available results.

61-1.3.5 The Committee therefore agreed that, in order to allow the application of reduced longitudinal separation minima to certain aircraft, a Regional Supplementary procedure applicable within that part of the NAT Region described in paragraph 61-1.3.8, should be established which should cover the following requirements:

- i) Inclusion of the planned Mach number in the flight plan of turbo-jet aircraft operating on a North Atlantic flight for that portion of such a flight conducted in the NAT Region.
- ii) Inclusion of the Mach number in each clearance given by Oceanic ACCs to turbo-jet aircraft.
- iii) Adherence by pilots to the cleared Mach number to a value of ± 0.01 and notification of ATC in case of deviations in excess of that value.
- iv) Inclusion of the current Mach number in each air report from turbo-jet aircraft while operating in the NAT Region.

61-1.3.6 In addition, the Committee considered it advisable to draw States' and operators' attention to the need for careful calibration of Mach meter systems.

RECOMMENDATION 6 i/7 - CALIBRATION OF MACH METER SYSTEMS *

That States' and operators' attention be drawn to the need for ensuring that Mach meter systems of aircraft used in North Atlantic operations be carefully calibrated in order to allow correct use of this equipment and maximum effectiveness in the application of the Mach number technique.

Longitudinal Separation between Turbo-jet Aircraft

61-1.3.7 After considerable discussions the Committee decided that in the CTAs Gander Oceanic, Lisboa Oceanic, New York Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N) 20 minutes longitudinal separation may be applied between turbo-jet aircraft. The United Kingdom indicated however that they were at present not prepared to apply this minimum and would, for the time being, continue to apply 30 minutes separation until such time as the results of further studies using statistical and mathematical methods had shown to its satisfaction that the application of a minimum of 20 minutes was feasible.

* See comment by the PP Committee, Section 61-2, paragraph 61-2.1.3

Longitudinal Separation between Turbo-jet Aircraft on the Same or Diverging Tracks

6i-1.3.8 The Committee agreed that in the OTAs under Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N), 15 minutes longitudinal separation may be applied between turbo-jet aircraft provided that the aircraft concerned have reported over the same entry point into the oceanic control area and

- i) follow the same track; or
- ii) follow continuously diverging tracks until another form of separation is established.

Other Longitudinal Separation between Aircraft

6i-1.3.9 The Committee agreed that in the NAT Region the present longitudinal separation of 30 minutes between aircraft should continue to apply for all those cases and in all such areas not covered by the specifications in paragraphs 6i-1.3.7 and 6i-1.3.8.

6i-1.3.10 It also noted that 20 minutes longitudinal separation would continue to apply between all other aircraft in the New York Oceanic Control Area operating between the United States, Canada or Bermuda and Caribbean terminals or between the United States or Canada and Bermuda.

Application of Longitudinal Separation Standards

6i-1.3.11 It was indicated that, in view of the increase in North Atlantic traffic expected for the summer of 1965, it would be desirable to introduce the new longitudinal separation minima in the NAT Region as soon as possible. The Committee therefore agreed that these minima should be introduced on a trial basis as soon as possible and that the Regional Supplementary procedures required for the definite application of these new separation minima should be made applicable at the earliest possible date.

Lateral Separation between Turbo-jet Aircraft

6i-1.3.12 Following a number of statements by delegates and a brief discussion, the Committee by a majority decision agreed that in the OTAs under Oceanic, Lisbon Oceanic, New York Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N) 90 NM lateral separation should be applied between turbo-jet aircraft operating on parallel tracks. This decision was based on views that observations of the accuracy with which aircraft navigate in the North Atlantic area demonstrated a constant improvement in the performances of the navigation function throughout each successive recent year. On this basis it was considered reasonable to assume that the navigational capability feasible today was sufficient to permit an immediate reduction of lateral separation to 90 NM. The Committee was informed, however, that it was the opinion of Ireland and the United Kingdom that, although the results of the observations were encouraging, and that, with the application of improved navigational

techniques, a reduction to 90 NM might prove to be acceptable, the feasibility of such a reduced minimum had so far not been conclusively demonstrated. It was their considered opinion that until the practicability of this reduced standard was demonstrated, it would be unsafe to reduce below the current 120 NM standard. It was therefore agreed that operators would make a concerted effort, between the end of this Meeting and the time the new lateral separation standard can be applied in accordance with established procedures, to make available to Ireland and the United Kingdom such additional data as to make it possible for them to confirm the feasibility of the recommended separation.

Other Lateral Separation between Aircraft

6i-1.3.13 The Committee agreed that in the NAT Region the present lateral separation of 120 NM between aircraft operating on parallel tracks should continue to apply for all those cases and in all such areas not covered by the specifications in paragraph 6i-1.3.12.

Application of Lateral Separation Standards

6i-1.3.14 The Committee agreed that the new lateral minima should be introduced as soon as the Regional Supplementary Procedures required for their application can be made applicable in accordance with established procedures.

Continued Evaluation of Data on Track-keeping Accuracy of Aircraft

6i-1.3.15 The Committee believed it desirable if States and operators were requested to collect and evaluate data with respect to the accuracy with which aircraft, operating in the NAT Region, were able to maintain their assigned track, in order to facilitate further reviews of the lateral separation minima whenever this appeared to be warranted by the data obtained.

RECOMMENDATION 6 i/8 - DATA ON TRACK-KEEPING ACCURACY OF AIRCRAFT*

That States and operators concerned collect and evaluate data with respect to the accuracy with which aircraft, operating in the NAT Region, were able to maintain their assigned track, to facilitate further reviews of the lateral separation minima, whenever this appeared feasible.

Reduction of Separation Minima by States

6i-1.3.16 The Committee agreed that the provisions, now contained in the Regional Supplementary Procedures, with regard to special arrangements for the reduction of separation minima by States should be maintained.

* See Statements by the Delegations of the United Kingdom and Ireland, Section 6i-4, paragraphs 6i-4.3 and 6i-4.4.

Use of Composite Separation Minima

6i-1.3.17 The Committee considered briefly a number of proposals submitted to it which suggested the use of separation minima in the NAT Region consisting of a combination of reduced vertical separation together with reduced lateral separation. Apart from the fact that the present standards, as contained in Annex 11, did not make provision for the application of such composite separation minima, the Committee agreed that their use, other than in order to provide a temporary relief to ATC in complex traffic situations, appears to introduce a degree of inflexibility and complication into the application of air traffic control. It was therefore agreed that this subject should not be pursued at this time.

Navigational Accuracy of Aircraft

6i-1.3.18 The Committee noted that with the application of the new separation standards indicated above, the need to navigate with a high degree of accuracy would become even more important than heretofore. It was believed that improvements in this respect could be expected if:

- i) aircraft maintained the assigned track as closely as possible;
- ii) equipments and techniques used by operators were directed towards an overall improvement of the navigational capability.

The Committee agreed that position determination should be such that deviations from track are quickly detected, thereby facilitating the regaining of the assigned track in accordance with established procedures.

RECOMMENDATION 6 i/9 - NAVIGATIONAL TECHNIQUE*

That operators engaged in North Atlantic operations should make every effort to refine their navigational techniques as applied in the NAT Region in order to ensure a uniformly high quality of navigation.

6i-1.3.19 In this context, the Committee agreed that the provision of LORAN A cover in the area between the Shanwick Oceanic FIR and north west Spain would be of assistance in the further improvement of track-keeping accuracy in this area.

* See Statements by the Delegations of the United Kingdom and Ireland, Section 6i-4, paragraphs 6i-4.3 and 6i-4.4.

SECTION 6 i-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING
COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6i

6i-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6i and made the following comments:

6i-2.1.1 The Committee noted that the periods required for the actions listed in paragraph 6i-1.2.15 would to a large extent depend on the measures referred to in paragraphs 6i-1.2.7, 6i-1.2.8 and 6i-1.2.9. The Committee was of the opinion that these periods were not intended to form a fixed time scale but rather to give a rough indication of the minimum time required to carry out these actions, bearing in mind the earliest possible implementation date of 1 April 1966 given in 6i-1.2.15 vi).

6i-2.1.2 The Committee considered that the meeting proposed in Recommendation 6i/6, should be a Limited North Atlantic (RAC) RAN Meeting, restricted in scope to the problems referred to in the Recommendation, and that it would require only one committee to deal with its agenda.

6i-2.1.3 With regard to Recommendation 6i/7 the Committee believed it necessary to stress the importance of determining accurately and regularly the in-flight errors of Mach meter systems. One way of doing this would be to monitor the Mach meter by comparing it with the air speed indicator readings converted to Mach numbers.

SECTION 6 i-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 6i

6i-3.1 The General Committee reviewed the material presented to it under Agenda Item 6i and made no comment.

SECTION 6 i-4: Statements by Delegations on the action taken on Agenda Item 6i6i-4.1 STATEMENT BY THE DELEGATION OF IFALPASeparation Minima

IFALPA appreciates the opportunity this Meeting has afforded for participation by our representatives in discussions of a subject of great importance and direct interest to pilot groups throughout the world. We are grateful not only for the readiness to include us in all stages of these discussions, but also for the genuine efforts which have been made to achieve necessary safety in a number of aspects of the vertical separation question. We believe continued effort on the part of all States may lead to improvements which fulfill necessary safety requirements.

As we have previously indicated, IFALPA remains in a state of deep concern in respect to the approach which this Meeting has adopted to the subject of separation minima generally and in respect of the resultant outcome.

We started out here with a problem - indeed, this problem was the primary reason for this ICAO Meeting being set up - as to how to cope with the increasing traffic in the NAT Region in such a way that this traffic, as it grows, is not exposed to mounting delays and other operational penalties which the present system engenders. The answer to this problem is simple - increase system capacity to accommodate the expected increase of traffic. One obvious way to do this is to reduce separation minima. We do not quarrel with this, although we have pointed out in our opening statement to this Meeting that there are other potentially fruitful areas with better safeguards which could repay exploration - schedule rationalization, for example, being also one that is most obvious. We do say, however, that the pressure of the requirement to increase capacity by means of reducing separation minima has resulted in decisions being made here without, in our opinion, adequate justification and which may compromise operational safety.

We are all concerned with safety and, indeed, the assurance of safety lays a heavy responsibility on all levels of the civil aviation spectrum, from the States who, through ICAO, frame the necessary regulations, down to the pilots who are licensed to be responsible for the safety of individual operations.

Now this Meeting has been manifestly divided on this basic question of safety. It has been said on the one hand that safety is implicit in any measure agreed upon within ICAO and that no State would apply separation minima which were not of themselves quite safe. On the other hand, we have heard it said that particular States, two of which happen to be the responsible authorities for air traffic service in the North Atlantic Region, are not satisfied that proposed reductions in the minima are safe at this time and that more evidence is needed to establish their safety beyond all reasonable doubt.

IFALPA is not convinced that the reduced minima now agreed have been shown to be safe beyond that reasonable doubt. There appears to be no sound basis of adequately monitored operational trial results to support the reduction of longitudinal separation to 15 minutes associated with the use of Mach techniques. This decision appears to us to be an arbitrary one which takes no account of such matters as lack of communications which now exist at certain times of the year, inadequate navigational capability, or the value of introducing station-keeping devices on the aircraft.

That this decision is one of expediency is made clear by the Report itself, wherein it is stated (at paragraph 6i-1.3.11) that, in view of the increase in North Atlantic traffic expected for the summer of 1965, it would be desirable to introduce the new longitudinal separation minima in the NAT Region as soon as possible. Expediency is no justification for precipitate action in the field of civil air operations.

Lateral separation is in much the same category and, in this case, IFALPA, like IANC, shares the view of Ireland and the United Kingdom that 90 n.m. separation will be unsafe unless a higher navigational standard than that now achieved is demonstrated.

"Accordion" certainly did not demonstrate it and we are at a complete loss to understand the interpretation placed upon the results of that exercise by some States. Large errors over 40 n.m. do occur and should be taken into account because these rare errors are the dangerous ones. They are the product of navigational capability and IFALPA considers that, with the navigational equipment now available, and with the diverse character of North Atlantic operations generally, no genuine assurance can be given that these dangerous errors will not continue.

The possible reduction of vertical separation worried us most of all originally but here we are to some extent encouraged by the attitude of this Meeting. We sincerely trust that, in this case, a genuine attempt is to be made to establish the safety of 1000 feet as a North Atlantic vertical minimum. We are, however, very doubtful that it will, using today's instrumentation, prove to be feasible. We gave our reasons for this view in our working paper number 84. There must be no question that expediencies will influence this matter as appears to be the case in the lateral and longitudinal considerations.

To summarize our views:

- First - If to increase capacity of the ATC system over the North Atlantic, a decision is made to decrease the separation between aircraft; and
- Secondly - If some of the Contracting States conclude that the standards proposed to accomplish this are unsafe; and

Thirdly - If this Meeting was determined that certain areas of reduced separation need further data for study as is indicated in paragraph 6i-1.3.4

then IFALPA must in the interest of continued safety earnestly request that a cautious approach be made - with full evaluation of data accumulated, under conditions brought out at this Meeting, prior to any final decision by ICAO which would authorize decreased separation. Our request would have an even greater note of urgency should ICAO contemplate authorizing reduced separation solely to accommodate a larger volume of traffic, without improvements in equipment which would assure safety of flight to the same degree we enjoy today.

6i-4.2 STATEMENT BY THE DELEGATION OF IANC

This statement must include a little background of our group in order for us to impress upon you the validity of our opinions. IANC is a technical group composed of 900 navigators representing 23 countries. These 900 navigators are in the majority men who have 20 to 25 years experience in the civil and military field. IANC is not a union of unions and union matters are not tolerated on our agendas. It would be difficult to find a group with more practical navigation experience and thus we feel that we can speak with authority on the subject of lateral separation. It is our opinion that with the combination of aids on the North Atlantic today an efficient and accurate job of navigation can be done. However to do this a proper technique must be adopted. While operation "Accordion" did much to attempt an evaluation of navigation accuracies it had some obvious short-comings. There were too many spaces left uncovered and there was a vast group of no data flights. Canada also has done much to assess 50 west accuracies, but again the vast portion of the North Atlantic is left uncovered. It must also be realized that most of these Canadian figures are obtained within VOR coverage. The United Kingdom have also done much work in the 10 west area but here again within good VOR coverage. We are sure that 10 west figures gathered south of Eire would produce a much higher standard deviation figure than those from Killard. The Loran A chain in South Western France, when operating on a 24-hour basis would do away with the above point. However even the 10 west figures within this VOR coverage produced several track deviations of more than 60 n.m., as recent as October last. In other words, we will have BLUNDERS and they cannot be ignored. It is impossible to group navigation on the North Atlantic into one category. There are poor performers, medium performers and good performers in navigation. It is the poor and medium that must be upgraded to the higher standard. In our WP/66 and its discussion paper we provided this Meeting with a set of figures that covered the lateral separation performance of one carrier. These data include every flight of the carrier during 1964. All blunders are included and the 2272 flights are analysed for the complete Atlantic crossing. These are not analysed by the navigator of the flight; they are a post flight analysis measured by one individual. Thus you have a complete and constant picture of track keeping by this carrier. Soon we hope to add to this figure another 5000 flights; when this is completed it will be published and sent to all interested parties. From our discussion paper it is evident that using a 7 sigma figure no problem would arise with a 90-mile lateral separation; it might be even

possible to consider 60 miles. However to do this it is evident to us that techniques must be more uniform than they have been in the past. It is certainly within the format of ICAO to legislate for this standardization of navigation technique. Even at this Meeting the Mach number technique is being adopted and the system laid down in order for all States to adhere to this new procedure. To sum up, it is IANC's opinion that before any reduction in lateral separation can be contemplated overall navigation capabilities must be improved. With the "Accordion" figures, the Canadian radar and UK radar figures plus our contribution, a best way of navigation can be determined. This best way must be sought out and utilized. Unless this high standard of technique is recommended and implemented, IANC cannot agree that 90 miles is a step in the right direction. In fact with the present performance it could be argued that the 120 miles should be increased.

61-4.3 STATEMENT BY THE DELEGATION OF THE UNITED KINGDOM

On the assumption that a sufficient increase in navigational accuracy was feasible and would be achieved, the Meeting has agreed that in certain CTAs in the Region the lateral separation between turbo-jet aircraft could be safely reduced immediately.

The United Kingdom is hopeful that the considerable increase in navigational accuracy which is necessary will be achieved soon. It is concerned however that the Meeting reached its decision to reduce lateral separation on the basis of an assumption, and considers that it would be unsafe to apply the reduction before the improvement in accuracy has been demonstrated to be sufficient.

Accordingly the United Kingdom welcomes Recommendations 6 i/1, 6 i/8 and 6 i/9 concerning continued work on the development of logical methods for the assessment of reductions in separation minima, the collection and evaluation of data to facilitate further reviews of the lateral separation minimum, and the refinement of navigational techniques by operators. It further notes that the revision of Regional Supplementary Procedures in accordance with established procedures cannot be completed before the latter part of 1965, and that in consequence no real benefit will be derived from the use of reduced lateral separation until the spring of 1966.

The United Kingdom hopes that States and operators will pursue urgently the measures referred to above so that the safety of the proposed reduction can be conclusively demonstrated during the coming year.

61-4.4 STATEMENT BY THE DELEGATION OF IRELAND

The Delegation of Ireland associates itself with the above Statement by the Delegation of the United Kingdom.

Agenda Item 6: Preparation of Amendments to the North Atlantic Plan
and Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 ii: Plan of Flight Information Regions

The short-term air route table, together with the statement of regionally agreed operational requirements established by the Policy and Programming Committee, as contained in the reports on Agenda Items 2 b) and 3, governed the consideration of Agenda Item 6 ii.

SECTION 6ii-1: ACTION BY THE NA COMMITTEE ON AGENDA ITEM 6 ii

Plan of Flight Information Regions

6ii-1.1 General

6ii-1.1.1 The Navigation and Air Traffic Services Committee agreed that consideration of this part of Agenda Item 6 was required in two steps. The first was to establish an agreed set of principles upon which the re-examination of the organization of the airspace in the NAT Region and the deployment of the associated air traffic services units should be based. The second step was to review the present situation against these principles and make changes as necessary to achieve better compliance with them whenever this was required.

6ii-1.1.2 This approach was chosen by the Committee because it was believed that with the network operation of HF RT facilities and the manner in which air traffic services are provided in the oceanic FIRs, boundary changes would have little or no effect on the cockpit workload since no special reports or communication checks have to be made due to the crossing of FIR boundaries and the region therefore, for all practical purposes, appears to the pilot as a single FIR. Accordingly, it was believed that at least this aspect of the question of organization of the airspace would not have to be considered when developing the basic principles set out below.

6ii-1.2 Basic Principles for Determination of the Airspace Organization in the
NAT Region

6ii-1.2.1 When establishing the basic principles set out below the Committee took into account the basic operational requirements contained in the report on Agenda Item 3 and all applicable Standards and Recommended Practices and Procedures for Air Navigation Services related to this subject. It was nevertheless believed that

it would be useful to reaffirm or amplify some of these basic operational requirements under this heading, together with any new principles which were developed by the Committee, in order to present all relevant factors having an influence on the organization of the airspace in the NAT Region in a consolidated manner. It should, however, be noted that the principles themselves are not presented in any order of priority, nor has any of them an over-riding importance over any of the others.

6ii-1.2.2 Lateral Division of the Airspace in the NAT Region

Principle: The airspace should be divided into the practical minimum number of FIRs.

This requirement is dictated essentially by the question of practicability since very large FIRs, desirable as they may be from a theoretical point of view, may not be practicable because of difficulties caused in the field of communication etc., which could only be overcome at considerable expense. It was, however, agreed that the main flow of air traffic operating in the "principal area" of the NAT Region should not normally be required to traverse more than two oceanic FIRs so as to reduce the requirement for coordination between ACCs to the minimum degree.

Note.- This principle is subject to considerations contained in paragraph 6ii-1.3.1 below.

6ii-1.2.3 Vertical Division of the Airspace in the NAT Region

Principle: The division of the airspace should take account of the different types of traffic operating at various levels.

The present FIR boundaries in the NAT Region were largely established at a time when traffic was still evenly spread throughout the whole range of the usable cruising levels and boundaries were therefore extending vertically throughout all levels. This original vertical distribution of air traffic does, however, no longer exist and there are marked differences in the types of operation at different levels which should be catered for in the vertical division of the airspace wherever this was found to be necessary. Therefore, in considering changes to FIR boundaries, the possible advantages of establishing different boundaries at different levels in the appropriate areas should not be overlooked. In addition it might also be advantageous to consider the retention or establishment of either "domestic FIRs" or "domestic control areas" to cater for specific local requirements.

6ii-1.2.4 Civil-Military Coordination in the NAT Region

Principle: The organization of the airspace and the deployment of air traffic services units should permit efficient civil-military coordination.

Although ICAO is concerned only with civil aircraft, operations conducted by State aircraft in the NAT Region should also be taken into consideration in the organization of the airspace and the deployment of the associated air traffic services units in order to permit efficient civil-military coordination, thereby catering for all users, be they civil or military.

6ii-1.2.5 Establishment of FIR Boundaries in the Transition Area between Oceanic and Continental FIRs

Principle: Boundaries between oceanic and continental FIRs should be defined so as to minimize difficulties in the transition of aircraft between these two types of airspace.

Boundaries between oceanic and continental FIRs should be critically examined since they represent the division between two different ATS environments and constitute not simply the demarkation of areas of responsibility of adjacent ATS units. One of the most difficult problems connected with North Atlantic operations is to effect the transition of aircraft between continental and oceanic FIRs as long as there exist differences in the procedures to be applied in these two types of FIRs. At the present time, ATC experiences considerable difficulties in feeding air traffic from the oceanic airspace into the continental ATS route system and vice versa, particularly during peak periods of operations. It is therefore necessary to use every facility available to ATS units and the airspace users to facilitate this transition and to establish the FIR boundaries in this critical area in such a way that optimum use can be made of those facilities. As this problem is most acute in those areas where the main flow of oceanic traffic joins high density continental areas, it was believed necessary to establish for this case the following secondary principles:

- i) the FIR boundary should be established within effective cover of direct pilot-controller VHF radiotelephony communications;
- ii) the boundary should be established within effective cover of any radar facility available to the ACC providing air traffic services to continental traffic;
- iii) the boundary should be established within effective cover of continental short range radio navigation aids;
- iv) the boundary should be established at a sufficient distance from the coast to permit aircraft to reach the assigned oceanic cruising level within continental airspace, so as to be in cruising flight upon entry into the oceanic airspace.

6ii-1.2.6 Alignment of FIR Boundaries in Relation to the Traffic Flow

Principle: FIR boundaries should be delineated with due regard to the main flow of air traffic.

In furtherance of this principle, FIR boundaries should be established in accordance with the following:

- i) when the boundary between two FIRs extends parallel to the direction of a major traffic flow, it should, as far as practicable, be established so that the flow pattern is included in one FIR only. If this is not possible, it should be established at least so as to minimize the coordination requirement between the ACCs providing ATS in the FIRs having the common boundary;
- ii) when the boundary between two FIRs extends across the direction of a major traffic flow it should, as far as practicable, be established at right angles to the principal direction of this traffic flow;
- iii) the boundary between two FIRs should, as far as practicable, be coincident with designated reporting lines;
- iv) FIR boundaries should be delineated with due regard to the normal traffic flow in such a way as to minimize the number of times a flight must cross them. Such boundaries should be specified as either great circles or rhumb lines which should maintain direction for as long as practicable.

