SUMMARY OF DISCUSSIONS AND CONCLUSIONS

OF THE

TWENTY-SECOND MEETING OF THE NAT SYSTEMS PLANNING GROUP

(Paris, 15-26 April 1985)

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INTRODUCTION

1. The Twenty-Second Meeting of the NAT Systems Planning Group (NAT SPG) was held in the European Office of ICAO from 15 to 26 April 1985. The Meeting was chaired by Mr. V. Feehan, the Member from Ireland. The Member from the Netherlands was unable to attend the Meeting due to other commitments. A list of participants is at page 4.

2. In addition to IAOPA, IATA and IFALPA, the Group had, as usual, also invited Denmark, Norway, Spain and the USSR to attend this Meeting. Norway, however, was unable to participate.

3. In order to progress its work efficiently, the Group established a number of sub-groups to deal with particular detailed aspects of some of the subjects considered during the Meeting. These were:

a) a sub-group charged with the scrutiny of observed gross navigation errors, of which Mr. J. Irving of the United Kingdom acted as Rapporteur;

b) a sub-group dealing with the review of matters related to NAT aeronautical telecommunications, of which Mr. R. Whitford of Ireland acted as Rapporteur;

c) a sub-group to consider the mathematical-statistical aspects of separation minima in the NAT Region, of which Mr. A. Busch of the USA acted as Rapporteur;

d) a sub-group to examine questions reelating to the application of separation standards in the NAT Region, of which Mr. P. McMurray of Canada acted as Rapporteur.

4. Mr. C. Eigl served as Secretary of the Meeting and was responsible for the preparation of this Report. He was assisted by Mr. W. Arcangeletti and Mr. T. Tostain, all staff of the European Office of ICAO.

LIST OF CONCLUSIONS

LIST OF PARTICIPANTS

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Agenda Item 1: NAT air navigation system safety performance review

1.1 Introduction

1.1.1 Discussions under this Agenda Item were covered under the following headings:

a) The navigation performance accuracy achieved in the NAT MNPS (Minimum Navigation Performance Specifications) airspace during the period commencing 1 March 1984 and ending on 28 February 1985.

b) Mathematical-statistical aspects and risk assessment methodology.

c) Consideration of methods of improving the effectiveness of current monitoring procedures.

d) Consideration of methods of improving the observed standard of navigation performance in the NAT Region.

1.2 Navigation performance accuracy achieved in NAT MNPS airspace during the period 1 March 1984 to 28 February 1985

1.2.1 The Group completed a scrutiny of observed gross errors of navigation in the NAT Region and found that a total of 46 (87)* errors and navigation incidents were reported during the period 1 March 1984 to 28 February 1985. 15 (38)* of these errors occurred outside MNPS airspace and were so classified. Of the remaining 31 (49)* errors, 5 (20)* were not eligible for inclusion in the risk analysis as defined by NAT SPG/17. A brief consideration of these errors is outlined at paragraph 1.2.12.

1.2.2 The remaining 26 (29)* errors retained in the sample form the basis of the detailed analysis. Attachment A to the Summary of Agenda Item 1 contains a breakdown of the sample in accordance with established procedures. As in previous Summaries the number of errors implied by the collision risk model (i.e. 5.3×10^{-4} for Eta errors ($\geq$ 30 NM) and 1.3×10^{-4} for Zeta errors (50 to 70 NM, 110-130 NM, etc.) have been shown. In addition, the practice adopted by NAT SPG/21 has been repeated and a further level (7.95×10^{-4} for Eta errors and 1.95×10^{-4} for Zeta errors) has been shown to indicate the point at which NAT SPG/19 felt the error rate would reach the stage where operational judgement should be used to consider the system impact of the increase in navigation errors (see NAT SPG/19 Summary, para 1.3.16). The results of the "eligible error" scrutiny are presented in Attachment A to the Summary on Agenda Item 1.

* For purposes of comparison, the figures for the last monitoring period (1983-1984) are given in brackets.

1.2.3 It was again of interest to note that, whilst only 35% of the traffic observed through the "observation windows" did not operate entirely on the Organized Track System (OTS), random traffic accounted for 60% (60%)* of the total Zeta errors in Risk Assessment Model 1 and 68% (55%)* of the Zeta errors in Risk Assessment Model 2.

1.2.4 The Group also noted that the occurrence of errors in this monitoring period had proved to be only marginally better than the previous year. Except for the "Total MNPS Traffic" Model 2 figures, the numbers and types of errors were remarkably similar. However, largely because of the increased size of the Canadian window, the number of aircraft observed had increased by some 20%, thus reducing the resulting error rates. The Group appreciated however that considerable improvement would still be necessary before the pre-1983/1984 levels could be achieved.

1.2.5 Of the 26 eligible errors analyzed, the predominant cause was Waypoint Insertion Error. Eleven errors, 42%, were the result of the insertion of incorrect waypoints. Of these 11, there were 6 instances where the aircraft had been re-routed by ATC and the crew had failed to enter the correct co-ordinates into the navigation computer. In three of the six cases only part of the new route had been inserted and ultimately the aircraft had re-joined the initial cleared route. Regardless of the particular circumstances, it is clear that some crews are still not methodically cross checking entries into the aircraft navigation system nor are they monitoring the system satisfactorily. Once again, the importance of adhering to the standard operating procedures, for example those described in the NAT MNPS Airspace Operations Manual - (currently in its Fourth Edition) should be emphasized.

1.2.6 It was also noted that in three of the incidents concerning Waypoint Insertion Errors, the flight crew had included the incorrect waypoint in at least one forward position report and this had not been detected by ATC. An important opportunity to correct the crew error was thus missed. On the other hand, there were two examples where ATC did identify such an error and raised a query with the flight crew but the action still failed to prevent the navigation error. The number of potential gross navigation errors which had been prevented by ATC intervention following detection of forward waypoint errors could not be estimated.

1.2.7 The Group noted that very few of the navigation errors were attributable to the larger aircraft operators. Eleven of these operators together accounted for 55% of the NAT MNPS airspace traffic and yet produced less than 20% of the errors. The smaller and less frequent civil users totalled 33% of the traffic and were responsible for 60% of the errors, whilst the military operators formed 12% of the traffic and accounted for 20% of the errors. After some discussion, the Group agreed that States should be urged to review their procedures for the granting of MNPS approval to the smaller operators and General Aviation users. It should be emphasized that such approvals signify that a State is fully satisfied that the approved user can meet the MNPS requirements detailed in Doc 7030 - Regional Supplementary Procedures and satisfies the ICAO Annex 6 provisions. This could only be achieved by means of an approval of the entire navigation system performance package as described in the NAT MNPS Airspace Operations Manual. Particular attention will have to be given to:

a) carriage of appropriate navigation equipment;

b) crew training and procedures;

c) correct installation of the navigation equipment;

d) navigation equipment maintenance procedures.

1.2.8 The Group expressed concern at the number of errors made by military users during the monitoring period. It was also noted that a specific civil aircraft type was again responsible for five gross navigation errors although the type in question formed a very low percentage of the total MNPS traffic. This same type had also appeared on five occasions in the previous monitoring period. It was apparent that equipment failure was the most common cause of error in these cases. The Group was informed that the United Kingdom Central Monitoring Agency would address a letter to the various operators using that type for NAT operations, drawing their attention to this potential problem and encouraging efforts towards its resolution.

1.2.9 The need for the tightening of the application of the MNPS approval procedures was further emphasized by the existence of four aircraft, in the category of errors eligible for inclusion in the risk analysis, which had not been approved for MNPS operations. In one instance the State of Registry admitted to having no knowledge of the NAT MNPS requirements. This question is addressed in more detail in para 1.4 below.

1.2.10 The Group observed that flight crews were still failing to advise ATC of navigation equipment failure. Of six equipment failure incidents, there was only one instance where an aircraft took the correct measures in sufficient time to allow ATC to take necessary action. In two cases it appeared probable that equipment failure had occurred prior to entry into MNPS airspace.

1.2.11 Whilst the Group was fully aware of previous NAT SPG discussions, it still felt that further consideration should be given to the ATC role in monitoring the MNPS approval status of aircraft seeking clearance to operate in the NAT MNPS airspace (see para 1.5.9 below).

1.2.12 The Group then considered the 5 (20)* incidents which appeared as errors which occurred in the NAT MNPS airspace but which were not eligible for inclusion in the risk analysis. The considerable reduction in the number of these errors observed was, in part, a direct result of the extension and realignment of the Canadian observation window (which converted potential non-eligible errors into eligible errors), but must also reflect some improvement in navigation performance. A detailed breakdown of the classification of errors is given in Table 1 below (the figures in brackets represent the corresponding ones for the previous monitoring period).

TABLE 1

Error Classification	Number of Errors
A	2 (4)
B	1 (3)
C	1 (9)
D	0 (0)
E	0 (1)
F	1 (3)
Total	5 (20)

Note: For an explanation of the error classification categories see Attachment A on page 1-21.

1.2.13 It was agreed that, although the number of errors was small, the same trends as those seen in Table A were evident namely:

a) errors by non-MNPS approved aircraft;

b) ATC system loop error; and

c) waypoint insertion error.

* For purposes of comparison, the figures for the last monitoring period (1983-1984) are given in brackets.

1.2.14 The Group completed the scrutiny of the errors with a brief examination of the incidents occurring outside MNPS airspace. Whilst some degradation of navigation accuracy is implicit in operations outside the MNPS airspace, there has nevertheless been a marked decrease in the number of errors reported, 15 against 38 in the previous monitoring period and 28 in the period 1982/1983. Five of these 15 errors were made by military aircraft. Follow-up action was taken to determine the causes of the errors in all except three cases (errors less than 50 NM). The replies received merely served to emphasize the limitations of the navigation equipment carried. Two aircraft operating above the MNPS airspace with sophisticated navigation equipment displayed errors typical of those experienced within the MNPS airspace.

Situation regarding longitudinal separation

1.2.15 With respect to the continued application of ten minutes longitudinal separation in NAT MNPS airspace, the Group agreed that this remained justified under present circumstances. The matter of adherence by pilots to the ATC assigned Mach Number was discussed in connexion with methods to improve the observed standard of navigation performance (see paras 1.5.10 to 1.5.12 below).

1.3 Mathematical-statistical aspects and risk assessment methodology

Occupancy

1.3.1 The Group considered estimates of occupancy derived from monitoring in both Gander and Shanwick OCA during 1984. Data collected in the Shanwick area indicated that the same direction occupancy of the Organized Track Structure (OTS) was 0.80 and for random tracks 0.17, with an overall weighted average of 0.53. The opposite direction occupancy was 0.006 for OTS, 0.011 for random tracks, resulting in an average of 0.0083. Since these numbers were not directly comparable with those in the MNPS derivation, a conversion was made which provided an overall occupancy ratio (i.e. with same and opposite direction traffic properly weighted). The achieved ratio for the OTS was 1.27, random 0.48 and total MNPS airspace 0.94. Thus the overall achieved MNPS airspace occupancy was less than that used in the MNPS derivation.

1.3.2 Data for the Gander area indicated that same direction occupancy for the OTS was 0.87 and for random tracks 0.24, with an overall average of 0.61. Overall opposite direction occupancy was 0.004. The achieved occupancy ratio for the OTS was 1.32, for random tracks 0.43 and the total for the MNPS airspace amounted to 0.96. The differences between these numbers and those found in the Shanwick area (para 1.3.1 above), were believed to be due to sampling differences.

1.3.3 Following discussions on the occurrence of a disproportionate number of errors occurring on the special routes via Greenland - Iceland - Scotland, the United Kingdom had conducted a traffic survey of aircraft operating eastbound on these routes (NAT SPG/21 Summary, paras 1.3.8 and 1.4.2 refer). It was found that the pattern of traffic both in 1983 and 1984 had remained stable. While, in 1983, this traffic had produced eight errors in Table A, it produced only two in 1984. It appeared therefore that the causes of the errors were not linked to geographical aspects but attributable to random effects. The Group supported the conclusion that the difference between the number of errors reported in 1984 compared with 1983 would not seem to be outside sampling variability for rare events (see also para 1.5.3). The Group went on to note that errors from any one reporting OAC at any one time might appear out of proportion just due to sampling variability but the long term effects and overall aggregate will be important for the average MNPS airspace system risk estimate. In fact, all efforts should be made to obtain as many samples as reasonably possible from all coastal boundaries of the MNPS airspace so as to avoid possible bias effects.

