LETTER OF TRANSMITTAL

To: President of the Council

From: Chairman of the Fifth North Atlantic Regional Air Navigation Meeting

I have the honour to submit herewith the Report of the Fifth North Atlantic Regional Air Navigation Meeting held in Montreal, Canada, from 1 to 24 April 1970.

R.W. O'Sullivan

Montreal, 24 April 1970

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HISTORY OF THE MEETING

ii.1 PLACE AND DURATION OF THE MEETING

The Fifth North Atlantic Regional Air Navigation Meeting was convened by the International Civil Aviation Organization on 1 April 1970 at ICAO Headquarters, Montreal, Canada, and completed its Agenda on 24 April 1970. All meetings were open to the public.

ii.2 ORGANIZATION, OFFICERS, OFFICIALS AND TASKS

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

ii.2.1 GENERAL COMMITTEE

Chairman	- Mr. R. W. O'Sullivan
First Vice-Chairman	- Mr. D. A. Blake
Second Vice-Chairman	- Mr. F. Lopez Mayo
Secretary	- Dr. J. H. Heierman
Assistant Secretary	- Mr. P. J. Ludgate

The General Committee held 20 meetings. The opening meeting of the General Committee was addressed by the President of the Council, Mr. Walter Binaghi, and the President of the Air Navigation Commission, Mr. J. M. Gabrielli.

The General Committee adopted the Agenda and the Organization Plan for the Meeting, as established by the Air Navigation Commission. It noted the Directives to Regional Air Navigation Meetings and Rules of Procedure in Doc 8144-AN/874/2 and additional directives of the Council and the Air Navigation Commission.

The General Committee dealt with Agenda Items 2 and 3 directly assisted by Mr. A. Spooner. Through an ad hoc Aircraft Operations Working Group, assisted by Mr. J.R. Park, it dealt with Agenda Item 1. Through its SAR-, AIS/MAP- and Implementation Working Groups it dealt with Agenda Items 11, 17 and 18 respectively. It further reviewed and approved the Reports of the NAVAIDS, AGA, ATS, MET and COM Committees on the remaining items of the Agenda.

Mr. K. MacAleavey, ICAO Representative, North American and Caribbean Office, Mexico and Mr. H. S. Marzusch, ICAO Representative, European Office, Paris were in attendance for the duration of the Meeting for general consultation and liaison with delegations. They also assisted the Implementation Working Group in its work.

ii.2.2 SAR WORKING GROUP OF THE GENERAL COMMITTEE

Rapporteur	- Mr. D. Lynch
ICAO Adviser	- Mr. P. Melia

The SAR Working Group prepared the Report on Agenda Item 11 for the General Committee.

ii.2.3 AIS/MAP WORKING GROUP OF THE GENERAL COMMITTEE

Rapporteur	- Mr. A. L. Ashton
ICAO Adviser	- Mr. H. M. D. Jansz
	- Mr. A.A. de Smit
	- Mr. T. Wilson

The AIS/MAP Working Group prepared the Report on Agenda Item 17 for the General Committee.

ii.2.4 IMPLEMENTATION WORKING GROUP OF THE GENERAL COMMITTEE

Rapporteur	- Mr. G. W. Wills
ICAO Advisers	- Mr. K. MacAleavey
	Mr. H. S. Marzusch

The Implementation Working Group, on the basis of submissions from the Technical Committees and General Committee Working Groups, prepared the Report on Agenda Item 18 for the General Committee.

ii.2.5 RADIO NAVIGATION AIDS (NAVAIDS) COMMITTEE

Chairman	- Mr. J. R. Fleming
Vice-Chairman	- Mr. C. Appleton
ICAO Advisers	- Mr. L. G. Fowler (Secretary)
	Mr. C. C. E. Bellringer
	Mr. G.G. Nye

The NAVAIDS Committee was charged with Agenda Item 4 and relevant parts of Items 3 and 18.

ii.2.6 AERODROME AND GROUND AIDS (AGA) COMMITTEE

Chairman	- Mr. L. G. Fitton
Vice Chairman	- Mr. R. F. Grosch
ICAO Advisers	- Mr. K. K. Wilde (Secretary)
	Mr. J. L. Santamaria

The AGA Committee was charged with Agenda Items 5, 6, 7 and 8 and relevant parts of Items 3 and 18.

ii.2.7 RULES OF THE AIR AND AIR TRAFFIC SERVICES (ATS) COMMITTEE

Chairman	- Mr. R. Howley
Vice-Chairman	- Mr. I. G. Barrowman
ICAO Advisers	- Mr. P. Berger (Secretary)
	Mr. B. Gaustad
	Mr. P. Melia

The ATS Committee was charged with Agenda Items 9 and 10 and relevant parts of Items 3 and 18.

ii.2.8 METEOROLOGY (MET) COMMITTEE

Chairman	- Mr. P. H. Peridier
Vice-Chairman	- Mr. J. P. Barberon
ICAO Advisers	- Mr. U. Schwarz (Secretary)
	Mr. U. Rath
	Mr. B. W. Thompson

The MET Committee was charged with Agenda Items 12, 13 and 14 and relevant parts of Items 3 and 18.

ii.2.9 COMMUNICATIONS (COM) COMMITTEE

Chairman	- M. M. Chef
Vice-Chairman	- Mr. G. Jones
ICAO Advisers	- Mr. F. E. Sperring (Secretary)
	Mr. C. C. E. Bellringer
	Mr. R. E. Malvido

The COM Committee was charged with Agenda Items 15 and 16 and relevant parts of Items 3 and 18.

ii.3 WORKING LANGUAGES

The working languages of the Meeting were English and French. Interpretation from Spanish was provided. The documentation of the Meeting was issued in English and French.

ii.4 ADMINISTRATIVE SERVICES

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

Administrative Officer	- Mr. A. O. A. Groven
Officer in Charge of Language Services	- Mr. F. Dufau-Labeyrie
Chief Interpreter	- Mr. F. Cordier
Conference Officer	- Mr. D. B. Hall
Control Officer	- Mr. F. O. Novotny

ii.5 LIST OF REPRESENTATIVES

Twenty-three Contracting States, Members of the Meeting, and seven International Organizations were represented at the Meeting, as follows:

CONTRACTING STATES, MEMBERS OF THE MEETING

Barbados, Belgium, Canada, Czechoslovak Socialist Republic, Denmark, Finland, France, Germany (Federal Republic of), Iceland, Ireland, Italy, Japan, Mexico, Netherlands (Kingdom of the), Norway, Portugal, Spain, Sweden, Switzerland, United Arab Republic, United Kingdom, United States of America, Venezuela.

INTERNATIONAL ORGANIZATIONS

Eurocontrol, International Airline Navigators Council (IANC), International Council of Aircraft Owner and Pilot Associations (IAOPA), International Air Transport Association (IATA), International Federation of Air Line Pilots Associations (IFALPA), 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 REPRESENTANTS

NAME/NOM	POSITION IN DELEGATION*/ TITRE DANS LA DELEGATION*	GENERAL COMMITTEE/ COMITE GENERAL	IMP WG	AIS WG	SAR WG	TECHNICAL COMMITTEES/ COMITES TECHNIQUES				
						NAV-AIDS	AGA	ATS	MET	COM
CONTRACTING STATES, MEMBERS OF THE REGION/ ETATS CONTRACTANTS, MEMBRES DE LA REGION										
BARBADOS / BARBADE										
Went, T.	D	X				X	X			
BELGIUM / BELGIQUE										
Quoilin, M.	D	X							X	
CANADA										
Fitton, L.G.	D	X					X			
Barrowman, I.G.	Alt	X						X		
Devine, W.N.	Alt	X								
Dodds, R.R.	Alt	X							X	X
Elliott, A.L.	Alt	X						X		
English, E.T.	Alt									X
Perrin, J.P.	Alt	X								X
Powell, E.B.	Alt	X	X							X
Appleton, C.	Adv	X				X				
Ashton, A.L.	Adv	X		X	X					
Bird, D.K.	Adv						X			
Davis, K.	Adv	X						X		
Elsley, E.M.	Adv								X	
Falvey, J.F.	Adv	X				X		X		
Fee, G.N.	Adv							X		
Foy, G.	Adv	X						X		
Klassen, W.C.	Adv	X					X			
Laing, G.	Adv	X						X		
Lynch, D.K.	Adv	X			X					
Nasi, W.S.	Adv	X						X		
Novakowski, A.R.	Adv							X		
Richards, A.E.	Adv				X					
Rowsell, C.R.	Adv	X						X		
Swanston, L.W.	Adv			X						
West, J.M.	Adv	X					X			
CZECHOSLOVAK SOCIALIST REPUBLIC / REPUBLIQUE SOCIALISTE TCHECOSLOVAQUE										
Gertler, Z.	D	X					X			

*D Delegate/Délégué
Alt Alternate/Suppléant
Adv Adviser/ Conseiller
Obs Observer/Observateur

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						NAV-AIDS	AGA	ATS	MET	COM
DENMARK / DANEMARK										
Hansen, A.	D	X		X				X		
Amundsen, O.	Alt	X							X	
Crone-Levin, G.	Alt	X								
Jørgensen, E.	Alt	X					X			
Larsen, A.	Alt	X			X					X
Mortensen, A.	Alt	X						X		
Nissen, J.	Alt	X				X	X			X
Rugsted, V.	Alt	X								X
Fugl-Svendsen, H.	Adv							X		
Larsen, C.	Adv	X						X		
Gehlshøj, B.	Obs	X								
Kruse, H.K.K.	Obs	X								X
Laursen, P.	Obs	X								
FINLAND / FINLANDE										
Tarkkanen, R.	D	X					X	X		
Riissanen, J.T.	Alt	X							X	
FRANCE										
Carour, P.R.	D	X								
Barberon, J.P.	Alt	X							X	
Bourrageas, D.(Mlle)	Alt	X					X			
Chef, M.	Alt	X				X				X
Duvergé, P.	Alt								X	
Marc, R.	Alt	X						X		
Oliviero, E.	Alt	X					X	X		
Provost, J.L.	Alt	X				X				X
Renard, J.M.	Alt	X							X	
Walle, R.	Alt	X	X		X			X		
Gouet, M.P.	Adv							X		
Sapin, J.-F.	Adv	X					X	X		

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						NAV-AIDS	AGA	ATS	MET	COM
GERMANY (FEDERAL REPUBLIC OF) ALLEMAGNE (REPUBLIQUE FEDERALE D')										
Engel, H.J.	D	X						X		
Ditz, L.L.	Alt	X		X		X	X	X		
Engler, J.	Alt	X							X	
Grosch, R.F.	Alt	X					X			
Karwath, K.E.	Alt	X						X		
ICELAND ISLANDE										
Kofoed-Hansen, A.	D	X								
Diego, F.A.H.	Alt	X						X		
Magnusson, L.	Alt	X				X	X	X		
Arndal, S.	Adv	X								X
Hjalmarsson, A.K.D.	Adv	X						X		
Sigtryggsson, H.	Adv	X							X	
Thorkelsson, S.	Adv	X								X
IRELAND IRLANDE										
O'Sullivan, R.W.	D	X						X		
Feehan, J.V.	Alt	X					X			
Howley, R.	Alt	X						X		
Jones, G.	Alt	X								X
McCabe, M.F.	Alt	X				X		X		
O'Neill, D.J.	Alt	X								X
Rohan, P.K.	Alt	X							X	
ITALY ITALIE										
Battiston, G.P.	D	X								
Passeri, L.	Alt						X	X		
Pimpinelli, V.	Alt	X								
JAPAN JAPON										
Nishimura, M.	D	X								
Noguchi, Y.	Alt	X						X		
Kohno, S.	Adv	X						X		
Ozaki, H.	Adv	X				X	X			X

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						NAV-AIDS	AGA	ATS	MET	COM
MEXICO MEXIQUE										
Molinar, F.	D							X		
Lezama, A.	Adv									
Sainz, E.	Adv									
NETHERLANDS (KINGDOM OF THE) PAYS-BAS (ROYAUME DES)										
Ten Velden, J.	D	X	X							
De Jong, H.M.	Alt	X							X	
Dubois, T.	Alt	X		X			X			
Jelier, M.C.	Alt	X				X				
Kastelein, J.	Alt	X							X	
Pool, A.	Alt	X						X		
Suttorp, J.	Alt	X								X
Hart, L.	Adv	X								X
NORWAY NORVEGE										
Grinde, B.	D	X								
Bjarkli, B.	Alt	X					X			
Christiansen, Ø.	Alt	X						X		
Edvardsen, J.H.	Alt	X				X				
Melvaer, S.	Alt	X								X
Hartvedt, R.	Adv	X						X		
PORTUGAL										
Barbosa, H.	D	X					X			X
Araujo, D.N.	Alt	X						X	X	
Campos, J.C.	Alt	X						X		
Lopes, L.D.	Alt	X				X	X			X
de Brito, M.C.	Adv	X			X			X		
SPAIN ESPAGNE										
Lopez Mayo, F.	D	X								
Alia, J.	Alt	X							X	
Benito, M.G.	Alt	X				X	X			X
Galdo Martinez, A.	Alt	X						X		
Garriddo Capa, J.R.	Alt	X						X		
Herrero, G.	Adv							X		

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						NAV-AIDS	AGA	ATS	MET	COM
SWEDEN SUEDE										
Akerstedt, C.	D	X					X	X		
Morales, C.	Alt	X							X	
Enderlein, L.	Adv	X								
SWITZERLAND SUISSE										
Candrian, H.	D	X				X		X		
Auberson, P.	Alt	X				X		X		
Jeannet, A.	Alt								X	
UNITED ARAB REPUBLIC REPUBLIQUE ARABE UNIE										
Hamdi, M.	D	X								
UNITED KINGDOM ROYAUME-UNI										
Blake, D.A.	D	X						X		
Brackstone, L.A.	Alt	X				X				
Brambleby, E.J.	Alt	X								X
Burrett, D.J.	Alt	X								X
Casley, W.	Alt			X						
De Belleroche, H.R.	Alt	X			X					
Fraser, J.H.H.	Alt							X		
Glendining, F.J. (Miss)	Alt	X								X
Hurley, J.B.	Alt	X					X			
Marshall, R.	Alt	X	X		X		X			
Rankin, G.W.	Alt							X		
Sugden, L.	Alt	X							X	
Thompson, D.	Alt	X							X	
White, A.	Alt	X						X		
Wilkie, D.	Alt	X						X		
Wills, G.W.	Alt	X	X						X	
King, V.H.	Adv	X						X		
Sugg, R.W.	Adv						X			
Ware, E.M.	Adv	X								
Warwick, P.J.	Adv	X								X

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						NAV-AIDS	AGA	ATS	MET	COM
UNITED STATES OF AMERICA / ETATS-UNIS D'AMERIQUE										
Wolfe, G.M.	D	X								
Budge, L.K.	Alt	X								X
Dunmire, C.E.	Alt	X						X		
Fleming, J.R.	Alt	X								
Fletcher, R.	Alt	X				X				
Hamm, W.A.	Alt	X					X	X		X
Jaffé, E.	Alt			X						
James, R.P.	Alt	X							X	
Jamison, J.S.	Alt	X					X			
McCullough, A.J.	Alt	X			X					
Pattison, R.E.	Alt	X	X			X				
Peridier, P.H.	Alt	X							X	
Von Runnen, J.	Alt	X						X		
Taylor, T.H.	Alt	X								X
Wells, R.W.	Alt	X				X	X			
Gerblick, P.	Adv				X					
Keys, C.	Adv					X				X
Keyser, J.J.	Adv	X							X	
VENEZUELA										
Alfonzo, R.	D	X					X	X		
Andrade, R.	Alt	X								X
INTERNATIONAL ORGANIZATIONS/ ORGANISATIONS INTERNATIONALES										
EUROCONTROL										
Schmid, H.K.A.	Obs	X						X		
IANC (INTERNATIONAL AIRLINE NAVIGATORS COUNCIL) / IANC (CONSEIL INTERNATIONAL DES NAVIGATEURS DE LIGNE)										
Still, T.D.	Obs	X				X		X		
Archor, A.	Obs							X		
Cassidy, C.A.	Obs							X		
English, R.	Obs	X								
Hammond, T.	Obs	X								
Knell, J.C.	Obs							X		
Lancaster, D.W.	Obs							X		
Waldman, R.	Obs	X						X		

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						NAV-AIDS	AGA	ATS	MET	COM
IAOPA (INTERNATIONAL COUNCIL OF AIRCRAFT OWNER AND PILOT ASSOCIATIONS)										
IAOPA (CONSEIL INTERNATIONAL DES ASSOCIATIONS DE PROPRIETAIRES ET PILOTES D'AERONEFS)										
Karant, M.	Obs	X				X			X	
Logsdon, C.S.	Obs	X					X			
IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)										
IATA (ASSOCIATION DU TRANSPORT AERIEN INTERNATIONAL)										
Meline, J.	Obs	X								
Aagaard, A.	Obs	X								
Anderson, G.I.	Obs	X					X			
Bearden, C.	Obs	X								
Browne, J.A.	Obs	X							X	
Castan, A.	Obs					X				
Chambers, E.	Obs	X							X	
Champie, O.	Obs	X				X		X		
Crandall, G.F.	Obs							X		
Gierloeff, O.	Obs								X	
Goodman, G.	Obs	X					X			
Heath, N.F.J.	Obs			X						
Ingleton, P.R.	Obs	X								X
Jimenez, R.	Obs								X	
Kelly, D.H.	Obs	X								X
Krejcik, S.V.	Obs	X								X
Lee, L.	Obs	X	X					X		
Leonardi, G.	Obs	X			X			X		
Lobera, P.	Obs							X		
Loke, A.W.	Obs	X						X		
Piculell, S.A.	Obs	X								X
Powell, P.G.	Obs	X						X		
Snee, J.	Obs									X
Stefanik, P.	Obs	X					X			
Tanner, F.S.	Obs	X						X		
Van der Aa, A.G.	Obs	X							X	
Wild, J.	Obs					X				
Williams, V.N.	Obs	X								X

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						NAV-AIDS	AGA	ATS	MET	COM
IFALPA (INTERNATIONAL FEDERATION OF AIR LINE PILOTS ASSOCIATIONS) / IFALPA (FEDERATION INTERNATIONALE DES ASSOCIATIONS DE PILOTES DE LIGNE)										
Battioli, I.	Obs	X				X		X		
Brewer, J.H.	Obs	X					X			
Gallagher, H.	Obs						X	X		X
Hart, H.V.	Obs							X		
Kidd, B.R.M.	Obs									
Maas, M.S.	Obs	X			X			X		
Nixon, A.	Obs	X							X	
de Vries, A.	Obs									
ITU (INTERNATIONAL TELECOMMUNICATION UNION) / UIT (UNION INTERNATIONALE DES TELECOMMUNICATIONS)										
Dellamula, F.	Obs	X								X
WMO (WORLD METEOROLOGICAL ORGANIZATION) / OMS (ORGANISATION METEOROLOGIQUE MONDIALE)										
Weiss, G.K.	Obs								X	

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LIST OF RECOMMENDATIONS

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Agenda Item 1: Table of Aircraft Operations

INTERNATIONAL COMMERCIAL AIR TRANSPORT OPERATIONS

1.1 The Meeting reviewed the provisional Table of International Scheduled Air Transport Operations made available to it at the commencement of the Meeting and decided that the Table together with amendments thereto and additional data on non-scheduled commercial operations submitted by States constituted, as far as commercial operations were concerned, the final table required under the Directives in para. 1.2 of Doc 8144-AN/874/2, and provided a reasonable basis for amending the Regional Plan.

1.1.1 In its examination and adoption of the Table, the Meeting noted extensive and significant changes both in the air route structure and the frequency of operations since the convening of the Special North Atlantic RAN Meeting in 1965. Traffic had increased at an average of roughly 15% annually and operations had been initiated on some 80 new routes connecting terminals on opposite sides of the Atlantic. It was further noted that SST operations would likely commence in 1973.

1.1.2 The Meeting did not find it necessary to reproduce the Table of Scheduled Air Transport Operations in the Report of the Meeting.

TYPE OF OPERATION INTENDED BY INTERNATIONAL SCHEDULED AIR TRANSPORT

1.2 The Meeting noted that States and IATA, as requested, had submitted data on the type(s) of operations intended on the various route stages. This did not include any stated intention to operate under CAT III conditions. The Meeting accepted the data submitted as suitable for planning purposes.

INTERNATIONAL GENERAL AVIATION OPERATIONS (IGA)

1.3 The Meeting reviewed the limited data made available on international general aviation operations, which had been secured through a traffic survey for the period 13-26 July 1969. It was deduced that some of the reported operations were actually non-scheduled air transport operations and these were therefore omitted. On the other hand, data was provided by one State which served to cover an obvious gap in the information. Also, a summary of IGA operations was provided by another State, which gave some indication of the volume of traffic over the past five years. It was noted that in general the traffic had doubled during this period and in 1970 would likely be in excess of 500 movements below 10,000 feet with an unknown quantity of turbine powered aircraft operations at higher levels.

1.3.1 The pattern of operations which appeared to be typical of the North Atlantic area comprised routes connecting Gander, St. Pierre and St. Johns in the west and many European locations with intermediate stops at Goose, Frobisher, Søndre Strømfjord or Narssarssuaq, Reykjavik or Keflavik and Santa Maria.

1.3.2 It was considered that the data provided would enable the Meeting to add to the provisions for international general aviation in the regional plan. The Meeting did not consider it necessary to reproduce this data in the Report of the Meeting. In this connexion, it was noted that IGA operations across the Atlantic are along routes and make use of aerodromes generally in common with international scheduled air transport.

AIR TRAFFIC FORECASTS

1.4 The Meeting was provided with Air Traffic Forecasts of North Atlantic flights prepared by the NAT Traffic Forecasting Group which was organized by Canada, the United Kingdom and the United States on endorsement by the Special NAT RAN Meeting (1965). It was noted that the Group was now working closely with the NAT Systems Planning Group. It was decided that the work of the Forecasting Group should be continued but this would depend on broader consideration of the Systems Planning Group's role under Agenda Item 3.

1.4.1 In view of the experience gained by the NAT Air Traffic Forecasting Group since its establishment and with recognition that this group had from time to time found it appropriate to revise the elements of the forecast as well as the forecasting methods, it was difficult for this Meeting, in the absence of forecasting group members, to identify desirable changes in the forecast format. However, the Meeting endorsed the agreement reached at the Sixth Meeting of the NAT Systems Planning Group that "busy day" and "busy hour" figures should be redefined so as to represent a forecast to the seventh busiest day and the seventh busiest hour in the year, that a distribution "shape" should be included in future forecasts, that non-jet traffic should be eliminated and that forecasts for the main traffic flow area(s) should include any traffic placing a demand on the air traffic services system whether or not only part of the flight was involved.

1.4.2 The Meeting noted that ICAO was becoming increasingly involved in forecasting air traffic in keeping with Assembly Resolution A16-22 and that it would be necessary to ensure that such activities and those of the NAT Traffic Forecasting Group were adequately coordinated.

1.4.3 Therefore the Meeting, having agreed to support the continuation of the Group, made the following recommendation*:

RECOMMENDATION 1/1 - WORK OF THE NAT AIR TRAFFIC FORECASTING GROUP

That the States responsible for the NAT Air Traffic Forecasting Group ensure that the Group reviews periodically the format and elements in the forecasts, coordinating as necessary with the ICAO Secretariat, and that the traffic forecasts be up-dated at least every other year and at other times as appropriate in order to reflect developments in air transport and associated changes in its environment, so that all information essential to NAT systems planning are made available in a timely fashion.

AIRCRAFT TYPES

1.5 It was noted that the types of aircraft engaged, or planned to be engaged, in international civil operations in the Region during the next 10 years will include the following:

AIRCRAFT TYPES USED IN INTERNATIONAL SCHEDULED AIR TRANSPORT OPERATIONS

B2707	Boeing 2707 (SST)	B707-340C	Boeing 707-340C
B707	Boeing 707 (Series Unknown)	B720	Boeing 720 (Series Unknown
B707-320C	Boeing 707-320C	B720B	Boeing 720B
B707-336C	Boeing 707-336C	B727	Boeing 727 (Series Unknown
B707-387B	Boeing 707-387B	B747	Boeing 747
B707-420	Boeing 707-420	B747F	Boeing 747F

* See also Recommendation 3/3 (page 3-12)

BR	British Aircraft Bristol Britannia (Series Unknown)
CL44	Canadair CL44
CONCORDE	British Aircraft/Sud Aviation CONCORDE (SST)
DC8C	Douglas DC8C (Series Unknown)
DC8F	Douglas DC8F (Series Unknown)
DC84	Douglas DC8, Series 40
DC85	Douglas DC8, Series 50
DC86	Douglas DC8, Series 60
DC9	Douglas DC9 (Series Unknown)
DC10	McDonnell-Douglas DC10
FK27	Fokker Friendship F.27
FK28	Fokker Fellowship F.28
HS21	Hawker Siddeley Trident 121
IL62	Ilyushin IL-62
Jet	Type Unknown
Jumbo	Type Unknown
L1011	Lockheed L1011
TU14	Tupolev Rossiya TU114
VC9	Vickers Vanguard 950
VC10	Vickers VC10

AIRCRAFT TYPES USED IN INTERNATIONAL GENERAL AVIATION OPERATIONS

AC21	Aero Commander Jet Commander 1121
AC58	Aero Commander Commander 580
AC68	Aero Commander Grand Commander 680
AV74	Hawker Siddeley Avro 748
BE17	Beech Stagger Wing
BE23	Beech Musketeer A23
BE33	Beech Debonair B33/C33
BE35	Beech Bonanza S35
BE65	Beech Queen Air 65
BE70	Beech
BE80	Beech Queen Air 80
BE90	Beech King Air 90
BN2	Britten-Norman Islander BN2
C206	Cessna Super Skywagon 206
C401	Cessna 401
C402	Cessna 402
CF05	Canadair CF5
CW46	Curtiss-Wright Commando CW20
DA20	Dassault Mystère 20 Falcon
DA23	Dassault
DC4/ C54	Douglas Skymaster DC4
FK27	Fokker Friendship F.27
FK28	Fokker Fellowship F.28
G2 (II)	Grumman Gulfstream II G1159
G159	Grumman Gulfstream G159
HP13	Handley Page Jetstream H.P. 137
HS25	Hawker Siddeley DeHavilland Dominie 125
L329	Lockheed Jet Star L329
LR23/ 24/25	Lear Jet 23/24/25
NA1	Navion Rangemaster
PA23	Piper Apache/Aztec PA-23
PA31	Piper Navajo PA-31
SH7	Short Skyvan SC.7
TA16	Transporter Allianz Transall C160
VC7	British Aircraft Corp. Vickers Viscount VC2-700

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Agenda Item 2: Operational Requirements and Planning Criteria

2.1 The Meeting noted that one State, a participant in the North Atlantic Systems Planning Group (NAT/SPG*), had presented working papers outlining the related activities of that group. The Delegates of the other States represented on the NAT SPG added their full support of this action in presenting these working papers.

2.2 The Meeting considered a proposal that Agenda Items 2 and 3 - Long-term Systems Plan - should be taken together due to their close inter-relationship. It was agreed that whereas Item 3 would need separate consideration, as it dealt with concepts not normally included in Item 2, the Meeting should, to the extent practicable, include in the Statement of Operational Requirements and Planning Criteria to be developed such long-term planning elements as could be identified.

2.3 The Meeting examined the Statement of Basic Operational Requirements and Planning Criteria, developed by the Air Navigation Commission (ANC) for the purpose of deciding upon the appropriate operating parameters and any changes or additions necessary to meet operational conditions peculiar to the area under consideration. While basing its consideration on the statement developed by the ANC, the Meeting found it necessary to include additional material and, in certain cases, to amend the ANC's basic statement. This was due to:

(i) planning, where practicable, for a ten-year, rather than the normal shorter period of some five years;

(ii) the area under consideration being that in which advanced equipment and techniques were traditionally introduced.

2.4 The additions and amendments so made covered matters of substance which were regarded as necessary for the guidance of the technical committees.

2.5 In one or two instances, notably when dealing with the dissemination of reports of slush, snow, water, etc. on aerodromes, the Meeting considered it necessary to allow reiteration in the relevant Operational Requirements and Planning Criteria of various world-wide provisions in the ICAO Annexes and associated documents, in the belief that this would facilitate the use, in planning by the technical committees, of the Meeting's directives concerned.

* The NAT/SPG was established in accordance with Recommendation 4/1 of the Special North Atlantic Meeting 1965. It comprises six States (Canada, France, Ireland, Kingdom of the Netherlands, United Kingdom and the United States of America) and has no official connexion with ICAO. It has met six times between SP NAT (1965) and NAT V.

2.6 The Meeting considered a proposal for the inclusion of a generalized statement calling for minimum performance criteria to be established for critical equipment, both ground and air, and for provision to be made to ensure that such equipment is maintained to the required level of performance and reliability. There was general support for this. However, the Meeting considered that since this expression of view neither constituted an Operational Requirement nor could be classified as a Planning Criterion, it would be inappropriate to include it in the statement under development.

2.7 The Meeting also considered the inclusion of a similar generalized statement expressing the belief that it was essential that proficiency of aircrews in the use of significant systems in air navigation (including their airborne components) be maintained to prescribed minimum standards. Although aware that Paragraph 8 d) of the Statement of Operational Requirements and Planning Criteria referred to the need for trained and competent personnel to be provided, nevertheless, in this instance, the Meeting, conscious of the need to eliminate navigational "blunders" etc., considered that, although this matter did not come within the bounds of either an Operational Requirement or a Planning Criterion, it was of sufficient importance to be brought to the attention of Contracting States and International Organizations concerned. Recommendation 2/1 was developed accordingly:

RECOMMENDATION 2/1 - PROFICIENCY OF AIRCREWS IN THE USE OF ESSENTIAL SYSTEMS

That Contracting States and International Organizations concerned take such steps as may be necessary to ensure that proficiency of aircrews in the use of systems essential to the safety of international air navigation, (including their airborne components) be maintained to prescribed minimum standards.

2.8 The Meeting adopted the following Statement of Operational Requirements and Planning Criteria for the guidance of the technical committees:

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

GENERAL: Applicable to both International Commercial Air Transport and International General Aviation.

1. Operating Parameters

The operating characteristics of the subsonic civil aircraft listed in the approved table of aircraft operations, except helicopters, that should be taken into account in the development of facilities, services and procedures are:

(i) Climb performance will differ considerably for the various aircraft types ranging from 2.5 to 20 metres per second (500 to 4 000 feet per minute)

(ii) Cruising speeds will range

(a) reciprocating engines 100 kt up to 300 kt;

(b) turbine engines up to 600 kt.

(iii) Cruising levels will range:

(a) reciprocating engines - up to FL 250;

(b) turbo-prop engines - up to FL 350;

(c) turbo-jet engines - up to FL 450;

(iv) Descent performance will normally vary from 2.5 metres per second, (500 feet per minute) for unpressurized aircraft to 25 metres per second (5 000 feet per minute) for pressurized aircraft.

1.1 For Concorde operations the following preliminary performance data is to be used:

(i) Average Climb Performance: 25 m/s (5 000 ft/min) up to 3 000 m (10 000 ft) /i.e. 12.5 m/s (2 500 ft/min) at 1 500 m (5 000 ft) increasing to 35 m/s (7 000 ft/min) at 3 000 m (10 000 ft)/ decreasing from average 32.5 m/s (6 500 ft/min) at 3 000 m (10 000 ft) down to 12.5 m/s (2 500 ft/min) at 9 000 m (30 000 ft) and thereafter reducing to approximately 1 m/s (200 ft/min) at 15 000 m (50 000 ft).

During cruise climb above 15 000 m (50 000 ft) the average rate of climb quickly stabilizes at approximately 0.25 m/s (50 ft/min).

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

For ATC purposes it may be necessary to give an advance notice at the beginning of climb to indicate that a 1 500 m (5 000 ft) altitude difference is possibly necessary for levelling off at specified cruising level.

(ii) Cruising Levels: Cruise Climb: 15 000 m to 17 500 m (50 000 ft to 58 000 ft) Continuous Altitude Cruise: 15 000 m (50 000 ft).

(iii) Cruising Level Speed: Mach 2.2 at ISA - 15°C, 2.05 at ISA, 2.0 at ISA + 5°C, 1.95 at ISA + 10°C.

(iv) Descent Performance: Normal procedure: Average 12.5 m/s (2 500 ft/min) from 18 000 m (60 000 ft) down to ground level.

Emergency Procedure: From 18 000 m (60 000 ft) to 7 500 m (25 000 ft) an average of 30 m/s (6 000 ft/min). Thereafter 7 500 m (25 000 ft) to ground level at normal descent procedure [average 12.5 m/s (2 500 ft/min)].

Note: Performance figures for military aircraft are not available but in some cases they are considerably in excess of those quoted above.

2. Planning for facilities and services, in addition to meeting the operational requirements, should take into account the need for:

(a) efficiency in operation;

(b) economy in equipment;

with due consideration being given to capability for future expansion without major redesign or replanning.

3. As ten-year traffic forecasts provide the basis for planning, this period should be used in the concept of systems and general philosophy. However, air navigation facilities, services and procedures should be planned to meet the requirements of all types of aircraft engaged, or planned to be engaged, in the region, primarily during the next five years in international civil operations but not necessarily limited to that period. The types of aircraft include all those listed in the approved table of aircraft operations, except that planning should not be necessarily undertaken in respect of aerodromes used only by operators of the State in which the aerodrome is located unless such planning is required to protect the integrity of the plan. International scheduled Airline Operators should be enabled to exercise operational control in accordance with Annex 6, Part I.

4. The workload upon any aircrews and ground personnel employed in the system should not reach a level where safety or efficiency is impaired when prescribing facilities, services and procedures for the area.

5. Planning for facilities and services should normally provide for their availability on a 24-hour basis. Where in certain cases part-time availability would suffice, a brief description of the circumstances should be given.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

6. Reports of slush, snow, water, etc., of operational significance remaining on aerodrome pavements, including their effect on braking action, should be disseminated to all directly concerned. Such reports should meet the following criteria:

(a) be transmitted without delay;
(Reference: Annex 10, Volume II, para. 4.1.1.7
Annex 14, Part II, para. 2.8.2
Annex 15, para. 5.1.1.1.f))

(b) be of sufficient frequency to provide knowledge of the current situation;
(Reference: Annex 14, Part II, para. 2.8.2
Annex 15, Appendix 2, Note 6)

(c) contain an indication of the intention of the authorities concerning removal;
(Reference: Annex 14, Part II, para. 2.8.3, Note
Annex 15, Appendix 2, Items L & M)

(d) provide notification when the conditions previously reported have ceased to exist;
(Reference: Annex 14, Part II, para. 2.8.2
Annex 15, Appendix 2, Note 6)

(e) be uniform throughout the area of concern and that the data be measured and disseminated by a uniform method.
(Reference: Annex 14, Part II, paras. 2.8.3, 2.8.4 and 2.8.6,
Attachment B, para. 7.2 and 7.3
Annex 15, Appendix 2.)

7. Planning for approach and landing aids should take into account possible future requirements for Facility Performance CAT II ILS and related ground environment facilities for at least one runway at all international aerodromes where, although CAT II operations are not planned as immediate requirements, they are nevertheless contemplated for the future.

8. 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 in so far as practicable.

(b) The system caters for the requirements of all aircraft*.

* Including local, domestic and military traffic in so far as it may affect international traffic.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

(c) Procedures, services and facilities be compatible with those for operations in adjacent regions and continental areas.

(d) An adequate number of technically trained and competent personnel be provided to supervise, maintain and operate air navigation facilities and services in the area.

(e) Operators have access to information necessary to exercise effective operational control over their aircraft. (Annex 11, para. 2.11 and PANS RAC, Part VIII, paras. 2.1.1.3 and 2.1.1.4 refer)

(f) 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.

(g) 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. (PANS-RAC, Part II, para. 6.1 refers.)

9. In the determination of system requirements full use should be made of cost/benefit techniques where these are appropriate and generally agreed.

NAVIGATION

10. Navigation Systems

A navigation system should be provided to meet the needs involved in operating all aircraft using the system as well as providing an adequate basis for ATS procedures. The system should:-

(a) Be provided with a level of reliability consistent with system requirements.
(b) Provide the pilot with continuously available information to determine his position, to maintain cleared track and to enable him to continue his flight and carry out any correction 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 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 such that its continental and oceanic components are compatible with respect to navigation performance and capability.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

11. Planning to satisfy these requirements should take into account the need for keeping the workload imposed on the flight crew and ground personnel 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.

Navigation Aids

Short-distance aids

12. The en-route aids should provide navigation assistance to permit en-route navigation to meet the needs of air traffic control with the accuracy required, and VOR supplemented as necessary by DME should be installed as the primary aid for continental and transition areas.

Long-distance aids

13. In areas involving long-distance navigation Loran-A, long-range NDBs, and if requirements so warrant, Consol will still have to be provided either as support where necessary for self-contained systems or for use in the primary rôle by other aircraft which are not provided with such equipment.

> Note: The extended use of INS, may with experience, enable reduction in separation standards beyond those previously contemplated. Also in the longer term, other long-distance station referenced aids (either ground or satellite referenced) may be needed to support even further reductions in separation standards.

Terminal Area Aids

14. The terminal area aids to be recommended should permit navigation for approach, holding and departure to be carried out with the accuracy required. The primary aid should be VOR, which should be so located as to permit the most efficient approach and air traffic control procedures and to give the pilot maximum assistance in adhering to requisite patterns. NDBs, preferably low powered, should be used for holding when the provision of VORs for this purpose is not possible or practicable. Consideration should be given to the provision of DME in association with VOR to ensure ATS procedural flexibility and/or improve navigational accuracy.

Altimetry System

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

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

Aids to Approach and Landing

16. 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. Specifically, the requirements for ILS should be assessed in terms of the provisions of Annex 10, Part I, Chapter 2 bearing in mind that, irrespective of the existence of other facilities, the provision of this aid is often considered necessary for the safe operation of turbo-jet aeroplanes in all operating conditions*. It should be noted that the CAT I requirement may, in some locations, need to be met by the provision of Localizer or Glide Path Equipment meeting the CAT II facility performance specifications of Annex 10. Consideration should be given to the provision of DME in association with ILS, particularly at those locations where it is not practicable to install the marker beacon components of the complete ILS.

17. Distinction should be made between requirements for the provision of full CAT II ground environment, including lighting, and those for Facility Performance CAT II ILS (localizer and glide path) for use in automatic approach and landing operations in better than CAT II visibility conditions.

Flight Testing of Radionavigation Aids

18. Co-operative arrangements for the flight testing of radionavigation aids should be recommended where flight testing on a national basis would be impracticable or uneconomic.

Frequency Assignment Plans for Radionavigation Aids in LF/MF and VHF Bands

19. Where suitable alternative planning arrangements do not exist, frequency assignment plans should be prepared for aids in the LF/MF and VHF navaid bands on the basis of agreed planning criteria.

AERODROMES

International Commercial Air Transport Operations

20. Regular aerodromes and principal alternates should be determined to meet the needs of the flights listed in the agreed table of aircraft operations. When studying the requirements for alternate aerodromes within the region, the guiding principle should be that, to the greatest practicable extent, the requirements for alternate aerodromes be satisfied by regular international aerodromes.

21. Physical characteristics and visual aids should be determined for each regular and alternate aerodrome required for international operations.

* Turbo-jet aeroplanes at present used in international general aviation operations require ILS only for IMC approaches in conditions of low cloud base and/or visibility.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

22. In cases where the extension or development of an aerodrome to meet infrequent critical operations would entail disproportionate expenditures, alternative solutions should be explored.

Note: If it is found that the full operational requirements cannot be met at an aerodrome then the maximum practicable development to facilitate operations should be recommended and the relevant reasons for this included in the report.

23. At alternate aerodromes the characteristics should be determined in accordance with the landing requirements of the diverted critical aircraft and the take-off requirements for the aircraft for a flight to the aerodrome of intended destination.

Note: Where more than one alternate aerodrome is available the requirements should be based on the types of aircraft each is intended to serve.

International General Aviation

24. Aerodromes, in addition to those required for international commercial air transport operations, should be determined to meet the needs of the flights listed in the agreed table of aircraft operations.

25. Physical characteristics should be determined for each aerodrome to meet at least the needs of the most commonly used aircraft operated or intended to be operated at the aerodrome by IGA.

Note: If it is found that the full operational requirements cannot be met at an aerodrome then the maximum practicable development to facilitate operations should be recommended and the relevant reasons for this included in the report.

General

26. The introduction of international operations at other aerodromes and the need for the inclusion of those aerodromes in air navigation plans should be considered.

This may arise from:

(i) the saturation of existing key terminals with a resulting need to distribute operations to other aerodromes;

(ii) increased air freight and charter operations;

(iii) increased international general aviation operations;

(iv) introduction of international SST operations;

(v) international operations with aircraft having different maximum permissible noise levels.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

27. The development of aerodrome capacity should be co-ordinated with that of the airspace, to ensure mutual compatibility.

AIR TRAFFIC SERVICES

28. Flight information service and alerting service should be provided throughout the area under consideration. In addition, air traffic control service should be provided within the limits of control areas (Annex 11, Para. 2.5.2.2 refers). The air traffic services system 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. Where appropriate, a target level of safety should be defined, to permit the level of safety likely to be afforded by particular values of separation minima to be compared with the target level;

(c) be procedurally "fail-safe", particularly in respect of oceanic clearances;

(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 consistent with the requirements of e); where SST's desire to operate a cruise/climb technique, this should be allowed as far as possible; relevant flight planning information should be provided to operators as early as possible;

(e) provide for safe and expeditious handling of air traffic (Annex 11, Para. 2.2 refers), including the ability to adequately process and clear peak traffic flow;

(f) assign responsibility to a single authority for the provision of air traffic services within any delineated area (Annex 11, Para. 3.4.2 refers);

(g) provide and adequately display to the controller the accurate position and intention of the aircraft in the area of responsibility (Annex 11, Paras.3.3.1 and 3.3.2 refer);

(h) require a minimum of air-ground communications and a minimum of inter-centre co-ordination; and

(i) require in terminal areas throughout the area covered by the Meeting, a uniform altimeter setting procedure (QNH or QFE).

Note: Specifications concerning altimeter setting procedures, including those for the determination by States of the transition level, appear in PANS-OPS Part III.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

29. Controlled airspace should be established around all international aerodromes where approach control service is provided and should encompass at least the climb to cruising level and the descent from cruising level of departing and arriving aircraft. Controlled airspace should also be established to encompass the entire en-route portion of IFR flights, except where the type and density of traffic clearly do not justify such establishment.

30. Air traffic advisory service should only be considered as a temporary expedient in those cases where the lack of adequate facilities or personnel precludes the immediate establishment of air traffic control service. Air traffic advisory service should not be recommended as part of the plan.

31. The lower limit of control areas should be established so as to allow adequate space for VFR flights to operate below control areas, taking into account the flight paths likely to be used by aircraft under air traffic control.

32. Air-ground communications, particularly position reporting, should be reduced to the minimum compatible with ATS requirements. All compulsory reporting points should, where practicable, be defined by static-free radio navigation aids. (Annex 11, Attachment C, Para. 1 refers.)

33. Direct pilot-controller static-free voice communications should be provided where practicable, particularly in terminal areas and on high density routes. Rapid and highly reliable communications should be provided between control centres. (Annex 11, Para. 6.2.2 refers.)

34. Where aircraft may be using different systems for navigation and position determination within the same controlled airspace, the ground facilities involved should, in so far as practicable, be located and oriented to enable a fully integrated air traffic control structure to be established.

Transition between Continental and Oceanic Airspace

35. Air Traffic Control procedures, airspace organisation, 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.

RADAR SERVICE

36. Primary radar should be provided as an essential element of air traffic control where traffic density and/or the multiplicity of converging or crossing routes create problems.

37. Secondary surveillance radar should be provided, wherever it is needed to improve or expedite the handling of air traffic, and where economically justified.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

SEARCH AND RESCUE

38. Provision should be made for adequate search and rescue service in the Region, covering both land and water areas. Planning should take into account, to the maximum practicable extent, existing facilities even if they are provided for purposes not connected with search and rescue.

METEOROLOGY

39. The aeronautical meteorological offices should be designated so as to:

(a) provide briefing and documentation for the first flight stage, or as agreed with the operators concerned, for more than one stage;

(b) enable the most efficient use to be made of the available meteorological data.

40. Arrangements should be made for meteorological watch to be provided for each FIR and/or UIR, and for relevant meteorological information to be supplied to the related ACCs and FICs. Arrangements should also be made to ensure that RCCs are provided with necessary meteorological information.

41. Any area forecast system to be provided should be in accordance with the principles expressed in Recommendation 11.2/1 of the 6th AN Conference, should take into account the additional services likely to be required for the operation of SSTs, and should cater for the particular characteristics of the area.

42. In general, forecasts for the same purpose should not be produced by more than one MET Office if users can be satisfied by a common service, assuming it is technically practicable and reasonably economical.

43. The ground exchange of operational meteorological information should satisfy the requirements of the pilot-in-command and the operator's local representative, before and during flight, as stated in the following table, with due regard to the need for economy in the volume of routine operational meteorological traffic to be exchanged:

Type of information	Required coverage and/or period of validity of information to be available	
Routine and selected special reports	At departure aerodrome	For aircraft in flight
For departure aerodrome and alternates	For all flights. Exchange involved only for reports of alternate aerodromes	During first 2 hours *) of flight

*) With possible exceptions for SST aircraft

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

For final aerodrome and alternates	For flights not exceeding 2 hours *) flying time	During last 2 hours *) of flight
For significant observation stations (routine reports only)	Along and adjacent to route up to distance corresponding to 2 hours *) flying time	Along and adjacent to route up to distance from aircraft corresponding to 2 hours *) flying time
Air-reports	For whole route	Appropriate special air reports for route ahead
SIGMET information	For route ahead up to distance corresponding to 2 hours *) flying time	For route ahead up to distance from aircraft corresponding to 2 hours *) flying time
Aerodrome forecasts and amendments	As per PANS-MET 2.5.2.4.2.4 for validity periods appropriate to the flight	As at departure aerodrome, but forecasts are required to be available only as long as appropriate
Pressure values	Exchange requirements as per PANS-MET 2.5.9	
Landing forecasts	No exchange requirements	For aerodromes of intended landing during last hour of flight
Area forecasts	For flights for which the entire service is not provided by the local meteorological office.	No exchange requirements
Upper wind and temperature forecasts (En route forecast service)	No exchange requirements	As per PANS-MET 2.5.3.8 and 2.5.1.9.2.2

44. **At departure aerodromes SST aircraft should be supplied with up-dated forecasts concerning destination and alternate aerodromes in a suitable form and having regard for the short flying time of aircraft operating at supersonic speeds.**

*) With possible exceptions for SST aircraft

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

45. The following categories of operational meteorological messages should achieve transit times not greater than the values indicated, on 95% of occasions:

SIGMET messages		5 minutes
Amendments to aerodrome forecasts		5 minutes
Aerodrome reports, Landing forecasts, Selected special reports	from 0 to 550 NM	5 minutes
	from 550 to 1100 NM	10 minutes
Aerodrome forecasts exchanged across the North Atlantic		30 minutes

46. Aerodrome forecasts exchanged across the North Atlantic should be available, at all locations at which they are required, at least 30 minutes before their period of validity commences.

47. Landing forecasts should be of the trend type.

48. The meteorological information supplied should be adequate to serve flights to the levels specified in 1 iii). For SST operations information should be provided to cover:

(i) the transonic phase, from FL 250 to the altitude of supersonic cruise,
(ii) the supersonic cruise phase between FL 500 and FL 600 for Mach 2 SST aircraft and between FL 600 and FL 700 for SST operations up to Mach 3.

49. States should continue to maintain appropriate climatological records of upper air information up to 30 000 metres (100 000 feet) for future SST aircraft operations.

50. For international general aviation traffic, information concerning weather conditions at aerodromes of departure and destination and at relevant alternate aerodromes and concerning en-route weather conditions, should be made available or should be easily procurable.

Note: This information is intended to enable the pilot-in-command to comply with the provisions of Annex 6, Part II, Paragraphs 4.7.1 and 4.7.2.

51. Arrangements should be made for the supply of forecasts for grid points in digital form, as provided for in Recommendations 9.3/2 and 11.2/2 of the Sixth Air Navigation Conference.

TELECOMMUNICATIONS

Communications Service

52. 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:-

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

(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 Co-ordination Centres; and

(e) for adequate and reliable communications between appropriate Rescue Co-ordination Centres.

53. Both the aeronautical fixed and aeronautical mobile services should meet the following technical criteria as appropriate.

54. Cover of the services must be adequate for the routes flown. The reliability of the services should be consistent with system requirements. To this end, with ground and airborne equipment, it may be necessary to use alternative and/or duplicate means of communication to ensure that sufficient redundancy is available to cater for any possible malfunction 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 to effect necessary action.

55. Communication services should be such as to minimize the possibility of errors in messages and to detect promptly any errors which occur.

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

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

Aeronautical Fixed Service (AFS) Planning and Engineering

58. The AFS recommended should be designed to meet the stated requirements of ATS, SAR, MET AIS and airline operating agencies for printed or speech communications.

59. It may be necessary for States in their national planning to provide for aerodromes, used by international general aviation, to have ready access to the AFTN.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

Aeronautical Mobile Service (AMS) Planning

60. Air-ground communication facilities should be recommended to meet rapidly and reliably the stated requirements for air traffic control as well as, to the extent required, all classes of traffic acceptable on the AMS. These facilities should employ VHF where practicable, including use of extended range VHF or other suitable techniques on VHF or higher frequencies; otherwise HF operation should be recommended.

61. Where possible, VOLMET Broadcasts should be recommended if overloading of air-ground channels has occurred or is expected to occur, due to request-reply meteorological traffic.

62. Aerodromes having a significant volume of international general aviation traffic should be served by stations of the AMS and, if possible, such stations should operate on frequencies within the bands normally used by aircraft constituting this traffic.

Selective Calling System (SELCAL)

63. Selective calling (SELCAL) devices should be employed, wherever possible and necessary, on HF and VHF/GP frequencies at aeronautical stations.

Frequency Assignment Plans

64. Where suitable alternative planning arrangements do not exist, frequency assignment plans should be prepared for mobile service facilities in the VHF aeronautical mobile band on the basis of agreed frequency/geographical separation criteria.

65. Frequency assignment plans should be prepared for mobile service in the HF (R) band in accordance with the provisions of the ITU Radio Regulations.

66. There is a requirement for channels for operational control purposes and the necessary radio frequencies should be allotted in accordance with the related provisions of Annex 10.

Note: (a) In the EUM Region in the case of VHF only the sub-band 131.4 M/cs to 131.95 M/cs is available.

(b) In instances where operational control frequencies are provided, at no time should air traffic control frequencies be left unguarded by flight crews.

STATEMENT OF BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (Cont'd)

AERONAUTICAL INFORMATION SERVICES AND AERONAUTICAL CHARTS

67. The designation of International NOTAM Offices and their areas of responsibility should be based on maximum efficiency in the dissemination of aeronautical information by telecommunications and on optimum use of the AFTN.

68. Arrangements for the international exchange of NOTAMS (including SNOWTAMS), AIS documents and aeronautical charts should be examined to ensure their adequacy to meet the needs of all forms of international civil aviation.

69. Arrangements for the transmission of NOTAM Class 1 including the utility of introducing a collective address system should be examined with a view to recommending measures to ensure that adequate and timely information is available.

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Agenda Item 3: Long-term Systems Plan

Introduction

3.1 In examining essential requirements for a long-term systems plan up to 1979, the Meeting recognized that these requirements would be influenced both by the introduction of SSTs and by the general increase of traffic. As a starting point, the Meeting drew up a statement which describes the situation in broad terms and went on to develop a more specific list of elements to be taken into account in long-term systems planning. For convenience, the broad statement that follows considers subsonic traffic, supersonic traffic and general matters under separate headings.

SUBSONIC TRAFFIC

Increased Traffic

3.1.1 It was agreed that, from the viewpoint of economy of operation, requirements would be best considered using the NAT forecast of busy hour rates contained in the forecast made by the NAT Traffic Forecasting Group which gave busy hour rates which were not exceeded on 90% of occasions. This predicted that subsonic forecast traffic would show a substantial growth until 1974 and then a levelling off for the remainder of the decade with extra growth in part taken up by the progressive introduction of SSTs (45 subsonic flights per hour in 1970 becoming 60 subsonic flights per hour in 1975). It was considered that, if this should prove to be the case, contemplated reductions in separation standards should then ensure that the economy of operation of subsonic traffic could be maintained at the present level throughout the decade with the improvements in navigational capability expected in the shorter term. There was evidence from the work of the North Atlantic Systems Planning Group (NAT/SPG) to suggest that the introduction of composite separation would be one way to achieve this end.

3.1.2 The above was based on the assumption of the continued use of organized tracks in the area of the main traffic flow between North America and Europe, strategic clearance into the system and refinements in longitudinal separation standards to cater for speed differentials with the introduction of the Boeing 747s. Studies suggested that about 85% of the flow along North American - European routes was accommodated on the organized tracks. Traffic along those routes which at present are not covered by the organized track system amounted, on average, to 5% north and 10% south of the organized tracks. It was felt that more attention would need to be paid to the needs of this traffic. On present evidence North American - European traffic originating south of the organized tracks should stabilise at about 6 movements per hour in the latter half of the decade.

3.1.3 It was agreed that air/ground communications might require supplementing after about 1975. It was also acknowledged that in a strategically operated system better communications alone would not permit a reduction in separation standards which are already designed to be safe for the oceanic crossing. However, improvements in navigation capability might permit reduction in separation standards to levels which would require more immediate communication, and would also facilitate the handling of traffic joining or crossing the organized tracks and of crossing traffic in low traffic density areas.

Examination of the ways and means of facilitating traffic joining or crossing the organized tracks by procedural means

3.1.4 It was also considered important to keep a close monitor on traffic growth in other parts of the area under consideration such as operations between Eastern Canada/ North Eastern U.S.A. and the CAR Region and operations between Europe and the Southern part of the U.S.A. and the CAR Region. **It was recognized that while the area of the main traffic flow in the NAT remained the key area of interest with respect to long-term systems planning, the traffic growth and aviation services in other areas were likely to justify increased attention at an early date.**

Summary (Subsonic Aircraft)

3.1.5 It was agreed that present trends in catering for subsonic traffic should be sufficient to maintain an expeditious and economic flow of subsonic traffic through this decade but more attention needed to be paid to traffic entering the area of the main traffic flow between North America and Europe either from the south or from the north. The continued adequacy of air/ground communications planned in the short term would need to be verified.

SUPERSONIC TRANSPORT

3.1.6 The Meeting expressed the opinion that the introduction of SSTs would have major effects as under:

3.1.6.1 In the en-route phase, over-ocean cruising levels would be above those of the subsonic traffic and flights would be more evenly spread over the day. This would reduce the competition for optimum tracks from what would have been the case if the traffic were to be wholly subsonic. The oceanic route problem did not appear to present great problems provided that the MET, COM and AIS services were geared to the greater speeds involved. En-route procedures had been proposed by the NAT/SPG; also the navigation capability and the more precise adherence to the ATC cleared flight path were likely to support smaller lateral and longitudinal separation standards than had hitherto been possible. It was believed that cruise climb would be possible on organized tracks and traffic volume would not demand the application of vertical separation between SST aircraft along the same track until later in the decade. Constant level cruise might be needed to resolve crossing conflicts off the organized tracks and on joining the organized tracks.

3.1.6.2 In the transition areas, SSTs flying in opposite directions would be separated vertically by virtue of their respective flight profiles, but SSTs would penetrate subsonic levels and, when subsonic, might in some instances wish to fly lower and faster than subsonic jets. When so operating, they would thus accentuate the problem of control in transition areas on either side of the ocean as they would be mixed with subsonic aircraft flying in both the same and opposite directions. There was an agreement that these considerations made it essential in NAT transition areas of high traffic density, for radar or some other means of surveillance to be provided.

Oceanic clearance

3.1.7 In order to ensure optimum utilization of the oceanic track structure either flow control techniques, to be applied before take-off, would be required or random flow of traffic could be accepted with the proviso that spacing on NAT tracks would be achieved by appropriate variation of the point of acceleration to supersonic speed. With regard to flow control techniques, studies in respect of European departures had indicated that if aircraft departures varied by more than 5 minutes from an allotted time, the flow became effectively random. Consequently, the second method was likely to be required, at least in respect of traffic originating from high density traffic airports. It was agreed, however, that the formulation of oceanic clearance for SSTs would appear to require computer assistance to ensure effective minimal longitudinal spacing on NAT tracks.

Increased SST traffic

3.1.8 It was pointed out that toward the end of the decade reductions in oceanic separation standards would be needed to hold the cost of deviation from optimum track within bounds. For instance, reductions in lateral separation between tracks in the organized track structure from the planned 60 NM to 30 NM and in longitudinal separation from the planned 10 minutes to 5 minutes would be sufficient. In this connexion, the Meeting made the point that the cost effectiveness of various solutions including satellite surveillance, enhanced aircraft navigational capability, airborne separation monitors, and the application of composite separation, based on the flight profile of SST aircraft, would need to be examined in due course.

GENERAL

Terminal Control Area-Aerodrome Capacity *

3.1.9 Concern was expressed about the problem of incompatibility between terminal control area capacity, aerodrome capacity, and the forecast need for an increase in en-route systems capacity. After discussion it was agreed that matters warranting urgent consideration are:

(i) the need to provide more terminal area capacity in order to be able to absorb the higher en-route capacity resulting from the increased traffic demands;

(ii) the need to maintain appropriate relationship between the ATS capacity, the aerodrome acceptance rates, and the related traffic demands;

(iii) the need for adequate aerodrome planning to cater for increased traffic at the aerodromes concerned.

Navaids Protection Dates

3.1.10 It being noted that the Annex 10 protection dates, associated with ILS, VOR and DME, are all 1 January 1975, the Meeting agreed that, to facilitate planning for a period of time extending well beyond the 1975 date, it would be desirable for an early review of the protection dates to be undertaken. Consequently, the following recommendation was developed:

* See also paragraph 6.8 (page 6-2)

RECOMMENDATION 3/1 - PROTECTION DATES FOR ILS, VOR AND DME

That early consideration be given to the desirability of extending the Annex 10 protection dates for ILS, VOR and DME.

Communications

3.1.11 The Meeting agreed that both aeronautical mobile and aeronautical fixed service communication means would require substantial improvement, reinforcement, and possibly re-organization, particularly as regards providing increased capacity and integrity, if they were to be fully adequate to meet the requirements, as yet undefined, of all aeronautical users (ATS, MET, AIS, SAR, Operational Control, etc.). It was expected that increased use will have to be made of automated techniques in association with improved transmission media. In the aeronautical mobile service the introduction of any new system might need to be on a step-by-step basis, but this might not be true in the case of fixed services. In both fields, systems planning in depth would have to be initiated at a very early stage so as to permit firm decisions to be taken as soon as possible on major issues.

3.2 Working Methods

3.2.1 Against the background of the general views expressed in paragraphs 3.1.1 to 3.1.11 above, the Meeting agreed, as a basis for its work to consider each of the headings contained in the Report of SP NAT RAN (1965) at paragraphs 5-1.4.2 to 5-1.4.11 adding, as necessary, additional headings to cover matters (such as those of the AGA and SAR sub-systems) not included in that section of the Report of the SP NAT RAN Meeting, with a view to identifying elements applicable to long-term systems planning.

3.2.2 It was also agreed to classify each element so identified as Grade A, B or C using the following classifications:

A. Those elements in the plan for which a definite requirement within a specified time-scale can be demonstrated.

B. Those elements in the plan for which a less positive or longer time-scale relationship is evident and which could usefully profit from further study both at the NAT V RAN Meeting and subsequently.

C. Developments which are worthy of investigation and monitoring on a long-term planning basis but for which the Meeting can, as yet, draw no firm conclusion.

3.2.3 A discussion took place on the need to prepare a bar-chart that would indicate the tentative long-term planning time-table of the various "Elements to be considered in Long-Term Systems Planning", identified by the Meeting. The bar-chart appearing at page 5-23 of the Report of the SP NAT RAN (1965) was cited as an example. However, the Meeting considered that, in this instance, its decision to classify the various elements and to attach to each a grade A, B or C had provided sufficient indication of their respective time-scale requirement and had, therefore, obviated the necessity of preparing such a bar-chart.

3.2.4. Using the above approach, the Meeting agreed upon the following:

3.3 Elements to be included in long-term systems planning*

Organization of airspace

3.3.1 This heading, which appears in the Report of the SP NAT RAN (1965) at paragraph 5-1.4.2, was broadened to include related navigation and separation minima aspects. Accordingly, the heading was changed to "Utilization of Airspace and System Capacity"

	ELEMENTS TO BE TAKEN INTO ACCOUNT IN LONG-TERM SYSTEMS PLANNING	GRADE (Para. 3.2.2 refers)
3.3.1.1	Utilization of Airspace and System Capacity	
(a)	Extent of the FIR structure and provision of area control service.	B
(b)	Establishment and use of the NAT route structure (e.g. is a predetermined track system required over the whole area or in parts thereof?)	A
(c)	Use of composite separation for subsonic aircraft	A
(d)	Refinement in longitudinal separation using Machmeter techniques	A
(e)	Uniformity in the use and performance of Machmeters used in maintaining longitudinal separation	B
(f)	Continuing monitoring of the navigation performance by radar with a view to achieving possible further reductions of horizontal separation	A
(g)	Reduction in vertical separation minima	B
(h)	Increase of NAT system capacity by:	
	(i) reduction of separation between aircraft, the navigational performance of which is demonstrated to be adequate, and	A
	(ii) adoption of a track structure to take advantage of improved navigation performance of certain aircraft	B

*See also Recommendation 18/3 (page 18-2)

ELEMENTS TO BE TAKEN INTO ACCOUNT IN LONG-TERM SYSTEMS PLANNING	GRADE (Para.3.2.2 refers)
(i) Continuing need of existing LORAN A chains on a 24-hour basis	A
(j) Evaluation of long-distance station reference aids as under:	
(i) ground referenced and	B
(ii) satellite techniques for on board position determination	C
(k) Adequate short-range navaids coverage and frequency protection of selected UHF/VHF navaids up to a height of 20,000 m (66,000 ft) where the aids are directly relevant to SST high level tracks	A
(l) Evolution, as necessary, of new types of separation for SST aircraft e.g. based on flight profiles	B
(m) Potential of the INS and its performance reliability, as related to horizontal separation minima, such as:	
(i) 60 NM lateral separation and 15/10 minutes longitudinal separation as is presently planned for early implementation for SST aircraft;	A
(ii) further reductions in lateral and/or longitudinal separation	B
(n) Airborne separation monitors such as:	
(i) DME air-to-air ranging or other techniques involving devices already in use or available on a short-term basis, and	B
(ii) satellite, time frequency or other techniques having a longer time-scale implication	C

	ELEMENTS TO BE TAKEN INTO ACCOUNT IN LONG-TERM SYSTEMS PLANNING	GRADE (Para.3.2.2 refers)
	(o) ATC surveillance for strategic/ tactical concepts of control accomplished by:	
	(i) telemetering of in-flight determined position, including INS data	B
	(ii) multi-satellite ranging techniques	C
	(p) Maintenance of the appropriate relationship between en-route systems capacity and the capacities of terminal control areas and aerodromes to avoid the occurrence of terminal delays	A
3.3.1.2	Continental Transition Airspace	
	(a) Completion of upper air route structure and provisions of area control service (subsonic aircraft)	A
	(b) Completion of primary/secondary radar coverage, both for subsonic and supersonic operations (including the trans-sonic acceleration and deceleration phases), and the possible later incorporation of automatic radar data processing facilities	A
	(c) Expansion of pilot/controller VHF RT communications	A
	(d) Data transfer (manual) between domestic/oceanic centres	A
	(e) Development of special oceanic clearance techniques for SST operations	A

	ELEMENTS TO BE TAKEN INTO ACCOUNT IN LONG-TERM SYSTEMS PLANNING	GRADE (Para.3.2.2 refers)
3.3.1.3	Application of ATC Computers to Oceanic Control	
	Fully automatic data processing providing:	
	(i) conflict prediction and resolution	B
	(ii) basic control displays	A
	(iii) data transfer between oceanic and domestic centres	A
	(iv) data transfer between oceanic centres	B
	(v) processing of position information (possibly derived from data link)	C
3.3.1.4	Automated Flight-planning	
	Automated flight-planning and related ATS/MET systems interface aspects	A
3.3.1.5	Navigation Systems*	
	(a) Recognition of the possible application of area navigation techniques in terminal and associated areas including effects of improved accuracy in both the ground and airborne elements of the short-distance system.	A
	(b) Continuing study of the work underway in the ICAO AWOP and elsewhere on improved or new aids to navigation and to approach and landing (as these may prove to be significant to long-term planning).	B

* See also para. 4.13 (pages 4-7 and 4-8)

	ELEMENTS TO BE TAKEN INTO ACCOUNT IN LONG-TERM SYSTEMS PLANNING	GRADE (Para.3.2.2 refers)
3.3.1.6	Communications	
	(a) Aeromobile Services [1]	
	(i) Additional VHF coverage for SST transition areas and terminal areas	A
	(ii) Application of air/ground automated data transfer techniques	B
	(iii) Introduction of SSB into HF aeromobile services	A
	(iv) Exploitation of satellite relay techniques	B
	(b) Aeronautical Fixed Services [2]	
	Development of automation with an increase in speed of transmission, channel capacity and reliability	A
3.3.1.7	Meteorological Services [3]	
	(a) Additional requirements arising from SST operations	A
	(b) Full provision of meteorological data in digital form for input into MET, ATS and OPS computers	A
	(c) Automation in the observation and in the reporting of aerodrome weather data in particular for CAT II and III operations	B
	(d) Co-ordinated and standardized exchanges of operational meteorological data [4]	B
	(e) Extension of the operational use of meteorological satellite data	C

1) See also paragraph 16.8 and Recommendation 16/37 (pages 16-20 to 16-22)
2) See also paragraph 15.10 and Recommendation 15/17 (pages 15-12 to 15-14)
3) See also paragraph 12.39 (page 12-15) and paragraph 13.10 (page 13-10)
4) See also paragraphs 13.4 to 13.4.2 and Recommendation 13/3 (page 13-4)

	ELEMENTS TO BE TAKEN INTO ACCOUNT IN LONG-TERM SYSTEMS PLANNING	GRADE (Para.3.2.2 refers
3.3.1.8	Aeronautical Information Services	
	(a) Additional requirements arising from SST operations	A
	(b) Additional requirements arising from the application of INS or area navigation techniques	A
	(c) Possible introduction of more centralized facilities for handling NOTAM Class I, using data processing equipment	C

3.3.2 **The Meeting also considered those technical fields (AGA and SAR) not covered at the SP NAT RAN 1965 Meeting as under:**

3.3.2.1	Aerodrome and Ground Aids	
	(a) Optimum development of existing aerodromes to achieve their maximum aircraft movement capacity	A
	(b) Multiple aerodrome systems as necessary to serve large cities, including the co-ordination of operations and transportation between such aerodromes	A
	(c) Introduction of international operations at other aerodromes and the need for their inclusion in future Regional Plans	A
	(d) Introduction of improved aids for ground guidance and control of all aircraft and ground vehicles during period of restricted visibility and at aerodromes having high traffic density; separate consideration being given to:	
	(i) visual aids	A
	(ii) non-visual aids	B

ELEMENTS TO BE TAKEN INTO ACCOUNT IN LONG-TERM SYSTEMS PLANNING	GRADE (Para.3.2.2 refers)
(e) Provision of improved or new visual approach aids for new aircraft types, i.e. long-bodied aircraft, SSTs, etc.	A
(f) Provision of Category II and III approach and runway lighting systems and obstruction free zones for the associated runways at those aerodromes where poor weather conditions may exist.	A
(g) Compatibility between the aerodrome and its environment.	A
(h) Study of the impact of the introduction* of fog dispersal techniques at aerodromes.	C

Search and Rescue

3.3.2.2 **Monitoring of changing circumstances and new developments, with a view to:**

(i) **identifying changes that might be needed in the NAT SAR Services as a result of changes in other services proposed in the long-term systems plan;**

(ii) **using to advantage those developments of other services, such as communications, air traffic service and alerting service, which might provide ancillary benefit to the SAR Services;**

(iii) **determining the effect on SAR Services of any changes in the operational environment, such as changing types of aircraft or equipment, changes in route structure and changing patterns in the use of the airspace.**

3.4 Follow-up Actions

3.4.1 The Meeting concluded its discussion of this Agenda Item by considering what further co-ordination and co-operation actions would be needed following the NAT V Meeting to ensure that optimum use was made of the above-mentioned "Elements to be Considered in Long-term Systems Planning". It was agreed that available follow-up machinery should be maintained specifically to ensure continuity of systems planning between NAT regional meetings. The valuable achievements of both the NAT/SPG and of the NAT Traffic Forecasting Group (NAT/TFG) during the years since SP NAT RAN (1965) and their co-ordination with the ICAO Secretariat were noted. It was also noted and

* See also para. 12.40 (page 12-15)

agreed that the "Elements to be Considered in Long-term Systems Planning" developed by the Meeting were key items of special interest to the entire NAT community throughout the planning period. Moreover, there was recognition of a continuing need for both NAT traffic forecasting activities and further work of the NAT/SPG, particularly with respect to such subjects as:

(i) organization of the NAT track structure with particular reference to the needs of traffic from terminals to the North and South of main flow;

(ii) criteria for the assessment of system performance;

(iii) improved means of measuring system performance, and

(iv) introduction of new aircraft types in the system.

In the light of the above points, a recommendation was developed for the continuation of both the NAT/TFG and the NAT/SPG, in co-ordination with the ICAO Secretariat, as follows:

RECOMMENDATION 3/2 - CONTINUATION OF THE NAT TRAFFIC FORECASTING GROUP AND THE NAT SYSTEMS PLANNING GROUP *

That the States concerned be invited, in co-ordination with the ICAO Secretariat, to continue their participation in the NAT Systems Planning Group as constituted by Recommendation 4/1 of SP NAT RAN 1965* and in the NAT Traffic Forecasting Group.

3.4.2 In connexion with NAT traffic forecasting, the Meeting expressed a need to collect North Atlantic traffic statistics additional to those currently available at the Gander and Shanwick oceanic CTAs, to enable the NAT Traffic Forecasting Group to extend its activities to include data on traffic between about 37°N and 45°N. It was considered that this information could best be obtained from the New York and Santa Maria Oceanic Area Control Centres and that the necessary detailed arrangements, including agreement on a common meridian for collecting traffic statistics, could be made by the States concerned. Recommendation 3/3 was developed accordingly:

RECOMMENDATION 3/3 - FURTHER INFORMATION FOR THE USE OF THE NAT/TFG

That, to assist in the compilation of more comprehensive statistics of the main flow of traffic between North America and Europe and, consequently, in the forecasting of NAT future traffic patterns,

(i) United States be requested to forward each month to Canada daily totals of turbojet aircraft transitting the North Atlantic between about 37°N and 45°N, divided into eastbound and westbound flights and further subdivided in terms of scheduled passenger, scheduled cargo and other flights and

(ii) Portugal be requested to forward each month to the United Kingdom similar daily totals of turbojet aircraft transitting the same area.

* See also Recommendation 1/1 (page 1-2) and paragraph 10.47 and Recommendation 10/14 (pages 10-17 and 10-18).

** Text of Recommendation editorially re-arranged.

*** The clauses of Recommendation 4/1 of SP NAT RAN 1965 make provision for any additional participation that may be called for by, for example, the task indicated at paragraph 3.4.1 i) above.

3.4.3 The Meeting also considered that the Air Navigation Commission should be invited to review the "Elements to be Considered in Long-term Systems Planning", to consider the support that ICAO existing machinery, such as Panels, might provide in progressing these elements and to consider their specific referral to the EUM VI RAN (1971) Meeting as background information. Recommendation 3/4 was developed accordingly:

RECOMMENDATION 3/4 - AIR NAVIGATION COMMISSION REVIEW OF THE ELEMENTS TO BE CONSIDERED IN LONG-TERM SYSTEMS PLANNING

That the "Elements to be Considered in Long-term Systems Planning", developed by the Meeting, be reviewed by the Air Navigation Commission with the following action in mind:

(a) endorsement, to the extent practicable;

(b) consideration of the support that existing ICAO machinery could provide to achieve progress on these elements, and

(c) referral of the elements, together with such comments as the Commission may wish to add, to the EUM VI RAN (1971) Meeting as background information.

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Agenda Item 4: Radio Navigation Aids

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

4.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 1 to 5 and 7 to 19 of the Report on Agenda Item 2, in addition to the Report on Agenda Item 3, governed the consideration of Agenda Item 4.

GENERAL

4.2 In developing the radio navigation plan reflected in Table OPS I, which follows, the Meeting carefully examined the current Air Navigation Plan, and to the greatest possible extent, tried to relate its requirements to the facilities already contained therein. Amendments to the current Plan were recommended only where it was evident that changes in the operational pattern and structure so dictated:

RECOMMENDATION 4/1 - CHANGES TO THE ICAO RADIO NAVIGATION AIDS PLAN

That the ICAO Radio Navigation Aids Plan be amended as indicated in Table OPS I.

Note: The amendments, except where otherwise annotated, represent additions to the Plan.

SHORT DISTANCE AIDS

4.3 For continental and oceanic transition areas VOR, supplemented as necessary by DME, was recommended for provision as the primary navigation aid to meet the needs of ATC with the necessary accuracy. The majority of the requirements stated for VOR and DME in Table OPS I were related to the provision of service on the typical ATS routes appearing in Appendix A to the Report on Agenda Item 9. Exceptions were made in the cases of the extreme northern routes where the installation of either VOR or DME is impracticable.

LONG DISTANCE AIDS

Consol

4.4 It was agreed that due to difficulties being experienced in the continued operation of the Sevilla, Ploneis and Nantucket Consol stations, they should be withdrawn from the ICAO Radio Navigation Aids Plan. These recommended changes are reflected in Table OPS I. However, difficulty was experienced in determining whether there was a requirement for the continued operation of the remaining Consol stations included in the plan. IATA stated that it had no requirement for Consol but an opposite view was expressed by IANC, IAOPA and IFALPA.

4.4.1 Finally, it was decided on the basis of reported substantial usage of Consol by flight crews engaged in international commercial transport operations and upon their usefulness in support of international general aviation operations, that the Consol stations remaining in the plan, i.e. Bushmills, Lugo and Varhaug should be retained in operation. It was noted that the very recent extension of the operating time to 24 hours a day of the Loran A rates 1 S3 and 1 S4 should improve navigational capability in the area S-W of Ireland. However, due to the very recent implementation of the extended schedule of transmissions from these Loran stations, it was not possible to assess the extent of any improvement.

NDB

4.5 The Meeting noted that the coverage achieved by a NDB is a complex function of frequency, radiated power and conductivity of the path between the transmitter and the point at which the minimum value of field strength is specified. In the NAT region, under an assumed set of average conditions, the calculated coverage utilizing a 5 kw transmitter for a 15 db S/N ratio would be in the order of 600 km (325 NM) by day and 390 km (210 NM) by night. However, the night time figure is influenced by "night effect", and the distance at which the ground wave component of the received field is likely to exceed the sky wave component by 10 db is in the order of 200-300 km (108-170 NM). It is therefore unlikely that reliable bearings can be obtained at night beyond these distances regardless of the power of the NDB.

4.5.1 The Meeting considered it necessary, particularly for the assistance of international general aviation in making accurate landfalls, to recommend in certain cases the provision of NDBs to fill to some extent the gap in navigational coverage caused by the withdrawal of some Consol stations. Replacement of these Consol stations by NDBs will provide navigational assistance without the requirement for extensive additional aircraft equipment. While it was recognized that NDBs would not provide the extensive cover provided by the Consol stations to be withdrawn, it was considered that the additional NDBs now recommended for inclusion in the plan, as shown in Table OPS I, will permit accurate landfalls to be made. Other requirements for NDB were related to the extreme northern routes where the provision of VOR/DME represents a practical impossibility and also to other typical routes appearing in Appendix A to the Report on Agenda Item 9.

4.5.2 Apart from those NDBs referred to above, required for navigational assistance to international general aviation aircraft on oceanic crossings, the Meeting considered that the gradual phasing-out of these aids should be encouraged, but withdrawal of any particular station should only be effected after consultation with the users.

4.5.3 The deletion from the ICAO Plan of 2 Icelandic NDBs operating at Keflavik on 339 and 325 kc was recommended. Also it was noted that the frequency of the Reykjavik NDB was now 333 kc rather than 303.4 kc, shown in the Plan. These recommended changes are reflected in Table OPS I.