In discussing principle iv) above, the Committee noted that there existed a tendency to have boundaries established between FIRs in the polar areas converge on the North Pole. This created a situation whereby aircraft operating close to the Pole were subject to repeated transfers of responsibility between adjacent FIRs/ACCs at comparatively short intervals. This was believed to increase the workload, both in the cockpit and on the ground, needlessly and it was therefore agreed that such a practice should be avoided. However, since this problem was limited in extent and affected only a limited number of the total operations in the area in question, it was agreed that this subject should not be made the matter of a principle.

6ii-1.2.7 Responsibility for the Provision of ATS in an oceanic FIR

Principle: There should be only one Oceanic Control Centre serving each FIR

6ii-1.2.8 Communications for ATS

Principle: Adequate air-ground communication facilities for the provision of air traffic services throughout its FIR must be available to each Oceanic FIC/ACC.

This essential requirement is one of the major factors which should be taken into account in determining the location of FICs/ACCs. In those cases where direct pilot-controller radiotelephony communications cannot be provided throughout the entire FIR, adequate air-ground communication stations should be established to act as relay between the controller and the pilot and the FIC/ACC should be so located, and equipped with communication links to such stations, as to cause the least possible delay to the exchange of information between ground services and the pilot.

6ii-1.2.9 Coverage of Air-Ground Communication Facilities

Principle: Area Control Centres serving oceanic FIRs contiguous with major North Atlantic traffic-generating areas should have air-ground communications facilities for contact with ocean-bound traffic well before entry into the oceanic FIR.

Experience has shown this facility to be invaluable to both ATC and operators for the in-flight negotiation of OAC clearances well in advance of entry into the oceanic FIR. It is emphasized that throughout its flight in continental airspace the ocean-bound aircraft remains in contact with and under the control of the appropriate continental ACC and that adjustments to its flight path to achieve the correct position and level for entry into the oceanic FIR are made under the instructions of that Centre, which will be coordinating with the Oceanic Control Centre.

6ii-1.3 Application of Basic Principles

6ii-1.3.1 When applying the basic principles contained in paragraph 6ii-1.2, it should be considered that changes to existing FIR boundaries and/or the location of ATS units should only be made if:

- i) this will result in a significantly better service to the users, or
- ii) this will provide worthwhile economies in the cost of ground services. Such economies should, however, be realized without detriment to the operational efficiency of these services.

Any change to the organization of the airspace or the location of ATS units, whether or not based on the principles contained in paragraph 6ii-1.2, will therefore not be justified if it does not lead to operational or economic benefits. However, anticipated initial difficulties resulting from a change should not prevent the change being made if it is clearly justified.

6ii-1.4 Development of the Airspace Organization

6ii-1.4.1 The Committee agreed that any phased plan for the better organization of the airspace and of the associated ATS units should be flexible and at the same time provide for an orderly progression towards a long-term objective. This was believed to be essential since the pattern of development of North Atlantic operations may vary geographically and also because the development and the degree of implementation of facilities and services may not be the same throughout the area in question and neither may be wholly predictable. Any contemplated changes should therefore be carefully planned to ensure that immediate changes do not prejudice subsequent developments nor involve unnecessary expenditure.

6ii-1.4.2 It was further agreed that there was a need for periodic reviews of the airspace organization in the Region based on the principles established in paragraph 6ii-1.2. Such reviews should, inter alia, also take into account technological advances in the provision of air traffic control and in communications, such as the introduction of automatic data processing and data transfer equipment, in order to determine the extent to which such technical improvements might lead to the consolidation of FIRs and/or changes to FIR boundaries.

6ii-1.5 Review of the Present Plan of FIRs

6ii-1.5.1 When reviewing the present plan of FIRs in the NAT Region, the Committee noted that there were five specific problems which needed examination. These were:

- i) the problems raised by the establishment of east/west FIR boundaries along full degrees of latitude;
- ii) the feasibility of incorporating the Reykjavik FIR in the Shanwick FIR;
- iii) the problems at the boundary between Shanwick and London and Paris FIRs at 08°W and south of Ireland;
- iv) the desirability of establishing an ATS route from Nantucket via Sable Island to 46°N 50°W and the consequential realignment of the boundaries of FIRs traversed by this route;
- v) the developments in the Polar area.

6ii-1.5.2 The Committee noted that some FIR boundaries had been established along whole degrees of latitude (mainly between Lisboa Oceanic and Shanwick and Gander FIRs, between New York Oceanic and Gander FIRs, and between Shanwick and Reykjavik FIRs). As flight planning and position reporting was generally done with reference to full degrees of latitude the question arose whether this situation, which could result in aircraft "riding an FIR border" for appreciable portions of their flight, had not resulted or could not be expected to result in difficulties, at least as far as pilots were concerned. After a detailed discussion in which different points of view were expressed, it was finally decided that any change of these boundaries to a position where they would extend along lines defined by fractions of degrees of latitude was not thought feasible. This decision was based on the fact that, while such a change might clarify the question of responsibility of the ATS unit on the ground for the pilot, it did not relieve the ATS units whose area of responsibility was separated by this boundary from the obligation to coordinate all flights operating within a value defined by the lateral separation criteria applied in the NAT Region. (At present 2° of latitude either side of the boundary.) This coordination was at present carried out in a satisfactory manner and the change would not result in any better service nor would it affect the efficiency of the air traffic services. Any concern likely to exist among operators could however just as well be alleviated by the development of appropriate regional supplementary procedures covering this specific problem. It was therefore agreed that no action should be taken on this matter under this Agenda Item but that this problem should be reviewed again under Agenda Item 6 iii).

6ii-1.5.3 Recommendation 14/3 of the Fourth NAT RAN Meeting called for a study of the possibility of extending the Shanwick FIR northwards to incorporate part or the whole of Reykjavik FIR. The Committee noted that a detailed study of this matter by the United Kingdom and Iceland had revealed that any immediate change of the present situation was not justified. Since the implementation of the SCOTICE cable, the problem of inter-centre coordination which previously existed had become negligible. Furthermore, no reduction in cockpit workload would result from such boundary change. On the other hand, the VHF air-ground communications cover available to Reykjavik ACC in an area extending roughly from 10° to 30° W and southward to about 61° N could only be realized for Shanwick ACC at a cost. In addition, it appeared doubtful whether the necessary civil/military coordination required in the southern part of the Reykjavik FIR could effectively be provided by Shanwick ACC. In view of this situation the Committee agreed that this matter should not be pursued further at this time.

6ii-1.5.4 The attention of the Committee was drawn to a recurring problem in the area around 08° W, south of the Shannon FIR. The problem was caused by the necessity for oceanic flights to effect a flight level change in the uncontrolled airspace immediately east of 08° W. The use of opposite direction levels over the oceanic area aggravated the problem in the case of eastbound aircraft. The

Meeting noted that aircraft routing to and from the ocean through the Shannon FIR effected the necessary level changes in the controlled airspace of the Shannon FIR. Ireland felt that an acceptable solution could be provided by extending the upper airspace of the Shannon FIR southwards to 4850N, at which point the southern boundary of the London FIR joined 08° W. It was also pointed out that these difficulties might be eased by appropriate airspace designation changes in the London FIR. In the course of the discussion it was mentioned that there existed other considerations in this general area which tended to complicate the situation and which might not be resolved by the application of either of the above proposals. It was also indicated that EUROCONTROL was already studying the matter with a view to reaching an early solution. The Committee only therefore indicated its belief that the proposal for the extension of the Shannon CTA to the south in the upper airspace deserved careful consideration taking account of the relevant principles established by the Committee (other matters being beyond its competence) and stressed the requirement for a rapid solution of the present unsatisfactory situation.

RECOMMENDATION 6ii/1: STUDY OF THE ATS PROBLEMS IN THE SHANWICK FIR SOUTH OF IRELAND IN THE VICINITY OF 08° W

That France, Ireland and the United Kingdom continue as a matter of urgency the study of the ATS problems encountered by North Atlantic flights in the upper airspace around 08° W south of Ireland with a view to presenting to ICAO, as early as possible, proposals for the action necessary to resolve the present situation.

6ii-1.5.5 The Committee noted that when plotting minimum time tracks between New York and European terminals it had frequently been found that a routing extending from Nantucket via Sable Island to 4600N 5000W would best accommodate aircraft. A route covering this itinerary does not however at present exist and its establishment will require changes to the boundaries of a number of domestic FIRs of Canada and the United States as well as to the New York Oceanic FIR. It was noted that discussions on this subject were already in progress and it was therefore agreed that Canada and the United States should be requested to continue their studies and report to ICAO as soon as any results had become available.

RECOMMENDATION 6ii/2: PROVISION OF AN ATS ROUTE FROM NANTUCKET TO 4600N 5000W

That Canada and the United States continue joint studies with a view to establishing a controlled ATS route from Nantucket via Sable Island to 4600N 5000W and that the results of these studies, together with appropriate proposals for amendment of the NAT Regional Plan, be submitted to ICAO as soon as possible.

6ii-1.5.6 The Committee noted that Canada and the United States had recently taken action in pursuance of Recommendation 14/4 of the Fourth NAT RAN Meeting to provide ATS services to North Atlantic flights operating on Polar routes between Northern Europe and Alaska by the establishment of the Goose UIR (in the case of Canada) and Fairbanks FIR (in the case of the United States). The possible need to rearrange the boundaries of these FIRs in the vicinity of the North Pole in order to better accommodate the requirements of aircraft was recognized, but the matter was not pursued at this time since insufficient operational experience had as yet been gained with the existing arrangements. It was suggested, however, that both Canada and the United States should keep developments in this area under review with the object of making such adjustments to the FIRs concerned as were found necessary in the light of practical operating experience. In addition it was noted that the southern boundary of Fairbanks FIR was not completely contiguous with the northern boundary of domestic FIRs in that part of the United States and it was therefore suggested that the United States should correct this abnormal situation.

RECOMMENDATION 6ii/3: REVIEW OF EXISTING BOUNDARIES OF GOOSE UIR AND FAIRBANKS FIR

That Canada and the United States review the existing boundaries of the Goose UIR and the Fairbanks FIR and, in the light of operational experience gained, notify ICAO of any adjustments of these boundaries that are found necessary to best meet the needs of aircraft operations on the Polar routes between Northern Europe and Alaska.

6ii-1.5.7 The Committee noted the intention of Iceland to increase the upper limit of the domestic sector of the Reykjavik CTA from the present FL 290 to "unlimited". Iceland explained that this was intended solely to better accommodate arriving, departing and overflying traffic over Iceland by making it possible to apply the reduced separation minima used in this domestic sector of the CTA also to high-flying aircraft.

SECTION 6 ii-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6 ii

6 ii-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6 ii and made no comment.

SECTION 6ii-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6ii

6ii-3.1 The General Committee reviewed the material presented to it under Agenda Item 6ii and made no comment.

Agenda Item 6: Preparation of Amendments to the North Atlantic Plan and Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 iii): Air Traffic Services Procedures and Facilities

The short-term air route table, together with the statement of regionally agreed operational requirements established by the Policy and Programming Committee, as contained in the Report on Agenda Item 2 b) and in paragraphs 1, 5 and 8.2 of the Report on Agenda Item 3 a), governed the consideration of Agenda Item 6 iii).

SECTION 6 iii-1: ACTION BY THE NA COMMITTEE ON AGENDA ITEM 6 iii

Air Traffic Services Procedures and Facilities

6iii-1.1 Regional Supplementary Procedures

General

6iii-1.1.1 The Committee reviewed the existing RAC Supplementary Procedures with a view to modifying or amplifying them as necessary in order to reflect decisions taken by the Committee under Agenda Items 6i, 6ii and 6iv and to cater for any additional new or changed requirements arising out of operational experience gained since the Fourth NAT RAN Meeting and not covered by the applicable Annexes and PANS.

Procedures regarding reduced vertical separation and cruising levels

6iii-1.1.2 The Committee was informed that Amendment 6 to Annex 2, Amendment 15 to Annex 11 and Amendment 7 to the Seventh Edition of the PANS-RAC, which were before the Council for adoption or approval, as appropriate, and contained exception clauses permitting a reduction in vertical separation above FL 290 on the basis of regional air navigation agreements, were recommended for application on 1 December 1965.

6iii-1.1.3 In the light of its decisions regarding vertical separation minima under Agenda Item 6 i) (paragraphs 6i-1.2 to 6i-1.2.16), the Committee considered the desirability of formulating, at this time, appropriate texts for the regional supplementary procedures required to cover a reduction of such minima, with the object of submitting such texts to the Council for approval on the understanding that, inter alia, the date of applicability remained to be decided at the Special meeting of NAT States proposed in Recommendation 6 i/6. The Committee saw some advantage in this approach, since this might make it possible, should the Special NAT Meeting mentioned decide upon a reduction of vertical separation, to implement such decision more quickly.

6iii-1.1.4 Accordingly, the recommendations of the Committee for supplementary procedures on this subject are incorporated in Recommendation 6iii/2.

Procedures relating to the use of organized track systems

6iii-1.1.5 The need for Regional Supplementary procedures relating to the application of ATC organized track systems was discussed at length. The Committee noted that, since 1961, a track system had been organized and applied by Gander and Shanwick Oceanic ACCs in the "principal area" of the NAT Region, whenever necessary to expedite traffic during peak periods, and that the system had proved invaluable as a means of coping with the main east-west traffic flow. In the light of operational experience, it was considered necessary to include more detailed operating procedures associated with the use of the system.

6iii-1.1.6 The Committee emphasized that, because of the inherent flexibility in the air traffic control system and the need to avoid penalizing operators unnecessarily, aircraft would continue to specify in their flight plans their preferred tracks. There was no requirement for basic flight planning along any of the tracks organized by ATC, since these tracks were intended to be used only during periods of the day when the volume of traffic made it impossible to control a random flow of aircraft in an efficient manner.

6iii-1.1.7 It was considered essential, however, that operators provide, or continue to provide, the oceanic ACCs concerned with information regarding operations planned and tracks intended to be requested during the peak periods, so as to permit the ACCs to establish organized track systems that would, if required to be used, impose minimum penalties on the operators. The stated requirement was that this information be received by the ACCs applying organized track systems as early as possible, so that information regarding the tracks established could be disseminated three hours in advance of the beginning of each anticipated peak period via the AFTN or any available ground-to-air communication channels. Any subsequent change made to the track structure should be notified to the operator as soon as practicable.

6iii-1.1.8 The Committee agreed that these matters should be covered by appropriate supplementary procedures.

6iii-1.1.9 The possibility of assigning coded designators to the ATC organized tracks was discussed briefly. The Committee agreed that a simple form of coding might be used to identify the first set of tracks established for a given day. However, in order to avoid possible misunderstandings as to the routing referred to, coded designators should not be used to identify subsequent modifications of these tracks. Also, it was agreed that, if coded designators were used in clearances given to aircraft, the pilot must be required to identify, in his read-back of the clearance, the coordinates of the positions defining the cleared route. However, no supplementary procedure to cover this point seemed necessary at the present stage.

6iii-1.1.10 The Committee considered a number of other measures that could be taken to improve the application of ATC organized track systems. It was agreed that these measures should not be made the subject of regionally agreed procedures at the present stage but should be identified and given continued attention as part of the systems planning, coordination and evaluation exercises that would take place following this Meeting. The matters identified in this connection were as follows:

- a) Upon receipt of information regarding the established ATC track structure, operators should, wherever practicable, develop sufficient data on time and fuel variations obtaining with different available tracks and levels, in anticipation of possible deviations from the filed flight plan. This information should be provided to pilots before departure to assist them in making prompt decisions on the acceptability of clearances subsequently issued by oceanic ACCs.
- b) ATC estimates, calculated by the oceanic ACC controlling the entry of traffic into the oceanic airspace and updated as necessary, would be acceptable as a basis for the planning of separation by all ACCs concerned. The transmission of such estimates to operators and pilots would provide them with a useful supplement to their own calculations. The Committee recognized, however, that the systematic dissemination of ATC calculated estimates to aircraft in flight and to operators would only be feasible if some form of automatic communication links were introduced. Likewise, continuous updating of the estimates on the basis of current meteorological information would only be practicable with the assistance of automatic data processing equipment.
- c) The method of determining datum line(s) and organized track structures for the day could be improved. Substantial improvements, however, would appear to depend on the longer-term application of ATC computers to the problem.
- d) The problem of changing the datum line(s) and/or notified track structure during a peak traffic flow is a difficult one, but the possibility that this problem may be solved, should not be overlooked. Every effort should be made towards developing a method or methods whereby modifications to datum line(s) and track structure can be made in accordance with the most recent meteorological information received and with the aid of automatic equipment and techniques.

- e) Particular attention must be given to the problem of clearing aircraft on converging tracks through the ATC track structure. The Committee noted that, in the present ATC environment, some crossing flights were heavily penalized by extensive re-routings or large level changes because of the difficulty in providing a slot in the main east-west flow of traffic that would permit crossing along or close to the preferred flight path. It was recognized that there was no simple solution to this problem, but it was believed essential that efforts to achieve a solution be intensified. In the longer-term, automatic conflict prediction and resolution could assist in a reduction of the problem.

RECOMMENDATION 6 iii/1 - FLIGHTS CROSSING THE MAIN FLOW OF TRAFFIC IN THE PRINCIPAL AREA

That States concerned, in consultation with operators, intensify their efforts to achieve a solution to the problem of clearing flights across the main east-west flow of traffic in the principal area so as to ensure that such flights are not unduly penalized by extensive re-routings and/or large level changes.

Procedures regarding the specification of planned track

6iii-1.1.11 The Committee examined a proposal submitted by Ireland and the United Kingdom for amendment of the existing procedures regarding the specification of planned track in flight plans. This proposal formed part of an amendment proposal which had been circulated to NAT States in 1964 and which, due to certain objections raised, had been referred by the Air Navigation Commission to this Meeting for consideration.

6iii-1.1.12 The Committee was informed that the objections previously expressed had been withdrawn in the light of actual operational experience. It was agreed, therefore, that only minor changes needed to be made to the proposed amendment to reflect conclusions reached under Agenda Items 6 i) and 6 ii) regarding the use of 90 nautical miles lateral separation south of 70° N and the need to clearly define boundaries and ATS routes either as great circles or rhumb lines.

Position reporting procedures

6iii-1.1.13 The Committee had before it a proposal submitted by Ireland and the United Kingdom for amendment of the existing procedures regarding the time and content of position reports. This proposal formed part of the amendment proposal mentioned in paragraph 6iii-1.1.11 which had been referred to this Meeting by the Air Navigation Commission.

6iii-1.1.14 Note was taken that the objections previously made to the proposal had been withdrawn also in respect of the position reporting procedures. The Committee agreed, therefore, to accept the proposal subject to such changes as were necessary to reflect the decisions of the Committee under Agenda Item 6 iv).

6iii-1.1.15 The Committee further agreed that, in order to facilitate inter-centre coordination, a new procedure should be introduced to the effect that flights operating in an oceanic control area at a distance of 60 nautical miles or less from the boundary of an adjacent oceanic FIR, should transmit a single position report but should address the position report to both the oceanic centres concerned. (See paragraph 6iii-1.1.16 regarding position reporting by flights operating through successive points on an FIR boundary).

Special procedures relating to flights along the northern or southern boundaries of Gander and Shanwick Oceanic FIRs

6iii-1.1.16 When considering Agenda Item 6 ii), the Committee recognized that special procedures were required to cater for flights planned to operate, or operating, through successive points situated on the northern and southern boundaries of the Gander and Shanwick Oceanic FIRs. It was agreed that the tracks of such flights should be regarded as lying within the Gander and Shanwick Oceanic FIRs respectively and that the Gander and Shanwick Oceanic ACCs should therefore be responsible for the provision of air traffic control service to such flights. The Committee agreed that appropriate procedures should be formulated to reflect this decision.

6iii-1.1.17 The Committee noted, in this context, that the above procedure would not obviate the need for close inter-centre coordination in respect of the flights concerned but would clarify the situation for pilots as well as for the ACCs concerned.

Issuance of clearances to long-distance flights

6iii-1.1.18 Attention of the Committee was invited to the problems confronting pilots approaching the entry point into oceanic airspace and receiving a re-clearance in route or level or both, without adequate time to prepare for the change in flight plan and to assess its effects in terms of fuel requirements.

6iii-1.1.19 It was emphasized that any re-clearance must be issued as early as possible and preferably not later than 20 minutes before the estimated time of crossing the boundary. On the other hand, it was stated that the ATC authorities concerned were fully aware of the problem and that, in so far as the eastern side of the Atlantic was concerned, the difficulty was one of communication and existed mainly in the area south of 51° N.

6iii-1.1.20 The Committee agreed that there was a lack of communication facilities, rather than a lack of adequate procedures, and that the matter could best be solved by the States concerned in consultation with the operators.

Information to pilots regarding runway conditions

6iii-1.1.21 The Committee noted that the Policy and Programming Committee had recognized an operational requirement for information on prevailing runway conditions at regular and alternate aerodromes to be available for transmission to pilots on request immediately prior to starting descent for landing.*

6iii-1.1.22 It was recognized that whilst the existing PANS-RAC provisions were quite specific with regard to the provision of such information by aerodrome control towers, there were no equivalent procedures applicable to approach control offices and area control centres. The Committee agreed, therefore, to formulate a supplementary procedure to cover this matter.

6iii-1.1.23 In the light of the foregoing considerations and conclusions, the Committee framed the following recommendation:

RECOMMENDATION 6 iii/2 - AMENDMENT TO THE RAC SUPPLEMENTARY PROCEDURES

That the Regional Supplementary Procedures (Doc 7030), Part 2, be amended as follows:

1) AMEND 2.1.1 c) TO READ:

"2.1.1 c) for turbo-jet aircraft operating within the airspace and under the conditions specified in para. 4.1, cruising levels appropriate to the following table:

MAGNETIC TRACK	
From 000° to 179°	From 180° to 359°
Odd flight levels up to and including FL 450; thereafter FL 490 FL 530 FL 570 etc.	Even flight levels up to and including FL 440; thereafter FL 470 FL 510 FL 550 etc.

Not for immediate implementation. See para 6iii-1.1.3 regarding applicability date.

* See comments by the PP Committee, Section 6iii-2, paragraphe 6iii-2.2 and 6iii-2.3.

- otherwise, odd flight levels for east-bound flights and even flight levels for west-bound flights up to FL 290; above FL 290, flight levels 330, 370, 410 etc., for east-bound flights, and flight levels 310, 350, 390 etc., for west-bound flights.

Note 1.- This procedure does not apply within Bodø Oceanic Control Area.

Note 2.- The lowest usable flight level is flight level 60.

Note 3.- For the purpose of this procedure, aircraft flying north of 70° N on polar routes from Europe to North America are considered to be west-bound and aircraft flying from North America to Europe are considered to be east-bound."

[This procedure would not be necessary when Amendment 8 to Annex 2 is approved comprising the amendment proposed for Appendix C to the said Annex.]

2) REPLACE existing para 3.1.1.d) and associated Note BY THE FOLLOWING:

- "3.1.1 d) Twenty (20) minutes for turbo-jet aircraft operating within the Gander Oceanic, Lisboa Oceanic, New York Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N) control areas, except as provided in 3.1.2 or when States concerned agree that by virtue of the navigation aids available within specified portions of the airspace, the requirements of PANS-RAC may apply;
- 3.1.1 e) twenty (20) minutes for other than turbo-jet aircraft ~~operating~~ within the New York Oceanic control area on routes between the United States, Canada or Bermuda and Caribbean terminals, or between the United States or Canada and Bermuda;
- 3.1.1 f) thirty (30) minutes for flights not covered by the provisions of 3.1.1 d) or e) or 3.1.2."