1.3.4 Concluding its discussion concerning occupancy, the Group noted that the occupancy value for the OTS had continued to increase over the past few years and was now significantly higher than that assumed in the MNPS derivation. In view of the rise in OTS traffic over the past two years (15%), the Group felt it important to avoid any decrease in the average number of published tracks. Some consideration should also be paid to the possiblity of increasing the number of tracks to contain any future increase in OTS traffic. It was also considered important that the monitoring of occupancy in NAT MNPS airspace be continued and made available to the NAT SPG in the future.

Risk estimate

1.3.5 In a study made by the United Kingdom, data was provided on the lateral deviations of aircraft observed at Stornoway as they entered the MNPS airspace and as they left it. The resultant standard deviation for traffic entering was 1.76 NM and for traffic leaving was 3.55 NM. Thus the standard deviation requirement of the MNPS of 6.3 NM was achieved. There were some questions concerning whether the error growth rate could in fact be calculated from this data as indicated since not enough information was available, but it appeared to be less than the often quoted INS figure of 1 NM per hour.

1.3.6 A review of data on the gross error rate for the period March 1984 to February 1985 showed that the achieved error rate for errors of 30 NM or greater was 2.6×10^{-4} for the total MNPS airspace which compares to an MNPS requirement of 5.3×10^{-4}. Thus these errors were about one half the allowable limit. The data also indicated that the zeta errors (between 50-70 NM) for the OTS were 0.9×10^{-4} for Model 1 and 0.65×10^{-4} for Model 2; for random traffic they were 2.5×10^{-4} for both Model 1 and Model 2. The MNPS criterion for this type of error is 1.3×10^{-4}. When these error rates are aggregated for the total MNPS airspace they are 1.47×10^{-4} and 1.30×10^{-4} for the Model 1 and Model 2 analyses respectively.

1.3.7 The Group now having before it estimates for occupancy and large errors in the NAT MNPS airspace, endeavoured to estimate the relative MNPS airspace risk. To achieve this, the following procedure was applied:

1) multiply the occupancy ratio by the zeta error ratio for the OTS (this is the OTS risk ratio relative to the target level of safety);

2) multiply the occupancy ratio by the zeta error ratio for the random tracks (this is the random risk ratio relative to the target level of safety);

3) multiply the OTS risk ratio by the number of observations used for the OTS zeta error calculations;

4) add the result of (3) to the product of the random risk ratio and the number of observations used in the random zeta error calculations; and

5) divide this sum by the total number of aircraft observed.

The result of this calculation is the weighted average of the MNPS airspace risk ratio.

TABLE 2

RISK OF OTS, RANDOM AND TOTAL TRAFFIC RELATIVE TO THE TARGET LEVEL OF SAFETY

OTS		Random		MNPSA	
Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
0.88	0.64	0.92	0.92	0.90	0.75

1.3.8 An entry in the above Table 2 of 1.0 would indicate that the estimated risk is equal to the current target level of safety of 0.2 accidents in 10^7 flying hours. Any entry larger than 1.0 would indicate a risk greater than, and any ratio smaller than 1.0 indicates a relative risk less than the target level of safety. In this connexion, it is important to note, however, that the results are sensitive to the method employed to do the calculation and future analyses will therefore need to follow the same procedure in order to get comparative results.

1.3.9 The results shown in Table 2 indicate that the NAT MNPS airspace for the past year had been "safer" than the goal implied by the target level of safety.

1.3.10 These calculations have been performed differently from the method adopted in some previous years, in that in this case the risk associated with random tracks and the OTS have been calculated separately and then combined. The Group regarded this as more appropriate in view of the marked differences in the individual risk components for the OTS and random traffic, and it should be noted that the overall system risk calculated in this fashion is somewhat different than that calculated with the previous years' methodology.

1.3.11 As to the differences in the risk assessment Models 1 and 2, there did not appear to be any studies or data available to date which would allow the endorsement of one Model over the other. Thus it would appear that, until further analysis or additional data are available, no change of view is likely to occur.

1.3.12 A request was made to have a study conducted to develop the statistical tolerance limits for the MNPS occupancy parameters and navigation system parameters. Furthermore, it was desirable that explanatory text be developed so that the NAT SPG could appreciate the implications and operational difficulties of employing such multiple criteria. It invited its Member from the USA to make necessary arrangements for the study, if possible, and to make the results available to the Group at its next Meeting.

CONCLUSION 22/1 - STATISTICAL TOLERANCE LIMITS FOR MNPS OCCUPANCY AND NAVIGATION SYSTEM PARAMETERS

That the Member for the USA undertake a study to develop the statistical tolerance limits for the NAT MNPS airspace occupancy and navigation systems parameters and present the results to the next Meeting of the NAT SPG.

1.4 Methods of improving the effectiveness of current monitoring procedures

1.4.1 Based on experience gained with a further year of monitoring navigation performance in the NAT Region, the Group reviewed the relevant provisions contained in the "Guidance and Information Material concerning Air Navigation in the North Atlantic Region" (4th Edition), distributed by the European Office of ICAO. It found it necessary editorially to revise the text of the letter to be sent by the Central Monitoring Agency to a State of Registry when indicating a gross navigation error investigation (NAT Guidance Material, ref T 13/5.N, 4th Edition, page 3-32 refers). The revised text is contained in Attachment B to the Summary on Agenda Item 1. It was noted that the European Office of ICAO would shortly distribute a suitable loose-leaf Amendment to the NAT Guidance Material.

1.4.2 Pursuant to NAT SPG Conclusion 21/4, Canada and the United Kingdom had conducted several spot checks on MNPS approvals of MNPS operators. One check was designed to verify the use by operators of the letter "X" in Field 10 of the ICAO flight plan form to indicate that the operator was approved by its State of Registry for MNPS operations. The checks showed that a considerable number of operators (approximately 5%) had omitted the "X" although intending to operate in NAT MNPS airspace. No follow-up action was taken, however, to determine the approval status of these operators. The same States also conducted random spot checks of MNPS approvals for flights on selected days. In these checks, the State of Registry was asked to confirm that a specific flight was MNPS authorized. In all, 81 flights were checked. In 17 instances the State did not reply and the remaining 64 flights revealed four examples of aircraft without MNPS approval. Enforcement action was taken by the States concerned in three of these cases. The fourth incident, however, indicated a possible misunderstanding of the provisions concerning the use of the special routes via Greenland and Iceland.

1.4.3 This latter matter was discussed in detail by the Group. One Member felt that flights carrying the navigation equipment required for navigation on these routes should be considered authorized to do so because a specific approval process for such flights might unnecessarily increase the bureaucratic burden on NAT operations. Stressing that State authorization for MNPS operations included the obligation by operators not only to carry the necessary navigation equipment but also to ensure maintenance and serviceability of that equipment, as well as crew training, the Group confirmed that flights planning to operate on the special routes via Greenland and Iceland within NAT MNPS airspace had to obtain approval to do so from their State of Registry.

1.4.4 The USA also conducted a series of spot checks to determine if operators not indicating MNPS authorization in their filed flight plans were requesting flight levels in MNPS airspace. Of 180 aircraft checked in October 1984 and 474 checked in February 1985, all were found to indicate the proper authorization. The samples included air carriers, military and general aviation operators.

1.4.5 A further matter raised in connexion with the monitoring procedures was related to the question of confidentiality of related information, particularly the identity of the aircraft operators concerned, the details of the incidents and follow-up action taken to avoid recurrence. On some occasions in the past, such information had been used by the news media, often presented out of context or in a biased manner. The Group strongly felt that such occurrencies could impair the so far generally excellent and open co-operation of States and aircraft operators in identifying and correcting shortcomings. A deterioration of such co-operation could have an unfortunate and negative impact on efforts to ensure and enhance the safety of the operational environment in the North Atlantic.

1.4.6 The Group realised that the legal situation from State to State was different concerning the availability of often sensitive information to the public. It was therefore not possible to give specific guidance or to establish particular rules. Nevertheless, the Group stressed the need, in the interest of continued progress towards improvements in the navigation situation in the NAT Region, to ensure a maximum degree of confidentiality concerning the identity of individual aircraft operators involved and to ensure that facts are presented impartially, balanced and in their proper context. It was felt important not to raise unfounded fears amongst the general public nor to cause misunderstandings through inadvertent or deliberate misrepresentation of facts.

1.4.7 With respect to the follow-up of individual observed gross navigation errors, the Member of the United Kingdom informed the Group that, in his capacity as head of the Central Monitoring Agency, he found it necessary to draw the attention of a State to apparently unacceptable performance by one of its operators. It was felt that this action might perhaps be misunderstood and it was agreed that the the European Office of ICAO would lend assistance to the United Kingdom in such cases. It was understood, however, that enforcement responsibility for the various applicable provisions remained entirely with the States concerned in accordance with the Convention on International Civil Aviation.

1.4.8 Finally, a question was raised concerning the financing of services or activities provided or undertaken by one State and which were of benefit to or required in the NAT Region as a whole. It would appear unfair if the costs involved would be recuperated through air navigation charges levied only from those users of airspace for which the State providing such regionwide service is responsible. As an example, the Central Monitoring Agency operated by the United Kingdom was financed exclusively from charges levied from those operators passing through the Shanwick OCA.

1.4.9 Several potential alternatives were mentioned to establish a suitable degree of fairness in cost-contribution in that case, e.g. the rotation, on an annual basis, of the responsibility to provide the monitoring function amongst the NAT Provider States or the establishment of joint financing agreements. The Group felt that such solutions did not appear realistic and feasible. Expensive cost-recovery machinery would itself contribute to an increase of the overall cost involved and rotation of monitoring responsibility could result in a negative effect on efficiency.

1.4.10 The Group was aware that the matter was outside its terms of reference and did therefore not persue the matter any further. It noted that similar problems concerning financing of services of sub-regional or regional extent were currently also encountered in the European Region (AIS Automation, air traffic flow management service, etc) and that suitable arrangements might evolve for eventual application also in the NAT Region.

1.4.11 In concluding the matter, the Group expressed its full appreciation to the United Kingdom for the essential services provided by the Central Monitoring Agency and expressed the sincere hope that that State would continue to make them available to the international aviation community.

1.5 Methods of improving the observed standard of navigation performance

1.5.1 The Group noted that a core sample of lateral navigation accuracy had confirmed a standard deviation of ± 3.55 NM from a sample of 1488 aircraft entering United Kingdom airspace after completing an oceanic crossing. It also noted with interest that 5055 westbound aircraft entering oceanic airspace after flights of relatively short duration, showed a standard deviation of ± 1.76 NM. The figure of ± 3.55 NM is well within the ± 6.3 NM standard deviation required by the related NAT Regional Supplementary Procedures contained in ICAO Doc 7030/3 - NAT RAC SUPPS, Part I, para 2.2.1.1.

1.5.2 In this connexion the Member from Ireland mentioned that core sample data collected by Shannon had been submitted to the United Kingdom as a contribution to the same study but that this had apparently not been analysed by the time of this Meeting. The Member from the UK explained that workload considerations had not made this possible but that the available material would shortly be processed and that he would circulate the results to all Members and participants in the NAT SPG in due course. Noting that the core sample results did not reveal any significant new information when compared with earlier studies, the question was raised as to the need for further effort in this direction. It was agreed that systematic annual exercises would not be justified but that occasional spot checks would still be undertaken in order to detect any possible departures from the current situation.

1.5.3 NAT SPG Conclusion 21/3 called for a review of the navigation performance achieved by aircraft operating Eastbound via Greenland - Iceland - Scotland to determine the cause of the frequent navigation errors observed on these routes last year. The Group noted that, whilst traffic levels have remained remarkably stable over the last two years, the eight errors eligible for inclusion in the risk analysis observed last year have fallen to two errors (route LIMA - STN) during the period under review. Although the sample was small, the error rate did not appear to be disproportionate. The Group noted that the Central Monitoring Agency would continue the study of that matter for a further year (see also para 1.3.3).

1.5.4 Considering the findings of the scrutiny exercise on observed gross navigation errors reflected in para 1.2 above, the Group addressed itself to the apparent higher error rate found by aircraft operating along random tracks as compared to operations on the OTS. While this fact, when considered against present occupancy values which were lower on random tracks, did not cause unacceptable risk levels, it nevertheless appeared advisable to pay attention to this situation. It was not possible to identify any particular reasons for this because they could lie in differences of sample sizes available, a limited knowledge of the history of the flights, which may have been proceeding on an organized track for part of its flight and could have been counted within the category of all-random flights, etc. In order to increase the necessary sample size for random traffic, the Group hoped that NAT provider States which so far had not yet participated in radar monitoring exercises, would consider using available radar facilities wich might provide suitable coverage, in order to monitor, at least on a part-time basis, the navigation performance of flights on random tracks. It was stressed that need for additional monitoring would not in itself require the installation of radar equipment but that use should be made of existing facilities and without unreasonable effort.