Loran-A

4.6 Information was given by all users that the Loran A, contained in the existing Plan continued to fulfil a useful navigational aid service in the Region. It was therefore agreed that the Loran A facilities now contained in the ICAO radionavigation aids plan should be retained and that in addition, the existing Denmark Strait Chain (1L4 and 1L5) should be included in the plan. The existence of the Baffin Bay Loran A Chain was noted. Although it was known to be available for civil use, it was decided that it should not be included in the ICAO Plan, but that details of it should be included in the Report of the Meeting. These details are:

Name:	Cape Atholl	Cape Christian	Nipisat
Position	76°19'12,92N 69°22'03,32W	70°31'42,98N 68°18'06,88W	69°26'58,32N 54°14'48,02W
Function	Master	Double Slave	Master
Rate:	2S6	2S6/2S7	2S7
Frequency:	1850KC/S	1850KC/S	1850KC/S
Peak Power	1000kW	800kW	1000kW

AIDS TO APPROACH AND LANDING

ILS

4.7 In considering this Item, the Meeting concluded that there was a requirement for ILS for at least one runway at each regular international aerodrome catering to international commercial operations by turbo-jet aeroplanes. However, there was a departure from this principle at some few locations, served by aeroplanes of the type referred to, where no requirement for ILS was made known to the Meeting. In view of the directive issued under Agenda Item 2 - that "turbo-jet aeroplanes at present used in international general aviation operations require ILS only for IMC approaches in conditions of low cloud base and/or visibility", it was found to be unnecessary to make any additional recommendations for the provision of ILS, to cater for the requirements of this category of aviation.

Provision of Additional Frequencies

4.7.1 The United Kingdom Delegation informed the Meeting that difficulties were being encountered in making channel assignments for ILS installations, including those required to support North Atlantic operations, from the limited number of channels currently prescribed in Annex 10.

4.7.2 It was agreed that similar assignment difficulties were generally being experienced by all States in areas of high facility density in Europe, as well as by the United States and Canada. It was further agreed that even more acute difficulties could be expected in the future as the number of ILS requirements increases.

4.7.3 The Meeting, in recognizing that this was a problem of growing proportions in many areas, noted with satisfaction that it was the declared intention of the United Kingdom to make proposals for the amendment of Annex 10 with a view to increasing to 59 the number of assignable ILS channels.

Association of ILS and DME

4.7.4 In terms of the directive issued under Agenda Item 2, that consideration be given to the provision of DME in association with ILS, particularly at those locations where it is not practicable to install the marker beacon components of the complete ILS, it was considered that in many instances where the nature of the terrain raised technical difficulties in the provision of marker beacons to Annex 10 specifications, that DME could provide a most satisfactory substitute.

4.7.5 The Meeting was informed that one State had recently associated DME with ILS (minus outer marker) at three locations, and noted that other States had similar intentions. The question was raised that although this combination might well perform within the accuracy requirements of a complete ILS, Annex 10 did not recognize that the combination constituted an ILS. It was recommended that the Annex provisions in this respect should be examined with a view to recognizing DME as a substitute for the outer marker where the provision of this element of the complete ILS is not practicable.

RECOMMENDATION 4/2 - USE OF DME TO PERFORM THE OUTER MARKER BEACON FUNCTION OF ILS

That consideration be given to examination of Annex 10 with a view to determining the desirability of specifying DME as a substitute for the outer marker where the provision of this element of the complete ILS is not practicable.

RECOMMENDATION 4/3 - PROVISION OF ILS OUTER MARKERS ON OVERWATER APPROACHES

That information be obtained on a method, reported to the Meeting, of locating an ILS outer marker transmitter on a partly submerged and relatively stable, cannister for overwater approaches and that such information be disseminated to all States.

Performance Category of ILS

4.7.6 In stating requirements for ILS, the Meeting agreed that the indication of Category should be interpreted as referring to the standard of performance to be achieved and maintained in accordance with ICAO specifications and not to the specifications of the equipment installed, which may not necessarily be the same. An appropriate explanation has been included in the related Table OPS I.

4.7.7 No requirements for CAT III ILS facility performance were stated.

Locators

4.8 In considering the requirements for Locators, in association with ILS, the Meeting, in the absence of ICAO guidance on the subject, adopted the principle that these should be specified only in those cases where it would be impossible otherwise to transition from the en-route phase of flight, where guidance is being provided by the standard short-distance aid, to the localizer course. Application of this principle resulted in no requirements for Locators being expressed. It was considered to be impossible to assess local requirements for Locators for the purposes of:

(i) increasing the acceptance rate of the aerodrome and expediting the flow of traffic in the terminal area by elimination of procedure turns or by use of the shortest possible terminal transition routes;

(ii) providing a holding fix on the localizer course;

(iii) providing an alternative fixing aid for an inoperative outer marker;

(iv) reducing cockpit workload;

(v) facilitating overshoot procedures.

Therefore, local requirements may dictate installation of Locators although no requirement has been specified by the Meeting.

4.8.1 It was considered that there was a general lack of guidance material on how the requirements for Locators should be determined, and accordingly, the following recommendation was made:

RECOMMENDATION 4/4 - GUIDANCE MATERIAL CONCERNING THE NECESSITY FOR LOCATORS

That criteria be developed, in the form of guidance material, for determining the necessity for the installation of Locators.

Precision Approach Radar

4.9 The Meeting found it unnecessary to make recommendations for Precision Approach Radar Systems since no requirement was stated. It was noted, however, that these were in operation at some aerodromes and were providing a valuable service particularly, for runways not serviced by ILS.

FREQUENCY ASSIGNMENT PLANS FOR RADIO NAVIGATION AIDS IN THE LF/MF AND VHF BANDS

4.10 The Meeting noted that there was no authority specifically responsible for frequency planning and assignment in the NAT Region, and that these functions had always been carried out satisfactorily through co-ordination between the appropriate frequency planning authorities. It was agreed that this was a satisfactory arrangement, and that it was therefore unnecessary for the Meeting to specify frequencies for radio navaids contained in the ICAO Air Navigation Plan for the NAT Region.

RECOMMENDATION 4/5 - RADIO NAVAIDS FREQUENCY PLANNING

That the appropriate frequency planning bodies in the EUM and NAM Regions should, in their respective areas, co-ordinate, as necessary, the frequency requirements for the radio navaids facilities recommended, to ensure that there is adequate frequency protection.

Note: In general the planning criteria apply for the NAM Region to the west of longitude 30°W and for the EUM Region to the east of this meridian.

FREQUENCY PROTECTION OF VHF/UHF NAVAIDS

4.11 The Meeting noted that the SST Panel had developed a Possible Operational Requirement for the frequency protection of VHF/UHF navaids, e.g. VOR and DME, based on a standard service height of 20,000 m (66,000 ft.) when such installations are directly relevant to SST high level tracks. As regards the service range, this depends on the operational requirement and its effect on the range requirements for each individual facility, and could be in the order of 250 to 300 NM. It further noted that a number of such installations would undoubtedly emerge in the NAT Region as the SST is progressively introduced into scheduled service, and that early action should be taken to ensure appropriate frequency planning in the Regions concerned. However, in many cases, the requirement for VHF/UHF navaid coverage would be in limited areas, and maximum efficiency in frequency planning would be achieved by the use of methods whereby the protected service area would be tailored to the specific need, e.g. by "keyhole" or equivalent methods. In view of the above, the following Recommendation was adopted:

RECOMMENDATION 4/6 - FREQUENCY PROTECTION FOR VHF/UHF NAVAIDS RELATED TO SST HIGH LEVEL TRACKS

That States, in their future planning of VHF/UHF navaids, e.g. VOR and DME:

(a) give early consideration to the need to provide frequency protection to a standard service height of 20,000 m (66,000 ft.) where these facilities are directly relevant to SST high level tracks;

(b) take full advantage of methods for adapting the service areas to the operational requirement of such facilities, e.g. by the "keyhole" method.

LONG-RANGE NAVIGATION REQUIREMENTS ON CERTAIN OF THE TYPICAL AIR ROUTES DETERMINED IN ACCORDANCE WITH AGENDA ITEM 9.

4.12 The Meeting was aware that due to the impracticability of providing en-route navigation aids on all sectors of such typical air routes, determined in accordance with Agenda Item 9, as Alert -Anchorage, Resolute - Anchorage, Frobisher - Anchorage, Frobisher - Seattle, special provisions should be made for aircraft flying them to be suitably equipped with long-range navigation equipment.

RECOMMENDATION 4/7 - AIRCRAFT LONG-RANGE NAVIGATION REQUIREMENTS ON EXTREME NORTHERN ROUTES

That aircraft flying such typical air routes, determined under Agenda Item 9, as Alert - Anchorage, Resolute - Anchorage, Frobisher - Anchorage, and Frobisher - Seattle, be provided with suitable long-range navigation equipment for sectors of such routes not adequately provided with en-route navigation aids.

LONG-TERM PLANNING

4.13 Examination of the long-term planning requirements for a navigation system showed that it would not be feasible to make any recommendations involving the employment of systems now under development but in respect of which insufficient operational experience had been gained. However, this was not to say that such developments should not be closely followed and their potentials evaluated as soon as possible. Also it was accepted that requirements for long-term navigation systems planning could not profitably be considered in isolation from other essential planning elements.

4.13.1 It was noted that reductions in separation standards would result more from measures that could be taken to reduce the probability of unacceptable deviations (blunders) than solely from the improvement in accuracy of the navigation system.

4.13.2 The probability of unacceptable deviations might be greatly reduced by the use of a combination of independent airborne systems and or a means whereby surveillance capability is provided.

4.13.3 The Meeting noted with satisfaction the results obtained so far in the use of INS. It was noted that this system will probably be used primarily by the new generation of aircraft, at least in the near future.

4.13.4 The Meeting felt that it is necessary to give as early as possible careful consideration to the extension of Navaids Protection Dates as outlined in para. 3.1.10 of the report.

4.13.5 It is likely that VOR and DME will continue beyond 1975 to be the basic navigation aids over continental airspace. For this reason it was also felt necessary to give careful consideration to the improvement of accuracy particularly of the VOR element in order to increase the overall achievable VOR-system accuracy. The Meeting endorsed Recommendation 5/2 of the COM/OPS Divisional Meeting (1966) in this respect.

4.13.6 The Meeting took note of a decision of the Air Navigation Commission to include the question of a new landing aid in the Work Programme of the AWOP and in the Agenda for the Panel's next Meeting.

4.13.7 A factor that should be taken into account when considering navigation systems, in view of the fact that provision must be made for all classes of aviation, is the needs of international general aviation for a navigation system in the NAT Region that is relatively inexpensive and that imposes no excessive power and weight demands.

4.13.8 Altogether, it was agreed, that the "Elements to be taken into account" in long-term planning under the sub-headings of "Utilization of Airspace and System Capacity" and "Navigation Systems" developed under Agenda Item 3, represented an acceptable basis for long-term planning.

REVIEW OF RECOMMENDATIONS OF PREVIOUS MEETINGS

4.14 The Meeting reviewed the recommendations, relevant to this Agenda Item, made by the Fourth North Atlantic Regional Air Navigation Meeting (1961) and the Special North Atlantic Meeting (1965). It was concluded that none required re-stating as all were either superseded or replaced by recommendations of this Meeting.

STATEMENTS BY DELEGATIONS

4.15 Statement by the United Kingdom

Statement of Reservation

Table OPS I - Radio Navigation Aids

Entry for: WEST INDIES AND ASSOCIATED STATES

Station	ILS CAT & RWY
St. Johns/Coolidge Antigua I.	I 07

The United Kingdom reserves its position at the present time on the need for a CAT I ILS at St. Johns/Coolidge, Antigua Island, in the light of current plans to provide VOR/DME on the approach to the aerodrome, but undertakes to keep the matter under review in relation to CAR and NAT operations.

4.16 Statement by IAOPA

The continuing decrease in long-range aids usable by IGA across the North Atlantic is a source of concern to IAOPA. Despite the fact that IGA today is only a comparatively small percentage of total transatlantic traffic, IGA operations in the area are notable, particularly, in view of the fact that the great majority of such flights are in short-range aircraft. A considerable increase in the next ten years is virtually assured, as longer-range aircraft come on the market.

Only one long-range radio aid has been readily available to IGA over the years, for use in this area - Consol. For all of its deficiencies, Consol nevertheless has been readily usable by aircraft equipped just with a simple low-frequency receiver. An action of the NAVAIDS Committee now has accelerated the shutdown of many of the remaining Consols on the North Atlantic, including the last remaining station on the west shore of the Atlantic (Nantucket). Also of concern to IAOPA is the fact that, once IATA announced that its operators no longer have a requirement for Consol, Spain, France and the U.S. announced they would no longer continue to operate a number of Consol stations.

IAOPA also is impressed by the fact that, while IATA stated they have no further requirement for Consol, both IFALPA and IANC (who are exclusively air carrier operating personnel) joined with IAOPA in objecting to the deletion of Consol. Looking to future planning for this area, the situation looks worse for IGA. Information disclosed in the NAVAIDS Committee indicates that Loran A, largely financed by the military, no longer serves their more exacting requirements.

Loran C is described as having a dubious future, for the same reasons. OMEGA appears to be headed toward the same fate. Unfortunately, long-range NDBs are hardly a substitute for Consol.

The requirements of IATA companies apparently will be met for the next ten years by INS, doppler and satellite developments. Our repeated inquiries of electronics manufacturers into these exotic systems for IGA indicate that, for the foreseeable future, they will <u>not</u> be available to the vast majority of IGA for both economic and operational reasons.

TABLE OPS I - RADIO NAVIGATION AIDS

EXPLANATION OF TABLE

1 Name of Station.

2 ### indicates VOR recommended. "DME" indicates that a co-located Distance Measuring Equipment, operating on the paired DME channel, is recommended.

3 ILS Category. Category I ILS is indicated by "I" and Category II ILS by "II". Indication of Category refers to the standard of performance to be achieved and maintained in accordance with ICAO Annex 10 specifications and not to the specifications of the equipment installed which is not necessarily the same.

4 ILS Runway.

5 ### indicates recommended NDB and rated coverage.

Note: Rated coverage is defined as the area surrounding an NDB within which the strength of the vertical field of the ground wave exceeds the minimum value specified for the geographical area in which the radio beacon is located.

6 Remarks related to implementation of facilities.

also indicates that the Meeting made no recommendations related to assignment of specific frequencies for these facilities (refer to Recommendation 4/6).

ø indicates the facility is required only to serve the typical NAM air routes.

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
BAHAMAS				
Freeport/Intl.		I 06		
BARBADOS				
Bridgetown/Seawell		II 09		
BERMUDA				
Bermuda/NAS		I 12 I 30		Approach over sea. Outer marker component to be met by DME.
CANADA	Amend and/or add the entries for the under-mentioned locations as follows:			
Abbotsford/ Abbotsford		I 06		
Alert			### ø	
Armstrong			### ø - 75 nm	
Calgary/Intl.	### ø	I 34 I 16		
Churchill	### ø			
Dawson			### ø - 75 nm	
Deer Lake	###			Replaces Stephenville
Edmonton/Intl.		I 01		
Fort Chimo	### ø			
Fort Chipewyan			### ø -100 nm	
Fort Nelson	### ø			

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
Frobisher Bay/ Frobisher	###	I 36	###-200 nm	Frobisher is a refuelling stop only. Technical problems also preclude CAT II at this location. OM will be provided by DME.
Gander/Intl.		I 04		
Goose Bay			###-75 nm	
Halifax/Intl.		I 15 II 24		
Hopedale	###/ DME			
Kapuskasing			### - 75 nm ø	
Kimberley	###ø			
London	###ø			
Lynn Lake			### - 150 nm ø	
Moncton/ Moncton		I 07 I 29		
Montreal/Intl.		II 06L II 24R		OM will be provided by DME. CAT II provisionally planned at existing aerodrome. Requirement may be transferred to new aerodrome.
Moosonee			### - 125 nm ø	
Ottawa/Intl.		I 07		
Poste de la Baleine	### ø			
Quebec City	### ø			
Saglek	###/ DME			
Schefferville	###/ DME			
St. Anthony	###/ DME			Replaces Belle Isle

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
St. Johns	DME			
Sydney/Sydney		I 07		
Toronto/Intl.		II 05R II 14 I 05L		
Vancouver/Intl.		I 08		OM component met with DME.
Vermillion	### ø			
Whitehorse	### ø			
Windsor/Windsor		I 25		
Winisk			### ø	
Winnipeg/Intl.	### ø	I 36 I 13		
CUBA				
Habana/ José Marti		I 05		
DENMARK				
København/ Kastrup		I 30		
Kulusuk	###/ DME*			* Nature of terrain may preclude implementation.
Prins Christiansund (Greenland)			Amend to read 372 kc-300 nm	
Søndre Strømfjord/ Søndre Strømfjord (Greenland)			### - 200 nm	

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
Thule	###			
Greenland				
DOMINICAN REPUBLIC				
Santo Domingo/ De Las Americas Intl.		I 16		
FRANCE				
Lyon/Satolas		I 18 II 36		
Ploneis		Delete the requirement for Consol.		
GERMANY				
Hamburg/ Kaltenkirchen		I II		Precise runway orientation not yet determined.
Koln/Koln-Bonn		I 14L		

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
St. Johns	DME			
Sydney/Sydney		I 07		
Toronto/Intl.		II 05R II 14 I 05L		
Vancouver/Intl.		I 08		OM component met with DME.
Vermillion	### ø			
Whitehorse	### ø			
Windsor/Windsor		I 25		
Winisk			### ø	
Winnipeg/Intl.	### ø	I 36 I 13		
CUBA				
Habana/ José Marti		I 05		
DENMARK				
København/ Kastrup		I 30		
Kulusuk	###/ DME*			* Nature of terrain may preclude implementation.
Prins Christiansund (Greenland)			Amend to read 372 kc-300 nm	
Søndre Strømfjord/ Søndre Strømfjord (Greenland)			### - 200 nm	

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
Thule	###			
Greenland				
DOMINICAN REPUBLIC				
Santo Domingo/ De Las Americas Intl.		I 16		
FRANCE				
Lyon/Satolas		I 18 II 36		
Ploneis		Delete the requirement for Consol.		
GERMANY				
Hamburg/ Kaltenkirchen		I II		Precise runway orientation not yet determined.
Koln/Koln-Bonn		I 14L		

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
HAITI				
Port-Au-Prince/ President Duvalier Intl.	DME			
ICELAND				
Akureyri/Akureyri			294 kc-50 nm	
Hornafjordur			287 kc-150 nm	
Isafjordur			385 kc-100 nm	
Keflavik/ Keflavik	AMEND 114.0 mc to 111.2 mc	II 12 II 21	AMEND 392 to indicate range 250 nm DELETE 339 325	
Reykjavik/ Reykjavik			AMEND to read 333 kc-100 nm	
JAMAICA				
Kingston/ Palisadoes Intl.		I 11		
Montego Bay/Intl.		I 06		
MEXICO				
Mexico City/Intl.		II 23L		

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
NETHERLANDS ANTILLES				
Oranjestad/Prinses Beatrix Aruba I.		I 11		
Willemstad/ Dr. A. Plesman Curaçao I.		I 11		
NORWAY				
Bergen/Flesland		II 18		Localizer operates CAT II specifications. Unable provide glide path to CAT II specifications until runway extended.
Oslo/New Main		II		Precise runway orientation not determined.
PORTUGAL				
Santa Maria/Santa Maria Açores		I 19		This is for inclusion of CAT & RWY designation.
SPAIN				
Madrid/Barajas		I 19 I 01		
Malaga/Malaga		II 14		ILS Runway 32 OM requirement met by DME.
Sevilla			### - 100 nm	
Sevilla	Delete the requirement for Consol.			
SURINAM				
Paramaribo/ Zanderij		I 10		

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
SWITZERLAND				
Zurich/Zurich		II		The requirement is for the new runway to be constructed.
UNITED STATES				
		Amend and/or add the entries for the under-mentioned locations as follows:		
Alamosa	###			
Anchorage/ Elmendorf AFB		I 05		
Anchorage/Intl.		II 06		
Baltimore/ Friendship Intl.		II 10 I 15		
Bangor/Intl.		I 33		
Birmingham	###			
Boston/Logan Intl.		I 04R I 33L II 15R		
Boulder City	###			
Bradford	###			
Buffalo	DME			
Chattanooga	###			
Chicago/ O'Hare Intl.	###	I 27R I 32R I 32L I 09R I 27L II 14L II 14R		
Cleveland/ Hopkins Intl.		II 05R I 28R		
Cold Bay/ Cold Bay		I 14		
Corpus Christi/ Intl.		I 13		
Coyle	###			

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
Crazy Woman	### ø			
Dallas/Dallas Love Field		I 13L I 31L		
Dallas-Fort Worth/ Regional Airport		*		*Specific ILS runways have not been established as yet, since the aerodrome is under construction.
Detroit/ Metropolitan-Wayne Co.		II 03L I 03R I 21R		
Dickinson	### ø			
Dubuque	### ø			
El Paso/Intl.		I 22		
Evansville	### ø			
Everett/ Snohomish County Paine Field)	###/ DME	I 16		
Fairbanks/Intl.		I 19		
Farmington	### ø			
Fort Dodge	### ø			
Fresno/Fresno Air Terminal		I 29R		
Galveston	DME ø			
Gordonsville	### ø			
Gulkana	### ø			
Hector	### ø			
Hill City	### ø			
Houston/ Intercontinental	DME	II 08		
Huguenot	###/ ø DME			
Humble	### ø			

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
Indianapolis/ Weir Cook	###/ DME	II 04L I 31L		
Joliet	### ø			
King Salmon/ King Salmon		I 11		
Knoxville	### ø			
Lakeview	### ø			
Lamoni	### ø			
Las Vegas/McCarran		I 25		
Linden	### ø			
Little Rock	### ø			
Los Angeles/Intl.		II 24R II 25L I 25R I 07L		
Lucin	### ø			
Lufkin	### ø			
Meridian	### ø			
Miami/Intl.		I 09L I 27L		
Milford	### ø			
Millinocket	DME ø			
Milwaukee/ General Mitchell		II 01 I 07R		
Mina	### ø			
Minneapolis/ Minneapolis - St. Paul Intl.	###/ DME	II 29L I 04		
Nantucket			###- 200 nm	
	Delete the requirement for Consol.			
Newark/Newark	###/* DME	II 04R I 22		*Located at New York.

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
New York/ John F. Kennedy Intl.		II 04R I 22L I 04L I 13R I 13L I 31R		
Niagara Falls/Intl.	###/* DME	I 28		*Located at Buffalo.
Oakland/Intl.	###	II 29		
O'Neill	###ø			
Ontario/Intl.		II 25		
Pawnee City	###ø			
Peach Springs	###ø			
Peck	###ø			
Pembina	###ø			
Pendleton	###ø			
Philadelphia/ Intl.	### /* DME	II 09R		*Located at Woodstown.
Pittsburgh/ Greater Pittsburgh		II 10L I 28L		
Portland/Intl.		II 10R I 28R		
Prudhoe Bay	###/ DME			
Pulaski	### ø			
Pullman	### ø			
Red Bluff	### ø			
Rock Springs	### ø			
Rosewood	### ø			

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
Sault Ste. Marie	###ø			
St. Louis/ Lambert-St. Louis	###/ DME	I 12R I 24		
San Antonio/Intl.	###/ DME	II 12		
San Diego/Intl.		I 09		
San Francisco/Intl.		II 28L I 19L		
Scottsbluff	###ø			
Seattle/Seattle-Tacoma Intl.		II 16R I 34		
Shreveport	###ø			
Slate Run	###ø			
Spokane/Intl.		I 21		
Stockton/Metropolitan		I 29R		
Syracuse/Hancock	###/ø DME	I 28		
Tampa/Intl.	###/* DME	I 18L I 36L		*Located at St. Petersburg.
Tuba City	###ø			
Washington/ Dulles Intl.		II 1R I 19R		
West Palm Beach/ Palm Beach Intl.	###/ DME	I 09		
Windsor Locks/ Bradley Intl.	###/* DME	II 06		*Located at Hartford.

Delete the following VOR/DME from the plan:

Albany

Augusta

Burlington

Station	VOR/DME	ILS CAT & RWY	NDB & Cover.	Remarks
Columbus				
Concord				
Houlton				
Kennebunk				
Montauk Point				
Newport				
Norwich				
Poughkeepsie				
Presque Isle				
Princeton				
Providence				
Riverhead				
VENEZUELA				
Caracas		I 09R		The requirement is for the new aerodrome replacing Maiquetia.
VIRGIN ISLANDS				
St. Croix/ Alexander Hamilton		I 27		
WEST INDIES ASSOCIATED STATES				
St. Johns/Coolidge Antigua I.		I 07		

LORAN A

CHAIN - DENMARK STRAIT

Name:	Sandur	Orssuiaqssuag	Kudlek
Position	64°54'14,768N 23°55'55,286W	65°29'04,11N 38°53'10,65W	61°32'31,0N 42°14'03,0W
Function	Master	Double Slave	Master
Rate:	1L4	1L4/1L5	1L5
Frequency:	1950KC/S	1950KC/S	1950KC/S
Peak Power	1000kW	800kW	1000kW

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Agenda Item 5: Location of regular and alternate aerodromes

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

5.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 20 and 24 of the Report on Agenda Item 2 governed the consideration of Agenda Item 5.

SELECTION OF AERODROMES

5.2 On the basis of the information available in the Table of Aircraft Operations, the Meeting developed a list of land aerodromes required for regular use by international scheduled air transport operations (Part I of the List).

5.3 Operations at regular aerodromes were examined and appropriate aerodromes were selected to serve as alternates to each regular aerodrome (Parts I and II). The selection was based primarily on safety considerations and took into account, in so far as time permitted, such factors as stage distances, aircraft types, meteorological conditions, economic considerations and the availability of suitable alternates in the States concerned. Wherever possible, other regular aerodromes, either those required for North Atlantic operations or for operations in other areas were selected as alternates. Where this was not possible, additional aerodromes were selected. In most cases, such aerodromes were regular aerodromes used by domestic air services.

5.4 When reviewing the alternate aerodromes in Canada, it was noted that Goose/Goose was operated as a joint civil/military aerodrome and it was agreed that it should be included in the Plan on the understanding that it would only be used when other regular and designated alternate aerodromes were unusable. Difficulties in use of Comox/Comox were also indicated. This was a military aerodrome and facilities for refuelling and other servicing of large civil aircraft and for the provision of immigration, health and passenger amenity services were extremely limited. Operators using Comox and requiring such services could anticipate extensive delay and passenger discomfort.

RECOMMENDATION 5/1 - REGULAR AND ALTERNATE AERODROMES FOR SCHEDULED AIR SERVICES

That the aerodromes in Parts I and II of the List which follows constitute the aerodromes required for the scheduled air service operations considered by the Meeting and that the appropriate Air Navigation Plans be amended accordingly.

5.5 The Meeting agreed that in principle the aerodromes selected for use by international scheduled air transport operations would also be suitable and available for use by international general aviation. In certain instances, however, it was found desirable to designate additional aerodromes for use by international general aviation (Part III of the List). This Part was based on the Table of Aircraft Operations developed for international general aviation but as the Table represented only a limited sampling it was considered that only a provisional List could be developed at this time. The List required further study both to verify the inclusion of those aerodromes listed and the possible need for inclusion of other aerodromes and should be transmitted to States for review prior to inclusion in an Air Navigation Plan.

RECOMMENDATION 5/2 - ADDITIONAL AERODROMES FOR IGA

That the aerodromes in Part III of the List which follows be considered as a provisional list of additional aerodromes for IGA and that this Part and other planning requirements based on it be submitted to States for further consultation before approval.

STATEMENTS BY DELEGATIONS

Statement by the Delegation of IAOPA
(Relates to para. 5.5 page 5-1)

5.6 In view of the proposal to refer the list of additional IGA aerodromes to States for further study, IAOPA wishes to stress the importance of Narssarssuaq, Greenland as an IGA aerodrome requirement for the NAT Region. This requirement primarily exists because of regulatory and economic penalities imposed by the U.S. Air Force at Søndre Strømfjord.

5.7 Further, the IAOPA Delegation wishes to make its views in respect of several additional aerodromes, initially listed by the Aircraft Operations Working Group to the General Committee for use in preparing amendments to the NAT Regional Plan, as determined from the limited ICAO survey and additional data available to this Working Group on IGA operations in the NAT Region. Firstly, because of the apparent limited use of some aerodromes by IGA, and related discussions, IAOPA cannot now foresee any future requirement for St. Pierre, and Stornoway, Scotland as additional aerodromes for the NAT Region. Secondly, because the Leeds and Bradford aerodrome in the U.K. is already included in the EUM Regional Plan as a Regular aerodrome, and again because of the limited use of this aerodrome by IGA traffic crossing the North Atlantic, IAOPA cannot foresee the need for inclusion of this aerodrome in the NAT Regional Plan.

PROVISIONAL LIST OF AERODROMES
LISTE PROVISOIRE D'AERODROMES

PART I - AERODROMES REQUIRED PRIMARILY FOR INTERNATIONAL COMMERCIAL AIR TRANSPORT AND THEIR ALTERNATES

1ere PARTIE - AERODROMES NECESSAIRES PRINCIPALEMENT POUR LE TRANSPORT AERIEN COMMERCIAL INTERNATIONAL ET LEURS AERODROMES DE DEGAGEMENT

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
ALGERIA	
Alger/Dar el Beida	Annaba/Annaba Boufarik/Boufarik Oran/Es Sénia Ouargla/Ouargla
AUSTRIA	
Wien/Schwechat	Bratislava/Ivánka Salzburg/Salzburg
BAHAMAS	
Freeport/Intl., Grand Bahama I.	Kingston/Palisadoes Intl. Miami/Intl. Montego Bay/Intl. Nassau/Intl. Tampa/Intl. West Palm Beach/Palm Beach Intl.
Nassau/Intl., New Providence I.	Freeport/Intl. Kingston/Palisadoes Intl. Miami/Intl. Montego Bay/Intl. Rock Sound/Intl., Tampa/Intl. West Palm Beach/Palm Beach Intl.
BARBADOS	
Bridgetown/Seawell	Fort-de-France/Lamentin Pointe-à-Pitre/Le Raizet Port-of-Spain/Piarco St. Croix/Alexander Hamilton St. Johns/Coolidge, Antigua I. San Juan/Puerto Rico Intl. St. Lucia/Beane Field (future) (futur)

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
BELGIUM	
Bruxelles/National	Amsterdam/Schipol Dusseldorf/Dusseldorf Frankfurt Main/Frankfurt Main København/Kastrup Köln/Köln-Bonn London/Heathrow Marseille/Marignane Paris/Orly
BERMUDA	
Bermuda/NAS	Baltimore/Friendship Intl. Boston/Logan Intl. Halifax/Intl. Newark/Newark New York/John F. Kennedy Intl. Philadelphia/Intl. Washington/Dulles Intl.
CANADA	
Calgary/Intl.	Edmonton/Intl. Vancouver/Intl.
Edmonton/Intl.	Calgary/Intl. Vancouver/Intl.
2) Frobisher Bay/Frobisher	Gander/Intl. 1) Goose/Goose
Gander/Intl.	Boston/Logan Intl. 1) Goose/Goose Halifax/Intl. Moncton/Moncton Montreal/Intl. Sydney/Sydney
Halifax/Intl.	Boston/Logan Intl. Gander/Intl. 1) Goose/Goose Moncton/Moncton Montreal/Intl. Sydney/Sydney
Montreal/Intl.	Bangor/Intl. Boston/Logan Intl. Detroit/Metropolitan-Wayne Co. Gander/Intl. Niagara Falls/Intl. Ottawa/Intl. Syracuse/Hancock Toronto/Intl. Windsor Locks/Bradley Intl.

1) To be used only when other regular and alternate aerodromes are unusable.
A n'utiliser que lorsqu'on ne peut utiliser un autre aérodrome régulier ou de dégagement.

2) For refuelling only.
Pour avitaillement en carburant seulement.

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
CANADA (Cont'd)	
Toronto/Intl.	Chicago/O'Hare Intl. Cleveland/Hopkins Intl. Detroit/Metropolitan-Wayne Co. Montreal/Intl. Niagara Falls/Intl. Ottawa/Intl. Windsor/Windsor
Vancouver/Intl.	Abbotsford/Abbotsford Comox/Comox Seattle/Seattle-Tacoma Intl.
Winnipeg/Intl.	Calgary/Intl. Edmonton/Intl.
CUBA	
Habana/José Martí	Camaguey/Ignacio Agramonte Varadero/Varadero
CZECHOSLOVAKIA	
Praha/Ruzyně	Berlin/Schönefeld Bratislava/Ivánka Brno/Turany Wien/Schwechat
DENMARK	
København/Kastrup	Amsterdam/Schiphol Dusseldorf/Dusseldorf Frankfurt Main/Frankfurt Main Hamburg/Hamburg Hannover/Hannover Helsinki/Helsinki Oslo/Fornebu Stavanger/Sola Stockholm/Arlanda

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
DENMARK (Cont'd)	
Søndre Strømfjord/Søndre Strømfjord (Greenland)	1) Goose/Goose Keflavík/Keflavík
Vagar/Vagar (Faroe Is.)	Kirkwall/Kirkwall Reykjavík/Reykjavík
DOMINICAN REPUBLIC	
Santo Domingo/De Las Américas Intl.	Kingston/Palisadoes Intl. Montego Bay/Intl. Port-au-Prince/President Duvalier Intl. St. Croix/Alexander Hamilton San Juan/Puerto Rico Intl.
FINLAND	
Helsinki/Helsinki	Rovaniemi/Rovaniemi Stockholm/Arlanda Turku/Turku
FRANCE	
Lyon/Bron	Genève/Cointrin Marseille/Marignane
Lyon/Satolas (to replace Lyon/Bron) (en remplacement de Lyon/Bron)	
Paris/Orly	Amsterdam/Schiphol Bordeaux/Mérignac Bruxelles/National Frankfurt Main/Frankfurt Main Hamburg/Hamburg London/Heathrow Paris/Le Bourget Stavanger/Sola Shannon/Shannon

1) To be used only when other regular and alternate aerodromes are unusable.
A n'utiliser que lorsqu'on ne peut utiliser un autre aérodrome régulier ou de dégagement.

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
FRANCE (Cont'd)	
Paris/Roissy-en-France (future) (futur)	Amsterdam/Schiphol Bordeaux/Mérignac Bruxelles/National Frankfurt Main/Frankfurt Main Hamburg/Hamburg London/Heathrow Paris/Orly Shannon/Shannon Stavanger/Sola
FRENCH ANTILLES	
Fort-de-France/Lamentin Martinique	Bridgetown/Seawell Pointe-à-Pitre/Le Raizet
Pointe-à-Pitre/Le Raizet Guadeloupe	Bridgetown/Seawell Fort-de-France/Lamentin Port-of-Spain/Piarco St. Johns/Coolidge San Juan/Puerto Rico Intl. Willemstad/Dr.A. Plesman
GERMANY (FEDERAL REPUBLIC)	
Frankfurt Main/Frankfurt Main	Amsterdam/Schiphol Bâle-Mulhouse/Bâle-Mulhouse Bruxelles/National Dusseldorf/Dusseldorf Köln/Köln-Bonn München/München Nürnberg/Nürnberg Stuttgart/Stuttgart Zürich/Zürich
Hamburg/Hamburg	Amsterdan/Schiphol
Hamburg/Kaltenkirchen (future) (futur)	Bruxelles/National Dusseldorf/Dusseldorf Frankfurt Main/Frankfurt Main Hannover/Hannover København/Kastrup Köln/Köln-Bonn München/München Stuttgart/Stuttgart

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
Köln/Köln-Bonn	Amsterdam/Schiphol Bruxelles/National Dusseldorf/Dusseldorf Frankfurt Main/Frankfurt Main Hamburg/Hamburg München/München Nürnberg/Nürnberg Stuttgart/Stuttgart Zürich/Zürich
GREECE	
Athinai/Athinai	Andravida/Andravida Athinai/Elefsis Roma/Fiumicino Thesaloniki/Thesaloniki
HAITI	
Port-au-Prince/President Duvalier Intl.	Kingston/Palisadoes Intl. Santo Domingo/De Las Américas Intl.
ICELAND	
Keflavík/Keflavík	Akureyri/Akureyri Bergen/Flesland Oslo/Fornebu Prestwick/Prestwick Reykjavík/Reykjavík Shannon/Shannon Søndre Strømfjord/Søndre Stromfjord Stavanger/Sola
Reykjavík/Reykjavík	Akureyri/Akureyri Keflavík/Keflavík
IRELAND	
Shannon/Shannon	Amsterdam/Schiphol Dublin/Dublin London/Heathrow Manchester/Manchester Paris/Le Bourget Paris/Orly Prestwick/Prestwick

REGULAR AERODROME AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
ISRAEL	
Tel Aviv/Lod	**Ankara/Esenboğa** **Athinai/Athinai** **Elat/Elat** **Haifa/Ramat David** **Istanbul/Yesilköy** **Nicosia/Nicosia**
ITALY	
Milano/Malpensa	**Genova/Sestri** **Milano/Linate** **Pisa/San Giusto** **Roma/Fiumicino** **Torino/Caselle** **Venezia/Tesséra**
Roma/Fiumicino	**Alghero/Alghero** **Barcelona/Barcelona** **Frankfurt Main/Frankfurt Main** **Genève/Cointrin** **Genova/Sestri** **Milano/Malpensa** **Napoli/Capodichino** **Pisa/San Giusto** **Roma/Ciampino**
JAMAICA	
Kingston/Palisadoes Intl.	Barranquilla/Soledad Miami/Intl. Montego Bay/Intl. Nassau/Intl. Panama/Tocumén Port-au-Prince/President Duvalier Intl. Santo Domingo/De las Américas Intl.
Montego Bay/Intl.	Kingston/Palisadoes Intl. Miami Intl. Nassau/Intl. Port-au-Prince/President Duvalier Intl. Santo Domingo/De las Américas Intl.
LUXEMBOURG	
Luxembourg/Luxembourg	Bruxelles/National

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
MEXICO	
Mérida/Mérida	Cozumel/Cozumel Guatemala/La Aurora Tampico/Rihl Intl.
Mexico City/Intl.	Acapulco/Plan de los Amates El Paso/Intl. Guadalajara/Las Animas Guatemala/La Aurora Houston/Intercontinental Mérida/Mérida New Orleans/Intl. San Antonio/Intl.
MOROCCO	
Rabat/Salé	Casablanca/Nouasser Faro/Faro Lisboa/Lisboa Madrid/Barajas Málaga/Málaga Sevilla/Sevilla
NETHERLANDS (KINGDOM OF THE)	
Amsterdam/Schiphol	Bruxelles/National Dusseldorf/Dusseldorf Frankfurt Main/Frankfurt Main Hamburg/Hamburg København/Kastrup Köln/Köln-Bonn London/Heathrow Paris/Orly Rotterdam/Rotterdam
NETHERLANDS ANTILLES	
Oranjestad/Prinses Beatrix, Aruba I.	Caracas/Maiquetía Willemstad/Dr. A. Plesman
Willemstad/Dr. A. Plesman, Curaçao I.	Caracas/Maiquetía Oranjestad/Prinses Beatrix
NORWAY	
Bergen/Flesland	København/Kastrup Oslo/Fornebu Prestwick/Prestwick Stavanger/Sola Stockholm/Arlanda

REGULAR AERODROMES AERODROMES REGULIER	ALTERNATE AERODROMES AERODROMES DE DEGAGEMENT
NORWAY (Cont'd)	
Oslo/Fornebu Oslo/New Main	Amsterdam/Schiphol Bodø/Bodø Bergen/Flesland Göteborg/Torslanda København/Kastrup Oslo/Gardermoen Prestwick/Prestwick Stavanger/Sola Stockholm/Arlanda
PORTUGAL	
Lisboa/Lisboa	Barcelona/Barcelona Faro/Faro Genève/Cointrin Madrid/Barajas Málaga/Málaga Palma de Mallorca/Palma de Mallorca Porto/Porto Rabat/Salé Sevilla/Sevilla
Santa Maria/Santa Maria Santa Maria I., Açores	Faro/Faro Lisboa/Lisboa Madrid/Barajas Ponta Delgada/Ponta Delgada Porto Santo/Porto Santo
PUERTO RICO	
San Juan/Puerto Rico Intl.	Caracas/Maiquetía Pointe-à-Pitre/Le Raizet St. Croix/Alexander Hamilton St. Johns/Coolidge Santo Domingo/De Las Américas Intl.
SENEGAL	
Dakar/Yoff	Abidjan/Port Bouet Accra/Kotoka Intl. Conakry/Gbessia Freetown/Lungi Monrovia/Roberts Intl. Sal I./Sal
SPAIN	
Barcelona/Barcelona	Madrid/Barajas Málaga/Málaga Palma De Mallorca/Palma De Mallorca

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
SPAIN (Cont'd)	
Las Palmas de Gran Canaria, Canary Is.	El Aaiun/El Aaiun Lisboa/Lisboa Rabat/Salé Tenerife/Tenerife
Madrid/Barajas	Barcelona/Barcelona Lisboa/Lisboa Nice/Côte d'Azur Zaragoza/Zaragoza
Málaga/Málaga	Lisboa/Lisboa Madrid/Barajas Sevilla/Sevilla
SURINAM	
Paramaribo/Zanderij	Belem/Val De Cães Caracas/Maiquetía Cayenne/Rochambeau Georgetown/Timehri Intl. Port-of-Spain/Piarco
SWEDEN	
Stockholm/Arlanda	København/Kastrup Helsinki/Helsinki Oslo/Fornebu Stavanger/Sola Stockholm/Bromma
SWITZERLAND	
Genève/Cointrin	Bâle-Mulhouse/Bâle-Mulhouse Frankfurt Main/Frankfurt Main Lyon/Bron Marseille/Marignane Milano/Malpensa Nice/Côte d'Azur Paris/Orly Stuttgart/Stuttgart Zürich/Zürich
Zürich/Zürich	Bâle-Mulhouse/Bâle-Mulhouse Frankfurt Main/Frankfurt Main Genève/Cointrin Lyon/Bron Milano/Malpensa München/München Nice/Côte d'Azur Paris/Orly Stuttgart/Stuttgart

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
TRINIDAD & TOBAGO	
Port-of-Spain/Piarco, Trinidad	Bridgetown/Seawell Caracas/Maiquetía Fort-de-France/Lamentin Georgetown/Timehri Intl. Paramaribo/Zanderij Pointe-à-Pitre/Le Raizet St. Johns/Coolidge San Juan/Puerto Rico Intl. Willemstad/Dr. A. Plesman
UNITED KINGDOM	
Glasgow/Glasgow	Belfast/Aldergrove Birmingham/Birmingham Edinburgh/Turnhouse Manchester/Manchester Prestwick/Prestwick
London/Gatwick	Amsterdam/Schiphol Bruxelles/National Dusseldorf/Dusseldorf Hamburg/Hamburg København/Kastrup London/Heathrow Manchester/Manchester Prestwick/Prestwick Shannon/Shannon
London/Heathrow	Amsterdam/Schiphol Bruxelles/National Dusseldorf/Dusseldorf Hamburg/Hamburg København/Kastrup London/Gatwick Manchester/Manchester Prestwick/Prestwick Shannon/Shannon
Manchester/Manchester	Birmingham/Birmingham Dublin/Dublin Liverpool/Liverpool London/Heathrow Paris/Orly Prestwick/Prestwick Shannon/Shannon

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
UNITED KINGDOM (Cont'd)	
Prestwick/Prestwick	Amsterdam/Schiphol Bergen/Flesland Hamburg/Hamburg Liverpool/Liverpool London/Gatwick London/Heathrow Manchester/Manchester Shannon/Shannon Stavanger/Sola

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
UNITED STATES	
Anchorage/Intl., Alaska	1) Anchorage/Elmendorf AFB Cold Bay/Cold Bay Edmonton/Intl. Fairbanks/Intl. King Salmon/King Salmon
Baltimore/Friendship Intl., Maryland	Boston/Logan Intl. Detroit/Metropolitan-Wayne Co. Montreal/Intl. New York/John F. Kennedy Intl. Philadelphia/Intl. Pittsburgh/Greater Pittsburgh Washington/Dulles Intl.
Boston/Logan Intl., Massachusetts	Baltimore/Friendship Intl. Bangor/Intl. Detroit/Metropolitan-Wayne Co. Halifax/Intl. Montreal/Intl. Niagara Falls/Intl. Philadelphia/Intl. Washington/Dulles Intl. Windsor Locks/Bradley Intl.
Chicago/O'Hare Intl., Illinois	Cleveland/Hopkins Intl. Detroit/Metropolitan-Wayne Co. Indianapolis/Weir Cook Milwaukee/General Mitchell Minneapolis/Minneapolis-St. Paul Intl. Niagara Falls/Intl. St. Louis/Lambert-St. Louis Toronto/Intl.
Detroit/Metropolitan-Wayne Co., Michigan	Baltimore/Friendship Intl. Chicago/O'Hare Intl. Cleveland/Hopkins Intl. Montreal/Intl. Niagara Falls/Intl. Ottawa/Intl. Philadalphia/Intl. Toronto/Intl.

1) Military; prior permission required for use.
Aérodrome militaire; exige une autorisation préalable.

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
UNITED STATES (Cont'd)	
Houston/Intercontinental, Texas	Corpus Christi/Intl. (Dallas/Dallas-Love Field (Dallas-Fort Worth/Regional Airport New Orleans/Intl. San Antonio/Intl.
Los Angeles/Intl., California	Fresno/Fresno Air Terminal Las Vegas/McCarran Intl. Oakland/Metropolitan-Oakland Intl. Ontario/Intl. Palmdale/Palmdale P.F.T.I. San Diego/Intl.-Lindbergh Field San Francisco/Intl. Stockton/Metropolitan
Miami/Intl., Florida	Nassau/Intl. Tampa/Intl. West Palm Beach/Palm Beach Intl.
Newark/Newark, New Jersey	Baltimore/Friendship Intl. Bermuda/NAS Detroit/Metropolitan-Wayne Co. Niagara Falls/Intl. Philadelphia/Intl. Pittsburgh/Greater Pittsburgh Washington/Dulles Intl. Windsor Locks/Bradley Intl.
New York/John F. Kennedy Intl., New York	Baltimore/Friendship Intl. Boston/Logan Intl. Halifax/Intl. Philadelphia/Intl. Pittsburgh/Greater Pittsburgh Syracuse/Hancock Montreal/Intl. Washington/Dulles Intl. Windsor Locks/Bradley Intl.
Philadelphia/Intl., Pennsylvania	Baltimore/Friendship Intl. Bangor/Intl. Boston/Logan Intl. Montreal/Intl. New York/John F. Kennedy Intl. Pittsburgh/Greater Pittsburgh

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
UNITED STATES (Cont'd)	
Pittsburgh/Greater Pittsburgh, Pennsylvania	**Philadelphia/Intl.** **Washington/Dulles Intl.**
San Francisco/Intl., California	**Fresno/Fresno Air Terminal** **Las Vegas/McCarran Intl.** **Los Angeles/Intl.** Oakland/Metropolitan-Oakland Intl. **Ontario/Intl.** **Palmdale/Palmdale P.F.T.I.** **Stockton/Metropolitan**
Seattle/Seattle-Tacoma Intl., Washington	**Everett/Snohomish County (Paine Field)** **Los Angeles/Intl.** **Portland/Intl.** **San Francisco/Intl.** **Spokane/Intl.** **Vancouver/Intl.**
Washington/Dulles Intl., District of Columbia	**Baltimore/Friendship Intl.** **Boston/Logan Intl.** **Montreal/Intl.** **New York/John F. Kennedy Intl.** **Philadelphia/Intl.** **Pittsburgh/Greater Pittsburgh** **Windsor Locks/Bradley Intl.**
U.S.S.R.	
Moscow/Sheremetievo	**Moscow/Vnukovo**

REGULAR AERODROMES AERODROME REGULIER	ALTERNATE AERODROMES AERODROME DE DEGAGEMENT
VENEZUELA	
Caracas/Maiquetía	Barranquilla/Soledad Bridgetown/Seawell Georgetown/Timehri Intl. Kingston/Palisadoes Intl. Maracaibo/La Chinita Intl. Oranjestad/Prinses Beatrix Port-of-Spain/Piarco San Juan/Puerto Rico Intl. Willemstad/Dr. A. Plesman
VIRGIN ISLANDS	
St. Croix/Alexander Hamilton	Pointe-à-Pitre/Le Raizet St. Johns/Coolidge San Juan/Puerto Rico Intl. Santo Domingo/De las Américas Intl.
WEST INDIES ASSOCIATED STATES	
St. Johns/Coolidge, Antigua I.	Bridgetown/Seawell Fort-de-France/Lamentin Pointe-à-Pitre/Le Raizet Port-of-Spain/Piarco St. Croix/Alexander Hamilton San Juan/Puerto Rico Intl.

PART II - ALTERNATE AERODROMES REQUIRED FOR INTERNATIONAL COMMERCIAL AIR TRANSPORT IN ADDITION TO REGULAR AERODROMES LISTED IN PART I

2eme PARTIE - AERODROMES DE DEGAGEMENT NECESSAIRES AU TRANSPORT AERIEN COMMERCIAL INTERNATIONAL EN PLUS DES AERODROMES REGULIERS FIGURANT A LA 1ere PARTIE

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
ALGERIA	
*Annaba/Annaba	Alger
Boufarik/Boufarik	Alger
*Oran/Es Sénia	Alger
*Ouargla/Ouargla	Alger
AUSTRIA	
*Salzburg/Salzburg	Wien
BAHAMAS	
*Rock Sound/Intl.	Nassau

* Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
BRAZIL	
*Belem/Val de Cães	Paramaribo
CANADA	
Abbotsford/Abbotsford	Vancouver
Comox/Comox	Vancouver
1)Goose/Goose	Frobisher Bay, Gander, Søndre Strømfjord, Halifax
Moncton/Moncton	Gander, Halifax
Ottawa/Intl.	Detroit, Montreal, Toronto
Sydney/Sydney	Gander, Halifax
*Windsor/Windsor	Toronto

* Serves as a regular aerodrome in another Region.
Est utilisé comme aérodrome régulier dans une autre région .

1) To be used only when other regular and alternate aerodromes are unusable.
A n'utiliser que lorsqu'on ne peut utiliser un autre aérodrome régulier ou de dégagement.

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
CAPE VERDE IS.	
*Sal I./Sal	Dakar
COLOMBIA	
*Barranquilla/Soledad	Caracas, Kingston
CUBA	
Camaguey/Ignacio Agramonte	Habana
Varadero/Varadero	Habana
CYPRUS	
*Nicosia/Nicosia	Tel Aviv
CZECHOSLOVAKIA	
* Bratislava/Ivánka	Praha, Wien
Brno/Turany	Praha
FINLAND	
Rovaniemi/Rovaniemi	Helsinki
* Turku/Turku	Helsinki

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région.

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
FRANCE	
*Bâle-Mulhouse/Bâle-Mulhouse	Frankfurt Main, Geneve, Zürich
*Bordeaux/Mérignac	Paris
*Marseille/Marignane	Genève, Lyon, Bruxelles
*Nice/Côte d'Azur	Genève, Madrid, Zürich
*Paris/Le Bourget	Paris
FRENCH GUIANA	
*Cayenne/Rochambeau	Paramaribo
GERMANY (EAST)	
*Berlin/Schönefeld	Praha
GERMANY (FEDERAL REPUBLIC)	
*Dusseldorf/Dusseldorf	Amsterdam, Frankfurt Main, Hamburg, Köln, London, Bruxelles, København
*Hannover/Hannover	Hamburg, København
*München/München	Frankfurt Main, Hamburg, Köln, Zürich
*Nürnberg/Nürnberg	Frankfurt Main , Köln
*Stuttgart/Stuttgart	Frankfurt Main, Genève, Hamburg, Köln, Zürich
GHANA	
*Accra/Kotoka Intl.	Dakar

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
GREECE	
Andravida/Andravida	Athinai
Athinai/Elefsis	Athinai
*Thesaloniki/Thesaloniki	Athinai
GUATEMALA	
*Guatemala/La Aurora	Mexico City, Mérida
GUINEA	
*Conakry/Gbessia	Dakar
GUYANA	
*Georgetown/Timehri Intl.	Caracas, Paramaribo, Port-of-Spain
ICELAND	
Akureyri/Akureyri	Keflavík, Reykjavík
IRELAND	
*Dublin/Dublin	Manchester, Shannon
ISRAEL	
Elat/Elat	Tel Aviv
Haifa/Ramat David	Tel Aviv

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
ITALY	
*Alghero/Alghero	Roma
*Genova/Sestri	Roma, Milano
*Milano/Linate	Milano
*Napoli/Capodichino	Roma
*Pisa/San Giusto	Milano, Roma
Roma/Ciampino	Roma
*Torino/Caselle	Milano
*Venezia/Tessera	Milano
IVORY COAST	
*Abidjan/Port Bouet	Dakar
LIBERIA	
*Monrovia/Roberts Intl.	Dakar
MEXICO	
*Acapulco/Plan de los Amates	Mexico City
*Cozumel/Cozumel	Mérida
*Guadalajara/Las Animas	Mexico City
*Tampico/Rihl Intl.	Mérida
MOROCCO	
*Casablanca/Nouasser	Rabat

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
NETHERLANDS (KINGDOM OF THE)	
***Rotterdam/Rotterdam**	Amsterdam
NORWAY	
Bodø/Bodø	**Oslo**
***Oslo/Gardermoen**	**Oslo**
***Stavanger/Sola**	**Bergen, Keflavik, København, Oslo, Paris, Prestwick, Stockholm**
PANAMA	
***Panama/Tocumén**	**Kingston**
PORTUGAL	
***Faro/Faro**	**Lisboa, Rabat, Santa Maria**
Ponta Delgada/Ponta Delgada, São Miguel I., Açores	**Santa Maria**
***Porto/Porto**	**Lisboa**
Porto Santo/Porto Santo Porto Santo I., Madeira	Santa Maria

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régular dans une autre région

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
SIERRA LEONE	
*Freetown/Lungi	Dakar
SPAIN	
*El Aaiun/El Aaiun	Las Palmas de Gran Canaria
*Palma de Mallorca/Palma de Mallorca	Barcelona, Lisboa
*Sevilla/Sevilla	Lisboa, Málaga, Rabat
*Tenerife/Tenerife	Las Palmas de Gran Canaria
Zaragoza/Zaragoza	Madrid
SWEDEN	
*Göteborg/Torslanda	Oslo
Stockholm/Bromma	Stockholm

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
SWITZERLAND	
*Bâle-Mulhouse/Bâle-Mulhouse	Frankfurt Main, Genève, Zürich
TURKEY	
*Ankara/Esenboğa	Tel Aviv
*Istanbul/Yesilköv	Tel Aviv
UNITED KINGDOM	
*Belfast/Aldergrove	Glasgow
*Birmingham/Birmingham	Glasgow, Manchester
*Edinburgh/Turnhouse	Glasgow
*Kirkwall/Kirkwall	Vagar
*Liverpool/Liverpool	Manchester, Prestwick

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERDROME EST UN AERODROME DE DEGAGEMENT
UNITED STATES	
Anchorage/Elmendorf AFB	Anchorage
Bangor/Intl.	Boston, Montreal, Philadelphia
Cleveland/Hopkins Intl.	Chicago, Detroit, Toronto
*Cold Bay/Cold Bay	Anchorage
*Corpus Christi/Intl.	Houston
(*Dallas/Dallas-Love Field (Dallas-Fort Worth/Regional Airport**	Houston
El Paso/Intl.	Mexico City
Everett/Snohomish County (Paine Field)	Seattle
* Fairbanks/Intl.	Anchorage
Fresno/Fresno Air Terminal	Los Angeles, San Francisco
Indianapolis/Weir Cook	Chicago
King Salmon/King Salmon	Anchorage
Las Vegas/McCarran Intl.	Los Angeles, San Francisco
Milwaukee/General Mitchell	Chicago
Minneapolis/Minneapolis-St. Paul Intl.	Chicago

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région
**To replace Dallas/Dallas-Love Field
En remplacement de Dallas/Love Field

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
UNITED STATES (Cont'd)	
Niagara Falls/Intl.	Boston, Chicago, Detroit, Montreal, Newark, Toronto,
*New Orleans/Intl.	Mexico City, Houston
Oakland/Metropolitan-Oakland Intl.	Los Angeles, San Francisco
Ontario/Intl.	Los Angeles, San Francisco
Palmdale/Palmdale P.F.T.I.	Los Angeles, San Francisco
Portland/Intl.	Seattle
St. Louis/Lambert - St. Louis	Chicago
*San Antonio/Intl.	Houston, Mexico City
*San Diego/Intl. - Lindbergh Field	Los Angeles
Spokane/Intl.	Seattle
Stockton/Metropolitan	Los Angeles, San Francisco
Syracuse/Hancock	Montreal, New York
*Tampa/Intl.	Freeport, Miami, Nassau
*West Palm Beach/Palm Beach Intl.	Freeport, Miami, Nassau
Windsor Locks/Bradley Intl.	Boston, Montreal, Newark, Washington, New York

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

ALTERNATE AERODROME AERODROME DE DEGAGEMENT	CITY FOR WHICH AERODROME IS AN ALTERNATE VILLE POUR LAQUELLE L'AERODROME EST UN AERODROME DE DEGAGEMENT
U.S.S.R.	
Moscow/Vnukovo	Moscow
VENEZUELA	
*Maracaibo/La Chinita Intl.	Caracas
WEST INDIES ASSOCIATED STATES	
St. Lucia/Beane Field (future) (futur)	Bridgetown/Seawell

*Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

PART III - ADDITIONAL AERODROMES REQUIRED FOR INTERNATIONAL GENERAL AVIATION

3eme PARTIE - AERODROMES SUPPLEMENTAIRES NECESSAIRES A L'AVIATION GENERALE INTERNATIONALE

CANADA

1# Goose/Goose

St. John's/Torbay

DENMARK

Narssarssuaq/Narssarssuaq
(Greenland)

FRENCH TERRITORY OF ST. PIERRE AND MIQUELON

St. Pierre/St. Pierre

UNITED KINGDOM

* Leeds & Bradford/Leeds & Bradford

Stornoway/Stornoway

Serves as an alternate aerodrome for international commercial air transport operations
Est utilise comme aerodrome de degagement pour les vols du transport aerien commercial international

* Serves as a regular aerodrome in another Region
Est utilisé comme aérodrome régulier dans une autre région

1 For use only when other regular and alternate aerodromes are unusable.
A n'utiliser que lorsqu'on ne peut utiliser un autre aérodrome régulier ou de dégagement.

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Agenda Item 6: Physical characteristics of aerodromes

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

6.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 21 to 23 and 25 to 27 of the Report on Agenda Item 2 governed the consideration of Agenda Item 6.

6.2 Additional consideration of this item was conditioned by the Directives to the Meeting that it should provide as realistic figures as possible on runway length and strength requirements at individual aerodromes on the basis of the Table of Aircraft Operations approved by the General Committee and the available aircraft performance data.

AERODROMES FOR INTERNATIONAL SCHEDULED AIR TRANSPORT

6.3 The Meeting reviewed the requirements for runway length, pavement strength; pavement widths, separation distances, etc. (as indicated in Table AGA 1 by the runway code letter) for each of the aerodromes in the Region. A detailed examination was made for each aerodrome taking into account the critical aircraft, route segments, the weight at which the aircraft would operate and the elevation, reference temperature and runway slope for the aerodrome. In all cases the critical aircraft types related to the runway length and pavement strength, and the planned date of introduction of the operations, were indicated. The Meeting developed its recommendations for Table AGA 1 on a technical basis and not on existing plans or budgets of States.

6.4 When considering the correction to be applied for runway slope affect the Meeting was advised that the national practices of some States differed from that specified in Annex 14 either in respect to the method of determining the average slope or in the correction to be applied. The Meeting utilized the practice as specified in Annex 14 for its work. In instances where information on runway slope is not presented in Column 5 no correction for slope effect has been included in the proposed runway length figure.

6.5 It was agreed that the Meeting should develop the most realistic planning requirements possible, based on the best information available at the Meeting. The figures presented in the Table for runway length were for balanced field lengths (i.e. where the accelerate-stop distance is equal to the take-off distance). It was recognized that in practice these requirements might be met by the use of stopways and clearways in association with the runway. The figures for pavement strength requirements were the operating weight of the critical aircraft for pavement strength design. The runway length and pavement strength figures should be reviewed by the competent authority in consultation with the operators concerned when making plans for the development of aerodromes.

6.6 In addition to indicating in column 8 the critical aircraft for pavement strength and its operating weight, the column was expanded to include information on operations of the B747. Though it was recognized that because of the landing gear design this aeroplane would not normally be critical for pavement strength requirements, its high total weight would be an important factor in the design of culverts, cable ducts and bridge overpasses. Further, it was felt important to indicate where this aeroplane would be operating as its size and passenger volume could require modification of other facilities. Indications of the operation of supersonic aeroplanes were also included where it was known they would be operating.

6.7 Many of the alternate aerodromes selected under Agenda Item 5 served as regular or alternate aerodromes for operations not considered by this Meeting. The Meeting did not plan facilities for these aerodromes unless there was a need for an increase over the existing Air Navigation Plan requirement.

RECOMMENDATION 6/1 - AERODROME PHYSICAL CHARACTERISTICS

That AGA Table 1 constitute the plan for physical characteristics for the aerodromes for scheduled air services considered by the Meeting and that the appropriate Air Navigation Plans be amended accordingly.

6.8 The Meeting considered the operational requirement in para. 27 of the report on Agenda Item 2 which stated that the development of aerodrome capacity should be coordinated with that of the airspace to ensure mutual compatibility. The desirability of planning for such a requirement was unanimously agreed but in view of the lateness at which this requirement was framed, it was unable to do any constructive work during the course of the Meeting. Future meetings, it was thought, might be able to identify particular aerodromes or even runways and terminal aprons where capacity problems existed. However, it was recognized that it would be difficult to incorporate this work into the air navigation planning and would require substantial guidance in the form of pre-meeting work and documentation. This might include requesting States to provide meetings with estimates of aerodrome capacity.

AERODROMES FOR INTERNATIONAL GENERAL AVIATION

6.9 The Meeting had considerable difficulty planning aerodrome facilities for the aerodromes designated for International General Aviation in Part III of the List of Aerodromes developed under Agenda Item 5. It was considered that the information on International General Aviation operations contained in the Table of Aircraft Operations did not provide adequate data with respect to the types of aircraft that would be utilizing the aerodromes or their frequency of operations. It was, therefore, decided not to identify any specific facilities in Table AGA 1 and to leave the development of physical facilities for International General Aviation entirely to the work to be done through consultation with States following the Meeting as outlined in Recommendation 5/2. As an interim measure, the Meeting recommended that the existing facilities at the aerodromes be maintained.

RECOMMENDATION 6/2 - AERODROME PHYSICAL CHARACTERISTICS FOR INTERNATIONAL GENERAL AVIATION

That for the aerodromes in Part III of the List of Aerodromes, States maintain the current facilities for the use of International General Aviation until a more detailed analysis of specific IGA requirements can be concluded.

6.10 As a basis for any future work which may be done for planning of aerodromes facilities for International General Aviation, the Meeting considered it suitable to follow the course taken by the Third South American/South Atlantic Regional Air Navigation Meeting and recommended the table at Appendix 6-A.

RECOMMENDATION 6/3 - FUTURE PLANNING FOR INTERNATIONAL GENERAL AVIATION

That in future consultation with States concerning facilities for International General Aviation, States be requested to submit proposals for the physical characteristics of International General Aviation aerodromes in accordance with the Table at Appendix 6-A.

6.11 The Meeting reviewed the recommendations in the Report of the Third North Atlantic Regional Air Navigation Meeting concerning the physical characteristics of aerodromes and considered that they were either superseded by the recommendations of this Meeting or no longer needed.

TABLE AGA 1 - PHYSICAL CHARACTERISTICS OF AERODROMES

EXPLANATION OF TABLE

Column

1 Name of country, city and aerodrome.

2 Aerodrome elevation - highest point of the landing area expressed in metres, and the aerodrome reference temperature expressed in degrees centigrade.

3 Designation of the aerodrome as either for Regular (REG) use or Alternate (ALT) use and the period when the critical operation is planned to begin.

4 Runway designation number and type of runway to be provided, i.e.

N-Instr	Non-instrument runway
Instr	Instrument approach runway
PA I	Precision approach runway, category I
PA II	Precision approach runway, category II

5 Average runway slope - the difference between the maximum and minimum elevation along the runway centre line divided by the runway length.

6 Critical aircraft for runway length and required runway length expressed in terms of a balanced field length. Account has been taken of the effect of elevation, temperature and runway slope when data is provided in columns 2 and 5.

7 Reference code letter for aerodrome characteristics expressed in accordance with Annex 14, Part II Chapter 3, Fifth Edition

8 Critical aircraft for pavement strength and required pavement strength expressed as the all-up weight (AUW) in 1 000 kg. and information on operations of B747 and SST aircraft.

9 Additional information.

Notes

* Column 3, indicates an alternate aerodrome in this plan serves as a regular aerodrome for other international operations.

** Columns 6, 7 and 8, indicates an existing requirement in an Air Navigation Plan is greater than that required for operations considered by this Meeting and the existing Plan requirement should be retained.

TABLE AGA 1 - PHYSICAL CHARACTERISTICS OF AERODROMES

TABLEAU AGA-1 - CARACTERISTIQUES PHYSIQUES DES AERODROMES

PART 1 - AERODROMES REQUIRED FOR INTERNATIONAL COMMERCIAL AIR TRANSPORT

1ère PARTIE - AERODROMES NECESSAIRES AU TRANSPORT AERIEN INTERNATIONAL COMMERCIAL

CITY/AERODROME VILLE/AERODROME	ELEV. m TEMP. c ALT. m TEMP. c	DESIG. DATE DESIG. DATE	RUNWAY - PISTE No. TYPE N° TYPE	SLOPE PENTE %	ACFT LENGTH AVION LONGUEUR m	CODE LETTER LETTRE D'IDENTIFICATION	ACFT PAVEMENT STRENGTH AVION RESISTANCE DE CHAUSSEE 1 000 kg	REMARKS AND OTHER FACILITIES OBSERVATIONS ET AUTRES MOYENS
1	2	3	4	5	6	7	8	9
ALGERIA								
Alger/Dar El Beida	25 27.8	REG 1970	06/24 PA-I	0.103	TU-114 2980	A	TU-114 AUW 165	
Annaba/Annaba	4 27.1	ALT* 1970	05/23 PA-I	0.075	TU-114 2620	A	TU-114 AUW 128	
Boufarik/Boufarik	102 27.9	ALT 1970	05/23	NA	TU-114 2640	A	TU-114 AUW 128	

1	2	3	4	5	6	7	8	9
Oran/Es Sénia	90 27.4	ALT* 1970	07/25 PA-I	0.04	**	**	TU-114 AUW 128	
Ouargla/Ouargla	150 36	ALT* 1970	02/20 INSTR	0.368	TU-114 2640	A	TU-114 AUW 128	
AUSTRIA								
Salzburg/Salzburg	430 19.8	ALT* 1970	16/34 PA-I	0	**	**	B707-300 AUW 94	
Wien/Schwechat	183 21.7	REG 1970	12/30 PA-II	0.233	B707-300 3500	A	B707-300 AUW 142	
BAHAMAS								
Freeport/Intl. Grand Bahama I.	2 29.4	REG 1970	06/24 PA-I	NA	B707-400 2180	A	B707-400 AUW 110 B747 AUW 285	
Nassau/Intl. New Providence	3 28.9	REG 1970	09/27 PA-I	NA	B707-300C 2511	A	B707-300C AUW 153	
		1973			B707-400 4115			
		1974		NA			B747 AUW 283 L-1011 AUW 163	
		1970	14/32 N-INSTR	NA	B707-300C 3352	A	B707-300C AUW 153	

1	2	3	4	5	6	7	8	9
BARBADOS								
Bridgetown/Seawell	50 28.3	REG 1970	09/27 PA-I	0.033	DC8-63 3350	A	DC8-63 AUW 158	
		1972					B747 AUW 269	
		1974					B747 AUW 308	
BELGIUM								
Bruxelles/National	55 19.1	REG 1970	08L/26R INSTR	0.2	B707-400 3610	A	B707-300C AUW 153	
		1973					B747 AUW 322	
		1974					Concorde AUW 170	
		1970	08R/26L PA-II	0.09	B707-400 2292	A	B707-300C AUW 130	
		1970	02/20 PA-II	0.8	B707-400 2819	A	B707-300C AUW 150	
		1973					B747 AUW 256	
		1970	12/30 INSTR	0.7	B707-400 2392	A	B707-300C AUW 130	

1	2	3	4	5	6	7	8	9
BERMUDA								
Bermuda/NAS	3 28	REG 1970	12/30 PA-I	NA	B707-430 3720	A	B747 AUW 275	
					-		-	
CANADA								
Abbotsford/Abbotsford	58 18.5	ALT 1970	06/24 PA-I	0.28	DC8-40 2250	A	DC8-40 AUW 102	
					-		-	
Calgary/Intl.	1084 19	REG 1970	16/34 PA-I	0.11	DC8-40 3863	A	DC8-40 AUW 143	
		1974					DC8-61 AUW 148	
Comox/Comox	24 NA	ALT 1970	11/29 INSTR	NA	DC8-60 2080	B	DC8-60 AUW 109	
Edmonton/Intl.	723 18.5	REG 1970	01/19 PA-I	0.13	DC8-40 3353	A	DC8-40 AUW 143	
		1974					DC8-63 AUW 158	

1	2	3	4	5	6	7	8	9
Frobisher Bay/Frobisher	34 NA	REG 1974	18/36	0.44	Concorde 2743	A	Concorde AUW 177	
Gander/Intl.	151 19	REG 1970	14/32 INSTR	0.5	DC8-61 2713	A	IL 62 AUW 158	
		1970	04/22 PA-I	0.36	DC8-61 2560	A	IL 62 AUW 158	
Goose/Goose	48 18	ALT 1970	09/27 N-INSTR	0.1	DC8-61 2080	B	DC8-61 AUW 109	
		1970	17/35 N-INSTR	NA	DC8-61 2080	B	DC8-61 AUW 109	
Halifax/ Intl.	145 21	REG 1970	06/24 PA-I	0.2	DC8-40 2682	A	DC8-40 AUW 134	
		1974					DC8-61 AUW 148	
		1970	15/33 PA-I	NA	DC8-40 2347	A	DC8-40 AUW 134	
Moncton/Moncton	71 NA	ALT 1970	11/29 PA-I	0	DC8-61 2080	B	DC8-61 AUW 109	
		1970	07/25 PA-I	0.005	DC8-61 1850	B	DC8-61 AUW 109	

1	2	3	4	5	6	7	8	9
Montreal/Intl.	36 23.1	REG 1970	06L/24R PA-II	0.09	DC8-63 3600	A	DC8-63 AUW 162	New Aerodrome planned Nouvel aérodrome projeté
		1971					B747 AUW 323	
		1972					B747-B AUW 333	
		1973			B747 3700		B747-F AUW 353	
		1974					Concorde AUW 170	
		1970	06R/24L PA-II	NA	DC8-63 2926	A	DC8-63 AUW 162	
		1970	10/28 INSTR	NA	DC8-63 2134	A	DC8-63 AUW 162	
Ottawa/Intl.	114 25	ALT 1970	07/25 INSTR	0.31	B707-330B 2080	B	B707-330B AUW 112	
		1970	14/32 INSTR	NA	B707-330B 2080	B	B707-330B AUW 112	
Sydney/Sydney	62 19.9	ALT 1970	07/25 PA-I	0.11	DC8-40 2155	A	DC8-40 AUW 102	
		1974					DC8-61 AUW 110	
Toronto/Intl.	173 24	REG 1970	14/32 PA-II	0.23	DC8-63 3368	A	DC8-63 AUW 162	
		1971					B747 AUW 317	
		1970	05R/23L PA-II	0.17	DC8-63 2896	A	DC8-63 AUW 162	
		1970	05L/23R PA-I	0.17	DC8-63 3181	A	DC8-63 AUW 162	

1	2	3	4	5	6	7	8	9
Vancouver/Intl.	3 18.9	REG 1970	08/26 PA-I	0.03	DC8-40 3000	A	DC8-40 AUW 143	
		1974			DC8-61 3180		DC8-61 AUW 148	
Windsor/Windsor	188 24	ALT 1970	07/25 PA-I	0.18	B707-300 2394	A	B707-300 AUW 94	
Winnipeg/Intl.	239 23	REG 1970	18/36 PA-I	0.03	DC8-61 3353	A	DC8-61 AUW 148	
CUBA		1970	13/31 PA-I	NA	DC8-61 2652	A	DC8-61 AUW 148	
Camaguey/Ignacio Agramonte	122 28.5	ALT 1970	07/25	NA	TU-114 3200	A	TU-114 AUW 130	
Habana/José Martí	63 28.5	REG 1970	05/23 PA-I	NA	DC8-50 3500	A	TU-114 AUW 180	
		1974			DC8-63 3700			
Varadero/Varadero	3 28	ALT 1970	06/24	NA	TU-114 2600	A	TU-114 AUW 128	

1	2	3	4	5	6	7	8	9
CYPRUS								
Nicosia/Nicosia	223 31	ALT* 1970	14/32 PA-I	0.25	**	**	B707-300B AUW 97	–
		1970	09/27 INSTR	NA	**	**	B707-300B AUW 97	–
CZECHOSLOVAKIA								
Bratislava/Ivánka	132 22.2	ALT* 1970	04/22 PA-I	0.07	IL 62 2800	A	IL 62 AUW 102	
Brno/Turany	238 21.2	ALT 1970	10/28 PA-I	0.25	IL 62 2800	A	IL 62 AUW 102	
Praha/Ruzyně	380 19.0	REG 1970	13/31 PA-I	0.65	IL 62 3200	A	IL 62 AUW 158	
			07/25 PA-II	0.39				
DENMARK								
København/Kastrup	5 18.8	REG 1970	04R/22L PA-II	0.15	DC8-62 3770	A	DC8-62 AUW 158	Additional runway 04L/22R planned Piste supplémentaire 04L/22R projetée
		1971					B747-B AUW 351	
		1974					DC 10 AUW 185	
		1970	12/30 PA-II	0.11	DC8-62 3070	A	DC8-62 AUW 158	

1	2	3	4	5	6	7	8	9
Søndre Strømfjord/ Søndre Strømfjord (Greenland)	50 / 11.4	REG 1970	11/29 INSTR	0.65	DC8-60 2800	A	DC8-60 AUW 136	
Vagar/Vagar (Faroe Is.)	86 / 11.5	REG 1970	13/31 N-INSTR	1.18	FK 27 1510	B	FK 27 AUW 19	
DOMINICAN REPUBLIC								
Santo Domingo/ De Las Américas Intl.	17 / 28.6	REG 1970	16/34 PA-I	NA	DC8-63 3700	A	DC8-63 AUW 162	
FINLAND								
Helsinki/Helsinki	51 / 17.9	REG 1970	04/22 PA-II	0.19	DC8-62C 3200	A	DC8-62C AUW 158	
		1970	15/33 PA-II	0.245	DC8-62C 2250	A	DC8-62C AUW 109	
Rovaniemi/Rovaniemi	198 / 15.8	ALT 1970	03/21 PA-I	0.19	SE 210-6R 1920	B	DC8-62 AUW 108	

1	2	3	4	5	6	7	8	9
Turku/Turku	49 17.6	ALT* 1970	08/26 PA-II	0.30	DC8-62 1800	B	DC8-62 AUW 108	
FRANCE								
Bâle-Mulhouse/ Bâle-Mulhouse	269 22.01	ALT* 1970	16/34 PA-II	0.11	**	**	DC-8-F AUW 109	—
Lyon/Bron	201 22.6	REG 1970	17/35 PA-II	0.304	B707-300 2630	A	B707-300 AUW 142	
Lyon/Satolas	240 22.6	REG 1974	18/36 PA-II	NA	B747 3600	A	B747 AUW 343	To replace Lyon/Bron En remplacement de Lyon/Bron
Paris/Orly	89 21	REG 1970	07/25 PA-II	0.125	B707-300B 3490	A	B747 AUW 324	
		1971			B747 3650			
		1974					Concorde AUW 170	
		1970	08/26 PA-II	0.011	B707-300B 3320	A	B747 AUW 324	
		1970	02L/20R PA-I	0.07	B707-300B 2400	A	B707-300B AUW 153	
Paris/Roissy-en-France	105 21	REG 1973	09/27 PA-II	NA	B747 3600	A	B747 AUW 324	Future Futur
		1974					Concorde AUW 170	