- 3) RENUMBER para 3.1.1.1 as para. 3.1.2 and AMEND TO READ:

"3.1.2 For turbo-jet aircraft operating within the Gander Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N) control areas fifteen (15) minutes separation may be applied provided that the aircraft concerned have reported over the same entry point into the oceanic controlled airspace and

- i) follow the same track; or
- i) follow continuously diverging tracks until another form of separation is established."

- 4) INSERT a new para 3.2.1 TO READ:

"3.2.1 Area control centres shall provide a minimum lateral separation of 90 nautical miles between the tracks of turbo-jet aircraft operating within the Gander Oceanic, Lisboa Oceanic, New York Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N) control areas."

- 5) INSERT a new para 3.2.2 TO READ:

"3.2.2 Area control centres shall provide a minimum lateral separation of 120 nautical miles between the tracks of aircraft not covered by 3.2.1."

- 6) RENUMBER existing para 3.2.1 as 3.2.3 and DELETE "NAT" from this paragraph.

- 7) INSERT a new Section 4 TO READ as follows:

"4. VERTICAL SEPARATION

4.1 Special Application of Vertical Separation (A 2-Appendix C, P-Part III-3)

4.1.1 A minimum vertical separation of 1000 feet shall be applied between qualified aircraft operating at flight levels 290 to 450 within the CTAs Gander Oceanic, Lisboa Oceanic, New York Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N).

Note - The term "qualified aircraft" means aircraft that are equipped with Type II or better altimeters, which are corrected either by a correction device or a correction card, and with automatic pilots including an altitude hold device (height-lock), all of which have been installed, calibrated and maintained in accordance with specifications developed by the States of registry on the basis of recommendations of the Special NAT Meeting, 1965.

- 4.1.2 The phrase "UNA 1000" shall be inserted in Item I of the flight plan for any aircraft intended to be operated within the airspace specified in 4.1.1 but which is not qualified for the application of 1000 feet vertical separation.
- 4.1.3 In the event that an aircraft in flight within the airspace specified in 4.1.1 and being provided with 1000 feet vertical separation is unable to maintain the assigned flight level within a tolerance of ± 250 feet, the appropriate air traffic control unit shall be informed immediately. Likewise, the appropriate air traffic control unit shall be informed when the aircraft is again able to maintain the assigned flight level within the prescribed tolerance."

[Not for immediate implementation. See para 6iii-1.1.3 regarding applicability date.]

3) RENUMBER paras 4 to 13 accordingly

2) INSERT a new para 6.1.1 TO READ

"6.1.1 Flight plans for flights or portions thereof conducted in the NAT Region shall be made in accordance with the following:-

6.1.1.1 Traffic operating south of 70° N

i) For flights operating south of 70° N and whose flight path is generally oriented in an east-west direction, the planned track shall normally be defined by significant points formed by the intersection of half or whole degrees of latitude with meridians spaced at intervals of 10° from the Greenwich Meridian to longitude 70° W.

ii) For flights operating south of 70° N and whose flight path is generally oriented in a north-south direction, the planned track shall normally be defined by significant points formed by the intersection of whole degrees of longitude with specified parallels of latitude which are spaced at intervals of 5°.

iii) All flights shall be operated on a great circle track joining successive significant points.

6.1.1.2 Traffic operating north of 70° N

For flights operating north of 70° N, the planned track shall normally be defined by significant points formed by the intersection of parallels of latitude expressed in degrees and minutes with meridians expressed in whole degrees of longitude. The distance between significant points shall, as far as possible, correspond to one hour's flight time, commencing from the point of entry into the NAT region north of 70° N, or from the crossing of that parallel.

6.1.1.3 Indication of significant points

Significant points shall be indicated by whole or half degrees of latitude and whole degrees of longitude, except that for flights operating north of 70° N the latitude shall be indicated in degrees and minutes."

10) RENUMBER existing para 5.1.1 as 6.1.2 and AMEND TO READ:

"6.1.2 For flights departing from points within adjacent regions and entering the NAT Region without intermediate stops, the total estimated elapsed time to the point of entry into the NAT Region or such other point as specified by the area control centre concerned, shall be included in Item I of the flight plan."

11) RENUMBER existing para 5.1.2 as 6.1.5 and INSERT a new para 6.1.3. TO READ:

"6.1.3 For turbo-jet aircraft intending to operate within Gander Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70°N) control areas for any portion of their planned flight, the planned Mach number for portions of the route within the NAT Region shall be specified in Item E of the flight plan immediately following the TAS for the same route portions. The TAS and the Mach number shall be separated by an oblique stroke."

- 12) INSERT a new para 5.1.4 TO READ:

"6.1.4 For turbo-jet aircraft intending to operate within that part of the NAT Region described in 3.1.1 d), a request for a flight level other than that appropriate to its direction of flight may be included in Item of the flight plan."

- 13) INSERT a new para 6.4 TO READ:

"6.4 Adherence to ATC approved Mach Number

6.4.1 Turbo-jet aircraft operating within that part of the NAT Region described in 3.1.1 d) shall adhere to the Mach number approved by ATC within a tolerance of ± 0.01 and shall request ATC approval before making any change thereto. If essential to make an immediate temporary change in the Mach number, (e.g. due to turbulence), ATC shall be notified as soon as possible that such a change has been made.

Note.- For flights operating within the New York Oceanic or Lisboa Oceanic control areas this procedure only applies if the flight will subsequently enter the Gander or Shanwick Oceanic FIRs."

- 14) RELOCATE paras 9.1 to 9.1.1.2 as new paras 6.5 to 6.5.1.2 respectively and RENUMBER subsequent paragraphs.

- 15) INSERT a new para 6.7.3 TO READ

"6.7.3 The ATC approved Mach number shall be included in each clearance given to turbo-jet aircraft operating within that part of the NAT Region described in 3.1.1 d).

Note.- For flights operating within the New York Oceanic or Lisboa Oceanic control areas this procedure only applies if the flight will subsequently enter the Gander or Shanwick Oceanic FIRs."

- 16) DELETE existing paras 5.6 and 5.6.1 IN TOTO and SUBSTITUTE IN LIEU THEREOF

"6.8 Application of organized track system

6.8.1 When necessary, in order to permit the optimum use of the airspace, the area control centres serving Gander and Shanwick FIRs may, subject to appropriate coordination, apply an organized track system. In order to make optimum use of this system the following procedures shall be applied:

6.8.1.1 Operators conducting scheduled or non-scheduled flight operations within Gander and Shanwick Oceanic CTAs shall provide information to the oceanic area control centres concerned regarding the tracks likely to be requested by turbo-jet aircraft during the peak traffic periods. Such information shall be provided as far in advance of the anticipated peak periods as practicable or at such time(s) as have been specified in appropriate aeronautical information publications. Messages containing the information shall be addressed to Gander and Shanwick Oceanic ACCs.

6.8.1.2 The area control centres concerned shall, when applicable, disseminate to operators information regarding the ATC tracks established, together with such other information as may be considered useful by the operator for correct assessment of the track system. Such information shall be disseminated three hours in advance of each anticipated peak period. Any subsequent change made to the track structure shall be notified to the operator as soon as practicable."

- 17) INSERT a new para 6.10 TO READ:

"6.10 Special procedures for flights along the northern or southern boundaries of Gander and Shanwick Oceanic FIRs

6.10.1 Aircraft operating along tracks through successive points situated on the northern or southern boundaries of Gander and Shanwick Oceanic FIRs shall be provided with air traffic services by Gander or Shanwick ACC as appropriate. Flight plans for such flights shall therefore be addressed to these ACCs and in addition to the ACC of the FIR sharing the common boundary with Gander or Shanwick Oceanic FIRs.

- 18) DELETE existing paras 6.2.2 to 6.2.2.3 IN TOTO and SUBSTITUTE IN LIEU THEREOF

"7.2.2 Unless otherwise required by ATS, position reports shall be made at the significant points listed in the flight plan, except that for turbo-jet flights operating south of 70° N full position reports are only required at significant points located at 20° W and 40° W. At all other significant points an abbreviated report only is required (see para 7.2.5.3).

7.2.2.1 ATS may require any flight operating south of 70° N and generally in an east-west direction to report its position at any of the intermediate meridians spaced at intervals of 10° of longitude between 5° W and 65° W when deemed necessary.

7.2.2.2 ATS may require any flight operating generally in a north-south direction to report its position at any intermediate parallel of latitude when deemed necessary.

7.2.2.3 In requiring aircraft to report their position at intermediate intervals, the ATS authorities will be guided by the requirement to have position information at approximately hourly intervals and also by the need to cater for varying types of aircraft and for varying traffic and meteorological conditions."

- 19) RENUMBER para 6.2.3.1 as 7.2.3.1 and AMEND TO READ

"7.2.3.1 A position report shall be transmitted at the time of passing each reporting line or as soon as possible thereafter."

- 20) DELETE paras 6.2.5.1 to 6.2.5.3 IN TOTO and SUBSTITUTE IN LIEU THEREOF

"7.2.5.1 Position

"Position" shall be expressed by the latitude and longitude of the point at which the fixed reporting line is crossed. For flights whose track is predominantly east and west, latitude shall be expressed in degrees and minutes, longitude in degrees only. For flights whose track is predominantly north and south, latitude shall be expressed in degrees only, longitude in degrees and minutes.

7.2.5.2 Next Position and Time Over

"Next position" shall normally be expressed as the next significant point listed in the flight plan, except that for turbo-jet flights operating south of 70° N the next position shall be the significant point located on the reporting line 20° ahead, or the entry point of the continental airspace, where applicable.

7.2.5.3 Abbreviated Reports

7.2.5.3.1 Abbreviated reports shall only contain the aircraft identification, position, time and flight level.

7.2.5.4 Current Mach Number

7.2.5.4.1 For turbo-jet aircraft operating in the part of the NAT Region described in 3.1.1 d) the current Mach number shall be transmitted with each full position report.

Note.- For flights operating within the New York Oceanic and Lisboa Oceanic control areas this procedure only applies if the flight will subsequently enter the Gander or Shanwick Oceanic FIRs."

21) INSERT a new para 7.3.2 TO READ

"7.3.2 Position reports transmitted by aircraft operating within an oceanic control area at a distance of 60 nautical miles or less from the common boundary with an adjacent oceanic control area, including aircraft operating on tracks through successive points on such boundary, shall also be addressed to the area control centre serving the adjacent control area."

22) ADD "NAT" opposite existing para 6.3.2 (to be renumbered as para 7.3.3)

23) INSERT a new para 9.2 TO READ:

"9.2 Information on runway conditions

9.2.1 Unless otherwise provided, area control centres and approach control offices shall have available for transmission to aircraft on request, immediately prior to descent, information on the prevailing runway conditions at the aerodrome of intended landing."

24) RENUMBER existing paras 8.2 and 8.3 as 9.3 and 9.4 respectively

6iii-1.1.24 In formulating the amendment to paragraph 6.2 of the SUPPs-RAC, as presented in Recommendation 6 iii/2 18), the Committee was fully aware that such amendment could not be implemented unless the existing provision in PANS-RAC, Part III, paragraph 11.2 (renumbered as paragraph 12.2 in Amendment 7 to the Seventh Edition) were amended to permit a greater interval than one hour of flying between position reports. For the reasons given in paragraph 6iv-1.1.8 of the Report on Agenda Item 6 iv), however, the Committee agreed to recommend that appropriate action be taken by ICAO to introduce such amendment to the PANS-RAC.

RECOMMENDATION 6 iii/3 - NEED FOR AMENDMENT OF THE PANS-RAC, PART III, PARAGRAPH 12.2

That appropriate action be taken by ICAO to introduce an amendment to the PANS-RAC (Doc 4444-RAC/501), Part III, paragraph 11.2 (renumbered as paragraph 12.2 in Amendment 7 to the Seventh Edition), so as to permit the determination, on the basis of regional air navigation agreements, of an interval greater than one hour of flying between position reports for flights operating in high density traffic areas such as the "principal area" of the North Atlantic Region.

6iii-1.2 Establishment of an oceanic ATC Coordination and Evaluation Team

6iii-1.2.1 The Committee noted that the liaison visits by personnel of ATS units providing service in the NAT Region, as recommended by a number of NAT Regional Meetings, had assisted considerably in the improvement of coordination. It also noted that a number of meetings which had been organized in the past few years on an ad hoc basis between users and the ground services had had beneficial effects on the mutual understanding and had helped to clarify and solve a number of practical problems which had been encountered on the operational level.

6iii-1.2.2 In the light of this experience, Canada had presented a proposal which envisaged the establishment of a NAT Oceanic ATC Coordination and Evaluation team, in order to take these developments a step further and make them a more permanent feature of the cooperation between ATC units in the Region.

6iii-1.2.3 After some discussion, the Navigation and Air Traffic Services Committee agreed that an ad hoc team should be established to assist in obtaining the best possible common level of performance of the air traffic control services in the NAT Region so as to ensure that its various ATC units operate as a harmonious entity in practical day-to-day operations. It was, however, to be clearly understood that such an ad hoc team could only act in an advisory capacity and that its findings would not be binding on any State, nor would they be made public without the agreement of the State(s) concerned.

6iii-1.2.4 The terms of reference of this ad hoc team should therefore cover the periodic review of ATC activities in the oceanic FIRs of the NAT Region and should, in particular, cover the following:

- a) Application of control procedures, methods and techniques, in particular co-ordination procedures and internal operating practices.
- b) Utilization of the airspace, in particular organization of the traffic flow and adaptation of ATC procedures to aircraft operating techniques.

6iii-1.2.5 The ad hoc team should consist of senior practising controllers from Oceanic Control Centres maintained by Canada, Iceland, Portugal, United Kingdom and United States of America, who should make periodic joint visits to NAT Oceanic Control Centres in order to obtain a realistic appreciation of the operating methods and gain direct experience of the problems confronting individual ATC units. The method of work adopted by the team should be reviewed after the first round of visits.

6iii-1.2.6 The work of the team should be conducted with the least possible formality and should be directed towards practical problems and their solutions.

RECOMMENDATION 6 iii/4: - ESTABLISHMENT OF AN AD HOC ATC CO-ORDINATION AND EVALUATION TEAM

- a) That an ad hoc team be established to assist in obtaining the best possible common level of performance of the air traffic control services in the NAT Region.
- b) That this team should concern itself with the practical aspects of:
 - i) application of control procedures, methods and techniques
 - ii) utilization of airspace.
- c) That this team initially should be composed of senior practising controllers from the NAT Oceanic Control Centres operated by Canada, Iceland, Portugal, United Kingdom and United States of America who should make periodic joint visits to all NAT Oceanic Control Centers.
- d) That the working method of the team should be reviewed after the first round of visits.
- e) That the team should have only an advisory capacity and that its findings would not be binding on any State, nor be made public without the agreement of the States concerned.

6iii-1.2.7 The Committee noted a statement by the United Kingdom that, while it agreed in principle with the establishment of such team, its continued participation in it would be dependent on the demonstrated practical usefulness of the team.

6iii-1.3 Facilities

6iii-1.3.1 With regard to para 6i-1.3.19, the Committee noted that the operation of the Loran A Stations referred to in this paragraph were subject to ITU Radio Regulation Number 195, since they were located south of 55°N, and that it would therefore be necessary for the States operating these facilities to undertake special coordination measures before these stations could be operated on a twenty-four hour basis. The Committee nevertheless believed that it would be worth-while to pursue this matter further even though it was very likely that rapid solution to this question might not be expected.

RECOMMENDATION 6iii/5: - OPERATION OF LORAN A STATIONS IN THE AREA OF THE BAY OF BISCAY

That the States concerned should endeavour to resolve the problems raised by the operations of Loran A Stations in the area of the Bay of Biscay, particularly as regards ITU Radio Regulation Number 195, in order to obtain continuous operation of these stations as early as possible. In addition, efforts should be made to provide adequate maps allowing an efficient utilization of these stations as soon as their permanent operation had been assured.

6iii-1.4 Presentation of aeronautical information on services and facilities in the NAT Region

6iii-1.4.1 It was noted that, at present, information on services and facilities in the NAT Region was contained in a number of aeronautical information publications, some of which were issued by States not normally regarded as provider States of the NAT region and some of which, in their presentation and their content, did not correspond to the specifications of Annex 15. This situation caused difficulties to users who wished to get a complete appreciation of existing services and facilities and the extent to which these were able to assist or supplement each other.

6iii-1.4.2 It was therefore believed that it would be of benefit, particularly to users, if all information on the essential services and facilities located in, or providing service for the Oceanic FIRs would be shown in a consolidated manner in each of the AIPs published by NAT provider States, so that users could get a complete appreciation of the essential parts of the whole air navigation system when consulting one single document.

6iii-1.4.3 It was therefore agreed that provider States in the NAT Region should be requested:

- i) to ensure that their aeronautical information publications are presented and published in accordance with the specifications of Annex 15 and related ICAO documents;
- ii) to study the feasibility of presenting information regarding the essential parts of the NAT air navigation system in identical supplements, appended to each national Aeronautical Information Publication.

RECOMMENDATION 6 iii/6 - PUBLICATION OF AERONAUTICAL INFORMATION ON SERVICES AND FACILITIES IN THE NAT REGION

- a) That States whose aeronautical information is not yet published in accordance with the specifications of Annex 15 and related ICAO documents be requested to do so as soon as possible;
- b) That Canada, France, Denmark, Iceland, Ireland, Portugal, the United Kingdom and the United States of America study the feasibility of publishing identical supplements to their Aeronautical Information Publications providing information on the more important air navigation services and facilities available in the FIRs of the NAT Region in order to give a presentation of the air navigation system of the NAT Region as a whole.

SECTION 6 iii-2 COMMENTS AND RECOMMENDATIONS OF THE POLICY AND PROGRAMMING
COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6 iii

6iii-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6 iii) and made the following comment:

6iii-2.2 With reference to 6iii-1.1.21, the Committee noted with satisfaction the consideration being given by the Air Navigation Commission to the matter of developing internationally agreed criteria and compatible methods for measuring runway conditions and associated procedures for providing this information to pilots in meaningful terms.

6iii-2.3 The Policy and Programming Committee further noted that the subject, together with the question of removal of precipitants from aerodrome pavements was included in the Agenda for the EUM V RAN Meeting (due to commence on 8 February 1966) and made the following recommendation:-

RECOMMENDATION 6iii/7 - MEASUREMENT OF CONTAMINANTS ON RUNWAYS AND
DISSEMINATION OF INFORMATION ON RUNWAY CONDITIONS

That the attention of States in the NAT Region, not already involved, be drawn to the trials and experiments being conducted in the EUM Region for the measurement of contaminants on runways and dissemination of information on runway conditions, and that these NAT States be urged to contribute information on the criteria and methods used by them for these purposes with a view to ultimate world-wide agreement thereon.

SECTION 6iii-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 6iii

6iii-3.1 The General Committee reviewed the material presented to it under Agenda Item 6iii and made no comment.

Agenda Item 6: Preparation of Amendments to the North Atlantic Plan and
Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 iv: Air-reporting

The short-term air route table, together with the statement of regionally agreed operational requirements established by the Policy and Programming Committee, as contained in the Report on Agenda Item 2 b) and in paragraphs 1, 5 and 6 of the Report on Agenda Item 3 a), governed the consideration of Agenda Item 6 iv.

SECTION 6 iv-1: ACTION BY THE NA AND CM COMMITTEES ON AGENDA ITEM 6 iv*

Air-reporting

6iv-1.1 Action by the NA Committee

General

6iv-1.1.1 In considering this Agenda Item the Committee confirmed that there was a definite and urgent need to find ways and means of alleviating the congestion on air-ground communication channels available to ACCs in the "principal area" of the NAT Region. The view was held that whilst the problem primarily related to HF radiotelephony channels, VHF channels were also heavily loaded. Against this background, and bearing also in mind the desirability of alleviating the cockpit workload, the necessity of reviewing the entire air-reporting procedure with a view to eliminating redundancy in the information to be transmitted, was a real and pressing one. It was contended that at least some reduction in the amount of air-reporting was essential already during the forthcoming summer season, and that a further reduction would be required during the 1966 season.

The concept of air-reports

6iv-1.1.2 The Committee agreed at the outset that it would be unrealistic to divorce the position reporting for ATC and operational control purposes from the MET air-reporting at the present time. The separation of the information required for the different purposes into two distinct types of message would increase the number of messages to be transmitted and would increase channel occupancy still further because of the need to duplicate transmission of actual position information. It was recognized, however, that future improvements in the field of communications, e.g. the provision of separate air-ground channels for ATC and MET purposes, might permit reconsideration of this issue.

* See comment by the PP Committee, Section 6iv-2, paragraph 6iv-2.2.

Reduction in the number and contents of air-reports

6iv-1.1.3 An examination was made of the minimum number of routine air-reports required to satisfy the needs of the various services for information from trans-oceanic flights through the "principal area" of the NAT Region. In so doing consideration was only given to jet aircraft since such aircraft constituted about 80% of all trans-oceanic flights.

6iv-1.1.4 The Committee considered that with the introduction of the Mach number technique, the ATC requirement for information would normally be satisfied by routine air-reports at intervals of 20° longitude in the oceanic airspace. However, during the trial period in which the reduced longitudinal separation minimum recommended under Agenda Item 6 i) would be evaluated, a requirement for abbreviated position reports at intermediate 10° meridians was deemed to exist, due to the need to accurately assess the time-keeping capability of aircraft.

6iv-1.1.5 The requirements of airlines for operational control information were also believed to be met by air-reports at intervals of 20° longitude. In some cases, it was suggested, there might even be real need for only one such report during an oceanic crossing.

6iv-1.1.6 The Committee was not in a position to assess the MET requirements for information and this aspect of the question was therefore referred to the CM Committee for consideration.

6iv-1.1.7 With regard to the needs of the alerting service, the Committee considered that these would likewise be met by reports at intervals of 20° longitude provided that some form of intermediate reports were transmitted, e.g., the one specified in PANS-RAC Part VII, paragraph 2.1.2.

6iv-1.1.8 On the basis of the foregoing considerations, the Committee agreed that for jet aircraft operating within the FIRs Gander Oceanic, Lisboa Oceanic, New York Oceanic, Reykjavik, Shanwick Oceanic and Sondrestrom (south of 70° N) routine air-reports comprising Sections 1 and 3, and Section 2, if appropriate, should only be transmitted at intervals of 20° longitude. The current Mach number should be transmitted, when applicable, immediately following Section 1 of such routine reports. (See paragraph 6i-1.3.5 on page 6i-11). In addition, for the duration of the aforementioned trial period, position reports containing only aircraft identification, position, time and flight level should be transmitted at intermediate 10° meridians. The Committee's recommendations for regional supplementary procedures to that effect are contained in the Report on Agenda Item 6 iii).

6iv-1.1.9 In reaching the above agreement, the Committee emphasized that the short-term objective was the elimination of the reports at intermediate 10° meridians and that the retention of such reports beyond the trial period associated with the new longitudinal separation minimum should be discouraged. The Committee agreed, however, that in the case of eastbound flights position reports would continue to be required at 30° W.