CONCLUSION 22/2 - EXTENSION OF RADAR MONITORING OF AIR NAVIGATION PERFORMANCE IN THE NAT REGION

That NAT provider States not currently participating in the radar monitoring of navigation performance in the Region consider using suitable existing radar facilities, at least on a part-time basis, in order to contribute useful further material to increase the data sample size for the NAT system safety assessment.

1.5.5 In this connexion, the Member from Portugal mentioned the possiblity by his State to provide radar coverage from Santa Maria as well as from a site located in the north-western part of the Azores. Although, in terms of cost-effectiveness, some doubt existed as to the justification of providing such coverage, Portugal would implement suitable radar facilities if and when a firm operational requirement emerged, particularly for ATC purposes. The Group agreed that an in-depth cost effectivenes study may be advisable before the question of radar coverage in the Azores could be further advanced.

1.5.6 During the scrutiny of navigational errors observed in the NAT Region, the Group had found two cases where aircraft were not operating on their assigned flight levels. While such errors were not MNPS related, they nevetherless constituted a considerable source of concern. Upon closer analysis of the circumstances under which these errors occurred it was found that radio-telephony phraseology, although used correctly, could have been a contributing factor. The Group agreed that a close review of the radio-telephony phraseologies contained in ICAO Doc 4444 (PANS-RAC), and the Manual of Radiotelephony (Doc 9432) should be undertaken, particularly with regard to the need for clear phraseology concerning conditional ATC clearances, such as clearances requiring aircraft to change flight level at a certain geographical position or time. The Member for the United Kingdom agreed to undertake this task and to report to the next Meeting of the NAT SPG. In the meantime, the Group agreed that NAT provider States should draw the attention of their ATS personnel to the need for particular vigilance, especially when issuing conditional ATC clearances. Similarly, the attention of flight crews should be drawn to the same matter.

CONCLUSION 22/3 - PHRASEOLOGY FOR CONDITIONAL ATC CLEARANCES

That:

a) the Member for the United Kingdom review the radiotelephony phraseologies contained in ICAO Doc 4444 and Doc 9432 and to develop proposals, as necessary, with respect to clearances concerning the flight profile in the vertical plane;

b) NAT provider States draw the attention of air traffic services personnel to the need for particular vigilance with regard to air traffic control clearances concerning flight levels and, especially, conditional flight level changes; and

c) the international airspace user organizations draw the attention of flight crews to the need for particular vigilance with regard to air traffic control clearances concerning flight levels and, especially, conditional flight level changes.

1.5.7 In this context, the Group considered possibilities of further reducing the incidence of ATC system loop errors. The Group agreed that States should draw the attention of the air traffic services personnel to this problem area so that vigilance may be further enhanced and ATC system loop errors be all but eliminated. In addition, the attention of flight crews should also be drawn to that matter.

CONCLUSION 22/4 - REDUCTION OF ATC SYSTEM LOOP ERRORS

That,

a) NAT provider States draw the attention of their air traffic services personnel to the need for continued vigilance, especially in the routine read-back procedure, so as to further reduce the incidence of ATC system loop errors in the NAT Region; and

b) the international airspace user organizations draw the attention of flight crews to the need for continued vigilance, especially in the routine read-back procedure, so as to further reduce the incidence of ATC system loop errors in the NAT Region.

1.5.8 Discussing the subject of waypoint insertion errors as one of the main reasons for gross navigation errors, the Group considered ways and means to further improve matters. It noted that the Fourth Edition of the NAT MNPS Airspace Operations Manual took full account of the related procedural aspects designed to reduce such errors. In addition, both IATA and IFALPA had taken action to circulate suitable material for the attention of flight crews. Under the circumstances, the Group agreed to await further results from the monthly monitoring activities to determine the need for further action.

1.5.9 With reference to the results of spot-checks carried out by Canada and the United Kingdom concerning the inclusion of the letter X in the flight plan for flights intending to operate in NAT MNPS airspace and concerning the approval of the flight operation through MNPS airspace (para 1.2.13 refers), the Group considered any suitable action that may be taken in this respect. It gave consideration to the possibility of involving the air traffic control service in routinely checking with pilots whether their intended MNPS operations were authorized or not. Considering that the ATC organization was not currently set up for this particular task, the Group was reluctant to further advance in this direction. The question was raised as to whether the spot checks made so far had revealed a pattern regarding the identity of consistent offenders and it was found that the samples had been much too small to do so. It was felt that, if spot checks were continued in the future and if NAT provider States additional to Canada and the United Kingdom would join in this exercise, a more complete picture would evolve, and operators and flight crew would become alerted to an increasing degree to the various specific requirements related to operations in NAT MNPS airspace.

CONCLUSION 22/5 - SPOT CHECKS ON MNPS APPROVAL OF AIRCRAFT OPERATORS

That the NAT provider States continue to carry out spot checks at irregular intervals on the MNPS approval of selected operators in NAT MNPS airspace.

1.5.10 At NAT SPG/21, some concern had been expressed at an apparent tendency for assigned Mach Number adherence to be relaxed and the Group had agreed that provider States should examine this situation (NAT SPG/21-Summary, para 1.6.1 refers). The Group was now presented with the results of a survey carried out by the United Kingdom in July 1984. Of the total of 1406 pairs of aircraft scrutinized, there was no evidence of significant Mach Number deviations by aircraft that had been cleared at their flight planned cruise Mach Number. However, there were two instances where aircraft had been given revised Mach Numbers en route, which subsequently gave rise to concern in respect of Mach Number adherence. It had not been possible to establish the reasons for the two individual cases.

1.5.11 It was clear, nevertheless, that non-adherence by aircraft to a revised Mach Number, for whatever reason, could be potentially critical in cases where the revised Mach Number was based on the fact that the aircraft pair was operating at or near the longitudinal separation minimum and ATC was attempting to maintain longitudinal separation by a Mach Number revision of one or both of the aircraft concerned. This appeared to indicate that the Mach Number technique was primarily useful for strategic ATC planning but that its practical use in tactical separation application might be less effective under certain circumstances.

1.5.12 Notwithstanding the above, the results of the survey did not produce evidence of a significant relaxation of Mach number adherence. Nevertheless, it appeared useful to remind pilots of the relevant provisions so as to ensure that no significant erosion of longitudinal separation occurs during ocean crossing. The Group therefore agreed that the States responsible for the provision of air traffic services in the NAT Region advise their ATC personnel of the apparent doubts existing as to the usefulness of speed control through revised Mach Numbers in order to maintain or restore longitudinal separation on a tactical basis. At the same time it was agreed that the NAT provider States should issue, on 9 May 1985, a NOTAM Class I drawing the attention of pilots to the need to strictly adhere to their ATC assigned Mach Numbers.

CONCLUSION 22/6 - ADHERENCE TO ATC ASSIGNED MACH NUMBER

That NAT provider States issue, on 9 May 1985, the following text in the form of a NOTAM Class I:

"1. Pilots of turbojet aircraft operating in the North Atlantic Region are reminded of the need to adhere to assigned Mach Number at all times. This is particularly important when original Mach Number clearances are revised by ATC, as in certain situations the aircraft concerned may be operating at, or close to, the longitudinal separation minimum.

2. If an immediate temporary change in Mach Number is essential (e.g. due to turbulence), ATC must be advised as soon as possible."

RESULTS OF THE 1984/1985 NAVIGATION ERROR SCRUTINY

(para 1.2 refers)

CLASSIFICATION	30 NMS ETA ERRORS	ERROR			
		50-70 NMS (ZETA ERRORS)			
		TOTAL MNPS TRAFFIC		OTS TRAFFIC	
		Model 1	Model 2	Model 1	Model 2
A	4	2	2	0	0
B	3	1	0.46	0	0
C	13	9	7.82	4	2.30
D	1	1	1	1	1
E	0	0	0	0	0
F	5	2	2	1	1
Not Classified	0				
TOTAL	26	15	13.28	6	4.30
Total in last period	29	15	9.64	6	4.30
OBSERVED TRAFFIC		101837		66194	
Last monitoring period traffic		85333		54445	
Maximum number of errors implied by MNPS requirements	53.97 (5.3×10^{-4})	13.23 (1.3×10^{-4})		8.60 (1.3×10^{-4})	
Number of errors by which action based on operational judgement would be needed.	80.96 (7.95×10^{-4})	19.85 (1.95×10^{-4})		12.91 (1.95×10^{-4})	

Note 1: See explanations of Classifications on next page.

EXTRACT OF NAT SPG/17 REPORT

(1) Classification of errors (NAT SPG/17, Para 1.2.3)

Class	Cause
A	Aircraft not certified for operation in MNPS airspace.
B	ATC system loop error.
C	Equipment control error, including way-point insertion error.
D	Other navigation errors, including equipment failure notified to ATC in time for action.
E	Other navigation errors, including equipment failure notified to ATC too late for action.
F	Other navigation errors, including equipment failure of which notification was not received by ATC.

(2) Weighting Factors used in Model 2 (NAT SPG/17 Page 1-B-1)

(i) ATC System Loop Errors which scrutiny establishes could only occur at exit from the oceanic airspace be factored as follows and treated as zeta (50 - 70NM) errors.

(i) those having an observed magnitude of:

50 - 70 NM ..... Factor by 0.12
110 - 130 NM ..... Factor by 0.31
170 - 190 NM ..... Factor by 0.44

(ii) those have an equivalent* magnitude of:

60NM ..... Factor by 0.06
120NM ..... Factor by 0.16
180NM ..... Factor by 0.22

(ii) ATC System Loop Errors which scrutiny cannot establish as being of a type which could only occur at exit from the oceanic airspace, and Waypoint Insertion Errors, be factored as follows and treated as zeta (50 - 70 NM) errors:

having an equivalent* magnitude of:

50 - 70 NM ..... Factor by 0.46
110 - 130 NM ..... Factor by 1.22
170 - 190 NM ..... Factor by 1.75
230 - 250 NM ..... Factor by 2.0

*Note: "Equivalent" magnitude is the magnitude which scrutiny establishes that the error would have reached, had not the presence of radar enabled the error to be truncated.

ATTACHMENT B
to the Summary on
Agenda Item 1

Dear Sir,

NORTH ATLANTIC - GROSS NAVIGATION ERROR

Please find attached a copy of a letter that has been sent in respect of a North Atlantic gross navigation error attributed to an aircraft registered in your State. You will note that the operator has been requested to provide an explanation of the incident. This is in accordance with the North Atlantic monitoring procedures set out in ICAO document "Guidance and Information Material concerning Air Navigation in the North Atlantic Region" prepared and distributed by the ICAO European Office under reference T 13/5N. Should the operator fail to reply to the request, a further letter will be sent to you seeking your assistance in obtaining the information requested.

ICAO Document 7030/3 - Regional Supplementary Procedures gives the definition of the North Atlantic Minimum Navigation Performance Specification Airspace (NAT MNPSA) in Chapter 2, para 2.2 and of the required navigation performance in Chapter 2, para 2.1, in accordance with the requirement of Annex 6, Parts I and II, para 7.2.2.

The Guidance document (Ref. T 13/5N) explains how the State of Registry, or if appropriate the State of the Operator, should carry out the approval of aircraft intended for operation in the NAT MNPSA and includes consideration of crew competence and of the equipment fitted.

It would be appreciated if you would confirm that the flight in question was in possession of approval to operate in NAT MNPS airspace, indicating whether the approval was for the whole of the NAT MNPS airspace or only for the special routes described in Appendix H to Part 1 of the ICAO document reference T 13/5N.

Yours faithfully,

.....
Signature

Agenda Item 2: NAT Air Navigation System operations review

2.1 Introduction

2.1.1 Under this Agenda Item, the Group considered the following specific subjects:

a) Air Traffic Services Operations; and

b) Communications Operations.

2.2 Air Traffic Services Operations

2.2.1 Under this heading the Group dealt with the following specific matters regarding NAT air traffic services operations:

a) Review of the 1984 operations and ATS system efficiency.

b) Application of composite separation in the NAT OTS and its impact on the ATS route structure in the oceanic/continental interface areas.

c) Extended range twin-engined aircraft operations (ETOPS) in the NAT Region.

d) MET services for NAT flight operations.

e) Flight planning in the NAT Region.

f) Application of separation criteria.

g) Interception of civil aircraft.