1	2	3	4	5	6	7	8	9
FRENCH ANTILLES								
Fort-De-France/Lamentin, Martinique	4 27.9	REG 1970 1975	09/27 INSTR	0.087	B707-300 3100	A	B707-300 AUW 142 B747 AUW 263	
Pointe-à-Pitre/Le Raizet, Guadeloupe	11 28.2	REG 1970	11/29 PA-I	0.29	B707-300 3105	A	B747 AUW 343	
GERMANY (FEDERAL REPUBLIC OF)								
Frankfurt Main/ Frankfurt Main	112 20.9	REG 1970	07L/25R PA-II	0.256	B707-300B 3570	A	B747F AUW 354	
		1974					Concorde AUW 170	
		1970	07R/25L PA-II	0.296	B707-300B 3570	A	B747 F AUW 354	

1	2	3	4	5	6	7	8	9
Hamburg/Hamburg	16 18.8	REG 1970	05/23 PA-II	0.13	B707-300B 3440	A	B747 AUW 351	
		1970	16/34 INSTR	0.175	B747 3665	A	B747 AUW 351	
Hamburg/Kaltenkirchen	-	REG 1976	New PA-II	-	B747 3700	A	B747 AUW 351	New Aerodrome Nouvel aérodrome
Hannover/Hannover	56 19.2	ALT* 1970	09L/27R PA-II	0.106	**	**	B707-300B AUW 94	
Köln/Köln-Bonn	91 19.4	REG 1970	14L/32R PA-II	0.56	B707-300B 3570	A	B707-300B AUW 148	
							B747 AUW 308	
		1970	07/25 PA-I	0.47	B707-300B 2459	A	B707-300B AUW 95	
Nürnberg/Nürnberg	319 19.5	ALT* 1970	10/28 PA-II	0.39	B707-300B 2130	B	B707-300B AUW 94	
Stuttgart/Stuttgart	396 20.1	ALT* 1970	08/26 PA-II	1.0	**	**	DC8 F AUW 109	
GREECE								
Andravida/Andravida	15 28.0	ALT 1970	16/34 INSTR	0.15	B707-400 2420	A	B707-300C AUW 113	

1	2	3	4	5	6	7	8	9
Athinai/Athinai	27 29.6	REG 1970	15/33 PA-II	0.297	B707-300B 3660	A	B707-300B AUW 148	
		1973					B747 AUW 323	
		1970	03/21 INSTR	1.20	B707-300B 1796	B	B707-300B AUW 95	
Athinai/Elefsis	21 30.5	ALT 1970	18/36 INSTR	1.26	B707-400 2680	A	B707-300C AUW 113	
Thesaloniki/Thesaloniki	4 28.5	ALT* 1970	10/28 PA-I	0.147	**	**	B707-300B AUW 94	
		1970	17/35	0.244	B707-300B 2000	B	B707-300B AUW 94	
GUYANA								
Georgetown/Timehri Intl.	29 29	ALT* 1970	05/23 INSTR	NA	**	**	DC8-63 AUW 116	
HAITI								
Port-Au-Prince/President Duvalier Intl.	33 35	REG 1970	09/27 INSTR	0.384	DC8-61 2940	A	DC8-61 AUW 147	

1	2	3	4	5	6	7	8	9
ICELAND								
Akureyri/Akureyri	2 12	**ALT** **1970**	**02/20** **INSTR**	**0**	**B727-100** **1560**	**B**	**B727-100** **AUW 62**	
Keflavík/Keflavík	51 12	REG 1970 1978	12/30 PA-II	0.643	B707-300 3052	A	DC8-63 AUW 161 B747 F AUW 309	
		1970	03/21 PA-II	0.065	B707-300 2000	B	B707-300 AUW 94	
		1970	07/25 INSTR	NA	B707-300 2122	A	B707-300 AUW 94	
Reykjavik/Reykjavik	14 12	REG 1970	02/20 INSTR	0.665	B727-100 1765	B	B727-100 AUW 62	
IRELAND								
Dublin/Dublin	68 15.9	**ALT*** 1970	06/24 PA-II	**0.12**	**	**	B707-300C AUW 112	
		1971			**B747** **2286**		**B747** **AUW 250**	
		1970	17/35 INSTR	0.24	**B707-300C** **2073**	**B**	**B707-300C** **AUW 112**	
Shannon/Shannon	14 16.5	REG 1970	06/24 PA-II	0.37	B707-300C 3414	A	B707-300C AUW 153	
		1971					B747 AUW 325	
		1970	14/32	0.14	DC9 1720	B	DC9 AUW 50	

1	2	3	4	5	6	7	8	9
ISRAEL								
Haifa/Ramat David	49 28	ALT 1970	15/33 N-INSTR	NA	B707-400 2380	A	B707-331C AUW 115	
Tel Aviv/Lod	40 28	REG 1970	12/30 PA-I	0.3	B707-400 3960	A	B707-300B AUW 148	
		1971					B747 AUW 316	
		1970	08/26 PA-II	0.3	B707-400 3657	A	B707-400 AUW 148	
ITALY								
Genova/Sestri	3 25.7	ALT* 1970	11/29 PA-I	NA	**	**	DC8-62 AUW 108	
Milano/Linate	107 25.3	ALT* 1970	18/36 PA-II	0.2	**	**	DC8-62 AUW 108	
Milano/Malpensa	234 24.5	REG 1970	17L/35R PA-II	0.58	B707-300 3915	A	DC8-62 AUW 158	
					**		B747 AUW 317	
Napoli/Capodichino	88 26.5	ALT* 1970	06/24 PA-I	1.0	**	**	DC8-62 AUW 108	New aerodrome planned Nouvel aérodrome projeté
Pisa/San Giusto	3 24.8	ALT* 1970	04/22 PA-I	0.1	B707-400 2390	A	DC8-62 AUW 108	
Roma/Ciampino	129 26.8	ALT 1970	15R/33L PA-I	0.17	B707-300C 2660	A	B707-400 AUW 113	

1	2	3	4	5	6	7	8	9
Roma/Fiumicino	2 25.5	REG 1970	16R/34L PA-I	0	DC8-62 3650	A	B747 AUW 324	
		1972	16L/34R PA-II	0	DC8-62 3650	A	B747 AUW 324	
		1970	07/25 PA-II	0	DC8-62 3500	A	B747 AUW 324	
Torino/Caselle	301 23.1	ALT* 1970	18/36 PA-II	0.55	**	**	DC8-62 AUW 108	
Venezia/Tessera	2 25.2	ALT* 1970	04/22 PA-II	0	**	**	DC8-62 AUW 108	
JAMAICA								
Kingston/Palisadoes Intl.	3 29	REG 1970	11/29 PA-I	0.17	DC8-61 2600	A	B707-300B AUW 135	
		1974			L-1011 3200		B747 AUW 278 L1011 AUW 176	
Montego Bay/Intl.	1 29	REG 1970	06/24 PA-I	0	B707-330 2600	A	B747 AUW 290	
LUXEMBOURG								
Luxembourg/Luxembourg	378 18	REG 1970	06/24 PA-II	0.81	CL44-J 2430	A	CL44-J AUW 90	

1	2	3	4	5	6	7	8	9
MEXICO								
Mérida/Mérida	9 29.56	REG 1970	10/28 INSTR	NA	B707-300 2250	A	B707-300 AUW 107	
Mexico City/Intl.	2237 23	REG 1970	05R/23L PA-II	NA	DC8-40 4050	A	B707-320C AUW 150	
		1972					B747 AUW 265	
		1970	05L/23R N-INSTR	NA	DC8-40 3120	A	DC8-40 AUW 95	
		1970	13/31 N-INSTR	NA	DC8-40 2300	A	DC8-40 AUW 95	
MOROCCO								
Casablanca/Nouasser	200 26.5	ALT* 1970	17/35 PA-I	0.875	B707-300 2360	A	B707-300 AUW 94	
Rabat/Salé	84 24.2	REG 1970	04/22 PA-I	0.36	B707-300 3770	A	B707-300 AUW 142	

1	2	3	4	5	6	7	8	9
NETHERLANDS (KINGDOM OF THE)								
Amsterdam/Schiphol	-4 17.8	REG 1970	09/27 PA-II	0	B707-330 3600	A	DC8-62 AUW 158	
		1971					B747B AUW 338	
		1970	01L/19R PA-II	0	B707-330 3300	A	DC8-62 AUW 158	
		1970	01R/19L PA-II	0	B707-330 3400	A	DC8-62 AUW 158	
		1970	06/24 PA-II	0	B707-330 3250	A	DC8-62 AUW 158	
		1970	14/32	0	B707-300C 1800	B	B707-300C AUW 98	

1	2	3	4	5	6	7	8	9
Rotterdam/Rotterdam	-4.5 18.3	ALT* 1970	06/24 PA-II	0	B707-300B 2100	B	DC8-62 AUW 108	
NETHERLANDS ANTILLES								
Oranjestad/Prinses Beatrix, Aruba I.	18 30.1	REG 1970	11/29 PA-I	0.55	DC8-50 2740	A	B747B AUW 293	
		1974					B747 AUW 298	
Willemstad/Dr. A. Plesman Curaçao I.	8 30.1	REG 1970	11/29 PA-I	0	DC8-63 2590	A	B747B AUW 295	
		1974					B747 AUW 298	
NORWAY								
Bergen/Flesland	50 16	REG 1970	18/36 PA-II	0.32	DC8-62 2990	A	DC8-62 AUW 158	
		1974			B747 3170		B747 B AUW 340	
Bodø/Bodø	13 14.1	ALT 1970	08/26 PA-I	0.27	DC8-50 2500	A	DC8-62 AUW 108	

1	2	3	4	5	6	7	8	9
Oslo/Fornebu	17 19.5	REG 1970	06/24 PA-II	0.60	DC8-62 2200	A	DC8-62 AUW 147	
		1970	01/19 PA-I	0.59	DC8-62 1750	B	DC8-62 AUW 100	
Oslo/New Main	-	1974	New PA-II	-	DC10 3200	A	DC10 AUW 240	
Stavanger/Sola	8.5 15.6	ALT* 1970	18/36 PA-II	0.24	**	**	DC8-62 AUW 108	
			11/29	0.26	B707-300B 2420	A	B707-300B AUW 94	
PORTUGAL								
Faro/Faro	7 26	ALT* 1970	11/29 INSTR	0.084	**	**	DC8-63 AUW 116	
Lisboa/Lisboa	114 24.2	REG 1970 1973 1978	03/21 PA-II	0.223	DC8-63 3890	A	B747 AUW 322 B747B AUW 342 Concorde AUW 170	
		1970	18/36 INSTR	0.585	B707-300B 2000	B	B707-300B AUW 94	
Ponta Delgada/Ponta Delgada São Miguel I., Açores	79 23.1	ALT 1970	13/31 N-INSTR	1.0	B707-300B 1800	B	B707-300B AUW 94	
Porto/Porto	76 20.5	ALT* 1970	18/36 PA-II	0.50	DC8-40 2240	A	DC8-63 AUW 116	
Porto Santo/Porto Santo Porto Santo I., Madeira	93 23.5	ALT* 1970	01/19 INSTR	1.0	B707-300B 2100	B	B707-300B AUW 94	

1	2	3	4	5	6	7	8	9
Santa Maria/Santa Maria, Santa Maria I., Açores	93 23.2	REG 1970	01/19 PA-I	0.27	B707-300B 2630	A	B707-300B AUW 128	
		1974					B747 AUW 300	
PUERTO RICO								
San Juan/Puerto Rico Intl.	3 27.8	REG 1970	07/25 PA-I	0.02	B707-300B 3048	A	B707-300B AUW 148 B747 AUW 308	
SENEGAL								
Dakar/Yoff	27 28.5	REG 1970	01/19 PA-II	0.103	B707-300 3820	A	DC8-62 AUW 152	
		1970	12/30 N-INSTR	NA	B707-300 2410	A	B707-300 AUW 95	
SPAIN								
Barcelona/Barcelona	4 25	REG 1970	07/25 PA-I	NA	B747 3540	A	DC8-63 AUW 162	
							B747 AUW 308	
		1970	02/20 INSTR	NA	DC8-55 2720	A	DC8-55 AUW 148	
Las Palmas de Gran Canaria, Canary Is.	24 25	REG 1970	03/21 PA-I	0.4	DC8-50 3670	A	DC8-50 AUW 141	
		1978					DC8-63 AUW 162	

1	2	3	4	5	6	7	8	9
Madrid/Barajas	609 28	REG 1970	15/33 PA-II	0.7	B747 4210	A	B747 AUW 321	
		1973					B747 AUW 326	
		1970	01/19 PA-I	0.15	B747 3700	A	B747 AUW 321	
Malaga/Malaga	16 27	REG 1970	14/32 PA-II	0.2	DC8-63 3200	A	DC8-63 AUW 162	
Sevilla/Sevilla	34 31	ALT* 1970	09/27 PA-I	0.3	B707-300 2360	A	DC8-63 AUW 116	
Zaragoza/Zaragoza	257 26	ALT 1970	13L/31R INSTR	0.28	B747 3000	A	B747 AUW 308	
SURINAM								
Paramaribo/Zanderij	16 27	REG 1970	10/28 PA-I	0	DC8-63 3700	A	DC8-63 AUW 162	
		1973					B747 B AUW 332	
SWEDEN								
Göteborg/Torslanda	8 18.5	ALT* 1970	04/22 PA-I	NA	**	**	DC8-62 AUW 108	New aerodrome Harryda to replace Torslanda Le nouvel aérodrome d'Harryda doit remplacer Torslanda

1	2	3	4	5	6	7	8	9
Stockholm/Arlanda	38 19	REG 1970	01/19 PA-II	0.197	DC8-62 3670	A	DC8-62 AUW 158	
		1974					DC-10 AUW 185	
		1970	08/26 **PA-I**	0.20	**DC8-62** **2500**	A	**DC8-62** **AUW 158**	
SWITZERLAND								
Bâle-Mulhouse/ Bâle-Mulhouse (See France)								
Geneve/Cointrin	430 23.3	REG 1970	05/23 PA-II	0.36	DC-8F 3730	A	DC-8F AUW 148	
		1971			**B747B** **3900**		**B-747B** **AUW 352**	

1	2	3	4	5	6	7	8	9
Zürich/Zürich	432 22.2	REG 1970	16/34 PA-II	0.135	DC8-62 3900	A	DC8-62 AUW 158	
		1972			B747 4000		B747B AUW 352	
TRINIDAD & TOBAGO								
Port-of-Spain/Piarco, Trinidad	14 27	REG 1970	10/28 PA-I	NA	DC8-F 3300	A	DC8-F AUW 148	
		1973					B747 AUW 318	
UNITED KINGDOM								
Belfast/Aldergrove	82 16	ALT* 1970	08/26 PA-I	NA	** **	** **	B727-00 AUW 62	
Birmingham/Birmingham	99 18	ALT* 1970	15/33 PA-I	NA	**	**	B727-00 AUW 62	
		1970	06/24 INSTR	NA	**	**	VC700 AUW 33	
Edinburgh/Turnhouse	41 16	ALT* 1970	13/31 PA-I	NA	**	**	B727-00 AUW 62	
Glasgow/Glasgow	7 16	REG 1970	06/24 PA-II	NA	B727-00 1630	A	B727-00 AUW 67	
Liverpool/Liverpool	26 17	ALT* 1970	10/28 PA-I	NA	DC8-40 2286	A	B707-300C AUW 113	
London/Gatwick	59 18	REG 1970 1974	09R/27L PA-II 09L/27R PA-II	NA NA	B707-300 3400 B707-300 3400	A A	B707-300 AUW 142 B707-300 AUW 142	
London/Heathrow	24 19	REG 1970	10R/28L PA-II	NA	B707-300B 3660	A	B747 AUW 308	
		1971					B747 AUW 324	

1	2	3	4	5	6	7	8	9
London/Heathrow (Cont'd)		1974					Concorde AUW 170	
		1970	10L/28R PA-II	NA	B707-300B 2838	A	B707-300B AUW 135	
		1970	05R/23L PA-I	NA	B707-300B 2357	A	B707-300B AUW 135	
Manchester/Manchester	78/17	REG 1970	06/24 PA-II	NA	B707-300C 3350	A	B707-300C AUW 153	
Prestwick/Prestwick	19/16	REG 1970	13/31 PA-II	NA	B707 3414	A	B707-400 AUW 151	
		1974					B747 AUW 322	

1	2	3	4	5	6	7	8	9
UNITED STATES								
Anchorage/Elmendorf AFB, Alaska	65 16 est	ALT 1970	05/23 PA-I	NA	B707-300 2400	A	DC8-60 AUW 108	
		1974					B747 AUW 285	
Anchorage/Intl., Alaska	38 15.7	REG 1970	06R/24L PA-II	0.36	DC8-62 3400	A	DC8-62 AUW 158	
		1971					B747 AUW 318	
		1974			B747B 3460		B747B AUW 332 Concorde AUW 170	
Baltimore/Friendship Intl., Maryland	44 27	REG 1970	10/28 PA-II	0.16	DC8-50 2880	A	DC8-50 AUW 143	
		1974			B707-300 3261		B747 AUW 322	
		1970	15/33 INSTR	0.12	DC8-50 2880	A	DC8-50 AUW 143	
Bangor/Intl., Maine	59 26.5 est	ALT 1970	15/33 PA-I	0.26	B707-300 2400	A	DC8-60 AUW 108	
Boston/Logan Intl., Massachusetts	6 23.7	REG 1970	04R/22L PA-I	0.04	B707-300 3660	A	B747 AUW 324	
		1971			B747B 3700		B747B AUW 351	
		1974					DC10 AUW 240	
		1978					Concorde AUW 170	
		1970	15R/33L PA-II	0.01	B707-300 3075	A	B747 AUW 324	
		1970	04L/22R INSTR	0.03	B707-300 2400	A	B747 AUW 324	
		1970	09/27 INSTR	0.03	B707-300 2150	A	B747 AUW 324	

1	2	3	4	5	6	7	8	9
Chicago/O'Hare Intl., Illinois	203 24.3	REG 1970	14R/32L PA-II	0.056	B747 3500	A	B747 AUW 324	
		1978					B2707	
		1970	14L/32R PA-II	0.02	B747 3048	A	B747 AUW 324	
		1970	09L/27R PA-I	0.13	B747 2260	A	B747 AUW 324	
		1970	09R/27L PA-I	0.17	B747 3048	A	B747 AUW 324	
Cleveland/Hopkins Intl., Ohio	241 24.4	ALT 1970	05R/23L PA-II	0.25	B707-300 2410	A	DC8-62 AUW 108	
		1970	10L/28R PA-I	0.43	B727-00 1833	B	B727-00 AUW 62	
Cold Bay/Cold Bay, Alaska	30 11.5	ALT 1970	14/32 PA-I	0.21	B707-300 2360	A	DC8-62 AUW 108	
Corpus Christi/Intl., Texas	13 30.8	ALT* 1970	13/31 PA-I	0.03	B707-300 2134	A	B707-300 AUW 91	
Detroit/Metropolitan-Wayne Co., Michigan	195 24.4	REG 1970	03L/21R PA-II	0.03	B707-300 3200	A	B707-300 AUW 142	
		1974					B747 AUW 322	
		1970	03R/21L INSTR	0.07	B707-300 2590	A	B707-300 AUW 142	
		1970	09/27 INSTR	0.07	B707-300 2652	A	B707-300 AUW 142	
Dallas-Fort Worth/ Regional Airport, Texas	183 30.8	ALT 1974	17/35	NA	B707-300 2380	A	B747 AUW 285	
El Paso/Intl., Texas	1220 34.5 est	ALT 1970	04/22 PA-I	0.22	B707-300 2500	A	DC8-62 AUW 108	
Everett/Snohomish County (Paine Field), Washington	184 22.2 est	ALT 1970	16/34 PA-I	0.32	B707-300 2400	A	B747 AUW 285	
Fairbanks/Intl., Alaska	132 17.8	ALT 1970	01/19 PA-I	0.22	B707-300 2380	A	DC8-62 AUW 108	
Fresno/Fresno Air Terminal, California	101 30.9	ALT 1970	11L/29R PA-I	0.04	B707-300C 2060	A	B707-300C AUW 112	

1	2	3	4	5	6	7	8	9
Houston/Intercontinental, Texas	30 30	REG 1970	08L/26R PA-II	0.04	DC8F-55 2650	A	DC8F-55 AUW 134	
		1972					B747B AUW 290	
Indianapolis/Weir Cook, Indiana	243 26.2	ALT 1970	04L/22R PA-II	0.32	B707-300B 2130	B	DC8-62 AUW 108	
		1970	13R/31L PA-I	0.21	B707-300B 2130	B	DC8-62 AUW-108	
King Salmon/King Salmon, Alaska	17 14.3	ALT 1970	11/29 PA-I	0.15	B707-300 2360	A	B707-300 AUW 91	
Las Vegas/McCarran Intl, Nevada	662 29.5	ALT 1970	07/25 PA-I	1.04	B707-300C 2160	B	B707-300C AUW 91	
Los Angeles/Intl. California	38 23.7	REG 1970	07R/25L PA-II	0.28	B707-300 3650	A	B747 AUW 324	
		1974					Concorde AUW 170	
		1970	07L/25R PA-I	0.34	B707-300 3685	A	B747 AUW 324	
		1970	06L/24R PA-II	NA	B707-300 2720	A	B747 AUW 324	
		1970	06R/24L N-INSTR	0.12	B707-300 3135	A	B747 AUW 324	

1	2	3	4	5	6	7	8	9
Miami/Intl., Florida	3 28.9	REG 1970	09L/27R PA-I	0	B707-300 3353	A	B707-400 AUW 153	
		1971					B747 AUW 272	
		1970	09R/27L PA-I	0.02	B707-300 2850	A	B707-400 AUW 153	
		1970	12/30 INSTR	0	B707-300 2926	A	B707-400 AUW 153	
Milwaukee/General Mitchell, Wisconsin	220 23.2	ALT 1970	01/19 PA-II	0.34	B707-300B 2130	A	DC8-62 AUW 108	
			07R/25L PA-I	0.52	B707-300B 2130	A	DC8-62 AUW 108	
Minneapolis/Minneapolis-St. Paul Intl., Minnesota	254 28.9 est	ALT 1970	11R/29L PA-II	0.28	B707-300 2400	A	B747 AUW 285	
		1970	04/22 PA-I	0.04	B707-300 2400	A	B747 AUW 285	
Newark/Newark, New Jersey	5 25.6	REG 1970	04R/22L PA-II	0.014	B707-300 2460	A	B707-300 AUW 147	
		1971			B747 2890		B747 AUW 313	
New York/John F. Kennedy Intl., New York	4 24.8	REG 1970	13R/31L PA-I	0.007	B747B 3770	A	B747B AUW 350	
		1974					Concorde AUW 170	
		1970	13L/31R PA-I	0	B747B 3048	A	B747B AUW 350	
		1970	04L/22R PA-I	0.01	B747B 3459	A	B747B AUW 350	
		1970	04R/22L PA-II	0	B747B 2560	A	B747B AUW 350	
Niagara Falls/Intl. New York	183 23.8	ALT 1970	10L/28R PA-I	0.05	B707-300 2360	A	DC8-60 AUW 108	

1	2	3	4	5	6	7	8	9
Oakland/Metropolitan-Oakland Intl., California	2 23.6 est	ALT 1970	11L/29R PA-II	0.01	B707-300 2350	A	DC8-60 AUW 108	
Ontario/Intl., California	290 28.2	ALT 1970	07/25 PA-II	0.15	B707-300C 2110	B	B707-300 AUW 100	
Palmdale/Palmdale P.F.T.I., California	777 30.3	ALT 1970	04/22 INSTR	0.52	B707-300 2500	A	B707-300 AUW 94	
		1970	07/25 INSTR	NA	B707-300 2500	A	B707-300 AUW 94	
Philadelphia/Intl., Pennsylvania	4 26.1	REG 1970	09R/27L PA-II	0.05	B707-300 3261	A	B707-300C AUW 153	
		1975					B747 AUW 322	
Pittsburgh/Greater Pittsburgh, Pennsylvania	367 25.2	ALT 1970	10L/28R PA-II	0.35	B707-300 2500	A	B707-300 AUW 94	
		REG 1970			B747 3200	A	B747 AUw 308	
		1970	10R/28L PA-I	0.49	B707-300 2360	A	DC8-62 AUW 108	
Portland/Intl., Oregon	8 21.5	ALT 1970	10R/28L PA-II	0.02	B707-300 2360	A	DC8-62 AUW 108	
			10L/28R PA-I	0.04	B707-300 2360	A	DC8-62 AUW 108	
St. Louis/Lambert-St. Louis, Missouri	174 28.1	ALT 1970	12R/30L PA-I	0.302	B707-300B 2130	A	DC8-62 AUW 108	
		1970	06/24 PA-I	0.33	B707-300B 2130	A	DC8-62 AUW 108	
San Antonio/Intl., Texas	246 30.9	ALT* 1970	12/30 PA-II	0.30	B707-300 2400	A	DC8F-55 AUW 109	

1	2	3	4	5	6	7	8	9
San Diego/Intl.- Lindbergh Field, California	5 21.5	ALT* 1970	09/27 PA-I	0.02	B707-300 2350	A	B707-300 AUW 94	
San Francisco/Intl., California	4 17.8	REG 1970	10R/28L PA-II	0.05	B707-300C 3261	A	B707-300C AUW 153	
		1974					B747 - AUW 322	
		1970	01R/19L PA-I	0.02	B707-300C 2895	A	B707-300C AUW 153	
Seattle/Seattle-Tacoma Intl., Washington	130 25	REG 1970	16R/34L PA-II	0.72	DC8-62 3444	A	DC8-62 AUW 158	
		1975					B747 AUW 322	
Spokane/Intl., Washington	723 23.7	ALT 1970	03/21 PA I	0.61	B707-300 2480	A	DC8-62 AUW 108	
Stockton/Metropolitan California	9 27.7	ALT 1970	11L/29R PA-I	0.06	B707-300C 2040	B	B707-300C AUW 112	
Syracuse/Hancock, New York	128 29.9	ALT 1970	10/28 PA-I	0.22	B707-100 2130	A	B707-100 AUW 91	
Tampa/Intl., Florida	8 29.3	ALT* 1970	18L/36R PA-I	0.12	B707-400 2380	A	**	
		1970	18R/36L PA-I	0.11	B707-400 2652	A	B707-400 AUW 95	
		1970	09/27 INSTR	0.20	B707-400 2130	A	B707-400 AUW 95	

1	2	3	4	5	6	7	8	9
Washington/Dulles Intl., District of Columbia	95 26.9	REG 1970	01L/19R PA-I	0.16	B707-300B 3490	A	B707-300B AUW 148	
		1978					B747 AUW 322 Concorde AUW 170	
		1970	01R/19L PA-II	0.17	B707-300B 3490	A	B707-300B AUW 148	
West Palm Beach/Palm Beach Intl.,Florida	6 30.8	ALT* 1970	09L/27R PA-I	0.05	B707-300 2350	A	B707-300 AUW 100	
Windsor Locks/Bradley Intl.,Connecticut	57 25.2	ALT 1970	06/24 PA-II	0.14	B707-300C 2042	B	B707-300C AUW 116	
		1970	15/33 INSTR	0.07	B707-300C 2042	B	B707-300C AUW 116	
U.S.S.R.								
Moscow/Sheremetievo	190	REG 1970	07/25 PA-II	NA	IL62	A	IL62 AUW 158	
Moscow/Vnukovo	204	ALT 1970	02/20	NA	IL62 2800	A	IL62 AUW 102	
			06/24	NA				
VENEZUELA								
Caracas/Maiquetía	70 32	REG 1970	08R/26L PA-I	1.33	DC8-62 4200	A	DC8-62 AUW 158	
		1974					B747B AUW 333	

1	2	3	4	5	6	7	8	9
VIRGIN ISLANDS								
St. Croix/Alexander Hamilton	19 29	REG 1970	09/27 PA-I	0.52	B707-300 2743	A	B707-300 AUW 147	
WEST INDIES ASSOCIATED STATES								
St. Johns/Coolidge, Antigua I.	19 29	REG 1970	07/25 PA-I	NA	VC10 2740	A	VC10 AUW 153	
		1974			DC8-61 3000			
St. Lucia/Beane Field	3 29	ALT 1970	10/28 PA-I	NA	DC8-63 2727	A	DC8-63 AUW 159	

APPENDIX 6-A

TABLE FOR FUTURE PLANNING OF THE PHYSICAL CHARACTERISTICS OF INTERNATIONAL GENERAL AVIATION AERODROMES

EXPLANATION OF TABLE

Column

1 Name of country, city and aerodrome

2 Aerodrome elevation - highest point of the landing area expressed in metres, and the aerodrome reference temperature expressed in degrees centigrade

3 Runway designation number

4 Types of runway to be provided:

PAV Paved runway

N-PAV Unpaved runway

5 Critical aircraft for runway length and required runway length expressed in terms of a balanced field length. Account has been taken of the effect of elevation and temperature when data is provided in column 2.

6 Reference code letter for aerodrome characteristics expressed in accordance with Annex 14, Part II Chapter 3, Fifth Edition

7 Critical aircraft for pavement strength and required pavement strength expressed as the all-up weight (AUW) in 1 000 kg.

8 Additional information.

TABLE FOR FUTURE PLANNING OF THE PHYSICAL CHARACTERISTICS

OF INTERNATIONAL GENERAL AVIATION AERODROMES

City/Aerodrome Coordinates	Elev. m. Temp. C.	Landing Area			CL	Strength 1000 kg	Remarks
		Runway NR	Type	Length m			
1	2	3	4	5	6	7	8

Agenda Item 7: Visual aids at aerodromes

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

7.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 21 to 23 and 25 to 27 of the Report on Agenda Item 2 governed the consideration of Agenda Item 7.

AERODROMES FOR INTERNATIONAL SCHEDULED AIR TRANSPORT

7.2 The Meeting determined the visual aid requirements for individual runways at each aerodrome. These requirements were based on the specifications and guidance material contained in Annex 14. The requirements for precision approach lighting systems and simple approach lighting systems were coordinated with the plan for radio navigation aids.

7.3 Many of the alternate aerodromes selected under Agenda Item 5 served as regular or alternate aerodromes for operations not considered by this Meeting. The Meeting did not plan facilities for these aerodromes unless there was a need for an increase over the existing Air Navigation Plan requirement.

7.4 Planning for precision approach category II lighting systems, runway centre line lighting and runway touchdown zone lighting was based on the information in the Table of Aircraft Operations, as agreed by the General Committee, and at a number of other aerodromes where it was considered such facilities would be required for future operations. At some other aerodromes, it was noted that Category II ILS was planned but because of the meteorological conditions, the corresponding visual aids were not required. In such instances, the ILS was planned to permit automatic coupled approaches and not for operations in the visibility conditions associated with Category II. It was also noted that Category II operations had been indicated as planned at two other aerodromes, Barbados and Miami, but it was agreed that such operations were unjustified and requirements were included for Category I operations.

7.5 It was recognized that there was a general requirement for the purposes of operational planning, for VASIS to be provided for approach slope guidance on all runways served by jet aircraft. Nevertheless, in some cases it might not be possible to achieve this during the period of the Plan. Accordingly, in such cases specific requirements for VASIS were generally not included in the Plan.

RECOMMENDATION 7/1 - AERODROME VISUAL AIDS

That AGA Table 2 constitute the plan for visual aids for the aerodromes for scheduled air services considered by the Meeting and that the appropriate Air Navigation Plans be amended accordingly.

7.6 It was not considered economically sound to plan for the operation of all aerodromes on a 24-hour basis in accordance with the operational requirement stated in paragraph 5 of the Report on Agenda Item 2 since at a number of aerodromes night operations were not contemplated. Planning requirements for night operations were, therefore, based on the information contained in the Table of Aircraft Operations. This, of course, did not apply to the planning of VASIS which are also suitable for day operations.

AERODROMES FOR INTERNATIONAL GENERAL AVIATION

7.7 The Meeting had the same difficulty planning visual aid requirements for International General Aviation aerodromes as it did planning the physical characteristics of these aerodromes (see paras. 6.8 and 6.9) and agreed to take similar action.

RECOMMENDATION 7/2 - AERODROME VISUAL AIDS FOR INTERNATIONAL GENERAL AVIATION

That for the aerodromes in Part III of the List of Aerodromes, States maintain the current visual aids for the use of International General Aviation until a more detailed analysis of specific International General Aviation requirements can be concluded.

RECOMMENDATION 7/3 - FUTURE PLANNING FOR INTERNATIONAL GENERAL AVIATION

That in future consultation with States concerning visual aids for International General Aviation, States be requested to submit proposals for the visual aids at International General Aviation aerodromes in accordance with the Table at Appendix 7-A.

7.8 The Meeting reviewed the recommendations in the report of the Third North Atlantic Regional Air Navigation Meeting concerning visual aids and considered that they were either superseded by the recommendations of this Meeting or no longer needed.

TABLE AGA 2

VISUAL AIDS AT AERODROMES

LIST OF ABBREVIATIONS

Lighting Aids

PA	Precision Approach Lighting System
	I - Category I System
	II - Category II System
SA	Simple Approach Lighting System
VA	Visual Approach Slope Indicator System (VASIS)
AV	Abbreviated Visual Approach Slope Indicator System (AVASIS)
R	Runway Edge, Threshold and End Lights
C	Runway Centre Line Lights
TD	Runway Touchdown Zone Lights
TX	Taxiway Edge Lights or Taxiway Centre Line Lights
B	Aerodrome Beacon or Identification Beacon
O	Obstruction Lighting

Marking Aids

D	Runway Designation Markings
C	Runway Centre Line Markings
T	Runway Threshold Markings
TD	Touchdown Zone Markings
S	Side Stripe Markings
FD	Fixed Distance Markings
TX	Taxiway Centre Line and Holding Position Markings
O	Obstruction Markings

The designation numbers in columns 3, 4, 5, 6 and 9 indicate the approach for which the lighting aids are to be provided. The "O" in the other columns indicates an omni- or bidirectional requirement.

TABLE AGA 2 - VISUAL AIDS AT AERODROMES

TABLEAU AGA-2 - AIDES VISUELLES AUX AERODROMES

Note.- Where existing visual aids exceed international requirements, States should continue to maintain these aids in good condition.

Note.- Lorsque les aides visuelles existantes excédent les besoins internationaux, les États devraient maintenir ces aides en bon état.

PART 1 - AERODROMES REQUIRED PRIMARILY FOR INTERNATIONAL COMMERCIAL AIR TRANSPORT

1ère PARTIE - AERODROMES NECESSAIRES PRINCIPALEMENT POUR LE TRANSPORT AERIEN COMMERCIAL INTERNATIONAL

CITY/AERODROME VILLE/AERODROME	RUNWAY PISTE	LIGHTING BALISAGE LUMINEUX										MARKING BALISAGE								OTHER AIDS AUTRE AIDES
		PA	FA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AIGERIA																				
Alger/Dar El Beida	06/24	24I		24		O			O		O	O	O	O	O	O	O	O	O	
Annaba/Annaba	05/23	05I		05		O			O		O	O	O	O	O	O	O	O	O	

1	2	PA 3	SA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	O 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
ALGERIA (Cont'd)																				
Boufarik/Boufarik	05/23		05			0			0	0	0	0	0	0			0	0	0	
Oran/Es Sénia	07/25	25I	07	25		0			0		0	0	0	0	0	0	0	0	0	
Ouargla/Ouargla	02/20		02	02		0			0		0	0	0	0			0	0	0	
AUSTRIA																				
Salzburg/Salzburg	16/34	16I		16		0			0	0	0	0	0	0	0		0	0	0	
Wien/Schwechat	12/30	12II		12 30	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	
BAHAMAS																				
Freeport/Intl. Grand Bahama I	06/24	06I	24	06 24		0			0	0	0	0	0	0			0	0	0	
Nassau/Intl. New Providence I	09/27	09I	27	09 27		0			0	0	0	0	0	0			0	0	0	
	14/32			14 32		0						0	0	0			0			
BARBADOS																				
Bridgetown/Seawell	09/27	09I	27	09 27		0			0	0	0	0	0	0	0	0	0	0	0	

1	2	PA 3	SA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	O 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
BELGIUM																				
Bruxelles/National	08L/26R		26R	08L 26R		0			0	0	0	0	0	0			0	0	0	
	08R/26L	26LI		08R 26L		0	0	26L				0	0	0	0	0	0			
	02/20	02II		02 20		0	0	02				0	0	0	0	0	0			
	12/30		12	12 30		0	0					0	0	0			0			
BERMUDA																				
Bermuda/NAS	12/30	12I		12		0			0	0	0	0	0	0	0	0	0	0	0	
CANADA																				
Abbotsford/Abbotsford	06/24	06I	24	06		0			0	0	0	0	0	0	0		0	0	0	
Calgary/Intl.	16/34	34I 16I		34		0			0		0	0	0	0	0		0	0	0	
Comox/Comox	11/29		29	11 29		0			0	0	0	0	0	0			0	0	0	
Edmonton/Intl.	01/19	01I		01		0			0		0	0	0	0	0		0	0	0	
Frobisher Bay/Frobisher	18/36		36	36		0			0		0	0	0	0			0	0	0	

1	2	PA 3	SA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	O 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
CANADA (Cont'd)																				
Gander/Intl.	14/32		32	14		0			0	0	0	0	0	0			0	0	0	
	04/22	04I	22	22		0						0	0	0	0		0			
Goose/Goose	09/27			09 27		0				0	0	0	0	0			0	0	0	
	17/35			17		0						0	0	0			0			
Halifax/Intl.	06/24	24II		06 24		0	0	24	0	0	0	0	0	0	0		0	0	0	
	15/33	15I	33	33		0						0	0	0			0			
Moncton/Moncton	11/29	29I	11			0			0	0	0	0	0	0	0		0	0	0	
	07/25	07I	25	25		0						0	0	0	0		0			
Montreal/Intl.	06L/24R	06LII		06L 24R		0	0	06L	0	0	0	0	0	0	0		0	0	0	
	06R/24L	24LII	06R	06R 24L			0	24L				0	0	0	0		0			
	10/28		28	10 28		0						0	0	0			0			
Ottawa/Intl.	07/25	07I	25	25 07		0			0	0	0	0	0	0	0		0	0	0	
	14/32		14	14		0						0	0	0			0			
Sydney/Sydney	07/25	07I		07		0			0	0	0	0	0	0	0		0	0	0	
Toronto/Intl.	14/32	14II		14		0	0	14	0		0	0	0	0	0		0	0	0	
	05L/32R	05LI				0						0	0	0	0		0			
	05R/23L	05RII		05R 23L		0	0	05R				0	0	0	0		0			
Vancouver/Intl	08/26	08I		08		0			0	0	0	0	0	0	0		0	0	0	
Winnipeg/Intl.	18/36	36I		36		0			0		0	0	0	0	0		0	0	0	
	13/31	13I				0						0	0	0	0		0			
Windsor/Windsor	07/25	25I	07			0			0	0	0	0	0	0	0		0	0	0	

1	2	PA 3	SA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	G 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
CUBA																				
Camaguey/Ignacio Agramonte	07/25			25		0			0	0	0	0	0	0			0	0	0	
Habana/José Martí	05/23	05I		05		0			0	0	0	0	0	0	0	0	0	0	0	
Varadero/Varadero	06/24			24		0			0	0	0	0	0	0			0	0	0	
CYPRUS																				
Nicosia/Nicosia	14/32	32I		14 32		0			0	0	0	0	0	0	0	0	0	0	0	
	09/27			09 27								0	0	0			0			
CZECHOSLOVAKIA																				
Bratislava/Ivánka	04/22	22I		22		0			0		0	0	0	0	0	0	0	0	0	
Brno/Turany	10/28	28I		28		0			0		0	0	0	0	0	0	0	0	0	
Praha/Ruzyně	13/31	31I		31		0			0		0	0	0	0	0	0	0	0	0	
	07/25	25II		07 25		0	0	25				0	0	0	0	0	0			

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
DENMARK																				
København/Kastrup	04R/22L	22LII 04RII		22L		0	0	22L 04R	0	0	0	0	0	0	0	0	0	0	0	
	12/30	12II 30I		12 30		0	0	12				0	0	0	0	0	0			
Søndre Strømfjord/ Søndre Strømfjord (Greenland)	11/29		11 29	11 29		0			0	0	0	0	0	0			0	0	0	
Vagar/Vagar (Faroe Is.)	13/31			13 31		0			0		0	0	0	0	0	0	0	0	0	
DOMINICAN REPUBLIC																				
Santo Domingo/De Las Américas Intl.	16/34	16I		16 34		0			0	0	0	0	0	0	0	0	0	0	0	
FINLAND																				
Helsinki/Helsinki	04/22	22II		04 22		0	0	22	0	0	0	0	0	0	0	0	0	0	0	
	15/33	15II		15 33		0	0	15				0	0	0	0	0	0			
Rovaniemi/Rovaniemi	03/21	21I		03 21		0			0		0	0	0	0	0	0	0	0	0	
Turku/Turku	08/26	26II				0	0	26	0	0	0	0	0	0	0	0	0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
FRANCE																				
Bâle-Mulhouse/Bâle-Mulhouse	16/34	16II	34	16 34		0	0	16	0	0	0	0	0	0	0		0	0	0	
Lyon/Bron	17/35	35II		17		0	0	35	0	0	0	0	0	0	0		0	0	0	
Lyon/Satolas	18/36	36II 18I				0	0	36	0	0	0	0	0	0	0		0	0	0	
Paris/Orly	07/25	07II		07		0	0	07	0	0	0	0	0	0	0		0	0	0	
	08/26	26II		08		0	0	26				0	0	0	0		0			
	02L/20R	02LI	20R	20R		0						0	0	0	0		0			
Paris/Roissy-en-France	09/27	09II 27II				0	0	09 27	0	0	0	0	0	0	0		0	0	0	
FRENCH ANTILLES																				
Fort-de-France/Lamentin, Martinique	09/27		09	09		0			0	0	0	0	0	0			0	0	0	
Pointe-à-Pitre/Le Raizet, Guadeloupe	11/29	11I	29	29 11		0			0	0	0	0	0	0	0		0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
GERMANY (FEDERAL REPUBLIC)																				
Frankfurt Main/ Frankfurt Main	07L/25R	25RII 07LII		25R		0	0	25R 07L	0	0	0	0	0	0	0	0	0	0	0	
	07R/25L	25LII 07RI		25L		0	0	25L 07R				0	0	0	0	0	0			
Hamburg/Hamburg	05/23	23II 05I		23		0	0	23	0	0	0	0	0	0	0	0	0	0	0	
	16/34		16	16 34		0						0	0	0			0			
Hamburg/Kaltenkirchen	New	?II				0	0	?	0	0	0	0	0	0	0	0	0	0	0	
Hannover/Hannover	09L/27R	27RII 09LI		27R		0	0	27R	0	0	0	0	0	0	0	0	0	0	0	
Köln/Köln-Bonn	14L/32R	32RII 14LI		14L		0	0	32R	0	0	0	0	0	0	0	0	0	0	0	
	07/25	25I		07		0						0	0	0	0	0	0			
Nürnberg/Nürnberg	10/28	28II 10I		10		0	0	28	0	0	0	0	0	0	0	0	0	0	0	
Stuttgart/Stuttgart	08/26	26II		08 26		0	0	26	0	0	0	0	0	0	0	0	0	0	0	
GREECE																				
Andravida/Andravida	16/34		34			0			0	0	0	0	0	0			0	0	0	

1	2	PA 3	SA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	O 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
GREECE (Cont'd)																				
Athinai/Athinai	15/33	33II		15 33		0	0	33	0	0	0	0	0	0	0	0	0	0	0	
	03/21		03 21	03		0						0	0	0			0			
Athinai/Elefsis	18/36		18			0			0	0	0	0	0	0			0	0	0	
Thesaloniki/Thesaloniki	10/28	28I		28		0			0	0	0	0	0	0	0	0	0	0	0	
	17/35			17 35								0	0	0			0			
GUYANA																				
Georgetown/Timehri Intl.	05/23		23	23		0			0	0	0	0	0	0		0	0	0	0	
HAITI																				
Port-au-Prince/ President Duvalier Intl.	09/27		09 27	09		0			0		0	0	0	0			0	0	0	
ICELAND																				
Akureyri/Akureyri	02/20		02	02 20		0			0	0	0	0	0	0			0	0	0	
Keflavík/Keflavík	12/30	12II		30		0	0	12	0	0	0	0	0	0	0	0	0	0	0	
	03/21	21II		03		0	0	21				0	0	0	0	0	0			
	07/25			07		0						0	0	0			0			
Reykjavík/Reykjavík	02/20		20	02 20		0			0	0	0	0	0	0			0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
IRELAND																				
Dublin/Dublin	06/24	24II		06 24		0	0	24	0	0	0	0	0	0	0	0	0	0	0	
	17/35		17 35	17 35		0						0	0	0			0			
Shannon/Shannon	06/24	24II		06 24		0	0	24	0	0	0	0	0	0	0	0	0	0	0	
	14/32		14 32	14 32		0						0	0	0			0			
ISRAEL																				
Haifa/Ramat David	15/33		15 33	33		0			0	0	0	0	0	0			0	0	0	
Tel Aviv/Lod	12/30	12I		12 30		0			0	0	0	0	0	0	0	0	0	0	0	
	08/26	08II 26II		08 26		0	0	08 26				0	0	0	0	0	0			

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
ITALY																				
Genova/Sestri	11/29	29I				0			0	0	0	0	0	0	0	0	0	0	0	
Milano/Linate	18/36	36II		18 36		0	0	36	0	0	0	0	0	0	0	0	0	0	0	
Milano/Malpensa	17L/35R	35RII		17L		0	0	35R	0	0	0	0	0	0	0	0	0	0	0	
Napoli/Capodichino	06/24	24I		06 24		0			0		0	0	0	0	0		0	0	0	
Pisa/San Giusto	04/22	04I		04 22		0			0	0	0	0	0	0	0	0	0	0	0	
Roma/Ciampino	15R/33L	15RI		15R		0			0	0	0	0	0	0	0	0	0	0	0	
Roma/Fiumicino	16R/34L	16RI		16R 34L		0			0	0	0	0	0	0	0	0	0	0	0	
	16L/34R	16LII		34R		0	0	16L				0	0	0			0			
	07/25	25II		07 25		0	0	25				0	0	0			0			
Torino/Caselle	18/36	36II		18 36		0	0	36	0		0	0	0	0	0		0	0	0	
Venezia/Tesséra	04/22	04II		04 22		0	0	04	0	0	0	0	0	0	0	0	0	0	0	
JAMAICA																				
Kingston/Palisadoes Intl.	11/29	11I		11		0			0	0	0	0	0	0	0	0	0	0	0	
Montego Bay/Intl.	06/24	06I		06 24		0			0	0	0	0	0	0	0	0	0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
LUXEMBOURG																				
Luxembourg/Luxembourg	06/24	24II		06		0	0	24	0	0	0	0	0	0	0	0	0	0	0	
		06I																		
MEXICO																				
Mérida/Mérida	10/28		10	10 28		0			0	0	0	0	0	0			0	0	0	
Mexico City/Intl.	05R/23L	23LII		05R 23L		0	0	23	0	0	0	0	0	0	0	0	0	0	0	
	05L/23R			05L 23R								0	0	0			0			
	13/31			13								0	0	0			0			
MOROCCO																				
Casablanca/ Nouasser	17/35	17I		17		0	0		0	0	0	0	0	0	0	0	0	0	0	
Rabat/Salé	04/22	04II	22	04 22		0	0	04	0	0	0	0	0	0	0	0	0	0	0	

1	2	PA 3	SA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	O 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
NETHERLANDS (KINGDOM OF THE)																				
Amsterdam/Schiphol	09/27	27II		27		0	0	27	0		0	0	0	0	0	0	0	0	0	
	01L/19R	19RII		19R		0	0	19R				0	0	0	0	0	0			
	01R/19L	01RII		01R		0	0	01R				0	0	0		0	0			
	06/24	06II		06		0	0	06				0	0	0	0	0	0			
	14/32			32		0						0	0	0		0	0			
Rotterdam/Rotterdam	06/24	24II		06 24		0	0	24	0		0	0	0	0	0	0	0	0	0	
NETHERLANDS ANTILLES																				
Oranjestad/Prinses Beatrix, Aruba I.	11/29	11I	29	11		0			0	0	0	0	0	0	0	0	0	0	0	
Willemstad/Dr. A. Plesman, Curaçao I.	11/29	11I		11		0			0	0	0	0	0	0	0	0	0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
NORWAY																				
Bergen/Flesland	18/36	18II		18 36		0	0	18	0		0	0	0	0	0	0	0	0	0	
Bodø/Bodø	08/26	08I		08		0			0		0	0	0	0	0	0	0	0	0	
Oslo/Fornebu	06/24	06II		06 24		0	0	06	0		0	0	0	0	0	0	0	0	0	
	01/19	01I				0						0	0	0	0	0	0			
Oslo/New Main	new	?II				0	0	?	0		0	0	0	0	0	0	0	0	0	
Stavanger/Sola	18/36	18II		18 36		0	0	18	0		0	0	0	0	0	0	0	0	0	
	11/29			11 29								0	0	0			0			
PORTUGAL																				
Faro/Faro	11/29		29	11 29		0			0	0	0	0	0	0			0	0	0	
Lisboa/Lisboa	03/21	21II	03	03 21		0	0	21	0	0	0	0	0	0	0	0	0	0	0	
	18/36		36	18		0						0	0	0			0			
Ponta Delgada/Ponta Delgada Sao Miguel I., Açores	13/31											0	0	0			0	0	0	
Porto/Porto	18/36	18II		18 36		0	0	18	0	0	0	0	0	0	0	0	0	0	0	
Porto Santo/Porto Santo Porto Santo I., Madeira	01/19		01	01 19		0			0	0	0	0	0	0			0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
PORTUGAL (Cont'd)																				
Santa Maria/Santa Maria Santa Maria I., Açores	01/19	19I	01	19 01		0			0	0	0	0	0	0	0	0	0	0	0	
PUERTO RICO																				
San Juan/Puerto Rico Intl.	07/25	07I	25	07 25		0			0	0	0	0	0	0	0	0	0	0	0	
SENEGAL																				
Dakar/Yoff	01/19	01II		01 19		0	0	01	0	0	0	0	0	0	0	0	0	0	0	
	12/30			30		0						0	0	0			0			
SPAIN																				
Barcelona/Barcelona	07/25	07II		07 25		0	0	07	0	0	0	0	0	0	0	0	0	0	0	
	02/20		02	02 20		0						0	0	0			0			
Las Palmas de Gran Canaria, Canary Is.	03/21	03I		03 21		0			0	0	0	0	0	0	0	0	0	0	0	
Madrid/Barajas	15/33	33II	15	15 33		0	0	33	0	0	0	0	0	0	0	0	0	0	0	
	01/19	01I 19I		01 19		0						0	0	0	0	0	0			
Malaga/Malaga	14/32	14II	32	14 32		0	0	14	0	0	0	0	0	0	0	0	0	0	0	
Sevilla/Sevilla	09/27	27I	09	09 27		0			0	0	0	0	0	0	0	0	0	0	0	
Zaragoza/Zaragoza	13L/31R		31R	13L 31R		0			0	0	0	0	0	0	0	0	0	0	0	

1	2	PA 3	SA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	O 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
SURINAM																				
Paramaribo/Zanderij	10/28	10I		10 28		0			0	0	0	0	0	0	0	0	0	0	0	
SWEDEN																				
Göteborg/Torslanda	04/22	22I		04 22		0			0	0	0	0	0	0	0		0	0	0	
Stockholm/Arlanda	01/19	01II 19II		01 19		0	0	01 19	0		0	0	0	0	0	0	0	0	0	
	08/26	26I	08	26		0						0	0	0	0	0	0			
SWITZERLAND																				
Bâle-Mulhouse/Bâle-Mulhouse (See France)																				
Genève/Cointrin	05/23	23II 05I		05 23		0	0	23	0	0	0	0	0	0	0	0	0	0	0	
Zürich/Zürich	16/34	16II		16 34		0	0	16	0	0	0	0	0	0	0	0	0	0	0	
	10/28			10 28								0	0	0			0			
	new	II				0	0	0				0	0	0	0	0	0			

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
TRINIDAD & TOBAGO																				
Port-of-Spain/Piarco	10/28	10I		10 28		0			0	0	0	0	0	0	0	0	0	0	0	
UNITED KINGDOM																				
Belfast/Aldergrove	08/26	08I 26I		08 26		0			0		0	0	0	0	0		0	0	0	
Birmingham/Birmingham	15/33	33I		16 34		0			0	0	0	0	0	0	0		0	0	0	
	06/24		06 24	06 24								0	0	0			0			
Edinburgh/Turnhouse	13/31	13I		13 31		0			0		0	0	0	0	0		0	0	0	
Glasgow/Glasgow	06/24	06II 24II		06		0	0	06 24	0		0	0	0	0	0		0	0	0	
Liverpool/Liverpool	10/28	10I 28I		28		0			0	0	0	0	0	0	0		0	0	0	
London/Gatwick	09L/27R	09LII 27RII		09L 27R		0	0	09L 27R	0	0	0	0	0	0	0		0	0	0	
	09R/27L	09RII 27LII		09R 27L		0	0	09R 27L				0	0	0	0		0			
London/Heathrow	10R/28L	10RII 28LII		10R 28L		0	0	10R 28L	0	0	0	0	0	0	0		0	0	0	
	10L/28R	10LII 28RII		10L 28R		0		10L 28R				0	0	0	0		0			
	05R/23L	23LI		05R 23L		0						0	0	0	0		0			

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
UNITED KINGDOM (Cont'd)																				
Manchester/Manchester	06/24	06II 24II		06 24		0	0	06 24	0	0	0	0	0	0	0		0	0	0	
Prestwick/Prestwick	13/31	13II 31II		13		0	0	13 31	0		0	0	0	0	0		0	0	0	
UNITED STATES																				
Anchorage/Elmendorf AFB, Alaska	05/23	05I		23		0			0	0	0	0	0	0	0	0	0	0	0	
Anchorage/Intl., Alaska	06R/24L	06RII	24L	24L		0	0	06R	0	0	0	0	0	0	0	0	0	0	0	
Baltimore/Friendship Intl., Maryland	10/28	10II	28			0	0	10	0		0	0	0	0	0	0	0	0	0	
	15/33	15I	33	15 33		0						0	0	0	0	0	0			
Bangor/Intl., Maine	15/33	33I				0			0	0		0	0	0	0	0	0	0		
Boston/Logan Intl., Massachusetts	04R/22L	04RI	22L	22L		0			0	0	0	0	0	0	0	0	0	0	0	
	15R/33L	33LI 15RII		15R		0	0	15R				0	0	0	0	0	0			
	04L/22R		04L 22R			0						0	0	0			0			
	09/27			09 27		0						0	0	0			0			
Chicago/O'Hare Intl., Illinois	14R/32L	14RII 32LI				0	0	14R	0	0	0	0	0	0	0	0	0	0	0	
	09L/27R	27RI	09L	09L		0						0	0	0	0	0	0			
	14L/32R	14LII 32RI				0	0	14L				0	0	0	0	0	0			
	09R/27L	27LI 09RI		09R		0						0	0	0	0	0	0			
Cleveland/Hopkins Intl., Ohio	05R/23L	05RII		23L		0	0	05R	0	0	0	0	0	0	0	0	0	0	0	
	10L/28R	28RI		10L		0						0	0	0	0	0				
Cold Bay/Cold Bay, Alaska	14/32	14I				0			0	0	0	0	0	0	0	0	0	0	0	
Corpus Christi/Intl., Texas	13/31	13I				0			0	0	0	0	0	0	0	0	0	0	0	

1	2	PA 3	SA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	O 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
UNITED STATES (Cont'd)																				
Dallas-Fort Worth/Regional Airport, Texas	17/35	17LII				0	0	17L	0	0	0	0	0	0	0	0	0	0	0	
Detroit/Metropolitan-Wayne Co., Michigan	03L/21R	03LII 21RI				0	0	03L	0	0	0	0	0	0	0	0	0	0	0	
	03R/21L	03RI	21L	03R 21L		0						0	0	0	0	0	0			
	09/27		09 27	09		0						0	0	0			0			
El Paso/Intl., Texas	04/22	22I				0			0	0	0	0	0	0	0	0	0	0	0	
Everett/Snohomish County (Paine Field), Washington	16/34	16I				0			0	0		0	0	0	0	0	0	0		
Fairbanks/Intl., Alaska	01/19	19I	01			0			0	0	0	0	0	0	0	0	0	0	0	
Fresno/Fresno Air Terminal, California	11L/29R	29RI				0			0	0	0	0	0	0	0	0	0	0	0	
Houston/Intercontinental, Texas	08L/26R	08LII				0	0	08L	0	0	0	0	0	0	0	0	0	0	0	
Indianapolis/Weir Cook, Indiana	04L/22R	04LII		22R		0	0	04L	0		0	0	0	0	0	0	0	0	0	
	13R/31L	31LI				0						0	0	0	0	0	0			
King Salmon/King Salmon, Alaska	11/29	11I				0			0	0	0	0	0	0	0	0	0	0	0	
Las Vegas/McCarran Intl., Nevada	07/25	25I	07	07		0			0	0	0	0	0	0	0	0	0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
UNITED STATES (Cont'd)																				
Los Angeles/Intl., California	07R/25L	25LII	07R	07R		0	0	25L	0	0	0	0	0	0	0	0	0	0	0	
	07L/25R	25RI 07LI		25R 07L		0						0	0	0	0	0	0			
	06L/24R	24RII				0	0	24R				0	0	0	0	0	0			
	06R/24L					0						0	0	0			0			
Miami/Intl., Florida	09L/27R	09LI	27R	27R		0			0	0	0	0	0	0	0	0	0	0	0	
	09R/27L	27LI	09R	09R		0						0	0	0	0	0	0			
	12/30		30	12 30		0						0	0	0		0	0			
Milwaukee/General Mitchell, Wisconsin	01/19	01II		19		0	0	01	0	0	0	0	0	0	0	0	0	0	0	
	07R/25L	07RI		25L		0						0	0	0	0	0	0			
Minneapolis/Minneapolis-St. Paul Intl., Minnesota	11R/29L	29LII	11R			0	0	29L	0	0	0	0	0	0	0	0	0	0	0	
	04/22	04I		22		0						0	0	0	0	0	0			
Newark/Newark, New Jersey	04R/22L	04RII 22LI				0	0	04R	0	0	0	0	0	0	0	0	0	0	0	
New York/John F. Kennedy Intl., New York	04L/22R	04LI		04L		0			0	0	0	0	0	0	0	0	0	0	0	2nd CAT II runway unspecified
	13L/31R	13LI 31RI				0						0	0	0	0	0	0			
	13R/31L	13RI		13R		0						0	0	0	0	0	0			
	04R/22L	04RII 22LI				0	0	04R				0	0	0	0	0	0			
Niagara Falls/Intl., New York	10L/28R	28RI		10L		0			0	0	0	0	0	0	0	0	0	0	0	
Oakland/Metropolitan - Oakland Intl. California	11L/29R	29RII				0	0	29R	0	0	0	0	0	0	0	0	0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
UNITED STATES (Cont'd)																				
Ontario/Intl., California	07/25	25II		07		0	0	25	0	0	0	0	0	0	0	0	0	0	0	
Palmdale/Palmdale P.F.T.I., California	04/22		04 22			0			0	0	0	0	0	0			0	0	0	
	07/25		07 25			0						0	0	0			0			
Philadelphia/Intl., Pennsylvania	09R/27L	09RII	27L	27L		0	0	09R	0	0	0	0	0	0	0	0	0	0	0	
Pittsburgh/Greater Pittsburgh, Pennsylvania	10L/28R	10LII	28R	28R		0	0	10L	0	0	0	0	0	0	0	0	0	0	0	
	10R/28L	28LI		10R		0						0	0	0	0	0	0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
UNITED STATES (Cont'd)																				
Portland/Intl., Oregon	10R/28L	10RII				0	0	10R	0	0	0	0	0	0	0	0	0	0	0	
	10L/28R	28RI				0						0	0	0	0	0	0			
St. Louis/Lambert-St. Louis, Missouri	12R/30L	12RI		30L		0			0		0	0	0	0	0	0	0	0	0	
	06/24	24I		06		0						0	0	0	0	0	0			
San Antonio/Intl., Texas	12/30	12II		30		0	0	12	0	0	0	0	0	0	0	0	0	0	0	
San Diego/Intl.-Lindbergh Field, California	09/27	09I		27		0			0	0	0	0	0	0	0	0	0	0	0	
San Francisco/Intl., California	10R/28L	28LII				0	0	28L	0	0	0	0	0	0	0	0	0	0	0	
	01R/19L	19LI				0						0	0	0	0	0	0			
Seattle/Seattle-Tacoma Intl., Washington	16R/34L	16RII 34LI				0	0	16R	0	0	0	0	0	0	0	0	0	0	0	
Spokane/Intl., Washington	03/21	21I				0			0	0	0	0	0	0	0	0	0	0	0	
Stockton/Metropolitan, California	11L/29R	29RI				0			0	0	0	0	0	0	0	0	0	0	0	
Syracuse/Hancock, New York	10/28	28I		10		0			0	0	0	0	0	0	0	0	0	0	0	

1	2	PA 3	CA 4	VA 5	AV 6	R 7	C 8	TD 9	TX 10	B 11	O 12	D 13	C 14	T 15	TD 16	S 17	FD 18	TX 19	O 20	21
UNITED STATES (Cont'd)																				
Tampa/Intl., Florida	18L/36R	18LI				0			0	0	0	0	0	0	0	0	0	0	0	
	18R/36L	36LI		36L 18R		0						0	0	0	0	0	0			
	09/27		09	09		0						0	0	0			0			
Washington/Dulles Intl., District of Columbia	01L/19R	19RI				0			0	0	0	0	0	0	0	0	0	0	0	
	01R/19L	01RII				0	0	01R				0	0	0	0	0	0			
West Palm Beach/Palm Beach Intl., Florida	09L/27R	09LI				0			0	0	0	0	0	0	0	0	0	0	0	
Windsor Locks/Bradley Intl Connecticut	06/24	06II	24	24		0	0	06	0	0	0	0	0	0	0	0	0	0	0	
	15/33		15 33	15 33		0						0	0	0	0		0			
U.S.S.R.																				
Moscow/Sheremetievo	07/25	25II		07 25		0	0	25	0	0	0	0	0	0	0	0	0	0	0	
Moscow/Vnukovo	02/20											0	0	0			0	0	0	
	06/24																			
VENEZUELA																				
Caracas/Maiquetía	09R/27L	09RI		09R 27L		0			0	0	0	0	0	0	0	0	0	0	0	

		PA	SA	VA	AV	R	C	TD	TX	B	O	D	C	T	TD	S	FD	TX	O	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
VIRGIN ISLANDS																				
St. Croix/Alexander Hamilton	09/27	27I		27		0			0	0	0	0	0	0	0	0	0	0	0	
WEST INDIES ASSOCIATED STATES																				
St. Johns/Coolidge, Antigua I.	07/25	07I		07 25		0			0	0	0	0	0	0	0	0	0	0	0	
St. Lucia/Beane Field	10/28	10I		10		0			0	0	0	0	0	0	0		0	0	0	

STATEMENTS BY DELEGATIONS

Statement by the Delegation of IAOPA
(Relates to paragraph 7.6, page 7-2)

7.9 At the present time, IAOPA has no requirement for VASIS. At such time as VASIS appear to be an International General Aviation requirement, specific aerodromes needing that equipment will be identified by IAOPA.

APPENDIX 7-A

TABLE FOR FUTURE PLANNING OF THE VISUAL AIDS AT INTERNATIONAL GENERAL AVIATION AERODROMES

EXPLANATION OF TABLE

Column	
1	Name of the country, city and aerodrome
2	Runway number for which visual aids are to be provided
3	Simple approach lighting system
4	Abbreviated visual approach slope indicator
5	Runway edge, threshold and end lighting
6	Aerodrome beacon or identification beacon
7	Runway marking
8	Additional information

TABLE FOR FUTURE PLANNING OF THE VISUAL AIDS OF INTERNATIONAL GENERAL AVIATION AERODROMES

City/Aerodrome	Runway Nr.	Lighting				Mk.	Remarks
		SA	AV	R	B		
1	2	3	4	5	6	7	8

Agenda Item 8: Aerodrome services

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

8.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 2, 5 and 6 of the Report on Agenda Item 2, governed the consideration of Agenda Item 8.

RESCUE AND FIRE FIGHTING SERVICES

8.2 The Meeting considered that in general the rescue and fire fighting services at the aerodromes within the area under consideration were adequate. It was noted that many large and supersonic aircraft would be operating in the plan period and that States would need to increase the scale of protection to be provided at their aerodromes. For the scale of protection to be provided at aerodromes, States were generally following the guidance material in Attachment C to Annex 14 and Part 5 of the Aerodrome Manual. In this regard, the Meeting was informed that the Rescue and Fire Fighting Panel at its first meeting, March 1970, had proposed that Table C-2 of Attachment C to Annex 14 should be revised to account for an increase in the amounts of extinguishing agents to be provided.

8.3 The Meeting considered the need to specify at which aerodromes special equipment, normally boats, should be provided for water rescue purposes. The main objective of this equipment was to provide a holding facility for initial rescue, until life rafts carried by the aircraft could be utilized. In order to meet this requirement, it was indicated that water rescue vehicles should be provided with break-in equipment and life rafts. It was reported that in one State water rescue vehicles were provided with pumps for fire fighting.

8.4 Because of lack of prior meeting work, it was not possible to develop a list of aerodromes at which special equipment should be provided. To obviate this difficulty, it was considered that for future meetings, it would be desirable that prior to the meeting, States identify those aerodromes at which special equipment might be required for rescue purposes and advise on the facilities to be provided.

8.5 A lack of specific guidance material on this subject was noted. In this regard, the Meeting was informed that the Middle East/South East Asia Regional Air Navigation Meeting had developed some guidance material on the requirements for and characteristics of water rescue equipment and as a result of Recommendation 7/4 of that Meeting, further development of the guidance material was being pursued by ICAO.

8.6 When discussing the range that water rescue vehicles should be capable of operating, a distance of 5 nautical miles from the runway end was considered appropriate. When considering this distance, emphasis was given to organizing existing facilities for use during emergency situations so as to achieve satisfactory coordination with search and rescue services.

8.7 It was considered that special equipment capable of operation on tidal or mud-flat areas also should be provided. At one aerodrome an experimental amphibious rescue vehicle which could also work in most mud conditions was reported as successful. The vehicle was capable of achieving speeds of up to 40 km/h (25 mph) on land, 24 km/h (15 mph) on 0.90 m (3 ft) of water with the tracks still bearing on the ground and 5 knots once afloat. Hovercraft had been tested by two States but results had not been successful due to the low payload permitted by these vehicles and to their poor manoeuverability when rocks or depressions on mud flats were encountered.

REMOVAL OF DISABLED AIRCRAFT

8.8 Removal of disabled aircraft from runways was primarily considered to be an economic issue and not an operational one as in most instances other aircraft could always divert to an alternate aerodrome. Though there were certain legal questions involved with the removal of disabled aircraft, this Meeting was concerned with the availability of equipment for removal and not responsibility. The cost of providing the necessary equipment for moving large aircraft was high and in view of its limited use, careful consideration of the aerodromes at which the equipment would be located was required. On the other hand, the high cost of large aircraft justified increased attention to the removal of these aircraft and the cost of any special equipment needed. Discussion showed that special equipment for this purpose was provided at a number of aerodromes, in some cases by the aerodrome maintenance service. In addition arrangements existed for using other than aerodrome equipment and personnel. It was the opinion of the Meeting that the guidance material contained in the Aerodrome Manual was very useful and that it should be updated. In this regard, the Meeting was informed that as a result of Recommendation 7/5 of the MID/SEA RAN Meeting (1968), updating of this material so as to include new equipment to account for large aircraft, such as B747, was being undertaken by ICAO.

AERODROME MAINTENANCE

8.9 Removal of rubber deposits - Rubber deposits on runways resulting from the spin-up of aircraft tires on touchdown presented a particularly difficult maintenance problem. When wet, areas with such deposits were extremely slippery and the vulcanized rubber was difficult to remove. Use of chemicals had been rejected by one State in order to eliminate any potential pollution problem. As a result tests had been conducted using both a high pressure steam method and a cold water method at higher pressure. Both methods were considered equally effective as they removed the majority of the rubber and resulted in an increase in the wet runway coefficient of friction. Studies were continuing to determine which was the most economical method. Another State was evaluating the use of a combination of water, chemical and abrasive applied at 1 500 psi. Tests conducted to-date showed that the method was effective and that by a slight variation in the pressure paint markings could be removed or left on, as desired.

8.10 Runway surface treatment - Reports by States showed that grooving of both asphaltic and portland cement concrete pavements was being done at a number of runways throughout the area to improve runway surface drainage. Results of runways grooved to-date were considered successful with only some minor adverse difficulties of spalling of the edges of grooves cut in portland cement concrete runways, some closing of the grooves in asphaltic concrete runways and in some instances, of water remaining in grooves and freezing. Over all, however, grooving of runways was considered as an effective means for improving braking friction under wet conditions though other equally good and sometimes more economical methods existed (such as those described in the Aerodrome Manual, Part 5, Volume II). One State planned to measure the braking action of 21 runways and then to grade them in order of their slipperiness. Grooving was also reported to improve the braking action for other than wet conditions. Studies of the effects of grooving and of the best practices to follow were continuing on a wide basis.

8.11 It was considered that States should conduct surveys to identify runways which were slippery when wet and to take corrective measures to improve the braking action.

RECOMMENDATION 8/1 - IMPROVEMENT OF RUNWAY BRAKING ACTION

That States:

(a) survey runways to identify those which are slippery when wet; and

(b) for those runways so identified, take action to improve braking through some form of corrective surface treatment.

8.12 Measuring braking coefficient - Annex 14, Part II, para. 2.8.1 c) requires that the braking action be reported when snow, slush, or ice is present on runways and the PANS-RAC contains rules for transmittal of this information to aircraft approaching to land. Within the European Region, a method for the reporting of this information had been agreed upon and it was proposed that it be adopted for North Atlantic operations as well. Though it was considered desirable for standard measuring devices to be used as well, this was not considered absolutely essential as long as the equipment was capable of detecting aquaplaning conditions when slush existed on the runway and could be correlated to other equipment and aircraft. Equipment which could produce a continuous measurement of conditions along the runway had been developed but a recommendation that such equipment be used at the aerodromes under consideration was not agreed as other States were still studying the development of measuring equipment. This did not prevent the Meeting from agreeing upon a table for the reporting of braking action when conditions of snow, slush or ice existed.

RECOMMENDATION 8/2 - MEASURING AND REPORTING OF RUNWAY BRAKING ACTION

That States

(a) when using measuring devices for the assessment of runway braking action resulting from conditions of snow, slush or ice on runways, report the measurements in accordance with the following table and interpret the descriptive terms in this table to have the indicated meanings:

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(a) when using measuring devices for the assessment of runway braking action resulting from conditions of snow, slush or ice on runways, report the measurements in accordance with the following table and interpret the descriptive terms in this table to have the indicated meanings:

RECOMMENDATION 8/2 (Cont'd)

Code	Measured or calculated coefficient of friction	Estimated braking action	
		Descriptive Terms	Operational Meaning
5	0.40 and above	Good	Aircraft can expect to land comfortably within the scheduled distance, where this is "wet" distance, without undue directional control problems.
4	0.39 to 0.36	Medium to good	
3	0.35 to 0.30	Medium	Aircraft are likely to use all the "wet" scheduled distance including the safety factor part of the distance, and may run even further. Directional control might be impaired.
2	0.29 to 0.26	Medium to poor	
1	0.25 and below	Poor	Aircraft can expect to run for up to the full "very wet" or aquaplaning distance where this too is scheduled. Directional control will also be poor.

(b) should ensure that the measuring devices used in slush be capable of indicating aquaplaning conditions.

8.13 Birds on aerodromes - Birds were considered to be a potential problem at all aerodromes being considered by the Meeting. Although recognized as a problem, it was thought that aerodrome authorities were well aware of the necessary action to be taken to reduce the attractiveness of aerodromes to birds and for dispersing birds from the aerodromes.

8.14 Snow removal - Snow removal was a common problem at most aerodromes but, in general, authorities were able to cope with most situations. It was noted that with the introduction of the B747 aircraft into operation, greater attention would need to be paid to keeping snow banks farther from taxiway edges. One State reported that it would clear down to ground level a 47 m (155 ft) width along all taxiways.

8.15 Construction and maintenance work along runways - A number of States were utilizing the procedures in Part 3 of the Aerodrome Manual for dealing with temporary hazards on strips. One State considered the most restrictive area defined in the Manual to be too small, particularly when considering the possible increased wing overhang of new large aircraft. This State felt that more realistic requirements based on statistics of aircraft running off runways could be developed. The Meeting noted the possible need to take into account more stringent requirement for permitting temporary hazards to be present on strips when runways were still operational.

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Agenda Item 9: Airspace Organization and ATS Units

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

9.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 28 to 37 of the Report on Agenda Item 2, governed the consideration of Agenda Item 9.

GENERAL

9.2 When considering Agenda Item 9, the Meeting agreed that the following aspects should be considered:

(a) The delineation and extent of flight information regions.

(b) Provision of an ATS route network.

(c) Provision of air traffic control service.

(d) ATS requirements for aeronautical fixed service communications.

(e) ATS requirements for aeronautical mobile service communications.

(f) Review of recommendations of previous RAN meetings.

THE DELINEATION AND EXTENT OF FLIGHT INFORMATION REGIONS

NAT Region

9.3 When reviewing the plan of flight information regions in the NAT Region, the Meeting, being fully aware of the basic principles developed by the Special NAT Meeting 1965 (Doc 8499, SP NAT (1965), paragraphs 6 ii-1.1 to 6 ii-1.2.9 refer), found that even taking into account the advent of SST operations, there was insufficient evidence available to show that any basic changes to the existing plan of FIRs were required.

9.4 As a consequence, the Meeting agreed that no separate upper flight information regions need be established to cater specifically for operations in the upper airspace, including SST operations, and it therefore did not recommend any plane of division for the flight information regions in the NAT Region.

9.5 However, a number of detailed problems were found to require resolution as follows:

9.5.1 Studies made by Portugal had shown that the recommended transfer of the Oceanic ACC from Santa Maria to Lisboa, as currently shown in the plan, would create considerable problems between Lisboa ACC and Santa Maria Oceanic ACC with regard to the co-ordination of traffic operating in the Lisboa Oceanic FIR and traffic in the Santa Maria TMA. It was therefore agreed that it would be more efficient to revert to the plan as it existed before the NAT IV RAN Meeting and to re-designate the Lisboa Oceanic FIR as the Santa Maria Oceanic FIR with the ACC situated at Santa Maria.

9.5.2 With respect to the boundaries of the new Santa Maria Oceanic FIR, it was found that the increase in traffic operating between Portugal and Madeira posed a co-ordination problem due to the alignment of the common boundary between the existing Lisboa Oceanic FIR (new Santa Maria Oceanic FIR) and the Lisboa FIR. It was therefore agreed that the common boundary between these two FIRs should be modified so as to permit flights between Portugal and Madeira to remain within the Lisboa FIR throughout their flight.

9.5.3 With regard to the common boundary between FIRs Santa Maria Oceanic, New York Oceanic, San Juan and Piarco, the Meeting noted that the present arrangement caused some difficulties in that aircraft, proceeding from the San Juan FIR into the Santa Maria Oceanic FIR and vice versa, were required to make a position report at 40°W and when passing the common FIR boundary. It was therefore agreed that the boundary should be aligned along 40°W as far as possible in order to eliminate this requirement for two reports at short intervals.

9.5.4 It was also noted that some flights operating between Lisboa and Paramaribo penetrated for periods ranging between 10 and 15 minutes into the Canarias FIR in the vicinity of 30°N 25°W. This resulted in the requirement for two transfers of control at very short intervals between the Santa Maria Oceanic ACC and the Canarias FIC. It was noted that this ATS problem would be the subject of discussions between Portugal and Spain after the Meeting with a view to resolving this problem in the most suitable manner.

9.5.5 With regard to the common boundary between the New York Oceanic, Santa Maria Oceanic and San Juan FIRs in the vicinity of 27°N 40°W, it was noted that flights en route between Portugal and points in the Caribbean entered for a brief period into the New York Oceanic FIR and that this imposed an undesirable workload on flight crews with regard to air-reporting. It was, however, noted that, as long as adequate ATS direct speech communications between Santa Maria Oceanic ACC and San Juan ACC could not be provided, the present arrangement constituted the optimum solution ensuring at least that no unco-ordinated traffic was operating in the area in question. The Meeting therefore agreed to leave the FIR boundaries as they were but to request States concerned to keep this matter under review with the aim of modifying the FIR boundaries as and when such modifications would result in actual improvements to the provision of air traffic services in the area in question.

9.5.6 The Meeting noted that problems of co-ordination also existed in respect of flights departing from the Lisboa or Madrid FIR and entering the Shanwick FIR in the vicinity of 45°N 13°W. It was agreed, however, that the solution to these problems should be sought by procedural arrangements rather than by changing the FIR boundaries. (See para. 10.53 of the Report on Agenda Item 10.)