6iv-1.1.10 The attention of the Committee was invited to the fact that the provision in PANS-RAC, Part III, paragraph 11.2, as presently worded, did not permit position reports at intervals greater than 1 hour of flight, whilst the flying time for a jet aircraft between, say, 40° W and 20° W was approximately 1 hour 40 minutes. The Committee concluded, however, that in view of the urgent need for a reduction in the amount of air-reporting in the Region, a recommendation should be made for appropriate amendment action to be taken by ICAO so as to permit a greater interval of time to be established on the basis of regional air navigation agreements. This recommendation is also included in the Report on Agenda Item 6 iii). (Recommendation 6iii/3 refers).

Possible reduction in the contents of routine air-reports

6iv-1.1.11 The Committee examined the practicability of omitting certain elements from Section 1 of the air-reports to be transmitted at intervals of 20° longitude but concluded that the complete Section 1 would be required at least for some time to come.

6iv-1.1.12 Note was taken, however, that Section 2 of the Air-report appeared to be transmitted on a routine basis, although the PANS-RAC required this information to be sent only when so requested by ATS or the operator or when deemed necessary by the pilot. The Committee agreed that the attention of operators should be invited to this apparent situation and that they should be requested urgently to examine their requirements for Section 2 and to notify air crews accordingly in an effort to ensure stricter compliance with existing procedures.

RECOMMENDATION 6 iv/1 - EXAMINATION BY OPERATORS OF THEIR REQUIREMENTS FOR SECTION 2 OF THE AIR-REPORT

That States invite operators engaged in flight operations in the NAT Region to urgently examine their requirements for Section 2 of the Air-report with a view to determining whether a single report during an oceanic crossing would not normally be adequate, and to inform air crews accordingly so as to ensure stricter compliance with the air-reporting procedures contained in the PANS-RAC.

6iv-1.1.13 With regard to Section 3 of the Air-report the Committee was of the opinion that there was considerable redundancy in the information transmitted, particularly during peak traffic periods, since no workable exemption or designation procedures had as yet been found. As this aspect was not entirely within the competence of the Committee, it confined itself to inviting the CM Committee to consider the problem and, if possible, to formulate specific proposals for ways and means to eliminate redundancy.

6iv-1.1.14 The Committee recognized that a significant reduction in the transmission of in-flight meteorological observations would be obtained with the implementation of the recommendations of the MET/OPS Division (1964) and of Recommendations 6iv/5 and 6iv/6 of the CM Committee of this Meeting, but considered it desirable that continued efforts be made with a view to seeking further reduction. Accordingly, it was recommended that:

RECOMMENDATION 6 iv/2 - FURTHER REDUCTION IN THE VOLUME OF IN-FLIGHT MET INFORMATION*

In order to eliminate transmission of excessive in-flight meteorological observations, efforts should be continued by all concerned to develop an improved method of designating specific aircraft to transmit such observations.

Read-back of air-reports

6iv-1.1.15 The Committee noted that the current practice of read-back of air-reports contributed considerably to the loading on HF radiotelephony channels. It was believed that there was a possibility of some reduction being achieved through temporary suspension of the read-back procedure, as permitted by the PANS-RT, paragraph 19.7.1.2.1. Accordingly, it was agreed to recommend that States operating aeronautical stations serving the "principal area" take appropriate action to achieve such reduction.

RECOMMENDATION 6 iv/3 - REDUCTION OF READ-BACKS OF AIR-REPORTS

That States operating aeronautical telecommunication stations serving the "principal area" in the NAT Region take appropriate action to reduce read-backs of air-reports in accordance with paragraph 19.7.1.2.1 of the PANS-Radiotelephony Procedures (Doc 7181-COM/546), with a view to alleviating the congestion on HF radiotelephony channels.

6iv-1.1.16 The Committee also noted that a large proportion of ground-initiated messages originated by airline operating agencies continued to duplicate information already provided to the pilot by other means. The Committee recalled Recommendation 8/2 of the Fourth NAT RAN Meeting and agreed that the attention of operators should be invited to the urgent need to re-examine this question and take the necessary remedial action.

RECOMMENDATION 6 iv/4 - NEED TO REDUCE GROUND-INITIATED MESSAGES TO AIRCRAFT IN FLIGHT **

That States invite operators engaged in flight operations in the NAT Region to urgently re-examine their practices regarding the transmission of messages to aircraft in flight with a view to eliminating any duplication of information provided to the aircraft by other means and thus to relieve congestion on HF radiotelephony channels.

6iv-1.1.17 Having examined the aspects of air-reporting described in paragraphs 6 iv-1.1.2 to 6 iv-1.1.5 the Committee concluded that continued study should be undertaken of ways and means of rationalizing air-reporting procedures and thereby alleviating congestion on ATC communication channels, in association with the development of the long-term plan under Agenda Item 5.

* See comment by the PP Committee, Section 6iv-2, paragraph 6iv-2.3.

** See comment by the PP Committee, Section 6iv-2, paragraph 6iv-2.4.

6iv-1.2: Action by the CM Committee

6iv-1.2.1 Introduction

6iv-1.2.1.1 The CM Committee first considered the existing procedures for making and reporting routine aircraft meteorological observations in the NAT Region. It found that in some areas too few reports were received while in others the number was excessive during peak traffic periods, except perhaps when the reports were used in meteorological electronic computers. It also supported the conclusion of the MET/OPS Meeting (Doc 8411, MET/OPS (1964), para. 6.25) that the concentration of air-reports along 10 degree meridians did not provide the optimum distribution from the meteorological point of view, but it recognized that a more uniform distribution would not meet the requirements of air traffic services.

6iv-1.2.1.2 The Committee noted the views of the NA Committee that relief from congestion on the aeromobile channels was urgently needed and that full air-reports should be transmitted only at 20 and 40°W, supplemented, during the trial period for reduced longitudinal separation, by abbreviated position reports at intermediate 10 degree meridians (paragraph 6 iv-1.1.8). The CM Committee agreed that it was unacceptable for air-reports to have a Section 3 only at 20° and 40°W but it considered carefully the possibility of making some reduction in the number of air-reports in the Gander and Shanwick Oceanic FIRs and in the contents of all air-reports, having a Section 3, originated in the NAT FIRs. It did this even though, on the one hand, all efforts to devise practical exemption or designation procedures had thus far been unsuccessful, and on the other hand the mere use of the form of air-report expected to be introduced shortly as a result of recommendations of the MET/OPS Meeting would in any case reduce significantly the load on aeromobile channels. As regards the New York and Lisboa FIRs, the CM Committee agreed that it was essential for all aircraft to make and transmit meteorological observations at least every 10° of longitude from 10° to 70°W on eastbound and westbound flights. It recognized that this procedure could not overcome the shortage of routine aircraft meteorological observations south of 40°N, but it did not believe it was practicable to call for more frequent observations in that part of the Region.

6iv-1.2.2 Reduction in number of air-reports in the Gander and Shanwick Oceanic FIRs

6iv-1.2.2.1 Of the exemption procedures previously tried, that based on limiting the number of routes on which reports would be made and that based on reporting only at synoptic hours were examined. However, the Committee was not able to make a satisfactory selection of routes for the former while the synoptic system would have provided too few reports especially at the main upper air synoptic hours of 00 and 12 GMT. Neither, in fact, appeared likely to permit a high standard of forecasting to be attained, in accordance with the agreed operational requirements.

6iv-1.2.2.2 An entirely new approach was therefore made and this led to agreement on a designation procedure on the following lines:

- a) Every aircraft would not be required to make meteorological observations at each 10° meridian as at present. Instead, roughly equal numbers would report at the even and odd multiples of 10° between 10 and 50°W (except when too near the time of the next landing).
- b) The division of aircraft into two approximately equal groups for this purpose would be on the basis currently used for designating aircraft to use Family "B" or Family "C" of the NAT HF radio-telephony network (SUPPS-COM 3.4.10).
- c) The procedure would be applied in the whole of the Gander and Shanwick Oceanic FIRs and during two fixed and equally spaced 6-hour periods covering the normal peak periods of traffic.

6iv-1.2.2.3 It was recognized that such a procedure would result in a reduction in the number of reports at times and places where there was already a shortage. In this connexion, it was noted that WMO had recently stressed the increasing importance of air-reports in connexion with the planned World Weather Watch and was currently arranging an improved world wide exchange of air-reports in figure code, for use in meteorological computers. However, the proposed procedure had the merit of being reasonably simple, with a minimum of variations in space and time (in accordance with 2.3.1.6.1 c) of the PANS-MET). Further it was believed that the decision to identify the more accurate "spot winds" as such, referred to in paragraph 6iv-1.2.4.1 below, would reduce to some extent the degree of redundancy required in reports to make them suitable for use with meteorological computers.

6iv-1.2.2.4 The new designation procedure was incorporated in the following recommendation:

RECOMMENDATION No. 6 iv/5 - AMENDMENT TO THE NAT SUPPLEMENTARY PROCEDURES -
AIR REPORTING DESIGNATION PROCEDURES

That Part 4 of Doc 7030 (amended up to No. 102 dated 19/11/64) be amended as follows:

Insert the following new procedures, applicable in the NAT Region;

2.3.1 Routine aircraft meteorological observations

Turbo-jet aircraft flying in the Gander and Shanwick Oceanic FIRs between North America and Europe shall make and record meteorological observations* as follows:

* Subject to exemptions in accordance with 2.3.1.4 b) or 2.3.1.5 a) of the PANS-MET.

From 03 - 09 GMT and 15 - 21 GMT:

a) Aircraft registered in States west of 30°W:

on eastbound flights - at 50°, 30° and 10°W;
on westbound flights - at 20° and 40°W;

b) Aircraft registered in States east of 30°W:

on eastbound flights - at 40° and 20°W;
on westbound flights - at 10°, 30° and 50°W;

Note: For the purposes of this procedure, Australia, which is partly east and partly west of 150°E, is regarded as being east of 30°W.

At other times:

as for aircraft other than turbo-jets (see below)

Aircraft other than turbo-jets flying in the Gander and Shanwick Oceanic FIRs and all aircraft flying in the New York and Lisboa Oceanic FIRs, in both cases between Europe and North America (either direction), shall make and record meteorological observations* at each 10° meridian from 10° to 70°W.

(Note: Meteorological observations by aircraft flying in other FIRs or on predominantly north-south tracks are covered by the provisions of the PANS-MET without regional exemption or designation procedures.)

2.3.3 Reporting of routine aircraft meteorological observations during flight

In the Gander and Shanwick Oceanic FIRs aircraft meteorological observations made by turbo-jet aircraft at 10°, 30° or 50°W shall be reported with the associated position report, if any, made in accordance with the applicable air traffic services procedures; otherwise they shall be reported with the next position report, or as soon as practicable using appropriate general purpose air-ground channels.

In other FIRs and in the case of aircraft other than turbo-jet aircraft in the Gander and Shanwick Oceanic FIRs, aircraft meteorological observations shall be reported with the associated position report, if any, made in accordance with the applicable air traffic services procedures; otherwise they shall be reported as soon as practicable.

* Subject to exemptions in accordance with 2.3.1.4 b) or 2.3.1.5 a) of the PANS-MET.

6iv-1.2.3 Reduction in contents of routine air-reports

6iv-1.2.3.1 The CM Committee agreed that air-reports should be shortened as recommended by the MET/OPS Meeting as soon as practicable. It therefore recommended as follows:

RECOMMENDATION No. 6 iv/6 - AMENDMENT TO THE MET SUPPLEMENTARY PROCEDURES - OMISSION OF ELEMENTS OF AIR REPORTS

That Part 4 of Doc 7030 (amended up to No.102 dated 19/11/64) be amended as follows:

Insert the following new procedure, applicable in the NAT Region:

2.3.2 Record of aircraft observations

The following elements of a routine aircraft meteorological observation shall be omitted as indicated:

<u>Item</u>		
5	Next position and time over	unless required by air traffic services procedures.
6	Estimated time of arrival)	unless required by the aircraft operator or deemed necessary by the pilot.
	)	
	)	
7	Endurance)	
13	Light Icing)	invariably
	)	
14	Light turbulence)	
10	D-value)	if, in the opinion of the pilot-in-command, they are not of aeronautical interest.
11	Present weather)	
12	Cloud)	
15	Remarks)	

Mean winds included in Item 9 should, if practicable, be for distances not exceeding 500 NM.

6iv-1.2.4 Adherence to procedures

6iv-1.2.4.1 Certain Delegates reported that considerable difficulty arose at times with wind reports, because the more accurate spot winds were not identified as such (see paragraph 6iv-1.2.2.3 above, last sentence). Further the position for mean winds, and for spot winds not measured at the position given in the report,

was often omitted. The Committee therefore made the following recommendation:

RECOMMENDATION No. 6 iv/7 - ADHERENCE TO AIR-REPORTING PROCEDURES - WIND

That Contracting States and IATA take action as appropriate with a view to ensuring that spot winds in air-reports be identified as such and that the instructions for indicating the position in connexion with wind observations included in air-reports be strictly complied with.

6iv-1.2.5 Requirements, other than of Meteorological Services

6iv-1.2.5.1 The CM Committee was interested to have the following up to date information on the use made of aircraft meteorological observations by operators and air traffic services:

- a) the Observer of IATA stated that a representative sample of Section 3 of AIREPs was required for operational control purposes; however, it was not necessary that such reports be originated by aircraft of the operator specifically interested;
- b) it was understood that area control centres made use of information derived from air-reports in various ways, e.g., in estimating elapsed times.

6iv-1.2.6 Future developments in aircraft meteorological observations and reports

6iv-1.2.6.1 Looking towards the future, the CM Committee noted the consideration given to this matter by the MET/OPS Meeting, leading to its Recommendation 6/4 on the subject of automatic recording and reporting equipment. It foresaw the following advantages in the use of such automatic equipment:

- a) information would be transmitted more rapidly and with less disturbance to air-ground channels;
- b) the distribution of reports in space and time could be tailored more closely to requirements for forecasting - by computer or otherwise - and direct operational use;
- c) the accuracy of measurements could be increased and some data made more objective (e.g., turbulence);
- d) the number of variables recorded could be increased, and this would probably be essential in the case of supersonic aircraft (e.g., ozone, radiation etc.).

The Committee assumed that the potentialities of such equipment would be carefully studied, in connexion not only with operations by supersonic aircraft, but also with those of subsonic aircraft.

SECTION 6 iv-2: COMMENTS AND RECOMMENDATION BY THE PP COMMITTEE
ON THE ACTION TAKEN ON AGENDA ITEM 6 iv

6iv-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6 iv) and made the following comments:

6iv-2.2 The Committee noted that certain difficulties had been encountered in reconciling the views of the Navigation and Air Traffic Services Committee and those of the Communication and Meteorology Committee on the subject of the time of transmission of air-reports containing a Section 3. In the opinion of the Policy and Programming Committee, these difficulties stemmed at least in part from the structural organization of this Meeting, which caused Agenda Item 6 iv) to be discussed separately by two bodies without adequate means of coordination. The Policy and Programming Committee believed that at future meetings where the subject of air-reporting procedures was to be discussed, similar difficulties might be avoided if arrangements were made for joint consideration of this subject by the various parties concerned, i.e. ATC, COM, MET and OPS.

6iv-2.3 The Committee did not accept Recommendation 6 iv/2 as written and agreed to the following alternative wording:

"RECOMMENDATION 6 iv/2 - FURTHER REDUCTION IN THE VOLUME OF
IN-FLIGHT MET INFORMATION.

In order to reduce transmission of in-flight meteorological observations, efforts should be continued by all concerned to develop an improved method of designating specific aircraft to transmit such observations."

6iv-2.4 The Committee noted that Recommendations 6 iv/4 and 6 viii/7 were inter-related but not in conflict.

SECTION 6iv-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 6iv

6iv-3.1 The General Committee reviewed the material presented to it under Agenda Item 6iv and made no comment.

Agenda Item 6: Preparation of amendments to the North Atlantic Plan and Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 v: Meteorological service for flight planning and air traffic services

As the basis for its work under Agenda Item 6 v), the Communications and Meteorology Committee used paragraph 6 of the Statement of Basic Operational Requirements prepared under Agenda Item 3a). Additional advice on an important point of detail was obtained from the NA Committee (see paragraph 6v-1.1.2, below).

SECTION 6 v-1: ACTION BY THE CM COMMITTEE ON AGENDA ITEM 6 v

Meteorological service for flight planning and air traffic services

6v-1.1 Area Forecast System

6v-1.1.1 The CM Committee agreed that an area forecast system would be a means of satisfying the operational requirements for the supply of meteorological information to all concerned "in such a manner as to provide a uniform basis for planning". The Committee also used as guidance the principles for an area forecast system, stated in MET/OPS Recommendation 9/1, and the extracts from the Report of the CAoM Working Group on Area Forecasting, given in the Annex to MET/OPS Recommendation 9/4.

6v-1.1.2 It became evident at the start that the arrangements required would depend to an important extent on whether or not, for ATC purposes, complete consistency was necessary between forecasts issued for westbound flights and those issued for eastbound flights. Advice was therefore sought from the NA Committee, which decided that such consistency was not a requirement. This permitted the planning of a comparatively simple system in which forecasting for the major part of the ocean area and for the adjacent continental areas is carried out independently in North America and Europe for eastbound and westbound flights respectively.

6v-1.1.3 It was decided that provision need not be made for the coordination of forecasts issued in North America with those issued in Europe, to cover cases when parts of the former were used as westward extensions of the latter until the European part of the plan was fully developed, because discrepancies of the kind found in practice were not expected to cause difficulty if the transition from one forecast to the other did not occur in the principal area.

6v-1.1.4 It was not believed practicable to arrange that the NAT area forecast system provide the forecasts needed for the latter parts of certain - rather infrequent - long distance flights, as these forecasts could be obtained much more economically by other means in accordance with 2.5.2.5.1.1 of the PANS-MET.

6v-1.1.5 Further, no specific provision was made for disseminating amendments to forecasts (as required by 2.5.2.6 of Annex 3). It was however noted that in spite of the practical difficulties which the dissemination of such amendments involves it was possible to envisage various ways of doing so and it was decided that this should be left for the Meteorological Authorities operating the area forecast centres to arrange. It was also judged desirable to leave free time in the dissemination programmes in order to allow repetition of charts as the need arose.

6v-1.1.6 It was assumed that area forecasts would be used by meteorological offices as appropriate in the provision of en-route forecast service and no specific procedure on this subject was recommended for inclusion in the Regional Supplementary Procedures.

6v-1.1.7 Features that the CM Committee believed desirable in a NAT area forecasting system are listed below with a brief indication of the supporting reasons:

- a) Areas covered by forecasts should be as large as conveniently possible, taking into account the limitations of the means of dissemination used (expected to be facsimile initially), in order that in most cases one chart will cover the whole flight stage to be flown, and also because much of the potential benefit of an area forecast system is lost if meteorological offices still have to prepare forecasts for remote route segments in neighbouring areas.
- b) The frequency of issue of forecasts should be four times daily so that the period for which each must be used will not be unduly long.
- c) Times of validity should be 00, 06, 12 and 18 GMT:
 - i) to provide a continuous meteorological forecast service for air navigation, based on the prompt use of the latest synoptic data, taking account of the time required to process these data, disseminate the forecasts and use them in pre-flight planning;
 - ii) to simplify verification of forecasts.

6v-1.1.8 The Committee was not able to devise a practicable way of ensuring complete compatibility of forecasts for all aircraft flying in either direction at any one time over the principal area, for three main reasons, namely;

- a) it was not believed appropriate to propose that the supply of the area forecasts for flight planning purposes be mandatory (however, operators could be expected to benefit from the use of the forecasts, since in general they would suffer less inconvenience in obtaining clearance of flight plans if they made use of this service);*
- b) occasions would arise when the meteorological office supplying such a forecast would feel obliged to advise the pilot or operator's representative of meteorological reports - especially AIREPS - indicating a need for significant modification of the forecast;
- c) flights arriving over the principal area simultaneously, having taken off at different times, would on occasion be planned on the basis of forecasts issued at different times.

In any case, it was noted that even when two flight plans were prepared on the basis of the same forecast significant differences sometimes occurred as a result of the use of different flight planning practices.

6v-1.1.9 Some Delegates felt that there might be in certain meteorological offices a deterioration in the quality of the service provided for international air navigation, at least during the early stages of implementation of those parts of the proposed area forecast system which are not already in operation, i.e., those providing forecasts for westbound flights.

6v-1.1.10 The Representative of IATA expressed the opinion that charts bearing identical times of validity would not adequately cater for the initial or final portions of routes exceeding 3000 to 4000 NM, in view of the time difference between the time of validity of the forecasts and the times of flight. The Committee decided, however, not to make arrangements at this time to provide additional charts bearing a later time of validity for the remote portions of such long distance routes, e.g., Europe to the west coast of North America.

6v-1.1.11 Consideration was given to the desirability of holding up implementation of an area forecast system in the NAT Region in order to ensure that it would be compatible with neighbouring parts of any world wide system that might result from MET/OPS Recommendation 9/3. It was decided that this was not at present justifiable, in view of MET/OPS Recommendation 9/4, which envisaged the early development of interim systems where urgently needed. The Committee believed, however, that Recommendation 9/3 remained valid and took care that the proposed NAT area forecast system would not interfere with the establishment of a world wide system and could indeed form a further step towards the development of such a system.

* See comment by the PP Committee, Section 6v-2, paragraph 6v-2.1.1.

6v-1.1.12 The Committee studied the problem of designating a European centre to act as area forecasting centre for transatlantic flights in a westward direction, and noted that a number of States (France, Fed.Rep.of Germany, Ireland, Italy, United Kingdom and United States of America) were at present operating radio facsimile transmissions which could be used for the meteorological planning of westbound transatlantic flights.

6v-1.1.13 The French Delegation, stressing its interest in this problem, indicated that for the last three years the radio facsimile transmission from Orly had been working on principles very close to those outlined above, but France was willing, in a spirit of constructive cooperation, to terminate this transmission as far as coverage of the NAT Region was concerned, as soon as the designated European Centre was functioning satisfactorily. France nevertheless intended to continue and develop its present transmissions in other areas, in the spirit of Recommendation 9/3 of the MET/OPS Meeting. The French Delegation moreover indicated that it was still considering its long-term position with respect to the whole of the problem, in view of the rapid technological developments both in meteorology and transmissions.

6v-1.1.14 The Committee noted the proposals of Germany and the United Kingdom to locate the European Centre in their respective countries and agreed that, taking into account the meteorological and telecommunications facilities available in these two States and the developments planned for the future, both appeared well able to operate the area forecast centre at a high standard of efficiency. However, the Committee decided that the United Kingdom would have an advantage in view of its long experience in forecasting for North Atlantic aviation, its proximity to the oceanic area, the high volume of North Atlantic air traffic using its aerodromes and its operation of the Shanwick Area Control Centre. The United Kingdom was therefore designated to provide the European Centre in the recommended area forecast system. The Committee noted with appreciation the wish expressed by the Delegate of Germany to cooperate in the future development of the area forecast system as a whole in Europe.

6v-1.1.15 The Committee assumed that certain European States might not wish to participate in the system if it entailed expenditures comparable with those of preparing their own forecasts. The Committee could not, therefore, be specific about the list of recipients of the charts issued by the European centre.

6v-1.1.16 With regard to the telecommunications facilities required for the area forecast system envisaged, these would, as indicated in paragraph 6v-1.1.2 above, consist primarily of arrangements for disseminating, in North America, forecast charts prepared at North American centres and, in Europe, forecast charts prepared in Europe. In addition provision would be needed for Greenland to receive the charts prepared by the North American centres or, if coverage were sufficient, those prepared by the European Centre. It was noted however that the costs involved in transmitting the charts by land-line quality communications facilities would at present far exceed the potential savings. In the case of Iceland radio facsimile

reception might offer a satisfactory solution even in the future. The difficulties mentioned further stress the need for the availability in Greenland and Iceland of basic meteorological data.