REVIEW OF 1984 OPERATIONS AND ATS SYSTEM EFFICIENCY

2.2.2 The Group undertook an overall review of flight operations conducted during 1984, including the traffic densities in the Organized Track System (OTS) as well as on random tracks, hourly and monthly traffic distribution, flight level usage, required level changes, as well as the proportion of flights which obtained clearance to operate at their desired flight profile.

2.2.3 With respect to the OTS, an increase was noted during 1984 over 1983 in the number of daytime (westbound) tracks published, while the number of nighttime (eastbound) tracks published had slightly decreased. Similar to previous years, random routing traffic in 1984 was found north of the OTS, both east- and westbound, to greatly exceed random routing in other areas, such as above/below, within and south of the OTS. This information is based on comparisons of eastbound random traffic to night tracks and westbound random traffic to the day tracks in the OTS.

2.2.4 The datum line technique had again been applied sucessfully in the area north of the OTS which afforded appreciably increased use of random routings and desirable flight levels. Studies both by the United Kingdom and the United States have confirmed that traffic density and composition south of the OTS would not justify the introduction of the datum line technique in the area south of the OTS and its operational feasibility was doubtful.

2.2.5 An evaluation of the distribution of flight density on the OTS and on random tracks in the North Atlantic Region confirmed similar findings in the past, i.e. that utilization was well balanced and the implementation of the OTS was well suited to traffic demand, both in time and space.

ATS system efficiency

2.2.6 The Member for the United Kingdom presented the Group with a survey of westbound high level oceanic clearances issued by Shanwick OAC during the month of July 1984. This survey had been undertaken in an attempt to determine the extent to which the westbound oceanic ATC system met the requirements of the NAT airspace users and the extent of penalties imposed by the system. A comparison was made between the flight profile requested by the pilot and the clearance issued by ATC. During that month, 6621 clearances were issued, 3958 relating to the OTS and 2663 to random tracks. A close study revealed that approximately 85% of all aircraft were cleared onto their requested track at or above the requested flight level, both in the OTS and on random tracks. Approximately 11% of the aircraft were cleared on their requested track but 2000 ft below their requested flight level, again regardless of whether operating in the OTS or on random tracks. 4.6% of the flights using the OTS had to use an adjacent track but could do so at the requested flight level. A small number of aircraft in the OTS (0.25%) were either cleared on the requested track but 4000 ft below requested flight level or onto an adjacent track 2000 ft below the requested level. On random tracks, 4% had to operate 4000 ft below the requested flight level.

2.2.7 Judging from this survey, it appeared that the ATS system efficiency had further improved over the last year. In this connexion it was noted that the question of ATS system efficiency assessment was first raised at the Special North Atlantic Meeting (1965). The Group noted that, since that time, it had not been possible to develop an agreed assessment method based on standard parameters. It was felt that such a method would have to be developed if ATC system efficiency should become a meaningful measure. This appeared particularly important in view of the increased emphasis on medium and long-term system planning.

2.2.8 Any surveys addressing this question reviewed by the NAT SPG on this and on previous occasions had given a limited outlook on a sampling of the ATS efficiency for a limited period of time and a limited delimitation in space. The Group was, however, unable to develop a set of parameters against which efficiency should be measured, but agreed to undertake work on this matter commencing at its next meeting. It was therefore agreed that all Members of the Group, and in particular the representatives of the international airspace user organizations, should study this matter and provide the next Meeting of the NAT SPG with initial material, on the basis of which a methodology of data collection, processing, presentation and interpretation could be developed.

CONCLUSION 22/7 - ATS SYSTEM EFFICIENCY ASSESSMENT

That all Members of the Group and IATA and IFALPA study the question of ATS system efficiency assessment with the aim of developing an agreed common assessment method on the basis of a suitable set of system parameters against which system efficiency should be measured.

Revised flight level parameters for the night-time (eastbound) OTS

2.2.9 The Group considered a proposal by its Member for Canada to modify the flight level band within which the night-time OTS was normally established (FL 310 to FL 370) so as to extend from FL 330 to FL 390 systematically. This proposal was based on a number of assessment exercises concerning the actual use of flight levels in the eastbound direction which appeared to support this proposal and would allow increased random flying by releasing FL 310 for that purpose. This proposal was supported by the Member for the USA, and IATA confirmed that such action would adequately meet with the requirements of the users. The Member for the United Kingdom felt that systematic release of FL 310 could lead to a number of difficulties and that he would have therefore preferred the ad hoc arrangement concerning the extent of the flight level band for the eastbound OTS which was currently being applied in practice. The Group nevertheless agreed that the night-time OTS should be established so as to extend from FL 330 to FL 390 inclusively on a systematic basis and that the question would be reviewed again in future if necessary.

CONCLUSION 22/8 - VERTICAL EXTENT OF THE NIGHT-TIME (EASTBOUND) OTS

That:

a) Gander OAC establish the night-time (eastbound) OTS within the flight level band between FL 330 and FL 390 inclusive; and

b) any difficulties that might occur be reported to the NAT SPG, if necessary.

Lower limit of the NAT MNPS airspace

2.2.10 It was recalled that, since its introduction in 1977, MNPS airspace in the NAT Region had been adjusted in its lateral extent so as to accommodate operational requirements in the most satisfactory manner. On this occasion, the Group addressed the question of the continued validity of its present vertical extent and in particular its lower limit which was still established at FL 275. Based on a study made by the Member for Canada concerning the traffic densities at FL 270, 280 and 290, it would appear that the bottom of the MNPS airspace could be raised without detriment to FL 295.

2.2.11 It was obvious that such action would have both advantages and disadvantages to a number of users of the airspace. While raising of the bottom of the MNPS airspace would result in increased lateral and longitudinal separation criteria to be applied between aircraft operating at FL 280 and 290, it would permit commercial operations with aircraft types not meeting the MNPS requirement at somewhat more economic flight levels. Similarly, IGA and military traffic would be afforded more economic flight levels for their non-MNPS operations.

2.2.12 Although the matter did not appear to be of any particular urgency at this time, the Group agreed that it would nevertheless merit serious consideration. It was clear that a final decision to propose an amendment to the current provisions could not be taken without an in-depth study of all relevant aspects. To this extent all Members of the Group agreed to undertake work and to present the findings for discussion at the next Meeting of the Group.

CONCLUSION 22/9 - STUDIES RELATED TO THE LOWER LIMIT OF NAT MNPS AIRSPACE

That all Members of the Group study the actual flight level utilization in the flight level band between FL 260 and FL 290 in order to determine the need or otherwise to raise the lower limit of the NAT MNPS airspace from its present delimitation at FL 275, for consideration at the next Meeting of the NAT SPG.

Minimum time track (MTT) calculation by Gander OAC

2.2.13 The Member for Canada presented to the Group a detailed explanation of the minimum time track calculation made by the current Gander automated air traffic system for the purpose of establishing the daily night-time OTS. Detailed comparison surveys between meteorological information reported by aircraft and valid forecast data, reviews of current domestic fixes and landfall points, speed and altitude parameters for the MTT calculations had been undertaken in order to assess and confirm the validity of the method employed.

2.2.14 As to the improved quality of the MTT calculation which could be achieved with more recent and accurate meteorological forecast data, it was pointed out that such data was available at 0700 UTC (based on the 0000 UTC weather observation) and at 1900 UTC (based on the 1200 UTC observation). The publication of the night-time OTS by 1230 UTC was therefore based on the 0000 UTC weather observation. A calculation of the MTT on the basis of the more recent observation at 1200 UTC would therefore have to be delayed until after 1900 UTC. This would give operators a lead-time of only two to four hours in advance of the majority of the eastbound departure times which clearly would not meet their requirements. Acceding to requests from the airspace users, the publication of the night-time OTS was being delayed by Gander OAC from 1230 UTC to 1330 UTC in order to achieve at least a slight improvement in its precision by the fact that during this period a greater number of information of company-preferred MTTs was becoming available and could be integrated into the OTS calculation. A study has also revealed the value of en route weather reporting which was invaluable for the updating and enhanced interpretation of forecast data available.

Link track for traffic from Italy to Shannon UIR

2.2.15 With respect to the link track which was available when required by traffic originating from Italy providing access to the Shannon UIR at 51N 08W, IATA expressed its satisfaction with this arrangement.

Shannon Oceanic Transition Area (SOTA)

2.2.16 The Group recalled that the problem of flights originating from Paris were unable, under some circumstances, to reach optimum cruising flight level when passing 08W, due to aircraft weight, ambient temperature, etc.. As a consequence, such flights could only accept lower than optimum flight levels and had to maintain these levels for a considerable proportion of their ocean crossing. It was noted that both the United Kingdom and Ireland had studied this matter in detail and had developed a number of possible alternatives. In bilateral discussions between the two States it emerged that one particular solution appeared preferable by comparison with other possibilities.

2.2.17 The proposed solution foresaw the establishment of delegated airspace with lateral limits determined by straight lines extending from 51N 08W - 4830N 08W - 49N 15W - 51N 15W back to 51N 08W to be controlled by Shannon ACC at all available flight levels. The area would be covered by radar stations located at Mt. Gabriel and Woodcock Hill. The proposed solution would cause no operational problems and was technically entirely feasible. The improvements expected would affect westbound SST flights in that the provisions of the NAT Regional SUPPS (Doc 7030, NAT/RAC, para 7.2.1.1 a)) concerning the use of 10 minutes longitudinal separation beween such flights could be applied within the necessary radar coverage within the SOTA. Similarly, the problems related to flights departing from Paris would be resolved as well as any other ATC problems that could not be handled without radar.

2.2.18 It was pointed out that the airspace in question would remain oceanic airspace.

2.2.19 The Member for Ireland pointed out that the necessary discussions with France had not yet been initiated but that this would be done without delay when the proposal was approved by his Authorities. The Member for France expressed the readiness of his State to enter into the discussion at any time.

2.2.20 It was agreed that the Members of the Group would be kept informed of progress so that any arrangements that may be required on their part could be taken in good time.

Conflicting traffic flow in the Brest FIR

2.2.21 IATA raised the matter of traffic flows which were apparently interacting in the Brest FIR and which had created problems resulting in the application of air traffic flow restrictions to traffic departing for the North Atlantic from European points of origin. The Member for France confirmed that a significant traffic flow occurred in a north-south direction at the same time when the peak westbound departure traffic from Europe into the North Atlantic was about to commence. Brest ACC had considered several alternatives to resolve this matter which were still under discussion between France and the United Kingdom. It was hoped that agreement could be reached between these two States shortly and that additional measures such as re-sectorization of the Brest ACC, the implementation of the Shannon Oceanic Transition Area (see paras 2.2.16 to 2.2.20 above), the implementation of the automated equipment in Shanwick OAC and other related matters would result in the resolution of this problem.

Standardization of OTS messages

2.2.22 The Representative of IATA recalled that the Group, at its last Meeting, had considered the question of standardization of OTS messages in order to simplify their processing by automated operational flight planning systems used by aircraft operators (NAT SPG/21-Summary, paras 2.2.20 and 2.2.21 refer). Both the Members from the United Kingdom and Canada confirmed that efforts had been made in that direction since NAT SPG/21 but that a final agreement had not yet been reached. It appeared that a standardized message format could become available by summer 1985.

Clearances for step-climbs

2.2.23 Following discussions at earlier meetings of the NAT SPG on the subject of clearances for step-climbs in the NAT Region, IATA reported that the situation had somewhat improved but practical experience was still not entirely satisfactory. It was particularly noted that requests for step-climbs made by westbound flights when passing 20W for clearance by 30W were apparently not relayed from Shanwick OAC to Gander OAC, so that the request had to be repeated at 30W and climb clearance was thus delayed or not forthcoming at all. From an operator's point of view, this situation was not satisfactory and a plea was made to improve arrangements as necessary.

2.2.24 In the ensuing discussion, it was found that step-climb requests were, in fact, relayed routinely between the two OACs concerned and the reason for the complaint made by IATA were not fully understood. In the absence of specific case histories or any particular data as to the frequency with which these problems occurred, the Group was unable to deal with the matter in any more detail. It requested IATA to collect concrete information on the subject so that it could be dealt with in sufficient detail at a suitable future occasion.

Flights between the CAR and EUR Regions

2.2.25 With respect to flight operations originating in the CAR Region across the NAT Region with destinations in Europe, IATA indicated that such flights were constrained to some degree within the New York OCA. The operators were aware of the situation in the New York Oceanic Area Control Centre both with respect to personnel and the equipment available at the present time. The Member for the USA stated that attempts were being made to introduce additional routings within New York OCA, that current personnel problems were about to be resolved and that the introduction of modern display and processing equipment in New York would resolve the shortcomings encountered within approximately one year's time. The matter was also related to the overall airspace re-organization undertaken by the USA which is dealt with in more detail below.