9.5.7 Brief consideration was given to a suggestion for modification of the boundaries of the Reykjavik FIR in the west and in the north so as to include portions of that FIR in the Gander Oceanic and Sondrestrom FIRs respectively. The Meeting concluded, however, that, while this might resolve some problems, it would create others, and it therefore agreed that there was no requirement for recommending any changes to the Reykjavik FIR.

9.5.8 The Meeting, referring to Recommendation 6 ii/1 of the Special NAT Meeting (1965), noted that France, Ireland and the United Kingdom were still in the process of studying the ATS problems encountered by North Atlantic flights in the upper airspace south of Ireland and in the vicinity of 08°W. It was also noted that planning for SST flights originating in Western Europe and destined for points on the other side of the North Atlantic had revealed that such operations would tend to aggravate the existing problems in the area in question. This was one reason why no final proposal for the solution of the problems encountered had as yet been made by the States concerned. It was therefore agreed that they should be requested to continue to study this problem.

NAM Region

9.6 With regard to the NAM Region, the Meeting noted that both in Canada and the United States of America flight information service was provided throughout the entire airspace used by international air traffic. Since, however, the delineation of FIR boundaries in the area where ATS was provided by these two States was primarily dictated by domestic considerations, the Meeting refrained from specifying in detail the limits of the various FIRs and restricted itself in its planning for the NAM Region to the listing of ACCs and FICs providing air traffic services.

RECOMMENDATION 9/1 - AMENDMENT OF THE PLANS OF FIRs FOR THE NAT, CAR and EUM REGIONS

That the plans of FIRs for the NAT, CAR and EUM Regions be amended as follows:

(a) re-designate the Lisboa Oceanic FIR as the Santa Maria Oceanic FIR with the centre to be located at Santa Maria;

(b) amend the eastern boundary of the new Santa Maria Oceanic FIR (existing Lisboa Oceanic FIR) as follows:

4500N 1300W - 4300N 1300W - 4200N 1500W - 3630N 1500W - 3410N 1748W - then along the boundary of the Porto Santo/Madeira CTA (radius of 100NM centred on 3304N 1621W) to 3139N 1725W (on the boundary of the Canarias FIR) - 3000N 2000W - 3000N 2500W - 2500N 2500W

(c) amend the western boundary of the Lisboa FIR to coincide with the amended boundary of the new Santa Maria Oceanic FIR from 4300N 1300W to 3139N 1725W and then to follow the western boundaries of the Canarias and Casablanca FIRs to 3558N 1200W;

(d) amend the western boundary of the new Santa Maria Oceanic FIR as follows:

4500N 4000W - 2218N 4000W - 1700N 3730W

(e) amend the eastern boundaries of the New York Oceanic, San Juan and Piarco FIRs to coincide with the amended western boundary of the new Santa Maria Oceanic FIR.

RECOMMENDATION 9/2 - REVIEW OF THE COMMON BOUNDARY BETWEEN FIRs SANTA MARIA OCEANIC, NEW YORK OCEANIC AND SAN JUAN IN THE VICINITY OF 27°N 40°W

That Portugal and the United States of America in co-operation review the ATS problems encountered in the vicinity of 27°N 40°W with a view to modifying the common FIR boundary between Santa Maria Oceanic, New York Oceanic and San Juan FIRs, so that these problems are eliminated, or reduced to the maximum extent possible, whenever the necessary services and facilities for such a solution become available.

RECOMMENDATION 9/3 - STUDY OF THE ATS PROBLEMS IN THE VICINITY OF 08°W, SOUTH OF IRELAND

That France, Ireland and the United Kingdom continue their studies of the ATS problems encountered by North Atlantic flights in the vicinity of 08°W and south of Ireland (including planned SST operations across that area), with a view to presenting to ICAO, at the next suitable opportunity, proposals for their resolution.

RECOMMENDATION 9/4 - PROVISION OF FLIGHT INFORMATION SERVICE IN THE NAM REGION

That the following text, together with the list of ATS units, be included in the ATS part of the regional plan for the NAM Region to reflect the requirements for the provision of flight information service in that Region:

"Flight information service should be provided on a 24-hour basis within the entire NAM Region by area control centres (ACCs) or flight information centres (FICs) at the following locations:

CANADA

Edmonton, Gander, Moncton, Montreal, Toronto, Vancouver and Winnipeg.

UNITED STATES

Anchorage, Albuquerque, Atlanta, Boston, Chicago, Cleveland, Denver, Fairbanks, Fort Worth, Great Falls, Houston, Indianapolis, Jacksonville, Kansas City, Los Angeles, Memphis, Miami, Minneapolis, New York, Oakland, Salt Lake City, Seattle and Washington.

Note.- The delineation of the flight information regions to be served by the respective centres is subject to determination by the two States concerned."

PROVISION OF AN ATS ROUTE NETWORK

NAT Region

9.7 The question of ATS routes in the NAT Region is covered in the Report on Agenda Item 10 (paragraphs 10.45 to 10.60 and Recommendations 10/12 to 10/19 refer).

NAM Region

9.8 The Meeting noted that, with the exception of the northern part of Canada, there exists, both in Canada and in the United States of America, a dense network of ATS routes which, even though it was primarily developed to serve domestic requirements, offers adequate facilities to cater for international flights operating into and across the North American continent. However, in order to provide some indication as to international requirements for which such a network should cater and in order that these requirements can be taken into account by planners concerned with ATS routes in the NAM Region, the Meeting agreed that it would be advantageous to include into the NAM Regional Plan a list of typical routes required by international air traffic in that region with the understanding that the routes shown did not, as was usual in other ICAO Regions, represent the detailed requirements for individual ATS routes, but rather represented itineraries between significant terminals or portions thereof for which provisions should be made for international operations within the more detailed domestic ATS route network of the States concerned.

9.9 As a consequence, the Meeting refrained from making any specific recommendation with regard to the designation of the actual ATS routes provided by the States to meet the requirements shown by the typical ATS routes. It also refrained from relating series of cruising levels to the direction along which flights were operating on such routes, as is usual in other ICAO Regions. It was however hoped that the system of designation and the methods used for the assignment of cruising levels by the States concerned would, if at all possible, be those prescribed by the relevant ICAO provisions.

RECOMMENDATION 9/5 - ATS ROUTE NETWORK IN THE NAM REGION

That the following text and the list of ATS routes contained in Appendix A to this report be included in the NAM Regional Plan to constitute the NAM ATS route network:

"The list of typical routes for international air traffic operating into or across the NAM Region shown in Appendix A to this report should constitute the NAM ATS Route Network in the sense that it represents, in a schematic manner, an example of the requirements of international air traffic for operationally suitable routings, corresponding to the routes shown in the list, but provided within a more complex ATS route network established by the States concerned."

PROVISION OF AIR TRAFFIC CONTROL SERVICE

NAT Region

9.10 The present NAT Plan provides that all flight information regions in the NAT region should be established as control areas with a lower limit of Flight Level 55 over the high seas and a lower limit over land of 600 metres (2 000 feet). The Meeting noted that a proposal for amendment of the NAT Regional Plan made by the United Kingdom some time ago and aimed at raising the lower limit of the control area within the Shanwick Oceanic FIR to Flight Level 95 had been the subject of discussion between the United Kingdom and other interested parties and, as a consequence of these discussions, was now withdrawn.

9.11 The Meeting also noted that ever since the third NAT RAN Meeting, there had been a requirement in the Regional Plan to establish a Bodø Oceanic Control area with the same lateral limits as the FIR but that this had never been implemented. The reason for this was that international air traffic operating through the area had been and still was very light and that adequate arrangements for the provision of satisfactory air traffic service had been made without resorting to the establishment of a Bodø Oceanic Control area. The Meeting therefore agreed that, since no significant increase in air traffic was expected within the area in question, this requirement should be deleted from the Plan.

9.12 The Meeting noted that there existed a note in the table contained in page 2-1-21 of Doc 7030, which shows the areas of applicability of RAC SUPPS, to the effect that the NAT RAC SUPPS do not apply in the local areas established around Kindley Field, Iceland, Santa Maria and in Greenland. While recognizing this situation, the Meeting nevertheless felt that the present presentation of it was not entirely satisfactory. It therefore agreed that the note should be included in an appropriate place in the text of Part 2 of Doc 7030 and that the local areas, as established by the local authorities, should be shown in the appropriate parts of the air navigation plan publication.

RECOMMENDATION 9/6 - AMENDMENT OF THE PLANS OF CTAs IN THE NAT, CAR AND EUM REGIONS

(i) That the boundaries of CTAs affected by Rec 9/1 be amended accordingly;

(ii) That the requirement to establish a Bodø Oceanic Control Area with the same lateral limits as the FIR be deleted from the NAT Regional Plan.

RECOMMENDATION 9/7 - PRESENTATION OF THE PROVISION REGARDING LOCAL AREAS IN THE NAT REGION

That a provision regarding the non-applicability of the NAT RAC SUPPs in the local areas around Kindley Field, Iceland, the Faroe Islands, Santa Maria and in Greenland be included in an appropriate place in the text of Part 2 of the Regional Supplementary Procedures and that the local areas, as established by the local authorities, be shown in the appropriate parts of the air navigation plan publication.

NAM Region

9.13 The Meeting noted that both Canada and the United States of America had already made adequate arrangements for the provision of air traffic control services along all ATS routes used by international operations both during the en-route and the terminal phases of their flights. It was therefore not felt necessary to include specific recommendations regarding the provision of air traffic control service in the NAM Region.

RECOMMENDATION 9/8 - PROVISION OF AIR TRAFFIC CONTROL SERVICE IN THE NAM REGION

That the following text be included in the NAM Regional Plan to present the requirement for the provision of air traffic control service:

"Air traffic control service should be provided on a 24-hour basis along all ATS routes used by international operations both during the en-route and the terminal phases of their flight by ACCs at the locations listed in Recommendation 9/4 and ATC units established at least at those aerodromes used by international commercial air traffic.

Note.- The delineation of the control areas served by the respective ATC units is subject to determination by the two States concerned."

ATS REQUIREMENTS FOR AERONAUTICAL FIXED SERVICE COMMUNICATIONS

Requirements for ATS Direct Speech Circuits

NAT Region

9.14 In view of the fact that the air navigation system in the NAT Region had been subject to repeated reviews by regional air navigation meetings and was thus developed on an evolutionary basis, the Meeting did not find it necessary to make a systematic review of the requirements for ATS direct speech communications in that region. It therefore limited its review to those changes in requirements resulting from amendments made to other parts of the ATS plan or to new requirements which are expected to appear within the lifetime of the new plan.

9.15 As a consequence, the Meeting established the following new or changed requirements for ATS direct speech communications in the NAT Region:

9.15.1 Circuit Prestwick - Reykjavik - Prins Christian Sund - Gander. Information submitted to the Meeting indicates that this circuit, which serves not only the requirements for co-ordination between ACCs Gander and Prestwick but also those between ACCs Prestwick and Reykjavik and ACCs Reykjavik and Gander, is already now severely overloaded and that during peak traffic conditions serious delays in co-ordination are experienced. Since the majority of co-ordination has to be effected between ACCs Prestwick and Gander in order to serve the area of the main traffic flow between Europe and North America, there is therefore a requirement for an additional direct communication link between ACCs Prestwick and Gander. In this respect it should be noted that the provision of such an additional direct link would relieve the present "omnibus" circuit Gander - Reykjavik - Prins Christian Sund - Prestwick sufficiently in order to not only permit satisfactory ATS co-ordination between the Reykjavik ACC on the one hand and the ACCs Gander and Prestwick on the other hand, but that it may also be possible to use it for the relay of air/ground communications from additional intermediate VHF air/ground communication stations and for the relay of communications between Reykjavik ACC and Stavanger ACC.

9.15.2 Circuit Reykjavik - Søndrestrøm. The Meeting noted that the requirement for this circuit was at present met by a military circuit which initially had been established for different reasons. While it was recognized that this arrangement was fully satisfactory as long as the military facilities were available, it was nevertheless felt that the existing arrangement contained a certain element of vulnerability, since the technical means, because of their military nature, may be subject to unilateral changes at comparatively short notice.

9.15.3 Circuit Reykjavik - Stavanger. The Meeting noted that this circuit is now included in the NAT Regional Plan with the annotation "type of service to be determined by the States concerned". As a result the requirement for this circuit is at present met by the use of the circuits Stavanger - Prestwick and Prestwick - Reykjavik, the latter using the circuit mentioned in paragraph 9.15.1 and with Prestwick ACC performing relay functions. Because of the operating conditions mentioned above with regard to the circuit Prestwick - Reykjavik - Gander and also because of the relay functions involved in Prestwick ACC, co-ordination between Reykjavik ACC and Stavanger ACC has in the past been time consuming, cumbersome and at times difficult. Since, at the same time, traffic operating between the Stavanger and Reykjavik FIRs is on an upward trend, the Meeting believed that this matter needed review. The United Kingdom delegate pointed out that, while Prestwick ACC was prepared to continue the present relay functions whenever this was possible, this would have to be considered as a strictly temporary arrangement and was subject to workload considerations in Prestwick ACC. It was therefore felt that adequate technical measures should be taken to resolve this problem.

9.15.4 Circuit Prestwick - Madrid. The Meeting was provided with information both from Spain and the United Kingdom indicating that the requirement for this circuit was in the process of being met. It therefore restricted itself to a confirmation of the requirement for early provision of this circuit in view of the increased traffic operating between the Madrid and Shanwick Oceanic FIRs.

9.15.5 Circuits connected to Lisboa Oceanic ACC. In the light of the agreement reached to restore the Santa Maria Oceanic FIR with the ACC Santa Maria Oceanic, it was found necessary to amend the requirement for ATS speech circuits concerning this ACC as follows:

(a) The present circuit Prestwick - Lisboa should be replaced by a requirement for a circuit Prestwick - Santa Maria with the understanding that this circuit is an immediate and pressing requirement.

(b) The existing circuit Gander - Lisboa should be replaced by a requirement for a circuit Gander - Santa Maria on the understanding that this may be switched through New York.

(c) The circuit New York - Lisboa should be replaced by a requirement for a circuit New York - Santa Maria and a circuit Santa Maria - Lisboa.

(d) The requirement for a circuit San Juan - Lisboa should be replaced by a requirement for a circuit San Juan - Santa Maria which may be switched through New York. In this respect attention was drawn to Recommendation 9/2 regarding the possible re-alignment of the common boundary between FIRs New York Oceanic, San Juan and Santa Maria Oceanic which, when agreed, may require the provision of a direct circuit between San Juan and Santa Maria Oceanic ACCs.

(e) In the light of the increase of traffic operating between the NAT Region and the northern part of the Iberian peninsula, it was agreed that there was a new requirement for the provision of a circuit between Madrid and Santa Maria Oceanic ACCs. It was however also agreed that this requirement could be met by the use of the circuits Santa Maria - Lisboa and Lisboa - Madrid by switching at Lisboa.

(f) It was confirmed that, in the light of traffic density, there was no requirement for the provision of a circuit between Piarco and Santa Maria Oceanic ACCs.

NAM Region

9.16 With respect to the requirement for ATS direct speech circuits in the NAM Region, the Meeting noted that both, in Canada and in the United States of America, all known requirements for circuits are already met. It therefore refrained from formulating any specific requirements. In addition, it noted that both States were in the process of converting their aeronautical fixed services to fully automatic operation including the use of computers.

ATS REQUIREMENTS FOR AERONAUTICAL MOBILE SERVICE COMMUNICATIONS

ATS Requirements for Air-Ground Communications

General

9.17 When considering the ATS requirements for air-ground communications in the NAT and NAM Regions, the Meeting noted that for various reasons the requirement in service range and height for VHF air-ground communications in the NAT Region had never been determined in the manner specified for regional air navigation meetings. As regards the NAM Region, this had obviously not been done because the region has only been newly created.

9.18 Since, however, the majority of the VHF air-ground communication facilities serving the NAT Region are physically located either in the EUM Region or, now, in the newly created NAM Region and since the operational requirements for service range and height for those facilities are believed to be similar, if not identical, to those expressed in the EUM Region, it was agreed that the criteria developed for the EUM Region at the LIM EUM RAC/COM VHF RAN Meeting, 1968, should also be adopted for the NAT and NAM Regions. A table showing these criteria is contained in Appendix B to this part of the report.

9.19 As regards the requirements for service range and height of VHF air-ground communication channels used to serve SST operations, the Meeting agreed with the conclusion reached at the Second Meeting of the SST Panel that the service height should be FL 660. However, in view of the fact that the EUM VHF plan is to be reviewed in toto by the Sixth EUM RAN Meeting and because it was expected that, in the NAM Region, the provision of adequate technical facilities would not create unsurmountable difficulties, the Meeting refrained from formulating requirements for specific VHF air-ground communication channels at this time. This decision was also based on the fact that there is as yet an element of uncertainty involved as regards the exact routing of such operations during those portions of their flight where they are within VHF coverage obtained from facilities located on either side of the North Atlantic.

NAT Region

9.20 Noting that the ATS requirements for air-ground communications in the NAT Region had been reviewed repeatedly by regional air navigation meetings, and have developed on an evolutionary basis, and taking into account that provision of air-ground communications was, due to the geographical features of the area, such that technical possibilities and economical considerations played a very significant role in their development, the Meeting agreed not to undertake a basic review of existing facilities and services but rather to limit its considerations to amendments or new requirements as they became apparent at this Meeting.

9.21 With regard to the requirements for VHF air-ground communications, the Meeting had before it a proposal by Iceland referred to it by the Joint Support Committee for the extension of VHF coverage to the south-east, east, north-east and north of Iceland. After careful consideration of all relevant ATS features, e.g. the rather complex traffic pattern in the area in question and the co-ordination difficulties which exist between some of the ACCs concerned, the Meeting came to the conclusion that the proposed extension of VHF coverage would improve the provision of air traffic services in the area. It therefore agreed to support its realisation.

9.22 In the same context it noted that with the increase of traffic operating in the general area to the east and southeast of Iceland, the provision of additional VHF coverage in this area would be of considerable assistance to the air traffic services. It therefore agreed that any possibility for the provision of such coverage should be carefully considered.

9.23 In addition to some small amendments concerning changes of locations or the provision of additional channels at existing facilities the Meeting also agreed to a requirement for the provision of a second air-ground communication channel for ACC Reykjavik within the same service area now provided for the channel to which frequency 119.7 Mc/s is assigned.

9.24 Due to the transfer of Lisboa Oceanic ACC to Santa Maria, the VHF assignments made to Lisboa Oceanic ACC should consequently be transferred to Santa Maria Oceanic ACC.

9.25 With regard to air-ground communications operating in the HF band, there were no new specific requirements. It was, however, noted that the communications load on the HF en-route radiotelephony networks in the NAT region was continually increasing and that as a result the exchange of ATS communications between pilots and controllers became increasingly difficult. In fact, it could be envisaged that, if not all possibilities for the technical as well as procedural improvements of the operation of these networks were taken, serious communication difficulties may occur in the not too distant future. It was therefore felt that all technical and procedural possibilities for the improvement of the operation of the HF en-route radiotelephony networks should be explored.

NAM Region

9.26 With regard to the NAM Region, the Meeting noted that, to the extent practicable, the requirements for VHF air-ground communications had already been provided by Canada and the United States of America. It therefore restricted its considerations to a review of existing facilities and based on these developed a list of ATS requirements for VHF air-ground communication channels for the development of the COM plan under Agenda Item 16*.

9.27 With regard to HF en route communications, it noted that those stations required for the operation of an HF en route radiotelephony network covering the NAM Region were already included in the present NAT plan and that no additional requirements existed.

REVIEW OF RECOMMENDATIONS OF PREVIOUS RAN MEETINGS

9.28 The Meeting briefly reviewed all outstanding recommendations made by previous regional air navigation meetings related to the area in question and covering the subjects considered under Item 9 by this Meeting and found that all of them were either obsolete or were superseded by the foregoing recommendations. The recommendations covered were those made by the Fourth North Atlantic RAN Meeting, the Special North Atlantic Meeting (1965) and the Fourth Caribbean RAN Meeting.

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* The statement of ATS requirements for VHF air-ground communications can be deduced from the Report on Agenda Item 16.

Appendix A to Part 9

NAM ATS ROUTE NETWORK

TABLE OF TYPICAL AIR ROUTES

1. ALERT - ANCHORAGE

   Alert - Prudhoe Bay - Anchorage.

2. (THULE/UPERNAVIK) - ANCHORAGE

   Resolute - Cape Parry - Inuvik - Fairbanks - Anchorage.

3. (SONDRE STROMFJORD) - FROBISHER - ANCHORAGE (1968)

   Frobisher - Cambridge Bay - Norman Wells - Dawson - Anchorage.

4. FROBISHER - CALGARY - SEATTLE

   Frobisher - Churchill - Lynn Lake - Vermillion - Calgary - Kimberley - Seattle.

5. CHURCHILL - CALGARY - SAN FRANCISCO

   [Churchill - Kimberley (c.f.4)] - Spokane - Pendleton - Lakeview - Red Bluff - Oakland - San Francisco.

6. SAGLEK - WINNIPEG - LOS ANGELES

   Saglek - Ft. Chimo - Winisk - Winnipeg - Pembina - Dickinson - Crazy Woman - Rock Springs - Milford - Boulder City - Hector - Los Angeles.

7. FT. CHIMO - CHICAGO

   Ft. Chimo - Poste De La Baleine - Moosonee - Kapuskasing - Sault Ste. Marie - Pullman - Chicago.

8. GOOSE - MONTREAL - TORONTO - CHICAGO - LOS ANGELES

   Goose - Lake Eon - Sept Iles - Mont Joli - Quebec - Montreal - Ottawa - Toronto - Peck - Pullman - Chicago - Joliet - Bradford - Lamoni - Pawnee City - Hill City - Alamosa - Farmington - Tuba City - Peach Strings - Hector - Los Angeles

9. GANDER - SYDNEY - HALIFAX - BOSTON - NEW YORK - NEW ORLEANS - (MEXICO CITY)

   Gander - Sydney - Halifax - Yarmouth - Boston - Putnam - New York - Coyle - Gordonsville - Pulaski - Knoxville - Chattanooga - Birmingham - Meridian - New Orleans - Grand Isle

10. GANDER - MONTREAL

    Gander - Channel Head - Moncton - Fredericton - Millinocket - Sherbrooke - Montreal.

11. MONTREAL - BOSTON - (BERMUDA/WEST INDIES)

Montreal - Plattsburgh - Boston - Nantucket -

12. TORONTO - NEW YORK - (BERMUDA/WEST INDIES)

Toronto - Buffalo - Huguenot - Newark/New York -

13. TORONTO - HOUSTON - (MEXICO)

Toronto - London - Cleveland - Rosewood - Evansville - Little Rock - Shreveport - Lufkin - Humble - Houston - Galveston -

14. TORONTO - CHICAGO

Toronto - Peck - Chicago.

15. NEW YORK - TORONTO - ANCHORAGE

/New York - Toronto (c.f. 12)/ - Sault Ste Marie - Armstrong - Lynn Lake - Fort Chipewyan - Fort Nelson - Whitehorse - Gulkana - Anchorage.

16. NEW YORK - DETROIT - CHICAGO - SAN FRANCISCO

New York - Slate Run - Detroit - Chicago - Dubuque - Fort Dodge - O'Neill - Scottsbluff - Rock Springs - Lucin - Mina - Linden - Oakland - San Francisco.

APPENDIX B TO PART 9

Requirements for service range and height for ATS VHF air-ground communications

Air-ground communications for	Symbol	Service		Remarks
		Range NM	Height FL	
1	2	3	4	5
Aerodrome control, including D/F service	T	25	40	
Precision approach radar	PR	25	40	
Approach control (low) including D/F service Radar approach control (low)	(APP)L (APP)R	25	100	
Approach control (intermediate) including D/F service Radar approach control (intermediate)	(APP)I (APP)IR	40	150	
Approach control (high) including D/F service Radar approach control (high)	(APP)H (APP)HR	50	250	
Area control service (lower airspace) Radar area control service (lower airspace) Terminal control functions (lower airspace)	(ACC)L)) (ACC)RL)) (TMA)	Within specified area 50	250 150	
Flight information service (lower airspace)	F	Within FIR	250	
Area control service (upper airspace) Radar area control service (upper airspace)	(ACC)U))) (ACC)RU))	Within specified area	450	One FIS channel per UIR may be assigned if no air traffic control channel is provided.
SST operations		Areas not yet specified	660	No specific requirements for assignments have as yet been established.

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Agenda Item 10: Airspace Utilization

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

10.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and in paragraphs 28 to 37 of the Report on Agenda Item 2, governed the consideration of Agenda Item 10.

10.2 In addition, those elements of the long-term systems plan given in the Report on Agenda Item 3 and related to the subjects reviewed under Agenda Item 10 were also taken into consideration in the discussions.

GENERAL

10.3 Under this Agenda Item, the following subjects were considered by the Meeting:

(a) Separation of aircraft

(b) Flight rules

(c) Provision of flight information service

(d) Organization of the flow of air traffic

(e) Flight planning

(f) Oceanic clearances

(g) Position reporting

(h) Special procedures for in-flight contingencies

(i) Use of radar in air traffic services

(j) ATS messages

(k) Uniform application of altimeter setting procedures

(l) Area of applicability of Regional Supplementary Procedures

(m) Co-operation between ATS units

(n) Review of outstanding recommendations.

10.4 With regard to the material contained in this report and referring to the operation of SST aircraft, the Meeting found that, due to the large number of variables still to be determined with respect to the exact operating modus of these aircraft, it was not possible to arrive at the formulation of specific provisions and procedures, essential for the safe conduct of these operations. On the other hand, it was agreed that in order to permit States and interested agencies to continue their planning with regard to such operations, it would be essential to develop a number of principles which could be used in further planning, on the understanding that these principles were still subject to further study as more information became available. In this respect, the Meeting noted information provided by EUROCONTROL regarding their studies and simulation programmes conducted in this field. As a consequence, any material in the Report on this Agenda Item relating to SST operations should only be regarded as guidance at this time, subject to later confirmation. It was noted that present information related mainly to the operation of Concorde aircraft.

10.5 As regards the presentation of recommendations concerning changes to the existing NAT RAC Regional Supplementary Procedures, the Meeting used as a reference Doc 7030 as amended by Amendment No. 125 of 2 April 1970. It noted, however, that the content of this document was being revised in order to arrive at a more rational presentation of the material contained therein and it also noted that, once the amendments to Annexes and PANS resulting from the recommendations made by the Sixth Air Navigation Conference became applicable, considerable changes would result to the text as now presented in Doc 7030. As a consequence, the Meeting refrained from making a collective recommendation covering all proposed changes to Doc 7030 and agreed that it would be more convenient if the changes relating to a subject were presented immediately following the text of the report dealing with the subject in question. This was done on the understanding that the incorporation of these recommendations in the appropriate form would be effected once the re-editing of Doc 7030 had been completed.

SEPARATION OF AIRCRAFT

10.6 When considering the subject of separation of aircraft in the NAT Region, the Meeting agreed that this should be dealt with under two aspects:

(a) changes which were required immediately and should, therefore, be reflected in the NAT RAC Regional Supplementary Procedures;

(b) matters which required further study but which were discussed by the Meeting.

Immediate changes to the NAT RAC SUPPS

Longitudinal Separation

10.7 When reviewing the special provisions made for the application of longitudinal separation in the NAT Region, as specified by the Special NAT Meeting (1965), the Meeting noted that the application of 20 minutes longitudinal separation between turbo-jet aircraft operating within the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic, Shanwick Oceanic and Sondrestrøm (south of 70°N) control areas had so far not been applied since it had not been possible to reach agreement on a common date of applicability between all provider States concerned. It was, however, now notified by all States concerned that there were no further difficulties preventing its implementation.

10.8 With regard to the application of 15 minutes longitudinal separation between turbo-jet aircraft operating in specified parts of the NAT Region, the Meeting agreed that the application of this separation should be extended so as to be also applicable in that part of the Santa Maria Oceanic control area situated north of 37°N. It was also believed that it would be helpful if difficulties preventing the general application of this separation in the New York Oceanic CTA north of 37°N could be overcome as soon as possible.

10.9 It was also noted that, with the introduction of new aircraft into service in the NAT Region, a problem was posed by the fact that these aircraft were operating at speeds which were significantly different from those used so far. In fact while the majority of today's subsonic aircraft were operating at a speed of Mach 0.82, it was expected that, with the introduction in significant numbers of Boeing 747 aircraft, the complete speed spectrum may extend between Mach 0.78 and Mach 0.89. It is evident that in the traffic flow along a given route and at the same level consisting of a mixture of aircraft operating at, say, Mach 0.82 and Mach 0.87, the traffic capacity on this flight path will be considerably reduced if, in providing separation between the aircraft concerned, no account is taken of this speed differential. Calculations show that over a stage length of approximately 1700 NM (corresponding to the distance between Gander and Shannon) and in no-wind conditions, approximately 2.25 minutes difference in separation per Mach 0.01 would result at the exit point as compared to the separation provided at the entry point of this stage. Therefore, a preceding faster aircraft operating at Mach 0.87 would have about 25 minutes longitudinal separation with respect to a successive aircraft cruising at Mach 0.82 by the time it reached the exit point of the NAT Region, if these aircraft were separated by 15 minutes over the entry point. As this would have considerable effects on the overall capacity of the North Atlantic air traffic control system, which would become particularly significant during the time when there exists an approximately even mixture of slower and faster aircraft, it was believed essential that measures should be taken which, while meeting the requirements of safety, would at least partially restore the traffic capacity of the system during this period.

10.10 It was, therefore, agreed that in those cases where 15 minutes longitudinal separation is applied between turbo-jet aircraft, this separation may be reduced over the entry point into the NAT Region to 10 minutes in those cases where the speed differential between a preceding faster aircraft and a successive slower aircraft along the same track is at least Mach 0.03 and that the separation over the entry point may be reduced to 5 minutes where the speed differential is at least Mach 0.06 between the aircraft concerned.

10.11 For those cases where 20 minutes longitudinal separation combined with the Mach number technique is applied between turbo-jet aircraft in the NAT Region, a similar provision was agreed to be made with a reduction to 15 minutes in the case of a speed differential of Mach 0.03 and to 10 minutes in the case of a speed differential of Mach 0.06.

RECOMMENDATION 10/1 - AMENDMENT OF RAC SUPPS- LONGITUDINAL SEPARATION

That Doc 7030, Part 2, be amended as follows:

(a) Amend para. 2.1.1(4) to read:

"twenty (20) minutes for turbo-jet aircraft operating within the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic, Shanwick Oceanic and Søndrestrøm (south of 70°N) control areas, except as in 2.1.1.1, 2.1.2 and 2.1.2.1".

(b) Amend para. 2.1.1(6) to read:

"thirty (30) minutes for turbo-jet aircraft operating north of 70°N, within the Søndrestrøm control area, and for other than turbo-jet aircraft except as in 2.1.1(5)".

(c) Add a new para. 2.1.1.1 to read:

"Where the separation in 2.1.1(4) is applicable, it may be reduced to:

(a) 15 minutes at the entry point into the oceanic controlled airspace, if the preceding aircraft is maintaining a speed of at least Mach 0.03 greater than that of the following aircraft; or

(b) 10 minutes at the entry point into the oceanic controlled airspace, if the preceding aircraft is maintaining a speed of at least Mach 0.06 greater than that of the following aircraft;

provided that the aircraft concerned have reported over the same entry point and follow the same track or continuously diverging tracks and the Mach number technique is therefore applied."

(d) Amend the first part of para. 2.1.2 to read:

"Fifteen (15) minutes separation may be applied between turbo-jet aircraft operating within the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic (north of 37°N), Shanwick Oceanic and Søndrestrøm (south of 70°N) control areas, provided that the Mach number technique is applied and the aircraft concerned have reported over the same entry point into the oceanic controlled airspace and:

(a) follow the same track; or

(b) follow continuously diverging tracks."

(e) Add a new para. 2.1.2.1 to read:

"The separation in 2.1.2 may be reduced to:

(a) 10 minutes at the entry point into the oceanic controlled airspace, if the preceding aircraft is maintaining a speed of at least Mach 0.03 greater than that of the following aircraft; or

(b) 5 minutes at the entry point into the oceanic controlled airspace, if the preceding aircraft is maintaining a speed of at least Mach 0.06 greater than that of the following aircraft."

(f) Amend the last two lines of para. 2.1.3 to read:

"provided that the Mach number technique is applied".

10.12 As regards the case of a preceding slower aircraft being followed along the same track by a faster aircraft, the Meeting noted that, due to a number of factors, this case could not yet be resolved in a uniform manner since too many variables entered into the calculation of the required separation. It was, however, informed by those States providing air traffic control service in the NAT Region that methods ensuring a continued safe separation had been developed and were actually used and it also noted that the new Attachment I to the PANS-RAC, resulting from the recommendations made by the Sixth Air Navigation Conference, made reference to this question (Amendment No. 2 to PANS-RAC, 9th Edition, Attachment I, para. 5.2.1, refers).

10.13 As it was estimated that by the middle of 1971 aircraft operating in the speed range of Mach 0.85 to Mach 0.87 or higher would constitute approximately 30 to 40 per cent of the total of the traffic operating in the NAT Region during the busy period, and that after that date their percentage will increase, it was believed that serious consideration should be given to a method whereby, within a given track structure, this traffic could be segregated from that traffic operating at Mach 0.82. One possibility to achieve this would be to reserve, based on the expected flow of traffic, either certain tracks or certain levels on a number of tracks for either of the two types of traffic, on the understanding that such a segregation would not imply that the best flight path would be reserved for any one of the two types of traffic.

10.14 The Meeting felt that international agreement on the segregation of traffic according to aircraft performance would need further review in the light of experience gained with the operation of the new types of aircraft and that its uniform resolution might, therefore, have to be reserved for later consideration. However, this should not deprive the Oceanic ACCs from developing appropriate operating procedures to cater for the needs expected to arise in the NAT Region.

10.15 As the safe application of the above procedures depends to a rather significant degree on the reliability and accuracy of the Mach meter, the Meeting felt that Recommendation 1.2/2 made by the Sixth Air Navigation Conference and referring to the calibration and maintenance of Mach meters or aircraft instruments used to calculate Mach numbers was insufficient. It felt that ICAO should, at the earliest possible time, develop world-wide specifications ensuring the highest possible accuracy of Mach number indications obtained on board aircraft while in flight.

RECOMMENDATION 10/2 - DEVELOPMENT OF SPECIFICATIONS ENSURING THE ACCURACY OF MACH NUMBER INDICATIONS OBTAINED ON BOARD AIRCRAFT

That the Airworthiness Committee of ICAO be invited to take necessary action to develop specifications ensuring the highest possible accuracy of Mach number indications obtained on board aircraft.

Lateral Separation

10.16 The Meeting noted that work conducted by the NAT Systems Planning Group during the period between the Special NAT Meeting 1965 and this Meeting had shown that conditions were not yet such as to permit safe application of the minimum lateral separation of 90 NM between the tracks of turbojet aircraft operating in that part of the NAT Region specified in the appropriate NAT RAC SUPPs. It noted that the States providing air traffic control services in the NAT Region had therefore reverted to the use of 120 NM lateral separation, and it was not expected that this situation would change in the immediate future. As this situation did not give rise to any difficulties and since it was expected that with the expected increase in navigational accuracy by all users operating in the NAT Region it might become feasible to apply the minimum as now specified, the Meeting refrained from making any changes to the existing provisions.

Vertical Separation

10.17 Following the Special NAT Meeting 1965, considerable work has been done by States and interested International Organizations on the question of the application of reduced vertical separation above FL 290. Despite the fact that much valuable data has been obtained by this work, it has not been possible to confirm that the introduction of such a reduced vertical separation above FL 290 was feasible. As a result of this situation, the Meeting refrained from making any recommendation and agreed that the vertical separation minimum now applied in the NAT Region should be retained.

10.18 The Meeting noted that 2000 ft vertical separation is currently being applied in the airspace over Canada above FL 230, as compared with the provisions in contiguous airspace in the NAT and NAM Regions where this separation is only applied above FL 290. This not only limits the number of available flight levels between FL 230 and FL 290 over Canada, but has serious effects on the flights in this band when operating in the transition area between the NAT Region and Canada and between the USA and Canada. In addition, it is expected that the problems regarding transition from the NAT Region to Canadian airspace and vice versa will become more serious when composite separation is implemented.

RECOMMENDATION 10/3 - COMPATIBILITY OF VERTICAL SEPARATION USED IN CANADA AND ADJACENT AREAS (d)

That Canada review its position with regard to the use of vertical separation above FL 230 with a view to implementing the separation of 1000 ft between successive flight levels in the band from FL 230 to FL 290 as soon as practicable.

Composite Separation

10.19 In the course of work undertaken with regard to lateral separation and vertical separation it became apparent that while neither of them could be reduced individually, a combination of these two types of separation consisting of values below those constituting their individual minimum was feasible and met the requirements for safe application. As a consequence, the proposal to allow the application of such a form of separation was made at the Sixth Air Navigation Conference and action is now in hand to include it in the standards within Annex 11. However, work conducted prior to the Meeting showed that the practical application of composite separation in the NAT Region should consist of a lateral element of 60 NM combined with a vertical element of 1 000 feet above FL 290, both these values representing the half value of the two types of separation as now applied individually.

10.20 As regards the area of application, it was found that this type of separation should be limited to the organized track structure established in the area where the main flow of traffic between Europe and North America operates and within that track structure to turbojet aircraft operating at or above FL 290. Moreover, it was also found that it could be applied between aircraft operating in the same or opposite directions.

10.21 In the light of the studies undertaken, the Meeting agreed that this type of separation should be applied in the NAT Region as proposed once the relevant standard in Annex 11, recommended by the Sixth Air Navigation Conference, had become applicable and it noted that the date envisaged was 4 February 1971. A proposal made by IFALPA to use composite separation based on a lateral element of 90 NM and a vertical element of 1000 feet above FL 290 was not accepted on the grounds that the 60 NM/1000 feet composite separation meets the safety requirements and provides an appreciably greater traffic capacity.

RECOMMENDATION 10/4 - AMENDMENT OF RAC SUPPS - COMPOSITE SEPARATION

That Doc 7030, Part 2, be amended as follows:

(a) Under the heading "Separation" insert a new paragraph as follows:

"X. Composite separation

X.1 For turbo-jet aircraft operating at or above FL 290 and within the organized track system when established within the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic, Shanwick Oceanic and Søndrestrøm (south of 70°N) control areas, composite separation, consisting of the combination of at least 60 NM lateral and 300 metres (1000 feet) vertical separation may be applied.

X.2 This type of separation may be applied between aircraft operating in the same or opposite directions."

(b) Under the heading "Establishment and use of organized tracks" insert the following new paragraphs:

"Y.1 When composite separation is used in the organized track system, the following procedures shall apply:

Y.1.1 Aircraft may be cleared to join the outer track of the organized track system at points other than the normal entry points in the oceanic CTAs provided required minimum longitudinal or vertical separation will exist between such aircraft and others operating along this track. The clearance shall, however, provide that joining shall be effected via a track extending between the point of joining and a point which, at 10 degrees of longitude from the joining point is laterally not less than 60 NM and not more than 120 NM distant from the track in question.

Y.1.2 Aircraft flying along the outer track of the organized track system may be cleared to leave the system provided that the separation from all other aircraft in the system continuously increases until another form of separation is established.

Y.1.3 Aircraft changing tracks within the organized track system or which are crossing the organized track system shall be cleared to do so only if they are provided with minimum longitudinal, lateral or vertical separation with respect to other aircraft.

Y.1.4 Aircraft operating in the organized track system may be cleared to change levels on the same track."

10.22 When considering the implementation of composite separation, the Meeting agreed that this would have to be reviewed under two aspects:

(a) Preparatory measures required

(b) Manner of application.

10.23 With regard to the preparatory measures, the Meeting agreed that these should at least cover the following:

(a) the provision of radar coverage in the entry/exit area where composite separation is applied;

Note: It should also be noted that procedural provisions will have to be made to cover the potential case of radar failure.

(b) the navigational environment in the entry/exit areas shall be such that aircraft can navigate accurately along the routes assigned to them. This may be achieved either by the provision of adequate radio navigation aids or by the provision of suitable navigation equipment on board the aircraft or a suitable combination thereof;

(c) the entry/exit procedures in the transition area to and from the oceanic airspace shall be such that an orderly transition between the fixed ATS route network and the organized track structure based on the use of composite separation, is possible.

10.24 As regards the possible manner of application, the Meeting felt that it constituted such a change from existing procedures, both to pilots and controllers, that it would be advisable to apply this new type of separation on a progressive basis. Initial limited application will permit better utilization of the airspace since it is expected to permit earlier implementation, because facilities and services required for the full implementation will, in some cases, not be available before a number of years. At the same time the limited application will permit controllers and pilots to familiarize themselves progressively with the required procedures, thus avoiding an abrupt overall change to existing procedures.

10.25 In the light of these considerations the Meeting believed that it would be best to leave the arrangements for the start of application, as well as its initial mode of application and possible expansion, to the provider States concerned on the understanding that:

(a) full coordination would be effected between them prior to any step taken in this field, and

(b) necessary aeronautical information publications informing operators of the intended measures would be published well ahead of any date of application.

10.26 It was also noted that the level of safety of this type of separation was directly related to the degree with which it was applied to aircraft operating in opposite directions. It is therefore necessary to keep the developments regarding overlaps in time between the flows of traffic operating in opposite directions and their general navigation capability under close review and the Meeting agreed that this should be done by the NAT Systems Planning Group.

RECOMMENDATION 10/5 - PREPARATORY MEASURES FOR THE APPLICATION OF COMPOSITE SEPARATION

That provider States concerned with the application of composite separation within the organized track system of the NAT Region, prior to the application of such separation take necessary measures to ensure that:

(a) radar coverage is provided in those parts of the entry/exit areas where composite separation is applied;

(b) the navigational guidance in the entry/exit areas is such that aircraft can navigate accurately along the routes assigned to them;

(c) the entry/exit procedures in the transition areas to and from the oceanic airspace provide for an orderly transition between the fixed continental ATS route network and the organized track structure.

RECOMMENDATION 10/6 - MANNER OF APPLICATION OF COMPOSITE SEPARATION

That provider States concerned with the application of composite separation ensure that prior to its application:

(a) full coordination is effected between the oceanic ACCs concerned with this type of separation, and

(b) notification in AIP and/or NOTAM is given well ahead of the date of application of such separation.

RECOMMENDATION 10/7 - CONTINUED REVIEW OF THE OVERLAP OF OPPOSITE DIRECTION TRAFFIC FLOWS AND NAVIGATION PERFORMANCE

That the NAT Systems Planning Group keep developments regarding the overlap in time between the flows of air traffic operating in opposite directions and the navigation performance of aircraft to which composite separation is applied, under close review with a view to obtaining necessary statistical data in order to permit a continued assessment of the level of safety provided by this form of separation.

Reduction in separation

10.27 The Meeting reviewed the existing NAT RAC SUPPs regarding "special arrangements for the reduction of separation by States" as now contained in Doc 7030 and found that no change was required at this time.

Separation planning criteria for SST aircraft

10.28 As already pointed out in paragraph 10.4, the Meeting when reviewing the question of separation between SST aircraft, agreed that any values studied should only be considered for future planning purposes and were subject to further study.

10.29 With respect to longitudinal separation, it was noted that the time spent by SST aircraft in the NAT oceanic area will be much shorter than that of subsonic traffic and will not normally exceed 1 1/2 - 2 hours, depending on the track flown and on the destination. It was, therefore, believed that initially the provision of 10 minutes longitudinal separation between successive SST aircraft at the oceanic entry point would be satisfactory. It is however possible that this could be reduced to a shorter interval as operating experience confirms the anticipated capability of SST aircraft to adhere accurately to their predicted flight profile.

10.30 As regards the lateral separation between SST aircraft, this depends to some extent on the time required between the detection of a lateral deviation from track and a successful corrective intervention by the pilot. This in turn is again related to cockpit operating procedures which are thus of particular importance. Subject to the satisfactory completion of trials with pre-production aircraft it was agreed that ATC planning should be based on the provision of 60 NM lateral separation between adjacent tracks for either opposite or same direction traffic.

10.31 Concerning vertical separation the Meeting noted that while operating at sub-sonic speeds SST aircraft will be separated vertically from other aircraft in accordance with normal procedures. During acceleration to supersonic flight, the provision of vertical separation between SST aircraft may not always be feasible, and radar may be required to provide separation. On the other hand, the flight profiles of SST aircraft in acceleration and those in deceleration are such that an automatic vertical separation is likely to exist between them in the transition area between domestic and NAT airspace. In addition the use of Mode C of Secondary Surveillance Radar offers a potential means of ensuring vertical separation between SST aircraft.

10.32 Above FL 500 and up to the maximum normal operating level, SST aircraft will normally cruise-climb up to the end of cruise ("top of descent"). When this technique is applied only lateral or longitudinal separation can be applied to them during this phase. When operating in an organized track structure with a common cruise-climb regime, the provision of vertical separation between SST aircraft may be unnecessary since they will not achieve proximate vertical relationship in the cruise phase of flight, separation being maintained in a common plane laterally or longitudinally.

10.33 For planning purposes "sufficient vertical separation" for the SST aircraft is assumed to be 4 000 feet. This assumption is based on a prediction of the performance of the altimetry system of SST aircraft. Should experience with pre-production aircraft show that the actual performance is better than now predicted, this should be reflected in the separation applied.

10.34 During subsonic flights the normal radar separation minima prescribed by the competent authority should be applied to SST aircraft. However, whenever an SST aircraft in trans-sonic flight or in flight at supersonic speed is involved, a minimum of 10 NM radar separation should be applied between the aircraft concerned. This value has been used in simulation studies and seems to cater for the types of radar likely to be employed for the surveillance of SST aircraft.

RECOMMENDATION 10/8 - PLANNING CRITERIA FOR THE SEPARATION OF SST AIRCRAFT

That for planning purposes regarding the provision of air traffic control services to SST aircraft in the NAT Region the following criteria regarding separation of such aircraft should be used:

(a) for longitudinal separation 10 minutes between successive SST aircraft over the same oceanic entry point.

(b) for lateral separation 60 NM between adjacent tracks established in the oceanic control areas regardless of whether these tracks are used for same direction or opposite direction traffic.

(c) sufficient vertical separation should be assumed to exist between SST aircraft in supersonic flight when their respective levels are different by 4 000 feet.

(d) a minimum of 10 NM radar separation should be provided between SST aircraft in trans-sonic or supersonic flight and any other aircraft.

Matters requiring further study

10.35 It was evident to the Meeting that, with the increase of traffic in the NAT Region and the change of the aircraft fleets of operators expected to occur over the next years, there would be a continuing requirement to improve the traffic capacity of the ATC system in the region. One way of achieving this was to further reduce separation. However, in order to do this without causing possible safety risks, it was essential to:

(a) establish criteria appropriate to an acceptable level of safety, and

(b) improve the navigation performance of all aircraft in the system.

10.36 The Meeting noted the work which had been done by the NAT Systems Planning Group since the Special NAT Meeting in 1965 and which had been devoted to the development of a method whereby collision risks, which had been calculated based on statistical data on the navigation performance of aircraft in the NAT Region, had been compared with a target level of safety. It also noted that this subject was now included in the work programme of the Panel charged with a world-wide review of the general criteria for separation (RGCS Panel).

10.37 **In view of this situation, the Meeting refrained from making any recommendation on this subject. It wished it however, to be noted that, should a target level of safety be established this should never be considered more than an aid in assessing the safety of any form of separation since such assessment would, by necessity have to take account of operational and economic considerations. The Meeting therefore agreed that this matter required further study within the context of the long term planning.**

10.38 Because of the relationship which exists between the navigation performance of any pair of aircraft (both across and along track) and the separation required between them, it is evident that, in areas where the navigation performance of aircraft varies considerably, this will impose severe penalties on those capable of appreciably higher performance than the "worst" performer. The Meeting noted that a data collection exercise organized during the period from July 1967 to March 1968 had revealed a significant variation in navigation performance and this not only between aircraft carrying different navigation equipment but also aircraft carrying identical navigation equipment.

10.39 While a proposal to separate aircraft into different classes based on their demonstrated navigation performance and applying to them different sets of separation minima was not retained due to the number of technical, operational and organizational problems this would raise, the Meeting nevertheless agreed that this matter needed careful attention and this not only by the operators conducting flights in the NAT Region, but also by the States which had jurisdiction over those operators.

10.40 It was therefore agreed that States' and operators' attention should be drawn to the need to:

(a) improve the navigation performance of aircraft in the NAT Region to the maximum extent possible and to effect efficient supervision over such operations;

(b) investigate any known or reported case of significant navigation error; and

c) in case of technical or human error involved in such cases, take adequate corrective measures.

10.41 It was also noted that, while a classification of traffic according to navigation performance based on administrative decisions may not be practicable there was a strong possibility that such a classification may come about "naturally" by the introduction of new types of aircraft which have not only different operating characteristics with regard to their aeronautical performance, but also with respect to their navigation performance. Information provided to the Meeting by IATA with regard to the reliability of inertial navigation systems (INS) seemed to support this possibility. As this was however not likely to occur within the immediate future, and as the RGCS Panel aims to develop a relationship between navigation accuracy and reliability and its effects on separation on a worldwide basis, it was felt that it would be premature to take any action with regard to the classification of traffic at this time.

RECOMMENDATION 10/9 - IMPROVEMENT AND MONITORING OF NAVIGATION PERFORMANCE OF AIRCRAFT OPERATING IN THE NAT REGION

(a) That operators engaged in North Atlantic operations make every effort to improve the navigation of their aircraft and the navigation techniques applied in the NAT Region in order to ensure a uniformly high quality of navigation and that States having jurisdiction over such operators take all necessary measures to ensure that these objectives are actively pursued.

(b) That operators engaged in North Atlantic operations and States having jurisdiction over such operators investigate carefully any known or reported case of gross navigation error which has occurred during a flight in the NAT Region of an aircraft with which they are concerned and that, where found appropriate, States concerned and operators take necessary corrective action.

10.42 In this respect, it was noted that Canada as well as the United Kingdom have already instituted procedures whereby gross errors in navigation are brought to the attention of operators. For future purposes, it was agreed that a lateral error in excess of 30 NM would require notification and that France, Ireland and the USA would join in this procedure as soon as possible. In addition, on a proposal by a number of States, the Paris Regional Office had issued summarised reviews of observed navigational errors. It was also noted that IATA has a programme in being, aimed at advising airlines on those methods of navigation shown to be successful, and that information on this subject has been disseminated to virtually all NAT operators.

RECOMMENDATION 10/10 - REVIEW OF REPORTED OR OBSERVED NAVIGATIONAL ERRORS

(a) That Canada, France, Ireland, the United Kingdom and the USA continue, or institute, procedures whereby lateral errors in navigation in excess of 30 NM be brought to the attention of operators and/or where necessary the State of Registry of the aircraft concerned with the least possible delay;

(b) That ICAO continue to issue at 6-month intervals summaries on observed navigational errors in and immediately adjacent to the NAT Region, based on data obtained from Canada, France, Ireland and the United Kingdom.

FLIGHT RULES

10.43 The Meeting briefly reviewed the Regional Supplementary Procedures concerning flight rules as reflected in Doc 7030. They were found to be adequate and no recommendation for change was, therefore, made.

PROVISION OF FLIGHT INFORMATION SERVICE

10.44 When reviewing the Regional Supplementary Procedures concerning the provision of flight information service, the Meeting noted that the two existing provisions applicable in the NAT Region needed no change. However, it also noted that so far no provision had been made for the NAT Region regarding the transmission of SIGMET information and the transmission of amended aerodrome forecasts. As these provisions are subject to regional agreement, the Meeting developed appropriate provisions specifying, in the case of the transmission of SIGMET information, that this should cover a portion of the route up to two hours flying time ahead of the aircraft and that it should be transmitted by VOLMET broadcast, by a general call to a group of aircraft or by directed transmissions to individual aircraft in that order, taking account of all applicable circumstances existing at the time of transmission. With regard to the transmission of amended aerodrome forecasts, the Meeting agreed that these should be passed to aircraft within 60 minutes from the aerodrome of destination.

RECOMMENDATION 10/11 - AMENDMENT OF RAC SUPPS - TRANSMISSION OF METEOROLOGICAL INFORMATION TO AIRCRAFT

That Doc 7030, Part 2, be amended as follows:

(a) Insert a new procedure applicable in the NAT FIRs to read:

"7.4.x SIGMET information shall be transmitted to aircraft by VOLMET broadcast, by a general call to a group of aircraft, or by directed transmissions to individual aircraft, as determined by the appropriate area control centre according to the circumstances, bearing in mind the need to ensure timely receipt of the information by the aircraft and to keep the load on the HF en-route communication channels to a minimum."

(b) Insert "NAT" opposite paras. 7.4.2 and 7.5.

ORGANIZATION OF THE FLOW OF AIR TRAFFIC

Concept of the Organized Track System

10.45 The Meeting noted that,as air traffic in the North Atlantic increased, it became more and more necessary to resort to the establishment of an organized track system to cater for the main flow of air traffic operating between Europe and North America during peak hours of traffic density. While this system had proved its usefulness with respect to traffic operating between the central part of western Europe and North America, it, nevertheless, presented certain disadvantages to air traffic which, because its points of origin in Europe were generally situated in the northern or the southern part of Europe, only joined the organized track system when already well within the NAT Region. Efforts to overcome this situation had repeatedly been made but had so far not resulted in a satisfactory solution to this problem. A number of possible solutions which had been explored prior to the Meeting including, in particular, a proposal submitted by Spain to the Meeting were discussed at length. They were found to suffer from one essential shortcoming. While they generally provided for more advantageous routings across the North Atlantic, all of them failed to cater for the required capacity increase during peak traffic periods. It was, therefore, agreed that, while the matter required urgent attention, action on it had to be divided into two phases:

(a) In the first phase, immediate attention should be given to any measures which when applied to the present air traffic control system would improve the situation with regard to accommodation of traffic joining or crossing the organized track system either from the north or from the south; and

(b) A second phase which should envisage a more basic review of the whole concept of the organized track system with the aim to making such modifications as were possible to come to a more satisfactory long-range solution regarding the needs for economy of individual flights and the need for increased capacity within the ATC system of the North Atlantic.

10.46 It was pointed out that improved communications and better co-ordinatic between the oceanic ACCs concerned, and the application of the revised longitudinal separation would more effectively accommodate the traffic. In addition, it was agreed that during phase one the organized track system should, when required, be extended to the south so that it would cover the northern part of the Santa Maria Oceanic FIR. A further measure related to this extension was that the co-ordination process now conducted between Shanwick and Gander Oceanic ACCs, prior to the establishment of an organized track system covering a specific peak period, should be extended so as to include consultations with the adjacent Oceanic ACCs at New York, Reykjavik and Santa Maria, in order to permit that full account could be taken of traffic expected to operate through these control areas and joining the organized track system other than at its entry and exit points. Finally, it was expected that the early provision of a direct-speech circuit between Shanwick ACC and Madrid ACC would also contribute to a more satisfactory solution of the present problem.

10.47 The measures envisaged during the second phase, i.e. the basic review of the organized track system, were recognized to require extensive and detailed studies and it was, therefore, not believed possible that any valuable contribution could be made to this project at this Meeting. However, in view of its recognized urgency, the Meeting agreed that a recommendation should be directed to the NAT Systems Planning Group (Recommendation 3/2 in the Report on Agenda Item 3 refers) to undertake work on this question at the earliest possible time and with the participation of all interested parties concerned.

10.48 In this context, the Meeting noted a proposal by Spain which envisaged the creation of a new planning organism catering for route planning in the NAT Region. While the Meeting agreed that the proposal had many merits, it nevertheless doubted that it could be implemented within a timescale which was likely to have immediate beneficial effects on the present unsatisfactory situation. It was, therefore, agreed that the substance of this proposal should also be considered by the NAT Systems Planning Group in its more long-term study.

10.49 A proposal by Iceland to introduce a system of preferential routes extending primarily between Iceland and the boundaries of the Reykjavik FIR and which was made in order to facilitate the resolution of traffic problems now encountered in and around Iceland was also reviewed by the Meeting. While the principle underlying the proposal was generally supported, detailed discussion nevertheless revealed that there remained some questions which appeared to need further clarification between Iceland and the operators affected by the proposal. It was, therefore, agreed that Iceland should have further consultations with the operators concerned before implementing the proposed routing system.

RECOMMENDATION 10/12 - AMENDMENT OF RAC SUPPS- ESTABLISHMENT AND USE OF ORGANIZED TRACKS

That Doc 7030, Part 2, paras. 4.8.1 and 4.8.1.1 be amended to read:

"4.8.1 When necessary in order to permit optimum use of the airspace, the area control centres serving the Gander and Shanwick Oceanic control areas may, subject to co-ordination with each other and, when appropriate, with the New York Oceanic, Reykjavik, and Santa Maria Oceanic ACCs, apply an organized track system. The following procedures shall then be applied:

4.8.1.1 Operators conducting scheduled or non-scheduled operations within Gander, Santa Maria Oceanic (north of 37°N) and Shanwick Oceanic CTA 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 and, concerning tracks in the area between 37°N and 45°N in the Santa Maria Oceanic CTA also to Santa Maria Oceanic ACC."

RECOMMENDATION 10/13 - CO-ORDINATION BETWEEN ACCs WITH RESPECT TO THE ORGANIZED TRACK SYSTEM

That Provider States concerned take, as a matter of urgency, all necessary action to improve the co-ordination between the ACCs affected by or responsible for the establishment of the organized track system in order to achieve a better modus operandi both from the point of view of integration of aircraft joining the organized track system at points other than the entry points into the NAT Region, and from the point of view of capacity, so as to facilitate integration of such air traffic under more favourable conditions.

RECOMMENDATION 10/14 - BASIC REVIEW OF THE ORGANIZED TRACK SYSTEM

That the NAT Systems Planning Group at its first meeting following the NAT V RAN Meeting initiate necessary action to conduct a basic review of the organized track system with a view to permit a more equitable distribution of penalties incurred by operators during peak traffic periods and to facilitate to the optimum extent possible access into the organized track system by aircraft joining it at points other than the entry points into the NAT Region, taking into account particularly a proposal made by Spain regarding a modified track structure.

RECOMMENDATION 10/15 - INTRODUCTION OF A SYSTEM OF PREFERENTIAL ROUTES IN THE REYKJAVIK FIR

That, prior to the implementation of a system of preferential routes in the Reykjavik FIR, Iceland arrange for necessary consultations with all operators affected by this system in order to ensure that any detrimental effects of such a system, particularly on long-range polar operations, are sufficiently taken into account.

10.50 In the context of this basic study of the organized track system, it was also noted that the introduction of SST aircraft in appreciable numbers in the coming years would impose additional constraints on the air traffic control system. These resulted from problems created in the transition area where subsonic air traffic and SST traffic was expected to operate in the same height band and, as explained in paragraph 10. 60 , from the need to maintain, at least initially, a relatively close relationship between the organized track system for subsonic air traffic and any track system developed for SST aircraft.

10.51 As it is possible that for SST operations a fixed route structure may be the most suitable means of meeting their requirements, the question has arisen whether studies should not be undertaken to see whether the route structure catering for subsonic air traffic, which is now established on a daily basis, cannot be given a more permanent status. There is as yet no statistical data available regarding the daily or seasonal variations of the subsonic track system and on the cost/benefit aspect of a comparison between a track system as determined by ATC and using forecast MET conditions and the actual MET conditions encountered in flight on the tracks. The Meeting agreed that it would be worthwhile to look into this question in more detail in order to be able at a later date and based on appropriate data to determine whether, from an overall systems point of view, it would not be advantageous to define a limited number of possible route structures which can be related to specific operating conditions in the NAT Region, especially as regards the meteorological conditions. It was believed that this latter aspect was of particular interest when applied to a time where possibilities for a direct data exchange existed between computers used respectively for flight planning by the operators, air traffic control and meteorological purposes.

Problems of Crossing Traffic

10.52 As already stated in previous meetings, the problem of traffic crossing the organized track system, rather than diminishing in significance, was increasing not only in the area where the main traffic flow between Europe and North America operated, but also in the area east of the southern coast of the United States of America where a major stream of traffic, operating between Canada or the area around New York and points in the Caribbean Region, was crossed by traffic between Europe and points in the southeast part of the USA. Despite efforts made by all ACCs concerned, it had as yet not been possible to avoid occasional severe penalties with respect to flight levels to aircraft crossing these major traffic flow areas. Without being able to offer any specific solution, the Meeting felt, however, that efforts should be continued to at least reduce the existing problems to bearable proportions so that economic penalties to the operators concerned are kept to a minimum.

RECOMMENDATION 10/16 - PROBLEMS CREATED BY FLIGHTS CROSSING MAIN FLOWS OF AIR TRAFFIC IN THE NAT REGION

That States concerned, in consultation with operators affected by this problem, continue their efforts to improve the situation with respect to aircraft crossing main flows of traffic in the NAT area, with a view to ensuring that such flights are not unduly penalized by excessive re-routings and/or large changes in, or assignment of operationally unsatisfactory, flight levels.

Specific Co-ordination Problems

10.53 In the course of its discussions on Agenda Item 9, the Meeting noted that there existed a specific problem regarding the co-ordination of air traffic in the vicinity of 45°N 13°W (para. 9.5.6 refers). As it was not believed that a change of the FIR boundaries in the area in question would resolve these problems, the Meeting agreed that a solution should rather be sought by the conclusion of appropriate procedural agreements between the ACCs concerned.

RECOMMENDATION 10/17 - CO-ORDINATION PROBLEMS IN THE VICINITY OF 45°N 13°W

That Portugal, Spain and the United Kingdom undertake studies of the ATS problems encountered in the vicinity of 45°N 13°W where the FIRs Madrid, Santa Maria Oceanic and Shanwick Oceanic join, with a view to developing procedural arrangements necessary to resolve the problems encountered.

Transition Procedures

10.54 The Meeting noted that as traffic in the NAT Region increases, so increase the problems encountered in the transition area between the fixed continental ATS route networks and tracks in the oceanic airspace. This was particularly apparent on the European side of the NAT Region not only because of the larger diversity of originating points for NAT traffic but also because of the more complex organizational set up with regard to the air traffic services involved. As explained previously, the introduction of composite separation will pose new problems in this respect and so will the introduction of SST operations whereby the impact of the latter will depend largely on whether supersonic flight of SST aircraft will be permitted over land areas.

10.55 Studies undertaken by the States concerned have shown that the resolution of these problems is very intimately related to local conditions and that it is therefore not possible to develop generally applicable procedures. Nevertheless, it has become evident that there exists one common problem concerning the early co-ordination of NAT flights between continental and oceanic ACCs responsible for the initial integration of those flights into the NAT traffic flow. Earliest possible transmission of the oceanic clearance to flights and close adherence by such flights to their estimated time over the designated entry point into the NAT Region could do much to increase the traffic capacity of the NAT ATC system.

10.56 Transition problems are expected to become even more acute with the start of operation of SST aircraft, when the question of the determination of start of acceleration and the beginning of deceleration will be added to the already complicated co-ordination requirements.

10.57 Without entering into details, many of which are determined by local operational and technical (equipment) considerations, it was believed that the use of SSR for early identification of individual flights, their separation and with the use of Mode C, automatic pressure altitude reporting might assist considerably in resolving those problems.

RECOMMENDATION 10/18 - PROBLEMS ENCOUNTERED IN TRANSITION AREAS

That States concerned with problems encountered in the transition area between the continental fixed ATS route network and flight in the oceanic airspace, actively pursue studies for their resolution and provide the necessary technical facilities and services required to permit timely and efficient co-ordination between the ATC units concerned.

Track Structure for SST aircraft

10.58 From early studies it appeared that at least in the initial stage of planning, it would be advantageous to assume that for scheduled SST operations an organized track structure based on a great circle should be used in order to cater for the main traffic flow of SST aircraft across the North Atlantic on the understanding that any track structure would also be dependent on decisions taken regarding the admissibility of sonic boom over land areas. It was however agreed that a fixed parallel track structure should not be considered as the only workable solution and that, therefore, the possibility of the provision of a free track structure should be kept under review. Probably elements of both may be required.

10.59 On the North Atlantic, the area of the main traffic flow of SST aircraft between Europe and North America may be considered to extend along a great circle between London/Paris and New York. A route structure consisting of tracks parallel to this axis would however impose heavy penalties in time and fuel on aircraft operating to New York from European terminals located further to the North or South of this axis. The same applies to flights bound for Montreal, Chicago, etc. from most European terminals. For these flights, a track structure would be needed where conflicts caused by crossing traffic would normally have to be resolved by the interruption of the cruise-climb of the aircraft concerned to provide for vertical separation. When economically possible, aircraft on these tracks should join the axis of the main traffic flow within radar coverage on either side of the North Atlantic.

10.60 A further point which, in the opinion of the Meeting, deserved attention in the development of a route structure for SST aircraft was the need to provide for a close relationship between it and the sub-sonic track system, at least during the initial stages of operation of SST aircraft, since little or no information is as yet available on the likely frequency with which SSTs may be obliged to descend into those layers of the airspace usually occupied by sub-sonic air traffic. It was however believed that this relationship should not necessarily imply the need for the parallel or near-parallel alignment of the two sets of tracks used.

RECOMMENDATION 10/19 - ROUTE STRUCTURE FOR SST OPERATIONS

That co-ordinated studies aimed at the determination of the most suitable route structure to be applied to SST aircraft in the NAT Region be actively pursued by all States and international organizations concerned with a view to presenting the results obtained to the Limited NAT RAN Meeting proposed to be held one year in advance of the start of scheduled SST operations in this Region.

FLIGHT PLANNING

Reference to organized tracks in flight plans

10.61 Experience with the organized track system gained over the last number of years has shown that many operators intending to operate within the area covered by this system are planning their flights on one or the other of the promulgated tracks. It would therefore appear advantageous if the code letter assigned to the track by the oceanic ACC concerned, and promulgated to operators, could be used in the flight plan instead of a rather lengthy listing of significant points expressed in degrees of latitude and longitude whenever the track chosen is identical with one of the tracks described in the track structure message. Such a procedure would not only simplify the preparation of flight plans by operators, but would also shorten considerably the resultant flight plan message normally transmitted via the AFTN and could thus lead to a saving of both time and effort on the part of all those concerned with the handling of flight plan messages. As it was noted that the provider States as well as the operators were fully in agreement on this proposal, the Meeting agreed to make an appropriate recommendation. In doing so, the Meeting noted however that the present system used for designating tracks in the organized track system did not entirely correspond to the principles laid down in Appendix A to Annex 11 governing identification of ATS routes. It was however noted that the strict application of the principles specified in Annex 11 may result in a situation whereby confusion could arise between the designation of those portions of the route of a flight conducted within the continental fixed ATS route network on either side of the North Atlantic and the designation used for the track within the organized track system of the NAT Region. In addition the present manner of designating tracks in the NAT Region was well established, well known to pilots and operators and had not resulted in any difficulties. The Meeting therefore unanimously agreed that the present system of designation of these tracks should be retained and that modifications should be made to the provisions in Annex 11 permitting the use of the practice now in use in the NAT Region.

Insertion in flight plans of ETAs over FIR boundaries and estimated times over significant points

10.62 The Meeting noted that as regards the requirements for inserting ETAs at FIR boundaries and estimated times over significant points, there was a significant difference between the requirements relating to flights operating outside of or at times when the organized track system was not in operation and flights operating in the organized track system. For the first category of flights, it was confirmed that there was a requirement to insert not only ETAs at FIR boundaries, but also all estimated times over the significant points listed to describe the planned route in the flight plan.

10.63 Operating within the organized track system the only requirement was to indicate an ETA at the FIR boundary marking the entry into the NAT Region and that otherwise no further times were required. It was however emphasized that this provision was restricted to aircraft which plan their entire flight within the NAT Region along one of the organized tracks and that aircraft joining an organized track at points other than the entry point in the NAT Region would have to comply with the provisions mentioned in paragraph 10.62 above.

Requests for alternative flight levels in flight plans

10.64 The existing NAT RAC Supplementary Procedure permitting a pilot to include under item 18 of his flight plan a request for flight levels other than those shown under item 15 and which had been provided in order to permit flights to indicate a preferred alternative in those cases where their request for the level indicated in item 15 could not be met, was reviewed by the Meeting. It was found that in the light of developments this paragraph needed a slight modification since the present provision stating that flight levels "other than those appropriate to their direction of flight" had led to certain interpretation difficulties. In addition the Meeting found that the possibility for pilots to insert more than one alternative flight level was of little practical value but could only result in lengthening the corresponding messages unnecessarily. It therefore decided that the provision should be limited to the insertion of one alternative flight level only.

Submission of flight plans

10.65 With regard to the provision in the NAT RAC SUPPS specifying that flight plans for NAT operations should be submitted as early as possible, the Meeting agreed to retain this provision. However, since it was addressed to operators only and did not involve the responsibility of other ground services outside the NAT Region, a proposal to extend the applicability of this procedure to other ICAO regions affected was not retained on the understanding that operators would make necessary arrangements wherever the requirement arose for its application.

RECOMMENDATION 10/20 - AMENDMENT OF ANNEX 11 - DESIGNATION OF ATS ROUTES

That Annex 11 be amended to permit organized tracks in the NAT Region to be designated by a regional identifier followed by a single letter.

RECOMMENDATION 10/21 - AMENDMENT OF RAC SUPPS - FILING OF FLIGHT PLANS

That Doc 7030, Part 2 be amended as follows:

(a) Amend para 4.1.1 to read:

"4.1.1 Flight plans for flights conducted wholly or partly outside the organized tracks in the NAT Region shall be made in accordance with the following:-"

(b) Renumber para 4.1.1.4) as para 4.1.y.

(c) Insert a new procedure applicable in the NAT FIRs to read:

"4.1.x For flights conducted along one of the organized tracks from the entry point into the NAT FIRs to the exit point, the organized track shall be defined in the flight plan by the abbreviation "NAT" followed by the code letter assigned to the track."

(d) Insert a new procedure applicable in the NAT FIRs to read:

"4.1.z For flights conducted along one of the organized tracks from the entry point into the NAT FIRs to the exit point, the estimated time of arrival over only the first Oceanic FIR boundary should be specified in Item 13 of the flight plan."

(e) Insert a new procedure applicable in the NAT FIRs to read:

"4.1.n For flights conducted wholly or partly outside the organized tracks in the NAT Region, estimated times over significant points en route shall be specified in Item 18 of the flight plan."

(f) Amend para 4.1.4 to read:

"4.1.4 For turbo-jet aircraft intending to operate within the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic, Shanwick Oceanic and Søndrestrøm (south of 70°N) control areas, requests for a suitable alternative flight level may be included in Item 18 of the flight plan."

Indication of and adherence to Mach Numbers

10.66 Because of the recommendations made with regard to the application of longitudinal separation in the NAT Region, which are largely based on the use of the Mach number technique, the Meeting found it necessary to extend the area of application of the procedure whereby the Mach number planned to be used should be included in the flight plan.

10.67 In addition, it was felt that, since the existing provisions regarding adherence to the ATC approved Mach number are closely linked to the provision of longitudinal separation, they should be relocated in Doc 7030 to make this association more apparent than is now the case.

RECOMMENDATION 10/22 - AMENDMENT OF RAC SUPPS - USE OF MACH NUMBERS

That Doc 7030, Part 2 be amended as follows:

(a) Amend para 4.1.2 to read:

"4.1.2 For turbo-jet aircraft intending to operate in the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic, Shanwick Oceanic or Søndrestrøm (south of 70°N) control areas, the Mach number planned to be used for any portion of their flight within these control areas shall be specified in Item 15 of the flight plan"

(b) Amend the first sentence of para. 4.4.1 up to the words "Mach number" to read:

"Turbo-jet aircraft operating in the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic, Shanwick Oceanic or Søndrestrøm (south of 70°N) control areas shall adhere to the Mach number ..."

(c) Delete the Note following para. 4.4.1

(d) Relocate paras 4.4.1 and 4.4.2 under Section 2.1 "Special application of longitudinal separation."

OCEANIC CLEARANCES

Clearance delivery for westbound turbo-jet traffic

10.68 The Meeting noted that oceanic clearance for westbound turbo-jet traffic from Europe to North America and operating within the area of the main traffic flow is at present effected via two VHF clearance delivery channels provided within the United Kingdom with a service range and height so as to permit early delivery of these clearances. Distribution of the communications load on these two channels is effected so that aircraft registered east of 30°W are required to use one channel for this purpose while the other channel is used by aircraft registered in States situated west of 30°W. However it has recently been noted that, with the increase of air traffic operating in the NAT Region, the communications load on the two channels in question was approaching saturation and the need for an additional channel could therefore be foreseen. Investigations made by the United Kingdom revealed that one of the reasons for the congestion on these channels was the requirement, stipulated in the Regional Supplementary Procedures, that pilots who receive an abbreviated clearance are required to read back full details of the track specified in the abbreviated clearance by a simple code letter. This led the United Kingdom to a proposal which envisaged that, since the message containing details of the organized route structure was now made available to all operators on a regular basis and was generally available to pilots, it would be possible to adopt a system whereby full details of the organized route structure were trans-

mitted in broadcast form over the new third oceanic clearance delivery channel, while the communication concerning assignment of the actual track to pilots could be abbreviated to the code letter of the track in question. The need for read-back by the pilot of the route in full detail could then be eliminated, on the understanding that pilots would obtain, or confirm, details of the route by listening to the broadcast made on the new third channel. The United Kingdom pointed out that according to studies made in the United Kingdom this proposal contained sufficient safeguards against possible misunderstandings as to the assigned route since it was envisaged that:

(a) the pilot could check his route information against the broadcast on which precautions were to be taken to avoid any possible mistake;

(b) the service range and height of the new third oceanic clearance delivery channel would be identical to the service range and height of the two clearance delivery channels already in existence; and

(c) the pilot was in case of any possible doubt free to return to one or the other of the two specific clearance delivery channels to obtain necessary clarification.

10.69 Despite these safeguards, the Meeting was unable to reach unanimous agreement on the feasibility of the method and it therefore explored a number of alternative methods to relieve the present unsatisfactory situation. Methods proposed were:

(a) the present system of distribution should continue with the proviso that pilots could be referred to the third channel as necessary to relieve congestion on the two basic channels;

(b) all pilots would call initially on one channel and would thereafter either be handled directly on this channel or transferred to any one of the two other channels as necessary;

(c) the present system of assignment of channels should be replaced by a system whereby traffic is split into three groups according to the geographical location of the State of Registry;

(d) pilots should continue to be provided with their clearances on two channels but should use the third channel for the read-back of the route;

(e) read-back of details of the route by pilots should be eliminated in the case of those aircraft which are being cleared via the organized track requested in their flight plan, while read-back should be made in all those cases where the aircraft is assigned a track different from that specified in the filed flight plan.

10.70 When considering these five methods, the Meeting noted that methods a), b), c) and d) would definately be less effective than method e) as far as relieving communications congestion is concerned. However, they permitted retention of the read-back by the pilot of the assigned track which in the past has been found to provide a reasonably fail-safe checking procedure. Since after review of the above procedures it was still not possible to reach agreement on the procedure which should be chosen once the third clearance delivery channel was brought into operation, the Meeting agreed that this matter should be left to further discussion between the United Kingdom and the users on the understanding that **if, after evaluation,** agreement had been reached on a specific method requiring amendment of the existing Regional Supplementary Procedures, the United Kingdom would make an appropriate proposal.

RECOMMENDATION 10/23 - OCEANIC CLEARANCE DELIVERY FOR WESTBOUND TURBO-JET TRAFFIC

That the United Kingdom, in consultation with all users concerned, actively pursue, if necessary by practical evaluation, a solution to the problem caused by communication congestion on the oceanic clearance delivery VHF channels and that, once agreement is reached on an acceptable method, an appropriate proposal for amendment of the NAT RAC Regional Supplementary Procedures is submitted, should this be necessary.

Clearance for SST aircraft

10.71 Because of the special operating characteristics of SST aircraft, especially as regards acceleration from sub-sonic to supersonic flight, the Meeting was fully aware of the need for special procedures regarding the delivery of oceanic clearances to these aircraft. Points to be covered in such procedures, which were obviously subject to further study in the light of revised or new data on the operating modus and decisions by States with respect to admissability of sonic boom over land areas should include the following:

(a) establishment, if necessary, of positions at which acceleration to supersonic speed should normally be started.

(b) adjustment of longitudinal spacing of successive SST aircraft on NAT tracks by delaying the commencement of acceleration to supersonic speed.

(c) application of the principle of first-come-first-served in respect of aircraft departing from different aerodromes by the use of a reference datum. To avoid a requirement for ETAs at this datum, and to facilitate the mechanics of issuing an oceanic clearance, it might be preferable to establish a standard time relationship between this datum line and the various established positions at which acceleration to supersonic speed should normally begin.