6v-1.1.17 The CM Committee recognized that, if the European Area Forecast Centre were capable of providing charts that would cover flights not only over the North Atlantic but also to such points as Anchorage, Seattle, San Francisco, Los Angeles, Miami and Pointe-a-Pitre, no requirement would exist for the exchange of prognostic charts across the Atlantic. The meteorological numerical computers currently in use in the North American centres already had this capability and it was envisaged that in the not too distant future one or more possible European centres would also have this same capability.

6v-1.1.18 It was considered desirable that certain prognostic charts prepared by the North American centres be transmitted to Europe until such time as the European Centre attained the capability of producing its own. However, in view of time delay involved and the cost benefit assessment considered to be essential prior to the establishment of a transatlantic facsimile exchange with the high standard of quality and reliability necessary, the CM Committee concluded that even though it was desirable it was not practicable at this time in the light of the expected development of expanded forecasting capability in Europe.

6v-1.1.19 The CM Committee further recognized that the Statement of Basic Operational Requirements prepared under Agenda Item 3 a) placed emphasis on a meteorological system that should aid the air traffic system by enabling consistent planning of oceanic flights by different operators and placed no similar emphasis on overland flights. Under the circumstances the CM Committee could not recommend, for the interim period, anything beyond the continuation of the current practices and facilities for the provision in Europe of the forecasts for the North American areas required for flights to the west coast of North America. In this connection it was understood that States concerned would continue their efforts to overcome present shortcomings in these arrangements. Further, it was believed that steps should be taken to improve, as necessary, the reception in Europe of the basic data required for the preparation of these forecasts.

6v-1.1.20 It was agreed that the area forecast system would need to be highly reliable and efficient in order to meet the operational requirements and at the same time permit meteorological offices to discontinue a substantial part of their forecasting work for NAT operations. It was therefore decided that technical specifications similar to those applied to the WMO facsimile transmissions should be used.

6v-1.1.21 Finally, in view of the uncertainty indicated in paragraph 6v-1.1.15 above it was recognized that it would be necessary to consult with the States concerned before the European part of the system could be planned from an engineering point of view, and it was agreed that it would be desirable to take this opportunity of reviewing the requirements, particularly in respect of the needs of adjacent regions, and adjust the details of the system as necessary.

6v-1.1.22 Facilities corresponding to the North American part of the area forecast system described above were already in operation. However, it was appreciated that it might take some time to obtain firm support for, and subsequently to implement, the European part, and this was not expected to occur before 1 January 1967. It was believed, therefore, that it might be necessary to introduce a simplified interim system. For example, a somewhat lower standard of reliability in reception such as could be provided by maintaining and perhaps improving existing European radio facsimile transmissions would permit the provision of a useful advisory service. Such an interim system would not, of course, satisfy all the operational requirements. Its sole purpose would be to achieve a considerable measure of uniformity in forecasts used for pre-flight planning, so avoiding at least some of the discrepancies between flight plans submitted for clearance. In this connexion the Committee noted with appreciation the offer of the United Kingdom to continue and improve its existing radio facsimile transmissions of aeronautical charts for the North Atlantic area.

6v-1.1.23 The following recommendation for an area forecast system was made:

RECOMMENDATION No. 6 v/1 - AREA FORECAST SYSTEM FOR THE NAT REGION

- a) That the implementation of the area forecast system outlined in Appendix I to this Section 6 v-1 be completed as soon as practicable;
- b) that all States likely to be concerned be consulted with a view to the organization as rapidly as possible of a dissemination network in Europe for the charts transmitted by the European Centre;
- c) that, the North American part of the system be incorporated in the NAT Regional Plan forthwith, and that the European part be incorporated as soon as it has been agreed upon in sufficient detail;
- d) that steps be taken, not only after implementation but also during the period preceding implementation, to keep the requirements under review, particularly in respect of the possible needs of adjacent Regions, and to amend the details given in Appendix I accordingly;
- e) that Regional Supplementary Procedures - MET, given in Appendix II to this Section 6 v-1, be approved;
- f) that the possibility be explored of introducing, at an early date, an interim system for transatlantic flights originating in Europe, based on the use of the existing United Kingdom radio facsimile broadcast or other suitable facilities.

6v-1.2 Current charts and analyses

6v-1.2.1 The CM Committee recognized that some meteorological offices making use of area forecasts might wish to discontinue also the plotting and analysis of synoptic charts for related areas, and would therefore wish to be supplied with analysed charts to permit them to provide briefing and consultation service to operators. A majority of the Committee felt that this additional service should not be specifically planned as part of the area forecast system but that the facilities organized through WHO should, in principle, be used. However, some Delegates felt that there might be cases where, for practical reasons, the limited number of analysis charts required for this purpose might also be transmitted on facsimile circuits established for the area forecast system.

6v-1.3 Future developments in regard to the area forecast system

6v-1.3.1 It appeared that within the next few years there would be a limited requirement for area forecasts to be disseminated in digital form for direct input into flight planning computers. There were several possibilities for the dissemination of forecast charts between meteorological centres, for example:

- a) transmission of meteorological computer data in digital form to a second computer which would convert the data into chart form through a line drawing process;
- b) facsimile distribution of charts, including high speed transmission.

6v-1.3.2 The Committee also examined the problems which might be raised in the long run by the development of transatlantic air traffic. It was recognized that the development of general aviation might lead to an increase in requirements concerning the lower layers of the atmosphere while the advent of supersonic aircraft and their coexistence with the present types of aircraft would undoubtedly increase the number of upper air charts to be prepared for the higher levels. No decision could be reached on these points because of the difficulty of defining the operational requirements. However, the Committee believed it useful to emphasize that the amount of information to be exchanged would undoubtedly increase and that the rapidity of these exchanges would have to be greatly increased.

6v-1.3.3 It also appeared highly advisable that the area forecast system cover as soon as possible areas other than those given in Appendix I to this Section 6 v-1. In this connexion the Committee was informed that Portugal was prepared to study the possibility of establishing, if necessary, an area forecast centre in Lisbon, responsible for an area covering the flights from Europe to Central and South America. This requirement was recognized by certain delegates and the Observer of IATA.

6v-1.4 Meteorological requirements of supersonic transport operations

6v-1.4.1 The Committee studied the expected needs of supersonic transports and noted Recommendation 10/4 of the 4th NAT RAN Meeting and Recommendations 8/16, 8/26, 11/4 and 11/12 of the MET/OPS Meeting dealing with this matter. The Committee was concerned to ensure that the climatological data thus requested should be of sufficient quality up to the expected operating heights of these aircraft, and made the following recommendation:

RECOMMENDATION No. 6 v/2 - UPPER AIR OBSERVATIONS FOR CLIMATOLOGICAL STATISTICS AND FORECASTING STUDIES

That WMO be informed that, additionally to the requirements expressed in MET/OPS Recommendations 8/16, 8/26, 11/4 and 11/12, there is a requirement in the NAT Region for regular and reliable upper air observations of winds and temperatures to be made up to at least 24,000m (80,000 ft) from a sufficiently dense network of stations to provide data at supersonic transport operating levels for the purposes of aviation climatology and for the development of forecasting techniques.

6v-1.4.2 The Committee then looked forward to the time when supersonic transports would be introduced into service, and noted Recommendations 8/26 and 8/27 of the MET/OPS Meeting. To allow appropriate and adequate preparations to be made by States, the Committee made the following recommendations:

RECOMMENDATION No. 6 v/3 - METEOROLOGICAL OPERATIONAL REQUIREMENTS OF SUPERSONIC TRANSPORTS

That WMO be informed that the meteorological operational requirements of supersonic transports referred to in MET/OPS Recommendations 8/26 and 8/27 will include in the NAT Region a requirement for the exchange of regular and reliable upper air reports of wind and temperature from a sufficiently dense network of stations to serve operations at levels up to 24,000m (80,000 ft).

6v-1.4.3 Noting that the above requirements would have to be considered in relation to jointly financed facilities, the following recommendation was made:

RECOMMENDATION No. 6 v/4 - JOINTLY FINANCED OBSERVATION STATIONS

That ICAO take action as necessary to ensure coordination in all implementation planning aspects, related to upper wind reporting stations referred to in Recommendation No. 6 v/2 and Recommendation No. 6 v/3, under ICAO joint financing arrangements.

6v-1.5 Landing forecasts

6v-1.5.1 The CM Committee found the existing Regional Supplementary Procedures on the subject of landing forecasts were, on the whole, satisfactory. However, it noted that, for technical reasons, difficulty was currently being experienced by Canada and the United States in preparing landing forecasts for certain aerodromes. Noting that these difficulties could be overcome more easily if landing forecasts of the self-contained type, instead of the trend type, were issued, it made the following recommendation :

RECOMMENDATION No. 6 v/5 - AMENDMENT TO THE MET SUPPLEMENTARY PROCEDURES -
LANDING FORECASTS

That Part 4 of Doc 7030 (amended up to No.102 dated 19/11/64) be amended as follows:

Amend paragraph 2.4.2 1), applicable in the NAT Region, to read:

1) Type

Landing forecasts issued should preferably be of the trend type.

6v-1.5.2 The Committee noted with satisfaction the statements by the Delegates of Canada and the United States to the effect that they would continue their efforts to find practical ways of making landing forecasts available where operationally necessary.

APPENDIX IAREA FORECAST SYSTEMNotes:

1. Each area forecast centre appearing in column (1) is responsible for the preparation of forecasts for the area specified in column (2). It is required to transmit charts covering the area specified in column (3) (using, as appropriate, parts of forecasts received from other centres).
2. Reception of the charts is required at the points listed after the tabular section, below.
3. The selection of charts issued should be in accordance with Regional Supplementary Procedures, Doc 7030, Part 4, Meteorology paragraph 2.4.4 2). Charts should be valid for the time given in column (4) and transmission should be completed by the times indicated in column (5).
4. The specifications of the charts should be as follows:
 - a) all charts - fixed time prognostic charts;
 - b) projection and scale - Miami: Mercator, scale 1:15 million at 22 $\frac{1}{2}$ °N.
Others: Polar stereographic, scale 1:15 million at 60°N.
5. Wherever facsimile equipment is used, the terminal equipment should have the standard characteristics adopted by WMO for application in the facsimile transmission of charts of the kind to be used in the area forecast system.
6. The quality of the charts received should be such as to permit reproduction for flight planning and documentation. (This implies good propagation conditions if radio facsimile is used and proper balancing etc., if land line facsimile is used.) Received charts should be legible over 95% of their area and be a fair copy of the original.
7. Wherever radio facsimile is used, the applicable technical radio characteristics specified by the CCIR and the CCITT should be applied.
8. Interruption of satisfactory reception should not exceed 10 minutes during any period of 6 hours.

CENTRES

Area forecast centre	Area of responsibility for preparation of forecast.	Approx. area of charts issued.	Times to which charts relate (GMT)	Times by which transmission is to be completed.
(1)	(2)	(3)	(4)	(5)
Part 1. NORTH AMERICA				
Canadian centre	Canada and the Arctic Ocean	A. 64°N 144°E 62°N 18°E 36.5°N 122°W 36°N 72°W	00, 06, 12, 18	In appropriate sequence, 14 to 9 hours before the times given in column (4).
New York	Principal NAT air routes from the east coast of North America to Europe.	B. 53°N 82°W 62°N 47°E 17°N 52°W 31°N 14°E	00, 06, 12, 18	
Washington	United States	C. 47°N 133°W 45°N 58°W 23°N 118°W 22°N 74°W	00, 06, 12, 18	
Miami	Central America, the Gulf of Mexico and the Caribbean Sea west of 72°W	D. Between Equator and 43°N, and between 55 and 120°W	00, 06, 12, 18	
Part 2. EUROPE				
United Kingdom centre	Air routes from western Europe to Canada, the continental United States (including Alaska) and the eastern Caribbean. <u>Interim area, until the above can be implemented</u> Principal NAT air routes from western Europe to northeastern North America.	E. To be decided later <u>Initially</u> F. 45°N 99°W 52°N 36°E 19°N 63°W 22°N 2°W	00, 06, 12, 18	11 hours earlier than the times given in the preceding column.

RECEPTION

Reception of charts for the areas indicated is required at the following points, for onward distribution and/or for use at a local aerodrome:

a) In North America

Montreal	B*, C*, D*
Washington	A*

b) In Greenland

Søndre Strømfjord	A**, B and C**; <u>or</u> E
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c) In Europe

Shannon	København	Zurich	} E
London	Praha	Madrid	
Paris	Frankfurt	Roma	
Oslo	Amsterdam	Lisboa	
Reykjavik	Bruxelles	S. Maria	

Note: * The necessary facilities are already in operation.
 ** If possible A and C should be combined to the extent necessary to cover on one chart routes to Los Angeles and to Anchorage.

APPENDIX II
AMENDMENTS TO REGIONAL SUPPLEMENTARY PROCEDURES
DOC 7030, PART 4, METEOROLOGY

Insert new paragraphs as follows:

"2.4.4 Area Forecasts

1) Preparation of area forecasts

Area forecasts for the Area Forecast System shall be prepared by area forecast centres indicated in the Regional Plan and for the areas there specified

T6

2) Form of area forecasts

Area forecasts for the Area Forecast System shall be prepared in the form of fixed-time prognostic charts, and shall include a selection of the following, determined by agreement between the Meteorological Authorities concerned, taking into account the needs of the operators:

- i) surface and significant weather charts (normally combined)
- ii) a 700 mb chart
- iii) a 500 mb chart
- iv) a 300 mb chart
- v) a tropopause/maximum wind chart and a 200 mb chart or a tropopause/vertical wind shear chart.

3) Times of transmission and validity of area forecasts

Area forecasts issued under Area Forecast System shall be transmitted at times indicated in the Regional Plan and shall have the times of validity there stated.

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4) Dissemination of area forecasts

- a) Area forecasts issued under the Area Forecast System shall be disseminated to meteorological

T6

offices wishing to receive them as indicated in the Regional Plan, or by alternative means if so agreed by the Meteorological Authorities concerned.

- b) The areas of the prognostic charts that are issued by facsimile transmission by area forecast centres shall be as indicated in the Regional Plan."

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Insert new paragraph, as follows, under existing 2.6.5 Area, flight and route forecasts and amendments to these forecasts:

"Area forecasts issued under the Area Forecast System in the form of prognostic charts and disseminated by means other than facsimile shall be transmitted in a form agreed upon by the Meteorological Authorities concerned."

SECTION 6v-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6v

Meteorological service for flight planning and air traffic services

6v-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6 v) and made the following comments:

6v-2.1.1 The Policy and Programming Committee did not share the view expressed in parenthesis in paragraph 6v-1.1.8 a). However, it agreed that a uniform meteorological basis for flight planning could be expected to result in a more economical use of airspace.

SECTION 6v-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6v

6v-3.1 The General Committee reviewed the material presented to it under Agenda Item 6v and made no comment.

Agenda Item 6: Preparation of Amendments to the North Atlantic Plan and Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 vi: Aeronautical Fixed Services

In considering Agenda Item 6 vi due attention was given to the short-term air route table and the statement of operational requirements established on Agenda Items 2 b) and 3 by the Policy and Programming Committee.

SECTION 6 vi-1: ACTION BY THE CM COMMITTEE ON AGENDA ITEM 6 vi

Aeronautical Fixed Services

THE NAT SUBMARINE CABLE SYSTEM

6vi-1.1 Channel 1 of NAT Cable

6vi-1.1.1 Present Function of Channel 1

6vi-1.1.1.1 The Committee noted that the function of Channel 1 as recommended by the NAT IV RAN Meeting is to provide a Simplex-Omnibus circuit, connecting the principal aeronautical stations of the North Atlantic to permit the exchange of messages necessary for coordination and cooperation of the NAT R/T network operations. In view of the special nature of the circuit NAT IV felt that traffic would not need to be prepared in AFTN format.

6vi-1.1.1.2 Representatives of the States directly concerned informed the Committee that the present function of the channel is in accordance with the recommendation of the NAT IV RAN Meeting and that more specifically the channel is used for the following types of messages:

- A. Station to station communication using informal procedures for liaison between air/ground staffs at the network centres.
- B. Forwarding of ground originated messages to other network stations for relay to aircraft in flight.
- C. Relay of certain messages between network stations from aircraft in flight. In some cases onward relay to destination is achieved by subsequent transfer to AFTN or AFS circuits.

6vi-1.1.2 Effectiveness of Channel 1

6vi-1.1.2.1 There was agreement that the general liaison role of Channel 1 has been performed most effectively and that this has resulted in many direct advantages in the operation of the HF aeromobile networks. An example cited was that at one aeronautical station the number of "alerts" due to loss of communications had dropped from 303 in 1962 to 146 in 1964 due very largely to the ability to coordinate rapidly with other stations without using aeromobile channels.

6vi-1.1.3 Loading on Channel 1

6vi-1.1.3.1 The present loading on the channel was noted to be low. This was considered to be a desirable condition if the channel were to be able to perform its special liaison function so long as the present physical arrangements for the operation of the channel are continued. The normal criteria of AFTN channel loading do not of course apply in these circumstances.

6vi-1.1.3.2 A substantial proportion of the present load involves coordination activities between Shannon and Birdlip. It was noted, however, that this would no longer be the case when all HF aeromobile services for the Shanwick OAC were provided from Shannon.

6vi-1.1.4 Possible changes to Channel 1

6vi-1.1.4.1 The Committee considered a number of possible changes that might be introduced to provide for even more effective use of the channel. These included:

- i) changes in procedures associated with use of the channel including the development of a predetermined address list;
- ii) more extensive use of tape feed (most liaison communication at present is manual operation and would probably remain so);
- iii) increase in modulation rate from 50 to 75 baud;
- iv) automatic preparation of message format and push-button selection for delivery;

as well as a number of other possibilities.

6vi-1.1.4.2 The Committee was of the opinion that at this time there were no grounds for proposing any fundamental change in the functional utilization of Channel 1 although the matter would as a matter of course be kept under constant review. Special attention in future planning will need to be given to integration with automatic AFTN facilities planned for implementation in both North America and Europe during the next few years.

6vi-1.1.4.3 Attention was given to the desirability of splitting Channel 1 at Reykjavik, which had been mentioned as a possibility by the NAT IV RAN Meeting. It was agreed that this would be a fairly radical change for which no early need could be foreseen.

6vi-1.1.5 Procedures associated with the use of Channel 1

6vi-1.1.5.1 The prime purpose of Channel 1 is to provide direct liaison between air/ground radio stations. Operational experience has indicated that this function is best performed on a manual basis using informal circuit procedures.

6vi-1.1.5.2 A further function is to relay traffic, by tape transmission, from the aeronautical mobile channels, to other air/ground radio stations, which have not copied it by intercept in accordance with normal network operating practices. This traffic is then delivered to ATC and MET, as if it had been directly received from the aircraft.

6vi-1.1.5.2.1 Operational experience has also indicated that by the adoption of suitable procedures at the air/ground radio stations Channel 1 may also be used to facilitate delivery, as appropriate, of aircraft originated message traffic to airline agencies. This procedure would obviate duplication on NAT AFTN channels.

RECOMMENDATION No. 6 vi/1 - PROCEDURES FOR THE USE OF CHANNEL 1

- a) That informal procedures continue to be used for the liaison function.
- b) That air/ground radio stations use Channel 1, as required, to relay messages to other air/ground radio stations which have not received them by normal network intercept procedures.
- c) That the air/ground radio stations connected to Channel 1 should accept responsibility on a predetermined* basis, to relay traffic received on Channel 1, without specific AFTN address, to preferably one and not more than two airline addressees in their areas of responsibility as designated below:

Gander	- North America
Prins Christian Sund	- Nil
Reykjavik	- Iceland and Greenland
Aeronautical station(s) serving Shanwick OAC	- Europe

* Note 1 - Airline operating agencies normally indicate to the aeronautical stations concerned where traffic is to be delivered.

Note 2 - It is recognized, however, that for the time being it may be necessary for AFTN format to be used on Channel 1, to facilitate onward relay.

6vi-1.1.5.3 In order to keep both AFTN and ground-to-air traffic to a minimum, it was agreed that Channel 1 should also be used to relay ground originated traffic to a radio station in direct communication with an aircraft. In these circumstances ground agencies need only forward their traffic to the nearest radio station connected to Channel 1. In this respect the following recommendation for a new COM SUPP was made.

RECOMMENDATION No. 6 vi/2 - NAT COM SUPPS- FORWARDING OF GROUND INITIATED TRAFFIC TO AIR/GROUND STATIONS

That the following new COM SUPP be included in Doc 7030 and related to Annex 10, Part III, 4.4.1.2.3:

"Airline operating agencies should normally pass messages destined for onward transmission to aircraft to the nearest air/ground station in the network. This station, if unable to transmit directly to the aircraft, will utilize Channel 1 to pass the message to another air/ground station in direct communication with the aircraft."

6vi-1.2 Channels 2, 3 and 4 of the NAT Cable

6vi-1.2.1 Method of operation of Channels 2, 3 and 4

6vi-1.2.1.1 In the light of experience reported by States directly involved in the operation of the channels it was agreed that the best method of deployment for the immediate future would be as indicated below. In reaching this conclusion it was decided that at this time there was insufficient justification for providing a channel for the exclusive use of MET traffic although some reconsideration of this matter might become necessary in future planning, having full regard to the AFTN requirements.

Channel 4	-	Direct London-Gander AFTN
Channel 3	-	Direct London-Gander AFTN
Channel 2A	-	Direct AFTN duplex London-Reykjavik
Channel 2B	-	Direct AFTN duplex Gander-Reykjavik

The necessary amendments to the NAT Plan to reflect the foregoing deployment are contained in Recommendation No. 6 vi/5 which consolidates all proposed changes to the fixed services plan.

6vi-1.3 Channels of the NAT Cable - General Considerations

6vi-1.3.1 General Serviceability of the channels

6vi-1.3.1.1 It was noted that there continue to be occasions when outages occur and the criteria for the provision of alternative routing are not satisfied. That is a maximum of 15 minutes for any of the four teletypewriter channels and 5 minutes for the voice channel as recommended by the Second North Atlantic Fixed Services Meeting. It was therefore agreed to make the following recommendation.

RECOMMENDATION No. 6 vi/3 - NAT CABLE CHANNEL SERVICEABILITY

That the States directly concerned take all necessary steps to ensure that the agreed criteria for the provision of alternative routing in the event of a channel failure are fully satisfied.

6vi-1.3.2 Modulation rates

6vi-1.3.2.1 It was generally recognized that full utilization of the band-width characteristics of the cable by use of a modulation rate of 75 baud as opposed to the present 50 baud was highly desirable. In this respect it was noted that Canada and the United Kingdom plan to test one channel at 75 baud in June 1965.

RECOMMENDATION No. 6 vi/4 - MODULATION RATES

That as soon as practicable after the planned test of one channel has demonstrated that there are no difficulties the States concerned should on the basis of coordinated planning increase the modulation rate for Channels 2, 3 and 4 from 50 to 75 baud and also for Channel 1 if found to be necessary.

Note.- In some States a nominal 75 baud rate sometimes may be interpreted as 74.2 baud. The foregoing recommendation relates to a true modulation rate of precisely 75 baud.