Consolidation of USA East coast oceanic air traffic control facilities

2.2.26 The Member for the USA presented the Group with a detailed outline of a proposed consolidation of the oceanic air traffic control facilities at the east coast of the USA. A study by the FAA National Airspace Review Task Group had resulted in detailed recommendations aiming at the establishment of one consolidated US East coast oceanic ATC facility expected to be implemented at New York. Although the details of the consolidation process have not yet been formalized, studies were now being undertaken to determine the precise airspace delineation to be served by that unit. It is envisaged to combine the New York, San Juan and Miami FIRs, with the exclusion of Houston FIR and those parts of Miami FIR covering the Gulf of Mexico.

2.2.27 For operational reasons, it appeared desirable that the entire new oceanic airspace in question should be located within one and the same ICAO Air Navigation Region (NAT Region) in order to ensure uniform application of separation minima and ATC procedures throughout that airspace. A further consequence could be a realignment of the lateral limits of the NAT MNPS airspace in the area in question, as well as a review of its vertical extent depending on airspace users' requirements. As to the time-frame, it appeared that considerable developments in that direction would occur within the next year and the Member for the USA agreed to keep the NAT SPG informed on further developments.

Remoting of SSR data to Reykjavik ACC

2.2.28 Referring to information already provided to earlier NAT SPG Meetings, the Member for Iceland presented a progress report with respect to the possibility of remoting SSR data from a radar site located in the south-east of Iceland into Reykjavik ACC. This would significantly enhance the radar coverage available from Iceland and cost-effectiveness studies indicate that this would yield appreciable advantages to the operators. Furthermore, it would enhance safety, and would also allow navigation performance monitoring at an increased scale. In addition, the enlarged radar coverage provided by Iceland would allow partial radar monitoring of the Polar Track Structure. This matter also had a bearing on the question of interception of civil aircraft straying from their assigned tracks (para 2.2.89 refers).

2.2.29 The Representative of IATA mentioned that his Organization was not in a position at this time to support or disapprove of the implementation of the project because its own cost-effectiveness studies had not yet been completed. The Member for Iceland added that the matter had been discussed in the Joint Support Committee where it had been received with acceptance on cost-effectiveness grounds. A decision by Council was expected shortly.

2.2.30 There was unanimous support from all Members of the Group for this project and it was hoped that operational benefits would soon accrue and that related operational matters could be further reviewed in the near future.

APPLICATION OF COMPOSITE SEPARATION IN THE NAT OTS

General

2.2.31 In Recommendation 1.2/9, the LIM NAT RAN Meeting (1976) foresaw the potential for the implementation of composite separation within the NAT Organized Track System (OTS), after the introduction of MNPS in the NAT Region, at a date agreed between airspace users and provider States and upon the conclusion of arrangements ensuring its safe application by ATC (Doc 9182, LIM NAT (1976) Recommendation 1.2/9 c) refers).

Note: The term "composite separation" is being used to indicate a technique where additional tracks are introduced within the NAT OTS, spaced laterally by 30 NM, located between regular tracks established at 60 NM intervals. In addition, 1000 ft vertical separation is applied between aircraft on these composite tracks and aircraft on the adjacent normal tracks. Thus half the lateral separation minimum is combined with half of the applicable vertical separation minimum.

2.2.32 As on a number of accasions in the past, IATA strongly urged close consideration of this matter with the aim of earliest possible introduction of this separation technique.

Mathematical-statistical considerations relative to composite separation

2.2.33 Before entering into a detailed discussion of the various operational aspects of the matter, the Group reviewed a mathematical-statistical study presented to it by its Member for the United Kingdom. This study reviewed the risk associated with 30NM/1000ft composite separation within the OTS using the Reich collision risk model. It was found that the situation had not changed greatly in the period since previous estimates had been presented concerning this subject. On the basis of recent information regarding aircraft height keeping performance, it apeared reasonnable to assume the lower of the two previously estimated NAT SPG values for $P_z(1000)$, namely 0.0003. Assuming a constant flow of traffic and no contraction of the present rectangular system (60NM/2000ft), the composite system was found likely to result in lower overall risk levels.

2.2.34 It was concluded that collision risk should be no obstacle to the introduction of 30NM/1000ft composite separation, provided the qualifications included in the mathematical-statistical analysis were recognized. For example, no opposite direction occupancy within the OTS was assumed. Also, the number of step climbs and the rate of climbs during strep climbs would have to be monitored carefully. Furthermore, no change in gross navigation error rate in a composite system was assumed. Further work using occupancy values obtained by means of fast time simulation studies would possibly provide more precise estimates for the relative level of risk in a composite system.

Operational matters related to composite separation

2.2.35 The Group then undertook an in-depth review of all identifiable operational matters that had a bearing on the possibility or otherwise of introducing composite separation in the NAT OTS. It found a few subjects on which it could express a firm opinion. A much higher number, however, appeared to require further study before firm conclusions could be reached.

2.2.36 The subjects upon which the Group was able to express a firm view were the following:

a) action in case of an observed deterioration of navigation performance in a composite track system;

b) the question of opposite direction traffic;

c) the use of flight management systems on-board aircraft operating in a composite track system;

d) software installation at NAT OACs applying composite separation; and

e) capability of aircraft operators to flight plan on composite tracks.

2.2.37 With respect to action to be taken in a composite track environment in cases where a significant and sustained deterioration of navigation performance by aircraft was observed, as well as in circumstances where exceptionally large surges in navigational gross error rates (as experienced in August 1983 and February 1985) became apparent, the Group confirmed that the obvious immediate step was to consider reversion to the rectangular 60NM/2000ft configuration and, if mathematical-statistical considerations would not suggest this to be sufficient, any additional action that might be advisable to restore risk levels to acceptable limits (e.g. expansion of the OTS, increase of lateral separation, etc.).

2.2.38 On the question of opposite direction traffic in connexion with a composite track environment, the Group was unanimous that such traffic should be excluded in view of the additional risk that such flights would present to the system.

2.2.39 A point was made concerning the use of flight management systems on-board aircraft which could result, on some occasions, in an excessively low rate of climb during the execution of step climb manoeuvres or which could cause aircraft to depart significantly from their assigned flight levels. It was noted that these were exceptional cases which could be dealt within the framework of operating procedures applicable in the NAT Region and it was therefore assumed that this problem was not likely to occur (but see para 2.2.34).

2.2.40 Both Gander and Shanwick OACs which would be concerned with the provision of ATC service within a composite OTS, were introducing automated data processing systems and it was noted that, in both cases, software was available or would shortly be installed, supporting the provision of composite separation, from the time this was formally introduced.

2.2.41 Finally, the representatives of the international airspace user organizations confirmed that aircraft operators were able at any time to assume flight planning on composite tracks and that, from a pilot's point of view, no particular difficulties were expected.

2.2.42 With respect to subjects that would appear to require further study before a definitive decision on the introduction of composite separation could be taken, the Group identified the following points:

a) extent and use of composite separation and related cost-effectiveness aspects;

b) impact of a composite OTS on the eastern oceanic/domestic interface areas;

c) influence of composite separation on traffic intending to cross or to join the NAT OTS;

d) navigational performance in the vertical plane affecting the application of composite separation;

e) precision requirement for the determination of the actual minimum time track (MTT);

f) impact of composite separation on the OTS change-over procedures;

g) need for revised criteria for the monitoring of navigation performance in a composite OTS environment;

h) need for specific procedures for in-flight contingencies occurring in a 30NM/1000ft composite track environment; and

i) necessity or otherwise of a revised MNPS definition of aircraft navigation performance capabilities for operations in NAT MNPS airspace and resulting regulatory consequences for States responsible for MNPS approvals.

2 2.43 There was some discussion on the question of the extent of the use of composite separation and its potential cost-effectiveness. The question was also related to the precision with which actual MTTs could be determined and the degree to which a composite OTS could be tailored around it (a) and e) above refer). It was felt that improvements to the MTT estimation would hardly be possible in the near future but that, based on on-the-day experience, a certain proportion of flights could be re-routed within the composite OTS to get closer to the experienced actual MTT. It was clear that an entire restructuring of the OTS in order to closely fit the MTT was not possible to achieve by ATC. As to the cost-effectiveness question, a study made by the United Kingdom with its cost-penalty estimation model indicated a potential savings to the user of approximately 17 US$ (1985) per OTS ocean-crossing which could, overall, amount to a total savings of 1.2 million US$ over a year (see also paras 4.2.4 to 4.2.6).

2.2.44 The Group then addressed the question of the effect that a composite OTS would have on the oceanic/domestic interface areas (b) above) and agreed that this required very close review, especially on the eastern side of the North Atlantic where difficulties were foreseen with the integration of closely spaced aircraft into the domestic ATS route system. It was agreed that the availability of radar coverage in the oceanic interface areas was essential, particularly in order to enable flights to operate on their desired flight levels and their integration into the domestic route network via the shortest links. To some extent, a re-design of domestic ATS routes might become necessary. In some cases, it might be necessary to develop procedures to cope with the possiblity of radar failure in the interface area to ensure that composite tracks would still be able to be accepted by ATC and sudden reversion to other forms of separation would not become necessary.

2.2.45 In the case of Canada, following analysis of a simulation exercise conducted in 1985, it was stated that it would be possible to accommodate composite separation within the OTS between 46N and 58N at 50W. With respect to Shannon FIR, the Member for Ireland pointed out that the entire interface area on the eastern side of the Atlantic would need close review by all States concerned to ensure the feasibility of a composite OTS and the flexible and concerted management of traffic transiting from oceanic to European domestic airspace. It was clear, however, that a possible establishment of a composite OTS on a limited basis, e.g. only in the west-bound direction, would reduce significantly the overall cost-effectiveness of the application of this type of separation.

2.2.46 A further matter that gave rise to considerable discussion at earlier NAT SPG Meetings was the question of traffic intending to join or to cross the OTS (c) above). While this problem had been considerable in the past, it appeared that matters had significantly improved, although full resolution had not yet been achieved. Fears expressed by some Members that a composite OTS could possibly cause negative effects on crossing and joining traffic, others were of the opinion that, in fact, it could further improve the situation. Again, it was obvious that this subject needed further consideration.

2.2.47 The height-keeping performance of aircraft in a composite OTS (d) above) might also prove of a more stringent importance than in a rectangular 60NM/2000ft environment. Recent data obtained from surveys in the European Region appeared to be encouraging as to the overall vertical performance of modern aircraft but the mathematical-statistical aspects of this element would have to be studied further.

2.2.48 In one particular situation (f) above)), when the eastbound and the westbound composite OTS were similar in geographic alignment, the transition from a composite eastbound OTS to a composite westbound OTS could impose particular difficulties in clearing early westbound flights at requested flight levels against the residual eastbound flow.

2.2.49 It was pointed out that the present MNPS criteria contained in ICAO Doc 7030/3-NAT had originally not been designed to support 30NM/1000ft composite separation, nor had the monitoring criteria involving occupancy and core size been established to assess relative risk values (g) above). While the monitoring procedures as such would not appear to need modification, the criteria related to navigation performance monitoring would have to be based on criteria specifically designed for the case of 30NM/1000ft composite separation. A draft set of criteria had been put forward at NAT SPG/21 as follows:

a) a standard deviation of not more than 4.25 NM;

b) the proportion of deviation of 30NM or more shall be less than $3x10^{-4}$; and

c) periodic monitoring of lateral deviations must verify that the achieved distribution of lateral deviations conform with the double-double-exponential distribution.

These criteria appeared to be met by the population of aircraft currently operating in the MNPS airspace.

2.2.50 With respect to estimating track occupancies in a composite OTS, the Member for the United Kingdom would examine its recently completed computer study.

2.2.51 As was the case in the past, when the OTS was established in a 120NM/2000ft configuration with 60NM/1000ft composite separation, it would be necessary to devise a specific procedure for in-flight contingencies to be applied by aircraft using a future 30NM/1000ft environment (h) above). The Group agreed that, once the introduction of this type of separation was contemplated, it would develop the necessary material for inclusion in ICAO Doc 7030/3-NAT. IATA had already submitted a proposal on the subject to NAT SPG/21.