(d) **requirement to transmit the actual departure time via the continental ATS inter-area communication channels to the oceanic ACC concerned in order to update the filed flight plan whenever the time between take-off of an SST aircraft and the moment when it needs its oceanic clearance is short. The oceanic clearance may then have to be relayed via the same communication channels should it be found that the present technique of using a special frequency for direct delivery of the oceanic clearance to the pilot is not suitable.**

10.72 In addition there might be merit in studying the possibility of assigning by the oceanic ACC concerned to each SST aircraft a special code number together with the oceanic clearance which should be used during the flight in the NAT Region and which, by its combined use with the usual call sign would provide to ATC and to other SST aircraft in a readily understood form information on the track on which the aircraft concerned was operating and its sequence number in the flow of SST traffic on this track.

RECOMMENDATION 10/24 - OCEANIC CLEARANCE FOR SST AIRCRAFT

That States and international organizations concerned continue their study regarding the procedures required for oceanic clearances for SST aircraft with a view to presenting the results obtained to the Limited NAT RAN Meeting proposed to be held one year in advance of the start of scheduled SST operations in this Region.

POSITION REPORTING

Review of existing procedures

10.73 The Meeting made a review of the existing procedures regarding position reporting for ATS purposes and found that they were adequate. It therefore agreed not to recommend any changes.

Procedure for designating MET reporting aircraft

10.74 It was noted that the provisions concerning the designation of MET reporting aircraft operating in the organized track system had so far been included in the MET part of Doc 7030. Since they referred however to oceanic ACCs, it was believed to be more appropriate to have these provisions transferred to the RAC part of this document and the Meeting therefore acted accordingly.

RECOMMENDATION 10/25 - AMENDMENT OF RAC SUPPS- DESIGNATION OF AIRCRAFT REQUIRED TO SEND MET REPORTS

That Doc 7030 be amended as follows:

(a) Insert, in Part 2, the following new procedure applicable in the NAT FIRs:

"5.x Meteorological reports

5.x.1 From among the aircraft intending to operate on the organized tracks, oceanic area control centres shall designate those which shall be required to report routine meteorological observations at each prescribed reporting point. This designation shall be made by the OAC delivering the oceanic clearance, using the phrase "SEND MET REPORTS", and should normally be made so as to designate one aircraft per track at approximately hourly intervals unless otherwise requested by the associated MET office and it is operationally possible to comply with this request."

(b) Delete, from Part 4, the last two sentences of para 2.3.3.

Position Reporting by SST Aircraft

10.75 Even though position reporting procedures for SST aircraft were not reviewed in any detail by the Meeting, it was believed that they would have to be different from those applicable to subsonic air traffic. Their detailed specification was, however, left to later development when some of the applicable factors such as requirements by ATC for data on the flight progress, cockpit workload, etc., could be assessed more precisely.

SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

Procedures for sub-sonic air traffic

10.76 The Meeting noted that so far no provisions had been made to cater for cases where aircraft, due to mechanical or other reasons, were unable to continue their flights to destination or were obliged to abandon their assigned flight level, and that such cases, when they occurred, had been handled on an ad hoc basis. However, with the increase of air traffic in the NAT Region, and especially with the introduction of composite separation, it was believed prudent to establish a number of provisions which, while fully respecting the freedom of choice of the pilot with regard to the best means to cope with unforeseen situations, could serve as guide lines both for him and ATC in the resolution of such incidents.

10.77 In addition, it was believed that, when such provisions were formulated, they should not be limited to a specific portion of the air traffic only (that operating within the organized track system, or that operating within a specific part of the NAT Region) since experience had shown that exemption or limiting clauses attached to procedures which were only used when there was already considerable mental stress imposed on the persons concerned served only to render their efficiency questionable.

RECOMMENDATION 10/26 - AMENDMENT OF RAC SUPPS- SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

That Doc 7030, Part 2, be amended as follows:

Insert new procedures applicable in the NAT FIRs to read:

"X. Special procedures for in-flight contingencies

X.1 If an aircraft is unable to continue flight to its destination, and a reversal of track is necessary, it should initiate a turn, if possible to the right, and descend until it regains its assigned track in the opposite direction at a level which above FL 290 is 300 metres (1000 feet) lower and below FL 290 is 150 metres (500 feet) lower than the one which was assigned to it in its ATC clearance.

Whenever possible, these manoeuvres should be conducted in VMC. In addition, the pilot should broadcast his intentions on frequency 121.5 Mc/s.

X.2 If an aircraft is compelled to make a rapid descent, it should, whenever possible, alter its course, if possible to the right, and descend within a distance not exceeding 30 NM continuing flight parallel to its assigned track. If level flight can be resumed by the aircraft concerned, it should return to its previously assigned track and maintain a level which is not normally assigned on this track. In addition, the pilot should broadcast his intentions on frequency 121.5 Mc/s.

X.3 As it is not possible to provide for all possible circumstances, the procedures in x.1 and x.2 cannot provide more than guidance. However, ATC shall be advised of the action taken at the earliest possible time and a revised ATC clearance restoring minimum separation shall be obtained by the pilot concerned as soon as this is practicable."

Possible procedures for SST aircraft

10.78 The reasons which led the Meeting to recommend special procedures for subsonic air traffic are obviously much more compelling in the case of SST aircraft where not only a new type of aircraft is brought into operation but which will also operate in an environment which poses entirely new problems and on which data is still incomplete.

10.79 The Meeting, still bearing in mind the need for further study of all aspects of SST operations, therefore considered a number of possible procedures and agreed that these were needed and, where necessary, should be further developed as new information on the operation of SST aircraft became available.

RECOMMENDATION 10/27 - POSSIBLE SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES OF SST AIRCRAFT

That States and International Organizations concerned continue their studies for the development of special procedures catering for SST aircraft using as a basis the following:

(a) Turn-back procedure

No specific procedures can as yet be determined, however the need for such a procedure is fully recognized.

(b) Rapid descent procedure in case of solar radiation

(i) In case of need to descend because of solar radiation, the pilot shall broadcast on VHF (121.5 Mc/s) his decision to descend by giving his call sign and the code number assigned to his flight by the oceanic ACC of entry and the level to which he will descend (see paragraph 10.72).

(ii) The pilot shall contact ATC as soon as possible, even after having started his descent, in order to obtain a new ATC clearance for the level selected or, in case this is unsatisfactory, for any other level and other particulars concerning the continuation of the flight.

(iii) Descents below FL 450 shall in no case be made without having obtained an appropriate ATC clearance.

(c) Emergency descent procedure

The degree of hazard caused by the descent of an SST aircraft into or through the levels used by subsonic aircraft will depend on the subsonic track structure in use at the time. An added complication will be the requirement of the SST, when in subsonic flight, to continue on the best possible track depending on the wind field and other factors affecting the safe conduct of the flight. It will be essential for the SST pilot to have detailed knowledge before take-off of the subsonic track structure in use. It would appear that in order to present the least danger of collision, an SST making an emergency descent should:

(i) notify the ACC concerned as soon as possible of the nature of the emergency, stating its position, flight level, intentions, etc., and, if appropriate, request clearance to a more suitable level;

(ii) as soon as possible, broadcast information regarding the nature of the emergency, including position, flight level, intentions, etc., on VHF (121.5 Mc/s) in order to warn subsonic air traffic in the vicinity.

USE OF RADAR IN AIR TRAFFIC SERVICES

Use of radar in transition areas and for SST operations

10.80 As previously expressed when considering the application of composite separation and the introduction of SST aircraft into scheduled service, the Meeting noted that there existed an urgent requirement for the provision of radar coverage throughout those parts of the transition area where, due to traffic density and for other reasons, the safe and satisfactory flow of traffic could only be ensured if air traffic control was able to resort to radar separation in case of necessity. It also reconfirmed the need for radar coverage in those areas where SST aircraft in appreciable numbers were expected to conduct their trans-sonic acceleration or deceleration.

Use of SSR in the NAT Region

10.81 As it was expected that, in compliance with the requirements stated above, the use of SSR may spread within the NAT Region, the Meeting believed it necessary to provide for appropriate Regional Supplementary Procedures covering the use of this aid to the air traffic services. It therefore agreed that the Regional Supplementary Procedures regarding the use of SSR as prescribed for application in the EUM Region, including the amendments made to these EUM procedures subsequent to the LIM EUM RAC COM RAN Meeting, 1969, should become applicable in toto in the NAT Region with one exception concerning the operation of transponders by pilots when not instructed by ATC.

10.82 With respect to the latter exception, it was noted that the Sixth AN Conference, in an amendment to the PANS-RAC had recommended that, whenever the pilot was required to operate his transponder on his own initiative, he was to set the transponder to Mode A Code 2000. While this world-wide provision was accepted in principle, by both Canada and the USA, they had nevertheless already at the Sixth AN Conference indicated that because of certain military requirements they would temporarily not be in a position to apply the code specified for this procedure. When formulating a procedure for the operation on pilots' initiative of the transponder in the NAT Region, the Meeting was therefore again confronted with this temporary difficulty. Therefore, rather than formulating a Regional Supplementary Procedure, in strict accord with world-wide procedures to come into effect early 1971 and envisaging that such a procedure would then have, by necessity, to be annotated by a temporary notification of difference by Canada and the USA, the Meeting unanimously agreed that it would be better, exceptionally to include a Regional Supplementary Procedure which corresponded to the de facto situation specifying that on the western side of the NAT Region Mode A Code 2100 should be used. This was done on the understanding that this difference would be eliminated as soon as Canada and the USA were in a position to do so.

RECOMMENDATION 10/28 - AMENDMENT OF RAC SUPPS- SSR PROCEDURES

That Doc 7030, Part 2 be amended as follows:

(a) Insert "NAT" after each of the procedures in Section 12, except paragraph 12.1.1.1;

(b) Show the additional SSR procedures arising from Recommendations 5/1, 5/2 and 5/3 of the LIM EUM (1969) RAN Meeting as applicable also in "NAT";

(c) Insert a new paragraph 12.1.1.2 applicable in the NAT FIRs to read:

"12.1.1.2 Except in cases of emergency or radio failure, pilots of aircraft flying in the NAT Region and before reaching a position which is 30 minutes flying time from the nearest boundary of the oceanic control areas shall operate transponders on:

(a) Mode A, Code 2000 when eastbound; and

(b) Mode A, Code 2100 when westbound;

until otherwise directed by ATC."

10.83 A proposal by Iceland that the Meeting should agree to the need for the early implementation of SSR in Iceland in order to assist in the resolution of ATC problems experienced in the Reykjavik FIR, was considered by the Meeting, especially in view of its implications with regard to joint financing. In the absence of detailed operational, technical as well as economical data on the project, the Meeting found it impossible to come to any form of conclusion on the subject and therefore refrained from making any recommendation. It suggested however that Iceland may wish to pursue this matter further through appropriate channels outside the Meeting, once the detailed supporting data had been acquired.

Provision of Radar in the NAM Region

10.84 The Meeting noted that both in Canada and the USA, radar coverage was provided within all those areas where traffic density or complexity so required. In fact it noted that above FL 180 radar coverage throughout the USA was virtually complete. In view of this situation, the Meeting agreed that, apart from noting the situation, there was no need for any further action.

ATS MESSAGES

Filed flight plan messages

10.85 In order to ensure timely arrival of flight plans for flights entering the NAT Region it had already previously been specified that such flight plans should be transmitted immediately after the flight plan had been received. This procedure had been made applicable in the NAT Region, however in the majority of cases it affected adjacent Regions from where these flight plans emanated. It was therefore believed necessary to expand the applicability of these procedures to the adjacent AFI, CAR, EUM and NAM Regions.

10.86 It was also noted that the special procedure concerning flights along the northern or southern boundaries of Gander and Shanwick Oceanic FIR now contained under the Chapter "Flight Planning and Clearances" in Part 2 of Doc 7030 includes a provision regarding the addressing of flight plan messages. Furthermore it was noted that in order to respond to an operational requirement and also to be consistent with the related procedure regarding position reporting, the addressing of flight plan messages should not be limited to flights operating along this boundary but should rather be extended to flights operating at 60 NM or less from these boundaries. In addition it was believed that this provision should be transferred to the Chapter "ATS Messages" in Part 2 of Doc 7030.

RECOMMENDATION 10/29 - AMENDMENT OF RAC SUPPS - FILED FLIGHT PLAN MESSAGES

That Doc 7030, Part 2 be amended as follows:

(a) Delete the last sentence of paragraph 4.10.1 in toto;

(b) Insert a new procedure applicable in the AFI, CAR, EUM, NAM and NAT Regions to read:

"10.1.x Filed flight plan messages for flights intending to operate within the NAT Region at a distance of 60 NM or less from the northern or southern boundaries of the Gander and Shanwick Oceanic FIRs, shall be addressed to the ACCs in charge of the NAT FIRs along the route and in addition to the ACCs in charge of the nearest adjacent NAT FIRs."

(c) Insert "AFI, CAR, EUM and NAM" against paragraph 10.1.3 and amend the last four lines to read:

"messages shall be transmitted to the appropriate area control centres immediately after the flight plan has been submitted."

UNIFORM APPLICATION OF ALTIMETER SETTING PROCEDURES

10.87 The Meeting noted that a number of recent aircraft accidents has again given rise to the very old problem of the use of a QNH altimeter setting versus a QFE altimeter setting during approach to land. It noted that, while the provisions of PANS-RAC made it possible to give both settings to pilots, there remained the problem of confusion on their part with respect to the type of setting they had received from ATS. In an endeavour to resolve this question, the Meeting reviewed the situation as it existed on both sides of the North Atlantic and it noted that while in Europe the situation with regard to the provision of QNH and QFE settings varied from country to country, there was at least uniformity in North America since there a QNH setting exclusively was provided by the air traffic services, leaving it up to the operator to provide the pilot with a QFE setting if this was deemed to be essential.

10.88 Since no agreement could be reached by the Meeting with regard to the policy to be followed in this respect, it limited its action in this matter to recalling the need for precise application of the phraseology prescribed by the PANS-RAC for the transmission of altimeter settings to aircraft on an approach and in particular in those cases where, because of the availability of both QNH and QFE values, confusion was likely to arise.

RECOMMENDATION 10/30 - TRANSMISSION OF ALTIMETER SETTING VALUES BY ATS

That States concerned ensure strictest possible compliance with the phraseology prescribed for the transmission of altimeter setting values to aircraft by their air traffic services in all cases, particularly since the availability of both QNH and QFE could give rise to confusion as to the nature of the value transmitted.

AREA OF APPLICABILITY OF REGIONAL SUPPLEMENTARY PROCEDURES

Division of SUPPS into those applicable in the NAT and those applicable in the NAM Regions

10.89 The Meeting confirmed that the "NAT" RAC Regional Supplementary Procedures should continue to be applicable in the FIRs shown in the "Index to Application" on page RAC 2-1-21, subject to amendment of Lisboa Oceanic to read Santa Maria Oceanic as a consequence of Recommendation 9/1.

10.90 As indicated in the Report on Agenda Item 9, it was also confirmed that the "NAT" procedures should not apply in the local areas established in Greenland, and around the Faroe Islands, Iceland, Kindley Field and Santa Maria (Rec 9/7 refers).

10.91 With regard to the NAM Region, it was agreed that the procedures specifically mentioned in the foregoing recommendations as suitable for application in that Region should be made applicable within the FIRs served by the centres specified in Recommendation 9/4.

RECOMMENDATION 10/31 - AREA OF APPLICABILITY OF RAC SUPPS

That the Index to Application of RAC/SAR Supplementary Procedures on page RAC 2-1-21 of Doc 7030 be amended as follows:

(a) Amend in the list of NAT FIRs "Lisboa Oceanic" to read "Santa Maria Oceanic";

(b) Insert "NAM" in the appropriate location and list the names of the centres given in Recommendation 9/4.

Comment: See also Recommendation 9/7.

Requirement for additional SUPPS applicable in the NAM Region

10.92 Apart from those Regional Supplementary Procedures mentioned in the preceding paragraphs, the Meeting agreed that there was no need for the formulation of additional SUPPS to be applicable in the NAM Region.

CO-OPERATION BETWEEN ATS UNITS

Familiarization Visits

10.93 The Meeting noted that from the early beginning of regional planning within ICAO, recommendations had been made by NAT RAN Meetings which encouraged the

arrangement of familiarization visits of senior air traffic control personnel to adjacent ATS units. It was noted that, with rare exceptions, such visits had now become fairly frequent especially between personnel of those oceanic ACCs handling the majority of the air traffic in the NAT Region. It also noted these visits provided an excellent opportunity for the exchange of practical operating experience and assisted in creating the team spirit required for the handling of air traffic in the NAT environment. Similar visits by airline crews to oceanic ACCs were believed to be helpful.

10.94 With the increase of air traffic in the NAT Region and the significance which ATC problems in the transition areas gained, it was recognized that there may now be a need not only to continue established practices in this respect but if possible to extend them so as to include visits by senior personnel of continental ACCs which were adjacent to oceanic ACCs so that problems of common concern would be better understood by both parties.

RECOMMENDATION 10/32 - FAMILIARIZATION VISITS

That provider States concerned, if necessary in co-operation with interested operators, continue existing arrangements providing for regular visits of senior ATS personnel engaged in the control of air traffic in the North Atlantic, to other oceanic ACCs and that this programme be extended also to include visits of senior personnel of adjacent oceanic and continental ACCs to each others' facilities.

Provision for de-briefing meetings

10.95 The Meeting noted that the Special NAT Meeting 1965, had recommended the establishment of an ad hoc ATC co-ordination and evaluation team in order to assist in obtaining the best possible common level of performance of the air traffic control services in the NAT Region. It also noted that between that time and today this ad hoc team had met twice and had made valuable contributions to the improvement of the practical aspects of air traffic control in the NAT Region. However, it was believed that this team, in the light of the growing complexity of the problems confronting air traffic control services in the NAT Region had now outlived its usefulness and it was therefore agreed that it should be disbanded.

10.96 Instead, it was proposed, and supported by the provider States concerned that arrangements should be made for an annual meeting of all chief controllers of ACCs engaged in the control of air traffic in the NAT Region sometime after the peak period of traffic (e.g. late September or October) in order to have an exchange of views on the experience gained during the busy period of the year and on possible improvements required in the future, especially as regards the practical aspects of co-ordination and co-operation between the oceanic ACCs. IATA and IFALPA both indicated that they would be prepared to assist in such meetings in order to present the users' point of view.

RECOMMENDATION 10/33 - ANNUAL DE-BRIEFING MEETING OF OCEANIC CHIEF CONTROLLERS

That provider States concerned should make arrangements for the convening of an annual meeting of the chief controllers of oceanic ACCs after the busy period of the year in order to permit an exchange of views on experience gained and further improvements needed in the co-ordination between the ACCs concerned.

REVIEW OF OUTSTANDING RECOMMENDATIONS

10.97 The Meeting briefly reviewed all outstanding recommendations made by previous regional air navigation meetings related to the area in question and covering the subjects considered under Item 10 by this Meeting and found that non required re-stating as they were either all superseded or replaced by recommendations of this Meeting. The recommendations covered were those made by the Fourth North Atlantic RAN Meeting, the Special North Atlantic Meeting (1965) and the Fourth Caribbean RAN Meeting.

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Agenda Item 11: Search and Rescue Services

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

11.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraph 38 of the Report on Agenda Item 2, governed the consideration of Agenda Item 11.

SEARCH AND RESCUE AREAS

11.2 The Meeting took note of the amended plan for FIRs as established under Agenda Item 9 when considering the plan for search and rescue areas. It also took account of paragraphs 3.1.2 and 3.1.2.1 of Annex 12 regarding the delineation of boundaries of search and rescue areas and agreed that, wherever possible, SRR boundaries should be coincident with the boundaries of associated flight information regions.

11.2.1 The Meeting also noted, however, that SAR services in the northeast part of the Gander Oceanic FIR were provided by the facilities of Reykjavik RCC and agreed that no change should be made in the SRR boundaries as established at the Fourth NAT RAN Meeting, as SAR services in this area are more easily provided by Reykjavik RCC.

11.2.2 With regard to the NAM Region, the Meeting noted that, in both Canada and the United States of America, search and rescue service is provided throughout the entire airspace used by international air traffic. Since the delineation of SRR boundaries in the area where SAR service is provided by these two States is dictated primarily by domestic considerations and, as the Report on Agenda Item 9 indicates, no FIR boundaries were specified for inclusion in the Regional Plan, the Meeting refrained from specifying in detail the limits of the various search and rescue areas and restricted its planning for the NAM Region to the listing of RCCs and associated facilities.

RECOMMENDATION 11/1 - SEARCH AND RESCUE AREAS

(a) That the boundaries of the Lajes, Lisboa, New York, Piarco and San Juan SRRs be amended to coincide with the revised boundaries of the (new) Santa Maria Oceanic, Lisboa, New York, Piarco and San Juan FIRs respectively. (Rec. 9/1 refers)

(b) That search and rescue services be provided for the entire NAM Region with rescue co-ordination centres at the locations listed in Table SAR 1 at Appendix A to this part of the report.

NOTE: The delineation of the SAR areas to be served by the respective rescue co-ordination centres is subject to determination by the two States concerned.

SEARCH AND RESCUE FACILITIES

11.3 The Meeting reviewed paragraph 3.3 of Part V of Document 8755/2 (ANP NAT/NAM/PAC) and agreed that it should be reworded since it appeared to be in conflict with paragraph 3.1.

RECOMMENDATION 11/2 - PROVISION OF SAR FACILITIES

That paragraph 3.3 of Part V of Document 8755/2 be amended to read:

"All facilities listed need not be provided exclusively for SAR operations but some may be aircraft or ships used in other assignments which can be readily available for SAR operations."

11.3.1 The Meeting also agreed that the following amendments should be made to Table SAR - 1 to provide for the SAR facilities in the NAT/NAM Regions.

RECOMMENDATION 11/3 - AMENDMENT OF TABLE SAR - 1

(a) That the explanation of Column 5 of Table SAR - 1 be amended to include the following:-

"AMVER - Ship position information from the Automated Merchant Vessel Report (AMVER) System readily available."

(b) That Table SAR - 1 be amended as detailed in Appendix A to this part of the report.

NOTE: The SAR plan for the NAM Region will necessitate the following changes in Chart SAR - 1 P :-

(a) RCC Juneau replaces RCC Kodiak

(b) SRR Victoria (formerly Vancouver) should be shown as implemented.

CO-OPERATION BETWEEN STATES

11.4 The Meeting discussed paragraph 5.1 of Part V of Document 8755/2 and while confirming the principle of this paragraph, concluded that the economic aspect of mutual assistance in SAR operations was not sufficiently stressed.

RECOMMENDATION 11/4 - POOLING OF RESOURCES

That paragraph 5.1 of Part V of Document 8755/2 be amended to read as follows:

"In order to promote greater efficiency and economy in SAR facilities, States should enter into arrangements with neighbouring States, or with States able to give mutual assistance in SAR operations upon request:

(a) to meet the minimum requirements specified in Table SAR - 1, where difficulties exist in meeting such requirements;

(b) to provide full coverage of an SRR with the aid of rescue facilities of adjacent or other RCCs;

(c) to provide, if possible, fuller services than the minimum requirements listed in Table SAR - 1 while avoiding prohibitive cost.

Such mutual agreements should apply both to the technical and operational fields and to matters of assistance and logistics."

LOCATION OF SURVIVORS

11.5 The Meeting, having considered paragraph 5.2 of Part V of Document 8755/2, agreed that the provisions stated should, in general, apply in the NAM/NAT Regions, but that changes in the text were required to reflect the current terminology as used in ANNEXES 6 and 10 and to give emphasis to the homing capability of SAR aircraft.

RECOMMENDATION 11/5 - LOCATION OF SURVIVORS

That, in view of the great difficulty in locating survivors, States

(a) should encourage operators, having regard to the route flown, to carry survival radio equipment;

(b) should encourage the development of automatic features for survival radio equipment;

(c) should continue to encourage the improvement of visual location devices and conspicuity of survival equipment;

(d) should be encouraged to provide SAR escort service to aircraft in difficulties, wherever possible, and to equip their SAR aircraft with homing devices capable of homing on any such aircraft;

(e) should equip their SAR aircraft with homing devices capable of homing on survival radio equipment, and should publish the details of such capability in their AIP.

11.5.1 The Meeting gave careful consideration to the northern areas of the NAT and NAM Regions. These areas are relatively incapable of offering means to support the lives of survivors of an aircraft accident, have climatic conditions relatively hostile to human life and, further, offer complications to SAR activities due to seasonal variations in natural light and the lack of ancillary and special services, e.g. doctors, hospitals and ground transportation. The Meeting concluded that flights in these areas, which comprise land, water and ice fields, should be equipped with survival radio equipment, as described in the appropriate sections of Annexes 6 and 10, and with other survival equipment, including the means of sustaining life.

RECOMMENDATION 11/6 - SURVIVAL EQUIPMENT

That aircraft operating in the NAT or NAM Regions north of latitude 66° 30'N (Arctic Circle) should be equipped with survival radio equipment described in para. 6.5, Annex 6, Part I and with other survival equipment including the means of sustaining life which, in the case of International Commercial Air Transport, may consist of the equipment described in subpara. a) of para. 6.4.3, Annex 6, Part I.

INSTRUCTIONS FOR THE USE OF COLLECTIVE RESCUE EQUIPMENT

11.6 The Meeting when considering Paragraph 5.3 of Part V of Document 8755/2 under the above heading agreed that the heading and the first part of the paragraph should be reworded to reflect the current terminology.

RECOMMENDATION 11/7 - INSTRUCTIONS FOR THE OPERATION OF REQUIRED SURVIVAL EQUIPMENT

That the heading and first two lines of Paragraph 5.3 of Part V of Document 8755/2 be amended to read:

"5.3 Instructions for the Operation of Required Survival Equipment

Instructions concerning the operation of required survival equipment provided in aircraft ....."

INFORMATION ON THE POSITION OF SHIPS

11.7 The Meeting agreed that the recording of such information by States should apply to other ocean areas in the NAM/NAT Regions as well as the North Atlantic Ocean.

RECOMMENDATION 11/8 - INFORMATION ON THE POSITION OF SHIPS

That States recording information on the position of selected merchant or other ships at sea in all the ocean areas of the NAM/NAT Regions should disseminate, on a regular basis, in so far as practicable, such information to other States requesting it.

COMMUNICATION BETWEEN AIRCRAFT AND SHIPS

11.8 The Meeting, discussing the suggested use of frequency 2182 kc as outlined in Annex 10, Vol. 1, Part II Introduction, and recognizing that surface rescue craft would be the primary vehicles of rescue, agreed that there was a requirement for all search and rescue aircraft to be equipped with this frequency.

RECOMMENDATION 11/9 - USE OF 2182 kc IN EMERGENCY COMMUNICATIONS

That the following sub-paragraph be added to Paragraph 5.5 of Part V of Document 8755/2:

"SAR aircraft should be equipped to permit communications on 2182 kc."

CO-ORDINATION AND TRAINING

11.9 The Meeting, recognizing the value of exchange of visits between and joint training of the search and rescue personnel of neighbouring States, agreed that it was desirable to extend this practice to the whole of the NAM/NAT Regions.

RECOMMENDATION 11/10 - CO-ORDINATION AND TRAINING

That the provisions of Paragraph 7 of Part V of Document 8755/2 be applied to the whole of the NAM/NAT Regions.

REGIONAL SUPPLEMENTARY PROCEDURES

11.10 The Meeting reviewed the SAR Supplementary Procedures in Document 7030, Part 2 and concluded that paragraphs 6.3 - 6.8 inclusive now had world-wide application. Since it was noted that ICAO was already in the process of transferring these paragraphs to other appropriate documents, no recommendation is made.

SAR COMMUNICATIONS

11.11 The Meeting reviewed the SAR communications between RCCs serving adjacent areas and concluded that, since the existing ATS networks were adequate, it foresaw no requirements for discrete SAR communications facilities.

REVIEW OF RECOMMENDATIONS OF PREVIOUS REGIONAL AIR NAVIGATION MEETINGS

11.12 The Meeting reviewed recommendations from previous RAN Meetings relevant to Agenda Item 11 and concluded that they were already contained in the appropriate documents or were superseded by the foregoing recommendations.

APPENDIX A TO PART II

AMENDED TABLE SAR 1

NAT/NAM/PAC ANP SAR 1

Rescue Coordination Centre	Rescue Units: Location	Aircraft	Marine Craft	Other Units	Remarks
1	2	3	4	5	6
CANADA					
HALIFAX RCC	Dartmouth	HEL-H	RV		Coverage of SE part of Halifax SRR effected by deployment or requesting assistance of Lajes.
	Goose	MRG*			
	Greenwood	ELR			
	Summerside	MRG		PRU	
		HEL-H		AMVER	*Redeployment from Summerside
VICTORIA RCC	Comox	ELR	RB	PRU	
		MRG			
	Victoria	HEL-H	RV	AMVER	
WINNIPEG RCC	Edmonton	ELR			** Coverage north of mainland Canada effected by deployment of ELR aircraft from Edmonton and Trenton and MRG from Winnipeg. Implementation by 1 September 1970
		HEL-H			
	Winnipeg	MRG		PRU	
		HEL-H			
	Inuvik	ELR**		PRU	
	Resolute Bay	ELR**		PRU	
TRENTON RCC	Trenton	ELR		PRU	Escort service available
		MRG			
		HEL-H			
++CHILE					
ISLA DE PASCUA (Easter I.)RCC	Isla de Pascua (Easter I.)	VLR	RB		
DENMARK					#Operated by US
SONDRESTROM RCC (Greenland) #	Søndre Strømfjord	LRGø			
		MRGø			
		HEL-Mø			
	Grønnedal		RB+		+ Rescue cutters suitable for operation in fjords and at sea available through CINC Greenland Command
	Thule	LRGøø			
		MRGøø			
		HEL-Møø			Grønnedal Naval Base Escort service available

ø On deployment from USAF

øø Facility can be deployed to cover the N and E part of the SRR

++ No change has been made in the requirements for facilities outside the area considered by the Meeting

SAR 1 NAT/NAM/PAC ANP

RESCUE COORDINATION CENTRE	RESCUE UNITS				REMARKS
	LOCATION	AIRCRAFT	MARINE CRAFT	OTHER UNITS	
1	2	3	4	5	6
++FIJI IS.					
FIJI RCC	Lauthala Bay Lautoka	LRGø	RV RB		Administrative authority - Relève de l'administration- Administración - NEW ZEALAND øAvailable at Nandi on deployment from Auckland Disponible à Nandi utilisable à partir d'Auckland Disponible en Nandi basada en Auckland
++FRENCH POLYNESIA					
TAHITI RCC	Papeete	ELR/	RV		/VLR Existing - actuel - actual
++ICELAND					
REYKJAVIK RCC	Keflavík Reykjavík	LRG HEL-M MRG/ SRG/	RV RB	MRU	/LRG Existing - actuel - actual Escort service available - Service d'escorte assuré - Servicio de escolta disponible
++MARIANA IS.					
GUAM RCC	Guam I.	VLR HEL-M	RV		Escort service available - Service d'escorte assuré - Servicio de escolta disponible Facilities provided by - Moyens fournis par - Servicios suministrados por US
++NEW CALEDONIA					
*	Nouméa	SRG	RV		*RCC Fiji

NAT/NAM/PAC ANP SAR 1

RESCUE COORDINATION CENTRE	RESCUE UNITS				REMARKS
	LOCATION	AIRCRAFT	MARINE CRAFT	OTHER UNITS	
1	2	3	4	5	6
NORWAY					≠LRG existing - disponible øFacility can be deployed to cover the N part of the SRR Le moyen peut être redéployé pour couvrir la partie N de la SRR El medio puede situarse en otro lugár para abacar la parte N del SRR ≠EUM
BODØ RCC	Bodø	MRG≠ø SRG HEL-M	RV RB		
	Bardufoss≠ Tromsø≠	MRG≠	RV≠		
(STAVANGER RCC)	Stavanger	MRG SRG≠	RV RB≠		
PORTUGAL					
LAJES RCC	Lajes	VLRø SRG			øFacility can be deployed to SAL I. to cover the S part of the SRR - Le moyen peut être redéployé à l'île de SAL pour couvrir la partie S de la SRR - El medio puede situarse en la Isla de la SAL para abarcar la parte S del SRR
	Ponta Delgada		RV		
UNITED KINGDOM					
EDINBURGH RCC	Edinburgh SRR	VLR	RB RV	MRU	HEL-M available
PLYMOUTH RCC	Plymouth SRR	VLR	RB RV	MRU	HEL-M available

SAR 1

NAT/NAM/PAC ANP

Rescue Coordination Center	Rescue Units: Location	Aircraft	Marine Craft	Other Units	Remarks
1	2	3	4	5	6
UNITED STATES					
Elmendorf RCC Alaska	Anchorage Fairbanks	ELR ELRϕ		PRU	ϕ On deployment from Anchorage or Kodiak
Hamilton RCC California	ϕϕ	ϕϕ			ϕϕ Numerous SRG located throughout the area of responsibility. Other types and HELs also available.
HONOLULU RCC Hawaii	Hilo Honolulu Kahului Kaneohe Midway I. Nawiliwili Wake I.	 ELR HEL-M HEL-M VLR	RB RV RB RB RB RB		ELR for Kwajalein I. and Wake I. available on deployment from Honolulu or Guam - ELR pour Ile de Kwajalein et Ile de Wake assuré à partir d'Honolulu ou de Guam ELR para la Isla Kwajalein y de la Isla Wake disponible basada en Honolulu o Guam Escort service available - Service d'escorte assuré - Servicio de escolta disponible
Juneau RCC Alaska	Adak Annette Attu Juneau Ketchikan Kodiak Sitka	LRG LRG LRG* ELR 	RV RB RV RV RV	 AMVER 	Escort service available. *Available on deployment from Adak.
Miami RCC Florida	Key West Miami St. Petersburg	 ELR** LRG HEL-M HEL-H	RV RV RV	 AMVER 	Escort Service available. **Available on deployment from Elizabeth City.
New Orleans RCC Louisiana	Corpus Christi New Orleans Pensacola	LRG HEL-H	RV RV	 AMVER 	Escort Service available.

NAT/NAM/PAC ANP SAR 1

Rescue Coordination Center	Rescue Units				Remarks
	Location	Aircraft	Marine Units	Other Units	
1	2	3	4	5	6
New York RCC New York	Brooklyn Elizabeth City New York Salem Bermuda	Hel-H ELR HEL-M HEL-H ELR *	 RB RV RB	 AMVER	Escort Service available. *On deployment from Elizabeth City, N.C. or Orlando, Fla.
Robbins RCC Georgia	***	***			*** Numerous SRG located throughout the area of responsibility. Other types and HELs also available.
Richards-Gebaur RCC Missouri	#	#			#Numerous SRG located throughout the area of responsibility. Other types and HELs also available.
San Francisco RCC. California	Astoria Eureka Long Beach Los Angeles Port Angeles San Francisco San Diego	 HEL-M ELR## HEL-M ELR HEL-M ELR## HEL-H	RV RV RV RV RV	 AMVER	Escort service available. ## Available on deployment from San Francisco.

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Agenda Item 12: Aeronautical meteorological offices and their functions

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

12.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 37 to 40 and 45 to 49 of the Report on Agenda Item 2 and appropriate parts of the long-term systems plan, as given in the Report on Agenda Item 3, governed the consideration of Agenda Item 12.

GENERAL CONSIDERATIONS RELATING TO AGENDA ITEM 12

12.2 Under this Agenda Item the Meeting reviewed Tables MET 1, MET 5, MET 6, MET 8 and Appendix A of the Regional Plan, as well as the related Regional Supplementary Procedures. As appropriate, the scope of those parts of the NAT Plan was extended to cover the NAM Region.

12.3 The main aeronautical developments taken into account in this review included:

(a) increasing numbers of flights and a more complex air route pattern involving an increasing number of regular and alternate aerodromes;

(b) the introduction of supersonic transport aircraft operations;

(c) automation of air traffic control and of airline operational planning, including the increased use of electronic computers;

(d) the introduction at an increasing number of aerodromes of Category II flight operations.

12.4 Since the functions of the aeronautical meteorological offices required in the NAT and NAM Regions were recognized to depend to a significant degree on the area forecast system, it was agreed to commence the review of the Regional Plan with the area forecast system.

AREA FORECAST SYSTEM

12.5 The Meeting reviewed the area forecast system for the NAT Region, which had been implemented on the basis of recommendations by the Special NAT RAN Meeting (1965) and the Fifth EUM RAN Meeting (1966).

12.6 In that review account was taken of the principles expressed in Recommendation 11.2/1 of the Sixth Air Navigation Conference, the additional services likely to be required for the operation of supersonic transport aircraft and the particular characteristics of the NAT/NAM area.

12.7 It was agreed that, while the existing system provided most valuable services to the aeronautical users, adjustments were required to cater for the greatly increased international air traffic and for changes in its structure. The Meeting also agreed to extend the coverage of the area forecast system to the NAM Region. The following changes to the Regional Plan were thought to be necessary:

(a) Re-allocation to the National Meteorological Centre, Washington, D.C. of the area forecast centre (AFC) responsibilities assigned to the Canadian, New York, Washington and Miami centres, respectively;

(b) Acceptance by France of making available for use by other European States the existing AFC charts provided for routes from Europe to the Caribbean and the northern part of South America, on the understanding that these had been planned by France outside the scope of the NAT plan and might be subject to future modification taking into account operational requirements.

(c) Revision of the charts to be provided by the area forecast centres;

(d) Elimination of AFC charts for low-level flights by piston-engined and turbo-prop aircraft (700 mb and 500 mb charts), on the understanding that:

(i) the number of flights at those levels was small;

(ii) alternative arrangements would be made by agreement between Canada and the United States to provide services for low-level eastbound flights;

(iii) alternative sources, such as regional or national meteorological centres, were available for the provision of services to low-level westbound flights;

(iv) in future, services for supersonic transport aircraft would be required.

The Meeting also confirmed the London AFC in respect of air routes from Western Europe to Canada and the continental United States (including Alaska).

12.8 In this revision, the centres and areas of responsibility listed were recognized to cover most of the flights included in the table of aircraft operations as far as practicable and economical. In this connexion, it was noted that a few flights from CAR aerodromes to destinations in Europe could not be covered by the charts to be provided by the United States. However, area forecasts were provided in coded form for those flights in accordance with recommendations by the CAR IV RAN Meeting. Similarly, it was fully recognized that the acceptance by France of providing its Paris AFC charts for international use was to be construed as a provisional measure, to be reviewed in the light of the resources available to France and of the future world-wide development of the area forecast system and of the WMO World Weather Watch.

12.9 Some difficulties were encountered with the specific requirements for the future output of area forecast centres in respect of data for supersonic transport aircraft operations. The Sixth Air Navigation Conference and the Second Session of the SST Panel had implied that some documentation for pilots would be required, but that charts of upper winds and upper air temperatures may not be needed where those data were provided in digital form. All delegations recognized the need for computer flight planning by airlines intending to operate SSTs. The majority believed that initially 100 mb charts and significant weather charts for SST operating levels (above FL500 to FL600) would be required by Concorde aircraft and that such charts would meet the requirements for those aircraft. However, a few delegations were not convinced of any need to provide upper wind and temperature charts for SST pilots, if the airlines concerned were provided with MET data in digital form for direct computer input. The Meeting also considered the supply of meteorological information for the climb and transonic acceleration phases of SST flights. The preference expressed by the Sixth Air Navigation Conference and the Second Session of the SST Panel for pictorial presentations in cross-section format was noted. However, the Meeting concluded that any such forecasts should not be part of the area forecast system products.

12.10 In the light of the discussion outlined above, it was agreed to recommend a Table MET 6 in two parts. Part 1 was designed to cover subsonic jet aircraft operations; Part 2 was drafted to cover future SST chart needs, for which the specific details were yet to be determined by ICAO. Hence, Part 2 of the table was recognized as a broad framework to facilitate advance planning, but subject to revision and modification in detail in the light of practical experience and of the increasing use of digital meteorological data by airline flight planning computers. It was recognized that the meteorological service to be provided for supersonic transport aircraft operations might well have to include information other than that mentioned above; in this connexion the Meeting noted that the SST Panel and the ADIS Panel were studying the requirements for air-ground transmission of MET data and automated systems which may have applications for future SST and other operations that could not be anticipated by the Meeting.

12.11 The procedures relating to Table MET 6 - Area Forecast System, which had hitherto been published in three different places, viz:

(i) in the introduction to the MET Part of the Air Navigation Plan,

(ii) in the Explanations preceding Table MET 6, and

(iii) in Doc 7030 - Regional Supplementary Procedures

were consolidated into a single text for publication in an appropriate part of the Regional Plan.

12.12 The Observers of IATA and IFALPA advised that on occasion area forecast system charts were provided to pilots as flight documentation in illegible form. These difficulties were understood to arise mainly from shortcomings in the radio facsimile dissemination system and in the reproduction methods. The Meeting stressed the need for a high quality of the charts received to permit reproduction for flight planning and documentation; specifically, the received charts should be legible for better than 95% of the area they covered (see paragraph 6.5 of the following Recommendation).

RECOMMENDATION 12/1 - TABLE MET 6 - AREA FORECAST SYSTEM

(a) **That the following material be included as appropriate in the Introduction to Part IV of the Regional Plan:**

"6.1 Table MET 6 sets out the area forecast centres providing area forecast charts for international aviation together with their areas of responsibility, type of charts to be provided, approximate areas to be covered by the charts and the times to which the charts relate.

6.2 The specifications of the charts should be as follows:

a) all charts - fixed-time prognostic charts

b) projection and scale: - Washington areas 4 and 5 - Mercator, scale 1:20 million true at $22\frac{1}{2}$°N.

Other areas - Polar stereographic, scale 1:20 million true at 60°N.

6.3 Transmission should be such as to permit reception as appropriate to meet operational requirements; dissemination of area forecasts by digital or other non-pictorial methods should be as agreed between the States concerned according to operational requirements.

6.4 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.

6.5 The quality of the charts received should be such as to permit reproduction for flight planning and documentation. Received charts should be legible over 95% of their area and be a true copy of the original.

6.6 Wherever radio facsimile is used, the applicable technical radio characteristics specified by the CCIR* and the CCITT** should be applied.

6.7 Interruption of satisfactory reception should not exceed 10 minutes during any period of 6 hours."

*CCIR - International Radio Consultative Committee (ITU)
**CCITT - International Telegraph and Telephone Consultative Committee (ITU)

(b) That the explanations preceding Table MET 6 of the Regional Plan be amended as follows:

Column

1) Name or location of the area forecast centre

2) Broad description of the area of responsibility for the preparation of area forecast charts

3) Type of charts to be provided

4) Approximate area to be covered by the charts

5) Times to which the chart relate

6) Remarks

(c) That Table MET 6 of the Regional Plan be amended in respect of its NAT and NAM components as shown in Appendix C to Part 12.

FLIGHT DOCUMENTATION

12.13 The flight documentation to be supplied to pilots in command before departure was discussed, bearing in mind the need to keep the number of charts to a minimum as stated by the 6th Air Navigation Conference and by the Second Session of the SST Panel. The Meeting noted Recommendation 11.1/6 of the Sixth Air Navigation Conference requesting both ICAO and WMO to review documentation requirements and practices. In this connexion, the Meeting noted the minimum requirement for flight documentation to be provided for subsonic jet aircraft flights across the North Atlantic stated by IATA, namely only a significant weather chart and one chart of wind and temperature data for the flight altitude (about FL350-250 mb) and information concerning tropopause topography, together with terminal and alternate forecasts. In the light of that statement the following recommendation was agreed upon:

RECOMMENDATION 12/2 - DOCUMENTATION FOR FLIGHTS ACROSS THE NORTH ATLANTIC

That in following up Recommendation 11.1/6 of the Sixth Air Navigation Conference account should be taken of the minimum requirement expressed by IATA that the charts included in flight documentation be limited to:

(a) a significant weather chart, and

(b) one chart of wind and temperature data for the flight altitude (about FL350 - 250 mb) and information concerning the tropopause topography.

METEOROLOGICAL INFORMATION FOR GRID POINTS IN DIGITAL FORM

12.14 With respect to the operational requirement for the supply of meteorological information for grid points in digital form, as stated in paragraph 49 of the Report on Agenda Item 2, the Meeting recognized that there was a need for provision of computer-prepared MET information for:

(a) Automated air traffic services units in the NAT and NAM Regions, and

(b) Airline flight planning computers used by increasing numbers of operators conducting flights as listed in the table of aircraft operations.

12.15 It was noted that the Sixth Air Navigation Conference had recommended amendments to paragraphs 2.5.1.8 and 2.5.4.3.5 of the PANS-MET relating to the supply of computer-processed upper-air data for grid points in digital form to ATS and airline computers by agreement between the Meteorological Authority and the Air Traffic Services Authority and/or operators concerned.

12.16 The information available to the Meeting indicated that the States concerned had already made the necessary arrangements for the supply to the NAT oceanic control centres using electronic computers (e.g., the New York, Gander and Shanwick centres) of the necessary digital MET data. It was anticipated that, as necessary, the States concerned would continue to provide MET data to their ATS centres in this manner and that, as and when required, the system would be expanded to meet new operational requirements, e.g., concerning the supply to ATS computers of MET data for SST cruising levels.

12.17 A number of operators were understood to be using digital MET data for computer flight planning, the data being supplied by agreement between the Meteorological Authority and the operator concerned. The Representative of the United Kingdom informed the Meeting that the United Kingdom was prepared to make available meteorological data for computer flight planning within the area of responsibility of the London AFC, subject to certain financial arrangements. However, the provision of meteorological information in digital form for airline computers in Europe was considered to require further study to ensure that the most efficient and economical methods were employed for NAT operations.

12.18 The Meeting noted that action was in hand, in response to Recommendation 9.3/2 by the Sixth Air Navigation Conference, to determine the operational requirements, and to standardize the format and contents of such digital data including the codes and grid systems to be used; this involved world-wide aspects and was being carried out by ICAO and WMO. To meet regional requirements, the Meeting recommended as follows:

RECOMMENDATION 12/3 - PROVISION OF METEOROLOGICAL DATA IN DIGITAL FORM FOR AIRLINE FLIGHT PLANNING COMPUTERS LOCATED IN EUROPE

(a) That ICAO ascertain, by consulting IATA, which airlines require meteorological data for grid points in digital form for use in their flight planning computers. The airlines should indicate the locations at which they require the information and the areas to be covered by such digital data to meet the needs of flights between Europe and North and Central America. It may be found necessary also to include requirements for flights between Europe and other Regions.

(b) That WMO request European States having the necessary MET computer capability for providing NAT data in digital form to indicate whether they are prepared to make such data available for airline computers and under what conditions.

(c) That ICAO and WMO use the information received in accordance with (a) and (b) above to suggest a co-ordinated plan to facilitate the utilization by the airline operational centres of the digital data required for NAT flight planning. The plan should aim at the greatest uniformity of the product at the least cost to all concerned.

TABLE MET 1 - AERONAUTICAL METEOROLOGICAL OFFICES

12.19 The Meeting based its considerations relating to Table MET 1 on the concept that the aeronautical meteorological offices would receive area forecast system products. There was extensive discussion of the new classification of meteorological offices recommended by the Sixth Air Navigation Conference, namely Classes I, II and III rather than MMO, DMO and SMO. The criteria for the Application of these classifications recommended by the Sixth Air Navigation Conference and of the additional criteria requested by that Conference (Recommendation 11.1/4) and subsequently developed by the Air Navigation Commission and referred to the Meeting for trial application and comment were reviewed.

12.20 The development of a Table MET 1, listing detailed requirements for Class I, II and III offices on the basis of the new classification and the application criteria developed by the Sixth Air Navigation Conference and the ANC, was found not to be possible. The main obstacle was that, particularly in connexion with Class I and Class II offices, the new classification combined requirements for services (briefing and documentation, provision of aerodrome and landing forecasts, etc.) with methods of meeting the requirements (presence or absence of forecasters at the aerodrome). In the opinion of the Meeting, in areas such as NAT and NAM with extensive centralization of meteorological services and availability of a variety of methods to meet requirements, a RAN meeting could plan only the services that were required. The methods of meeting the requirements would have to be decided by States in the light of available resources and relevant technical and administrative considerations.

12.21 For these reasons it was agreed to leave it open whether at a particular aerodrome a Class I or Class II office was needed. The plan should only show that either one or the other type of office was required at all regular international aerodromes in the area under consideration. It was expected that States would indicate in their aeronautical information publications the actual class of meteorological office provided by them at the aerodromes concerned, namely either Class I or Class II. The following details were therefore agreed in respect of the revised Table MET 1:

(a) The meteorological offices which should provide services for international aviation at regular aerodromes were listed in Column 1; this excluded a number of aerodromes in Canada at which intermediate stops are planned (Calgary, Edmonton and Halifax) on the understanding that the required services were provided at departure points for the flights concerned.

(b) Meteorological watch offices were listed for the NAT oceanic area control centres and oceanic FIRs.

(c) A note was introduced indicating that for the continental FIRs in Canada and the United States, the meteorological watch offices and their areas of responsibility would be designated by the States concerned.

(d) The details of services for rescue co-ordination centres (RCCs) were deleted and a note was included that the meteorological offices providing services for RCCs would be determined by the Meteorological Authority in consultation with the Search and Rescue Authority. This action was taken in conformity with Operational Requirement 38 of the Report on Agenda Item 2.

RECOMMENDATION 12/4 - TABLE MET 1 - AERONAUTICAL METEOROLOGICAL OFFICES

That the Table MET 1 with the associated notes and explanations at Appendix A to Part 12 be included in the Regional Plan as indicating the aeronautical meteorological offices required in the area considered by the Meeting, and their responsibilities.

12.22 As a result of the work on the subject, the Meeting arrived at the conclusion that improvements in the classification of meteorological offices developed by the Sixth Air Navigation Conference were needed; in particular the removal of references to methods of meeting requirements for meteorological services. It was believed that without such improvements, future RAN meetings were likely to encounter difficulties similar to those encountered by the present Meeting.

RECOMMENDATION 12/5 - IMPROVEMENT OF CLASSIFICATION OF AERONAUTICAL METEOROLOGICAL OFFICES

That the classification of aeronautical meteorological offices (Class I, II and III) developed by the Sixth Air Navigation Conference be reviewed with a view to arriving at a classification based on requirements for meteorological services and to eliminating from the classification ways of meeting the requirements.

12.23 If the classification were changed in accordance with Recommendation 12/5, there may be no need for application criteria. As far as the application criteria developed by the ANC and submitted to the Meeting for trial and comment were concerned, the Meeting confined itself to some general comments in view of the difficulties it had experienced with the classification to which the criteria applied:

(a) the need for speedy and uninterrupted reception of all required forecasts from outside sources, on which, according to the ANC criteria, the removal of forecasters from aerodrome meteorological offices depended, seemed to apply equally to Class I and Class II offices;

(b) the same thought as in (a) applied also to satisfactory pilot briefing at a suitable location or locations on the aerodrome;

(c) although it was agreed that forecasters were needed at MWO's, these offices do not fall under the classification of Class I, II or III because no briefing or documentation and preparation of local forecasts was required by them;

(d) concerning the preparation of trend-type landing forecasts, the majority felt that forecasters would be required at aerodromes for which these forecasts are to be prepared, but it was agreed that progressive centralization of meteorological services and reasons of economy made this increasingly difficult to achieve.

KEFLAVIK METEOROLOGICAL OFFICE

12.24 The Meeting reviewed the requirements for the meteorological services to be provided by the Keflavik meteorological office and meteorological watch office under the ICAO Icelandic Joint Financing agreement, as set out in Recommendation 23/2 - Minimum specifications of meteorological facilities and services required in Iceland by the NAT IV Regional Air Navigation Meeting (1961) and as published in the NAT/NAM/PAC Air Navigation Plan publication, Doc 8755/2, Introduction to Part IV - Meteorology, paragraph 10.

12.25 The Meeting was informed that in order to perform the services required, the following functions were being carried out at the Keflavik meteorological office:

(a) Provision of surface synoptic charts embracing the North Atlantic Region for the main synoptic hours of 00, 06, 12 and 18 GMT.

(b) Provision of surface synoptic charts embracing the Eastern North Atlantic Region for the intermediate synoptic hours of 03, 09, 15 and 21 GMT.

(c) Provision of upper air charts embracing the North Atlantic Region for the 500 and 300 mb surfaces, at least twice daily.

(d) Provision of 700 and 200 mb chart, as required for international aircraft operations.

(e) Provision of prognostic significant weather and upper air charts generally embracing the North Atlantic Region based on the charts listed in a) to d) above, two to four times daily, as required.

12.26 The Meeting recognized that the ICAO Icelandic Joint Financing Agreement relating to the meteorological services to be provided by the Keflavik MET office was concluded before certain new components were introduced into the MET part of the Regional Plan, in particular before the area forecast system was developed. It was therefore agreed that Iceland should be invited to study the implications of these new developments on the services provided by that office under joint financing and, based on such a study, to present proposals for a possible simplification of the MET part of this agreement; it would be the objective of this review to propose possible savings.

12.27 In the light of the above considerations the following two recommendations were made:

RECOMMENDATION 12/6 - KEFLAVIK METEOROLOGICAL OFFICE

That the following material be included as appropriate in the Introduction to Part IV - Meteorology of the Regional Plan:

"KEFLAVIK METEOROLOGICAL OFFICE

The following sets out the duties of the Keflavik meteorological office/meteorological watch office provided under the current ICAO Icelandic Joint Financing agreement:

(a) Provision of meteorological briefing and flight documentation and amendments thereto, as required for international operations to and from Iceland, and for operational planning.

(b) Provision of routine terminal forecasts and necessary amendments thereto for Keflavik, Reykjavik and Akureyri aerodromes.

(c) Provision of area meteorological watch for the Reykjavik FIR and issue of SIGMET information."

RECOMMENDATION 12/7 - REVIEW OF JOINTLY FINANCED SERVICES BY KEFLAVIK MET OFFICE

That Iceland be invited to review the services provided by the Keflavik MET office under Joint Financing in the light of the centralization of MET services and to submit to ICAO proposals for possible simplifications and savings for consideration by all States concerned in accordance with the Joint Financing Agreement.

METEOROLOGICAL INFORMATION FOR INTERNATIONAL GENERAL AVIATION

12.28 En-route information for international general aviation.

12.28.1 The Meeting noted that there were about five hundred North Atlantic crossings by international general aviation aircraft per year and that this traffic constituted considerably less than 1% of the total North Atlantic traffic. It was understood that for eastbound flights adequate services were provided by Canada and the United States under bilateral agreements and that for the small number of westbound crossings, the meteorological offices had available adequate information, such as the products of national or regional meteorological centres, to meet the IGA needs independently of the NAT area forecast system.

12.28.2 It was accordingly agreed that it would be uneconomical and unnecessary to provide en-route information for these IGA flights through the NAT area forecast system, and the Meeting found no need to recommend specific regional measures for the provision of en-route meteorological information for North Atlantic crossings by international general aviation aircraft.

12.29 Aerodrome reports and forecasts for international general aviation.

12.29.1 With respect to aerodrome reports and forecasts for the aerodromes designated for IGA operations in the report on Agenda Item 5, it was agreed that Table MET 8 of the Regional Plan should be updated by including the designated NAT aerodromes for which such reports and forecasts should be made available. It was noted that the list of aerodromes was subject to review in accordance with Recommendation 5/2.

RECOMMENDATION 12/8 - AERODROME REPORTS AND FORECASTS FOR IGA

That the following aerodromes be added to Table MET 8 of the Regional Plan:

CANADA - Goose/Goose, St. John's/Torbay

DENMARK - Narssarssuaq/Narssarssuaq (Greenland)

FRENCH TERRITORY OF ST. PIERRE AND MIQUELON - St. Pierre/St. Pierre

UNITED KINGDOM - Leeds & Bradford/Leeds & Bradford, Stornoway/Stornoway

Note: The list of aerodromes in Table MET 8 is subject to revision if changes occur in Table AGA 3.

VOLMET BROADCASTS

12.30 Under Agenda Item 12 the Meeting reviewed the meteorological contents of the HF VOLMET broadcasts by Gander, New York and Shannon. Matters relating to the frequencies to be used and other aeronautical telecommunications aspects were considered under Agenda Item 16.

12.31 On the understanding that from 17 September 1970, additional broadcasting time would become available, viz, 60 minutes for Gander and New York and perhaps 50 minutes for Shannon, it was agreed to recommend the inclusion in these VOLMET broadcasts of additional stations, based on the following principles:

(a) Each alternate 5-minute time block should include SIGMET information on hand, or an indication of NIL SIGMET, with forecasts and reports plus trends for:

(i) two aerodromes, plus reports for four additional aerodromes (New York and Shannon)

(ii) three aerodromes, plus reports for three additional aerodromes with forecasts and reports shown in brackets to be omitted as required (Gander)

The remaining 5-minute time blocks should contain forecasts and reports plus trends when available for three aerodromes plus reports for three additional aerodromes, which is in accordance with current practice.

(b) The length of the SIGMET information included in VOLMET broadcasts should not be such as to cause the omission of any of the planned aerodrome forecasts and reports.

(c) The aerodrome forecasts and reports included in each block should, as far as possible, refer to aerodromes in the same geographical area.

12.32 Because of lack of precise information on the additional time which would become available for the Shannon VOLMET broadcast, the information set out for this broadcast in Table MET 5 was understood to be provisional. Should less than 50 minutes broadcasting time be available, the alternative plan, based on 40 minutes broadcasting time, should be used (see page 12-B-3). It was thought that in the case of no additional broadcasting time becoming available for the Shannon broadcast, the list of stations to be included in that broadcast should remain unchanged. In that case, it was also understood that aerodrome forecasts, rather than aerodrome reports plus trend, would be dropped from the individual transmissions by Shannon, as and when required for the inclusion of SIGMET information. Finally, the Meeting recognized that modifications to the contents of the Shannon VOLMET broadcast might become desirable in the light of the results of the implementation of Recommendation 8/4 of the Limited EUM RAC/COM RAN Meeting.

12.33 Accordingly, the following procedures and a revised Table MET 5 were developed:

RECOMMENDATION 12/9 - TABLE MET 5 - HF VOLMET BROADCASTS

(a) That the following material be included as appropriate in the Introduction to Part IV of the Regional Plan:

"5. HF VOLMET BROADCASTS

5.1 The HF VOLMET Broadcast plan appears in Table MET 5. The broadcasts should be made using radiotelephony.

5.2 The Gander, New York and Shannon VOLMET broadcasts should be made only in the English language.

5.3 Relevant SIGMET information or an indication of NIL SIGMET should be broadcast, as decided by the ATS centre concerned, in the time blocks indicated in Table MET 5.

5.4 The aerodrome forecasts should be transmitted before the routine reports plus trend.

5.5 The aerodrome forecasts should be valid for 9 hours.

5.6 The routine aerodrome reports should include air temperature and dew point temperature at least at hourly intervals.

5.7 The same order of stations in the broadcasts should always be maintained.

5.8 When data have not arrived from an aerodrome in time for a broadcast, the latest earlier material should be included in the broadcast, together with the time of observation."

(b) That Table MET 5 of the Regional Plan be amended in respect of its NAT/NAM components as shown in Appendix B to Part 12.

(c) That the Draft Table MET 5, showing NAT requirements for data to be included in the Shannon HF radiotelephony VOLMET broadcasts, as shown on pages 12-B-2 and 12-B-3 be reviewed in the light of follow-up action on Recommendation 8/4 of the LIM EUM (RAC/COM) Regional Air Navigation Meeting (1969).

DISSEMINATION OF TROPICAL STORM WARNINGS

12.34 The Meeting reviewed the contents of Appendix MET A dealing with the dissemination of tropical storm warnings. There was some discussion on the need for this Appendix to the MET part of the Regional Plan. It was agreed, however, that it should be retained, subject to some minor amendments, viz the deletion from Column 3 of the table of all references to Gander, Halifax, Montreal and Toronto, which were suggested by the Delegation of Canada on the basis that these warnings were routinely available in Canada for other purposes. In accordance with a proposal by the Delegation of France, it was also agreed that Paris should be added to Column 3 after Miami.

RECOMMENDATION 12/10 - APPENDIX MET A - DISSEMINATION OF TROPICAL STORM WARNINGS

That Appendix MET A to the Regional Plan be amended by deleting from Column 3 all references to Gander, Halifax, Montreal and Toronto and by adding to Column 3 a reference to Paris after the Miami storm warning centre.

AIRCRAFT OBSERVATIONS AND REPORTS

12.35 The existing regional supplementary procedures relating to Agenda Item 12 were reviewed and the Meeting noted that of the existing SUPPS-MET, as published in Doc 7030 - Regional Supplementary Procedures, only those relating to aircraft observations and reports were intended to be retained in that document.

12.36 In this review due account was taken of the need for extending the applicability of the residual SUPPS-MET relating to aircraft observations to the new NAM part of the Regional Plan. The Meeting noted that the existing NAT aircraft reporting procedures were generally satisfactory, except for the format of AIREPs as input data for meteorological computers. This involved world-wide aspects and the Meeting noted that action was in hand to standardize the format of AIREPs in accordance with Recommendation 5.1/2 of the Sixth Air Navigation Conference along the lines of proposals presented to that Conference by the United States of America. In this connexion the use of the CODAR form was regarded as unsuitable.

12.37 It was agreed to retain the substance of the existing NAT-SUPPS 2.3.1 and 2.3.3, but to recommend a simplified wording and also a corresponding NAM procedure aimed at exempting aircraft from routine observations over the NAM Region, except when flying:

(a) North of latitude 55°N and west of longitude 80°W, and

(b) North of latitude 60°N and east of longitude 80°W.

RECOMMENDATION 12/11 - PROPOSED NEW SUPPLEMENTARY PROCEDURES - METEOROLOGY - AIRCRAFT OBSERVATIONS AND REPORTS

(a) That the following procedures replace the current Supplementary Procedures for the NAT Region relating to routine aircraft observations.

(b) That the procedures annotated NAT be applied in all NAT FIRs and those annotated NAM be applied in all NAM FIRs.

(c) That all other current Supplementary Procedures for the NAT Region be regarded as superseded by the recommendations made under Agenda Items 12 to 14 of the Meeting.

"1. ROUTINE AIRCRAFT OBSERVATIONS (PANS-MET 2.3.1)

1.1 Locations

1) All aircraft flying in the Gander, Shanwick, New York and Santa Maria Oceanic FIRs between North America and Europe, in either direction, shall make, record and report routine meteorological observations at each designated reporting point or line, except that aircraft cleared on an organized track, shall be required to make, record and report routine observations only when so designated at the time of receiving their oceanic clearance in accordance with SUPPS-RAC 4.5. NAT

2) Aircraft shall be exempted from making, recording and reporting any routine observations, except when flying north of latitude 55°N and west of longitude 80°W and when flying north of latitude 60°N and east of longitude 80°W. NAM"

12.38 The Meeting noted that the incorporation of SUPPS-MET currently published in Doc 7030 would affect all Air Navigation Plan Publications. It was felt that the work of the Meeting on Tables MET 1, 5, 6 and 8 of the NAT/NAM/PAC ANP had provided an opportunity to discuss how the procedures and explanations relating to those tables might be presented in a form convenient for the future users. The Meeting believed that the editorial re-arrangement of similar material in other ANPs might be undertaken on the same lines with a view to maintaining uniformity in those publications.

RECOMMENDATION 12/12 - EDITORIAL ALIGNMENT OF MET PARTS OF ANP PUBLICATIONS

That, as far as necessary and possible, the format proposed by the Meeting for the presentation of procedural material relating to Tables MET 1, 5, 6 and 8 - formerly published in Doc 7030 - be used in the editorial alignment of the MET parts of other ANP publications, when these are revised to incorporate former SUPPS-MET, with a view to maintaining uniformity in all publications.

LONG-TERM SYSTEMS PLANNING MATTERS

12.39 With reference to the MET subjects considered under Agenda Item 3, the Report on Agenda Item 12 contains references to additional requirements arising from SST operations (paragraphs 12.6 to 12.10 and Recommendation 12/1) and to the provision of meteorological data for input into ATS and airline computers (paragraphs 12.14 to 12.18 and Recommendation 12/3).

12.40 Concerning the introduction of fog dispersal techniques at aerodromes, the Meeting noted that action was in hand in response to Recommendation 5/25 by the Fifth Air Navigation Conference, dealing with fog dispersal techniques. It was felt that no further regional action on this subject was needed under Agenda Item 12.

RECAPITULATION OF RECOMMENDATIONS BY PAST RAN MEETINGS

12.41 The following relevant recommendations by past RAN Meetings were reviewed: NAT IV (1961) Recommendations 11/1, 13/1, 13/2, 13/3, 13/4 and 23/2 and SP NAT (1965) Recommendations 6 iv/2, 6 iv/5, 6 iv/6, 6 iv/7, 6 v/1 and 6 v/5; it was concluded that the Meeting had developed new recommendations on the subjects of these as necessary and that no further action was needed on the above recommendations.

APPENDIX A

TABLE MET 1 - AERONAUTICAL METEOROLOGICAL OFFICES AND THEIR RESPONSIBILITIES

Material for the Introduction to Part IV - Meteorology of the ANP

2. AERONAUTICAL METEOROLOGICAL OFFICES AND THEIR RESPONSIBILITIES (Table MET 1)

2.1 The Meteorological Offices which should provide services for international aviation are listed in Table MET 1, together with details concerning their responsibilities in the field of international air navigation. They should provide service on a 24-hour basis, except as otherwise agreed between the Meteorological Authority, the Air Traffic Services Authority and the operators concerned.

2.2 Meteorological watch offices responsible for the issue of SIGMET information for all NAM FIRs and the area to be covered by each office should be determined by the Meteorological Authority concerned.

2.3 Meteorological offices providing service for rescue co-ordination centres should be determined by the Meteorological Authority in consultation with the Search and Rescue Authority concerned.

(Note: Paragraph 1 of the Introduction to Part IV deals with general explanatory material.)

Material for the "Explanation of Table" preceding Table MET 1

Column

1. Name of the aerodrome or location where the meteorological office is required.

2. Class of meteorological office as follows:
   Class I/Class II meteorological office (I/II)
   Meteorological watch office (MWO)

3. The area control centre (ACC) to be served by the meteorological watch office indicated in column 1.

4. Area to be served by the meteorological watch office indicated in column 1.

5. Responsibilities assigned to designated meteorological offices:

   AF - Responsible for collecting aircraft reports received at aeromobile ground stations within the FIR shown in Column 4 and responsible for transmitting them to other meteorological offices and to the appropriate WMO Regional Collecting Centres shown in parentheses.

6. Supplementary information including arrangements made by States for the implementation of the required aeronautical meteorological offices.

APPENDIX A

TABLE MET 1

1 MET OFFICE CENTRE MET	2 CLASS CATE-GORIE	3 ACC SERVED ACC DESSERVIS	4 AREA SERVED BY MWO REGION DESSERVIE PAR LE MWO	5 RESPONSIBILITIES FONCTIONS	6 SUPPLEMENTARY INFORMATION RENSEIGNMENTS COMPLEMENTAIRES
ALGERIA/ALGERIE ALGER/Dar el Beida	I/II				
AUSTRIA/AUTRICHE Wien/Schwechat	I/II				
BAHAMAS/BAHAMA (Iles) FREEPORT/Intl. NASSAU/Intl.	I/II I/II MWO	Nassau ACC	Nassau FIR	AF (Miami)	
BARBADOS/BARBADE BRIDGETOWN/Seawell	I/II				
BELGIUM/BELGIQUE BRUXELLES/National	I/II				
BERMUDA/BERMUDES BERMUDA/NAS	I/II				

APPENDIX A (Cont'd)

1	2	3	4	5	6
CANADA					
EDMONTON	I/II			AF (Montreal)	Briefing and documentation not required.
FROBISHER BAY/ Frobisher	I/II				
GANDER/Intl.	I/II MWO	Gander ACC	Gander Oceanic FIR	AF (Montreal)	Exposé verbal et documentation non exigés
MONTREAL/Intl.	I/II				
TORONTO/Intl.	I/II				
VANCOUVER/Intl.	I/II				
WINNIPEG/Intl.	I/II				
CUBA/CUBA					
HABANA/José Marti	I/II				
CZECHOSLOVAKIA/ TCHECOSLOVAQUIE					
PRAHA/Ruzyne	I/II				
DENMARK/DANEMARK					
KØBENHAVN/Kastrup	I/II				
SØNDRE STRØMFJORD (Greenland)	I/II MWO	Søndrestrøm ACC	Søndrestrøm FIR	AF (Bracknell)	
VAGAR/Vagar (Faroe Is.)	I/II				

APPENDIX A (Cont'd)

1	2	3	4	5	6
DOMINICAN REPUBLIC/ REPUBLIQUE DOMINICAINE					
SANTO DOMINGO/de las Américas	I/II				
FINLAND/FINLANDE					
HELSINKI	I/II				
FRANCE/FRANCE					
LYON/Bron	I/II				
PARIS/Orly	I/II				
PARIS/Roissy-en-France	I/II				
FRENCH ANTILLES/ ANTILLES FRANÇAISES					
FORT-DE-FRANCE/ Lamentin, Martinique	I/II				
POINTE-A-PITRE	I/II				
Le Raizet, Guadeloupe	I/II				
GERMANY (FED.REP.OF)/ ALLEMAGNE (REP.FED. D')					
FRANKFURT MAIN	I/II				
HAMBURG	I/II				
KOLN/Köln-Bonn	I/II				
GREECE/GRECE					
ATHINAI	I/II				

APPENDIX A (Cont'd)

1	2	3	4	5	6
HAITI/HAITI					
PORT-AU-PRINCE/ Président Duvalier Intl.	I/II				
ICELAND/ISLANDE	I/II				
KEFLAVIK	MWO	Reykjavik ACC	Reykjavik FIR	AF (Bracknell)	
REYKJAVIK	I/II				
IRELAND/IRLANDE					
SHANNON	I/II				
ISRAEL/ISRAEL					
TEL AVIV/Lod	I/II				
ITALY/ITALIE					
MILANO/Malpensa	I/II				
ROMA/Fiumicino	I/II				
JAMAICA/JAMAIQUE					
KINGSTON/Palisadoes	I/II				
MONTEGO BAY/Intl.	I/II				
LUXEMBOURG/LUXEMBOURG					
LUXEMBOURG	I/II				

APPENDIX A (Cont'd)

1	2	3	4	5	6
DOMINICAN REPUBLIC/ REPUBLIQUE DOMINICAINE					
SANTO DOMINGO/de las Américas	I/II				
FINLAND/FINLANDE					
HELSINKI	I/II				
FRANCE/FRANCE					
LYON/Bron	I/II				
PARIS/Orly	I/II				
PARIS/Roissy-en-France	I/II				
FRENCH ANTILLES/ ANTILLES FRANÇAISES					
FORT-DE-FRANCE/ Lamentin, Martinique	I/II				
POINTE-A-PITRE Le Raizet, Guadeloupe	I/II I/II				
GERMANY (FED.REP.OF)/ ALLEMAGNE (REP.FED. D')					
FRANKFURT MAIN	I/II				
HAMBURG	I/II				
KOLN/Köln-Bonn	I/II				
GREECE/GRECE					
ATHINAI	I/II				

APPENDIX A (Cont'd)

1	2	3	4	5	6
HAITI/HAITI					
PORT-AU-PRINCE/ Président Duvalier Intl.	I/II				
ICELAND/ISLANDE	I/II				
KEFLAVIK	MWO	Reykjavik ACC	Reykjavik FIR	AF (Bracknell)	
REYKJAVIK	I/II				
IRELAND/IRLANDE					
SHANNON	I/II				
ISRAEL/ISRAEL					
TEL AVIV/Lod	I/II				
ITALY/ITALIE					
MILANO/Malpensa	I/II				
ROMA/Fiumicino	I/II				
JAMAICA/JAMAIQUE					
KINGSTON/Palisadoes	I/II				
MONTEGO BAY/Intl.	I/II				
LUXEMBOURG/LUXEMBOURG					
LUXEMBOURG	I/II				

APPENDIX A (Cont'd)

1	2	3	4	5	6
MEXICO/MEXIQUE					
GUADALAJARA/ Las Animas	I/II				
MEXICO CITY/Intl.	I/II				
MOROCCO/MAROC					
RABAT/Salé	I/II				
NETHERLANDS (KINGDOM OF THE)/PAYS-BAS (ROYAUME DES)					
AMSTERDAM/Schiphol	I/II				
NETHERLANDS ANTILLES/ ANTILLES NEERLANDAISES					
ORANJESTAD/Prinses Beatrix, Aruba I.	I/II				
WILLEMSTAD/Dr. A. Plesman, Curacao I	I/II				
NORWAY/NORVEGE					
BERGEN/Flesland	I/II				
OSLO/Fornebu	I/II				
PORTUGAL/PORTUGAL	I/II				
LISBOA	MWO	Santa Maria Oceanic ACC	Santa Maria Oceanic FIR	AF (Paris)	
SANTA MARIA (Açores)	I/II				

APPENDIX A (Cont'd)

1	2	3	4	5	6
PUERTO RICO/PUERTO RICO					
SAN JUAN/Puerto Rico Intl.	I/II				
SENEGAL/SENEGAL					
DAKAR/Yoff	I/II MWO	Dakar ACC	Dakar Oceanic FIR	AF (Dakar)	
SPAIN/ESPAGNE					
BARCELONA	I/II				
LAS PALMAS DE GRAN CANARIA	I/II MWO	Canarias ACC	Canarias FIR	AF (Dakar)	
MADRID/Barajas	I/II				
MALAGA	I/II				
SURINAM/SURINAME					
PARAMARIBO/Zanderij	I/II				
SWEDEN/SUEDE					
STOCKHOLM/Arlanda	I/II				
SWITZERLAND/SUISSE					
GENEVE/Cointrin	I/II				
ZURICH	I/II				
TRINIDAD & TOBAGO/ TRINITE-et-TOBAGO					
PORT OF SPAIN/ Piarco, Trinidad	I/II MWO	Piarco ACC	Piarco FIR	AF (Miami)	

APPENDIX A (Cont'd)

1	2	3	4	5	6
UNITED KINGDOM/ ROYAUME-UNI					
GLASGOW	I/II				
LONDON/Gatwick	I/II				
LONDON/Heathrow	I/II	Shanwick ACC	Shanwick Oceanic FIR/UIR		
MANCHESTER	I/II				
PRESTWICK	I/II			AF (Bracknell)	
UNITED STATES/ ETATS-UNIS					
ANCHORAGE/Intl. Alaska	I/II				
BALTIMORE/Friendship Maryland	I/II				
BOSTON/Logan Massachusetts	I/II				
CHICAGO/O'Hare Illinois	I/II				
DETROIT/Metropolitan-Wayne Co., Michigan	I/II				
HOUSTON/Inter-continental, Texas	I/II				
LOS ANGELES/Intl. California	I/II				
MIAMI/Intl. Florida	I/II MWO	Miami ACC, Houston ACC	Miami Oceanic FIR Houston Oceanic FIR	AF (Miami)	
NEWARK, New Jersey	I/II				
NEW YORK/John F. Kennedy Intl.	I/II MWO	New York ACC	New York Oceanic FIR	AF (New York)	

1	2	3	4	5	9
PHILADELPHIA/Intl. Pennsylvania	I/II				
PITTSBURGH/Greater Pittsburg, Pennsylvania	I/II				
SAN FRANCISCO/Intl. California	I/II				
SEATTLE/Seattle-Tacoma Intl., Washington	I/II				
WASHINGTON/Dulles Intl., District of Columbia	I/II				
U.S.S.R./R.S.S.U.					
MOSCOW/Sheremetievo	I/II				
VENEZUELA/VENEZUELA					
CARACAS/Maiquetia	I/II				
VIRGIN ISLANDS/ ILES VIERGES					
ST. CROIX/Alexander Hamilton	I/II				
WEST INDIES ASSOCIATED STATES/ ETATS ASOCIES DES INDES OCCIDENTALES					
ST. JOHN'S/Coolidge Antigua I.	I/II				

APPENDIX B

TABLE MET 5 - NAT/NAM HF RADIOTELEPHONY VOLMET BROADCASTS

NEW YORK and GANDER

00-05	05-10	10-15	15-20	20-25	25-30
1	2	3	4	5	6
NEW YORK DETROIT CHICAGO CLEVELAND Detroit Chicago Cleveland Niagara Falls Milwaukee Indianapolis	NEW YORK SIGMET BANGOR PITTSBURGH Bangor Pittsburgh Windsor Locks St. Louis Syracuse Minneapolis	NEW YORK NEW YORK/JFK NEWARK BOSTON New York Newark Boston Baltimore Philadelphia Washington	NEW YORK SIGMET BERMUDA MIAMI Bermuda Miami Nassau Freeport Tampa West Palm Beach	GANDER MONTREAL TORONTO OTTAWA Montreal Toronto Ottawa Gander Goose Halifax	GANDER SIGMET WINNIPEG EDMONTON (CALGARY) Moncton Frobisher Winnipeg Edmonton (Calgary) (Sondrestrom)
30-35	35-40	40-45	45-50	50-55	55-60
1	2	3	4	5	6
NEW YORK NIAGARA FALLS MILWAUKEE INDIANAPOLIS Detroit Chicago Cleveland Niagara Falls Milwaukee Indianapolis	NEW YORK SIGMET WINDSOR LOCKS ST. LOUIS Bangor Pittsburgh Windsor Locks St. Louis Syracuse Minneapolis	NEW YORK BALTIMORE PHILADELPHIA WASHINGTON New York Newark Boston Baltimore Philadelphia Washington	NEW YORK SIGMET NASSAU FREEPORT Bermuda Miami Nassau Freeport Tampa West Palm Beach	GANDER GANDER GOOSE HALIFAX Montreal Toronto Ottawa Gander Goose Halifax	GANDER SIGMET MONCTON FROBISHER (SONDRESTROM) Moncton Frobisher Winnipeg Edmonton (Calgary) (Sondrestrom)

Note: The sequence of each broadcast should be as shown in the table. SIGMET denotes broadcasts which may contain SIGMET information. The reports and forecasts shown in brackets may be deleted from the Gander broadcasts to provide broadcasting time for the inclusion of SIGMET messages.