6vi-1.4 Specific Amendments to the NAT Fixed Services Plan

6vi-1.4.1 In reviewing the NAT Fixed Services Plan it was agreed to recommend the deletion of all circuits which were wholly contained within one country in accordance with current AFTN planning principles.* In addition the need to retain a number of circuits now that the cable system is fully operational was considered and appropriate amendments proposed. Particular attention was given to the need to retain the RTT circuit between London-Reykjavik (BE 1357) and it was felt that this would be justified for a further period of time as explained in the comment following that item in Recommendation No. 6 vi/5. Other minor changes were agreed in order to rationalize the plan as explained in a number of comments.

RECOMMENDATION No. 6 vi/5 - AMENDMENT TO NAT FIXED SERVICES PLAN

That Table COM 1A of Doc 7674/8 be amended as follows:

Page 3-1-2

- i) Delete the 3 Notes on this page

Page 3-1-3

- i) Amsterdam-Shannon - Insert Note Column 5: "The Administrations responsible for operation will agree on a date for cessation in light of EUM AFTN Plan implementation."

* Manual on the Planning and Engineering of the AFTN (Doc 8259-COM/553).

Page 3-1-3 (cont'd)

- ii) Argentia-Gander - Delete the entry
- iii) Argentia-Stephenville - Delete the entry
- iv) Frobisher-Goose - Delete the entry
- v) Gander-London - Replace present Note by: "Two duplex Channels 3 and 4 of Scotice/Icecan cables."
- vi) Gander-Montreal - Delete the entry
- vii) Gander-New York - Replace present Note by: "Two duplex circuits."
- viii) Gander-Reykjavik (BC 976) - Delete the entry
- ix) Gander-Reykjavik (BC 1825) - Replace present Note by: "Channel 2 of Icecan cable."
- x) Gander-Shannon - Delete the entry
- xi) Gander-Sydney - Delete the entry
- xii) Goose-Montreal - Delete the entry
- xiii) Goose-Søndre Strømfjord - Add in Col. 3 - "(VHF)"

Page 3-1-4

- i) Lisboa-New York - Col. 5 amend "P-/65" to read "P-/69"
- ii) London-Oslo - Col. 5 add Note: "This requirement met by Oslo-Kobenhavn-London circuits."
- iii) London-Reykjavik (BE 1357) - Col. 5, delete Note 1
 COMMENT: After careful analysis of the relative vulnerability of the various NAT cable circuits it was decided by the CMC to propose retention of this RTT circuit as a back-up for Channel 2 of the Scotice cable. Reconsideration of the need to retain the circuit could take place after a further period of operational experience with the cable system.
- iv) London-Reykjavik (BE 1829) - Replace present Note by: "Channel 2 of Scotice cable."
- v) Moncton-Montreal - Delete the entry
- vi) Mont Joli-Montreal - Delete the entry
- vii) Montreal-New York - Delete the entry

Page 3-1-5

- i) Oslo-Stavanger - Delete the entry
- ii) Prestwick-Shannon - Delete the entry
- iii) Reykjavik-Søndre Strömfjord - Col. 3, add "(VHF)"
- iv) St. John's-Stephenville - Delete the entry
- v) Add a new entry: "Santa Maria-Shannon - Rtt dx"

COMMENT: This circuit was deleted from the NAT Plan by the NAT IV RAN Meeting. However, it has continued in operation and carries a substantial load of diversion traffic. The need for its deletion could be reviewed when the Lisboa OAC has been fully implemented.

6vi-1.5 General Technical Improvements to AFTN

6vi-1.5.1 The Committee was aware that the transit time requirements established by NAT IV were not always being met and that improvements in message handling were therefore desirable. To this end the following two recommendations were made.

RECOMMENDATION No. 6 vi/6 - PROVISION OF AUTOMATIC MESSAGE RELAY EQUIPMENT

That in order to improve transit times within the NAT AFTN States be encouraged to implement as soon as possible automatic message relay equipment to the greatest extent practicable.

RECOMMENDATION No. 6 vi/7 - PROVISION OF ARQ

That whenever practicable States should provide Automatic Error Correction equipment (ARQ) for RTT circuits operating into automatic relay centres.

Note.- It should be noted that the provision of ARQ on RTT circuits also provides an economical means of obtaining additional channels for AFS use.

6vi-1.6 Search and Rescue Communication Requirements

6vi-1.6.1 The CM Committee was not aware in detail of the extent to which SAR fixed service communication requirements - in particular between OACs and RCCs - was presently being satisfied. It was considered that any additional needs which might arise in this respect could be well satisfied by the use of TELEX and therefore the following recommendation was made.

RECOMMENDATION No. 6 vi/8 - USE OF TELEX FOR SAR COMMUNICATIONS

That to the extent that SAR requirements for fixed service communications are not now being fully satisfied or in order to meet new requirements which may develop, States consider the practicability of employing TELEX.

6vi-1.7 Long-Term Planning for NAT Aeronautical Fixed Communications

6vi-1.7.1 In the course of its deliberations the Committee studied various possible future developments which might progressively need to be reflected in the NAT Plan to accommodate increased communications traffic or changing operational requirements. While no firm recommendations were made that one or another development would necessarily have to be adopted it was felt that it would be useful to include in this Report material which could serve as a basis for any future studies.

6vi-1.7.2 One possible development which was considered in detail and agreed to have a great deal of merit was presented to the meeting by France. It was concerned with the development of the main cable circuits to produce increased capacity and flexibility for traffic associated with the principal area of the Region. In essence this would involve the provision of fully automatic relay capabilities in Iceland for cable channels 2, 3 and 4, which was believed to be capable of implementation by 1968 to 1970, further extending this development in order to provide a more satisfactory arrangement for those elements of the NAT AFTN which involve Greenland as it was considered undesirable to rely on the continued availability of circuits which were not provided on a permanent basis, the provision of a new cable channel (5) from Iceland to Frederiksdal connecting to domestic circuits from Frederiksdal to Søndre Strømfjord. Such an arrangement would be in accordance with the accepted engineering and planning principles for the AFTN and would, it was believed, be capable of implementation by 1970. A general description of such an arrangement is contained in Appendix B to this Section of the Report.

RECOMMENDATION No. 6 vi/9 - FUTURE PLANNING FOR NAT AFTN DEVELOPMENTS

That within any machinery established for the development on an evolutionary basis of the NAT Plan to meet future operational requirements examination should be made of development of the AFTN described in the foregoing paragraph 6vi-1.7.2 and its associated Appendix B.

6vi-1.7.3 If at a later date substantially increased fixed service capacity becomes necessary between Gander and London, one possible solution would be to introduce a wide-band high-speed cable channel between these two points as a replacement for one or more of the existing teletypewriter channels. This arrangement could have economic advantages over the provision of additional 75 baud channels to handle the same amount of traffic. The Committee agreed that this possibility should also be studied as a potential element of future planning in the Region although it was generally considered that this would likely be a longer-term development than that outlined in 6vi-1.7.2.

RECOMMENDATION No. 6 vi/10 - LONG-TERM PLANNING FOR NAT AFS DEVELOPMENTS

That the possible development outlined in paragraph 6vi-1.7.3 above be evaluated and applied as necessary in any long-term planning for the evolutionary development of the NAT AFS to meet future requirements.

6vi-1.8 Meteorological Fixed Communication Matters6vi-1.8.1 Amendments to the Plan for Aeronautical Meteorological Circuits

6vi-1.8.1.1 Table COM 1B of the Regional Plan Publication was reviewed and the following recommendation made to delete circuits which are wholly within one State (as was done for similar circuits of the AFTN) and to reflect certain factual information.

RECOMMENDATION No. 6 vi/11 - AMENDMENT TO NAT PLAN FOR AERONAUTICAL MET CIRCUITS

That Table COM 1B of Doc 7674/8 be amended as follows:

- i) Circuit MET 1
 - Col. 2 - Replace Prins Christian Sund by Reykjavik
 - Col. 3 - Delete "sx"
 - Col. 5 - Replace Note by: "Uni-directional Angmagssalik to Reykjavik with capability of requested repeats as required."
- ii) Circuit MET 3 - Delete the entry
- iii) Circuit MET 4 - Delete the entry
- iv) Circuit MET 5 - Delete the entry
- v) Circuit MET 7 - Delete the entry
- vi) Circuit MET 8 - Col. 5, amend "P-/65" to read "P-/69"
- vii) Circuit MET 9 - Col. 5, add "P-/69"
- viii) Circuits MET 6 and 11 - Col. 3, add "(VHF)"

6vi-1.8.2 Basic Meteorological Data6vi-1.8.2.1 Dissemination of basic meteorological data from Greenland and Iceland

6vi-1.8.2.1.1 Checks carried out on the dissemination of Greenland surface and upper air data to Europe via Reykjavik (using the Scotice-Icecan cable) and the IMTNE* showed that the revised arrangements made to avoid the need for changing headings, etc. en-route had resulted in the more rapid dissemination of MET data. Similar checks on the dissemination of data from Iceland to Europe also showed improved transit times.

6vi-1.8.2.1.2 It was agreed that there was no need to retain provision for the direct transmission of basic data from Greenland and Iceland to Gander via the AFTN.

6vi-1.8.2.2 Reception of basic meteorological data in Greenland and Iceland

6vi-1.8.2.2.1 It was reported that reception of North American basic data in Iceland via the New York (WSY) RTT broadcasts was not sufficiently reliable. In fact the situation had not improved since 1961 when the NAT IV RAN Meeting considered the matter (Doc 8198, NAT/IV, para. 12.1.3.1). The Hemisphere Broadcast from Offenbach (DDF) provided a satisfactory means of receiving data for 00 and 12 GMT but reports from the western North Atlantic weather ships were transmitted with excessive delay and transmission of 06 or 18 GMT data was not provided for under the hemispheric exchange system.

6vi-1.8.2.2.2 The Committee noted that the reception of basic data at Søndre Strømfjord using arrangements made by WMO was not satisfactory, and that the required data were currently being received by other means. However, if these means later became unavailable, it might be necessary to consider using aeronautical channels temporarily to obtain data from both Europe and North America.

* International Meteorological Telecommunications Network in Europe.

6vi-1.8.2.2.3 The estimated future requirements of Søndre Strømfjord for basic meteorological data and those of Reykjavik at the present time are listed in the Appendix to this section of the Report.

6vi-1.8.2.2.4 Recognizing that arrangements for the exchange of basic meteorological data are the responsibility of WMO, the CM Committee recommended as follows:

RECOMMENDATION No. 6 vi/12 - RECEPTION OF BASIC DATA IN GREENLAND AND ICELAND

That WMO be informed that the following minimum requirements for the reception of basic meteorological data in Greenland and Iceland are not being met satisfactorily through facilities arranged by WMO*:

a) In Greenland

- i) 6-hourly surface synoptic reports (42 stations) and 12-hourly upper air reports (73 stations) from North America.
- ii) 6-hourly surface synoptic reports and 12-hourly upper air reports from OSVs A, B, C, D, I, J, K, M.
- iii) 6-hourly surface synoptic reports (9 stations) and 6-hourly upper air reports (1 station) from Iceland.
- iv) 6-hourly surface synoptic reports (30 stations) and 12-hourly upper air reports (29 stations) from Europe.

b) In Iceland

- i) Surface synoptic reports at 0600 and 1800 GMT from North America and ship reports from the western part of the North Atlantic (Bulletins SMUS 1, 2, 3 - KJFK; SMCN 1, 2, 3 - KJFK; SMXX-KWBC).
- ii) Surface synoptic reports from OSVs in the western part of the North Atlantic (Bulletins SMNT/SINT-KNMH).
- iii) Upper air reports from OSVs in the western part of the North Atlantic (Bulletins USNT/UWNT-KNMH).
- iv) AIREPs for the North Atlantic (Bulletins UANT-CYQX and EINN).

6vi-1.8.2.2.5 Pending the necessary improvements as a result of Recommendation No 6 vi/11, the Committee agreed that the most practical way to make provision for the transmission of data to Iceland would be to use one channel of the London-Reykjavik RTT circuit (BE 1357) the retention of which has been recommended as a back-up circuit for the Scotice cable channel.

* other means are currently being used successfully for receiving the necessary data in Greenland.

RECOMMENDATION No. 6 vi/13 - TRANSMISSION OF MET DATA TO ICELAND

That the States directly concerned study the practicability, pending the provision of suitable WMO circuits, of transmitting from the United Kingdom the MET data required in Iceland (Rec. No. 6vi/12 refers) over the back-up AFTN circuit London-Reykjavik (BE 1357), bearing in mind the possible future need for onward transmission to Greenland (see Rec. No. 6vi/9).

6vi-1.8.2.3 Exchange of basic meteorological data between WMO Regions IV and VI

6vi-1.8.2.3.1 With respect to the exchange of basic meteorological information between Region IV (North and Central America) and Region VI (Europe) of WMO, the Committee noted with appreciation the improvements achieved by implementing the cable teletypewriter channel between Offenbach and New York. It felt, however, that some improvements in the scheduling of the data, as well as in the regularity of transmission, would be desirable for aeronautical purposes with a view to ensuring more rapid and regular reception. This was considered particularly important for the transmission of upper air information up to the 100 mb level.

6vi-1.8.2.3.2 The Committee felt that the synoptic reports from NAT aerodromes should be included in the relevant bulletins.

6vi-1.8.2.3.3 As regards the exchange across the Atlantic of synoptic data from land stations at intermediate synoptic hours (para. 12.1.6.2 of the Report of NAT IV RAN Meeting - Doc 8198, NAT IV - refers), the Committee agreed that there was at present for the time being no aeronautical requirement for maintaining the exchanges. It recognized that there might be a requirement in four or five years time, but considered that their elimination for even a short period would be worth while since it would permit more rapid dissemination of upper air data.

6vi-1.8.2.3.4 The CM Committee accordingly made the following recommendation.

RECOMMENDATION No. 6 vi/14 - EXCHANGE OF BASIC DATA BETWEEN WMO REGIONS IV AND VI

That WMO be informed that the requirements regarding the exchange of basic data between Regions IV and VI are as follows:

- a) that the scheduling of data be rearranged to ensure more rapid and regular reception, especially of information up to the 100 mb level;
- b) that synoptic reports for the main synoptic hours from regular aerodromes listed in the North Atlantic Regional Plan be included in the relevant bulletins.

6vi-1.8.3 Operational Meteorological Messages6vi-1.8.3.1 Dissemination of operational meteorological messages

6vi-1.8.3.1.1 The CM Committee confirmed the view of the NAT IV RAN Meeting (Doc 8198, NAT IV, para. 12.1.13) that the following classes of operational meteorological data should be carried on the AFTN, including appropriate channels of the Scetice-Icecan cable:

TAFORs, amended TAFORs, routine meteorological reports, SIGMET information messages, special AIREPs and route and area forecasts.

It was understood that this arrangement was on the whole satisfactory for the dissemination of SIGMET information. AIREPs required for direct operational use were usually being disseminated promptly via the stations of the HF radiotelephony networks, while the dissemination for synoptic purposes was being carried out by the means used for basic data.

6vi-1.8.3.1.2 The CM Committee noted that the transmission of aerodrome forecasts in TAFOR code form between North America and Europe - carried out since 1 January 1964 exclusively via the Scotice-Icecan cable (NAT IV Rec. 6/3 refers) - was not satisfactory. The collective messages were subject to delay, often exceeding 20 minutes, and some were not received at all. It was also noted that TAFORs required to travel from East to West across the Atlantic would be likely to present some difficulties when Phase 3 MOTNE is introduced. In this connexion the Committee confirmed the transit time requirements stated in paragraph 2.1.1.4.4 of the Report of NAT IV RAN Meeting (Doc 8198, NAT IV).

6vi-1.8.3.1.3 The problem which exists was recognized as being very real but it was nevertheless considered that it was not due to a communications circuit deficiency but rather that delays were being created by the need for manual reprocessing of material due to divergent procedures in Europe, Canada and the United States.

6vi-1.8.3.1.4 In the circumstances facing the Committee no immediate solution to the problem could be seen. The requirements stated by MOTNEP (MOTNE V, Rec. 6/12) for the availability of North American bulletins on the MOTNE also were not well understood due to the limited background material which had preceded the Panel's recommendation. The possibility that that requirement could be satisfied by the EUM AFTN, in particular when it has been full automated, was mentioned but again the Committee concluded that on the basis of the information available it was unable to advance any solution to the problems posed. No alternative could be seen therefore to recommending as follows.

RECOMMENDATION No. 6 vi/15 - TAFOR EXCHANGES BETWEEN EUROPE AND NORTH AMERICA

That the problems resulting in transit times in excess of 20 minutes in the exchange of TAFORs between Europe and North America including the associated problems of insertion into or extraction from the MOTNE be studied by a suitably qualified group with a view to arriving at an early satisfactory solution.

Note.- The Committee deliberately did not suggest any particular group which would be best qualified to undertake this task, although it was recognized that certain features of both the NCMC and the MOTNEP were relevant to the general problem. Further it was noted that TAFOR addressing difficulties could be resolved by direct coordination between the States concerned.

APPENDIX A

- I - Circuit loading to meet the minimum future requirements of Søndre Strømfjord for basic data, if not connected to the proposed area forecasting system*

North America to Greenland		Number of Groups per day
<u>Surface:</u>		
6 (Land stations		1008
hourly (Ocean stations		176
<u>Upper air:</u>		
00 and (Land stations		5402
12 GMT (Ocean stations		312
Sub-total		6898
Iceland to Greenland		
6 hourly surface:		216
6 hourly upper air:		480
Sub-total		696
Europe to Greenland		
<u>Surface:</u>		
6 (Land stations		720
hourly (Ocean stations		176
<u>Upper air:</u>		
00 and (Land stations		2146
12 GMT (Ocean stations		312
Sub-total		3354
Grand total		10948

* The requirements would be reduced by roughly 40% if Søndre Strømfjord received area forecasts for NAT flights.

- II - Circuit loading to meet the minimum requirements of Reykjavik for additional basic data, if not connected to the proposed area forecasting scheme*

North America to Iceland		Number of Groups per day
Surface:		
06 and	(Land stations	1722
18 GMT	(Ocean stations and ships	1080
Upper air:		
		Sub-total
		2802
00 and	(Ocean stations	480
12 GMT		
Grand total		3282

* No estimate can be made of the requirements if Reykjavik received area forecasts for NAT flights.

APPENDIX BA POSSIBLE FUTURE DEVELOPMENT OF THE NAT AFTN

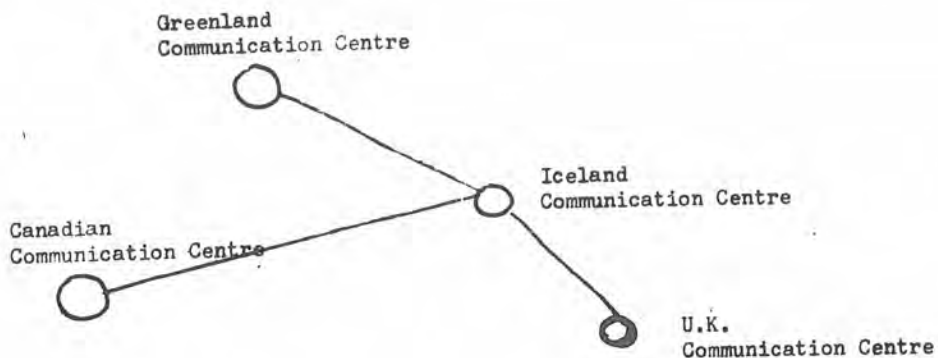
1. In this study of AFTN planning for the northern part of the NAT Region the provision of services to Greenland was studied on the basis of the principal means of communication between Europe and America, consisting of the three AFTN channels of the cable.

1.1 The view expressed by the Committee was that:

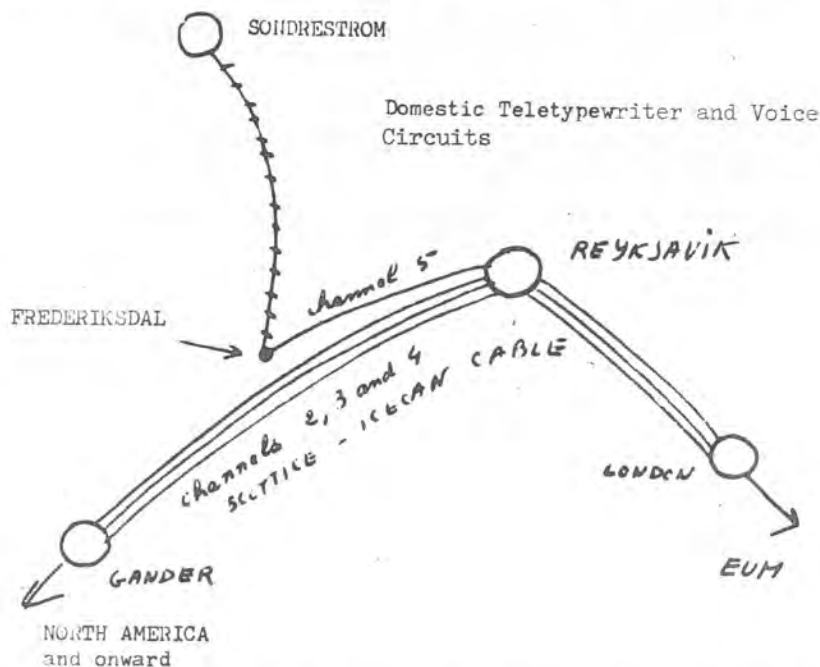
- a) AFTN traffic, during the years corresponding to fairly long-term planning, would be maintained at a relatively low volume and be made up chiefly of basic meteorological and operational data transmissions to and from Greenland.
It was agreed that the most practical way to route these data would be to insert them in the AFTN - in an appropriate form.
- b) The physical means of providing service to Greenland should be reliable, efficient and economical.
- c) The proposed planning should meet the operational requirements established at this Meeting and be in agreement with the criteria applicable to the planning and engineering of the AFTN (Doc 8259-COM/553).
- d) As far as practicable and for reasons of economy of frequencies and equipment, the physical support of the circuits should permit several of the requirements of the aeronautical fixed service to be met, and it should rely on facilities provided on a permanent basis.

Furthermore, it has been noted that the configuration envisaged, would facilitate message routing. This is because Greenland, which is in Routing Area B (BG), would be served by Iceland which is also in Routing Area B (BI).

1.2 Consequently, the proposal suggests the following configuration for the AFTN to serve Greenland and Iceland:



1.3 In practice, this planning could be achieved as follows for APTN and ATs voice circuits:



1.4 The Greenland communication centre (here assumed to be located at Sondrestrom) would be served by the leasing of a cable teletypewriter channel (e.g. at 75 baud) between Reykjavik and Frederiksdal connected to a domestic teletypewriter and voice circuit.

1.5 The lease for this channel should include a clause stipulating that in the event of submarine cable failure between Greenland and Iceland, a reserve channel would be brought into service between Canada and Greenland, with Gander handling the diversion.

1.6 It was noted that the domestic teletypewriter and voice circuits between Sondrestrom and Frederiksdal would have the advantage of easily providing a telephony channel for ATC purposes, which by switching could give access to the ATC link of the cable and thus provide a means of coordination.

1.7 These circuits could, in the opinion of Denmark, be introduced into service by D/O.

SECTION 6 vi-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING
COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6 vi

6 vi-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6 vi and made no comment.

SECTION 6vi-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 6vi

6vi-3.1 The General Committee reviewed the material presented to it under Agenda Item 6vi and made no comment.

Agenda Item 6: Preparation of Amendments to the North Atlantic Plan and
Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 vii: Low frequency radio teletypewriter (ground-to-air) broadcasts

To the limited extent that it was directly applicable to the consideration of this Agenda Item, due attention was given to the statement of operational requirements established by the Policy and Programming Committee, as contained in the Reports on Items 2 b) and 3.