2.2.52 Finally, the question was raised whether the introduction of composite separation would require modification of the NAT MNPS provisions in Doc 7030/3-NAT in order to enable revised approval procedures by States of Registry responsible for the apporval of flight operations through NAT MNPS airspace (i) above). It was argued that the current standard deviation criterion of 6.3 NM was not stringent enough to support 30NM/1000ft separation since the achieved value would have to be in the order of 4.25 NM. On the other hand, it was recalled that, upon acceptance of the NAT MNPS provisions by the Limited NAT RAN Meeting (1976), the lateral separation criteria in the NAT Region had remained in the order of 120 NM until radar monitoring had proven that a standard deviation of 6.3 NM or less was being achieved in practice. In other words, the present 60NM/2000ft environment was implemented on the basis that achieved navigation performance met the MNPS criteria. Similarly, it was argued, a 30NM/1000ft composite separation environment could be established in the OTS on the basis of required navigation performance being achieved, which was clearly below a standard deviation of 4.25 NM and provided other applicable criteria were met. Given annual navigation performance monitoring in the future, it should be possible to detect trends towards higher values of standard deviation and timely corrective action could be taken.

2.2.53 The Group agreed that this was essentially a philosophical question which would be looked into by the Members on the basis of other available advice on the matter.

2.2.54 Concluding the discussion on the subject of 30NM/1000ft composite separation, the Group felt that, under present circumstances, a time frame for the planning and the implementation of that type of separation in the order of some 2 1/2 years must be foreseen. A planned implementation date some time in autumn 1987 was considered feasible, leaving ample lead-time for the various studies and considerations which were still found to be necessary.

EXTENDED RANGE TWIN-ENGINED AIRCRAFT OPERATIONS (ETOPS)

General

2.2.55 The Group briefly recalled the background to a development which potentially could significantly modify the air navigation systems environment in the NAT Region. Throughout 1984, widespread and detailed discussions had taken place within the international aviation community on the subject of extended range flight operations by twin-engined aircraft, and in particular the feasibility of such operations for NAT Region ocean-crossings. Action had been initiated by States concerned and also within the forum of ICAO in order to review and establish the regulatory and procedural provisions that may be affected. Within ICAO the discussion had advanced to a considerable degree in the competent bodies and a consultation process with all ICAO Member States was currently underway.

2.2.56 Among other things, the question of the so-called "90-minutes-rule" and its application to twin-engined aircraft operations was of direct and very considerable operational impact world-wide and for obvious reasons of prime interest to ATC in the NAT Region. The final decision as to how far a twin-engined aeroplane may operate over-water away from a suitable en-route alternate aerodrome determined to a large extent the flight profile that could be followed across the North Atlantic.

2.2.57 At the time of this Meeting, a number of operators had undertaken test operations for limited periods of time in order to obtain some operational experience. They did so on the basis of operational authorizations by their States of Registry and the rules concerning the single-engine flight time away from a suitable en-route alternate aerodrome differed from case to case. Reviewing the results of these trial operations, it was found that they could be considered as uneventful routine operations. The speed range of these aircraft was very close to the one within which other North Atlantic traffic was operating and the flight level bands used by twin-engined aircraft were within the upper levels or even above those normally used.

2.2.58 Although it was not possible to derive any definitive conclusions from these findings as to the behaviour of a significant twin-engined aircraft population operating routinely within the NAT air navigation system, the results achieved were nevertheless considered encouraging. The Group was conscious of the fact that considerations related to the regulatory aspect of extended range twin-engined aircraft operations (ETOPS) were world-wide in nature and in any case outside its terms of reference. It agreed therefore to consider only the ATC related aspects of ETOPS, awaiting the final decisions concerning the "90-minutes-rule" and similar matters, whenever these may be forthcoming.

2.2.59 As to expected developments in the near future and in particular for the forthcoming summer season, the Group noted that a number of operators intended to serve selected city pairs between Europe and the North American continent. In an attempt to identify those aspects of ETOPS which were likely to have a direct and immediate impact on the current ATC operation and to find common denominators so as to assess the likely consequences during the 1985 main travel season, the Group identified a number of specific aspects which are addressed below.

Geographical extent of tracks and most likely altitude bands used by ETOPS

2.2.60 In the immediate future, and as long as twin-engined aircraft were required to operate within 60 to 90 minutes single-engine flying time in still air from a suitable en-route alternate aerodrome, the tracks likely to be used by them would lie to the north of 59N at 40W (for northerly en-route alternate aerodromes) or south of 47N at 40W (for southerly en-route alternate aerodromes). The climb and cruise performance of the aircraft types to be used would allow most west-bound flights to climb to FL 370 by 08W to operate at cruising levels of 370, 390 and, in some cases, 410. Only in few cases was it expected that FL 350 would be used in cruise for significant periods of time due to ambient atmospheric conditions. Cruising speeds would be in the range of Mach 0.80 to about 0.82.

2.2.61 The intention with high climb rates in ETOPS in the North Atlantic was to reach the ocean entry point at flight levels which would allow, in all probability, unrestricted further climb to cruising levels above normal NAT traffic and to operate into the upper levels of or above the MNPS airspace. This would allow an increased possibility of random routing and would less interfere with traffic operating at slightly higher Mach Numbers below.

2.2.62 In this connexion, it was hoped that this operational pattern would be retained also during routine ETOPS so that increased numbers of twin-engined aircraft would not interfere with the normal OTS traffic, especially if such operations were accepted at distances of 120 up to 138 minutes single-engine flying time in still air from a suitable en-route alternate aerodrome.

2.2.63 With respect to the latter possibility of encountering significant numbers of ETOPS in the upper levels of the OTS (FL 390 eastbound and FL 370 westbound), both Gander and Shanwick OACs gave assurance that random routings at those levels would be accepted as much as as traffic conditions permitted to do so.

2.2.64 The Group briefly considered the question whether the current application of the datum line technique north of the OTS needed revision but it was found that the level band affected by that technique were at present FL 330 and FL 350 and therefore below ETOPS.

ETOPS route limitations

2.2.65 The Group was of the unanimous view that rules applied by individual operators concerning flight time limitations to suitable en-route alternate aerodromes and other relevant information impacting on flight profile, should be made available to the ATC authorities concerned in order that air traffic controllers would be generally aware of the aircraft operating constraints. It was stressed that the responsibility for the acceptance of a route reclearance offered would remain with the pilot. On the other hand, it was important that protracted negotiations on the air-ground communications channels concerning routings were avoided. In this connexion, it appeared desirable to strive for standardization at the earliest possible time in order to reduce workload and to avoid possible misundertandings and other negative effects.

Flight information service requirements

2.2.66 During the initial ETOPS test operations, special arrangements had been made concerning the flights involved with regard to the cross-checking procedures for the NAT OTS broadcast messages, as well as regarding a reduction in the need for such flights to transmit routine meteorological observations with their position reports. It was understood that this was necessary to avoid potential cockpit workload constraints during the introductory phases of ETOPS in the NAT Region but that these temporary arrangements would be withdrawn, once ETOPS became more of a routine operation.

2.2.67 Because of the selection of a number of aerodromes located in Newfoundland, Greenland, Iceland and the Northern United Kingdom as en-route alternate aerodromes, a certain amount of additional aeronautical information, as well as weather forecast and MET reports were required for ETOPS. While, essentially, this information was available, it was, however, not routinely distributed throughout the NAT Region, e.g. by means of the HF VOLMET Broadcast System, suitable NOTAM routing arrangements, etc.. It was recognized that the requirements for procurement and dissemination of such information would be handled initially by the aircraft operators concerned on their operational control networks and communications means, but it was nevertheless expected that, in the not too distant future, the NAT provider States would be requested to make specific arrangements to satisfactorily meet these new needs.

2.2.68 With respect to the HF VOLMET Broadcast System, it was stated that the current repetition of METAR information was 60 minutes for some aerodromes and this could be insufficient in cases where flight crews were faced with an engine failure or major system malfunction and had to take an immediate decision concerning the selection of the most suitable alternate aerodrome to be used under the circumstances. Furthermore, the current VOLMET programme content was such that it would not allow insertion of additional MET information. Depending on future developments in the field of ETOPS, the Group felt that it may be necessary to address this question in due course.

2.2.69 While on this subject, the Group noted that dealing with the subject, as far as ICAO regional planning was concerned, had become somewhat difficult because the HF VOLMET broadcast requirement for the NAT Region had still not been included into the ICAO NAT Air Navigation Plan Publication (Doc 8755/12) although this had been requested repeatedly in the past. In addition, the requirement which had so far been reflected in the EUR Air Navigation Plan Publication (Doc 7754), was no longer shown in the new provisional 23rd Edition developed by the EANPG, because an underlying basic operational requirement did not exist for the European Region. The Group hoped that under these circumstance ICAO would now find it possible to correct this situation.

Expected future developments

2.2.70 Concluding that, in the short term, the introduction of twin-engined aircraft operations in the NAT Region was not likely to create any major ATC problems in view of their relatively small proportion within the overall traffic, the Group nevertheless hoped that reliable information concerning future trends and developments in this field would become available as soon as possible. It was hoped that useful results would emerge from the North Atlantic Forecasting Workshop and that the product of the deliberations of the NAT Traffic Forecasting Group's 19th Meeting (both in June 1985), would address this matter in some detail (para 4.4 below refers).

ETOPS in-flight contingency measures

2.2.71 Due to the specific nature of ETOPS, it had been necessary, upon commencement of the first trials, to establish specific procedures for guidance to pilots of twin-engined aircraft in the North Atlantic as to action to be taken in cases where engine failure or major airframe systems malfunctions might make a diversion to a suitable en-route alternate aerodrome necessary and at the same time reducing any potential collision risk within the NAT traffic flow. To this extent, the NAT provider States concerned had promulgated a NOTAM as an initial precautionary measure.

2.2.72 In view of its region-wide implication and the obvious requirement to reflect the matter in the ICAO NAT Regional SUPPS, the Group developed proposed text for inclusion in ICAO Doc 7030/3-NAT. This text is contained in the Attachment to the Summary on Agenda Item 2.

CONCLUSION 22/10 - AMENDMENT TO NAT REGIONAL SUPPS

That:

a) the NAT Regional SUPPS regarding special procedures for in-flight contingencies in the NAT Region (Doc 7030/3-NAT, Part 1, para 5) be amended in accordance with the revised material contained in Attachment A to the Summary on Agenda Item 2;

b) the Member for the United Kingdom take the necessary steps within his Administration to present to ICAO a formal proposal for amendment of Doc 7030.

MET SERVICES FOR NAT FLIGHT OPERATIONS

2.2.73 At NAT SPG/20, the Group had agreed to implement, on a trial basis, a procedure that required flights designated to submit AIREPs to also provide information on the observed meteorological conditions at the intermediate longitude(s). The NAT SPG, at its 21st Meeting, agreed to re-introduce the exercise, with modifications, in view of needs expressed by the MET Services for this additional information (Conclusion 21/10). The Group discussed the matter again in detail, addressing itself particularly to the question of the need for additional MET information. The question of the communications aspects concerning workload, frequency congestion and other related aspects is addressed in paras 2.3.29 and 2.3.30.

2.2.74 In the ensuing discussion, both the Members for the United States and for the United Kingdom stressed that their respective Meteorological Services responsible for forecasts for the NAT Region confirmed the urgent need for the mid-point MET information which had, so far, proved invaluable to them in order to assess and improve the reliability of their forecast products. IATA pointed out, however, that aircrews found the provision of this information work-intensive and in certain circumstances likely to cause confusion due to a significant increase of the use of geographical co-ordinates within the same message. In addition, some operators and pilots were doubtful as to the usefulness of the information provided and were therefore reluctant to agree to a further extension of the trial.

2.2.75 Taking into account that unacceptable cockpit workload as well as frequency congestion and communication workload had not been proven so far and in the light of the explanation by the MET Services concerning the usefulness of the additional information provided, the Group agreed that the trial should be continued. The Group also requested IATA to take advantage of the extended trial period in order to collect suitable data on the basis of which cockpit workload may be assessed. It was agreed to revert to the question at the next Meeting of the NAT SPG and to discuss the matter in the light of further information expected to be available by that time.

CONCLUSION 22/11 - MID-POINT MET REPORTING IN THE NAT REGION - OPERATIONAL ASPECTS

That the trial with the addition of mid-point meteorological information in position reports be continued until such time as a definitive decision can be taken concerning a permanent implementation of this procedure on the basis of additional information emerging from the trial particularly with respect to the operational aspects involved.

Note: Conclusion 22/20 on the COM aspects of that subject refers.