APPENDIX B (Cont'd)

DRAFT TABLE MET 5 - NAT REQUIREMENTS FOR DATA TO BE INCLUDED IN THE SHANNON HF RADIOTELEPHONY VOLMET BROADCASTS*

(Alternative 1 based on 50 minutes broadcasting time per hour)

00-05	05-10	10-15	15-20	20-25
1	2	3	4	5
SIGMET BRUXELLES/ NATIONAL HAMBURG Bruxelles/ National Hamburg Frankfurt Köln-Bonn Düsseldorf München	SHANNON PRESTWICK LONDON/HEATHROW Shannon Prestwick London/Heathrow Amsterdam/ Schiphol Manchester London/Gatwick	SIGMET KØBENHAVN/ KASTRUP STOCKHOLM/ ARLANDA København/ Kastrup Stockholm/ Arlanda Oslo/Fornebu Bergen Dublin Birmingham	PARIS/ORLY MADRID/BARAJAS LISBOA Paris/Orly Madrid/Barajas Lisboa Santa Maria Athens Paris/ Le Bourget	SIGMET ROMA/FIUMICINO MILANO Roma/Fiumicino Milano Zürich Genève Torino Barcelona
30-35	35-40	40-45	45-50	50-55
1	2	3	4	5
SIGMET FRANKFURT KÖLN-BONN Bruxelles/ National Hamburg Frankfurt Köln-Bonn Dusseldorf München	AMSTERDAM/ SCHIPHOL MANCHESTER LONDON/GATWICK Shannon Prestwick London/Heathrow Amsterdam/ Schiphol Manchester London/Gatwick	SIGMET OSLO/FORNEBU BERGEN København/ Kastrup Stockholm/ Arlanda Oslo/Fornebu Bergen Dublin Birmingham	SANTA MARIA ATHENS PARIS/ LE BOURGET Paris/Orly Madrid/Barajas Lisboa Santa Maria Athens Paris/ Le Bourget	SIGMET ZURICH GENEVE Roma/Fiumicino Milano Zürich Genève Torino Barcelona

* The contents of this draft table are subject to review in the light of follow-up of Recommendation 8/4 of the LIM EUM (RAC/COM) RAN Meeting (1969).

Notes: 1) The sequence of each broadcast should be as shown in the table. SIGMET denotes broadcasts which may contain SIGMET information.

2) Paris/Le Bourget to be replaced by Paris/Roissy-en-France in due course.

APPENDIX B (Cont'd)

DRAFT TABLE MET 5 - NAT REQUIREMENTS FOR DATA TO BE INCLUDED IN THE SHANNON HF RADIOTELEPHONY VOLMET BROADCASTS*

(Alternative 2 based on 40 minutes broadcasting time per hour)

6 00-05	05-10	10-15	15-20
1	2	3	4
SIGMET KØBENHAVN/KASTRUP BERGEN	SHANNON PRESTWICK LONDON/HEATHROW	FRANKFURT MAIN KÖLN-BONN PARIS/ORLY	SIGMET MADRID/BARAJAS LISBOA
København/Kastrup Bergen Hamburg Stockholm/Arlanda Oslo/Fornebu London/Gatwick	Shannon Prestwick London/Heathrow Amsterdam/Schiphol Bruxelles/National Manchester	Frankfurt Main Köln-Bonn Paris/Orly Zürich Genève Milano	Madrid/Barajas Lisboa Santa Maria Roma/Fiumicino Paris/Le Bourget Athens
30-35	35-40	40-45	45-50
1	2	3	4
SIGMET HAMBURG STOCKHOLM/ARLANDA	AMSTERDAM/SCHIPHOL BRUXELLES/NATIONAL MANCHESTER	ZURICH GENÈVE MILANO	SIGMET SANTA MARIA ROMA/FIUMICINO
København/Kastrup Bergen Hamburg Stockholm/Arlanda Oslo/Fornebu London/Gatwick	Shannon Prestwick London/Heathrow Amsterdam/Schiphol Bruxelles/National Manchester	Frankfurt Main Köln-Bonn Paris/Orly Zurich Genève Milano	Madrid/Barajas Lisboa Santa Maria Roma/Fiumicino Paris/Le Bourget Athens

* The contents of this draft table are subject to review in the light of follow-up of Recommendation 8/4 of the LIM EUM (RAC/COM) RAN Meeting (1969).

Notes: 1) The sequence of each broadcast should be as shown in the table. SIGMET denotes broadcasts which may contain SIGMET information.

2) Paris/Le Bourget to be replaced by Paris/Roissy-en-France in due course.

APPENDIX C

TABLE MET 6 - NAT/NAM AREA FORECAST SYSTEM

Part 1 - Charts for jet aircraft operations

Area Forecast Centre	Area of Responsibility for Preparation of Forecast	Type of Charts Provided	Approximate Area to be Covered by Charts	Times to which Charts Relate	Remarks
1	2	3	4	5	6
National Meteorological Center, Washington, D.C.	1) Continental United States excluding Alaska	a) surface and significant weather charts (normally combined)	28°N 43°W-43°N 139°W-17°N 121°W-9°N 65°W	00, 06, 12, 18	
		b) 300 mb chart c) tropopause/vertical wind shear chart	35°N 38°E-39°N 169°W-14°N 100°W-25°N 60°W-25°N 10°W	00, 06, 12, 18	
	2) Air routes from North America to Europe	a) surface and significant weather charts (normally combined)	48°N 47°E-42°N 89°W-23°N 58°W-26°N 15°E	00, 06, 12, 18	
		b) 300 mb chart c) tropopause/vertical wind shear chart	35°N 38°E-39°N 169°W-14°N 100°W-25°N 60°W-25°N 10°W	00, 06, 12, 18	
	3) Canada and the Arctic Ocean	a) surface and significant weather charts (normally combined) *	65°N 170°W-North Pole-59°N 20°E-32°N 76°W-33°N 123°W	00, 06, 12, 18	*Prepared by Canada
		b) 300 mb chart c) tropopause/vertical wind shear chart	35°N 38°E-39°N 169°W-14°N 100°W-25°N 60°W-25°N 10°W	00, 06, 12, 18	
	4) Air routes between North America and the Caribbean and routes to South America as far as Lima	a) surface and significant weather charts (normally combined) * b) 300 mb chart * c) 200 mb chart *	35°N 120°W-25°N 120°W-0° 88°W-13°S 80°W-13°S 73°W-0° 73°W-03°N 50°W-45°N 65°W-46°N 75°W	00, 06, 12, 18	*Temporarily prepared by Miami
	5) Air routes from the Eastern Part of the CAR Region into Southwest Europe as far as Madrid***	a) surface and significant weather charts (normally combined) * b) 300 mb chart * c) 200 mb chart *	32°N 81°W-3°N 81°W-3°N 50°W-10°N 15°W-35°N 02°W-43°N 02°W 43°N 25°W	06, 18**	*Temporarily prepared by Miami **To be implemented as soon as possible ***For flights to Northwest Europe area forecasts are supplemented by forecasts provided in coded form.

APPENDIX C

TABLE MET 6 - NAT/NAM AREA FORECAST SYSTEM

Part 1 - Charts for jet aircraft operations (Cont'd)

1	2	3	4	5	6
London	Air routes from Western Europe to Canada and the continental United States (including Alaska)	a) surface and significant weather charts (normally combined) b) 300 mb chart c) 250 mb chart d) 200 mb chart e) tropopause topography to be combined with either a) or c)	16°N 81°W, 31°N 141°W, 46°N 77°E, 24°N 00°long	00, 06, 12, 18	
Paris	Air routes from Europe to the Caribbean and the northern part of South America	a) surface and significant weather charts (normally combined) b) 300 mb chart c) 200 mb chart	17°N 88°W, 70°N 25°E, 21°N 01°W, 01°N 57°W	00, 06, 12, 18	Provisionally provided by France.

Note

Transmission is to be completed:

by Washington - in appropriate sequence 14 to 9 hours before the times given in Column 5

by London and Paris - 11 hours before the times given in Column 5.

APPENDIX C

TABLE MET 6 - NAT/NAM AREA FORECAST SYSTEM (Cont'd)

Part 2 - Charts for supersonic transport operations

1	2	3	4	5	6
National Meteorological Center, Washington D. C.	SST routes from North America to Europe	a) 100 mb chart for SST up to Mach 2 b) high-level significant weather chart * c) 70 and/or 50 mb chart for SST up to Mach 3	To be notified by USA in due course	To be notified by U.S.A. in due course	*) At the option of the issuing centre to be combined with a chart under a) and/or c)
London	SST routes from Western Europe to Canada and the continental United States (including Alaska)	a) 100 mb chart for SST up to Mach 2 b) high-level significant weather chart * c) 70 and/or 50 mb chart for SST up to Mach 3	To be notified by U.K. in due course	To be notified by U.K. in due course	*) At the option of the issuing centre to be combined with a chart under a) and/or c)

Agenda Item 13: Exchange of operational meteorological data between ground stations

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

13.1 The plan of aircraft operations, the relevant operational requirements and planning criteria, and the regular and alternate aerodromes adopted by the Meeting, as given in the Reports on Agenda Items 1, 2 and 5, and appropriate parts of the long-term systems plan, as given in the Report on Agenda Item 3, governed the consideration of Agenda Item 13.

ARRANGEMENTS FOR THE EXCHANGE OF OPERATIONAL METEOROLOGICAL DATA

13.2 The Meeting first reviewed the current state of the exchange of operational meteorological data between ground stations in the area. It noted that TAF exchanges across the Atlantic were not meeting specified transit times and that this problem had also been the subject of Special NAT RAN Meeting (1965) Recommendation 6vi/15. It was recognized that the main reasons for these delays were principally matters of COM concern. However, the subject was complicated by the fact that several different interests were involved. For instance, in the EUM Region, TAFs for NAT operations were collected and distributed by both MOTNE and the AFTN; the AFTN was used for the collection and distribution of NAT TAFs in one part of the NAM Region, whilst in other parts meteorological circuits were used. AFTN circuits across the Atlantic connected these two different systems, several incompatible systems of procedures, headings, etc., were in use and WMO also had certain responsibilities, e.g., for codes.

13.2.1 It appeared therefore that the subject should be treated partly under Agenda Item 13 and partly under Agenda Item 15. At the same time the Meeting was of the firm opinion that in order to preserve the identity of the overall problem, the report on the subject should be self-contained. Furthermore certain recommendations requested action by WMO. For these reasons the Meeting agreed that the report of its study and proposals on this matter should appear under Agenda Item 13, even though several aspects were more applicable to Agenda Item 15.

13.2.2 The Meeting examined the question of both short-term and long-term improvements in operational meteorological exchanges. The existing procedures and means of dissemination in both Regions and adjacent areas were given close scrutiny.

POSSIBLE SHORT-TERM IMPROVEMENTS

13.3 The following shortcomings of present arrangements were highlighted:

(a) the length and unsatisfactory transit times of some NAM TAFs disseminated in EUM via MOTNE which is organized on a strictly scheduled basis;

(b) similarly long transit times of EUM TAFs to NAM owing to differences between the two Regions in methods, procedures and circuits used for the transmission of operational MET data.

13.3.1 It was agreed that present systems cannot ensure dissemination within agreed transit times mainly because of:

(a) interface problems between MOTNE, AFTN and NAM MET circuits arising from different data designators and geographical indicators and other heading differences;

(b) differences in purpose, engineering and scheduling (tight or loose) of EUM and NAM MET/COM exchange systems;

(c) lack of suitable capacity in the present MOTNE system.

13.3.2 One suggestion for short-term improvements was that the NAM TAFs should be sent to EUM (with WMO abbreviated headings to identify bulletin contents) encapsulated in an AFTN format prior to transmission and using the pre-determined addressing technique. The TAFs would then be received in London and automatically switched onward via appropriate circuits to other European centres which, in turn, would similarly switch through to further centres for which they had relay responsibilities relevant to the address pattern.

13.3.3 Taking into account the advanced state of automation of AFTN centres in EUM, it was considered that by these means aeronautical meteorological offices in Europe requiring NAM TAFs would receive them with improved transit times.

13.3.4 In relation to EUM TAFs sent to NAM, the system suggested would operate by the originating meteorological offices using the WMO abbreviated heading and then injecting messages into the AFTN. These messages would be addressed to one or two NAM entry points in accordance with NAM requirements. From then on, distribution within USA and Canada would be the responsibility of the respective national systems.

13.3.5 Insofar as exchanges from CAR/SAM to EUM and vice versa were concerned, more study was required.

13.3.6 It was agreed that the arrangements outlined above could not be planned in all their necessary details at the Meeting. Also, in order to permit the pre-determined AFTN addressing system to be worked out, a detailed table of exchange requirements along the lines of Table MET 2 would have to be developed.

13.3.7 Another solution to the exchange problem might be to store all available TAFs in one or more computer centres which could be interrogated upon request through AFTN channels. Such a system was already in operation at Bruxelles National aerodrome to meet the needs for operational meteorological data for Belgian aerodromes.

13.3.8 After examining both the above suggestions, the Meeting agreed that a mixture of the two might afford a possible short-term solution; the first suggested method might be used for routine exchanges and the second for non-routine exchanges. In each case there could be considerable repercussions on MOTNE and EUM/MID/AFI TAF exchange arrangements. A method for dealing with requests for TAFs whether on a routine or non-routine basis would also need to be resolved, together with the changes to pre-determined address patterns which such changes implied. All these questions required urgent resolution by a meeting of the MOTNE Panel attended by representatives of other States concerned, in particular NAM States. In order to improve the present unsatisfactory situation and to make arrangements to meet the new operational requirements as soon as practicable, the Meeting made the following recommendation:

RECOMMENDATION 13/1 - ARRANGEMENTS FOR TRANS-ATLANTIC EXCHANGES OF OPERATIONAL METEOROLOGICAL DATA

In view of the urgent need for improvement of arrangements for trans-Atlantic exchanges of operational meteorological data, immediate action along the following lines is necessary:

(a) Detailed plans for early implementation of the arrangements listed below should be worked out by an early meeting of the MOTNE Panel attended by representatives from other States concerned, in particular NAM States;

(b) Trans-Atlantic exchanges of operational meteorological data should be carried out on the AFTN, including the dissemination of these data within EUM, CAR, SAM, MID and AFI as necessary. Arrangements in regard to TAFs should be based on the following principles:

1) all TAFs should have WMO abbreviated headings and be encapsulated in the AFTN format;

2) there should be a pre-arranged address system for eastbound TAFs based on lists of detailed exchange requirements prepared by ICAO in accordance with the approved operational requirements, table of aircraft operations and the material contained in Appendix A to the Report on Agenda Item 13;

3) westbound TAFs should be addressed to one or two NAM entry points in accordance with NAM dissemination system requirements;

4) specific arrangements were necessary for:

(i) notifying and carrying out alterations to routine exchanges;

(ii) requesting TAFs not required as routine from one or more predetermined locations;
Note: One method might be computer storage of all TAFs available in a given Region, e.g., EUM, so that they could be requested by any aeronautical meteorological office requiring them.

(iii) notifying predetermined locations of missing routine TAFs and requesting repeats;

(c) That the United Kingdom be invited to co-ordinate with States concerned, preparatory work in connexion with the practicability of these arrangements in relation to EUM and NAM exchanges and to report accordingly to the MOTNE Panel Meeting mentioned in a) above.

LONG-TERM PLANNING OF OPERATIONAL METEOROLOGICAL DATA EXCHANGE ARRANGEMENTS

13.4 The Meeting agreed that the ultimate objective was to standardize procedures for the exchange of operational meteorological data on a world-wide basis to permit the automation of these exchanges on a national, regional and/or inter-regional basis as required, including the possibility of using computer storage and retrieval, to achieve the most efficient and economic system. The Meeting believed that the possibility of using the World Weather Watch Global Telecommunication System (WWW GTS) for the collection, exchange and distribution of operational meteorological data should be explored. Although in the past, mixing of operational and basic data traffic had been found to be undesirable in some areas, modern communication techniques (computers, etc.) had made this much less of a problem. One prerequisite was, however, full compatibility of procedures, including message formats, and technical characteristics of the WWW GTS and aeronautical feeder circuits. Such compatibility was needed in any case in order to overcome existing interface difficulties (e.g., NAM MET/COM-AFTN-MOTNE) mentioned in paragraph 13.3.1 above, and to meet the long-term planning principle of co-ordinated and standardized operational meteorological exchanges mentioned in Agenda Item 3.

13.4.1 The Meeting agreed that efforts to remove interface difficulties should be undertaken without delay. This should be done on a world-wide basis to avoid such difficulties occurring elsewhere. Recommendation 7.3/2 of the LIM EUM (RAC/COM) RAN Meeting was a step in that direction which the Meeting endorsed with some minor modifications.

RECOMMENDATION 13/2 - WMO DATA DESIGNATORS

(a) That WMO be requested to make the changes to its data designators called for by LIM EUM (RAC/COM) RAN Meeting (1969) Rec. 7.3/2 a);

(b) That the need for additional designators for amended aerodrome forecasts called for by the LIM EUM (RAC/COM) RAN Meeting (1969) Rec. 7.3/2 b) be reconsidered by the MOTNE Panel in its action on Rec. 7.3/3 (Alignment of MOTNE and WMO bulletin headings) taking into account that the world-wide WMO procedures call for the use of the indicator "AMD".

13.4.2 The Meeting also endorsed the principle of joint ICAO/WMO action to bring about world-wide alignment of procedures, formats, etc., expressed in LIM EUM (RAC/COM) Recommendation 3.4/2 because, as shown by the exchange requirements developed by this Meeting, the problem was not confined to one or two Regions. In view of the complexity of the subject and the work already being undertaken by various ICAO and WMO bodies (e.g., ADIS Panel and CSM) the Meeting made the following recommendation:

RECOMMENDATION 13/3 - ICAO/WMO MET/COM LONG-TERM PLANNING

That ICAO and WMO:

(a) collaborate in preparing by 31 December 1970, a study of how MET/COM procedures, including message formats, and technical characteristics of circuits and centres engaged in the dissemination of operational and basic meteorological data might be aligned;

(b) make arrangements for the results of the study mentioned in(a) above to be considered by their appropriate bodies, if necessary in joint meetings, with a view to achieving the maximum degree of standardization or compatibility at the earliest possible time, and preparing guidelines for planning the regional and inter-regional exchange of these data;

(c) subsequently give consideration to the extent to which the World Weather Watch Global Telecommunication System can assist in the exchange of operational meteorological data on a regional and inter-regional basis.

FUTURE REQUIREMENTS FOR THE EXCHANGE OF OPERATIONAL METEOROLOGICAL DATA

13.5 As a first step in developing meaningful exchange requirements on the basis of the route structure and the regular aerodromes and their designated alternates, the Meeting felt it necessary to develop, in essence, a Table MET 2. This was done in order to have station-to-station requirements available should the use of the AFTN be required to disseminate operational meteorological data in EUM from the remaining portions of the NAT area. As, following the example of the EUM V RAN Meeting, the need for development of a revised Table MET 2 was not foreseen prior to the Meeting, the necessary preliminary work for a computer programme was not undertaken. It was, therefore,necessary to undertake considerable work early in the Meeting to develop the Table manually. It was agreed that a draft Table MET 2 should be prepared as a matter of course for future NAT RAN Meetings.

RECOMMENDATION 13/4 - DEVELOPMENT OF DRAFT TABLE OF EXCHANGE REQUIREMENTS

That for future NAT RAN Meetings a draft table of exchange requirements of operational meteorological data be developed prior to the Meeting, using the ICAO computer programme, which will permit necessary amendments to be made during and at the conclusion of the Meeting.

13.5.1 The information in the Table described in paragraph 13.5 was subsequently transposed into a simpler form, similar to Table MET 4, to indicate the overall operational meteorological traffic flow in respect to NAT operations to and from different parts of the area. A group count of these exchanges, based on a period of peak six-hour traffic, was also computed and tabulated.

13.5.2 In preparing the tables certain basic assumptions were made, and it was felt desirable to record them for the possible benefit of future meetings. They were as follows:

Average message lengths		Average AIREPs per FIR		
TAFs	27 groups	Bodø	5)	
Amended TAFs	20 "	Santa Maria	10)	reports
AIREPs	7 "	New York	10)	per 6
SIGMET messages	40 "	Reykjavik	20)	hours
Routine and selected special reports	8 "	Gander 150) reports per peak Shanwick 100) 6 hour period		
AIREP SPECIAL	8 "			

One SIGMET per 6-hour period and one AIREP SPECIAL per day were assumed. Attention was drawn to certain recorded figures for Gander FIR which indicated the occurrence of diurnal peaks in AIREPs between 1500-2100 hours and 0300-0700 hours. An annual variation of the order of 175 AIREPs per day in February to over 400 reports in July had also been recorded.

13.5.3 Material in respect of TAF exchanges included in these tables referred principally to maximum exchanges in 6-hour periods in accordance with the operational requirements. In some instances the exchanges would be less than indicated because flights were infrequent. It was felt that the COM facilities to be provided should also be able to handle an additional load of non-routine TAF request/reply traffic, which was assumed to average 5 messages per day in each direction between EUM and NAM.

13.5.4 The Meeting discussed the question of scheduling the flow of TAFs in both directions across the Atlantic in order to reduce traffic peaks as much as possible. It felt, however, that from the meteorological point of view 24-hour TAFs could best be made available between the periods 0400-0500, 1000-1100, 1600-1700 and 2200-2300. It was recalled that the operational requirements were that TAFs reach their destinations at least one half-hour before the commencement of their period of validity, and that their transit time should be no more than one half-hour.

13.5.5 Misgivings were expressed at the large volume of exchanges which resulted from the requirement to provide aerodrome forecasts for up to nine alternate aerodromes for each regular aerodrome. The need to provide air-reports at departure aerodromes for whole routes, which had been confirmed as an operational requirement, had also probably increased the information to be exchanged by a significant amount. IATA stated that it had no requirement for the provision of air-reports for the whole route at all departure aerodromes, but it recognized that air-reports for the whole route were required at some locations for operational control purposes by agreement between the appropriate Meteorological Authority and the operator concerned.

RECOMMENDATION 13/5 - TAF AND AIREP REQUIREMENTS AT DEPARTURE AERODROMES FOR NAT FLIGHTS

With the object of reducing MET workload and telecommunications traffic, the need for the provision at departure aerodromes for NAT flights of:

(a) terminal forecasts for all designated alternates associated with a particular aerodrome; and

(b) air-reports over the whole route to be flown,

should be re-examined after sufficient experience has been gained with the exchange requirements.

13.5.6 The Meeting considered the possible future increase of the quantity of operational meteorological data to be exchanged and reached the conclusion that a growth of 20% in the next ten years, resulting mainly from an increase in TAF exchanges, was the best estimate that could be provided. Growth rate of overall MET traffic could reach greater proportions.

13.5.7 The Meeting decided that the part of Table MET 2 referring to NAT and Tables MET 4A and 4B in the current NAT ANP should be cancelled and replaced by a single Table.

RECOMMENDATION 13/6 - TABLE OF EXCHANGE REQUIREMENTS FOR NAT OPERATIONAL METEOROLOGICAL DATA

That the Table in Appendix A to Part 13 of the Report be included in the NAT Regional Plan to show the meteorological stations from which operational meteorological data are to be exchanged for NAT operations.

REVIEW OF RELEVANT METEOROLOGICAL SUPPLEMENTARY PROCEDURES

13.6 The Meeting reviewed the meteorological supplementary procedures for the NAT Region in the light of decisions by the Air Navigation Commission concerning their consolidation.

13.6.1 In considering the operational requirements for terminal forecasts for SST flights, the Meeting noted that the SST Panel had considered that for short SST flights aerodrome reports with trend forecasts might be adequate. In other cases, routine aerodrome forecasts valid for appropriate periods and amendments thereto might be used. Noting that SST flight times between EUM and NAM would exceed two hours, the Meeting did not plan for exchange of routine reports especially for SST operations. It was considered that operational requirements for aerodrome forecasts for SST operations could be met by the issue of 9-hour forecasts each 3 hours as required, or by longer period forecasts issued each 6 hours as required, amended as necessary in all cases.

RECOMMENDATION 13/7 - MATERIAL FOR THE INTRODUCTION TO PART IV OF THE REGIONAL PLAN

That the following material be included as appropriate in the Introduction to Part IV (Meteorology) of the Regional Plan:

"1. Aerodrome observations and reports

(a) Hourly observations with selected special reports should be made; Note: in the EUM Region routine observations and reports are made at half-hourly intervals and there is no need for selected special reports;

(b) Relevant approved letter abbreviations shall be used with METAR and SPECI reports in addition to present weather code figures;

(c) QNH data shall be included with reports as required;

(d) Air temperature and dew point temperature shall be included in reports at least at hourly intervals;

(e) Routine and selected special reports for destination aerodromes and designated alternates should be disseminated over distances corresponding to two hours' flying time.

2. Aerodrome forecasts and amendments to aerodrome forecasts

(a) Aerodrome forecasts shall have a period of validity sufficient to meet the operational requirements;

(b) The validity period for routine issues shall normally begin at one of the main synoptic hours (00, 06, 12 or 18 GMT) for routine issues which are valid for more than 9 hours;

(c) Aerodrome forecasts and amended aerodrome forecasts shall be issued and exchanged in the TAF code;

(d) Each TAF should relate to only one aerodrome;

(e) Relevant approved letter abbreviations shall be used with aerodrome forecasts in the TAF form in addition to forecast weather code figures;

(f) The group $OG_FG_FT_FT_F$ should be included in TAF messages as required.

The groups $6I_ch_ih_it_L$ $5Bh_Bh_Bt_L$ shall not be included;

(g) Aerodrome forecasts and amendments shall normally be exchanged on aeronautical fixed service channels. Other channels may be used if they ensure rapid and reliable availability of these forecasts and amendments and if agreed by the Meteorological Authorities concerned;

(h) Requests for aerodrome forecasts for non-scheduled trans-Atlantic operations should be filed at least 12 hours before the time at which they are needed at the aerodromes of departure.

3. Landing forecasts

Landing forecasts should be of the trend type.

4. SIGMET information and special air-reports

(a) The period of validity of SIGMET messages shall be less than 4 hours;

(b) SIGMET information should include a daily sequence number immediately following the term "SIGMET" and preceding the validity period; this sequence number shall correspond with the number of SIGMET messages originated by the station (or office) since 0001 GMT on the day concerned;

(c) SIGMET information should be disseminated to Flight Information Centres, Area Control Centres and Meteorological Watch Offices so as to be available for aircraft in flight for distances corresponding to two hours' flying time ahead of the aircraft. Special air-reports should not be disseminated if a relevant SIGMET message has been issued.

5. Air-reports

(a) Air-reports shall be so disseminated as to be available at departure aerodromes for complete route segments;

(b) Collecting centres shall transmit air-reports to regional collecting centres by means of hourly consolidated bulletins.

6. Area, route and flight forecasts and amendments to these forecasts

Relevant approved letter abbreviations shall be used in addition to the forecast weather code figures in area, route and flight forecasts in the ARFOR, ROFOR, FIFOR, PROAR, PRORO and PROFI forms.

7. Severe storms of tropical or sub-tropical origin

Warnings of severe storms of tropical or sub-tropical origin which are prepared mainly for other users shall be disseminated in accordance with Appendix MET A of the Regional Plan for use as advisory information by the aeronautical meteorological offices receiving them."

(Note: The contents of Appendix MET A are dealt with in Part 12 of the Report.)

LANDING FORECASTS (TREND TYPE)

13.7 The Meeting examined the procedures governing the trend type of landing forecast and recognized that difficulties resulted from the absence of a coded form for this type of message, in particular for exchanges between ground stations of information disseminated in VOLMET broadcasts. The Meeting noted that the only procedure applicable in preparing trend type landing forecasts (PANS-MET, paragraph 2.7.2.2.2) was different from the procedure for preparing METAR messages to which the forecasts were appended. The Meeting considered that the increasingly widespread use of automatic systems for processing meteorological operational messages and, in particular, the automatic voice transmission of observation and trend messages in VOLMET broadcasts required that the form of these messages be strictly standardized. It was noted with satisfaction that the Commission for Synoptic Meteorology of WMO was developing a code for trend forecasts and that this was planned for consideration by CSM V in June 1970.

INCLUSION OF OTHER SIGNIFICANT INFORMATION IN REPORTS EXCHANGED BETWEEN GROUND STATIONS

13.8 In considering the exchange of significant information not already contained in the main body of reports, as provided for in PANS-MET paragraph 2.7.2.6 c), the Meeting noted that there is no operational requirement for exchange of this information for NAT flights.

ALIGNMENT OF OBSERVING PROCEDURES AND CODES

13.9 The Meeting reviewed the observing procedures and codes employed in the area and noted that these were governed by the provisions of the PANS-MET. It was observed that despite the employment of domestic codes for weather reports and aerodrome forecasts in the NAM Region, standard code forms for aerodrome forecasts were used in international exchanges between ground stations and no alterations to procedures appeared necessary.

13.9.1 The Meeting discussed the use of half-hourly METAR reports in the EUM Region instead of the more common system of hourly METARs and selected special reports employed elsewhere. It was agreed that the EUM system created no operational problems or difficulties for NAT operations. No change in the system was therefore deemed necessary.

FUTURE PRESENTATION, DISPLAY AND ACQUISITION OF OPERATIONAL METEOROLOGICAL DATA

13.10 In its work on the development of a long-term systems plan, considered under Agenda Item 3, the Meeting identified some elements within the field of provision of meteorological services for aeronautical purposes where changes in requirements and the manner in which requirements would be met would evolve in the 1970 - 1980 time period. These changes are expected to follow the introduction of new aircraft (SST), extension of the use of computers for data processing, developments in the field of satellite meteorology and automation in other fields, e.g., VOLMET broadcasts.

13.10.1 The Meeting considered that as a consequence of these innovations attention should be directed to the need to review the requirements relating to the form of presentation and display, and to the means of obtaining operational meteorological data from storage.

RECOMMENDATION 13/8 - FORM OF PRESENTATION AND DISPLAY, AND MEANS OF OBTAINING METEOROLOGICAL DATA FROM STORAGE

That, in parallel with the application of new technology to:

(a) meteorological observing;

(b) computer processing of operational meteorological data;

(c) automation in other fields (e.g., VOLMET broadcasts);

requirements relating to the form of presentation and display, and to the means of obtaining operational meteorological data from storage, e.g., request/reply, be kept under review and taken into account in the development of programmes and plans.

REVIEW OF RECOMMENDATIONS OF PAST NAT RAN MEETINGS

13.11 Relevant parts of the following recommendations were reviewed and it was concluded that no further action was required in respect of them:

NAT IV (1961) Recommendations 11/1, 12/1, 12/2, 12/3, 12/4, 12/5.

SP NAT (1965) Recommendations 6vi/11, 6vi/12, 6vi/13, 6vi/14, 6vi/15.

STATEMENTS BY DELEGATIONS

Statement by the Delegation of France
(Relates to Recommendation 13/6 and Appendix A to the Report on Agenda Item 13, Part I-6, page 13-21)

13.12 Not having requested the inclusion of the aerodrome of St. Pierre (French Territory of St. Pierre and Miquelon) in the Table given in Appendix A to the Report on Agenda Item 13, the French delegation makes full reservations regarding implementation of the stated requirements.

Statement by IAOPA
(Relates to Recommendation 13/6 and Appendix A to the Report on Agenda Item 13, Part I-6, page 13-21)

13.13 IAOPA does not have a requirement for the inclusion of St. Pierre (French Territory of St. Pierre and Miquelon) in the Table given in Appendix A to the Report on Agenda Item 13.

APPENDIX A

TABLE OF EXCHANGE REQUIREMENTS FOR NAT OPERATIONAL METEOROLOGICAL DATA

I. TAF EXCHANGES

(a) Individual exchanges shown below should not be implemented on a routine basis unless the flights for which they are required occur more than 5 times per week;
(b) Exchanges should only be implemented when required for operations;
(c) Additional exchanges may be necessary to meet special requirements such as for en route alternate forecasts or for charter operations.

APPENDICE A

TABLEAU DES ECHANGES DE RENSEIGNEMENTS METEOROLOGIQUES D'EXPLOITATION NECESSAIRES DANS LA REGION NAT

I. ECHANGES TAF

(a) Chacun des échanges indiqués ci-dessous ne devrait pas être effectué sur une base régulière, à moins que les vols pour lesquels ils sont nécessaires n'aient lieu plus de cinq fois par semaine;

(b) aucun échange ne devrait être effectué tant qu'il n'est pas nécessaire à l'exploitation;

(c) des échanges additionnels peuvent être nécessaires pour répondre à des besoins spéciaux, tels que les échanges nécessaires pour les prévisions d'aérodromes de dégagement en route ou pour les vols d'affrètement.

1. TAFs required in NAM
TAF nécessaires dans la Région NAM

From AFI En prov. de AFI	From CAR/SAM En prov. de CAR/SAM	From EUM En prov. de EUM	From MID En prov. de MID	From NAT En prov. de NAT
Ghana	Argentina/ Argentine	Austria/Autriche	Cyprus/Chypre	Bermuda/Bermudes
Accra	Buenos Aires	Salzburg Wien	Nicosia	Bermuda
Guinea/Guinée	Bahamas		Israel/Israël	Denmark/Danemark
Conakry	Freeport Nassau Rock Sound	Belgium/ Belgique	Elat Haifa Tel Aviv	Søndre Strømfjord
Ivory Coast/ Côte d'Ivoire		Bruxelles		
Abidjan				

From AFI En prov. de AFI	From CAR/SAM En prov. de CAR/SAM	From EUM En prov. de EUM	From MID En prov. de MID	From NAT En prov. de NAT
Liberia/ Libéria	Barbados/ Barbade	Czechoslovakia/ Tchécoslovaquie	Turkey/ Turquie	Iceland/Islande
Monrovia	Bridgetown	Bratislava	Ankara	Akureyri
Morocco/Maroc	Brazil/Brésil	Brno	Istanbul	Keflavik
Casablanca	Brasilia	Praha		Reykjavik
Rabat	Rio de Janeiro	Denmark/ Danemark		Portugal
Portugal	Colombia/ Colombie	København		Ponto Delgado
Sal Island	Barranquilla	Finland/ Finlande		Santa Maria
Senegal/ Sénégal	Cuba	Helsinki		
Dakar	Camaguey	Rovaniemi		
Sierra Leone	Habana	Turku		
Freetown	Varadero	France		
	Dominican Republic/ République Dominicaine	Bale-Mulhouse		
	Santo Domingo	Bordeaux		
	Ecuador/ Equateur	Lyon		
	Guayaquil	Marseille		
	French Antilles/ Antilles françaises	Nice		
	Fort-de-France	Paris/Le Bourget		
	Pointe-à-Pitre	Paris/Orly		
	Guyana/Guyane	Paris/Roissy en France		
	Georgetown	Germany (Fed. Rep)/ Allemagne (Rép Féd)		
	Guatemala	Dusseldorf		
	Guatemala	Frankfurt		
	Haiti/Haïti	Hamburg		
	Port-au-Prince	Hannover		
	Jamaica/ Jamaïque	Köln-Bonn		
	Kingston	Munchen		
	Montego Bay	Nurnberg		
	Mexico/Mexique	Stuttgart		
	Acapulco	Greece/Grèce		
	Cozumel	Andravida		
	Guadalajara	Athinai/Athinai		
	Merida	Athinai/Elefsis		
	Mexico City	Thesaloniki		
	Tampico	Ireland/Irlande		
		Dublin		
		Shannon		
		USSR/URSS		
		Moscow/ Scheremetievo		
		Moscow/Vnukovo		

From AFI En prov. de AFI	From CAR/SAM En prov. de CAR/SAM	From EUM En prov. de EUM	From MID En prov. de MID	From NAT En prov. de NAT
	Netherlands Antilles/ Antilles néerlandaises Aruba Curaçao Panama Panama Peru/Pérou Lima Puerto Rico/ Porto Rico San Juan Surinam Paramaribo Trinidad & Tobago/ Trinité et Tobago Port-of-Spain Venezuela Caracas Maracaibo Virgin Islands/ Les Vierges St. Croix St. Thomas West Indies Associated States/ Etats associés des Indes occidentales St. John's St. Lucia	Italy/Italie Alghero Genova Milano/Linate Milano/Malpensa Napoli Pisa Roma/Ciampino Roma/Fiumicino Torino Venezia Luxembourg Luxembourg Netherlands, Kingdom of the/ Pays-Bas, Royaume des Amsterdam Rotterdam Norway/Norvège Bergen Bodo Oslo/Fornebu Oslo/Gardemoen Stavanger Portugal Faro Lisboa Porto Spain/Espagne Barcelona Madrid Malaga Palma de Mallorca Sevilla Zaragoza Sweden/Suède Goteborg Stockholm/ Arlanda Stockholm/ Bromma Switzerland/Suisse Geneve Zurich United Kingdom/Royaume-Uni Birmingham Liverpool London/Gatwick London/Heathrow Manchester Prestwick		

2. TAFs required in Azores, Bermuda, Faroes, Greenland and Iceland
TAF nécessaires aux Açores, aux Bermudes, aux Féroé, au Groenland et en Islande

(a) Required in Azores
Nécessaires aux Açores

From NAM En prov. de NAM	From EUM En prov. de EUM	From AFI En prov. de AFI
Baltimore	Amsterdam	Rabat
Bangor	Barcelona	
Boston	Bruxelles	
Detroit	Dusseldorf	
Gander	Faro	
Halifax	Genève	
Montreal	Hamburg	
New York	København	
Niagara Falls	Lisboa	
Ottawa	London/Gatwick	
Philadelphia	London/Heathrow	
Pittsburgh	Madrid	
Syracuse	Malaga	
Toronto	Manchester	
Washington	Nice	
Windsor Locks	Palma de Mallorca	
	Prestwick	
	Porto	
	Sevilla	
	Shannon	
	Zaragoza	

(b) Required in Bermuda
Nécessaires aux Bermudes

From NAM En prov. de NAM	From EUM En prov. de EUM	From CAR/SAM En prov. de CAR/SAM
Baltimore	Amsterdam	Barranquilla
Bangor	Bruxelles	Bridgetown
Boston	Dusseldorf	Fort-de-France
Chicago	Hamburg	Freeport
Cleveland	København	Kingston
Detroit	London/Gatwick	Montego Bay
Gander	London/Heathrow	Nassau
Halifax	Luxembourg	Panama
Miami	Manchester	Pointe-à-Pitre

2. TAFs required in Azores, Bermuda, Faroes, Greenland and Iceland (cont'd)
TAF nécessaires aux Açores, aux Bermudes, aux Féroé, au Groenland et en Islande (suite)

(b) Required in Bermuda (cont'd)
Nécessaires aux Bermudes (suite)

From NAM En prov. de NAM	From EUM En prov. de EUM	From CAR/SAM En prov. de CAR/SAM
Montreal	Prestwick	Port-au-Prince
Niagara Falls	Shannon	Port of Spain
Newark		Rock Sound
New York		St. Croix
Ottawa		St. John's
Philadelphia		San Juan
Pittsburgh		Santo Domingo
Syracuse		
Tampa		
Toronto		
Washington		
West Palm Beach		
Windsor		
Windsor Locks		

(c) Required in Faroes
Nécessaires aux Féroé

From EUM En prov. de EUM	From NAT En prov. de NAT
Amsterdam	Akureyri
Bergen	Keflavik
Dusseldorf	Reykjavik
Frankfurt	
København	
Hamburg	
Hannover	
Helsinki	
Oslo/Fornebu	
Prestwick	
Stavanger	
Stockholm/Arlanda	

2. TAFs required in Azores, Bermuda, Faroes, Greenland and Iceland (cont'd)
TAF nécessaires aux Açores, aux Bermudes, aux Féroé, au Groenland et en Islande (suite)

(d) Required in Greenland
Nécessaires au Groenland

From EUM En prov. de EUM	From Iceland En prov. d'Islande
Amsterdam	Akureyri
Bergen	Keflavik
Dusseldorf	Reykjavik
Frankfurt	
København	
Hamburg	
Hannover	
Helsinki	
Oslo/Fornebu	
Prestwick	
Stavanger	
Stockholm/Arlanda	

(e) Required in Iceland
Nécessaires en Islande

From EUM En prov. de EUM	From NAM En prov. de NAM	From NAT En prov. de NAT
Amsterdam	Baltimore	Kirkwall
Belfast	Boston	Søndre Strømfjord
Bergen	Goose	Vagar
Bruxelles	Halifax	
Dublin	Montreal	
Dusseldorf	New York	
Edinburgh	Philadelphia	
Frankfurt	Pittsburgh	
Glasgow	Syracuse	
Hamburg	Washington	
Hannover	Windsor Locks	
Helsinki		
København		
Liverpool		
London/Gatwick		
London/Heathrow		
Luxembourg		
Manchester		
Oslo/Fornebu		
Oslo/Gardermoen		
Prestwick		
Shannon		
Stavanger		
Stockholm/Arlanda		

2. TAFs required in Azores, Bermuda, Faroes, Greenland and Iceland (cont'd)
TAF nécessaires aux Açores, aux Bermudes, aux Féroé, au Groenland et en Islande (suite)

(f) Required in Las Palmas
Nécessaires à Las Palmas

From EUM En prov. de EUM	From CAR En prov. de CAR
Barcelona	Caracas
Lisboa	Pointe-à-Pitre
Madrid	St. Croix
Nice	St. John's
Zaragoza	San Juan
	Santo Domingo

3. TAFs required in Africa
TAF nécessaires en Afrique

From NAM En prov. de NAM	From CAR En prov. de CAR
Baltimore	Camaguey
Boston	Habana
Halifax	Varadero
Montreal	
New York	
Philadelphia	
Pittsburgh	
Syracuse	
Washington	

4. TAFs required in CAR
TAF nécessaires aux Caraïbes

From EUM En prov. de EUM	From NAT En prov. de NAT	From AFI En prov. de AFI	From NAM En prov. de NAM
Amsterdam	Bermuda	Alger	Baltimore
Bale-Mulhouse	Santa Maria	Annaba	Bangor
Barcelona		Boufarik	Boston
Bordeaux		El Aaiun	Chicago
Bruxelles		Las Palmas	Cleveland
Dusseldorf		Oran	Corpus Christi
Faro		Ouargla	Dallas
Frankfurt		Rabat	Detroit
Geneve		Tenerife	Dallas/Fort Worth
Hamburg			Gander
Kobenhavn			Goose
Köln-Bonn			Halifax
Lisboa			Houston
London/Gatwick			Indianapolis
London/Heathrow			Milwaukee
Luxembourg			Minneapolis
Lyon			
Madrid			
Malaga			
Manchester			

4. TAFs required in CAR (cont'd)
TAF nécessaires aux Caraïbes (suite)

From EUM En prov. de EUM	From NAT En prov. de NAT	From NAM En prov. de NAM
Nice	Ponta Delgada	Ottawa
Milano		Philadelphia
Munchen		Pittsburgh
Palma de Mallorca		Moncton
Paris/Le Bourget		Montreal
Paris/Orly		Newark
Paris/Roissy en France		New Orleans
Pisa		New York
Porto Santo		Niagara Falls
Prestwick		St. Louis
Roma/Fiumicino		San Antonio
Rotterdam		Syracuse
Sevilla		Toronto
Shannon		Washington
Stavanger		Windsor
Stuttgart		Windsor Locks
Torino		
Venezia		
Zaragoza		
Zurich		

5. TAFs required in EUM
TAF nécessaires en Europe-Méditerranée

From NAM En prov. de NAM	From NAT En prov. de NAT	From CAR En prov. de CAR	From SAM En prov. de SAM	From AFI En prov. de AFI
Abbotsford	Akureyri	Aruba	Barranquilla	El Aaiun
Anchorage/Intl.	Bermuda	Acapulco	Belem	Rabat
Anchorage/	Keflavik	Bridgetown	Cayenne	Tenerife
Elmendorf	Las Palmas	Camaguey	Paramaribo	
Baltimore	Ponta Delgada	Caracas	Rio de Janeiro	
Bangor	Reykjavik	Curaçao		
Boston	Santa Maria	Freeport		
Calgary	Søndre	Fort-de-France		
Chicago	Strømfjord	Georgetown		
Cleveland	Vagar	Guadalajara		
Cold Bay		Guatemala		
Comox		Kingston		
Detroit		Maracaibo		
Edmonton		Merida		
El Paso		Mexico City		
Everett		Montego Bay		
Fairbanks/Intl.		Nassau		
Fresno		Pointe-à-Pitre		
Frobisher		Port of Spain		
Gander		Rock Sound		
Goose				
Halifax				

5. TAFs required in EUM (cont'd)
TAF nécessaires en Europe-Méditerranée (suite)

From NAM En prov. de NAM	From CAR En prov. de CAR
Houston	St. Croix
Indianapolis	St. John's
King Salmon	St. Lucia
Las Vegas	San Juan
Los Angeles	Santo Domingo
Miami	Varadero
Milwaukee	Willemstad
Minneapolis	
Moncton	
Montreal	
Newark	
New Orleans	
New York	
Niagara Falls	
Oakland	
Ontario	
Ottawa	
Palmdale	
Philadelphia	
Pittsburgh	
Portland	
St. Louis	
San Antonio	
San Francisco	
San Diego	
Seattle	
Spokane	
Stockton	
Sydney	
Syracuse	
Tampa	
Toronto	
Vancouver	
Washington	
West Palm Beach	
Windsor	
Windsor Locks	
Winnipeg	

6. Additional international TAF exchange requirements for general aviation
Echanges TAF internationaux additionnels nécessaires pour l'aviation générale

(The contents of this table are subject to review in the light of follow-up action on Recommendation 5/2 of this Meeting)

(Ce tableau pourra être révisé d'après la suite qui sera donnée à la Recommandation 5/2 de la présente Réunion)

Canada

From NAT/En provenance de NAT

Akureyri
Keflavik
Narssarssuaq
Reykjavik
Søndre Strømfjord

6. Additional international TAF exchange requirements for general aviation (cont'd)
Echanges TAF internationaux additionnels nécessaires pour l'aviation générale (suite)

Denmark Danemark	From Europe En provenance d'Europe	From North America En provenance d'Amérique du Nord
Narssarssuaq (Greenland)	Bergen Oslo Prestwick Shannon Stavanger	Boston Gander Goose Halifax Moncton Montreal

French Territory of St. Pierre et Miquelon Territoire français de St. Pierre et Miquelon	From Europe En provenance d'Europe	From NAT En provenance de NAT
St. Pierre	Amsterdam Bergen Dublin Faro Lisboa London/Heathrow Madrid Manchester Oslo Paris/Le Bourget Ponta Delgada Porto Santo Prestwick Shannon Stavanger	Santa Maria From Iceland En provenance d'Islande Akureyri Keflavik Reykjavik From Greenland En provenance du Groenland Narssarssuaq Søndre Strømfjord

Iceland Islande	From Europe En provenance d'Europe	From North America En provenance d'Amérique du Nord
Keflavik Reykjavik	Amsterdam Koln-Bonn Rotterdam	Frobisher Gander Goose From Greenland En provenance du Groenland Narssarssuaq

6. Additional international TAF exchange requirements for general aviation (cont'd)
Echanges TAF internationaux additionnels nécessaires pour l'aviation générale (suite)

Portugal	From Africa En prov. d'Afrique	From Europe En prov. d'Europe	From North America En prov. d'Amérique du Nord
Santa Maria	Abidjan	Bale-Mulhouse	Philadelphia
	Accra	Bordeaux	Pittsburgh
	Conakry	Frankfurt	Washington
	Dakar	Geneve	
	El Aaiun	Lyon	
	Freetown	Milano	
	Las Palmas	Munchen	
	Monrovia	Paris/Le Bourget	
	Sal Island	Stavanger	
	Tenerife	Stuttgart	
		Zurich	

II. EXCHANGE REQUIREMENTS FOR AIR-REPORTS

This table has been prepared on the criterion that air-reports are to be available at the departure aerodrome for the whole route to be flown.

II. ECHANGES DE COMPTES RENDUS EN VOL

Le présent tableau a été établi en se fondant sur le critère que des comptes rendus en vol doivent être disponibles à l'aérodrome de départ pour la totalité de la route à parcourir.

To be available in Doivent être disponibles à	From following FIRs En provenance des FIR suivantes
North America Amérique du Nord	Atkinson, Belem, Bodo, Bogota, Brasilia, Canarias, Casablanca, Central America, Curacao, Dakar, Ezeiza, Gander, Guayaquil, Lima, Manaus, New York, Nassau, Reykjavik, Shanwick, Søndre Strømfjord, Habana, Kingston, Mexico, Piarco, San Juan, Miami, Maiquetia, Mazatlan, Merida, Montevideo, New Orleans, Panama, Port-au-Prince, Porto Alegre, Rio de Janeiro, Santa Maria, Santo Domingo, São Paulo, Zanderij, EUM FIRs
Europe Europe	Belem, Bodo, Canarias, Casablanca, Gander, Curacao, Maiquetia, Mexico, Miami, New York, Nassau, Piarco, Reykjavik, Santa Maria, San Juan, Santo Domingo, Shanwick, Søndre Strømfjord, Zanderij Relevant NAM FIRs or parts thereof/FIR NAM pertinentes ou parties de ces FIR NAM
Caribbean Caraïbes	Canarias, San Juan, Habana, Kingston, Curacao, New York, Maiquetia, Miami, Nassau, Gander, Shanwick, Piarco, Mexico, Santa Maria, San Juan, Santo Domingo, EUM FIRs

II. EXCHANGES REQUIREMENTS FOR AIR-REPORTS (cont'd)
ECHANGES DE COMPTES RENDUS EN VOL (suite)

To be available in Doivent être disponibles à	From following FIRs En provenance des FIR suivantes
Bermuda Bermudes	Gander, New York, Nassau, Santa Maria, San Juan, Shanwick, Habana, Kingston, Miami, Piarco, EUM FIRs
Greenland Groenland	Reykjavik, Gander, EUM FIRs
Iceland & Faroe Islands Islande et Féroé	Bodo, Reykjavik, Shanwick, Gander, Søndre Strømfjord, EUM FIRs
Santa Maria	Gander, New York, Shanwick, EUM FIRs
Africa Afrique	Gander, Casablanca, Dakar, New York, Santa Maria, EUM FIRs.

III. EXCHANGE REQUIREMENTS FOR SIGMET MESSAGES

This table is based on the criterion that SIGMET information shall be disseminated to Flight Information Centres, Area Control Centres and Meteorological Watch Offices so as to be available for aircraft in flight for distances corresponding to two hours flight time ahead of the aircraft.

III. ECHANGES DE MESSAGES SIGMET

Le présent tableau a été établi en se fondant sur le critère que des renseignements SIGMET seront diffusés aux centres d'information de vol, centres de contrôle régional et centres de veille météorologique de façon telle que les aéronefs en vol puissent en disposer pour des distances correspondant à 2 heures de vol sur la route à parcourir.

To be available in Doivent être disponibles à	From following FIRs En provenance des FIR suivantes
North America Amérique du Nord	Bogota, Canada, Central America, Curacao, Gander, Habana, Kingston, Maiquetia, Mexico, Miami, Nassau, New Orleans, New York, Panama, Port-au-Prince, Reykjavik, Santa Maria, San Juan, Santo Domingo, Shanwick, Søndre Strømfjord
Europe	Bodo, Canarias, Casablanca, Gander, Reykjavik, Santa Maria, Shanwick, Søndre Strømfjord, EUM FIRs
Caribbean Caraïbes	Curacao, Maiquetia, New York, Miami, Piarco, San Juan, Nassau, Kingston, Habana, Santa Maria, Santo Domingo
Bermuda Bermudes	New York, Gander, Miami, Nassau, San Juan
Greenland Groenland	Gander, Reykjavik, Shanwick

III. EXCHANGE REQUIREMENTS FOR SIGMET MESSAGES (cont'd)
ECHANGES DES MESSAGES SIGMET (suite)

To be available in Doivent être disponibles à	From following FIRs En provenance des FIR suivantes
Iceland & Faore Islands Islande et Féroé	Reykjavik, Søndre Strømfjord, EUM FIRs
Santa Maria	Gander, New York, Shanwick, EUM FIRs
Africa Afrique	Casablanca, Dakar, Santa Maria, EUM FIRs

IV. EXCHANGE REQUIREMENTS FOR ROUTINE AND SELECTED SPECIAL REPORTS

This table has been based on the criterion that routine and selected special reports for final aerodromes and designated alternates should be disseminated over distances corresponding to two hours flying time.

IV. ECHANGES DE MESSAGES D'OBSERVATIONS REGULIERES ET D'OBSERVATIONS SPECIALES SELECTIONNEES

Le présent tableau a été établi en se fondant sur le critère que les messages d'observations régulières et d'observations spéciales sélectionnées pour les aérodromes de destination et les aérodromes de dégagement désignés devraient être diffusés pour des distances correspondant à deux heures de vol.

To be available in Doivent être disponibles à	From following aerodromes En provenance des aérodromes suivants
North America Amérique du Nord	Bermuda, Mexico, Acapulco, Guadalajara, Freeport, Guatemala, Kingston, Merida, Montego Bay, Nassau, Rock Sound, Tampico
Europe	Vagar, Reykjavik, Keflavik, Akureyri, Santa Maria, Ponta Delgada, Las Palmas, Rabat
Caribbean Caraïbes	Baltimore, Bermuda, New York, Philadelphia, Pittsburgh, Washington, Newark, Houston, Corpus Christi, Fort Worth, New Orleans, San Antonio
Bermuda Bermudes	Baltimore, Boston, Freeport, Montreal, Nassau, Newark, New York, St. John's, Washington, Philadelphia, Bangor, Niagara Falls, Windsor Locks, Port-au-Prince, Santo Domingo, Rock Sound, Pointe-à-Pitre, San Juan, St. Croix
Greenland Groenland	Akureyri, Keflavik, Reykjavik
Faroe Is. Féroé	Bergen, Kobenhavn, Keflavik, Reykjavik, Oslo, Stavanger, Prestwick, Stockholm/Arlanda, Amsterdam, Dusseldorf, Frankfurt, Hamburg, Hannover, Helsinki, Akureyri

IV. EXCHANGE REQUIREMENTS FOR ROUTINE AND SELECTED SPECIAL REPORTS (cont'd)
ECHANGES DE MESSAGES D'OBSERVATIONS REGULIERES ET D'OBSERVATIONS SPECIALES SELECTIONNEES (suite)

To be available in Doivent être disponibles à	From following aerodromes En provenance des aérodromes suivants
Iceland Islande	Bergen, Glasgow, London/Heathrow, London/Gatwick, Oslo/Fornebu, Prestwick, Søndre Strømfjord, Edinburgh, Belfast, Manchester, Oslo/Gardemoen, Stavanger, Shannon, Dublin, Liverpool
Santa Maria	Lisboa, Rabat.

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Agenda Item 14: Meteorological observation networks

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

14.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 46 and 47 of the Report on Agenda Item 2 and appropriate parts of the long-term systems plan, as given in the Report on Agenda Item 3, governed the consideration of Agenda Item 14.

GENERAL CONSIDERATIONS RELATING TO AGENDA ITEM 14

14.2 Under this Agenda Item the Meeting reviewed the recommended basic networks for synoptic surface and upper air observations from the point of view of present and future aviation needs. The existing state of implementation as reported by the WMO Secretariat was also reviewed.

BASIC SYNOPTIC NETWORKS FOR SURFACE AND UPPER AIR OBSERVATIONS

14.3 The Meeting noted with appreciation the progress made by WMO Members since the time of the 4th NAT RAN Meeting in the development of the basic network of synoptic surface and upper air observations. It was noted that, in the northern part of RA IV, a very high percentage of both surface and upper air observations had been implemented, but that implementation in the southern part was not so far advanced in all cases. With respect to RA VI it was noted that implementation was almost 100% for both surface and upper air observations. While the planned networks were considered to be adequate to meet aeronautical requirements, the Meeting considered that the coverage of ship reports in the Atlantic north of 60°N and in certain parts south of 40°N continued to be inadequate and recommended as follows:

RECOMMENDATION 14/1 - SHIP REPORTS FOR NORTH ATLANTIC

That WMO be informed that an increase in the number of weather reports from ships operating in that part of the North Atlantic Ocean south of 40°N and east of 60°W and that part of the North Atlantic north of 60°N is urgently required for aeronautical purposes.

14.4 The Meeting agreed that the network of observations for the 10 millibar level need not be as dense nor as universally distributed as observations for lower levels. However, it was noted that the question of this network density was under study in some States.

14.5 It was noted that there were still cases of long delays in receipt of basic data from RA IV in RA VI. The Meeting was informed by the WMO Observer that the matter was under consideration and improvement was to be expected by January 1971 when the Global Telecommunications System of the World Weather Watch was due to be implemented.

14.6 The Meeting also noted that increasing amounts and types of information were becoming available for use as basic data; this included in particular information from satellites. It was also noted that States were making increasing use of air-reports as basic data in meteorological computers. No regional action on these matters was felt to be necessary under Agenda Item 14.

CLIMATOLOGICAL RECORDS

14.7 The operational requirements for SST operations called for appropriate climatological records to be maintained of upper air information up to 30,000 metres (100,000 feet). The Meeting therefore recommended as follows:

RECOMMENDATION 14/2 - UPPER AIR CLIMATOLOGICAL RECORDS

That WMO be informed of a requirement in the NAT Region for the maintenance of appropriate climatological records of upper air information up to at least 30,000 metres (100,000 feet) for future supersonic transport aircraft operations.

NORTH ATLANTIC OCEAN STATIONS AND DANISH AND ICELANDIC JOINT FINANCING AGREEMENTS

14.8 Account was taken of the final act of the 6th ICAO Conference on the North Atlantic Ocean Stations (Paris 1968). The Meeting noted Recommendations 1, 4, 5 and 7 of that Conference and concluded that all necessary action concerning the study of the future operation of the NAOS Scheme was being taken.

14.9 The Meeting was informed of the recommendation by the Group of Experts set up as a result of NAOS/6, Recommendation 3, that Station Alpha should be left unmanned each alternate period of 24 days from July 1971 to June 1973, due to the need to withdraw one of the ocean station vessels from service, there being no prospect of a replacement. This development was regretted.

14.10 Appendix MET B of the NAT/NAM/PAC Regional Plan relating to observations to be provided under ICAO joint financing agreements was reviewed and it was agreed that it required no change. The same applied to the relevant part of the introduction to Part IV of the Regional Plan (para. 9).

RECOMMENDATION 14/3 - SURFACE AND UPPER AIR SYNOPTIC NETWORKS AND OBSERVATIONS TO BE PROVIDED UNDER ICAO JOINT FINANCING AGREEMENTS

That the material relating to observations to be provided under ICAO joint financing agreements be retained in the Air Navigation Plan publication together with the relevant explanatory material in the Introduction to Part IV of the Plan.

AERONAUTICAL CLIMATOLOGICAL SUMMARIES

14.11 It was noted that some States in the Region were not producing aeronautical climatological summaries and aeronautical descriptive climatological memoranda and that the lack of this information was causing difficulties for operators, especially in the field of planning. The Meeting agreed to recommend that States be urged to provide this material, especially climatological summaries in respect of runway visual range. The Meeting, therefore, recommended as follows:

RECOMMENDATION 14/4 - AERONAUTICAL CLIMATOLOGICAL SUMMARIES AND AERONAUTICAL DESCRIPTIVE MEMORANDA

That States be urged to continue their efforts to prepare and publish aeronautical descriptive climatological memoranda and climatological summaries or make the information available in another form. In particular information concerning RVR should be provided where available.

REVIEW OF RELEVANT PREVIOUS NAT RECOMMENDATIONS APPLICABLE TO AGENDA ITEM 14

14.12 The Committee reviewed Recommendations 10/1, 10/2, 10/3, 10/4, 12/1, 12/2, 12/3, 12/4, 23/2, 23/3 and 23/4 of the 4th NAT RAN Meeting and Recommendations 6v/2, 6v/3, 6v/4, 6vi/12, 6vi/13 and 6vi/14 of the Special NAT Meeting (1965) and agreed that no further action was required on most of them and that the others had been restated as necessary.

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Agenda Item 15: Aeronautical fixed service

RELEVANT OPERATIONAL REQUIREMENTS, PLANNING CRITERIA AND LONG-TERM SYSTEMS PLAN

15.1 The plan of aircraft operations, the relevant operational requirements and planning criteria and the long-term system plan adopted by the Meeting, as given in the Reports on Agenda Items 1, 2 and 3 governed the consideration of Agenda Item 15.

CHANNELS OF THE "NAT CABLE"

15.2 The Meeting considered the current utilization of the NAT cable circuits in order to assess what action would be needed in the short to medium term.

15.2.1 Telegraph Channel No. 1

15.2.1.1 Channel No. 1 linked Gander, Prins Christian Sund, Reykjavik and Shannon, and was basically intended to permit COM liaison between air-ground stations. It operated at 50 bauds.

15.2.1.2 The Meeting considered several proposals relating to Channel No. 1. One proposal was that the circuit should be converted to an additional AFTN circuit between Gander and Prestwick. An alternative proposal was that its existing function should continue, but with a modulation rate of 75 bauds.

15.2.1.3 The Meeting noted that relatively heavy traffic was generated at peak traffic hours by Shannon and Reykjavik, the latter particularly when aircraft were using northerly tracks and were contacting Iceland on VHF. Traffic was also generated by Prins Christian Sund when Gander experienced HF propagation problems.

15.2.1.4 The Meeting concluded that, as provision of Channel No. 1 was necessary to the ATC organization on the North Atlantic, it would be premature to discontinue it. On the contrary, as 1969 peak loading had been heavy (often 100%), and the load was likely to increase, the Meeting decided that the modulation rate should be increased to 75 bauds.

RECOMMENDATION 15/1 - MODULATION RATE ON NAT CABLE CHANNEL NO. 1

That NAT Cable Telegraph Channel No. 1 be maintained between Gander, Prins Christian Sund, Reykjavik and Shannon basically for liaison between air-ground stations, and that the modulation rate be increased to 75 bauds as soon as practicable after 1 April 1971.

Note: It was confirmed that the use of a modulation rate of 75 bauds would entail no additional cable rental charges.

15.2.1.5 The Meeting noted that direct manual access to the channel might be required in some cases for inter-station co-ordination purposes, but was, in general, wasteful of channel capacity, as well as precluding easy transfer of messages to the AFTN.

RECOMMENDATION 15/2 - OPERATION ON ICAO NAT CABLE CHANNEL NO. 1

(a) That technical arrangements be made, where they do not already exist, for transmissions onto Channel No. 1 to be made normally at automatic rather than manual speed; and

(b) That the States concerned make, to the extent practicable, automatic handling arrangements for the processing and transfer of air-ground messages onto the channel in AFTN format.

Note: It is not intended that, in the short-term, Channel No. 1 should become an AFTN channel with the use of AFTN format obligatory for all messages.

15.2.1.6 The foregoing considerations refer to operation of Channel No. 1 until the time, in mid-1971, when automatic AFTN relay centres are expected to be in full operation at London (Croydon) and Montreal. The Meeting considered whether changes should be introduced at that time. It recognized that although, in the short-term, changes would be premature, there were advantages to be gained in effecting delivery of air-ground messages via the AFTN. A major advantage would be that a significant volume of air-to-ground reports would be handled by fully automatic AFTN relay rather than by torn-tape arrangements. The Meeting concluded that it would be desirable that the States directly concerned should, following implementation and operational experience with the fully-automatic AFTN relay centres at London and Montreal, review the method of operation on Channel No. 1. The view was expressed that, if the transit times and reliability of the AFTN system proved adequate to handle these messages, the States concerned should then use the AFTN for Channel No. 1 traffic, initially on a trial basis, in order to acquire the necessary statistics to assist in the review.

15.2.1.7 The Meeting agreed that the eview and study should take place not later than 1 January 1972.

RECOMMENDATION 15/3 - STUDY OF LONGER TERM UTILIZATION OF CHANNEL NO. 1

That, in 1971, when operational experience has been gained with the automatic relay centres at London and Montreal, the NAT Cable Implementing States * should convene to study the future engineering and utilization of Channel No. 1 with a view to proposing appropriate amendment of the ICAO Plan.

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* Canada, Denmark, Iceland, Ireland and the United Kingdom.

COMMENT: It is intended that the Meeting should:

(a) explore the AFTN distribution of air-to-ground reports;

(b) study the possible conversion of Channel No. 1 to an AFTN channel between Iceland and the United Kingdom;

(c) study the appropriate use of the channel between Iceland and Canada, taking into account the problem of the distribution of traffic generated by Greenland;

(d) as a supplementary task, review the operation, loading, etc., on the cable circuits overall.

15.2.1.8 The Meeting noted, with appreciation, the intention of the States concerned to implement a standby RTT channel between Prins Christian Sund and Reykjavik.

15.2.2 Telegraph Channel No. 2

15.2.2.1 Channel No. 2 was noted to consist essentially of two channels with provision for relay in Iceland:

Channel No. 2A providing a duplex AFTN circuit between Reykjavik and London, and

Channel No. 2B providing a duplex AFTN circuit between Reykjavik and Gander.

15.2.2.2 The Meeting noted that Channel No. 2A was operating at 50 bauds and Channel No. 2B at 75 bauds. It was further noted that, at peak hours in 1969, Channel No. 2A was loaded about 50 minutes per hour, and Channel No. 2B about 40 minutes per hour (Westbound).

15.2.2.3 The Meeting further noted that, because there was a percentage of multiple address AFTN traffic on the North Atlantic, Channel No. 2 carried some messages addressed to Iceland which duplicated those carried on Channel Nos. 3 or 4. In this respect, the Meeting noted that certain advantages could result from use of an automatic relay centre in Iceland on Channel Nos. 2, 3 and 4 as proposed by France at the Special NAT Meeting in 1965. However, the reduction in overall loading would be relatively small, and, bearing in mind the time needed to provide an automatic centre in Iceland, would be more than overtaken by the rate of growth of traffic. Other interim arrangements would have to be made in any case. Some Delegations believed, moreover, that the introduction of an Iceland relay into the direct Gander - London AFTN links (which carried the majority of

trans-Atlantic AFTN traffic) would also unnecessarily reduce the overall serviceability. It was mentioned that the present tendency was to reducing the number of relay centres. The question of an automatic AFTN relay centre in Iceland was not pursued. It was noted that the question of the installation of automatic relay equipment for use on Channel No. 2 at Reykjavik would be the subject of further study by the Icelandic Administration.

15.2.2.4 Some Delegates felt that an increase of modulation rate to 75 bauds between Reykjavik and London would provide adequate Channel No. 2A capacity for several years. It was agreed that the capacity of Channel No. 2A should be increased by increasing the modulation rate overall to 75 bauds.

RECOMMENDATION 15/4 - MODULATION RATE ON CHANNEL NO. 2A

That the modulation rate on Channel No. 2A be increased as soon as practicable to 75 bauds.

15.2.3 Telegraph Channels Nos. 3 and 4

15.2.3.1 The Meeting agreed that, in view of the very heavy loading on Channels Nos. 3 and 4, already operating at 75 bauds, and expected increases in traffic, it was necessary to implement an additional AFTN channel between London and Montreal.

15.2.3.2 In the course of discussion on the way in which this channel should be provided, it was pointed out that it would be desirable that, for technical reasons, it be provided by a means, either cable or satellite, independent of the existing ICAO NAT Cable System. An alternative routing to that of the ICAO NAT cable would, in fact, mean that the liability to outage of the new channel would be independent of outages on the ICAO cable system. The existing lease provisions only normally resulted in provision of substitute routing in some 20 minutes or so, whilst the adoption of an alternative routing for the additional channel would permit high priority category traffic (e.g. Categories SS, DD and FF) to be carried as soon as any break occurred on Channels Nos. 3 and 4. The present Canadian diversion routing to Channels Nos. 3 and 4 was Channel No. 2, already heavily loaded, and, in any case, liable to breakdown coincident with Channels Nos. 3 and 4.

15.2.3.3 The Meeting noted, however, that use of routing in another cable, or by satellite, might well be much more expensive than use of the ICAO NAT cable. It was agreed that this question of cost would have to be examined in another forum and particularly in the light of the expected costs at that time, since alternative cost estimates could well have substantially changed by then.

15.2.3.4 The Meeting agreed to recommend provision of the additional channel, leaving the question of the optimum means and the financement thereof for determination following the Meeting.

RECOMMENDATION 15/5 - ADDITIONAL AFTN CHANNEL UNITED KINGDOM - CANADA

(a) That an additional direct AFTN channel, with a modulation rate of 75 bauds, be implemented between London and Montreal by 1 April 1971, and

(b) That discussions be at once initiated on the arrangements for financing and implementing this channel.

COMMENT: The Meeting agreed that it was desirable that the additional channel should, for technical reasons, be provided on a system other than the ICAO NAT Cable System unless there were significant financial advantages in using the latter. Under certain circumstances an additional telegraph channel can be provided in the ICECAN portion of the cable at no extra cost.

15.2.3.5 The Meeting noted that the Canadian terminal of ICAO NAT Cable Channels Nos. 2, 3 and 4 would shortly be Montreal instead of Gander.

15.2.4 ATS Speech Circuit

15.2.4.1 The Meeting took note of the fact that the existing conference-type ATS speech circuit carried on the ICAO NAT cable was severely overloaded. It agreed that an additional direct speech circuit was required between Prestwick and Gander.

15.2.4.2 It was noted that, under the terms of the ICAO NAT cable lease, the ATS speech circuit was replaced, in case of breakdown, by an alternative circuit within 5 minutes. It was also noted that provision of an additional speech channel on the ICAO NAT cable would be significantly cheaper than on other systems.

RECOMMENDATION 15/6 - ADDITIONAL ATS SPEECH CIRCUIT UNITED KINGDOM - CANADA

(a) That a direct ATS speech circuit Prestwick - Gander be implemented by 1 April 1971, and

(b) That discussions be at once initiated on the arrangements for financing and implementing this circuit.

COMMENT: The Meeting agreed that this circuit could be provided most conveniently and economically over the ICAO NAT Cable System.

15.3 AFTN RTT AND LTT CIRCUITS (other than those provided on the ICAO NAT cable)

15.3.1 The AFTN RTT standby Circuit London - Reykjavik

15.3.1.1 The Meeting was informed of the intention of the countries concerned to install an additional 480 channel cable Scotland - Shetlands - Faroes by the end of 1971. It was expected that this would greatly increase the overall serviceability of the SCOTICE part of the NAT Cable System.

15.3.1.2 It was noted that the circuit, at present shown in the ICAO Plan as a standby to Channel No. 2A of the SCOTICE cable, in fact served on a regular basis to handle basic meteorological data. If experience proved that the new cable rendered the circuit unnecessary, it might continue to be used for MET purposes, although being available for AFTN standby until the new cable circuit proved itself.

RECOMMENDATION 15/7 - RTT STANDBY CIRCUIT LONDON - REYKJAVIK

That the RTT standby circuit London - Reykjavik should, even if normally used and designated for MET purposes, be kept available for AFTN standby purposes, at least until the new cable has been operational and satisfactory for one year.

COMMENT: It is intended that, after one year, a decision should be taken as to whether the circuit could be definitively designated as a MET circuit and its use for AFTN standby discontinued.

15.3.2 London - Lisboa

15.3.2.1 The Meeting noted a proposal to delete this circuit since it appeared no longer to be needed, and traffic was very light. However, it was pointed out that this circuit provided triangulation for the routing London - Paris - Madrid - Lisboa in the EUM AFTN System in the event of breaks, particularly of the tributary circuit Madrid - Lisboa.

15.3.2.2 The Meeting noted that, although the requirement for the circuit stemmed from an early NAT Meeting, it could not currently be described either as a NAT circuit or a EUM circuit but only as a circuit in the world-wide ICAO Plan. It was, however, observed that it was not used in normal EUM routing. On the other hand, it served as a diversion routing to NAM from London in the periods between breakdowns of the ICAO NAT cable and provision of substitute channels, as well as to help clearance of backlog traffic at such times. Similarly Lisboa diverted NAM traffic over it to London in the event of breakdown of the RTT circuits west from Lisboa. It therefore served NAT rather than EUM operations. It was consequently agreed to retain the circuit as a NAT requirement for the time being. The situation when a third AFTN channel had been provided between London and Montreal would, however, be somewhat different, and it was agreed that, particularly if it were finally decided to provide that third channel on a system independent of the ICAO NAT cable, the requirement for the London - Lisboa circuit should then be reviewed.

RECOMMENDATION 15/8 - RECONSIDERATION OF CONTINUED NEED FOR LONDON - LISBOA AFTN RTT CIRCUIT

That, when a third direct AFTN channel has been provided between London and Montreal, the continued need for the Lisboa - London AFTN RTT circuit should be reviewed with a view to proposing its deletion from the Plan if it is no longer required.

15.3.3 Shannon - Santa Maria

15.3.3.1 The Meeting reviewed the need to retain this circuit when the additional London - Montreal AFTN channel and the Prestwick - Santa Maria speech circuit were implemented. The Meeting agreed to retain the requirement for the circuit for the time being as an AFTN circuit only.

15.3.4 AFTN/AFS RTT Circuits between Lisboa and Santa Maria and NAM

15.3.4.1 It was agreed that the circuits shown in the NAT/NAM/PAC document, i.e. the present plan, neither represented the existing situation nor constituted the required configuration.

RECOMMENDATION 15/9 - AFTN/AFS RTT CIRCUITS BETWEEN LISBOA AND SANTA MARIA AND NAM

(a) That the existing requirements for circuits:

New York - Lisboa
New York - Santa Maria
Santa Maria - Lisboa

and their associated Notes should be replaced by the following:

Kansas City - Lisboa	2 Duplex AFTN channels	routed via Santa Maria
Kansas City - Lisboa	1 Simplex MET (AFS) *	routed via Santa Maria
Santa Maria - Kansas City	1 Simplex MET (AFS) *	
Lisboa - Santa Maria	1 Simplex MET (AFS) *	
Santa Maria - Lisboa	2 Duplex AFTN	

and (b) That the multichannel circuit Lajes - Santa Maria be deleted.

Note * : See also paragraph 15.5 below on MET AFS circuit requirements.

15.3.5 NAM AFTN Circuits

15.3.5.1 The Meeting reviewed the changes required to the NAM Plan consequent upon the decisions of the USA and Canada to simplify their AFTN/AFS configurations, with installation of automatic AFTN centres at Kansas City and Montreal.

RECOMMENDATION 15/10 - NAM AFTN CIRCUITS

That the NAM Plan of AFTN circuits be amended as follows:

(a) Delete:
Gander - Goose
Gander - London (Channels Nos. 3 and 4 of the NAT cable)
Gander - New York
Gander - Reykjavik (Channel No. 2B of the NAT cable)
Portland - Seattle
San Francisco - Seattle

(b) Add:
Montreal - Goose LTT
Montreal - London (Channels Nos. 3 and 4 of the NAT cable) LTT
Montreal - Reykjavik (Channel No. 2B of the NAT cable) LTT
Montreal - Vancouver LTT
Montreal - Kansas City LTT

15.4 SPEECH CIRCUITS
(other than those provided exclusively on the ICAO NAT cable)

15.4.1 Reykjavik - Stavanger

15.4.1.1 The Meeting noted that it was becoming increasingly urgent to provide this circuit. Whilst it would be possible to meet the requirement by means of an HF radiotelephone circuit, it was considered that, on implementation of the direct Prestwick - Gander speech circuit, the requirement could be more readily and reliably met via Prestwick.

RECOMMENDATION 15/11 - IMPLEMENTATION OF THE ATS SPEECH CIRCUIT REYKJAVIK - STAVANGER

That the ATS speech circuit Reykjavik - Stavanger be implemented as soon as practicable, and that the States concerned should decide the engineering details of through-switching at Prestwick if that proves operationally acceptable.