SECTION 6 vii-1: ACTION BY THE CM COMMITTEE ON AGENDA ITEM 6 vii

Low frequency radio teletypewriter (ground-to-air) broadcasts

6vii-1.1 General

6vii-1.1.1 The Committee considered a proposal of the United Kingdom that the experimental LF RTT Ground-to-Air Broadcast system which has been in operation in the NAT Region for a number of years should be recognized as a necessary element of the NAT Plan.

6vii-1.1.2 The proposal was based on the UK view that the LF RTT system would be technically and operationally preferable to the HF VOLMET Broadcast, which initially it would supplement, and further that the new system would lend itself to evolutionary expansion to satisfy not only VOLMET requirements but also to handle such matters as urgent NOTAMS, ATC organized track data, etc. The use of the airborne printer in conjunction with VHF links and possible future air/ground data links was also foreseen. The possible spectrum economy by ultimately being able to discontinue the HF VOLMET broadcasts was also cited.

6vii-1.2 Technical Evaluation

6vii-1.2.1 The Committee noted that the Communications Division, Seventh Session, had considered this subject and reported on it in Chapter 12 of its Report, Doc 8226-COM/552. It was agreed that such additional data as had become available since the COM Division met in 1962 had only served to re-affirm the conclusions then reached of which the most significant from a technical viewpoint was that:

"the system has demonstrated its capability of providing a ground-to-air communication channel of high reliability over comparatively long distances in an automatic manner."

6vii-1.3 The operational need for the system

6vii-1.3.1 The Committee was widely of the opinion that while the technical capability of the system had been firmly established during an extensive period of trial, there was appreciably less evidence that it was operationally necessary

as an element of the overall NAT Communication System. The airborne penalty in terms of the cost and bulk of additional equipment was thought by many to be high in relationship to the immediate benefits which such a system might afford also bearing in mind the alternative VHF and HF communication methods which are either now available or planned for early implementation.

6vii-1.3.2 With respect to the operational need for the system the Committee was therefore unwilling to give general support for either of the most extreme points of view expressed. That is, on the one hand general support for the proposal as presented or, on the other, rejection of the system as having little immediate operational usefulness.

6vii-1.4 Future course of action

6vii-1.4.1 In view of all the foregoing considerations it was agreed that the most helpful guidance that the Committee could give on this subject was that the present evaluation be continued with airlines participating on a permissive basis but that emphasis should be placed on the operational rather than the technical aspects. The possibility of the LF RTT broadcast system being an element of any long-term system to be developed and evaluated on a systematic and progressive basis would then not be lost. To this end it was agreed to make the following recommendation.

RECOMMENDATION No. 6 vii/1 - OPERATIONAL EVALUATION OF LF RTT GROUND-TO-AIR BROADCAST SYSTEM

That the existing experimental LF RTT Ground-to-Air Broadcast System should be continued in operation and that the States most directly concerned should be invited to evaluate the potential operational usefulness of the system to broadcast not only VOLMET information but also the various other types of information of concern to an aircraft in flight which it may be possible to handle by this means.

Note:- The development of such a programme of operational evaluation might conceivably be undertaken through any machinery which the Meeting may recommend as part of its consideration of Agenda Item 4.

SECTION 6 vii-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6 vii

6 vii-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6 vii and made no comment.

SECTION 6vii-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6vii

6vii-3.1 The General Committee reviewed the material presented to it under Agenda Item 6vii and made no comment.

Agenda Item 6: Preparation of Amendments to the North Atlantic Plan and
Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 viii: Aeromobile high frequencies

In considering Agenda Item 6 viii due attention was given to the short-term air route table, the statement of operational requirements established by the Policy and Programming Committee, as contained in the Reports on Agenda Items 2 b) and 3 as well as the communication requirements stated by the Navigation and Air Traffic Committee as contained in the Report on Agenda Item 6 ii.

SECTION 6.viii-1: ACTION BY THE CM COMMITTEE ON AGENDA ITEM 6 viii

Aeromobile high frequencies

6viii-1.1 Deployment of Aeromobile High Frequency Families and related
COM Supplementary Procedures

6viii-1.1.1 On the basis of data provided by States operating the main HF Aeronautical Stations in the Region, it was agreed that the principles governing the deployment of the four available families continued to be satisfactory and that no change to them in the COM SUPP 3.4.10 a), b) and c) should be proposed.

6viii-1.1.2 There was general support for the view that the agreement between the Administrations of Ireland and United Kingdom whereby all HF communications for the Shanwick Oceanic Control Area would be provided from Shannon should result in a more effective use of all frequency orders within each family and so assist, to a degree that could not yet be determined, in rationalizing the use of the available HF channels.

Note.- The Committee recognized that as soon as the aforementioned agreement was formally concluded, one or both Administrations would propose an appropriate amendment to Table COM 2A of the NAT Regional Plan Publication.

6viii-1.1.3 Although the NAT COM SUPPS provide for the off-loading of traffic from Families B and C to A and then if necessary to D when the loads on B and C are excessive, it was generally agreed that the procedure was not being used to good effect. It was therefore agreed that the related SUPP 3.4.10 d) should be examined to see if it could usefully be strengthened or other means developed to encourage its use by States when appropriate. The conclusion reached was that the SUPP is sound but that it is not being used to the extent desirable. Consequently the following recommendation was made.

RECOMMENDATION No. 6viii/1 - OVERLOADING OF HF FAMILIES B AND C

That the Administrations responsible for the aeronautical stations serving the Gander and Shanwick oceanic control areas be urged to make greater use of the NAT COM SUPP 3.4.10 d) whenever excessive loading occurs on HF Families B and C.

6viii-1.1.4 In reviewing COM SUPP 3.4.8 it was agreed that a slight amendment was desirable as indicated in the following recommendation.

RECOMMENDATION No. 6 viii/2 - AMENDMENT OF COM SUPP 3.4.8

That the Note following SUPP 3.4.8 be expanded by the addition of the following words:

"... care being taken to ensure that no interference with other stations in the aeronautical mobile service would result."

6viii-1.2 Specific Amendments to NAT HF Aeromobile Plan

6viii-1.2.1 The existing NAT HF Plan was reviewed to determine whether any amendment was desirable for technical or operational reasons to achieve a more rational network and the changes reflected in the following recommendation were agreed.

RECOMMENDATION No. 6 viii/3 - AMENDMENTS TO HF AEROMOBILE PLAN

That the following amendments be made to Column 7 of Table COM 2A in Doc 7674/8:

- i) Gander - delete 2931; after 8862.5 add 13354.5
- ii) Goose - delete 13324.5, 2987, 5671.5, 8888, 13284.5
- iii) Knob Lake - delete 2868, 5626.5, 8913.5
- iv) Moncton - delete 2868, 5626.5, 8913.5
- v) Montreal - delete 13324.5
- vi) Winnipeg - add the symbol # after 17966.5 and 13324.5
- vii) Reykjavik - add the symbol # after 17966.5
- viii) Shannon - after 8913.5 add 13324.5
- ix) Kindley Field - delete 5611.5, 8947.5, 13324.5

6viii-1.3 Communication Network Practices

6viii-1.3.1 It was noted that in Chapter 8 of the Report of NAT IV, Doc 8198 that several general recommendations had been made with a view to improving the efficiency of the NAT Radiotelephony Networks. Some of these were considered to have effectively served their purposes while others remained valid to varying degrees. Specific decisions on this subject are reflected in the following recommendations which restate in part or as a whole certain of the related NAT IV Recommendations.

RECOMMENDATIONS No. 6 viii/4 - NEED TO REDUCE GROUND INITIATED MESSAGES TO AIRCRAFT IN FLIGHT

That where a VOLMET broadcast system is implemented the recognized objective should be that no ground initiated Meteorological information, duplicating the VOLMET data, be transmitted to an aircraft, unless specifically requested from the aircraft.

Note.- Maximum possible use could be made of simplified formats and abbreviations in preparing airline operating agency originated messages for transmission to aircraft, e.g. in lieu of giving a complete MET report or forecast for a particular airport it would only be necessary to indicate "ABOVE or BELOW Company Minima" and only in the case of the latter would additional detailed information be provided.

Comment - the above Recommendation is based on NAT IV Recommendation No. 8/2.

RECOMMENDATION No. 6 viii/5 - TRANSMISSION OF SIGMET MESSAGES

That an aeronautical station should endeavour to transmit SIGMET messages simultaneously to a group of aircraft by first individually alerting those aircraft by SELCAL where provided

Comment - the above Recommendation is substantially a restatement of the second part of NAT IV Recommendation No. 8/3.

RECOMMENDATION No. 6 viii/6 - NEED FOR PERSONNEL TRAINING AND LIAISON

That States be asked to continue to encourage in every way possible the technical and operational efficiency of personnel employed in the direct operation, maintenance and supervision of facilities related to communications in the NAT Region. In this connexion the opportunities should be given for such personnel to visit other locations, freely exchange views and discuss difficulties; if possible ground operating personnel should be given the opportunity of familiarization flights on NAT operations.

Comment - the above Recommendation is a restatement of NAT IV Recommendation No. 8/6 with minor reediting.

6viii-1.3.2 There was agreement that a new recommendation was required aimed at reducing the length of airline operational control messages as follows:

RECOMMENDATION No. 6 viii/7 - NEED TO REDUCE THE LENGTH OF AIRLINE OPERATIONAL CONTROL MESSAGES *

That dispatcher units of airline operating agencies have due regard to the need to restrict to a minimum the content of airline ground initiated messages in the interests of reducing congestion on the HF families particularly at peak periods, and that such units also have regard to the need to provide whenever practicable for close collaboration between airlines and the appropriate air traffic services to avoid repetition of messages content as between the ground-to-air messages they generate and those generated by the ACC.

* See comments by the PP Committee, Section 6iv-2, paragraph 6iv-2.4, and Section 6viii-2, paragraph 6viii-2.2.

6viii-1.4 Use of SELCAL by OSVs

6viii-1.4.1 It was recognized that the principal aeronautical stations of the Region occasionally need to seek the assistance of OSVs on aeronautical mobile frequencies when a report from an aircraft is overdue. In this respect it was agreed that the time taken to establish communications with OSVs that might be in a position to provide useful information would be appreciably reduced if the OSVs were provided with SELCAL receiving facilities. The following recommendation was made on the subject.

RECOMMENDATION No. 6 viii/8 - USE OF SELCAL BY OSVs

That to the extent practicable the States providing OSVs at Stations Alfa, Charlie, India, Juliett and Kilo should provide a SELCAL receive capability for the HF Aeronautical Mobile Channel guarded by their vessels.

Note.- Where SELCAL is implemented on OSVs it would be preferable to assign codes on a "Station" basis rather than to individual vessels.

6viii-1.5 Single Sideband HF Aeromobile Communication6viii-1.5.1 General

6viii-1.5.1.1 The Committee considered a proposal of the United States for the evolutionary introduction of SSB which would initially permit the compatible operation of both DSB and SSB but which on a longer termed basis was aimed at the implementation of a suppressed carrier system that would permit the full potential of SSB to be realized.

6viii-1.5.1.2 The view was expressed, and not challenged, that HF communications would need to play an important role in satisfying the overall requirements for aeromobile communication in the Region for a considerable period of time notwithstanding the increased use that it was hoped to make of VHF techniques.

6viii-1.5.1.3 An important element of the proposal is that there would be no mandatory requirement for airlines to install SSB equipment but that it was naturally hoped that they would progressively do so on a voluntary basis, in particular when equipping new aircraft.

6viii-1.5.2 Aeronautical Stations and Frequencies Involved

6viii-1.5.2.1 It was agreed that as the first step in the evaluation programme the Aeronautical Stations located at Shannon, Gander and New York should provide the SSB capability for the Family A frequencies (2931, 5611.5, 8947.5, 13324.5). In the case of the 13 Mc/s order frequency which is at present used to a very limited extent, it would be left to the individual States to determine when it would be operationally necessary to provide the SSB capability.

6viii-1.5.2.2 Family A was selected since it is very lightly loaded and aircraft making use of SSB on this family in the principal area would be off-loading traffic from the Families B and C on which they would otherwise have been communicating.

6viii-1.5.3 Technical means of achieving DSB/SSB compatibility

6viii-1.5.3.1 It was agreed that the broad system characteristics that would ensure compatibility during the evaluation period would be as follows.

6viii-1.5.3.1.1 Ground Stations

Aeronautical stations would be provided with both DSB and SSB receivers for the appropriate channels. The ground transmissions would be SSB-Full Carrier.

6viii-1.5.3.1.2 Aircraft Stations

Aircraft electing to utilize the SSB service would transmit SSB suppressed carrier on Family A when communicating with any of the SSB ground stations. Other aircraft could continue to transmit DSB irrespective of the ground stations with which they were communicating. SSB equipped aircraft would transmit full carrier when communicating with non-SSB ground stations.

6viii-1.5.4 Frequency Assignment Considerations

6viii-1.5.4.1 It was recognized that the Second Session of the ITU Aeronautical EARC was expected to be held early in 1966 and that that Conference in revising Appendix 26 to the ITU Radio Regulations was likely to determine how SSB might ultimately be introduced on a "channel splitting" basis. At the same time it was appreciated that the aircraft equipment now available and being employed by some airlines is limited in channel selection to multiples of 1 kc/s. It was therefore agreed that the only practical assignment of nominal carrier frequencies in the operational evaluation phase of the evolutionary plan would be to utilize the frequencies 2931, 5611, 8947 and 13324. That is to say those frequencies ending in .5 kc/s would drop in frequency by 0.5 kc/s. In arriving at this decision it was agreed that this was completely without prejudice to any decision that might later be arrived at within either ICAO or the ITU for a future more extensive use of SSB when airborne equipment with greater flexibility would be available.

6viii-1.5.5 Date for start of the operational evaluation

6viii-1.5.5.1 The need to commence the programme as soon as possible was generally recognized; however, the problems of engineering planning and equipment procurement were considered to be such that some States might require two years or more to effect implementation. At the same time it was felt that a closely coordinated implementation date was not of vital importance. It was therefore agreed to recommend that the evaluation of SSB at Gander, Shannon and New York on Family A should begin as soon as practicable but not later than 1 January 1968.

RECOMMENDATION No. 6 viii/9 - OPERATIONAL EVALUATION OF HF AEROMOBILE SSB

- a) That an operational evaluation of HF Aeromobile SSB at Gander, Shannon and New York on NAT HF Family A should begin as soon as practicable but not later than 1 January 1968.
- b) That this evaluation in which aircraft would participate on a voluntary basis should be undertaken within a compatible DSB/SSB environment.

6viii-1.5.6 Detailed Technical Characteristics

6viii-1.5.6.1 It was noted that some guidance on the technical characteristics of SSB systems is contained in Attachment D to Part I of Annex 10 but that this material is in need of updating and expansion - in particular with respect to system characteristics affecting frequency channelling.

6viii-1.5.6.2 In view of the general time period by which it was hoped to start the programme it was decided that it was not a matter of the utmost urgency to establish the more detailed system technical characteristics. Furthermore it was the general view that it would be preferable for such a task to be undertaken through the world-wide rather than regional machinery of ICAO in view of the potential world-wide use of SSB. Consequently, it was agreed to recommend that this task be included on the agenda of a suitable ICAO Meeting - possibly the COM/OPS Meeting or Air Navigation Conference tentatively scheduled for the third quarter of 1966. In this same connexion it was noted that that Meeting was likely to consider the outcome of the Second Session of the EARC as it affected ICAO and therefore it was believed that it would be most appropriate for the same Meeting to develop essential characteristics for an aeronautical mobile HF SSB system.

6viii-1.5.6.3 It was agreed that means would need to be provided within the system to retain the capability of transmitting SELCAL signals on both DSB and SSB modes. During the operational evaluation period when ground stations transmit the carrier no problem will exist with SELCAL. When, in a final system SSB suppressed carrier mode is used by aeronautical ground stations, it will be necessary for the ground stations to retain the capability of supplying the carrier during SELCAL transmissions unless or until a modified SELCAL system is developed.

RECOMMENDATION No. 6 viii/10 - DEVELOPMENT OF DETAILED SSB TECHNICAL CHARACTERISTICS

That an updating and expansion of the SSB technical characteristics presently contained in the Guidance Material in Attachment D to Part I of Annex 10 - in particular with respect to system characteristics affecting frequency channelling arrangements - be undertaken by a suitable ICAO world-wide meeting, possibly the COM/OPS Meeting or Air Navigation Conference tentatively scheduled for the third quarter of 1966.

SECTION 6viii-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6 viii

6 viii-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6 viii and made the following comments.

6 viii-2.2 The intent of Rec. 6 viii/7 would have been better served if that recommendation had included a reference to the need to reduce the number of airline operational control messages as well as their length. It was also considered that the reduction of such communications was important at all times and not just "particularly at peak periods".

SECTION 6viii-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6viii

6viii-3.1 The General Committee reviewed the material presented to it under Agenda Item 6viii and made no comment.

Agenda Item 6: Preparation of Amendments to the North Atlantic Plan and
Supplementary Procedures for short-term improvements

STATEMENT OF OPERATIONAL REQUIREMENTS RELATING SPECIFICALLY TO

AGENDA ITEM 6 ix: Extended-range very high frequency installations

In considering Agenda Item 6 ix due attention was given to the short-term air route table, the statement of operational requirements established by the Policy and Programming Committee, as contained in the Reports on Agenda Items 2b) and 3 as well as the communication requirements stated by the Air Navigation and Air Traffic Committee as contained in the Report on Agenda Item 6 ii.

SECTION 6 ix-1: ACTION BY THE CM COMMITTEE ON AGENDA ITEM 6 ix

Extended-range very high frequency installations

6ix-1.1 Probability of Communication Success

6ix-1.1.1 In order that there should be a common basis for discussion it was agreed that the probability of communication success for any given facility should relate to the technical ability to communicate assuming that the channel is not otherwise in use.

6ix-1.1.2 The accepted planning criterion for channels provided for direct pilot-to-controller use was a 99% probability of communication success within the specified coverage. For general purpose applications where the ground equipment is operated by a communicator at an aeronautical station a corresponding figure of 95% was accepted.

6ix-1.1.3 In order to establish the general order of difference in the coverage that a given facility might provide for these two probability figures the results of a number of system evaluations performed by several States were examined. It was agreed that for turbine powered aircraft operating around 30-40,000 ft. (9,150-12,200 m) there would be a difference in radius of coverage of about 10 to 15%.

6ix-1.2 Relationship between signal field strength and operational results
obtainable

6ix-1.2.1 It was noted that the results obtained for various extended-range VHF installations in the NAT Region had varied appreciably but it was found upon closer examination that a high order of agreement existed between the results when due allowance was made for differences in the technical characteristics of installations including the height of the sites over sea level. It was appreciated that many States wishing to plan extended-range VHF installations might wish to have some guidance on the relationship between radiated power and field strength to the useful limit of cover. Three typical cases were therefore calculated with the following results:

A. Lower power

- A.1 Effective radiated power (e.g. transmitter
5 W antenna gain 0 db) = 0.005 kW
- A.2 Altitude 10,000 m (33,000 ft.) distance
to radio horizon = 220 NM
- A.3 Average field strength at radio horizon
(assuming free-space propagation) = 31 db above one
microvolt per metre
- A.4 Average field strength at radio horizon
(according to CCIR propagation curves) = 10 db above one
microvolt per metre

B. Intermediate power

- B.1 Effective radiated power (e.g. transmitter
1kW antenna gain 16 db) = 40 kW
- B.2 Altitude 10,000 m (33,000 ft.) distance
to radio horizon = 220 NM
- B.3 Average field strength at radio horizon
(assuming free-space propagation) = 70 db above one
microvolt per metre
- B.4 Expected field strength for 120 mc/sec
after the "beyond the radio horizon"
attenuation at distance from transmitter
of 250 NM, attenuation over last 30 miles
estimated 45 db, remains 70 - 45 db = 25 db above one
microvolt per metre
- B.5 Attenuation after passing through 250 NM
for North Atlantic Region assumed to be
17.25 db per 100 NM. In case a field
strength at the receiver of 15 db above
one microvolt is required, then the
"extension" of distance will be:

$$\frac{25 - 15}{17.25} \times 100 \text{ NM} \approx 57 \text{ NM}$$

giving a total range of 250 + 57 = 307 NM

C. High power

- C.1 Effective radiated power (e.g. transmitter
4 kW antenna gain 27 db) = 2,000 kW
- C.2 Altitude 10,000 m (33,000 ft.) distance
to radio horizon = 220 NM
- C.3 Average field strength at radio horizon
(assuming free-space propagation) = 87 db

C.4 Expected field strength for 120 Mc/s after the "beyond the radio horizon" attenuation at distance from transmitter on 250 NM, attenuation over last 30 miles estimated 45 db, remains 87 - 45 db = 42 db

C.5 Attenuation after passing through 250 NM for North Atlantic Region assumed to be 17.25 db per 100 NM. In case a field strength at the receiver of 15 db above one microvolt is required, then the "extension" of distance will be:

$$\frac{42 - 15}{17.25} \times 100 \text{ NM} = 157 \text{ NM}$$

giving a total range of $250 + 157 = 407 \text{ NM}$

NOTES

To A.3 Field strength given in db with respect to a zero level of 1 microvolt per metre according to the free-space propagation formula for a short dipole.

$$F = 120 + 20 \log \frac{(0.115 \sqrt{P})}{d}$$

(See also U.S. National Bureau of Standards (NBS) Circular 462)

in which P = effective radiated power in kW

d = distance from transmitter antenna in NM.

For distance to radio horizon

$$d = 1.23 \sqrt{h} \text{ for feet}$$

$$d = 2.22 \sqrt{h} \text{ for metres}$$

in which d = distance from transmitter in NM

(See also Annex 10, Part II, 4.1.5.3)

To B.4 See various data in IAL Symposium and the Yeh-formula and C.4 A conservative "beyond the horizon" drop of 45 db over a distance of 30 NM is assumed here.

To B.5 Figure of 17.25 db per 100 NM taken from a U.S. Working Paper and C.5 presented to the Meeting in which extensive experimental results were reported.

General Note

It must be emphasized that the foregoing calculations are based on elementary approximations and assume, among other things, free-space propagation to the radio horizon. Consequently, they serve only and exclusively for a rapid estimation, not for an exact evaluation.

For detailed and more exact estimation the CCIR data contained in the "Atlas of Ground Wave Propagation Curves, Geneva 1959" have to be used and interpreted. They take into account among other things, the height of the transmitting antenna above ground level and the corresponding extension of range and formation of lobes.

In certain instances total ranges calculated on the basis of the CCIR data could differ from those arrived at in the foregoing simplified approach by the order of 10 to 15%.

6ix-1.2.2 The Committee found it important to emphasize that care should be taken to avoid any overenthusiasm about coverage which may be achieved on a high reliability basis in extended-range systems. With present technical knowledge the coverage indicated above of a high power installation would appear to be the maximum which is economically feasible unless the aircraft installation also is significantly improved.

6ix-1.2.3 The examples under 6ix-1.2.1, in the cases of ranges beyond the horizon, were based on the provision of a signal strength of 15 db above 1 microvolt/meter. Nevertheless, it was agreed that the establishment of a precise relationship at this time between this field strength figure and the probability of communication success out to distances beyond the radio horizon presented some difficulty. There was general agreement however that the figure quoted might be on the low side for application to a medium in which the mechanisms of propagation are still not fully understood.