FLIGHT PLANNING IN THE NAT REGION

2.2.76 At the 20th Meeting of the NAT SPG, the Group had established a Task Force charged to develop a uniform method of application of the relevant ICAO world-wide provisions regarding the completion, filing and transmission of flight plans for flights in the NAT Region (Conclusion 20/4 refers). The result of the work by that Task Force was finalized by the Group at NAT SPG/21 and it was agreed that NAT provider States should issue suitable Aeronautical Information Circulars to ensure that the material developed reaches the airspace users (Conclusion 21/8 refers).

2.2.77 Since then, ICAO had introduced Amendment Nr.6 to Doc 4444 (PANS RAC), incorporated in the 12th Edition (1985) of that Document. As a consequence, a new ICAO flight plan format was to be implemented by States world-wide on 21 November 1985 and to be used by aircraft operators as of that date. In the light of this situation, the Member for Canada had undertaken to revise the material agreed by NAT SPG/21 (NAT SPG/21-Summary, Attachment A to Agenda Item 2 refers) and presented it to the Group for further review. The Group studied the material in considerable detail and commented on a number of specific aspects. The Member for Canada took note of the discussion and agreed to develop a final revised version of the document which he would circulate to the NAT provider States for guidance in developing their respective aeronautical information publications necessary to be distributed in order to formally implement the new ICAO flight plan format on 21 November 1985.

CONCLUSION 22/12 - REVISED GUIDELINES FOR FLIGHT PLANNING IN THE NAT REGION

That the Member for Canada prepare a final version of the revised guidelines for flight planning in the NAT Region, incorporating the substance of Amendment No 6 to ICAO Doc 4444 (PANS RAC) and to circulate this document amongst the NAT provider States for guidance in developing their related aeronautical information publications implementing the new provisions on 21 November 1985.

2.2.78 In this connexion, the question was raised whether all States concerned would be ready to implement and process the new provisions by the common applicability date. It was found that, at least for the NAT Region, this was the case, except for a number of initial teething troubles that could be expected with software changes of such magnitude. In turn, however, concern was expressed as to whether all aircraft operators world-wide would be using the new flight plan format simultaneously as of the same date (21 November 1985). The Group hoped that all operators would conform to the new provisions in order to keep flight plan rejects by computers and the associated need for manual manipulation of such flight plans within manageable proportions.

2.2.79 While on the subject of flight planning, IATA raised the question of a recent Amendment to ICAO Annex 2 (Amendment Nr. 26), introducing a requirement for flight plans for flights to be provided with air traffic control service or air traffic advisory service, to be submitted at least 60 minutes before departure, unless otherwise prescribed by the appropriate ATS authority (Annex 2, para 3.3.1.1.2.3 refers). It was pointed out that this requirement was likely to pose significant problems to aircraft operators under certain circumstances. While it was not clear why this particular provision had been modified, it was felt that at least regional consensus should be reached for States to apply commonly the Unless-Clause and to introduce the 30 minutes limit previously stipulated in Annex 2. The Group did not express any firm opinion on that subject, but generally felt that the original Annex 2 provision had been adequate and should therefore perhaps be re-introduced in due course.

UNIFORM APPLICATION OF SEPARATION CRITERIA

2.2.80 The Group recalled that, at its 20th and 21st Meetings, a proposal for amendement of the NAT Regional SUPPS concerning the application of longitudinal separation and the use of the Mach number technique had been developed, processed in accordance with established procedures and approved on 12 July 1984 (Conclusion 21/11 and amendment proposal NAT/SUPPS-RAC/17 refers). In accordance with Conclusion 21/12, Canada had submitted a revised proposal for processing through the Mexico Office of ICAO to which it was accredited. The Group now noted that this proposal was in the process of circulation to States in accordance with established procedures and it was hoped that approval would be forthcoming as soon as possible.

2.2.81 It was further recalled that, at NAT SPG/21, the Group had developed guidance material concerning the practical application of the separation criteria to aircraft in the NAT Region. It had been found that this was required to achieve full common understanding, particularly with regard to the development of software algorithms for ATC automation. This document had been based on the provisions set out in amendment proposal NAT SUPPS - RAC/17. At this Meeting, Canada presented an updated version of that document which it undertook to publish on behalf of NAT SPG for perusal by the NAT provider States concerned.

2.2.82 The Group reviewed this document in great detail and recognized that a number of differences in interpretation and opinion still persisted with respect to the definitions of same-direction traffic, opposite-direction traffic and crossing traffic. It was agreed that the Member for Canada would, as soon as practicable, amend the current document. In addition, the Member for the United Kingdom would submit to Canada suggestions for specific additions which he considered important to be introduced. Upon approval by ICAO of the currently processed proposal for amendment mentioned in para 2.2.80 above, the Member for Canada would issue a second edition of the Guidance Document concerning the application of Separation Criteria between Aircraft in the NAT Region.

CONCLUSION 22/13 - GUIDANCE DOCUMENT CONCERNING THE APPLICATION OF SEPARATION CRITERIA IN THE NAT REGION

That:

a) the Member for Canada and the United Kingdom revise the current Guidance Document concerning the application of Separation Criteria in the NAT Region;

b) the Members for Canada and the United Kingdom co-ordinate the necessary revisions for the second edition of the Guidance Document concerning the application of Separation Criteria between Aircraft in the NAT Region; and

c) the Member for Canada make the necessary arrangements for the publication by his Administration of a second edition of the Guidance Document on behalf of the NAT SPG, as soon as the current related amendment proposal to the NAT SUPPS was approved by ICAO.

INTERCEPTION OF CIVIL AIRCRAFT

2.2.83 Under this heading the Group was informed of the activities and the progress of work of the ICAO Air Navigation Commission Working Group on Interception and the initial conclusions that had been reached so far. With respect to the NAT regional aspects of interception of civil aircraft, the Group considered in particular the following matters:

a) the use of SSR Mode A Code 2000;

b) the use of specific SSR codes by individual flights;

c) action to be taken in the event of deviation from assigned track;

d) enhanced monitoring of navigational performance; and

e) improved airborne navigational capability.

2.2.84 With respect to the use of SSR Code 2000 in the NAT Region, the Group agreed that the relevant provisions in Doc 7030/3, NAT RAC SUPPS, para 8.1.1.1, stipulating its continuous use (except in cases of emergency and following the requirement to retain the last ATC assigned code for 30 minutes upon entry into NAT airspace) should be retained unchanged. It was felt that, overall, this requirement remained valid for the NAT Region and, to a significant degree, could assist in the detection of aircraft straying from track or proceeding towards sensitive airspace reservations, by radar stations equipped to recognize the Mode A Code 2000 setting.

2.2.85 As regards the allocation of specific SSR Codes to individual flights, the Group found two potential alternatives which it discussed in detail:

a) the allocation of a discrete Code to an individual flight; or

b) the allocation of a particular Code specific to established routes, to all flights operating along that route.

2.2.86 Upon close consideration of these alternatives, it was found that both had significant draw-backs. In the first case, the complex SSR Code assignment techniques used in Europe (ORCAM - Originating Region Code Assignment Method) and on the North American continent could be faced with mutual interference in that flights leaving one Region with their last assigned individual Code could cause Code duplication in the other area with all the negative consequences that this would entail. Similarly, it would not appear feasible to charge Oceanic ATC Units with the task of assigning and protecting individual SSR Code assignments which required automated or manual book-keeping methods of some complexity, quite apart from the need to identify Codes which would be suitable and would not interfere with the SSR Code environment on either side of the Atlantic.

2.2.87 The allocation of route-specific Codes to all aircraft operating on a particular established track (para 2.2.83 b) refers) was likely to result in undesirable cases of over-interrogation in cases of relative aircraft proximity likely to occur quite frequently. Under any circumstances, this method would, at best, be suitable only on the Polar Track Structure (PTS) which, however, constituted potentially the most critical routes in the NAT Region with respect to interception of civil aircraft straying inadvertently from their assigned track.

2.2.88 The Group then reviewed the NAT RAC Regional Supplementary Procedures related to the adherence to the ATC-approved route by aircraft in the NAT Region. These procedures stipulate that an aircraft, having deviated inadvertently from the route specified in its ATC clearance, shall take action forthwith to regain such route within 100 NM from the position at which the deviation was observed (Doc 7030/3 - NAT, para 6.2.1 refers). Considering all operational aspects related to that question, it was agreed that this provision was not directly related to the subject of interception of civil aircraft. The provision was found to be operationally sound and should therefore be retained in its present form. From the interception point of view, it was not believed relevant whether a flight was regaining its originally assigned track within any distance shorter or longer than the prescribed 100 NM.

2.2.89 With respect to the question of extending navigational performance monitoring within the Polar Track Structure, it was felt that this had relative merits, provided radar coverage for that purpose could be enlarged. This would essentially involve two particular States, namely Iceland and Norway. While Iceland was open to this possibility, noting at the same time the relationship of the matter with progress related to the remoting of SSR data from a radar station located in the south-eastern part of Iceland (see para 2.2.28), the question could not be discussed further in the absence of Norway at the Meeting. It was therefore agreed that the European Office of ICAO should contact Norway on that matter in order to obtain its views and whether that State would consider it feasible to participate in an enhanced navigation peformance monitoring programme with radar stations that may be existing at suitable locations to provide the necessary coverage. Depending on the outcome of this consultation, the Group would again address the matter at its next Meeting.

CONCLUSION 22/14 - POSSIBLE PARTICIPATION BY NORWAY IN NAVIGATION PERFORMANCE MONITORING ON THE POLAR TRACK STRUCTURE

That the European Office of ICAO approach Norway with the aim of obtaining that State's views concerning active participation in navigation peformance monitoring on the Polar Track Structure by means of existing radar facilities covering that area so that the NAT SPG may take this into account in further work on that subject.

2.2.90 Finally, the Group considered a suggestion to develop a statement of required navigation capability for non-MNPS airspace over-water operations in the NAT Region. It was felt that the current provisions of the ICAO SARPS and PANS and the NAT Regional SUPPS adequately covered flight operations outside NAT MNPS airspace and that therefore no further procedures or regulations would have to be introduced. The only exception in this context could be flight operations in Polar areas where the use of the magnetic compass was difficult or impossible. The Group was unable to form a definite opinion on that matter and agreed to postpone further action pending additional study.

2.3 COMMUNICATIONS OPERATIONS

General

2.3.1 Under this heading, the Group dealt with the following specific subjects regarding NAT aeronautical telecommunications :

a) Routine review of the HF communications situation in the NAT Region;

b) SELCAL;

c) VHF channel for air-to-air communications;

d) Inter-OACC AFS speech circuits;

e) VHF coverage chart;

f) Position reports and other ATS fixed message formats;

g) Communication implications of mid-point MET reporting;

h) Similarity in aircraft callsigns.

Routine review of the HF communications situation in the NAT Region

2.3.2 The Group reviewed the results of the 1984 NAT HF data collection exercise, which had been made in accordance with Conclusion 21/14 of the NAT SPG/21 Meeting. The arrangements for the data collection had been the same as for the 1983 collection, i.e. data related to the three days where the alignment of the Organized Track System (OTS) was Central, Southabout and Northabout respectively. The dates selected were July 21 (Central), August 12 (South) and August 26 (North).

2.3.3 A comparison of the communication traffic figures with those of 1983 showed an increase in HF traffic of approximately 5% over the 1983 figures (7421 position reports for the three days in 1984 as compared to 7140 in the previous exercise). This was taken to reflect the overall increase in NAT aircraft movements during that period. With regard to GP/VHF, an increase of little more than 9% in the number of position reports was noted (2543 reports in 1984 as compared to 2338 in 1983).

2.3.4 Overall, the distribution of loading between frequencies and families was found to continue to be reasonably balanced. A slight overloading on Families "A" and "B" was observed on 26 August and 12 August respectively. As to frequency loading, the highest percentages were noted on 4/5 MHz and 8 MHz (43.3% and 42.8% on 12 August and 21 July respectively). However, once again, there was no indication of this causing any congestion or message delay.

2.3.5 Over the two-hour period 1300-1500 UTC on 21 July 1984, Shanwick Aeradio had the highest peak hour load of 86 position reports for the first hour and the second highest load of 84 reports for the second hour. This represented an increase of about 10% over the peak hour load observed in 1983. The mean overall system delay (*) was 3.02 minutes, which compares with the 1983 figure of 3.17 minutes. Once again, there was no evidence of a relationship between delay times and traffic loadings. In some cases, longer delays were noted during comparatively off-peak periods.