COMMENT: The speech circuit from Stavanger terminates in the Scottish ACC, whereas the speech circuit from Reykjavik terminates in the Shanwick OAC.

15.4.2 Prestwick - Madrid

15.4.2.1 The Meeting noted with appreciation that the circuit was likely to be implemented shortly following co-operation on the part of the two States concerned.

15.4.3 Prestwick - Santa Maria

15.4.3.1 The Meeting also noted with appreciation that the circuits and equipment concerned were on test. Two high quality (LINCOMPEX) circuits Santa Maria - Lisboa and Lisboa - Prestwick would be through-connected at Lisboa to form the equivalent of a direct circuit.

15.4.4 The Meeting decided upon the changes necessary to the plan to meet the revised ATS requirements.

RECOMMENDATION 15/12 - AMENDMENTS TO THE PLAN FOR ATS SPEECH CIRCUITS

(a) Replace Prestwick - Lisboa by Prestwick - Santa Maria.

(b) Replace Gander - Lisboa by Gander - Santa Maria, with switching at New York.

(c) Replace New York - Lisboa by New York - Santa Maria.

(d) Add Santa Maria - Lisboa.

(e) Add San Juan - Santa Maria, with switching at New York.

(f) Add Madrid - Santa Maria, with switching at Lisboa.

15.4.5 ATS Speech Circuits in the NAM Region

15.4.5.1 The Meeting considered that the existing circuits were adequate, and made no recommendation.

15.5 METEOROLOGICAL CIRCUITS (AFS)

15.5.1 Review of revised exchange requirements

15.5.1.1 The Meeting reviewed the revised requirements for exchanges of operational meteorological data on the AFTN. It was noticed that these new requirements represented some increase in the existing volume of exchanges, and it was noted that the new TAF exchange requirements were expected to increase by some 20% over the following 10 years.

15.5.1.2 It was observed that current MET traffic only constituted some 20% of the overall AFTN message traffic across the North Atlantic, and that the aggregate increases in AFTN capacity to be expected from the improvements recommended by the Meeting would be more than adequate to absorb the increased message loads including the increased MET traffic load. The Meeting therefore took no action specifically to amend the AFTN to take account of the new MET exchange requirements.

15.5.1.3 As regards MET (AFS) circuit requirements, the Meeting decided that some circuits could now be deleted.

RECOMMENDATION 15/13 - AMENDMENT OF THE PLAN FOR METEOROLOGICAL (AFS) CIRCUITS

(a) That the following meteorological (AFS) circuits be deleted from the ICAO Plan:

Goose - Søndre Strømfjord RTT
Montreal - New York LTT
Lisboa - Paris RTT (via Santa Maria or direct)
Vancouver - San Francisco
Seattle - San Francisco
Seattle - Portland
San Francisco - Los Angeles

(b) That the requirement for a circuit New York - Lisboa via Santa Maria be replaced by a requirement for simplex RTT circuits Kansas City to Lisboa, Lisboa to Santa Maria, and Santa Maria to Kansas City.

COMMENT: See also Recommendation 15/9 above.

15.6 GROUND EXCHANGE OF OPERATIONAL METEOROLOGICAL DATA

15.6.1 The arrangements, mainly procedural in nature, for the future transatlantic exchange of operational meteorological data were considered by the Meeting from both the COM and MET points of view and in both the short and long term phases. The relevant recommendations and supporting text are to be found in the Report on Agenda Item 13.

15.7 FIXED SERVICE COM PROCEDURES INCLUDING SUPPS

15.7.1 COM Supplementary Procedures (Fixed Services)

15.7.1.1 The Meeting reviewed the NAT COM Supplementary Procedures and agreed that there was no need to make any changes or deletions.

15.7.1.2 It considered suggestions that the SUPPs at paragraphs 2.2.1 and 2.2.2 of Regional Supplementary Procedures Part 3, Communications, should be made applicable in the NAT Region, but finally decided that it was better to leave the matter flexible, i.e. that the AFTN centres concerned could best make ad hoc decisions relative to the particular problems encountered, and taking into account previous experience.

15.7.2 COM Procedures (Fixed Services)

15.7.2.1 The Meeting decided that the procedures for the use of Channel No. 1 in the short term as drafted by the Special NAT Meeting, 1965, were still basically valid and should be restated.

RECOMMENDATION 15/14 - PROCEDURES FOR THE USE OF ICAO NAT CABLE CHANNEL NO. 1

(a) That informal procedures continue to be used in the short term for the liaison function; and

(b) That air-ground radio stations use Channel No. 1, as required, to relay messages to other air-ground radio stations which have not received them by normal network intercept procedures.

15.8 MISCELLANEOUS AFS QUESTIONS

15.8.1 Long term retention of AFTN traffic records

15.8.1.1 The Meeting noted that some States had experienced difficulties in interpreting the intent of paragraph 3.5.2 of Volume II of Annex 10 relative to the long term recording of AFTN traffic. For example, paragraph 3.5.2.1 required copies of all messages, in their entirety, transmitted by an AFTN origin station to be

retained for at least 30 days. Noting the definition of AFTN origin station, it appeared that airline operators offices having direct access to the AFTN, (as was the case at some locations), would thus be required to store the traffic they originated for at least 30 days.

15.8.1.2 Discussion of the matter revealed, however:

(a) that such locations could in fact be designated by a State to act as AFTN origin stations;

(b) that the requirement of paragraph 3.5.2.1 could be met, by local arrangement, by the storing of the messages either by the origin station or by the AFTN centre to which that station was connected.

15.8.1.3 The matter had in fact been discussed in some detail at the Seventh Meeting of the Panel of Teletypewriter Specialists (Montreal, 1968) and was recorded in paragraph 1.4.2.2 of its Report.

15.8.1.4 The Meeting considered that the question should be clarified in the Annex.

RECOMMENDATION 15/15 - CLARIFICATION OF THE INTENT OF PARAGRAPH 3.5.2.1 OF ANNEX 10, VOLUME II

That the intent of paragraph 3.5.2.1 of Volume II of Annex 10 should be clarified.

COMMENT: This might perhaps be done by a Note following the paragraph, and making it clear that the choice of the station which is to store the messages is left for local determination by the State concerned.

NOTE: The titles of paragraphs 3.5.2 and 3.5.3 could advantageously be amended to the form used in the heading (15.8.1) above.

15.8.2 Processing of AFTN Message Compilation

15.8.2.1 The Meeting noted that, whilst efforts were being made to reduce AFTN transit times, the processes whereby the AFTN messages themselves were originated prior to filing, as well as the delivery arrangements, were often relatively slow. It was believed that, to the extent practicable, originators should have access to the AFTN provided that arrangements could be made to ensure that they used the correct format. This could be done by several methods, or combinations thereof,

including semi-automatic preparation of some elements such as Start-of-Message, End-of-Message, Origin Line, etc., and the use, for example, of appropriate pro formas in which boxes could be completed.

RECOMMENDATION 15/16 - AFTN MESSAGE COMPILATION

That States devise and apply methods, including use of pro formas, automatic equipment, etc., to permit AFTN messages to be prepared by non-specialized personnel, particularly with regard to the use of correct AFTN format, thus speeding the injection of traffic into automatic systems.

15.9 REVIEW OF PREVIOUS NAT AFS RECOMMENDATIONS

15.9.1 The Meeting reviewed past NAT recommendations in the Fixed Services field and decided that they were either obsolete or had been superseded by its own recommendations.

15.10 LONG-TERM SYSTEMS PLANNING (AFS)

15.10.1 The Meeting considered it desirable to expand on the material relating to Communications as contained in the General section of the Report on Agenda Item 3, in order both to state more explicitly the long term systems planning problems in the Fixed Services field, and to explain why they needed urgent study.

15.10.2 It was pointed out that the period required from the time new AFS equipment was planned to the time it came into use was normally not less than 4 years. It was therefore necessary, starting in the very near future, to initiate long term planning so that the programme of drafting specifications, budgeting, ordering and installation could be put in hand as early as possible. It was essential to know soon and clearly in what direction fixed service communications planning was going. Otherwise States, who expected a reasonable amortization period for their equipment, might buy the wrong equipment, or equipment difficult to modify later, etc. In the fixed service field, as in others, it was not possible to await developments and to take provisioning action afterwards. Once States were committed to a system it could not quickly be changed without very severe economic penalties.

15.10.3 The Meeting noted that there were two main problems which needed early resolution.

15.10.3.1 The first problem concerned the future role and configuration of the AFTN. It appeared possible that either of two broad developments might emerge in the field of aeronautical fixed services:

(a) a single comprehensive AFS network;

(b) several independent specialized networks.

The first of these, a common-carrier concept, was, according to Recommendation 3.1/1 of the LIM EUM RAC/COM Meeting, 1969, to be studied at the EUM VI RAN Meeting, and appeared a feasible approach. The second development would lead to the establishment of several separate specialized networks comprising AIS and MET data circuits, air-ground digital data relay circuits, as well as circuits linking ATS data processors on a "real time" basis. With regard to the latter, the type of circuit or network could clearly be dependent on the type of ATC system to be used in the future. The Meeting felt, however, that even in sophisticated areas, where the tendency towards separate specialized networks might first develop, some form of AFTN would always be required. Also it was certain that, even if specialized networks finally proved to be essential in some areas of high air-traffic density, there would still be wide areas of the world where the conventional AFTN would be adequate and so be retained.

15.10.3.2 The main difficulty, if independent specialized networks were used, would thus be that of interfaces. Costly interface problems could well arise either between the specialized networks themselves, or between them and the conventional AFTN. Before a firm decision to go to specialized networks was made, there would have to be world-wide study of the extent and implications of the interface problems, which might arise not only between the systems used in sophisticated and non-sophisticated areas, but between different sophisticated areas (e.g. NAM, NAT and EUM) where somewhat different constraints and parameters applied.

15.10.3.3 The second problem related to the technical development of the AFTN. Should it, for example, and at what stage, employ higher level codes, error detection or correction facilities, higher speeds, speed conversion and code translation, etc.? The ADIS Panel was working in this field of codes for undetermined AFS use, but their impact on future AFTN planning had not yet been assessed. In this more technical field a regional approach was perhaps feasible, but caution was necessary.

15.10.4 The Meeting concluded that proper forward AFTN/AFS planning was essential, and that such planning should start as soon as possible. In fact, for a decision to be taken as to the COM developments in the NAM/NAT/EUM area in the period 1974-1980, studies would have to start urgently.

RECOMMENDATION 15/17 - URGENT AFTN/AFS SYSTEMS PLANNING STUDIES TO BE UNDERTAKEN

That, as a matter of urgency, studies be undertaken in the context of world-wide application so that firm decisions can be taken, at the earliest possible time, as to the future structure and role of the AFTN/AFS vis-à-vis the message handling and data transfer requirements of all the aeronautical interests concerned.

COMMENT: For the necessary top-level decisions to be taken by an appropriate body, consultation would have to take place with all interested and specialized branches concerned. However, it was considered essential that these consultations be conducted in such

a way that the arrangements finally recommended would not be unduly influenced by the particular requirements of any user, or group of users. In this connection, the Meeting felt that no existing form of ICAO machinery, including Study Groups, Panels, Regional or Divisional Level Meetings, was appropriate, but refrained from making any specific recommendation on this particular question.

The Meeting agreed that the findings of the ADIS, ASTRA, SST Panels, etc., would have to be taken into account if their work had reached a sufficient degree of maturity.

General Note: In this part of the Report no reference has been made to the possible use of satellites, since they represent, from a general fixed service point of view, merely another means of providing point-to-point links.

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Agenda Item 16: Aeronautical Mobile Services

RELEVANT OPERATIONAL REQUIREMENTS, PLANNING CRITERIA AND LONG-TERM SYSTEMS PLAN

16.1 The plan of aircraft operations, the relevant operational requirements and planning criteria and the long-term system plan adopted by the Meeting, as given in the Report on Agenda Items 1, 2 and 3 governed the consideration of Agenda Item 16.

16.2 THE NAT AERONAUTICAL MOBILE SERVICE ON HF

16.2.1 HF en-route Networks.

16.2.1.1 The Meeting noted the use made by AMS stations of the existing frequencies for the NAT A, B, C and D HF Networks from statistics provided by States and agreed that there was a need to reduce the loading on the HF channels employed by making optimum use of the allocated frequencies.

RECOMMENDATION 16/1 - OPTIMUM USE OF HF CHANNELS ASSIGNED

That, when designating Primary and Secondary frequencies, aeronautical stations should take into consideration the need to avoid overloading on HF channels employed and utilize to the extent practicable all assigned frequencies available which are suitable for the operation.

RECOMMENDATION 16/2 - REDUCTION OF GUARD ON DISCRETE HF CHANNELS AT AERONAUTICAL STATIONS

That the following Note be associated with the NAT HF en-route Plan:

"Note: Aeronautical stations may discontinue guard on discrete HF channels assigned to them if the expected seasonal propagation conditions indicate that their use will not be required for certain periods provided prior co-ordination is effected between all aeronautical stations concerned and with the users. Such action should be promulgated by AIRAC NOTAM. Frequencies guarded at any one time should be such as to permit communications with aircraft anywhere within the area served. Annex 15 requires that the watch schedules be published in States' AIPs."

RECOMMENDATION 16/3 - RESTRICTED USE OF HF AMS CHANNELS BY OSVs

That transmissions from NAT OSVs on NAT HF radiotelephony channels should be restricted to communications required for distress, SAR and emergency purposes, except for routine tests between vessels and aeronautical network stations to ensure communication is available when required. In this connection, loss of communication between aircraft and aeronautical HF radiotelephony network stations should be treated as an emergency and the NAT OSVs should relay air-ground messages to the appropriate aeronautical ground station when propagation conditions prevent, or make difficult, the direct exchange of messages.

16.2.2 Discrete Frequencies for NAT SSB (A3J) Operations

16.2.2.1 The Meeting, in reviewing the experience gained in the operational evaluation of SSB as was recommended at the Special North Atlantic Meeting (1965) (Rec. 6 viii/9), agreed that a significant improvement was apparent over DSB operations. The Meeting further agreed that maximum benefit of SSB operations would be realized if such operations were established on discrete frequencies. It was recognized, however, that conversion of one of the existing NAT A, B, C or D families to exclusive SSB operations was not appropriate at this time in view of the fact that overloading of the other families would occur. Until sufficient airborne installations were available to permit balanced loading conditions and the assignment of one of the existing families for SSB A3J operation, it was agreed that ICAO should attempt to secure the use of additional frequencies for these purposes for assignment at Gander, Shannon, New York and Reykjavik. Additional frequencies would, in any case, be required to accommodate the expected increase in traffic load.

16.2.2.2 In attempting to assist in recommending discrete frequencies for this purpose, a review was made of various possibilities as outlined below.

16.2.2.2.1 Consideration was given to the use of one of the EUM families of frequencies for which a specific proposal had been tabled. When analysing present usage of these frequencies and the interference patterns which could arise from their use at the locations indicated for SSB operations, it was found that they offered a reasonable solution provided action is taken to discontinue their use in the EUM Region.

16.2.2.2.2 A further analysis of the Frequency Allotment Plan in Appendix 27 to the ITU Radio Regulations and the known use made of the frequencies available from MWARA and RDARA allotments, produced only the following channels as offering some possibility for NAT SSB application: 5498, 5526, 5540, 8896 and 10009 kc/s. Except for 5526 and 10009 kc/s, all other frequencies mentioned above appeared to require more extensive co-ordination since the area of their intended use overlapped considerably with areas of their primary allotment.

16.2.2.2.3 In further considering the matter from a technical point of view, the three frequencies (6526, 10093 and 13356 kc/s) which are allotted on a world-wide basis for A1, A3A, A3H and A3J types of emission offered additional possibility for use in the NAT Region specifically for SSB A3J operations.

16.2.2.2.4 When reviewing the various alternatives outlined above, the Meeting agreed that the possibility mentioned in para. 16.2.2.2.1 appeared to offer the preferred ultimate solution provided that harmful interference could be avoided with respect to operations in other areas.

16.2.2.2.5 Further, in view of the optimum performance to be gained from a discrete family for HF SSB A3J operations, the Meeting agreed that the question of securing a family of frequencies for this purpose should be pursued as a matter of urgency. Accordingly, the following recommendations were established.

RECOMMENDATION 16/4 - NEW FREQUENCIES FOR NAT SSB A3J OPERATIONS

That the EUM VI Regional Air Navigation Meeting, in the course of its discussions on the HF en-route mobile service, make every effort to release a suitable family of frequencies for SSB A3J service in the NAT area giving due consideration to avoiding harmful interference to operations in other areas.

COMMENT: It is intended that an appropriate proposal for amendment to the NAT Plan would then be submitted jointly by the NAT States concerned.

RECOMMENDATION 16/5 - INTERIM FAMILY OF FREQUENCIES FOR NAT SSB A3J OPERATIONS

That, recognizing that the EUM VI Regional Air Navigation Meeting may not take place until late in 1971, and in view of the urgent requirement for securing an additional family of frequencies for implementation at Gander, Shannon, New York and Reykjavik for SSB A3J operations not later than 1 April 1971, immediate action should be taken to obtain frequencies for interim use until a family is available perhaps from the EUM Region.

NOTE: Consideration may be given to securing the use of 2931 kc/s from the NAT A family and efforts should also be made to secure frequencies of the order of 5 or 6 Mc/s and 9 or 10 Mc/s to complete this interim A3J family. Frequency 2931 kc/s could continue to be used at other assigned locations in the NAT area in the DSB or SSB/A3H modes.

16.2.3 Expansion of SSB A3J Operations

16.2.3.1 The Meeting envisaged an increase in the number of aircraft equipped for A3J operations and considered that this would lead to additional requirements for SSB communications.

RECOMMENDATION 16/6 - ASSESSMENT OF ADDITIONAL FREQUENCY REQUIREMENTS FOR SSB A3J OPERATIONS

That when the majority of aircraft are equipped to operate with SSB A3J equipment, the States concerned should assess the need for conversion of additional NAT frequencies to SSB A3J operation with a view to proposing appropriate amendments to the AMS plan.

16.2.4 Specific Amendments to the NAT HF Aeromobile Plan

16.2.4.1 In the light of the above recommendations the existing NAT HF Plan was reviewed and the changes reflected in the following recommendation were agreed.

RECOMMENDATION 16/7 - AMENDMENTS TO THE NAT HF AEROMOBILE PLAN

That the following amendments be made to Table COM 2B in Doc 8755/2:

(i) Cambridge Bay - add 13328 in column 4.

(ii) Edmonton - add 13328 in column 4.

(iii) Gander - add asterisk against NAT A in column 4 and the following related note in column 6 "with effect from a date to be co-ordinated by ICAO NAT A operation may be limited to 2931 kc/s only using SSB A3J in association with the introduction of other higher order SSB A3J frequencies to be co-ordinated between ICAO and the ITU. Other frequencies from family A may be reactivated at a later date if operationally required to accommodate overall NAT traffic loading conditions".

(iv) Goose - delete in toto.

(v) Mont Joli - delete in toto.

(vi) Montreal - delete in toto.

(vii) Resolute - add NP-3, NP-4 frequency 8939 in column 3 and 2910, 5589, 13264 in column 4.

In column 6 add note as follows:

"HF RTF station to be withdrawn when it has been demonstrated that the Cambridge Bay HF RTF station is capable of providing adequate communication service to the arctic control area, utilizing frequencies now operated at Resolute and recognizing that the assignment of NP3 - NP-4 frequencies at Resolute or Cambridge Bay should be co-ordinated with States in the PAC Region".

(viii) Prins Christian Sund, Greenland - delete NAT B and NAT C frequencies in column 4.

(ix) Paris - delete in toto.

(x) Shannon - add asterisk to NAT A family "with effect from a date to be co-ordinated by ICAO 2931 kc/s may be used if required for SSB A3J operations in association with the introduction of other higher order SSB A3J frequencies to be co-ordinated between ICAO and the ITU. Upon implementation of this new family at Shannon, Ireland will review the need for continued guard on other family A frequencies which may be discontinued after co-ordination with United Kingdom, United States, Portugal and the users."

(xi) Reykjavik - add asterisk in column 4 and related note in column 6 "A new SSB A3J family of frequencies to be co-ordinated between ICAO and the ITU will be introduced."

(xii) Lisboa - delete NAT B and NAT C frequencies and common frequency 17965 in column 4 and related entries in columns 5 and 6.

(xiii) Santa Maria - add NAT B and NAT C frequencies presently shown against Lisboa in columns 3 and 4 and related entries in column 5.

- add common frequency 17965 presently shown against Lisboa in column 4 and related entries in columns 5 and 6.

(xiv) Madrid - add asterisk * to NAT A family in column 4 and related note in column 6:

* To be withdrawn when increased cover to 350 NM is available from ER VHF at Santiago.

(xv) New York - add asterisk against NAT A frequency 2931 kc/s in column 4 and related note in column 6 "with effect from a date to be co-ordinated by ICAO 2931 kc/s may be used if required for SSB A3J operations in association with the introduction of a new SSB A3J family to be co-ordinated between ICAO and the ITU."

Add asterisk against NAT family D in column 4 and the following related note in column 6 "Family D will be discontinued at such time as the HF SSB A3J family can be implemented but may be reactivated at a later date if operationally required to accommodate overall NAT traffic loading conditions."

16.3 THE NAT AERONAUTICAL MOBILE SERVICE ON VHF

16.3.1 ATS Requirements

16.3.1.1 When considering the stated ATS requirements for service range and height for ATS VHF air-ground communications contained in Appendix B to Part 9 of the Report, the Meeting agreed that suitable planning arrangements for the assignment of frequencies already existed both in the NAM and EUM Regions. The Meeting consequently believed that the provisions of Part 2 of the Report, would be completely satisfied in respect of the ATS requirements by referring to the appropriate authorities in the NAM and EUM Regions respectively, the task of developing geographical separation criteria for frequency assignments, where they do not already exist, to meet the ATS requirements stated in Appendix B to Part 9 of the Report. In those portions of the NAT Region where no similar authority exists, it was decided that frequency planning should be based on the agreed geographical separation criteria applied in either the NAM or the EUM Region, as appropriate.

16.3.1.2 The Meeting noted the conclusion reached at the Second Meeting of the SST Panel that frequency protection for VHF facilities used by SSTs should be extended to a standard service height of FL 660, and noted furthermore that this service height was agreed as a NAT requirement in paragraph 9.19. The Meeting decided that the relevant bodies in the NAM and EUM Regions should develop geographical separation criteria to ensure the necessary frequency protection for specific requirements for VHF facilities serving SST operations. It was noted that in the EUM Region certain assignments are already protected up to FL 600.

RECOMMENDATION 16/8 - DEVELOPMENT AND APPLICATION OF GEOGRAPHICAL SEPARATION CRITERIA IN THE NAM AND EUM REGIONS

That the appropriate frequency planning bodies in the NAM and EUM Regions should develop as necessary, and apply, any additional criteria for the geographical separation of VHF facilities, to ensure there is adequate frequency protection for the stated ATS VHF communications requirements.

RECOMMENDATION 16/9 - APPLICATION OF GEOGRAPHICAL SEPARATION CRITERIA IN CERTAIN AREAS OF THE NAT REGION

That the agreed geographical separation criteria for the EUM Region should be applied within those areas of the NAT Region East of 30°W where no international frequency planning body exists, and the agreed criteria for the NAM Region in those areas West of 30°W.

RECOMMENDATION 16/10 - DEVELOPMENT OF GEOGRAPHICAL SEPARATION CRITERIA FOR VHF COMMUNICATIONS SERVING SST OPERATIONS

That the appropriate international frequency planning bodies of the NAM and EUM Regions should develop additional geographical separation criteria, when so required, to ensure the necessary frequency protection for any specific VHF requirements for SST operations.

16.3.2 Requirements for new facilities and services

16.3.2.1 The Meeting prepared a coverage chart of the existing VHF stations relating to the periphery of the main traffic flow area of the NAT Region with a view to determining the VHF gap and whether there was a requirement for implementing new facilities. It was agreed that the guidance material developed by the COM/OPS Meeting would be used as a basis for calculating the coverage of ER VHF facilities and, since there are contained therein specific data for a height of 10,000 metres, this figure was selected as a basis for these calculations. Coverage of conventional VHF stations was based on the radio horizon range of the stations concerned. A correction factor of 20% was found appropriate for determining the reduction of coverage at a height of 7,000 metres. The coverage of the GP stations was depicted by a solid line in the chart and it was also agreed that, where the coverage of a pilot-to-controller channel exceeded the coverage of a GP channel in that area, this fact would be indicated in the form of a broken line. In certain cases, Administrations provided information regarding facilities which they planned to implement in the near future. The coverage of such facilities was shown distinctively on the chart. This chart is contained in Appendix A to Part 16 of this Report.

16.3.2.2 The Meeting decided that for over-water areas overlap of coverage was desirable.

16.3.2.3 The Meeting noted that there was ATS support for a proposal by Iceland referred to it by the Joint Support Committee, to assess the justification of the cost of increasing the coverage of the existing GP ER VHF service controlled by Reykjavik (Gufunes) aeronautical station. The proposal was to increase the coverage by the provision of a further remotely controlled station at Gagnheidi. The Meeting similarly noted that the air traffic services would be considerably assisted by the provision of additional VHF coverage over an area in which there was an increase in air traffic operating between Iceland and the northern part of the United Kingdom.

16.3.2.3.1 As regards the extension of coverage to the south-east, east, north-east and north of Iceland, the Meeting noted that it had been invited to indicate, in the light of the above and other relevant information which might be provided by the States concerned, whether or not in its opinion the cost of providing the additional GP ER VHF coverage would be justified. The Meeting concluded that the proposed extended VHF coverage from Iceland appeared to achieve overlapping coverage with the VHF coverage provided from Norway and the United Kingdom at FL300 and above. Additionally the Meeting noted the following figures which, in view of recent developments, the Icelandic Delegation provided to it:

Capital Cost	Yearly Operating Cost	First Year Cost
$22,727.	$10,227.	$13,863.

and decided that the cost of providing the additional GP ER coverage would be justified on this basis.

RECOMMENDATION 16/11 - PROVISION OF EXTENDED VHF COVERAGE FROM ICELAND

That the appropriate bodies should be informed that, in the opinion of the Meeting, the benefit of increasing the VHF coverage of the GP ER VHF service from Reykjavik (Gufunes) would justify the expenditure incurred by the introduction of a further remotely controlled station at Gagnheidi.

16.3.2.3.2 The Meeting gave serious consideration to a proposal to provide a forward relay GP VHF channel on the Faroes Islands, remotely controlled from Reykjavik by a telephone circuit. In the opinion of the Meeting, the cover from this station might, at jet cruising altitude, duplicate the coverage provided by the increased cover from Reykjavik (Gufunes) (Rec 16/11) if the expected range of the latter were achieved. One of the advantages of providing the forward relay VHF system, however, was that aircraft proceeding from the Stavanger to Reykjavik FIRs would be able to obtain in-flight clearance on VHF, a decided advantage since the existing ATS liaison between Stavanger and Reykjavik ACCs was subject to undue delay, under the present arrangement of relaying messages at Prestwick OAC (See paragraph 9.15.3 in Part 9 of the Report).

16.3.2.3.3 It was, however, observed that a direct ATS speech circuit was included in the AFS Plan and that when this was provided, and operating efficiently, the requirement for in-flight clearances could be expected to disappear. The Meeting also noted that, if adequate overlapping coverage could be obtained from the GP ER VHF facility at Reykjavik, it would not be logical to incur expenditure to implement another facility on the Faroes. On the other hand, should the required overlap of coverage fail to be achieved at jet cruising altitudes, it might be found necessary to proceed with the provision of supplementary GP VHF forward-relay cover from the Faroes.

16.3.2.3.4 The Meeting, after careful consideration, decided that a GP VHF forward relay service on the Faroes Islands would not be required unless, after review by Iceland, it was found that insufficient overlap of VHF cover was available at jet cruising altitudes, after implementation of the measures discussed in Recommendation 16/11. In this event, the States concerned would, by bilateral agreement, arrange for the amendment of the NAT COM Plan and the necessary provisioning action. The Meeting also advocated the early implementation of the direct ATS speech circuit between Stavanger and Reykjavik (see Rec 15/11 in Part 15 of the Report), to obviate the need for in-flight ATC clearances.

16.3.2.4 Bearing in mind the need for additional GP extended range VHF cover to the west of Greenland to provide coverage of about 300 NM, and the fact that the solution previously offered was expensive, the Meeting agreed that a survey should be undertaken with a view to determining if a more modest service could not be provided for achieving an improved degree of coverage to the west.

RECOMMENDATION 16/12 - IMPROVEMENT OF GP ER VHF COVERAGE FROM GREENLAND

That the State concerned conduct a survey regarding provision of GP ER VHF service to the west of Greenland taking into account, in arriving at a decision concerning implementation:

(a) the coverage provided;

(b) the cost of the facility.

COMMENT: If and when VHF coverage has been satisfactorily implemented the remaining HF en-route radiotelephony services may be withdrawn from Prins Christian Sund.

16.3.2.4.1 Further, the Meeting noted that, in view of the availability of direct LTT liaison via NAT Cable Channel No. 1 between the aeronautical stations at Prins Christian Sund and Gander, this system could be further refined, should unacceptable delivery delays occur at Gander of aeronautical messages transmitted by Prins Christian Sund over Channel No. 1, by the provision at Gander of remote control facilities for Prins Christian Sund GP ER VHF channels. The States concerned should keep this question under review.

RECOMMENDATION 16/13 - DELIVERY BY PRINS CHRISTIAN SUND OF AMS TRAFFIC FOR GANDER

That the States concerned should keep under review the possible need to improve the transit time of aircraft messages received at Prins Christian Sund for delivery to Gander, and should take appropriate measures, including the provision if required of remote control at Gander of GP ER VHF stations in Southern Greenland, to overcome any delays on Channel No. 1 caused by congestion of traffic.

16.3.2.4.2 In order to improve VHF cover in this area, the Meeting considered that a new GP ER VHF station should be provided at Saglek, or at another location in the same area of eastern Canada, implementation to coincide approximately with the implementation of the increased VHF coverage to the west of Greenland.

RECOMMENDATION 16/14 - PROVISION OF A GP ER VHF STATION AT SAGLEK

That a new GP ER VHF station should be provided at, or near to, Saglek.

16.3.3 Specific amendments to NAT VHF aeromobile plan

16.3.3.1 The existing NAT VHF Plan was amended to provide for the stated ATS requirements.

RECOMMENDATION 16/15 - VHF CHANNEL FOR REYKJAVIK ACC

That the VHF channel 120.7 Mc/s U be added to Doc 8755/2, Table COM 2A, column 5, against Reykjavik ACC.

RECOMMENDATION 16/16 - VHF CHANNELS FOR SANTA MARIA ACC/TMA

That the VHF channels 126.50 and 128.20 Mc/s U be added to Doc 8755/2, Table COM 2A, column 5, against Santa Maria ACC. Also, against Santa Maria/Santa Maria I. Açores add the VHF channels 123.9 and 124.3 under column 4, TMA.

16.3.3.1.1 Additionally, the existing NAT VHF Plan was amended to provide for the following ATS requirements stemming from revision of the aerodrome list or of GP facilities.

RECOMMENDATION 16/17 - ADDITIONAL AMENDMENTS TO NAT VHF AEROMOBILE PLAN

That Table COM 2A of Doc 8755/2 be amended as follows:

1. Denmark -

(i) Col. 1 - replace Angmagssalik, Greenland by Kulusuk, Greenland;

(ii) Prins Christian Sund, Greenland
Col. 5 - insert 121.5

(iii) Søndre Strømfjord/Søndre Strømfjord, Greenland
Col. 2 - replace 121.5 by 126.2
Col. 3 - replace 121.5 by 126.2

(iv) Vagar/Vagar (Faroe Is.)
Col. 2 - delete asterisk against 118.1
Col. 3 - insert 118.1
Col. 7 - delete all remarks.

2. Iceland -

(i) Col. 1 - insert Akureyri/Akureyri
Col. 2 - insert T 118.1 and 121.5
Col. 3 - insert 118.1

(ii) Keflavik/Keflavik
Col. 2 - add 118.3
add S 121.9

Col. 3 - add 119.3
delete 119.1

(iii) Reykjavik/Reykjavik
Col. 2 - add 121.5
add S 121.7
Col. 3 - insert 119.1

(iv) Saudarkrokur - delete whole entry

3. Portugal

(i) Col. 1 - insert Ponta Delgada/Ponta Delgada
Col. 2 - insert T 118.3
Col. 3 - insert 118.3

(ii) Col. 1 - insert Porto Santo/Porto Santo
Col. 2 - insert T 119.1
Col. 3 - insert 119.1

(iii) Lajes/Lajes
Terceira Il, - delete whole entry
Açores

16.3.4 VHF Communication Requirements for the NAM Region

16.3.4.1 The Meeting noted that Recommendation 16/8 could be applied in respect of the requirements for VHF AMS facilities in the NAM Region contained in Appendix B to Part 16 of this Report.

RECOMMENDATION 16/18 - VHF COM REQUIREMENTS FOR THE NAM REGION

That Appendix B to Part 16 of this Report constitutes the plan for VHF AMS facilities in the NAM Region.

16.4 NAT/NAM VOLMET BROADCAST PLAN

16.4.1 The Meeting considered the new MET and ATS requirements contained in Parts 12 and 9 of this Report respectively, and revised the NAT HF A3 VOLMET Broadcast Plan to take advantage of the new EUM HF VOLMET frequency family which will be available as from 17 September 1970 at Shannon.

RECOMMENDATION 16/19 - **NAT/NAM HF A3 VOLMET BROADCAST PLAN**

That, with effect from 17 September 1970 at 0001 GMT, the existing NAT HF A3 VOLMET Broadcast Plan should be replaced by the following plan utilizing the frequencies 3001, 5652, 8868 and 13272 kc/s:-

NEW YORK and GANDER

00-05	05-10	10-15	15-20	20-25	25-30
1	2	3	4	5	6
NEW YORK	NEW YORK SIGMET	NEW YORK	NEW YORK SIGMET	GANDER	GANDER SIGMET
DETROIT	BANGOR	NEW YORK/JFK	BERMUDA	MONTREAL	WINNIPEG
CHICAGO	PITTSBURGH	NEWARK	MIAMI	TORONTO	EDMONTON
CLEVELAND		BOSTON		OTTAWA	(CALGARY)
	Bangor		Bermuda		
Detroit	Pittsburgh	New York	Miami	Montreal	Moncton
Chicago	Windsor Locks	Newark	Nassau	Toronto	Frobisher
Cleveland	St. Louis	Boston	Freeport	Ottawa	Winnipeg
Niagara Falls	Syracuse	Baltimore	Tampa	Gander	Edmonton
Milwaukee	Minneapolis	Philadelphia	West Palm Beach	Goose	(Calgary)
Indianapolis		Washington		Halifax	(Søndrestrøm)

30-35	35-40	40-45	45-50	50-55	55-60
1	2	3	4	5	6
NEW YORK	NEW YORK SIGMET	NEW YORK	NEW YORK SIGMET	GANDER	GANDER SIGMET
NIAGARA FALLS	WINDSOR LOCKS	BALTIMORE	NASSAU	GANDER	MONCTON
MILWAUKEE	ST. LOUIS	PHILADELPHIA	FREEPORT	GOOSE	FROBISHER
INDIANAPOLIS		WASHINGTON		HALIFAX	(SONDRESTROM)
	Bangor		Bermuda		
Detroit	Pittsburgh	New York	Miami	Montreal	Moncton
Chicago	Windsor Locks	Newark	Nassau	Toronto	Frobisher
Cleveland	St. Louis	Boston	Freeport	Ottawa	Winnipeg
Niagara Falls	Syracuse	Baltimore	Tampa	Gander	Edmonton
Milwaukee	Minneapolis	Philadelphia	West Palm Beach	Goose	(Calgary)
Indianapolis		Washington		Halifax	(Søndrestrøm)

Note: The sequence of each broadcast should be as shown in the table. SIGMET denotes broadcasts which may contain SIGMET information. The reports and forecasts shown in brackets may be deleted from the Gander broadcasts to provide broadcasting time for the inclusion of SIGMET messages.

RECOMMENDATION 16/20 - SHANNON EUM/NAT HF VOLMET BROADCAST PLAN

That, in accordance with the Limited European-Mediterranean RAC/COM Regional Air Navigation Meeting (1969) Recommendation 8/4, note be taken that NAT requirements which should be considered for inclusion in the Shannon Broadcast are given in the tables below:

COMMENT: The Broadcast will use the following frequencies: 2889, 5533, 8833 and 13312 kc/s which become available on 17 September 1970 at 0001 GMT

SHANNON BROADCAST*

(Alternative 1 based on 50 minutes broadcasting time per hour)

00-05	05-10	10-15	15-20	20-25
1	2	3	4	5
SIGMET BRUXELLES/ NATIONAL HAMBURG Bruxelles/ National Hamburg Frankfurt Köln-Bonn Düsseldorf München	SHANNON PRESTWICK LONDON/HEATHROW Shannon Prestwick London/Heathrow Amsterdam/ Schiphol Manchester London/Gatwick	SIGMET KØBENHAVN/ KASTRUP STOCKHOLM/ ARLANDA Køben̊havn/ Kastrup **Stockholm/** Arlanda Oslo/Fornebu Bergen **Dublin** **Birmingham**	PARIS/ORLY MADRID/BARAJAS LISBOA Paris/Orly Madrid/Barajas Lisboa Santa Maria **Athinai** Paris/ Le Bourget	SIGMET ROMA/FIUMICINO MILANO Roma/Fiumicino Milano Zürich Genève Torino Barcelona
30-35	35-40	40-45	45-50	50-55
1	2	3	4	5
SIGMET FRANKFURT KÖLN-BONN Bruxelles/ National Hamburg Frankfurt Köln-Bonn Dusseldorf München	AMSTERDAM/ SCHIPHOL MANCHESTER LONDON/GATWICK Shannon Prestwick London/Heathrow Amsterdam/ Schiphol Manchester London/Gatwick	SIGMET OSLO/FORNEBU BERGEN Køben̊havn/ Kastrup Stockholm/ **Arlanda** Oslo/Fornebu Bergen Dublin Birmingham	SANTA MARIA ATHENS PARIS/ LE BOURGET Paris/Orly Madrid/Barajas Lisboa Santa Maria **Athinai** Paris/ Le Bourget	SIGMET ZÜRICH GENEVE Roma/Fiumicino Milano Zürich Genève Torino Barcelona

* The contents of this draft table are subject to review in the light of follow-up of Recommendation 8/4 by the LIM EUM (RAC/COM) RAN Meeting (1969).

Notes: 1) The sequence of each broadcast should be as shown in the table. SIGMET denotes broadcasts which may contain SIGMET information.

2) Paris/Le Bourget to be replaced by Paris/Roissy-en-France in due course.

SHANNON BROADCAST *

(Alternative 2 based on 40 minutes broadcasting time per hour)

6 00-05	05-10	10-15	15-20
1	2	3	4
SIGMET KØBENHAVN/KASTRUP BERGEN København/Kastrup Bergen Hamburg Stockholm/Arlanda Oslo/Fornebu London/Gatwick	SHANNON PRESTWICK LONDON/HEATHROW Shannon Prestwick London/Heathrow Amsterdam/Schiphol Bruxelles/National Manchester	FRANKFURT MAIN KÖLN-BONN PARIS/ORLY Frankfurt Main Köln-Bonn Paris/Orly Zurich Genève Milano	SIGMET MADRID/BARAJAS LISBOA Madrid/Barajas Lisboa Santa Maria Roma/Fiumicino Paris/Le Bourget Athens
30-35	35-40	40-45	45-50
1	2	3	4
SIGMET HAMBURG STOCKHOLM/ARLANDA København/Kastrup Bergen Hamburg Stockholm/Arlanda Oslo/Fornebu London/Gatwick	AMSTERDAM/SCHIPHOL BRUXELLES/NATIONAL MANCHESTER Shannon Prestwick London/Heathrow Amsterdam/Schiphol Bruxelles/National Manchester	ZURICH GENÈVE MILANO Frankfurt Main Köln-Bonn Paris/Orly Zurich Genève Milano	SIGMET SANTA MARIA ROMA/FIUMICINO Madrid/Barajas Lisboa Santa Maria Roma/Fiumicino Paris/Le Bourget Athens

* The contents of this draft table are subject to review in the light of follow-up of Recommendation 8/4 by the LIMEUM (RAC/COM) RAN Meeting (1969).

Notes: 1) The sequence of each broadcast should be as shown in the table. SIGMET denotes broadcasts which may contain SIGMET information.

2) Paris/Le Bourget to be replaced by Paris/Roissy-en-France in due course.

16.5 COMMUNICATION PROCEDURES

16.5.1 COM SUPPS (AMS)

16.5.1.1 In view of the revised deployment principles of NAT HF families and the introduction of the SSB/A3J mode referred to in para. 16.2, it was agreed that an amendment would be necessary to the existing NAT COM SUPP 3.3.9 - accordingly it was recommended:

RECOMMENDATION 16/21 - OPERATIONAL USE OF HF FAMILIES

That the NAT SUPP concerned be amended to read as follows:

Procedures for dividing air traffic between NAT frequency families B and C and the SSB A3J frequency family within the area of the main traffic flow between Europe and North America.

1) Aircraft registered in States west of longitude 30°W which are not equipped with SSB should employ family B irrespective of direction of flight.

2) Aircraft registered in States east of longitude 30°W which are not equipped with SSB should employ family C irrespective of direction of flight.

3) In special cases, such as delivery flights of new aircraft, the location with respect to 30°W of the country in which the flight originates should govern the choice of frequency.

NOTE: In the case of Australia which is partly located both east and west of 150°E, aircraft registered in that State and involved in Atlantic flights should employ family C.

4) All aircraft flying in NAT equipped with SSB should, when loading permits, employ the SSB A3J frequency family.

5) When, in the opinion of either or both of the aeronautical stations at Gander and Shannon, the loading of frequency families B and C is excessive, an appropriate number of aircraft should be requested to transfer their communications to frequency family D. Preference should be given to the transfer of aircraft about to depart by liaison with other aeronautical stations in the region.

16.5.2 COM Procedures (AMS)

16.5.2.1 In connection with Recommendation No. 15/14, the Meeting's attention was drawn to the practice among some aircraft stations of filing air-ground messages addressed to up to ten company locations.

16.5.2.2 Whilst it was recognized that aircraft may exceptionally require a message to be delivered to a number of company addressees, it was considered that, under normal circumstances, an aircraft should be subject to the same restrictions as apply to an aircraft operating agency in regard to movement messages, as covered by PANS RAC (Doc 4444), Part VIII, paragraph 2.1.1.4.

RECOMMENDATION 16/22 - FILING OF AIR-TO-GROUND MESSAGES BY AIRCRAFT STATIONS

That aircraft stations, when filing an air-to-ground message requiring relaying by an aeronautical station, should be permitted normally to include not more than two aircraft operating agency addressees, in addition to the addressee referred to in (a) of paragraph 2.1.1.4 of PANS RAC.

COMMENT: Aircraft operators may nominate the addressees on a predetermined basis.

NOTE 1: Under exceptional circumstances messages containing more than two addressees may be filed, but these would be limited to addressees concerned with the text of the message.

NOTE 2: Filing of DEP messages while en-route is to be avoided to the extent possible since these messages can be filed at the point of departure for transmission on the AFTN. Non-compliance with this procedure leads to unnecessary loading of the air-to-ground channels and of Channel No. 1 of the NAT Cable.

16.5.2.3 The Meeting agreed that the present SARPs relating to the record of communications (see Annex 10, Volume II, paragraph 3.5.1.5) needed amendment in the light of the storage requirements to ensure retention of the large volume of written logs. It considered that written logs should be retained for at least 30 days as is the case in the AFS.

RECOMMENDATION 16/23 - REVIEW OF ANNEX 10 PROVISIONS REGARDING RECORDING OF COMMUNICATIONS (AMS)

That the requirement to retain written logs for a period of at least ninety days, and the related provisions in Volume II of Annex 10, be reviewed at the next appropriate opportunity.

16.6 SELCAL

16.6.1 In order to ensure that the provisions of Annex 10, Volume II, paragraph 5.2.4.6.1) are applied systematically in the NAT Region, the Meeting recommended

RECOMMENDATION 16/24 - CORRECT SELCAL CODE TO BE USED

That the attention of the aircraft operating agencies be drawn to the need to ensure that the correct SELCAL code is entered in the Flight Plan and that operators further ensure that the appropriate SELCAL code as indicated above is set up on board the aircraft.

16.6.2 The Meeting agreed that in order to reduce transmissions on HF AMS channels, the SELCAL check should be conducted on the GP VHF channel whenever possible.

RECOMMENDATION 16/25 - SELCAL CHECKS ON GP VHF CHANNEL

That in the NAT Region, in order to reduce the number of transmissions on HF AMS channels, the SELCAL check should whenever possible be conducted on the GP VHF channel at the time of allocation of primary and secondary frequencies.

16.7 REVIEW OF RECOMMENDATIONS MADE BY PREVIOUS NAT MEETINGS

16.7.1 The Meeting reviewed past recommendations in the Aeronautical Mobile Service field and decided that some of these had served their purposes, others had been made the subject of Annex 10 material, while the outstanding ones remained valid to varying degrees. Discussion on the validity of certain recommendations gave rise to new recommendations being developed in some cases. 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 and Special NAT Meeting (1965) Recommendations.

RECOMMENDATION 16/26 - FREQUENCY ASSIGNMENTS FOR VHF OPERATIONAL CONTROL CHANNELS

That:

(a) where a requirement exists for provision of Pilot-to-Company VHF communication channels, frequencies for such channels for locations W of 30°W should be assigned from the group 128.825 to 132.025 Mc/s inclusive and for locations E of 30°W from the group 131.4 to 131.95 Mc/s inclusive and specific assignments co-ordinated between the airline operating agencies and Administrations concerned;

(b) assignments made by States in this respect should be notified to ICAO for promulgation.

COMMENT: With respect to part (b) of this Recommendation, a similar practice has already been adopted in the EUM Region.

RECOMMENDATION 16/27 - ORDER OF BROADCAST OF DATA IN VOLMET BROADCASTS

That aerodrome forecasts should be transmitted after any SIGMETS and before routine reports plus trends.

RECOMMENDATION 16/28 - USE OF SPARE TRANSMISSION TIME IN VOLMET BROADCASTS

That, if the ACC concerned does not indicate a need for SIGMET information to be included in the VOLMET Broadcast and all the elements of a broadcast have been transmitted in less than the 5 minutes allotted, remaining time should be used by:

(a) repeating the first and possibly the second Routine Report, if there is time;

(b) repeating the station identification if there is insufficient time for a) or at any time remaining after a).

COMMENT: The intention is to ensure that the channels are never left dead, thus helping pilots' appreciation of propagation conditions. It presupposes very close adherence to the times for starting and ending individual broadcasts.

RECOMMENDATION 16/29 - TRANSMISSION OF SIGMET INFORMATION ON VOLMET BROADCASTS

That:

(a) if the ACC concerned indicates a need for SIGMET information to be included in a VOLMET Broadcast, that information should be broadcast at the beginning of the 5 minute time block concerned;

(b) in the case of the Gander broadcast, aerodrome forecasts and reports plus trends shown in brackets should, if required, be omitted if the broadcast would otherwise overrun;

(c) in the case of the Shannon broadcast, aerodrome forecasts only should, if required, be omitted if the broadcast would otherwise overrun.

RECOMMENDATION 16/30 - ALERTING OF PILOTS TO THE FACT THAT SIGMET INFORMATION IS BEING TRANSMITTED ON VOLMET BROADCASTS

That the pilot of a flight be advised that there is a SIGMET on the VOLMET Broadcast which concerns his flight. Preferably this should be done at the completion of a position report or other communication.

RECOMMENDATION 16/31 - PREFERRED METHOD OF DISSEMINATING SIGMET INFORMATION TO PILOTS

That, where SIGMET information is being disseminated on a VOLMET Broadcast, every effort should be made by pilots to receive the information via this medium so as to eliminate the requirement for duplication on the NAT en-route frequencies.

RECOMMENDATION 16/32 - DISSEMINATION OF SIGMET INFORMATION BY MEANS OTHER THAN THE VOLMET BROADCAST

That, should it not be possible to disseminate SIGMET information on VOLMET Broadcasts due to time limitations, the aeronautical stations concerned should endeavour to deliver the information simultaneously to a group of aircraft which have been alerted by SELCAL.

RECOMMENDATION 16/33 - EXAMINATION BY OPERATORS OF THEIR REQUIREMENTS FOR SECTION 2 OF THE AIR-REPORT

That States invite operators engaged in flight operation in the NAT Region to re-examine urgently 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 provisions contained in the PANS-RAC.

RECOMMENDATION 16/34 - 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 connection 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.

RECOMMENDATION 16/35 - NEED TO REDUCE THE LENGTH AND NUMBER OF GROUND INITIATED MESSAGES BY AIRCRAFT OPERATING AGENCIES

That States again invite aircraft operating agencies to have due regard to the need to restrict to a minimum the content of their ground initiated messages and reduce their number in the interests of reducing congestion on the HF en-route families, and also to have regard to the need to provide, whenever practicable, for close collaboration between them and the appropriate ATS units to avoid repetition of the contents of messages as between the ground-to-air messages they generate and those generated by the ACC.

16.7.1.1 The Meeting noted that application of the acknowledgement of receipt procedure consisting of reading back position reports and other flight progress reports as contained in paragraph 5.2.1.8.2.3.1 of Annex 10, Vol. II, contributed to congestion of NAT HF family frequencies. As a consequence, it discussed the possibility of applying the suspension of the read back procedure systematically in NAT HF communications. However, it also discussed the safety factor involved and decided that the provisions of Annex 10 adequately met the requirements. It was assumed that States would apply the provisions of Annex 10 as appropriate.

16.7.2 The Meeting noted that, as a result of the recommendations it had made under this Agenda Item, changes would be necessary in the texts introducing the various Parts of the Air Navigation Plan Document for the NAT/NAM/PAC Regions (Doc 8755/2). In fact texts of COM recommendations made by earlier NAT Regional Air Navigation Meetings which were, because of their contents, to be found in these various parts, continued nevertheless to have COM implications and so needed review.

RECOMMENDATION 16/36 - AMENDMENTS TO THE NAT/NAM/PAC AIR NAVIGATION PLAN DOCUMENT

That the NAT/NAM/PAC Air Navigation Plan Document (Doc 8755/2) be amended as follows:

(a) delete paragraph 3.1.2.1 at page 3-0-3;
(b) delete paragraph 3.3.2 and its Note at page 3-0-5;
(c) delete paragraph 3.3.4 at page 3-0-5;
(d) revise the NAT Region tabulation at page 3-0-7;
(e) delete the unnumbered paragraph * following the table at page 3-0-7;
(f) delete paragraph 5.1.3 at page 3-0-8;
(g) delete paragraph 5.3.1 at page 3-0-8;
(h) delete paragraph 5.4 at page 3-0-8.

*Note: The comment remains unchanged. See Recommendation 16/28.

16.8 LONGER TERM PLANNING FOR THE AERONAUTICAL MOBILE SERVICES

16.8.1 The Meeting reviewed the action it had taken to improve the system by:

(i) measures to reduce the load on the en-route HF channels;

(ii) provision for an additional frequency family for HF SSB A3J operation;

(iii) measures to allow the conversion of existing families to SSB A3J operation;

(iv) increase in the coverage of GP VHF facilities.

16.8.2 The Meeting attempted to assess the future adequacy of the NAT HF system to fulfil the longer term communications requirements in that area of the NAT region where VHF coverage could not be achieved by VHF ground-based facilities.

16.8.3 In attempting this assessment the Meeting appraised the current NAT air traffic forecast of movements through the area of the main traffic flow between Europe and North America and compared it with the actual number of movements and utilization of the air-ground channels, as recorded at Shannon Aeradio on 10 July 1969, which was the busiest day of the year.

16.8.4 It was noted that this loading was in excess of the criteria adopted by ITU for the allotment of frequency families (also refer to Rec. 8/5 of the Special Communications Meeting (1963) of ICAO). In reviewing this matter the Meeting did not feel qualified to establish criteria for a quantitative assessment of system capacity.

16.8.5 However it was agreed that it would be useful to establish an empirical approach based on practical experience of the current capacity of HF RTF channels related to the forecast busy hour flights, in order to predict when the demand would exceed the capacity which the Meeting was able to plan for. A graphical presentation was developed to present the results of this exercise. This graph is contained in Appendix C to Part 16 of this Report. It was recognized that there were many imponderables involved in making this empirical approach. It assumed for example that the volume of communications traffic would increase in proportion to the number of flights; that the flow pattern would not alter significantly and that there would be no change in ATS procedures nor any increase in meteorological and operational control traffic. Past experience indicated that communications traffic did not grow at the same rate as the number of flights. This might or might not hold true for the future. The impact of the measures taken at paragraph 16.8.1 on the volume of communications was also difficult to estimate. Notwithstanding these factors which could not be assessed a graph was prepared to indicate a linear trend of the future communications demands. This graph (which is contained in Appendix C to this Report on Part 16) was to be considered solely in this context.

16.8.6 In view of the forecast air traffic growth, and the new ATS procedures associated with possible reductions in separation standards, further expansion of the HF system might not, in view of its known limitations, be able to provide the necessary degree of integrity which would be required to meet the more stringent requirements for speed and reliability.

16.8.7 In NAT long-term planning, cognizance would have to be taken of the limitations in capacity and integrity of the existing and planned NAT HF RTF air-ground communications system to meet the requirements of all users. Based on the information inserted in the graph attached as Appendix C to Part 16 of this Report it was indicated that the capacity of the HF communication system comprising five families of frequencies might approach saturation in 1974/75. Additionally, problems concerning the integrity of the air-ground HF RTF communication system would become increasingly significant in relation to the growth of traffic.

RECOMMENDATION 16/37 - LONGER TERM PLANNING FOR THE AMS

(a) That the appropriate bodies of ICAO should give their attention to the planning of measures that may be required by 1974/75 to increase the capacity and the reliability of the NAT air-ground long-distance communication system. Such an improved long-distance system should provide communications for:

(i) ATC with the capability of voice communications on a direct basis between pilot and controller;

(ii) the meteorological service;

(iii) airline operations requirements.

(b) That, in order to make use of the significant improvement in the capacity of the NAT air-ground communication system offered by improved techniques and use of automated air-ground data transfer supplementing static-free voice communications:

(i) planning be undertaken of the utilization of automated air-ground data interchange in the NAT ATC organization, as well as by other users of the aeronautical mobile service;

(ii) attention be given to the planning of long-distance communication systems offering improved voice communications and providing suitable channels for the automation of air-ground data transfer; and to the associated experimentation, evaluation and cost/benefit studies which should be pursued with expediency.

COMMENT: It appears that an aeronautical satellite system complying with the requirements laid down by the appropriate bodies of ICAO provides the best solution to these needs.

50° 40°

80° 70° 60° 50° 40° 30° 20° 10° 0°

50° 40° 30° 20° 10° 0°

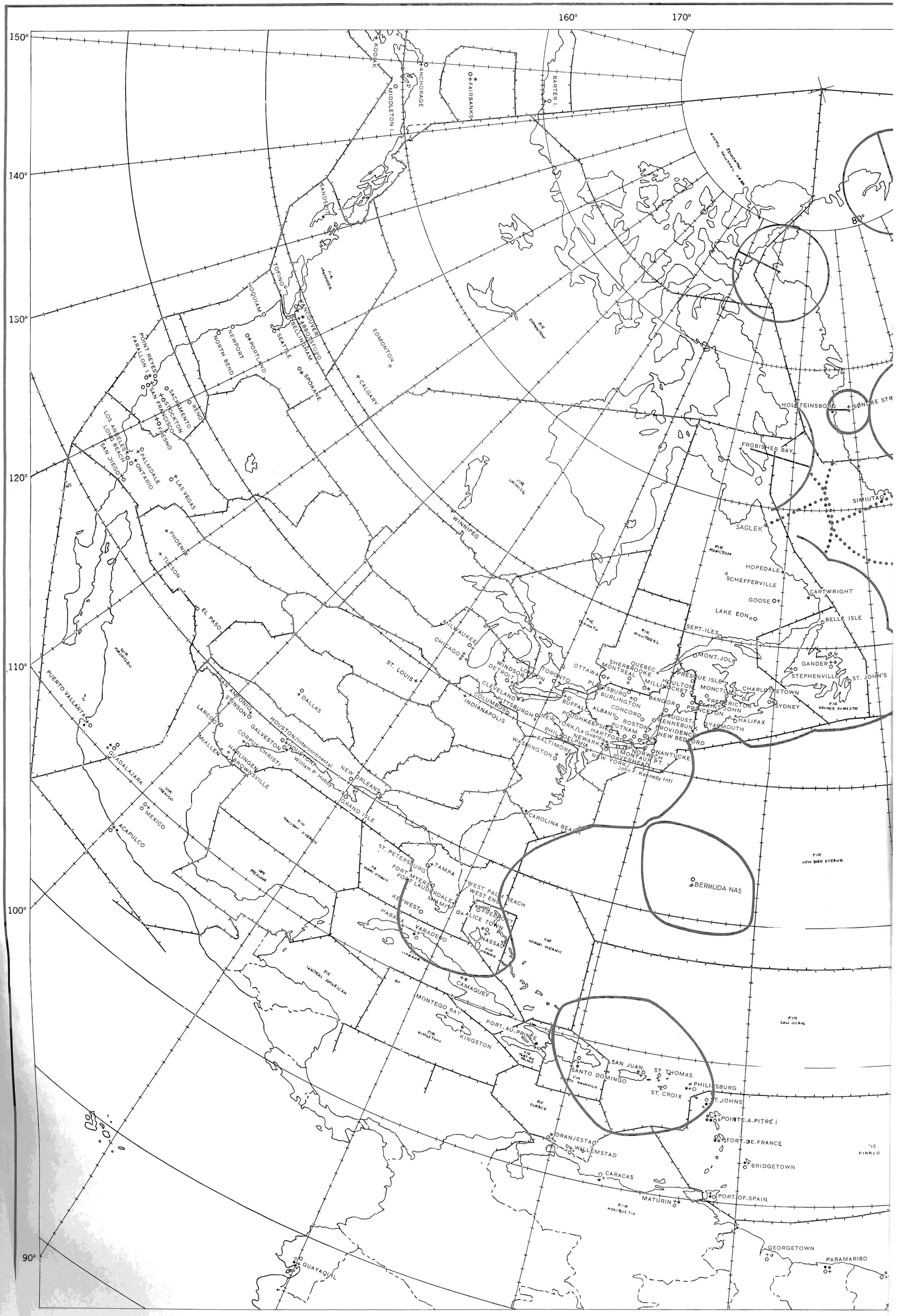
NORD
BODØ
ROVANIEMI
TURKU
HELSINKI
STOCKHOLM/Arlanda
STOCKHOLM/Bromma
MOSCOW/Sheremetjevo
MOSCOW/Vnukovo
ANKARA
NICOSIA
HAIFA
TEL AVIV
OSLO/Gardermoen
OSLO/Fornebu
MALMÖ
KØBENHAVN
THESSALONIKI
ATHINAI/Elefsis
ATHINAI
ANDRAVIDA
PRAHA
BRNO
WIEN
BRATISLAVA
BERGEN
STAVANGER
AMSTERDAM
HANNOVER
NÜRNBERG
FRANKFURT/MAIN
KÖLN
DÜSSELDORF
MAASTRICHT
ROTTERDAM
BREMEN
HAMBURG
WINDYHEAD
KIRKWALL
GLASGOW
PRESTWICK
MANCHESTER
LEEDS/Bradford
LONDON/Heathrow
LONDON/Gatwick
STANSTED
LUTON
BIRMINGHAM
DUBLIN
SHANNON
PARIS/Le Bourget
PARIS/Orly
REIMS
LUXEMBOURG
BRUXELLES
ZURICH
GENEVE
BERN
BALE
MULHOUSE
LYON
TOURS
MILANO/Malpensa
MILANO/Linate
VENEZIA
PISA
ROMA/Fiumicino
ROMA/Ciampino
MARSEILLE
BARCELONA
PALMA DE MALLORCA
ALGER
BOUFARIK
ANNABA
OUARGLA
ORAN
MADRID
MALAGA
LISBOA
FARO
RABAT
CASABLANCA
TENERIFE
LAS PALMAS
EL AAIUN
NOUADHIBOU
DAKAR
SAL I.
CONAKRY
MONROVIA
SØNDRE STRØMFJORD
ANGMAGSSALIK
KEFLAVIK
REYKJAVIK
SAUDARKROKUR
MYGGENAES
KRISTIANSAND
MANGERSTA
SIMIUTAQ
PRINS CHRISTIAN SUND
CARTWRIGHT
BELLE ISLE
GANDER
STEPHENVILLE
ST. JOHN'S
SANTA MARIA
PARAMARIBO
CAYENNE

FIR SONDRESTROM
FIR REYKJAVIK
FIR MYGGENAES
FIR SIMIUTAQ
FIR GANDER OCEANIC
FIR GANDER DOMESTIC
FIR SHANWICK OCEANIC
FIR LISBOA OCEANIC
FIR CANARIAS
FIR CASABLANCA
FIR DAKAR OCEANIC
FIR NEW YORK OCEANIC
FIR SAN JUAN
FIR PIARCO
UIR ZANDERIJ
UIR BELEM

LEGEND LEGENDE	
	PILOT TO CONTROLLER COMMUNICATIONS PILOTE-CONTROLEUR
	G. P. COMMUNICATIONS A USAGE GENERAL (GP)
	EXISTING NATIONAL VHF FACILITY AT FAROE ISLANDS L'INSTALLATION VHF NATIONALE EXISTANTE DES ILES FEROE
	PROPOSED EXTENSION OF ICELANDIC G.P. COVERAGE EXTENSION PROJETEE DE LA COUVERTURE GP DE L'ISLANDE
	NEW REQUIREMENT NOUVEAU BESOIN
	EXTENSION OF COVERAGE PLANNED EXTENSION PREVUE DE LA COUVERTURE

50° 40° 30° 20°

CARTE DE LA COUVERTURE DES INSTALLATIONS VHF A 10 000 METRES (voir paragraphe 16.5.2.1)



160° 170° 50° 40°

150° 140° 130° 120° 110° 100° 90°

80° 70° 60° 50° 40° 30°

BERMUDA HAS

LEGEND LEGENDE	
	PILOT TO CONTROLLER COMMUNICATIONS PILOTE-CONTROLEUR
	G P COMMUNICATIONS A USAGE GENERAL (GP)
	EXISTING NATIONAL VHF FACILITY AT FAROE ISLANDS L'INSTALLATION VHF NATIONALE EXISTANTE DES ILES FEROE
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	NEW REQUIREMENT NOUVEAU BESOIN
	EXTENSION OF COVERAGE PLANNED EXTENSION PREVUE DE LA COUVERTURE

APPENDIX B TO PART 16

LIST OF REQUIREMENTS FOR VHF AIR-GROUND COMMUNICATION CHANNELS IN THE NAM REGION (See Recommendation 16/18)

Station	TWR	APP	TMA	AC	GP
CANADA					
Abbotsford/Abbotsford	T+S				
Calgary/Intl	T+S	L+H	L		
Churchill					U
Comox/Comox	T				
Edmonton ACC				L+U	
Edmonton/Intl	T+S	L			
Frobisher Bay					L+U-ER
Gander ACC **				L+U-ER,FU	L+U-ER
Gander/Intl	T+S	L			
Goose/Goose	T	L			
Halifax/Intl	T+S	L			
Moncton ACC				L+U	
Moncton/Moncton	T+S				
Montreal ACC				L+U	L+U
Montreal/Intl	T+S	L			
Ottawa/Intl	T+S	L+H	L		
Resolute					U-ER
St. John's/Torbay	T+S				

** ACC provides service in an Oceanic CTA.

Station	TWR	APP	TMA	AC	GP
CANADA (cont'd)					
Schefferville					U-ER
Sydney/Sydney	T+S				
Toronto ACC				L+U	
Toronto/Intl	T+S	L			
Vancouver ACC				L+U	L+U
Vancouver/Intl	T+S	L			
Windsor/Windsor	T+S				
Winnipeg ACC				L+U	L+U
Winnipeg/Intl	T+S	L			
UNITED STATES *					
Albuquerque ACC				L+U	
Anchorage ACC **				L+U	L+U-ER
Anchorage/Elmendorf AFB	T+S	L			
Anchorage/Intl	T	L			
Atlanta ACC				L+U	
Baltimore/Friendship Intl	T+S	I			
Bangor/Bangor Intl	T+S	L			
Boston ACC				L+U	L+U
Boston/Logan Intl	T+S	L			
Chicago ACC				L+U	

* - Above FL 180, VHF/UHF coverage is provided over virtually the entire USA.
- Sur tout le territoire des Etat-Unis, le service VHF/UHF est assuré au-dessus du niveau de vol 180.

** ACC provides service in an Oceanic CTA.

Station	TWR	APP	TMA	AC	GP
UNITED STATES (cont'd)					
Chicago/O'Hare Intl	T+S	L			
Cleveland ACC				L+U	L+U
Cleveland/Hopkins	T+S	L			
Cold Bay					U-ER
Cold Bay/Cold Bay	T				
Corpus Christi/Intl	T+S	I			
Dallas/Love Field	T+S	I			
Dallas-Fort Worth/Regional Airport			(New Aerodrome)		
Denver ACC				L+U	
Detroit/Metropolitan-Wayne Co.	T+S	L			
El Paso/Intl	T+S	I			
Everett/Snohomish County	T+S	L			
Fairbanks ACC				L+U	
Fairbanks/Intl	T+S	L			
Fort Lauderdale/Hollywood Intl	T+S	L			
Fort Worth ACC				L+U	
Fort Worth/Greater Southwest Intl	T+S	I			
Fresno/Fresno Air Terminal	T+S	L			
Great Falls ACC				L+U	
Harlingen/Municipal	T				
Hilo/Gen. Lyman	T+S	L+H			
Honolulu ACC **				L+U	U
Honolulu/Intl	T+S	L			

** ACC provides service in an Oceanic CTA.

Station	TWR	APP	TMA	AC	GP
UNITED STATES (cont'd)					
Houston ACC **				L+U	
Houston/Inter-continental	T+S	I			
Indianapolis ACC				L+U	
Indianapolis/Weir Cook	T+S	I			
Jacksonville ACC				L+U	
Kahului	T+S	I			L
Kansas City ACC				L+U	
King Salmon	T+S	L			
Las Vegas/McCarran Intl	T+S	L			
Los Angeles ACC				L+U	U-ER
Los Angeles/Intl	T+S	L			
McAllen/Miller Intl	T+S				
Memphis ACC				L+U	L+U
Miami ACC **				L+U	
Miami/Intl	T+S	I			
Milwaukee/Gen. Mitchell Field	T+S	L			
Minneapolis ACC				L+U	
Minneapolis/Minneapolis St Paul Intl	T+S	L			
Newark/Newark	T+S	L			
New Orleans/Intl	T+S	I			

** ACC provides service in an Oceanic CTA.

Station	TWR	APP	TMA	AC	GP
UNITED STATES (cont'd)					
New York ACC **				L+U	U-ER
New York/J.F. Kennedy Intl	T+S	L			
Niagara Falls/Intl	T+S	L			
Oakland ACC				L+U	
Oakland/Intl	T+S	L			
Ontario/Intl	T+S	L			
Palmdale/P.F.T.I	T+S	L			
Philadelphia/Intl	T+S	L			
Phoenix/Sky Harbor	T	I			
Pittsburgh/Greater Pittsburgh	T+S	L			
Portland/Intl	T+S	L			
Salt Lake City ACC				L+U	
San Antonio/Intl	T+S	I			
San Diego/Intl-Lindbergh Field	T+S	I			
San Francisco/Intl	T+S	L			
Seattle ACC				L+U	U-ER
Seattle/Seattle-Tacoma Intl	T+S	L			
Spokane/Intl	T+S	L			
St. Louis/Lambert-St. Louis	T+S	L			
Stockton/Metropolitan	T+S	L			
Syracuse/Hancock	T+S	L			
Tampa/Intl	T+S	I			
Tuscon/Intl	T+S	I			

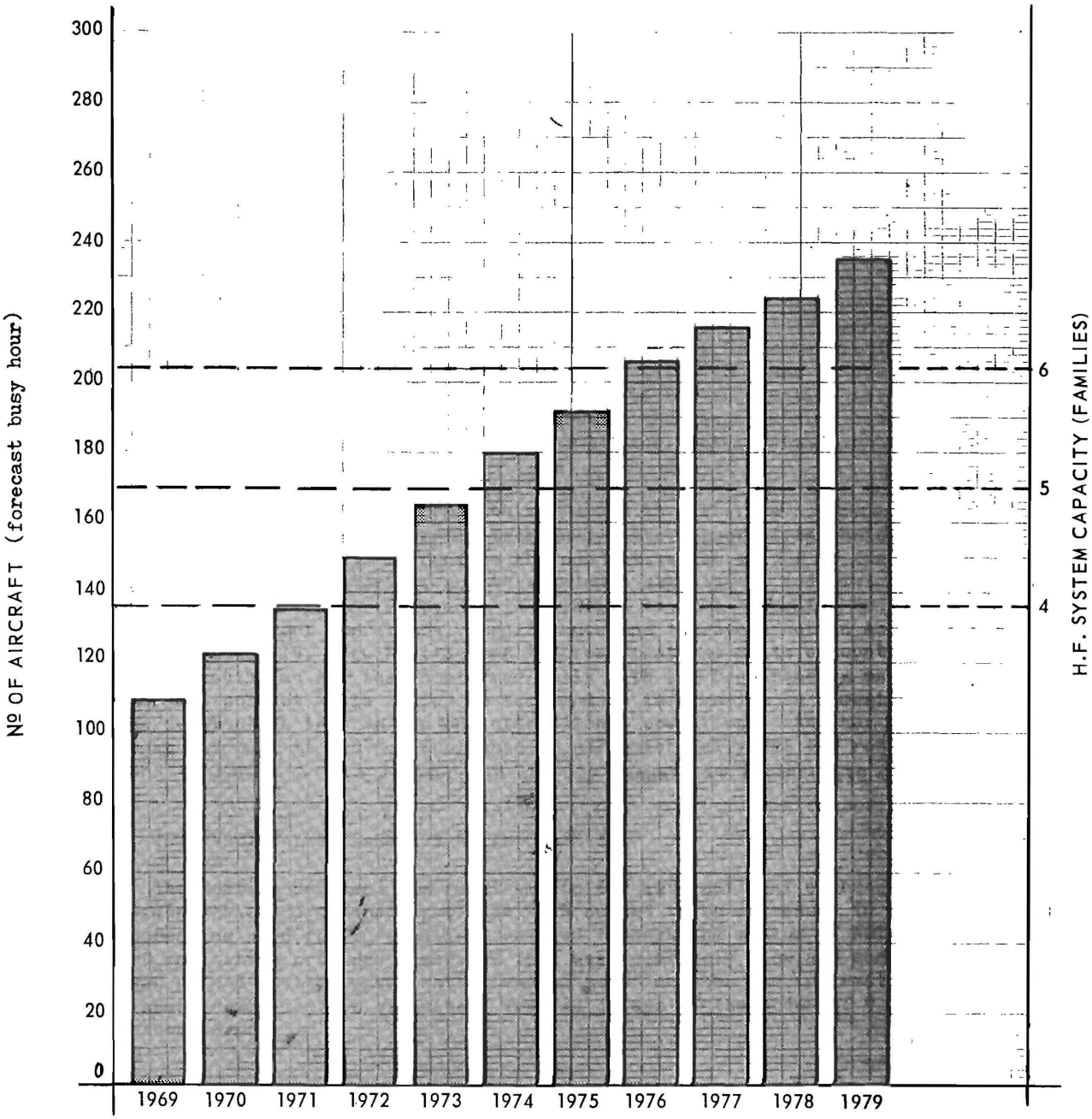
** ACC provides service in an Oceanic CTA.

Station	TWR	APP	TMA	AC	GP
UNITED STATES (cont'd)					
Washington ACC				L+U	
Washington/Dulles Intl	T+S	L			
West Palm Beach/Palm Beach Intl	T	I			
Windsor Locks/Bradley Intl	T+S	L			

APPENDIX C TO PART 16

PREDICTED GROWTH IN NUMBER OF AIRCRAFT FLYING BETWEEN 15°W AND 50°W FOR BUSY HOUR RELATED TO HIGH FREQUENCY FAMILY REQUIREMENTS

(See paragraph 16.8.5)



Note: Derived from NAT Air Traffic forecasts, January 1970.
A maximum of 34 aircraft per frequency family is assumed.

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Agenda Item 17: Aeronautical information services and aeronautical charts

RELEVANT OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA

17.1 The plan of aircraft operations and the relevant operational requirements and planning criteria adopted by the Meeting, as given in the Report on Agenda Item 1 and paragraphs 68 to 70 of the Report on Agenda Item 2, governed the consideration of Agenda Item 17.

OBSTACLES TO THE IMPLEMENTATION OF THE AIS/MAP PLAN

17.2 There was general concensus that States continued to allow development and progress in other spheres of aviation to outstrip the necessary complementary development of AIS/MAP. There was an urgent need for the service to be kept up-to-date, as to effectiveness and status, with the sophisticated equipment and systems which would be placed in use during the next decade. The information contained in AIP was in some cases incomplete, unnecessary or not current, not arranged in the manner required by 4.1.1 of Annex 15, or not in the format recommended in Appendix G of the AIS Manual (Doc 8126-AN/872/2). Preflight information was not always provided in the most effective or convenient form. Aeronautical charts were not produced as required or, where produced, were not adequately up-dated, and distribution arrangements were too frequently inadequate. In some areas there was a lack of printed plain-language summaries of NOTAM Class I, causing gaps in essential temporary information where incorporation of the information in NOTAM Class II or the AIP was not sufficiently speedy. Foreseeable changes requiring coordination or revision of charts were given inadequate advance notice, notwithstanding the requirements of Annex 15 paragraph 5.2.

17.2.1 Deficiencies in the information contained in AIP arose not because of inadequate SARPS and guidance, but most frequently from inadequate support from administrations for efforts on the part of the AIS to confine the subject-matter of AIP to that prescribed in the SARPS and guidance material, and to eliminate superfluous information. The Meeting noted that this had particular relevance in relation to some AIP which contained much information not of direct operational significance and therefore not in accord with the requirements of Annex 15. The Meeting was informed that one State encountered great difficulty in issuing an AIP that conformed fully with the requirements and guidance as to format and content while trying to accommodate information on domestic operations in the same document as information on international operations. Another State indicated that while in the past it had not published an AIP which fully met the requirements of Annex 15 and conformed to the guidance in the AIS Manual, it intended to do so in the near future.

INTERNATIONAL EXCHANGE OF NOTAM CLASS I

17.3 The Meeting reviewed the requirements for international exchange of NOTAM Class I and concluded that the capability of the AFTN needed to be increased in order to accomodate the increasing need for information conveyed through the medium of NOTAM Class I. The present facilities provided a service that was relatively slow and sometimes inefficient. It was agreed that computerization was no solution when the information travelled over slow-speed communication circuits. Traffic delays of the order of 9 to 12 hours had been encountered.

There was no means of knowing where the delays occur. They might be due to tardiness in filing the original message or they might be occurring in the local aeronautical telecommunication station, or perhaps in communication centres en route. Whatever the reason or whoever was at fault the fact remained that the overall time from origination to receipt was excessive for present day aircraft and would certainly be quite unacceptable for SST aircraft. As a result of the recommendations of the AIS/MAP (1966) Divisional Meeting there had been a noticeable decrease in superfluous NOTAM. However, it was anticipated that NOTAM traffic would increase, partly due to longer stage lengths being flown. In consequence the Meeting made the following recommendation:

RECOMMENDATION 17/1 - STUDY OF NOTAM CLASS I EXCHANGES IN THE NAT AND NAM REGIONS

That ICAO be invited to undertake a study to determine the extent of delays being experienced in the international exchange of NOTAM Class I with a view to determining the problem areas and necessary remedial action.

INTERNATIONAL NOTAM OFFICES

17.4 The Meeting confirmed that the existing International NOTAM Offices and their areas of responsibility as indicated in the current Regional Plan were adequate and needed no up-dating.

PRE-FLIGHT INFORMATION

17.5 The Meeting noted that computerization could assist in improving the preparation of pre-flight briefing utilizing NOTAM Summaries or other similar types of pre-flight bulletins, and made the following recommendation:

RECOMMENDATION 17/2 - COMPUTERIZATION OF PRE-FLIGHT INFORMATION SERVICES

That States look to computerization as a means of improving their pre-flight information services.