6ix-1.2.4 When considering the air-to-ground path using standard airborne equipment it was recognized that it may present difficulties to make good the difference between ERP of the airborne and ground equipments.

6ix-1.2.5 The need for more specific guidance on this overall subject was agreed and the following recommendation made.

RECOMMENDATION No. 6ix/1 - NEED FOR TECHNICAL GUIDANCE IN THE ENGINEERING PLANNING OF EXTENDED-RANGE VHF INSTALLATIONS

That ICAO develop on a world-wide basis guidance material which will assist in the engineering planning of extended-range VHF installations with particular regard to the signal strengths and signal to noise ratios which are necessary to provide a satisfactory level of service.

Comment: The possibility was noted that this task could be undertaken by the COM/OPS Meeting or Air Navigation Conference tentatively scheduled for the third quarter of 1966.

6ix-1.3 Relationship between pilot-to-controller and general purpose facilities

6ix-1.3.1 In reviewing operational experiences with existing extended coverage facilities in the NAT Region several important conclusions were reached. On this subject it was agreed that direct pilot-to-controller communication is required; however, several States have found that the most practical arrangement is to establish extended-range facilities primarily for general purpose but with the technical ability of switching the channel without delay to the controller so that he can engage in direct conversation with the pilot whenever desired.

6ix-1.3.2 The Committee agreed that within reasonable practical and economic limitations the long range goal for aeronautical mobile communications serving all NAT air routes was that the primary means should be VHF permitting pilot-to-controller communication whenever desired. It was agreed that where it was now impractical to provide as much coverage as might be desirable from an ATC point of view, the increased coverage of VHF for GP purpose was most desirable in order to reduce the loading on HF channels. In this respect it was noted that many aircraft when flying within reliable VHF coverage of an aeronautical station frequently transmit on HF. With a view to minimizing this practice the Committee agreed to the following recommendation.

RECOMMENDATION No. 6 ix/2 - MAXIMUM UTILIZATION OF VHF FACILITIES

That in order to reduce to a minimum all unnecessary loading on aeromobile HF channels, aircraft, when flying within VHF coverage of an aeronautical station should be encouraged to make all appropriate communications with that station on VHF.

6ix-1.4 Frequency planning matters

6ix-1.4.1 The Committee recognized that one of the less desirable by-products of extended-range VHF is the very considerable distance at which interference between co-channel facilities can occur as well as possibilities of interference between extended-coverage facilities sited close together although quite widely separated in frequency. It was agreed therefore that the Committee should recommend that States take into consideration the possibility of interference in the assignment of frequencies. Somewhat limited data appear to be available to guide States in this aspect of frequency planning and it was agreed also to recommend that ICAO make a deeper study of the matter.

RECOMMENDATION No. 6ix/3 - FREQUENCY PLANNING FOR EXTENDED-RANGE VHF FACILITIES

That ICAO develop appropriate world-wide criteria to assist States in frequency planning for extended-range VHF facilities so as to achieve an optimum balance between the avoidance of harmful interference and economic utilization of the radio spectrum.

RECOMMENDATION No. 6 ix/4 - POTENTIAL INTERFERENCE INVOLVING EXTENDED-RANGE VHF FACILITIES

That States in assigning frequencies for extended-range VHF facilities should give due consideration to all possibilities of interference which might result.

6ix-1.5 Specific Amendments to NAT VHF Plan

6ix-1.5.1 In considering the amendments that it would be desirable to make to Doc 7674/8, Table COM 2A with respect to extended-range VHF facilities, the Committee found that with very little additional effort it was possible to examine also conventional VHF requirements and prepare a consolidated recommendation for amendment of the VHF elements of Table COM 2A as follows.

RECOMMENDATION No. 6 ix/5 - AMENDMENTS TO NAT VHF PLAN

That Table COM 2A of Doc 7674/8 be amended as follows:

1. Bermuda -

i) Kindley Field

Col.5 - Delete 1st entry, add 126.9

Col.6 - Delete 126.9

Col.8 - Delete references to both Note 1 and Note 2

2. Canada

i) Churchill

Col. 6 - Add 126.9

ii) Edmonton

Col. 6 - Delete *

Col. 8 - Delete entry in toto

iii) Frobisher Bay

Col. 6 - Add 126.9~~4~~

Col. 8 - Add ~~4~~ Note 2 and delete Note 1

iv) Gander/Intl.

Col. 3 - Delete GCA 118.1

Col. 4 - Add 119.7~~4~~

Col. 5 - Amend 127.1 to read 127.1~~4~~*

Add U133.9

Amend 126.7~~4~~ to read 126.7

Col. 6 - Add 127.1~~4~~

Col. 8 - Add *available via telephone "patch thru" to GP facility."

2. Canada (cont'd)v) GooseCol. 3 - Add 133.1vi) Knob LakeCol. 6 - Amend 126.9 to read 127.9~~4~~Col. 8 - Add ~~4~~ Note 2vii) WinnipegCol. 6 - Add 126.9viii) YarmouthCol. 6 - Delete 126.9ix) ResoluteCol. 6 - Add 126.9*Col. 8 - Add *To be implemented with extended-range capability
when required operationally.3. Icelandi) KeflavikCol. 2 - Add 121.5Col. 3 - Add 119.1Col. 5 - Delete 121.5ii) ReykjavikCol. 5 - Add 121.5iii) SaudarkrokurCol. 2 - Add 121.5Col. 5 - Delete 121.54. United Kingdomi) PrestwickCol. 4 - Delete 127.65~~4~~*Amend 126.25**~~4~~ to read 126.25Col. 5 - Delete 127.9Add 127.65~~4~~*Col. 6 - Delete 123.85 and add 127.65~~4~~*Col. 8 - Delete existing Notes * and **Add *available via telephone "patch thru" to GP
facility.5. United Statesi) New YorkCol. 6 - Add ~~4~~ after 129.9

6ix-1.6 Extended-Range VHF Facility at Prins Christian Sund

6ix-1.6.1 The Committee acted the survey work which was being performed by Denmark to select a suitable site in this area of difficult terrain as well as the various alternative ways in which the station, when established, might be remotely controlled or integrated with the general communication system of the area.

6ix-1.6.2 The Committee noted the advice which had already been provided by the Air Navigation Commission in response to an enquiry from Denmark to the effect that it would be operationally preferable to provide coverage to the South and South-West of Prins Christian Sund rather than to the East if siting difficulties make a choice necessary. The Committee fully endorsed this point of view.

6ix-1.6.3 It was agreed to recommend that Denmark be invited when submitting final proposals - possibly in connexion with an ICAO Joint Financing request - to present full details of all possible alternative arrangements.

RECOMMENDATION No. 6 ix/6 - EXTENDED-RANGE VHF FACILITY AT PRINS CHRISTIAN SUND

That Denmark be invited, when submitting final proposals for the extended-range VHF facility required at Prins Christian Sund in accordance with the NAT Regional Plan, to indicate for each of the alternative solutions the full details of the ways in which the station might best be remotely controlled or otherwise integrated with the general communication system of the area.

6ix-1.7 Provision of Extended-Range VHF facilities at Thule (Dundas) and Nord (Greenland)

6ix-1.7.1 The Committee discussed a proposal to include in the NAT Plan a requirement for GP en-route extended-range VHF at Thule (Dundas) and Nord in Greenland. While the possible usefulness of such facilities in an area which suffers from frequent disturbance of HF channels was recognized, the Committee was unable, on the basis of the limited data available, to reach a conclusion on either the physical practicability of making such installations in Northern Greenland or the extent to which they would be operationally valuable. It was therefore decided with the concurrence of the Danish Delegation to make the following recommendation.

RECOMMENDATION No. 6 ix/7 - EXTENDED-RANGE VHF FACILITIES AT THULE (DUNDAS) AND NORD

That the Danish Administration be invited to make a study of the physical practicability and operational usefulness of extended-range VHF installations at Thule (Dundas) and Nord and if appropriate to make recommendations to ICAO on the subject.

SECTION 6ix-2: COMMENTS AND RECOMMENDATIONS BY THE POLICY AND PROGRAMMING COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6ix

6ix-2.1 The Policy and Programming Committee reviewed the material presented to it under Agenda Item 6ix and made no comment.

SECTION 6ix-3: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION TAKEN ON AGENDA ITEM 6ix

6ix-3.1 The General Committee reviewed the material presented to it under Agenda Item 6ix and made no comment.

Agenda Item 7: Implementation Schedule for AmendmentsSECTION 7-1: ACTION BY THE PP COMMITTEE ON AGENDA ITEM 7

7-1.1 The recommendations developed by the meeting cover a broad range of actions to be effected by ICAO, operators, and State Administrations. These recommendations have been given arbitrary classifications as follows:

- a) Amendments to the Facilities and Services Plan.
- b) Amendments to Regional Supplementary Procedures.
- c) Requests for studies, tests, or informal services.
- d) Requests for and assurance of equipment calibration.

Because of the nature of the recommendations under category c) and d) above, which pertain to various actions to be taken at the convenience of States or operators, and do not necessarily require consideration of the Meeting in respect to scheduling of actions or implementation dates, only those recommendations under category a) and b) as defined above, have been considered under Agenda Item 7.

7-1.2 Amendments to the Facilities and Services Elements of the NAT Regional Plan (Doc 7674/3)

RECOMMENDATION No. 7/1 - AERONAUTICAL FIXED SERVICES (6 vi/5)

That States implement the required changes in the AFIN as soon as practicable.

RECOMMENDATION No. 7/2 - AERONAUTICAL MET CIRCUITS (6 vi/11)

That States implement the required changes in the aeronautical MET circuits as soon as practicable.

RECOMMENDATION No. 7/3 - HF AEROMOBILE SERVICE (6 viii/3)

That States implement the required changes in the HF Aeromobile plan as soon as practicable.

RECOMMENDATION No. 7/4 - VHF AEROMOBILE SERVICE (6 ix/5)

That States implement the required changes in the VHF Aeromobile plan as soon as practicable.

RECOMMENDATION No. 7/5 - AREA FORECAST SYSTEM (6 v/1a)

That the Area Forecast System be implemented as soon as practicable.

7-1.3 Amendments to Regional Supplementary Procedures (Doc 7030)RECOMMENDATION No. 7/6 - RAC SUPPLEMENTARY PROCEDURES (6 iii/2)

That the amended RAC Supplementary Procedures be implemented as follows:

- a) the procedures regarding longitudinal separation minima and the use of Mach numbers (Rec. 6 iii/2 Items 2, 3, 11, 13, 15 and 20; paras 3.1.1 d) to f), 3.1.2, 6.1.3, 6.4, 6.7.3 and 7.2.5.4) to be implemented on a trial basis preferably on or before 1 June 1965;
- b) the procedures regarding the assignment of cruising levels and the application of reduced vertical separation (Rec. 6 iii/2 Items 1 and 7; para. 2.1.1 c) and new para. 4) to be implemented on a date to be recommended by the Limited NAT (RAC) Meeting proposed in Recommendation 6 i/6;
- c) other procedures: to be implemented four months after approval by Council.

RECOMMENDATION No. 7/7 - MET SUPPLEMENTARY PROCEDURES (6 iv/5, 6 iv/6, 6 iv/1e and 6 v/5)

That the amended MET Supplementary Procedures be implemented four months after approval by the Council.

RECOMMENDATION No. 7/8 - COM SUPPLEMENTARY PROCEDURES (6 vi/2, 6 viii/2)

That the amended COM Supplementary Procedures be implemented four months after approval by the Council.

SECTION 7-2: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 7

7-2.1 The General Committee reviewed the material presented to it under Agenda Item 7 and made no comment.

Agenda Item 8: Exchange of views on principles and criteria for use in determining the cost of North Atlantic facilities and services

SECTION 8-1: ACTION BY THE PP COMMITTEE ON AGENDA ITEM 8

Introduction

8-1.1 The Policy and Programming Committee spent part of one meeting on the exchange of views called for by Agenda Item 8. It had available to it an introductory working paper on the subject, presented by the Secretariat, and a working paper by the United Kingdom.

History of the item

8-1.2 Before introducing the first paper, the Secretary of the Meeting briefly recalled the history of the item, as follows: Recommendation 2/2 of the NAT IV RAN Meeting contained a phrase stating that systems planning aimed at promoting a safer, more efficient or more economical service in the North Atlantic Region. The Air Navigation Commission, when reviewing the recommendation, had agreed that the consideration of financial aspects could be expected to be initiated at the appropriate time in the study of the subject, and had acknowledged that the financial and economic aspects would interest all Member States of the Region.

8-1.3 In subsequent discussions, the Council had recognized that the economics of the system were an important element. The Council had always been concerned with the cost of the ground organizations of the air navigation services system. In fact the directives to regional air navigation meetings stressed that recommendations of a regional meeting for facilities and services should provide adequately for the needs of air navigation without entailing disproportionate costs. States were reminded of this in the preparatory documentation for each regional meeting.

8-1.4 The matter of costs of any system of air navigation facilities and services had been touched upon during the two informal meetings on systems planning preceding the present formal meeting and even the subject of the distribution of costs amongst those that might benefit from the facilities and services had been briefly considered. When the agenda of the Special NAT Meeting was established in the light of States' views, the Council had however deemed it undesirable to enter into this matter of cost distribution, particularly since it was and still is engaged in a world wide study of charges for air navigation services. The Council had further been anxious that the item on cost determination should not be considered too early in the Meeting in order to avoid that it absorb too large a proportion of attention to the detriment of the development of sound technical proposals. The Meeting was not expected to formulate any recommendation on the subject although it was not prevented from doing so.

Working papers available

8-1.5 The Secretariat working paper had been based largely on the Report of the Second Informal Meeting, held at Miami Beach in November 1963. The informal meeting had formulated principles which it considered should be applied in the allocation of facilities and services to the NAT system. They were the following:

- a) The facility or service is necessary to support the passage of an aircraft through the NAT FIRs.
- b) The facility or service is necessary to support the oceanic centres controlling the passage of the aircraft.
- c) The facility or service is required to establish the necessary collaboration between oceanic control centres.
- d) The facility or service is necessary for international operations flying the prevailing routes between the major terminal areas adjacent to the Atlantic seaboard and the NAT FIRs.

8-1.6 The Secretariat had further deemed it possible that the Meeting would include in its exchange of views a discussion of the geographical and technical delineations of the elements of the system and had also advanced the possibility of a discussion on the degree of allocation of terminal facilities to NAT operations. It had also suggested the possible need for discussion of the operational scope of the item, in terms of the various categories of operators in the North Atlantic and the various uses they might make of the planned facilities and services.

8-1.7 The United Kingdom contribution to the pre-meeting documentation consisted of a paper, the purpose of which was to elaborate in greater detail on the principles quoted in paragraph 8-1.5 above and to attempt to provide a specific basis on which, at some future time, the costs of various components of the system could be determined. Discussion on the application of the principles was however not deemed necessary at this stage.

Summary of discussions by the Committee

8-1.8 The United States view was that, while States had been willing to include the present item 8 in the agenda, they had not been willing to retain an item on allocation of costs, with which the Secretariat paper also seemed concerned. All that the present Meeting was required to do was to consider the need for a set of principles by which the costs of facilities such as VOR, NDB, LORAN A or CONSOL could be determined. Allocation of costs would only become relevant if it were decided to establish some form of collective financing or an agreed user charge programme. The discussion should therefore be based only on the matters referred to in paragraph 8-1.5 above and should be concerned with the principles and criteria for use in determining the costs of North Atlantic facilities and services.

8-1.9 In the Norwegian view the various costs would vary from country to country and there was little point in discussing them.

8-1.10 In the Netherlands view the discussion on the subject could be useful to the newly established Planning Group.

8-1.11 In the opinion of Czechoslovakia a discussion on the basis suggested by the United States would be useful. If however a joint financing scheme were later considered, user benefits and the allocation of costs to different users would have to be determined.

8-1.12 The Irish opinion was that the consideration of this item was premature at this time.

8-1.13 The Committee then proceeded with a brief discussion on some points related to the principles enumerated in paragraph 8-1.5 above. Summarizing this part of the discussion, it appeared that these principles seemed generally acceptable to the Committee. Figures provided by the United Kingdom were only intended to demonstrate the basis on which it might later be necessary to agree. The principles of costing advanced did not differ much from those used in joint financing schemes.

8-1.14 The Committee apparently was thinking of the possibility of a broad cost/benefit comparison. In a world wide study of cost and revenue of en-route facilities undertaken by the Organization, the problem had arisen of a large variation in costs between countries. An average actual cost could be established but the matter became difficult when one tried to determine future costs. The ICAO Joint Financing Scheme solved this by establishing theoretical costs. At this time only an exchange of views on this matter was practicable but it was a problem that might have to be considered later.

8-1.15 The Canadian view offered at this point was that the matter of costing of air navigation facilities and services had been of major concern at the time of the NAT IV Meeting when the question of user charges had focussed attention on the costs involved. Subsequently a somewhat revolutionary approach to North Atlantic requirements had maintained the emphasis on costs but it was now apparent that, with the passage of time and the development of longer range plans at this Meeting, general concern over financial aspects had somewhat diminished.

8-1.16 The discussion terminated with an exchange on whether more specific views on the principles for costing should be reflected in the Report. A method of assessing operators' benefits had been superficially explored under Item 3 b). It was suggested that the accounting principles offered could be used to compare costs of ground facilities and services with operators' benefits. It was however contended that it would be found that benefits would be distributed amongst many entities beside the operators.

SECTION 8-2: COMMENTS BY THE GENERAL COMMITTEE ON THE ACTION
TAKEN ON AGENDA ITEM 8

8-2.1 The General Committee reviewed the material presented to it under Agenda Item 8 and made no comment.

GENERAL STATEMENTS BY DELEGATIONSGENERAL STATEMENT BY IFALPA

IFALPA takes this last opportunity to express appreciation to the Organization for having convened, at such an appropriate time, a meeting for the purpose of developing means by which the forecasted increase in traffic can be accommodated with reduced delay and difficulty during the summer of 1965.

IFALPA eagerly looks forward to such increases inasmuch as this increase gives us all much more career opportunity and security, and permits the expression of the individual's esthetic desire to do what one can in the improvement of world communications.

The foregoing notwithstanding IFALPA member organizations and individual pilots have legal and moral obligations to lend the weight of their individual and collective experience and to offer their technical knowledge towards the advancement of Air Commerce. Additionally, Air Line Pilots have a distinct responsibility to preclude operation of Common Carrier Aircraft when experience directs that a compromise to requisite safety is indicated.

Everyone concerned is aware of the inevitable conflicts that arise within the community as aviation grows and more and more services are required. Reference to work load, efficiency and public responsibility of supporting services tends to obscure the basic responsibility: namely, the support of safe expeditions flight of all aircraft. Since the pilot will continue to be, for some time, a basic component of the aircraft, we feel that we are in a unique position to comment on the adequacy and efficiency of the services provided. At any rate, we believe the pilots are in many ways the best judges of what constitutes a reasonable level of safety in the performance of these services. Therefore, we feel the obligation to voice our objections whenever proposals of questionable safety are advanced regardless of the source of the proposal and our belief in the good intentions of the sponsor.

As a result of our organizations concern in the previously stated areas a cablegram was sent from the Annual Conference of IFALPA now convened in Rio de Janeiro, Brazil, which reads as follows:

"IFALPA HAVING REGARD TO STATEMENTS MADE AT THIS SPECIAL NAT MEETING WITH REFERENCE TO SEPARATION STANDARDS WISHES AGAIN TO EXPRESS ITS DEEP CONCERN STOP IT IS THE CONSIDERED OPINION OF THE FEDERATION THAT ANY REDUCTION IN SEPARATION STANDARDS BASED UPON PRESENT AIRCRAFT STABILITY AUTOPILOT HEIGHT LOCKS ALTIMETERS MACHMETERS STATIC SYSTEMS CLEAR AIR TURBULENCE FORECASTING AND NAVIGATIONAL AIDS IS UNSAFE STOP FURTHERMORE IT IS IMPRACTICABLE IN THAT THE DEGREE OF FLEXIBILITY OF THE SYSTEM IS REDUCED BELOW AN ACCEPTABLE LEVEL BEARING IN MIND MODERN H/F COMMUNICATION AND MESSAGE TRANSIT TIMES STOP THE FEDERATION IS VERY WILLING TO COOPERATE WITH ICAO IN THE FURTHER ACTIVE PURSUIT

OF THE METHOD AND MEANS BY WHICH THE SEPARATION STANDARDS CAN BE REDUCED WHILST MAINTAINING ADEQUATE STANDARDS OF SAFETY STOP IF THE AIM OF THE SPECIAL NAT MEETING IS TO INCREASE SYSTEM CAPACITY THEN THE SIX PROPOSALS MADE BY IFALPA ON THE FIRST DAY OF THE MEETING WILL IMMEDIATELY INCREASE THAT CAPACITY FAR BEYOND PRESENT REQUIREMENTS STOP HOWEVER, THE TIME SAVED BY THE ADOPTION OF THE IFALPA PROPOSALS SHOULD BE PUT TO IMMEDIATE USE IN THE FULL INVESTIGATION OF A LONG TERM SYSTEM CAPACITY IMPROVEMENT WHICH IS NOT DEPENDENT UPON THE PILOT MAKING GOOD THE DEFICIENCIES OF THE EQUIPMENT"

To facilitate reference to the six points, which could offer early assistance, stated by the IFALPA representative, at the beginning of this Conference, they are summarized hereafter :-

1. Every jet aircraft should carry, in addition to the minimum required, extra fuel sufficient for at least one hour of flight.
2. Maximum use should be made of off-peak hours.
3. Every effort should be made to extend operating hours of those terminals that currently imposed curfews on jet operations. It should be possible to eliminate low-level departures and arrivals currently imposed by air traffic control largely for lack of a short-range navaid suitable for high-density areas. IFALPA had long been recommending an area-cover navaid with pictorial presentation in the cockpit. In the New York area, currently a major problem with respect to both noise and air congestion, such a navaid is now in use by all interested parties except the operators of fixed-wing aircraft. IFALPA recommends its adoption by such aircraft to reduce the nuisance created by low-flying, to reduce the over-consumption of fuel and to expedite the flow of traffic with safety.
4. Where relaxation of the curfew at a terminal was not possible, the use of terminals more favourably sited with respect to the sleeping population is strongly urged.
5. Random flow must be organized when the potential capacity of any given airway must be realized.
6. IFALPA strongly urges the opening of additional continental airways feeding into the North Atlantic, particularly over the New York-Nantucket-Yarmouth-Sydney route where much extra fuel was presently consumed because of enforced low-level flight and even, on occasion, holding or spiral climbs.

In keeping with the long range planning portion of this meeting, we submit that time and fuel saved in the en-route phase of North Atlantic operations is a laudable objective. But if this merely adds to the ATC difficulties in our transition areas, and especially to the congestion and delays at the terminal areas, where the greatest problem lies, we have wasted our time here.

When such efficiency is achieved whereby an aircraft from Europe can come into the New York Complex, for example, and be assured of completion of landing approach, without having a delay due to traffic, not to be confused with delays due to weather or Airport construction, but only due to traffic volume, should ICAO consider putting more aircraft in the system. If such capability is achieved on both sides of the Ocean, reduction in enroute separation may be feasible if technical advances have been incorporated which will assure safe altitude and course separation over the North Atlantic.

In conclusion, the assistance of IFALPA is again offered to any interested organizations whenever needed in the evaluation of new tools or procedures which may effect a safe reduction in separation minima.

END