FORECASTS OF SOLAR FLARE RADIATION

17.6 At the present time, there is a Centre in the United States which has since July 1968 been issuing regular radiation forecasts which were being disseminated in the United Kingdom through its AIS to those involved in the Anglo-French Concorde programme. The SST Panel has considered this matter and is currently studying the subject to decide if operational requirement for this information exists. The Meeting was therefore of the opinion that, if forecasts of this nature were to become a requirement and were to continue to be disseminated, there would be a need for determination, by an appropriate body of ICAO, of the responsibility for such dissemination. If it were determined that this responsibility lay with the AIS such forecasts could probably best be handled as a NOTAM Class I. Accordingly, the Meeting made the following recommendation:

RECOMMENDATION 17/3 - DISSEMINATION OF SOLAR FLARE RADIATION FORECASTS

That, in the event of a requirement for the dissemination of solar flare radiation forecasts being established, ICAO be invited to determine responsibility for the dissemination of such forecasts and the medium through which they should be disseminated.

PROVISION OF IN-FLIGHT INFORMATION

17.7 The Meeting noted that with the advent of SST operations there would be a need to provide certain critical information to SST aircraft prior to their reaching their destination aerodrome. Accordingly it formulated the following recommendation:

RECOMMENDATION 17/4 - IN-FLIGHT INFORMATION FOR SST AIRCRAFT

That the ICAO SST Panel be invited to determine:

(a) the information that should be provided to SST aircraft approaching their destination aerodrome,

(b) the preferred means by which this information should be disseminated, and

(c) at what distance from their destination these aircraft should receive the information.

ALIGNMENT AND PROGRAMMING OF AIRCRAFT INERTIAL NAVIGATION SYSTEMS (INS)

17.8 With the introduction of Inertial Navigation Systems the Meeting recognized the need for accurately defined reference points at which aircraft equipment could be aligned before departure. It also agreed that similar information related to the coordinates of short distance navigational aids would be required for en-route navigation purposes. The Meeting therefore made the following recommendation:

RECOMMENDATION 17/5 - GEOGRAPHICAL COORDINATES FOR ALIGNMENT AND PROGRAMMING OF AIRCRAFT INS

That States in their AIP or on charts publish:

(a) information which will enable selected positions on the apron to be determined to an accuracy of at least one-tenth of a minute, and

(b) the geographical coordinates, to an accuracy of at least one-tenth of a minute, of navigational aids defining ATS routes,

AERONAUTICAL CHARTS

17.9 The Meeting examined the availability of aeronautical charts in the NAT and NAM Regions with a view to developing a chart programme indicating the chart series required, priorities and responsibility for production. This resulted in requirements being established for the following charts, in addition to the four mandatory charts:

Aeronautical Charts - ICAO 1:500,000
Terminal Area Charts - ICAO
Plotting Charts - ICAO
Aerodrome Charts - ICAO
Radio Navigation Charts - ICAO
Precision Approach Terrain Profile Charts

(Note: The Meeting recognized that Precision Approach Terrain Profile Charts were still in the experimental stage, and took note of a suggestion by one State that there might be some merit in including a nominal glide path on the profile in order to simplify the calculation of radio altimeter heights corresponding to given heights above the threshold.)

The Meeting therefore made the following recommendation:

RECOMMENDATION 17/6 - AERONAUTICAL CHART PROGRAMME

(a) That States provide, individually or collectively, and in accordance with Annex 4,

1) World Aeronautical Charts - ICAO 1:1,000,000 as indicated in Appendix A to this Report;

2) Instrument Approach Charts - ICAO;
(Note: Unless a practicable alternative could be found it seemed necessary at present to produce a separate Instrument Approach Chart for CAT I and CAT II ILS).

3) Landing Charts - ICAO;

4) Aerodrome Obstruction Charts - ICAO Type A;

5) Aeronautical Charts - ICAO 1:500,000, to cover all land masses;

6) Terminal Area Charts - ICAO;

7) Plotting Charts - ICAO both to ensure continuity in the present coverage of the Aircraft Position Charts and to extend this coverage south to the north coast of South America;

8) Aerodrome Charts - ICAO in the circumstances indicated in 13.1.1 of Annex 4;

9) Radio Navigation Charts - ICAO, to ensure continuation of the present coverage (cf Doc 7101-MAP/565/8).

(b) That States publish Precision Approach Terrain Profile Charts (cf paragraph 8.14 of Chapter 8 of the Aeronautical Chart Manual Doc 8697-AN/889) for all aerodromes in the AGA plan at which CAT II operations are occurring or are contemplated;

(c) That the highest priority be given to the production of Aerodrome Obstruction Charts - ICAO Type A;

(d) That in the production of Aerodrome Obstruction Charts - ICAO Type A, Instrument Approach Charts - ICAO, and Landing Charts - ICAO, States should take into account the AGA plan.

REQUIREMENTS OF SST OPERATORS FOR AERONAUTICAL CHARTS

17.10 The Meeting noted that at this time no specific requirement had been indicated for additional charts to be used in SST operations.

17.11 The Meeting noted that commercial and private users of aeronautical charts issued by States other than their own were experiencing some difficulty in obtaining current charts issued by those States and that the problem stemmed mainly from the reluctance of sales agents to have unsold charts on their hands for which they could obtain no credit when new editions were issued. In order to obviate the danger inherent in the sale of out-of-date charts, the Meeting made the following recommendation:

RECOMMENDATION 17/7 - SALES OF OUT-OF-DATE CHARTS

That States take every practicable measure to prevent the sale of out-of-date charts.

REVIEW OF THE RECOMMENDATIONS OF THE NAT IV (1961) RAN MEETING

17.12 The Meeting reviewed Recommendations 5/1 to 5/8 of the NAT IV (1961) RAN Meeting and concluded that, with the exception of Recommendation 5/4, they were now superseded by provisions in Annex 15. Considering Recommendation 5/4 to be still valid, the Meeting incorporated it as a recommendation of the NAT V RAN Meeting.

RECOMMENDATION 17/8 - FREQUENCY OF AMENDMENT OF DOC 7383-AIS/503 - AERONAUTICAL INFORMATION SERVICES PROVIDED BY STATES

That Doc 7383-AIS/503 "Aeronautical Information Services Provided by States" be amended at more frequent intervals, preferably not more than three months, in order that this document may be kept sufficiently up-to-date to serve its intended purpose.

STATUS OF IMPLEMENTATION OF AIS DOCUMENTS AND AERONAUTICAL CHARTS

17.13 The Meeting noted that there was insufficient evidence of the degree to which States were publishing the required AIS documents and aeronautical charts and implementing the requirements stated in Annexes 4 and 15 as to the manner in which aeronautical information and charts should be published. In an attempt to reduce the burden this placed on the pre-flight information services and on pilots, the Meeting considered that this information should be included in Tables in the Air Navigation Plan publication for the NAT and NAM Regions. Collection of this information should be coordinated through the ICAO Regional Offices to which States in the NAT and NAM Regions are accredited and the completed Tables forwarded to ICAO Headquarters for inclusion in each new edition of the NAT/NAM/PAC Air Navigation Plan publication. The Meeting therefore formulated the following recommendation:

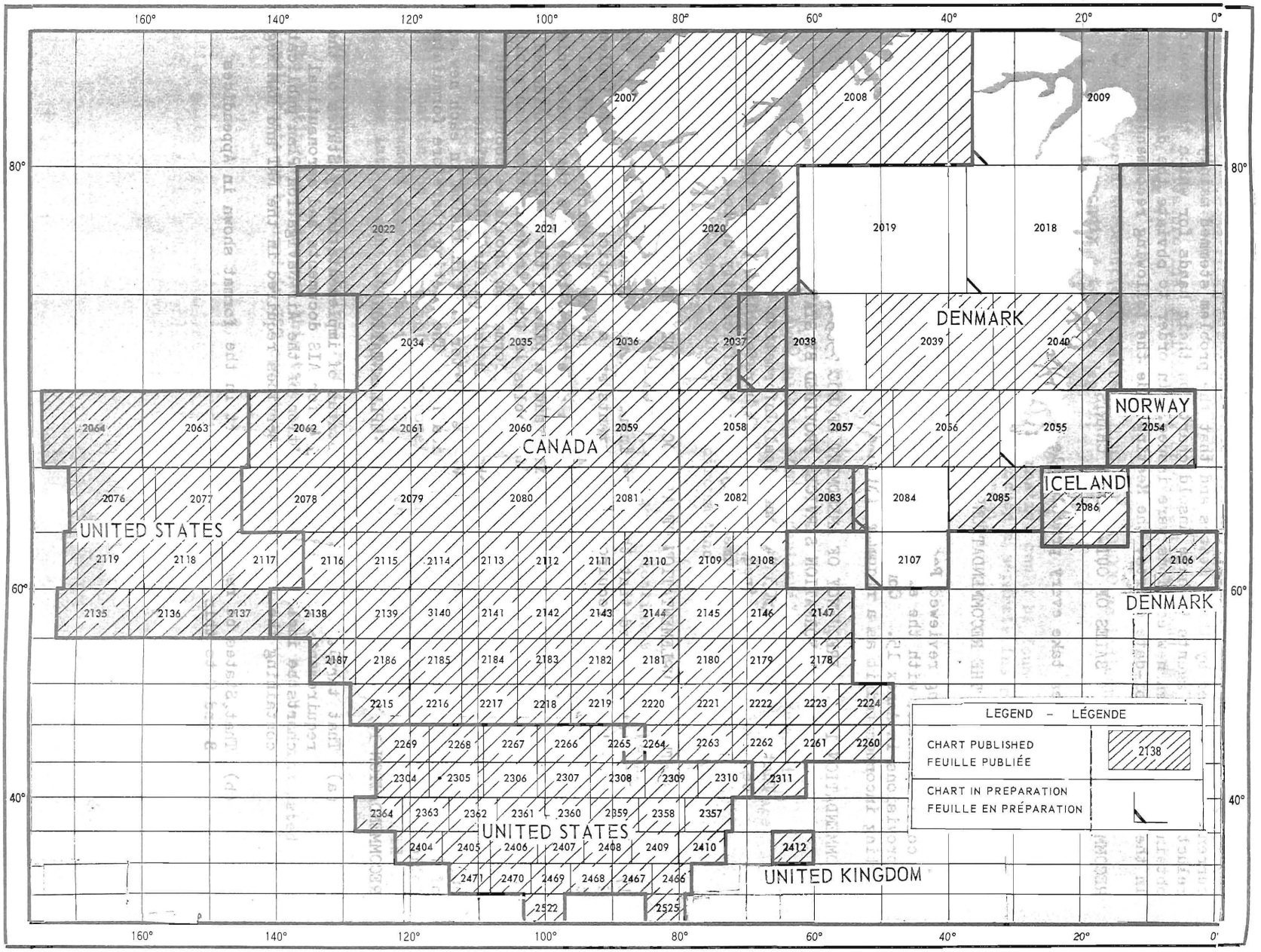
RECOMMENDATION 17/9 - STATUS OF AIS AND MAP IMPLEMENTATION

(a) That tabulations showing the status of implementation by States of the requirements in Annexes 15 and 4 for AIS documents and aeronautical charts be included in each edition of the Air Navigation Plan publication containing the facilities and services required in the NAT and NAM Regions;

(b) That States be required to report in the format shown in Appendices B and C to this Report.

COVERAGE AND PRODUCTION RESPONSIBILITY FOR THE WORLD AERONAUTICAL CHART - ICAO 1 : 1 000 000
COUVERTURE ET RESPONSABILITES D'EXECUTION DE LA CARTE AERONAUTIQUE DU MONDE AU 1 : 1 000 000 OACI

APPENDIX A
APPENDICE A



APPENDIX B
APPENDICE B

STATUS OF IMPLEMENTATION - AIS

ETAT DE MISE EN APPLICATION - AIS

STATE ETAT	AIP										NOTAM				AIC	AIRAC	REMARKS OBSERVATIONS
	EDITION	GEN	AGA	COM	MET	RAC	FAL	SAR	MAP	AMEND	II	CHECK LIST LISTE/A DE VERIFIC.	I	SUMMARY SOMMAIRE			

STATUS OF IMPLEMENTATION - MAP ETAT DE MISE EN APPLICATION - MAP

STATE ETAT	EDITION	CHART TYPE TYPE DE CARTE										Remarks Remarques
		WORLD AERONAUTICAL 1:1,000,000 AERONAUTIQUE DU MONDE AU 1:1,000 000	AERONAUTICAL 1:500,000 AERONAUTIQUE AU 1:500,000	PLOTTING TRACE DE NAVIGATION	RADIO NAVIGATION RADIO-NAVIGATION	TERMINAL AREA REGION TERMINALE	INSTRUMENT APPROACH APPROCHE AUX INSTRUMENTS	LANDING ATTERRISSAGE	AERODROME OBSTRUCTION TYPE A OBSTACLES D'AERODROME TYPE A	AERODROME AERODROME	PRECISION APPROACH TERRAIN PROFILE PROFIL DE TERRAIN POUR APPROCHE DE PRECISION	

Agenda Item 18: Co-ordinated Implementation Programme

GENERAL

18.1 The Meeting noted the Directives of the Council pertaining to the preparation of a co-ordinated programme for implementation, and also the procedures for the application after the Meeting whereby programmes for implementation of the individual facilities and services required by the revised plan would be prepared by the Secretariat in consultation with the States concerned.

18.1.1 The Meeting recognized that the degree of implementation of the relevant portions of existing Plans relating to the NAT area stood at a very high level and that there was no necessity to invite the attention of Provider States to lack of implementation. In the case of the revised Plan, the time allotted for the preparation of a well-considered co-ordinated implementation programme was insufficient. However, in the belief that the most vital actions to be taken in this field should follow the approval of the Report by the Council, it was agreed that States' implementation programmes could be developed on the basis of subsequent consultations between the States, the ICAO Regional Offices and the operators. With this in view the Meeting made the following recommendation:

RECOMMENDATION 18/1 - PREPARATION OF IMPLEMENTATION PROGRAMMES

That within six months of approval of the Report of this Meeting by the Council, the respective Regional Offices of ICAO in consultation with States and the operators, should prepare plans for implementation of the facilities and services required in individual territories. In this connexion States should be guided by the information contained in the Appendices to this Section of the Report.

18.1.2 The Meeting recognized that in certain instances these consultations might best be conducted through informal meetings.

18.1.3 The Meeting agreed that further action would be required from time to time for joint consideration by States, ICAO and the operators, of progress made in the implementation of the Plan and, if necessary, changes in priorities. This would best be achieved by informal meetings where agreement could be reached on any specific measures necessary.

RECOMMENDATION 18/2 - INFORMAL IMPLEMENTATION MEETINGS

That provider States be invited to organize or to participate in informal meetings together with the operators to review progress made in the implementation of the Plan; to take any specific measures necessary to further implementation and to review the priorities.

18.1.4 The Meeting also considered that in addition to any informal implementation meetings, the Limited NAT Meeting provided for in Recommendation 19/2 might provide a convenient forum for a review of progress.

18.1.5 The Meeting paid particular attention to the introduction of the proposed ATS procedures for improvement in the utilization of the airspace in the NAT Region and also the proposed MET procedures. The recommendations on introduction of these procedures are reflected under their respective headings.

18.1.6 With regard to long-term developments of systems such as the AFS, the Meeting felt that where planning is not already underway, it should commence in the very near future on the preparation of requirements for associated equipment. In this connexion, the Meeting recognized that there could be an extensive period of time between the commencement of planning and the installation of equipment. Failure to take account of this fact well in advance could possibly lead to severe economic penalties through procurement of incompatible equipment or to delays in the activation of any given system.

RECOMMENDATION 18/3 - LONG-TERM PLANNING

That, in view of the lead times involved in the provision of equipment, those responsible for specifying requirements for the associated systems should make the relevant decisions sufficiently far in advance so as to enable timely implementation.

PHYSICAL CHARACTERISTICS OF AERODROMES

18.2.1 The Meeting compared the Recommendations for physical characteristics contained in Table AGA 1 under Agenda Item 6 with the best information available at the Meeting on existing facilities at the aerodromes and noted that an extensive number of improvements were required for both increases in runway length and pavement strength.

18.2.2 It was recognized that the ideal dates for implementation would be immediately for present operations or by the time that future operations are planned to commence. It was realized, however, that these ideal dates should be tempered in accordance with the time needed by States to prepare their budgets, the availability of construction forces or equipment and the construction time required to accomplish these projects. States should, of course, strive to achieve implementation dates which correspond to the introduction of the operations which give rise to the requirements.

18.2.3 The data in Appendix 18-A indicates the aerodromes and requirements for improvement in runway length and pavement strengths. The dates shown are those considered by the Meeting as the latest for implementation of the improvements, and the priorities indicate the facilities considered most important in each State. When known, information concerning the plans for aerodrome development has been shown.

VISUAL AIDS AT AERODROMES

18.2.4 A comparison of the requirements for visual aids indicated in Table AGA 2 with the best information available at the Meeting on existing facilities indicated that an extensive number of improvements were necessary. It was recognized that where there was a current (1970) requirement for these aids, they should be implemented without delay. However, due to the time needed by States to prepare their budgets, and purchase and install equipment, it was considered impractical to suggest an implementation date. The dates shown in Appendix 18-B to this Section of the Report therefore take cognizance of the time required to implement these facilities.

18.2.5 The data in Appendix 18-B indicates the aerodromes and requirements for visual aids additional to those already provided. The dates shown are the latest dates suggested by the Meeting for implementation of the additional aids. The priorities indicate the aids considered most important at each aerodrome taking account of existing facilities. Where only one additional lighting aid was required, no priority was indicated. When known, information concerning the plans of States to provide visual aids has been shown.

18.2.6 Priorities have not been indicated for the required markings as the Meeting considered that these markings should be implemented immediately.

RADIO NAVIGATION AIDS

18.3 The Meeting concluded that in most cases there was an immediate need for the planned facilities and considered that these should be implemented as soon as possible or as soon as a requirement for them exists. Taking into account all factors however, the Meeting concluded that it would be inappropriate to suggest any specific dates for implementation. However, it agreed that the operators' list of priorities may be useful for planning purposes and this list is reflected in Appendix 18 C.

METEOROLOGICAL FACILITIES AND SERVICES

AERONAUTICAL METEOROLOGICAL OFFICES AND THEIR FUNCTIONS

18.4.1 When considering implementation of the recommendations made under Agenda Item 12, the Meeting agreed to recommend as follows:

RECOMMENDATION 18/4 - IMPLEMENTATION OF MET FACILITIES AND SERVICES

That:

1) With reference to Recommendation 12/1:

(a) The components of the area forecast system designed for subsonic jet aircraft listed in Part 1 of Table MET 6, as shown in Appendix C to Part 12, should be implemented approximately four months after approval by Council.

(b) The components of the area forecast system designed for supersonic aircraft listed in Part 2 of Table MET 6, as shown in Appendix C to Part 12, should be implemented by agreement between States concerned when SST flights become sufficiently frequent to call for relevant changes to the area forecast system. This date is now foreseen to be approximately 1975.

2) With reference to Recommendation 12/2:

The simplified flight documentation recommended should be introduced for NAT flights approximately four months after approval by Council.

3) With reference to Recommendation 12/3:

(a) Action should be initiated at such a date as to permit the information on airlines' digital data requirements to be received by ICAO by 1 October 1970.

(b) Action should be initiated at such a date as to permit the information on digital data available from European States to be received by WMO by 1 January 1971.

(c) The co-ordinated plan concerning the utilization by airlines of digital data to be suggested as a result of this subparagraph should be prepared preferably by 1 May 1971.

4) With reference to Recommendation 12/4:

The meteorological offices listed in Table MET 1 should provide the required services four months after Council approval.

5) With reference to Recommendation 12/7:

Iceland should be invited to submit the requested proposals for possible simplifications and savings to ICAO by 1 April 1971.

6) With reference to Recommendation 12/9:

The contents of the VOLMET broadcasts should be implemented on 17 September 1970.

7) With reference to Recommendation 12/10:

The amendments to the dissemination of tropical storm warnings should be implemented approximately four months after approval by Council.

8) With reference to Recommendation 12/11:

Implementation of the proposed new supplementary procedures relating to aircraft observations and reports should be effected approximately four months after approval by Council.

EXCHANGE OF OPERATIONAL METEOROLOGICAL DATA BETWEEN GROUND STATIONS

18.4.2 When considering implementation of the recommendations made under Agenda Item 13, the Meeting agreed to recommend as follows:

RECOMMENDATION 18/5 - IMPLEMENTATION OF EXCHANGES OF OPERATIONAL MET DATA

That:

1) With reference to Recommendation 13/1:

(a) The invitation called for under sub-paragraph 3) should be forwarded to the United Kingdom as soon as possible.

(b) The lists of exchange requirements called for in sub-paragraph 2) b) should be prepared as early as practicable, to be available in time for the preparatory work called for in sub-paragraph 3).

(c) The meeting of the MOTNE Panel attended by representatives of other States called for in sub-paragraph 1) to take action as outlined in sub-paragraph 2) should preferably be held not later than the end of November 1970.

2) With reference to Recommendation 13/5:

The re-examination should take place at the end of 1971.

3) With reference to Recommendation 13/6:

The exchanges indicated in the table should be implemented as and when required for flight operations.

4) Recommendation 13/7:

These procedures should be implemented approximately four months after their approval by Council.

METEOROLOGICAL OBSERVATION NETWORKS

18.4.3 When considering implementation of the recommendations made under Agenda Item 14, the Meeting agreed to recommend as follows:

RECOMMENDATION 18/6 - IMPLEMENTATION OF MET OBSERVATION NETWORKS

That, with reference to Recommendation 14/4:

The climatological information requested in this Recommendation should be made available for all NAT and NAM aerodromes by 25 May 1972.

COMMUNICATIONS FACILITIES AND SERVICES

Aeronautical Fixed Services

18.5.1 When considering implementation of the recommendations made under Agenda Item 15, the Meeting agreed to recommend as follows:

RECOMMENDATION 18/7 - IMPLEMENTATION OF THE AFS

That:

1) With reference to Recommendation 15/3:

A meeting of the NAT Cable Implementing States should be convened in 1971 to study the future engineering and utilization of Channel No. 1 with a view to proposing an appropriate amendment to the ICAO Plan.

2) With reference to Recommendation 15/5:

Appropriate arrangements be made to ensure implementation of the additional AFTN Channel between London and Montreal by not later than 1 April 1971.

3) With reference to Recommendation 15/6:

Appropriate arrangements be made to ensure implementation of the additional ATS direct speech circuit between Gander and Prestwick by not later than 1 April 1971.

4) With reference to Recommendation 15/13:

The Lisboa-Paris RTT circuit be maintained in operation until there is no further operational requirement.

Aeronautical Mobile Service

18.5.2 When considering implementation of the recommendations made under Agenda Item 16, the Meeting agreed to recommend as follows:

RECOMMENDATION 18/8 - IMPLEMENTATION OF AMS

That:

1) With reference to Recommendation 16/3:

The restrictions on the use of HF AMS channels by OSVs be effective approximately four months after approval by Council.

2) With reference to Recommendation 16/5:

Immediate action be taken to ensure that the interim family of frequencies for NAT SSB A3J operations will be available not later than 1 April 1971.

3) With reference to Recommendation 16/19:

The revised VOLMET Plan be implemented on the recommended frequencies at 0001 GMT on 17 September 1970.

4) With reference to Recommendation 16/21:

The revised Supplementary Procedure be effective approximately four months after approval by Council.

AIR TRAFFIC SERVICES

Airspace Organization and ATS Units

18.6.1 When considering implementation of the recommendations made under Agenda Item 9, the Meeting agreed to recommend as follows:

RECOMMENDATION 18/9 - FIR/CTA BOUNDARIES

That:

1) With reference to Recommendations 9/1 and 9/6:

Immediate steps be taken by the States concerned following approval by Council to agree on a common date for implementation, if necessary, with the assistance of the ICAO Regional Offices.

2) With reference to Recommendation 9/2:

The common boundary between the Santa Maria Oceanic, New York Oceanic and San Juan FIRs in the vicinity of 27°N 40°W be modified as soon as practicable.

Airspace Utilization

18.6.2 When considering implementation of the recommendations made under Agenda Item 10, the Meeting agreed to recommend as follows:

RECOMMENDATION 18/10 - AIRSPACE UTILIZATION

That:

1) With reference to Recommendations 10/1, 10/11, 10/12, 10/21, 10/22, 10/25, 10/26, 10/28, 10/29 and 10/31:
The proposed amendments to the RAC Supplementary Procedures become effective approximately four months after approval by Council.

2) With reference to Recommendation 10/4:

The proposed amendments to the RAC Supplementary Procedures be made effective on 4 February 1971.

3) With reference to Recommendation 10/5:

States take the necessary preparatory measures to ensure that composite separation may be applied with effect from 4 February 1971.

4) With reference to Recommendation 10/6:

Measures are taken in time to ensure the necessary co-ordination between the ACCs concerned and early notification through AIP and NOTAM for application of composite separation with effect from 4 February 1971.

5) With reference to Recommendation 10/23:

Action be undertaken as soon as possible with a view to obtaining the earliest possible agreement on a definite solution.

AIS/MAP

18.7.1 When considering implementation of the recommendations made under Agenda Item 17, the Meeting agreed to recommend as follows:

RECOMMENDATION 18/11 - ALIGMENT AND PROGRAMMING OF AIRCRAFT INS

That with reference to Recommendation 17/5 implementation be effected as soon as possible, implementation of 17/5 a) being of particular urgency.

APPENDIX 18-A

RUNWAY LENGTH AND PAVEMENT STRENGTH IMPROVEMENTS

State City/Aerodrome	Runway	Improvements Required[1]		Date[2]	National Priority[3]	States' Comments[4]
		Extend runway to (m)	Strengthen pavement for			
ALGERIA						
Alger/Dar el Beida	06/24		TU-114 at AUW 165	1971	1	
Annaba/Annaba	05/23	2620	TU-114 at AUW 128	1971	2	
Boufarik/Boufarik	05/23	2640	TU-114 at AUW 128	1974	5	
Oran/Es Sénia	07/25		TU-114 at AUW 128	1972	3	
Ouargla/Ouargla	02/20		TU-114 at AUW 128	1974	4	
AUSTRIA						
Salzburg/Salzburg	16/34	2500		1971	2	
Wien/Schwechat	12/30	3500		1971	1	
BAHAMAS						
Nassau/Intl. New Providence I.	09/27	4115	B747 at AUW 283 (if found necessary)	1973		

1. Improvements required to satisfy Table AGA 1.

2. Suggested latest date for implementation of improvements.

3. Priority indicating most important improvements and order in which it is preferred State implement improvements.

4. Information provided by States.

State City/Aerodrome	Runway	Improvements Required		Date	National Priority	States' Comments
		Extend runway to (m)	Strengthen pavement for			
BAHAMAS (Cont'd.)						
Nassau/Intl. (Cont'd)	09/27		L-1011 at AUW 163 (if found necessary)	1974		
BARBADOS						
Bridgetown/Seawell	09/27	3350		1971		Planned for 1971
BERMUDA						
Bermuda/NAS	12/30	3720		1971		Not planned
CANADA						
Montreal/Intl.	06L/24R	3600		1971	1	Extension not planned. New aerodrome planned for 1974
		3700		1973	2	" " " "
CUBA						
Camaguey/Ignacio Agramonte	07/25	3200	TU-114 at AUW 130	1971	2	
Habana/José Martí	05/23	3500	TU-114 at AUW 180	1971	1	
		3700		1974	3	
Varadero/Varadero	06/24	2600	TU-114 at AUW 128	1972	4	

State City/Aerodrome	Runway	Improvements Required		Date	National Priority	States' Comments
		Extend runway to (m)	Strengthen pavement for			
CZECHOSLOVAKIA						
Bratislava/Ivánka	04/22		IL 62 at AUW 102	1971	1	
Brno/Turany	10/28	2800	IL 62 at AUW 102	1972	2	
DENMARK						
København/Kastrup	04R/22L	3770		1971	1	Not planned. New runway 04L/22R, L=3600 m, to be in service in 1971.
Vagar/Vagar (Faroe Is.)	13/31	1510		1973	2	Not planned. Location of the aerodrome does not permit extension of the runway. New site of the aerodrome being investigated
DOMINICAN REPUBLIC						
Santo Domingo/De las Américas Intl.	16/34	3700	DC8-63 at AUW 162	1971		
FINLAND						
Helsinki/Helsinki	15/33		DC8-62C at AUW 109	1971	1	Planned for 1973
Rovaniemi/Rovaniemi	03/21		DC8-62 at AUW 108	1972	2	Planned for 1974
Turku/Turku	08/26		DC8-62 at AUW 108	1973	3	Not planned. A new runway is being considered.

State City/Aerodrome	Runway	Improvements Required		Date	National Priority	States' Comments
		Extend runway to (m)	Strengthen pavement for			
FRANCE						
Lyon/Satolas	18/36	3600	B747 at AUW 343	1974	2	This new aerodrome is planned for 1974.
Paris/Roissy-en-France (Future)	09/27	3600	B747 at AUW 324	1973	1	This new aerodrome is planned for 1973
			Concorde at AUW 170	1974		
FRENCH ANTILLES						
Fort-de-France/ Lamentin, Martinique	09/27	3100		1971	1	Planned for 1974
			B747 at AUW 263	1975	2	" " "
GERMANY (FEDERAL REPUBLIC)						
Hamburg/Hamburg	05/23	3440		1971	1	Not planned.
Hamburg/Kalten-Kirchen	New	3700	B747 at AUW 351	1976	2	This new aerodrome is planned for 1976
GREECE						
Andravida/Andravida	16/34		B707-300C at AUW 113	1971	2	
Athinai/Athinai	15/33	3660		1971	1	
HAITI						
Port-au-Prince/ President Duvalier Intl.	09/27	2940	DC8-61 at AUW 147	1971		

State City/Aerodrome	Runway	Improvements Required		Date	National Priority	States' Comments
		Extend runway to (m)	Strengthen pavement for			
IRELAND						
Shannon/Shannon	06/24	3414		1971	1	Planned for 1971
ISRAEL						
Tel Aviv/Lod	12/30	3960		1971		
ITALY						
Roma/Ciampino	15R/33L	2660		1971	2	Not planned
Roma/Fiumicino	07/25	3500		1972	1	Planned for 1973
JAMAICA						
Kingston/Palisadoes Intl.	11/29	2600		1971	1	
		3200	L-1011 at AUW 176	1974	2	
MEXICO						
Mérida/Mérida	10/28	2250	B707-300 at AUW 102	1971	2	
Mexico City/Intl.	05R/23L	4050	B707-320C at AUW 150	1971	1	

State City/Aerodrome	Runway	Improvements Required		Date	National Priority	States' Comments
		Extend runway to (m)	Strengthen pavement for			
MOROCCO						
Rabat/Salé	04/22	3770	B707-300 at AUW 142	1971		
NETHERLANDS (KINGDOM OF THE)						
Amsterdam/Schiphol	09/27	3600		1971	1	Not planned.
Rotterdam/Rotterdam	06/24	2100		1971	2	" "
NETHERLANDS ANTILLES						
Willemstad/Dr. A. Plesman, Curaçao I.	11/29		B747 at AUW 298	1971		Planned for 1973
NORWAY						
Bergen/Flesland	18/36	3170		1974	2	Planning in progress. Implementation dates not yet determined
Oslo/New Main		3200	DC-10 at AUW 240	1974	1	This new aerodrome for NAT operations is planned for 1978
PORTUGAL						
Lisboa/Lisboa	03/21	3890		1971	1	Not planned
Porto/Porto	18/36	2240		1971	2	Planned for 1974
Porto Santo/Porto Santo Porto Santo, I. Madeira	01/19	2100		1972	3	Not planned

State City/Aerodrome	Runway	Improvements Required		Date	National Priority	States' Comments
		Extend runway to (m)	Strengthen pavement for			
SENEGAL						
Dakar/Yoff	01/19	3820	DC8-62 at AUW 152	1971	1	
	12/30		B707-300 at AUW 95	1971	2	
SPAIN						
Madrid/Barajas	15/33	4210		1971		
SURINAM						
Paramaribo/Zanderij	10/28	3700		1971		Planned to extend to 3500 m in 1973
SWEDEN						
Göteborg/Torslanda	04/22		DC8-62 at AUW 108	1971	4	New aerodrome Göteborg/ Harryda to replace Torslanda
Stockholm/Arlanda	01/19	3670	DC8-62 at AUW 158	1971	1	Planned for 1971
			DC-10 at AUW 185	1974	3	" " 1974
	08/26		DC8-62 at AUW 158	1971	2	" " 1971
SWITZERLAND						
Zürich/Zürich	16/34	4000		1972		Not planned. New runway under consideration

State City/Aerodrome	Runway	Improvements Required		Date	National Priority	States' Comments
		Extend runway to (m)	Strengthen pavement for			
TRINIDAD & TOBAGO						
Port of Spain/Piarco, Trinidad	10/28	3300		1971		
UNITED KINGDOM						
Birmingham/ Birmingham	06/24		B727 at AUW 62		4	Not planned
London/Gatwick	09R/27L	3400		1972	1	Extension to present runway not planned
	09L/27R	3400		1974	5	Second runway being planned, implementation date not determined
Manchester/Manchester	06/24	3350		1971	3	Not planned
Prestwick/Prestwick	13/31	3414		1971	2	" "
UNITED STATES						
Anchorage/Intl.	06R/24L	3400		1971	2	This new runway, 3320m, is under construction. Completion date 1971
		3460		1971	2	
Baltimore/Friendship Intl.	10/28	3261		1974	5	Not planned
Boston/Logan Intl.	04R/22L	3660		1971	3	" "
		3700		1971	3	" "
Corpus Christi/Intl.	13/31	2134		1971	8	Under construction
Miami/Intl.	09L/27R	3353		1971	6	Not planned
Newark/Newark	04R/22L	2460		1971	7	" "
		2890		1971	7	" "
Philadelphia/Intl.	09R/27L	3261		1971	1	This new runway, 3200m, is under construction. Completion date 1970

State City/Aerodrome	Runway	Improvements Required Extend runway to (m)	Improvements Required Strengthen pavement for	Date	National Priority	States' Comments
UNITED STATES (Cont'd)						
San Francisco/Intl.	10R/28L	3261		1971	4	Not planned
VENEZUELA						
Caracas/Maiquetía	09R/27L	4200		1971		
VIRGIN ISLANDS						
St. Croix/Alexander Hamilton	09/27	2743		1972		Not planned
WEST INDIES ASSOCIATED STATES						
St. Johns/Coolidge, Antigua I.	07/25	2740	VC10 at AUW 153	1971	1	
		3000		1974	3	
St. Lucia/Beane Field	10/28	2727	DC8-63 at AUW 159	1971	2	Under construction

APPENDIX 18-B

IMPLEMENTATION OF VISUAL AIDS

State City/Aerodrome Facilities Required[1]	Runway	Date[2]	Local Priority[3]	States' Comments[4]
ALGERIA				
Alger/Dar el Beida				
Lighting	06/24			
VA-24		1971		
Annaba/Annaba				
Lighting	05/23			
PA-05-I		1971	1	
VA-05		"	2	
Marking				
TD, S, FD		1970		
Boufarik/Boufarik				
Lighting	05/23			
SA-05		1971	2	
R		"	1	
TX		"	1	
B		"	1	
Marking				
T, FD, TX, O		1970		

1. Improvements required to satisfy Table AGA 2.

2. Suggested latest date for implementation of improvements.

3. Local priority at the particular aerodrome indicating order in which it is preferred States implement improvements at that aerodrome.

4. Information provided by States.

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
ALGERIA (Cont'd)				
Oran/Es Sénia				
Lighting	07/25			
SA-07		1971	1	
VA-25		"	2	
Marking				
TD, S, FD		1970		
Ouargla/Ouargla				
Lighting	02/20			
SA-02		1971	1	
VA-02		"	2	
Marking				
FD		1970		
AUSTRIA				
Salzburg/Salzburg				
Marking	16/34			
TD, FD		1970		
Wien/Schwechat				
Lighting	12/30			
PA-12-II		1972	1	
VA-12		1971	3	
VA-30		"	2	
C		1972	1	
TD-12		"	1	
B		1971	4	
Marking				
FD		1970		
BAHAMAS				
Freeport/Intl.				
Lighting	06/24			
PA-06-I		1971	1	
SA-24		"	2	
VA-24		"	3	
B		"	4	
Marking				
FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
BAHAMAS (Cont'd)				
Nassau/Intl.				
Lighting	09/27			
PA-09-I		1971	1	
SA-27		"	2	
VA-27		"	4	
Marking				
C, FD		1970		
Lighting	14/32			
VA-32		1971	3	
Marking				
C, FD		1970		
BARBADOS				
Bridgetown/Seawell				
Lighting	09/27			
PA-09-I		1971	1	Planned for 1971
SA-27		"	2	" " "
VA-27		"	3	" " "
Marking				
TD, S, FD		1970		
BELGIUM				
Bruxelles/National				
Lighting	08L/26R			
VA-08L		1971	4	
VA-26R		"	5	
Marking				
FD		1970		
Lighting	08R/26L			
PA-26L-II		1972	6	
C		"	6	
TD-26L		"	6	
Marking				
S, FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
BELGIUM (Cont'd)				
Bruxelles/National				
Lighting	02/20			
PA-02-II		1973	7	
VA-20		1971	3	
Marking				
S, FD		1970		
Lighting	12/30			
VA-12		1971	1	
VA-30		"	2	
C		1972	8	
Marking				
FD		1970		
BERMUDA				
Bermuda/NAS				
Lighting	12/30			
PA-12-I		1971		Not planned
Marking				
D, C, T, TD		1970		
S, FD, TX, O		"		
CANADA				
Abbotsford/Abbotsford				
Lighting	06/24			
VA-06		1971		Not planned
Calgary/Intl.				
Lighting	16/34			
PA-16-I		1972	1	Planned for 1972
VA-34		1971	2	Not planned
				VA-16 planned for 1970

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
CANADA (Cont'd)				
Edmonton/Intl.				
Lighting VA-01	01/19	1971		Not planned
Frobisher Bay/Frobisher				
Lighting VA-36	18/36	1971		Not planned VA-18 planned for 1971
Gander/Intl.				
Lighting VA-14	14/32	1971		Not planned VA-32 planned for 1973
Goose/Goose				
Lighting VA-09	09/27	1971	1	Not planned
Lighting VA-17	17/35	1971	2	Not planned
Halifax/Intl.				
Lighting VA-24	06/24	1971	2	Not planned
VA-06		"	1	Planned for 1972
Montréal/Intl.				
Lighting VA-06L	06L/24R	1971	3	Not planned
VA-24R		"	1	" "

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
CANADA (Cont'd)				
Montréal/Intl.				
Lighting	06R/24L			
PA-24L-II		1972	6	Planned for 1976. Implementation dependent on new aerodrome programme.
VA-24L		1971	2	Not planned
C		1972	6	Planned for 1976. Implementation dependent on new aerodrome programme.
TD-24L		"	6	" " " "
Lighting	10/28			
VA-10		1971	5	Not planned
VA-28		"	4	" "
Ottawa/Intl.				
Lighting	07/25			
VA-07		1971	1	Not planned
Lighting	14/32			
SA-14		1971	2	Not planned. Physical limitations
Sydney/Sydney				
Lighting	07/25			
VA-07		1971		Not planned
Toronto/Intl.				
Lighting	14/32			
PA-14-II		1972	3	Planned for 1976
VA-14		1971	1	Not planned
C		1972	3	Planned for 1976
TD-14		"	3	" " "
Lighting	05R/23L			
VA-05R		1971	2	Not planned
Vancouver/Intl.				
Lighting	08/26			
VA-08		1971		Not planned

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
CANADA (Cont'd)				
Winnipeg/Intl.				
Lighting	18/36			
VA-36		1971		Not planned.
CUBA				
Camaguey/Ignacio Agramonte				
Marking	07/25			
FD		1970		
Habana/José Martí				
Lighting	05/23			
PA-05-I		1971		
Marking				
FD		1970		
Varadero/Varadero				
Marking	06/24			
FD		1970		
CYPRUS				
Nicosia/Nicosia				
Lighting	14/32			
PA-32-I		1971	1	
VA-14		"	2	
VA-32		"	3	
Marking				
S, FD		1970		
Marking	09/27			
D, C, T, TX		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
CZECHOSLOVAKIA				
Bratislava/Ivánka				
Lighting	04/22			
VA-22		1971		
Marking				
S, FD		1970		
Brno/Turany				
Lighting	10/28			
VA-28		1971		
Marking				
D, C, T, TD, S		1970		
FD, TX		"		
Praha/Ruzyně				
Lighting	13/31			
VA-31		1971	2	
Marking				
TD, S, FD		1970		
Lighting	07/25			
VA-07		1971	1	
Marking				
S, FD		1970		
DENMARK				
København/Kastrup				
Lighting	04R/22L			
VA-22L		1971	2	Not planned
PA-04R-II		"	3	Planned for 1971
PA-22L-II		"	4	" " "
C		1971	3	Not planned
Marking				
TD, FD		1970		
Lighting	12/30			
PA-12-II		1972	1	Not planned
C		"	1	" "
Marking				
TD, FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
DENMARK (Cont'd)				
Søndre Strømfjord/ Søndre Strømfjord (Greenland)				
Lighting	11/29			
SA-29		1971	1	Not planned
VA-29		"	2	" "
Marking				
C, TX		1970		
Vagar/Vagar (Faroe Is.)				
Lighting	13/31			
R		1970	1	Planned for 1970
TX		1971	2	Not planned
O		"	2	" "
Marking				
TD, FD, TX, O		1970		
DOMINICAN REPUBLIC				
Santo Domingo/De las Américas Intl.				
Lighting	16/34			
PA-16-I		1971	1	
VA-16		1972	3	
VA-34		1971	2	
Marking				
TD, S, FD, TX		1970		
FINLAND				
Helsinki/Helsinki				
Lighting	04/22			
B		1971	2	Not planned
Lighting	15/33			
PA-15-II		1972	1	Planned for 1974
TD-15		"	1	" " "
Marking				
S, FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
FINLAND (Cont'd)				
Rovaniemi/Rovaniemi				
Lighting	03/21			
VA-21		1971		Planned for 1974
Marking				
S, FD		1970		Planned for 1974
Turku/Turku				
Lighting	08/26			
PA-26-II		1973	1	Implementation dependent on new runway now under construction.
C		"	1	
TD-26		"	1	
B		"	2	
Marking				
FD		1970		
FRANCE				
Bâle-Mulhouse/Bâle-Mulhouse				
Lighting	16/34			
SA-34		1970	1	Not planned
VA-16		"	2	Planned for 1970
C		"	3	" " "
TD-16		1972	3	" " 1975
Lyon/Bron				To be replaced by Lyon/Satolas
Lighting	17/35			
VA-17		1971	1	Not planned
TD-35		1972	2	" "
Marking				
TD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
FRANCE (Cont'd)				
Lyon/Satolas				
Lighting	18/36			This new aerodrome is
PA-36-II		1974		planned for 1974
PA-18-I		"		" "
R		"		" "
C		"		" "
TD-36		"		" "
TX		"		" "
B		"		" "
O		"		" "
Marking				
D, C, T, TD, FD		1974		" "
TX, O		"		" "
Paris/Orly				
Lighting	07/25			
VA-07		1971	2	Not planned. It will be
B		1972	5	further discussed at the
Marking				EUM VI RAN Meeting
TD		1970		
Lighting	08/26			
VA-08		1971	3	" " "
Marking				
TD		1970		
Lighting	02L/20R			
VA-20R		1972	4	" " "
SA-20R		1971	1	
Marking				
TD		1970		
Paris/Roissy-en-France				
Lighting	09/27			This new aerodrome is
PA-09-II		1973		planned for 1973
PA-27-II		"		" "
R		"		" "
C		"		" "
TD-09		"		" "
TD-27		"		" "
TX		"		" "
B		"		" "
O		"		" "
Marking				
D, C, T, TD		1973		" "
FD, TX, O		"		" "

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
FRENCH ANTILLES				
Fort-de-France/Lamentin, Martinique				
Lighting	09/27			
SA-09		1970	1	Planned for 1970
VA-09		1971	2	Existing but not to ICAO Standards
Pointe-à-Pitre/Le Raizet Guadeloupe				
Lighting	11/29			
SA-29		1972	1	Not planned
VA-29		"	3	" "
VA-11		"	2	" "
Marking				
TD		1970		
GERMANY (FED. REP.)				
Frankfurt Main/ Frankfurt Main				
Lighting	07L/25R			
PA-07L-II		1971	2	Planned. Date not yet established
C		"	1	" " " " "
TD-25R		"	1	" " " " "
TD-07L		"	2	" " " " "
Lighting	07R/25L			
PA-25L-II		1973	5	Planned for 1971
PA-07R-II		1972	4	" " "
VA-25L		"	3	" " "
TD-25L		1973	5	" " "
TD-07R		1972	4	" " "
Hamburg/Kaltenkirchen				This new aerodrome is planned for 1976
Lighting	New			
PA- -II		1976		
R		"		
C		"		
TD-		"		
TX		"		
B		"		
O		"		
Marking				
D, C, T, TD, S, FD		1976		
TX, O		"		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
GERMANY (FED. REP) (Cont'd)				
Köln/Köln-Bonn				
Lighting	07/25			
VA-07		1971		Not yet planned
Nürnberg/Nürnberg				
Lighting	10/28			
PA-10-I		1971	1	Not yet planned
VA-10		"	2	" " "
Stuttgart/Stuttgart				
Lighting	08/26			
PA-26-II		1972	2	Planned for 1973
VA-26		1971	1	Not planned
GREECE				
Andravida/Andravida				
Lighting	06/34			
SA-34		1971	1	
B		"	2	
Marking				
FD, O		1970		
Athinai/Athinai				
Lighting	15/33			
PA-33-II		1972	1	
C		"	1	
TD-33		"	1	
Marking				
S, FD		1970		
Lighting	03/21			
SA-03		1971	4	
SA-21		"	3	
R		"	2	
Marking				
D, C, T, FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
GREECE (Cont'd)				
Athinai/Elefsis				
Marking	18/36			
FD, TX, O		1970		
Thesaloniki/Thesaloniki				
Lighting	10/28			
PA-28-I		1972	1	
VA-28		"	2	
Marking				
T, TD, S, FD, TX		1970		
Marking	17/35			
D, C, T, FD		1970		
GUYANA				
Georgetown/Timehri Intl.				
Lighting	05/23			
SA-23		1971	1	
VA-23		"	2	
HAITI				
Port-au-Prince/President Duvalier Intl.				
Lighting	09/27			
SA-09		1971	1	
SA-27		"	1	
R		"	1	
TX		"	1	
O		"	1	
Marking				
FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
ICELAND				
Akureyri/Akureyri				
Lighting	02/20			
SA-02		1971	1	Planned for 1972
VA-02		1972	3	Not planned. AVASIS installed
VA-20		1972	2	Planned for 1972
Marking				
FD		1970		Planned for 1971
Keflavík/Keflavík				
Lighting	12/30			
PA-12-II		1972	1	Planned. Date not determined
VA-30		1971	2	
TD-12		1972	1	Planned. Date not determined
Marking				
FD		1970		
Lighting	03/21			
PA-21-II		1973	2	Planned. Date not determined
VA-03		1972	3	" " " "
C		1973	2	" " " "
TD-21		"	2	" " " "
Marking				
FD		1970		
Lighting	07/25			
VA-07		1973	4	Planned. Date not determined
Marking				
FD		1970		
Reykjavík/Reykjavik				
Lighting	02/20			
SA-20		1971	1	Planned for 1971
TX		"	2	" " "
Marking				
FD, TX		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
IRELAND				
Dublin/Dublin				
Lighting	06/24			
PA-24-II		1971	1	Planned for 1971
C		1970	1	" " 1970
TD-24		"	1	" " "
Marking	17/35			
FD		1970		Planned for 1970
Shannon/Shannon				
Lighting	06/24			
PA-24-II		1972	2	Planned for 1972
C		1971	1	" " 1971
TD-24		"	1	" " "
Lighting	14/32			
VA-14		1971	3	Not planned
Marking				
FD		1970		Planned for 1970
ISRAEL				
Haifa/Ramat David				
Lighting	15/33			
SA-15		1971	2	
SA-33		"	1	
VA-33		"	3	
TX		"	4	
Marking				
T, FD		1970		
Tel Aviv/Lod				
Lighting	08/26			
PA-08-II		1972	1	
PA-26-II		1973	2	
VA-08		1972	2	
VA-26		1971	1	
R		"	1	
C		1972	1	
TD-08		"	1	
TD-26		1973	2	
Marking				
D, C, T, TD, S, FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
ITALY				
Genova/Sestri				
Lighting	11/29			
PA-29-I		1971	1	Not planned
B		"	2	" "
Marking				
S, FD		1970		
Milano/Linate				
Lighting	18/36			
PA-36-II		1972	1	Planned for 1972
VA-18		"	2	" " "
Marking				
FD		1970		
Milano/Malpensa				
Lighting	17L/35R			
PA-35R-II		1971	1	Planned for 1971
VA-17L		1972	2	" " 1972
Marking				
FD		1970		
Napoli/Capodichino				
Lighting	06/24			
PA-24-I		1971	1	Not planned
VA-06		1972	2	Planned for 1972
VA-24		"	3	" " "
Marking				
FD		1970		
Pisa/San Giusto				
Lighting	04/22			
VA-04		1972	2	Planned for 1972
VA-22		1971	1	Not planned
Marking				
FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
ITALY (Cont'd)				
Roma/Ciampino				
Lighting	15R/33L			
PA-15R-I		1972	1	Not planned
VA-15R		"	2	" "
Marking				
FD		1970		
Roma/Fiumicino				
Lighting	16R/34L			
VA-16R		1971	3	Planned for 1973
Marking				
FD		1970		
Lighting	07/25			
PA-25-II		1972	2	Planned for 1973
VA-07		1970	1	" " 1970
VA-25		1972	4	Not planned
C		"	2	Planned for 1973
TD-25		"	2	" " 1973
Marking				
FD		1970		
Lighting	16L/34R			This new runway is planned
PA-16L-II		1973	5	for 1973
VA-34R		"	6	
R		"	5	
C		"	5	
TD-16L		"	5	
Marking				
D, C, T, TD, FD		1973		
Torino/Caselle				
Lighting	18/36			
PA-36-II		1972	3	Not planned
VA-18		1971	2	Planned for 1972
TD-36		"	1	" " 1971
Marking				
FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
ITALY (Cont'd)				
Venezia/ Tesséra				
Lighting	04/22			
PA-04-II		1972	3	Planned for 1972
VA-04		1971	2	" " 1971
VA-22		"	1	" " "
C		1972	3	" " 1972
TD-04		"	3	" " "
Marking				
FD		1970		
JAMAICA				
Kingston/Palisadoes Intl.				
Lighting	11/29			
PA-11-I		1971		
Marking				
TD, S, FD		1970		
Montego Bay/ Intl.				
Lighting	06/24			
PA-06-I		1972	2	
VA-24		1971	1	
Marking				
TD, S, FD		1970		
LUXEMBOURG				
Luxembourg/Luxembourg				
Lighting	06/24			
C		1971	1	
TD-24		"	1	
Marking				
S, FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
MEXICO				
Mérida/Mérida				
Lighting	10/28			
SA-10		1971	2	
VA-28		"	1	
TX		"	3	
Marking				
C, T, FD, TX		1970		
Mexico/Intl.				
Lighting	05R/23L			
PA-23L-II		1972	1	
C		"	1	
TD-23		"	1	
Marking				
FD		1970		
Marking	05L/23R			
FD		1970		
Marking	13/31			
FD		1970		
MOROCCO				
Casablanca/ Nouasser				
Lighting	17/35			
				No information available
Marking				
Rabat/Salé				
Lighting	04/22			
PA-04-II		1972	1	
SA-22		1971	2	
VA-04		1973	4	
VA-22		1971	3	
C		1972	1	
TD-04		"	1	
Marking				
O		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
NETHERLANDS (KINGDOM OF THE)				
Amsterdam/Schiphol				
Lighting	09/27			
VA-27		1971	4	Not planned
Marking				
FD		1970		Installed on 27 only
Lighting	01L/19R			
VA-19R		1971	3	Not planned
Lighting	01R/19L			
VA-01R		1971	2	Not planned
Lighting	06/24			
PA-06-II		1971	1	Planned for 1971
VA-06		"	5	Not planned
C		"	1	Planned for 1971
TD-06		"	1	" " "
Marking				
TD, FD		1970		Planned for 1971
NETHERLANDS ANTILLES				
Oranjestad/Prinses Beatrix, Aruba I.				
Lighting	11/29			
PA-11-I		1971		Not planned. Difficult due to terrain
Marking				
TD, S, FD		1970		Not planned
Willemstad/ Dr. A. Plesman, Curaçao I.				
Lighting	11/29			
PA-11-I		1971		Not planned
Marking				
FD		1970		Not planned

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
NORWAY				
Bergen/Flesland				
Lighting	18/36			
PA-18-II		1972	1	Planned to coincide with runway extension
VA-18		"	2	" " " " " "
C		"	1	" " " " " "
TD-18		"	1	" " " " " "
Oslo/Fornebu				New aerodrome planned for 1978
Lighting	06/24			
PA-06-II		1972	1	Planned for 1972
TD-06		"	1	Not planned
Marking				
S		1970		
Stavanger/Sola				
Lighting	18/36			
PA-18-II		1973	1	Not planned
C		"	1	" "
TD-18		"	1	" "
Marking				
S, TX		1970		
Lighting	11/29			
VA-11		1971	2	Planned for 1971
VA-29		"	3	Not planned
PORTUGAL				
Lisboa/Lisboa				
Lighting	03/21			
PA-21-II		1970	1	Planned for 1970
SA-03		"	2	" " "
Ponta Delgada/Ponta Delgada São Miguel I., Açores				
Marking	13/31			
FD		1970		Planned for 1972

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
PORTUGAL (Cont'd)				
Porto/Porto				
Lighting	18/36			
PA-18-II		1972	1	Planned for 1974
TD-18		"	1	" " "
Santa Maria/Santa Maria Santa Maria I., Açores				
Lighting	01/19			
SA-01		1970		Planned for 1970
PUERTO RICO				
San Juan/Puerto Rico Intl.				
Lighting	07/25			
SA-25		1971	1	Not planned
VA-07		"	3	" "
VA-25		"	2	Planned for 1972
Marking				
S, FD		1970		
SENEGAL				
Dakar/Yoff				
Lighting	01/19			
PA-01-II		1972	1	
VA-01		1971	3	
VA-19		"	2	
C		1972	1	
TD-01		"	1	
Marking				
TD, S		1970		
SPAIN				
Barcelona/Barcelona				
Lighting	07/25			
VA-07		1970	1	Planned for 1970
C		1971	2	" " 1971
TD-07		"	2	" " "

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
SPAIN (Cont'd)				
Barcelona/Barcelona (Cont'd)				
Lighting	02/20			
VA-20		1972	3	Not planned
Las Palmas de Gran Canaria, Canary Is.				
Lighting	03/21			
VA-21		1970	1	Planned for 1970
B		1971	2	Not planned
Madrid/Barajas				
Lighting	15/33			
PA-33-II		1971	5	Planned for 1971
VA-15		1970	6	" " 1970
TD-33		"	5	" " "
Lighting	01/19			
PA-01-I		1970	1	Planned for 1970
PA-19-I		1971	2	" " 1971
VA-01		1970	3	" " 1970
VA-19		"	4	" " "
Málaga/Málaga				
Lighting	14/32			
PA-14-II		1972	2	Planned for 1972
VA-14		1970	1	" " 1970
VA-32		"	3	" " "
C		1972	2	Not planned
TD-14		"	2	Planned for 1972
B		1971	4	Not planned
Sevilla/Sevilla				
Lighting	09/27			
PA-27-I		1972	2	Planned for 1972
SA-09		"	3	" " "
VA-09		1970	1	" " 1970
VA-27		"	1	" " "
B		1971	4	Not planned

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
SPAIN (Cont'd)				
Zaragoza/Zaragoza				
Lighting	13L/31R			
VA-13L		1970	1	Planned for 1970
VA-31R		"	1	" " "
SURINAM				
Paramaribo/Zanderij				
Lighting	10/28			
PA-10-I		1971		Not planned
Marking				
TD, S, FD		1970		Not planned
SWEDEN				
Göteborg/Torslanda				New aerodrome. Göteborg/Harryda to replace Torslanda
Lighting	04/22			
VA-22		1971		Not planned
Marking				
FD		1970		
Stockholm/Arlanda				
Lighting	01/19			
PA-01-II		1972	1	Implementation date not determined
PA-19-II		1974	3	" " " "
VA-01		1971	4	" " " "
VA-19		"	4	" " " "
C		1972	1	" " " "
TD-01		"	1	" " " "
TD-19		1974	3	" " " "
B		1971	7	" " " "
Marking				
S, FD		1970		
Lighting	08/26			
PA-26-I		1973	2	Implementation date not determined
SA-08		1971	5	" " " "
VA-26		1973	6	" " " "

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
SWITZERLAND				
Bâle-Mulhouse/Bâle-Mulhouse				
Lighting	16/34			
SA-34		1970	1	Not planned
VA-16		"	2	Planned for 1970
C		"	3	" " "
TD-16		1972	3	" " 1975
Zürich/Zürich				
Lighting	16/34			
VA-16		1971		Under consideration
TRINIDAD & TOBAGO				
Port of Spain/Piarco				
Lighting	10/28			
PA-10-I		1971	2	
VA-28		"	1	
Marking				
FD		1970		
UNITED KINGDOM				
Belfast/Aldergrove				
Lighting	08/26			
PA-08-I		1971	2	Not planned
Glasgow/Glasgow				
Lighting	06/24			
PA-06-II		1971	1	Planned for 1971
PA-24-II		"	1	" " "
London/Gatwick				
Lighting	09L/27R			
PA-09L-II		1974	3	Planned for 1974
PA-27R-II		"	3	" " "
VA-09L		"	3	" " "
C		"	3	" " "
TD-09L		"	3	" " "
TD-27R		"	3	" " "
Marking				
FD, O		1970		
Lighting	09R/27L			
PA-09R-II		1971	2	Planned for 1971
PA-27-II		1970	1	Planned for 1970

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED KINGDOM (Cont'd)				
London/Heathrow				
Lighting	10R/28L			
PA-28L-II		1970	1	Planned for 1970
Lighting	10L/28R			
PA-10L-II		1970	2	Planned for 1970
PA-28R-II		"	3	" " "
Lighting	05R/23L			
PA-23L-I		1971	4	Not planned
Manchester/Manchester				
Lighting	06/24			
PA-06-II		1972	2	Not planned
PA-24-II		1970	1	Planned for 1970
C		"	1	" " "
TD-06		"	2	" " "
TD-24		"	1	" " "
Prestwick/Prestwick				
Lighting	13/31			
PA-13-II		1972	1	Not planned
PA-31-II		"	2	" "
C		"	1	" "

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED STATES				**Note:** US does not provide FD markings and has filed a difference with ICAO.
Anchorage/Intl.				
Lighting	06R/24L		1	New runway under construction (including the No. 1 priorities)
PA-06R-II		1971	3	
SA-24L		"	2	
VA-24L		"	1	
R		"	1	
C		"	1	
TX		"	1	
TD-06R		"	1	
Marking				
D, C, T, TD, S, FD		1970		
TX, O		"		
Baltimore/Friendship Intl.				
Lighting	10/28			
PA-10-II		1972	1	Cat. II facilities planned.
SA-28		1971	3	Implementation date not determined.
C		1972	1	No plans for other facilities.
TD-10		"	1	
Lighting	15/33			
SA-33		1971	4	
VA-15		"	5	
VA-33		"	2	
Boston/Logan Intl.				
Lighting	04R/22L			
PA-04R-I		1971	7	
SA-22L		"	3	Terrain difficulties may prevent implementation.
Lighting	09/27			Cat. II facilities planned,
VA-09		1972	5	implementation date not determined.
VA-27		"	6	No plans for other facilities.
Lighting	15R/33L			
PA-15R-II		1971	1	
C		"	1	
TD-15R		"	1	
Lighting	04L/22R			
SA-04L		1971	2	
SA-22R		"	4	

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED STATES (Cont'd)				
Chicago/O'Hare Intl.				
Lighting	14R/32L			
PA-14R-II		1972	5	Not planned at present
Lighting	09L/27R			
SA-09L		1971	4	Not planned at present
VA-09L		"	3	" " " "
Lighting	14L/32R			
PA-14L-II		1972	5	Not planned at present
Lighting	09R/27L			
PA-27L-I		1971	2	
PA-09R-I		"	1	
Cleveland/Hopkins Intl.				
Lighting	05R/23L			
VA-23L		1971	1	
PA-05R-II		1972	3	
Lighting	10L/28R			
VA-10L		1971	3	
Detroit/Metropolitan-Wayne Co.				
Lighting	03L/21R			
PA-03L-II		1972	6	
Lighting	03R/21L			
PA-03R-I		1971	4	
SA-21L		"	1	
VA-03R		1973	5	
VA-21L		"	5	
Lighting	09/27			
VA-09		1973	5	Not planned at present
SA-09		1971	3	" " " "
SA-27		"	2	" " " "
Fairbanks/Intl.				
Lighting	01/19			
SA-01		1972		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED STATES (Cont'd)				
Indianapolis/Weir Cook				
Lighting	04L/22R			
PA-04L-II		1972	2	
C		1970	1	Planned for 1970
TD-04L		"	1	" " "
Las Vegas/McCarran Intl.				
Lighting	07/25			
PA-25-I		1971	1	
SA-07		"	2	
VA-07		"	3	
Los Angeles/Intl.				
Lighting	07R/25L			
PA-25L-II		1972	1	
C		"	1	
TD-25L		"	1	
SA-07R		1971	2	
Lighting	07L/25R			
VA-25R		1972	4	
VA-07L		1971	3	
Lighting	06L/24R			
PA-24R-II		1973	5	
C		"	5	
TD-24R		"	5	
Miami/Intl.				
Lighting	09L/27R			
SA-27R		1971	1	
VA-27R		1972	5	
Lighting	12/30	1		
SA-30		1971	3	
VA-30		1972	6	

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED STATES (Cont'd)				
Miami/Intl. (Cont'd)				
Lighting	09R/27L			
VA-09R		1972	4	Not planned at present
SA-09R		1971	2	" " " "
Milwaukee/General Mitchell				
Lighting	01L/19R			
VA-19R		1972	2	
PA-01L-II		"	3	
VA-25L		"	1	
Minneapolis/Minneapolis - St. Paul Intl.				
Lighting	11R/29L			
PA-29L-II		1972	1	
SA-11R		1971	2	
Newark/Newark				
Lighting	04R/22L			
PA-04R-II		1972	1	
C		"	1	
TD-04R		"	1	
New York/John F. Kennedy Intl.				
Lighting	04R/22L			
PA-04R-II		1971	3	Planned for 1971
Lighting	13L/31R			
PA-13L-I		1971	2	
PA-31R-I		"	1	
Lighting	04L/22R			
PA-04L-I		1972	4	
VA-04L		1973	6	
Lighting	13R/31L			
PA-13R-I		1972	5	

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED STATES (Cont'd)				
Niagara Falls/Intl.				
Lighting	10L/28R			
VA-10L		1971		
Oakland/Metropolitan-Oakland Intl.				
Lighting	11L/29R			
PA-29R-II		1971		
Ontario/Intl.				
Lighting	07/25			
PA-25-II		1972	2	
VA-07		1971	1	
C		1972	2	
TD-25		"	2	
Palmdale/Palmdale P.F.T.I.				
Lighting	07/25			
SA-07		1971	1	Not planned at present
SA-25		"	2	" " " "
Philadelphia/Intl.				
Lighting	09R/27L			
PA-09R-II		1972	3	
SA-27L		1971	1	
VA-27L		"	2	
C		1972	3	
TD-09R		"	3	
Pittsburgh/Greater Pittsburgh				
Lighting	10L/28R			
PA-10L-II		1972	2	
SA-28R		1971	1	
VA-28R		1972	3	
Lighting	10R/28L			
VA-10R		1972	4	Not planned at present

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED STATES (Cont'd)				
Portland/Intl.				
Lighting	10R/28L			
PA-10R-II		1972	1	Planned. Implementation date
C		"	1	not determined.
TD-10R		"		
St. Louis/Lambert-St. Louis				
Lighting	12R/30L			
VA-30L		1971	1	
Lighting	06/24			
VA-06		1972	2	
San Antonio/Intl.				
Lighting	12/30			
PA-12-II		1973	1	
C		"	1	
TD-12		"	1	
VA-30		1972	2	
San Diego/Intl.				
Lighting	09/27			
VA-27		1971		
San Francisco/Intl.				
Lighting	10R/28L			
PA-28L-II		1972		
Seattle/Seattle-Tacoma Intl.				
Lighting	16R/34L			
PA-16R-II		1972	1	Planned, implementation
C		"	1	date not determined
TD-16R		"	1	

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED STATES (Cont'd)				
Stockton/Metropolitan				
Lighting	11L/29R			
PA-29R-I		1973		
Syracuse/Hancock				
Lighting	10/28			
VA-10		1971		
Tampa/Intl.				
Lighting	18R/36L			
PA-36L-I		1972	1	
VA-18R		"	3	
VA-36L		"	5	
Lighting	09/27			
SA-09		1971	2	Not planned at present
VA-09		1972	4	" " " "

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
UNITED STATES (Cont'd)				
Windsor Locks/Bradley Intl.				
Lighting	06/24			
PA-06-II		1973	7	Not planned at present
SA-24		1971	2	
VA-24		1972	5	
Lighting	15/33			
SA-33		1971	3	
VA-15		1972	4	
SA-15		1971	1	
VA-33		1972	6	
VENEZUELA				
Caracas/Maiquetía				
Lighting	09R/27L			
PA-09R-I		1971	2	Not planned. PA-I to be installed on new runway planned for 1973.
VA-09R		"	1	Not planned
Marking				
TD, FD		1970		
VIRGIN ISLANDS				
St. Croix/Alexander Hamilton				
Lighting	09/27			
PA-27-I		1971	1	
VA-27		"	2	
Marking				
TD, S, FD, O		1970		
WEST INDIES ASSOCIATES STATES				
St. Johns/Coolidge, Antigua I.				
Lighting	07/25			
PA-07-I		1971	2	
VA-25		"	1	
Marking				
TD, S, FD		1970		

State City/Aerodrome Facilities Required	Runway	Date	Local Priority	States' Comments
WEST INDIES ASSOCIATES STATES (Cont'd)				
St. Lucia/Beane Field				
Lighting	10/28			
PA-1O-I		1971		This new runway is under construction.
VA-1O		"		
R		"		" " " "
TX		"		" " " "
B		"		" " " "
O		"		" " " "
Marking				
D, C, T, TD, FD, T		1971		" " " "
O		"		" " " "

APPENDIX 18-C

OPERATORS PRIORITY REQUIREMENTS FOR NAVAIDS

STATION	VOR	DME	ILS CAT I & RWY	ILS CAT II & RWY	States' Comments
Barbados					
Bridgetown/Seawell				09	
Bermuda			12		
Bermuda/NAS			30		
Canada					
Frobisher Bay/ Frobisher			36		Installed
Gander/Intl.			04		Installed
Halifax/Intl.				24	Planned 1971
Hopedale	X	X			Not planned
Montreal/Int.				06L	Planned 1970
Poste de la Baleine	X				Not planned
Saglek	X	X			Not planned
Schefferville	X	X			VOR planned 1973 DME not planned
St. Anthony	X	X			VOR under construction 1970 DME not planned
St. Johns		X			Planned 1972
Toronto/Intl.				05R 14	Planned 1970 Planned 1976

STATION	VOR	DME	ILS CAT I & RWY	ILS CAT II & RWY	States' Comments
Denmark					
Kulusuk	X	X			Nature of terrain may preclude implementation
Iceland					
Keflavik/Keflavik				12	In the planning stage, but year of implementation is not yet known
Jamaica					
Kingston/ Palisadoes Intl.			11		
Montego Bay/Intl.			06		
Mexico					
Mexico City/Intl.				23L	
Norway					
Bergen/Flesland				18	Localizer operates to CAT II specifications. Unable provide glide path to CAT II until runway extended

STATION	VOR	DME	ILS CAT I & RWY	ILS CAT II & RWY	States' Comments
SPAIN					
Madrid/Barajas			19		
Malaga/Malaga				14	
UNITED STATES OF AMERICA					
Anchorage/Elmendorf AFB			05		
Anchorage/Intl.				06	10/70
Boston/Logan Intl.			04R 33L		
Chicago/O'Hare Intl.			27R 32R 32L 09R 27L	 14L 14R	 4/71 7/71
Cold Bay/Cold Bay			14		
Detroit/Metropolitan Wayne Co.			03R 21R	03L	
Fairbanks/Intl.			19		
Houston/Intercontinental			08		
Las Vegas/McCarran			25		
Los Angeles/Intl.			25R 07L	25L	5/71
Newark/Newark			22	04R	6/70

STATION	VOR	DME	ILS CAT I & RWY	ILS CAT II & RWY	States' Comments
New York/John F. Kennedy Intl.				04R	6/72
			22L		
			04L		5/72
			13R		5/72
			13L		
			31R		
Ontario/Intl.				25	Planned, indefinite
Philadelphia/Intl.				09R	12/70
Pittsburgh/ Greater Pittsburgh				10L	6/71
Prudhoe Bay	X	X			
Seattle/Seattle-Tacoma Intl.				16R	10/70
			34		
Washington/ Dulles Intl.				1R	
			19R		
Windsor Locks/ Bradley Intl.				06	Planned, indefinite
West Indies Associated States					
St. Johns/Coolidge Antigua I.			07		Not immediately planned.

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PLANNING FOR CAT I, II, III OPERATIONS

19.1 The planning of visual and non-visual facilities by the NAVAIDS and AGA components of the Meeting respectively encountered difficulties similar to those encountered at the MID/SEA (1968) RAN Meeting. The difficulties which rose in planning for various categories of operations at the Meeting were considered to have resulted from two main points:

(i) lack of understanding between planning for Category II operations and planning for ILS category II facility performance, particularly, with regard to the development of the Table of Aircraft Operations; and

(ii) lack of early co-ordination between the NAVAIDS and AGA Committees in their respective planning of aids to approach and landing.

19.2 The directives in Doc 8144-AN/874/2 call in paragraph 1.2.2, subparagraph (3) for a listing, in association with the Table of Aircraft Operations, of the type of operation (CAT I, II or III) to be indicated for each aerodrome in the Table. Paragraph 2.3.1, subparagraph (2) has in this Meeting, as well as preceding RAN meetings, been interpreted as requiring approval by the General Committee, as a mandatory directive to technical committees, of the categorization of operations referred to in Directive 1.2.2 (3).

19.3 As was the case at the MID/SEA (1968) RAN Meeting, the approval by the General Committee of the Table of Aircraft Operations, without the benefit of an examination of the proposals regarding categories of operations by the technical committees involved, has proven to be unsatisfactory. The NAVAIDS and AGA Committees, in the absence of objective criteria for the requirements for aids associated with the desired categories of operation, gave the subject independent treatment, with resulting incompatibility in their conclusions.

19.4 In an attempt to resolve these incompatibilities a joint meeting of the two committees was held, at which consistency in the facilities as proposed by the two committees was achieved.

The joint discussions further yielded the following conclusions:

(a) For future Regional Air Navigation Meetings States and operators should continue to be asked for an indication of proposed categories of operation, but the General Committee should not make the collective of these proposals the subject of official approval as a directive to the respective committees;

(b) The possibility of incompatible recommendations arising could be eliminated by early and frequent liaison by the two committees. This could be effected by a small ad hoc co-ordination group for continuing liaison between the two committees.

(c) It is necessary to re-emphasize the need for the establishment of planning criteria for the provision of aids to approach and landing as called for in Recommendation 2/1 of the MID/SEA (1968) RAN Meeting.

19.5 The Meeting wished to endorse Recommendation 2/1 of the MID/SEA RAN Meeting, and pending the availability of suitable planning criteria, recommends that the following measures be taken to facilitate the planning of approach and landing aids at appropriate RAN meetings:

RECOMMENDATION 19/1 - PLANNING FOR APPROACH AND LANDING AIDS

That: (a) paragraph 2.3.1 (2) of the Directives to Regional Air Navigation Meetings, Doc 8144-AN/874/2, be interpreted not to require explicit approval by the General Committee of the listing of categories of operation as prepared from proposals received from States and user-Organizations;

(b) arrangements be made enabling RAN meetings to have the planning of approach and landing aids co-ordinated by a small joint ad hoc working group of the NAVAIDS, AGA and MET components of the Meeting.

PLANNING FOR SST OPERATIONS IN THE NAT REGION

19.6 During discussions of the procedures and supporting services required for the introduction of scheduled SST operations in the NAT Region, it became apparent to the Meeting that, due to the large number of variables still to be determined with respect to the exact operating modus of these aircraft, it was not possible, at this time, to arrive at specific provisions regarding separation to be applied between these aircraft, the exact nature of the routes to be provided for them and a number of procedures essential for the safe conduct of these operations. It was, therefore, found that, at best, it would only be possible to establish principles for consideration in further planning by States and agencies concerned and that these were subject to further study.

19.7 In these circumstances, it was concluded that it will be essential to review this question further at a time sufficiently close to the actual start of scheduled SST operations in the NAT Region to permit the formulation of firm recommendations but also sufficiently in advance of such operations to permit any necessary processing of such material by ICAO and States. It was, therefore, believed necessary that arrangements be made for the convening of a limited NAT RAN meeting to develop procedures and requirements for supporting services for SST aircraft and to review any problems concerning subsonic air traffic inasmuch as this may be affected by SST operations. In view of the close interrelation between ATS and the other interested services, it was also believed that such a meeting should not be restricted to a review of ATS matters only.

19.8 Consequently the Meeting made the following recommendation:

RECOMMENDATION 19/2 - LIM NAT RAN MEETING PRIOR TO THE INTRODUCTION INTO SCHEDULED SERVICE OF SST AIRCRAFT

That, approximately one year prior to the start of scheduled operations by SST aircraft in the NAT Region, ICAO convene a meeting of NAT States to:

(i) develop the necessary procedures and requirements for supporting services for SST aircraft operations in the Region, and

(ii) review all other problems related to these operations and any problems raised by them with respect to the operation of subsonic air traffic in the area.

LONG-DISTANCE OPERATIONAL CONTROL

19.9 During consideration of Agenda Item 2, the need to reflect a requirement for aircraft operating agencies to be able to exercise long-distance operational control was discussed. Initially this requirement was envisaged, but subsequently, in view of certain radio frequency considerations, was deleted.

19.10 After further reflexion it appeared that such a requirement was valid. The main problem, however, was a world-wide one rather than a regional one and therefore needed to be dealt with on a world-wide basis.

RECOMMENDATION 19/3 - LONG-DISTANCE OPERATIONAL CONTROL

That ICAO, in consultation with the aircraft operating agencies through IATA, and through appropriate machinery, make provision on world-wide basis for meeting the requirement for long-distance operational control.

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GENERAL STATEMENTS BY DELEGATIONS

20.1 STATEMENT BY THE INTERNATIONAL FEDERATION OF AIRLINE PILOTS ASSOCIATIONS

IFALPA takes this opportunity of thanking the Organization for its invitation to attend the meeting and has been impressed by the efficient and purposeful manner in which it has been conducted.

With the opening of this new decade, we find - as is usual in aviation - several exciting and challenging developments ahead of us. These range from the novelty of composite separation to the launching of supersonic commercial aviation. Inertial Navigation Systems will develop and the era of satellite participation and the automatic transfer of data will advance.

The Federation is not alone in its enthusiasm to accept new systems and concepts and hopes to become an ally of those who seek improvements in efficiency and safety in aviation. Further, the Federation is not blind to the commercial interests underlying the whole structure of civil aviation.

It is unfortunate that in the NAT Region there are some physical difficulties which do not exist elsewhere, and the Federation is mindful of the fact that the desire to increase the capacity for aircraft operations over the Atlantic Ocean would be meaningless from the overall viewpoint unless matched by a parallel increase in the capacity for acceptance of aircraft in the terminal areas.

On the subject of separation standards, the meeting has noted the need to constantly monitor changes in Navigation facilities and performance. It is, perhaps, inevitable that minor changes in the environment will evolve since the recent Data Collection Programme on which present separation standards are based and, indeed, certain changes for better or for worse, have already occurred in the scale of ground-based and ship-based facilities. IFALPA noted with regret that the Meeting, in its discussions of the long-term application of airborne separation monitors, only saw fit to grade DME ranging as a "B" item and considers that some continuous distance monitoring system based on DME could readily increase the capacity of the traffic system.

With regard to new aircraft navigation systems, particularly the Inertial Navigation System, it is hoped that the Organization will be able to administer an overall assessment of this equipment in order that this aid can be applied with confidence to separation standards.

In conclusion, the representatives of the Federation at this meeting wish to thank the Secretariat, Delegations, and other Observers for their most helpful co-operation and assistance.

- END -