2.3.6 In the course of its detailed assessment of the results of the 1984 data collection exercise, the Group made the following remarks :

a) Although NAT SPG Conclusion 21/14 called for the inclusion of the Søndrestrom data (HF Family "D" and GP/VHF), this data had, at the request of Denmark, been excluded on the grounds that NAT HF services were being withdrawn from that facility. Data from Canadian Flight Service stations at Churchill, Frobisher and Cambridge Bay had been collected but were not included in the general review. This data was not broken down in detail, as only a preliminary indication of the communication traffic handled by the three stations was necessary at the present.

b) The data collection covered only position reports, which represented less than 50% of the total number of air-ground messages.

c) Several cases of harmful interference to NAT frequencies were reported to the Group. These were not mentioned in the report on data collection, since they were considered to be outside the scope of the exercise.

2.3.7 The Group was of the opinion that the three points made above should be covered in the course of future data collection exercises in order to obtain a more comprehensive picture of the situation. It accordingly agreed that, in the future :

a) Data from Churchill, Frobisher and Cambridge Bay should be collected and evaluated, both because these stations used NAT (Family D) frequencies and because the exclusion of the related data from the survey would give the false impression that Family "D" is relatively lightly loaded. Subject to agreement by Norway, the data collection should also include data from the Bodø station.

b) All air-ground messages, i.e. comprising messages other than position reports, should be included in the data collection exercise. However, only position report messages should be considered for the purpose of preparing time-delay information.

c) The report on the data collection should include information on the nature and extent of harmful interference to NAT frequencies, as well as on action taken thereon, in order to provide a more comprehensive data collection evaluation.

(*) Delay is the time period which has elapsed between the moment an aircraft passes over a reporting point and the moment the air-ground radio station has completed reception of the corresponding position report. Mean delay is obtained by dividing the total delay by the number of messages.

2.3.8 On the whole, the 1984 HF data collection exercise showed no major problem of message traffic distribution that would require any change to the existing arrangements for communications traffic management. Once again, it was found that the family and network principles worked satisfactorily and that there was no need to resort to a re-allocation of families or frequencies.

2.3.9 The above notwithstanding, the Group considered it necessary to continue to monitor frequency loading distribution and delay times. It, therefore, agreed that a new data collection exercise should be carried out in 1985, similar to the one made in 1984 but taking into account the points made in paragraph 2.3.7 above. The following detailed provisions should apply:

a) a decision as to the dates to be selected should be taken by early September 1985;

b) the returns should be provided to the United Kingdom for analysis by the end of November 1985;

c) the data, (covering HF, GP/VHF and information on harmful interference during the previous six months) from the following stations should be included : Cambridge Bay, Churchill, Frobisher, Gander, New York, Reykjavik, San Juan, Santa Maria, Shannon and, if possible, Bodø;

d) in addition to the normal position report messages, the data collection should also include total message traffic, broken down by time and frequency for each selected day;

e) the report should include information on the nature and extent of any harmful interference to NAT frequencies and on action taken thereon; and

f) the final report on the exercise should be made available for study to NAT SPG Members and COM experts concerned by the end of February 1986.

CONCLUSION 22/15 - NAT HF AND GP/VHF DATA COLLECTION IN 1985

That a three-day NAT HF and GP/VHF data collection be conducted in 1985 with the same arrangements agreed for 1984, noting that :

a) Ireland will co-ordinate the data collection and, in consultation with other participating States, will select suitable dates;

b) States concerned will retain data on all air-ground messages for July, August and September 1985 until the dates have been selected;

c) States concerned will send the results of the exercise to the United Kingdom by the end of November 1985 to the following address :

Civil Aviation Authority (CG2)
Room T 901
CAA House
45-59, Kingsway
LONDON WC2B 6TE

d) the United Kingdom will analyse the results and send the final report to the European Office of ICAO by the end of January 1986, for distribution to NAT SPG Members and COM experts concerned;

e) data (covering HF, GP/VHF and information on harmful interference during the previous six months) from the following stations should be included : Cambridge Bay, Churchill, Frobisher, Gander, New York, Reykjavik, San Juan, Santa Maria, Shannon and, if possible, Bodø; and

f) the final report will cover any problem of interference to NAT frequencies, in accordance with the provisions agreed by the NAT SPG/22 Meeting.

SELCAL

2.3.10 It was recalled that, in compliance with NAT SPG Conclusion 21/15, a proposal for amendment to the NAT Supplementary Procedures (Doc 7030/3 - NAT Communications) concerning SELCAL operation in the NAT Region had been presented by Ireland. The proposal was approved on 21 January 1985. The approved provisions called, among others, for the inclusion of the SELCAL Code in the flight plan and for a SELCAL watch on the assigned HF radio frequency to be maintained by aircraft, even in areas of the NAT Region where VHF coverage is available and used for air/ground communications. It was also recalled that a related Class II NOTAM had been promulgated by Ireland on 26 April 1984.

2.3.11 Statistical information presented by Ireland showed that in the period 1 March 1984 - 28 February 1985 Shannon Aeradio had received 130 incorrect SELCAL Codes. Almost all of these errors appeared on the flight plans and some 23% of such errors resulted in delays to oceanic clearances. There were 28 instances of two aircraft operating simultaneously with identical codes in the NAT Region. Surveys conducted by Shannon Aeradio in June 1984 and March 1985 indicated that compliance with the provisions on the use of SELCAL had decreased from 77.9% to 73.23%.

2.3.12 The Group confirmed the view expressed at its previous Meeting that, at least as far as the code duplication was concerned, the situation was likely to start to improve after the introduction, on 1 September 1985, of the new Table of SELCAL frequencies, providing for new assignments to be made using the four additional tones (P, Q, R and S). However, this was not expected to be an instant solution to the problem of many users having to share a code. In fact, it was not believed that any relief would be experienced until such time as a significant number of aircraft were equipped with new SELCAL equipment and new ground equipment capable of using the additional four codes was implemented. In this regard, the Group noted that information obtained by ICAO in response to a questionnaire issued in late 1984 indicated that only 33 States including all the NAT provider States, had either already installed new equipment or would install it before 1 September 1985. Of the other States having responded to the questionnaire, nine planned to implement the new equipment in the period 1986-90, whilst 26 had no plans.

2.3.13 In view of this situation, the Group was of the opinion that a new NOTAM action would hardly entail any positive results at the present stage. Rather, the Group considered it necessary to recommend that the process of retrofitting airborne receivers and the installation of new ground equipment be accelerated so as to create, as soon as possible, the required conditions for proper assignment and use of SELCAL Codes.

CONCLUSION 22/16 - SELCAL EQUIPMENT

That States and aircraft operators involved in flights over the North Atlantic and not yet in a position to use the expanded SELCAL Codes make every effort for an early installation or retrofitting of such equipment in order to avoid the problems experienced with the duplication of the SELCAL codes currently available.

Note: The target date for the implementation of the expected Table of SELCAL codes, as contained in Annex 10, Volume I, is 1 September 1985.

NAT air-to-air VHF channels

2.3.14 It was recalled that Amendment 63 to Annex 10 provided for an air-to-air VHF communication channel to be designated, subject to regional air navigation agreement. The purpose of such a channel was to enable aircraft in flight over remote and oceanic areas out of coverage of VHF ground stations to exchange necessary operational information and to facilitate the resolution of operational problems. The Annex 10 provisions also called for the assignment of a specific frequency to be co-ordinated, whenever necessary, between adjacent regions, to ensure the most efficient and safe utilization of VHF channels.

2.3.15 With regard to the NAT Region, a proposal for the use of 128.950 MHz for this purpose had been presented by Canada in compliance with NAT SPG Conclusion 20/7. Difficulties in accepting this frequency assignment for air-to-air use were expressed by the United Kingdom and Norway in view of ICAO ATC ground stations operating on the same frequency in these States. Later on, the use of frequency 130.550 MHz was suggested, in order to ensure compatibility with the recommended use of the latter frequency in the CAR/SAM Regions. However, this suggestion could not be accepted by the United Kingdom on the grounds of possible interference to two ATC co-channel assignments in that State. As a consequence, a revised proposal for amendment to the NAT Air Navigation Plan was circulated in January 1984 calling for a frequency in the operation control sub-band, 131.800 MHz, to be retained for the required air-to-air use in the NAT Region. This new proposed assignment had been objected to by IATA in view of possible interference with operational control stations operating on this frequency at the Heathrow and other airports at the oceanic boundary. IATA had, on this occasion, requested that consideration be given to the assignment of 123.450 MHz for air-to-air use in the NAT Region, noting that this frequency had been commonly used for many years without any problem being experienced. However, the Member from the USA opposed such a frequency assignment on the grounds of its current use for flight testing purposes in his State.

2.3.16 The Group made every effort to solve this frequency assignment problem, which appeared to be particularly complex, since a detailed survey of Table COM 2 of the EUR Air Navigation Plan showed that there was no frequency, other than 25 kHz-interleaved frequencies, which was not in use at one location or another in the Western part of the EUR Region. Following consultation with the Member for the United Kingdom, it appeared that a proposal to use 130.550 MHz would meet with a formal objection by that State for the reason already indicated.

2.3.17 In the circumstances, the Group recognized that the original proposal by Canada for the assignment of frequency 128.950 MHz for air-to-air communications purposes in the NAT Region was likely to constitute the least contested proposal, on the strict condition that its use would be restricted to areas out of range of VHF ground stations, in accordance with Annex 10 provisions. A distance of 450 NM from any such station was considered to constitute an adequate safeguard against any interference problem. In the view of the Group, frequency 128.950 MHz should not be used for air-to-air communications within this range of ground stations operating on frequencies ranging from 128.900 MHz to 129.000 MHz. It was therefore agreed that States having expressed difficulties in accepting the assignment of frequency 128.950 MHz for air-to-air use in the NAT Region should be invited to review their position, preferably before summer 1985. It was also agreed that, in the case of unsuccessful results of this action, the matter should be referred to the NAT SPG/23 Meeting.

CONCLUSION 22/17 - NAT AIR-TO-AIR VHF CHANNEL

That, in view of the recognized requirement for an air-to-air communication channel in the NAT Region and of the difficulties encountered in the assignment of a specific frequency for that purpose:

a) those States having expressed difficulties in accepting frequency 128.950 MHz for air-to-air use in the NAT Region, as originally proposed by Canada, be invited to reconsider their position and to notify their final decision to ICAO before summer 1985;

b) in the case that the frequency 128.950 MHz is accepted by these States, Canada be invited to confirm its original Amendment Proposal (N° NAM/CAR 84/1-COM); and

c) in the case that the objections to the selection of frequency 128.950 MHz are confirmed, the matter be referred to the NAT SPG/23 Meeting for renewed consideration.

Note: Under the condition in b) above, the new Amendment Proposal should contain an indication that the frequency 128.950 MHz should not be used at distances less than 450 NM from the ground stations operating on frequencies ranging from 128.900 MHz to 129.000 MHz.

Inter-OAC AFS speech circuits

2.3.18 It was reported to the Group that the operation of inter-OAC AFS speech circuits had suffered from shortcomings, essentially imputable to the complex constitution of such circuits. The problem related mainly to the Prestwick-Santa Maria, Prestwick-Gander, Prestwick-Reykjavik-Gander and Santa Maria-New York circuits.

2.3.19 In the case of the Prestwick-Santa Maria speech circuit, the current arrangements provided for the following routing : by micro-wave link from Santa Maria to Sao Miguel, by satellite to Lisbon/PTT, by landline to the Lisbon COM centre, by landline back to Lisbon/PTT, by submarine cable from Lisbon/PTT to London/British Telecom International (BTI) and by landline to Prestwick/BTI and to Shanwick/OAC. In addition, the above route arrangement provided for multiplex telegraph channels between London and Lisbon, which added considerably to the route complexity and the consequent problems. Following bilateral negotiations between Portugal and the United Kingdom, an improved service was expected to be obtained by separating the speech and telegraph elements and by establishing a more direct route for the speech circuit. The new arrangements were planned to be implemented by July 1985. The Group noted that, as an alternative solution, the provision of INMARSAT Ship Earth stations (SES) at both Prestwick and Santa Maria had been investigated. While technically feasible, such a solution would involve relatively high costs. For this reason it had been left in abeyance for the time being, pending the results of the circuit routing changes mentioned above.

2.3.20 With regard to the Santa Maria-New York speech circuit, it was reported that this was now restored to the required standard of operation since 28 March 1985. One remaining problem in New York OAC was the automatic switching of the Santa Maria circuit to San Juan, the establishment of which was dependent upon the implementation of a new line between New York and San Juan.

2.3.21 With regard to the Prestwick-Gander direct speech and ATC data circuit, it was reported that its splitting in Montreal into separate speech and data paths between Montreal and Gander had caused maintenance liaison-related problems. It had been agreed between Canada and the United Kingdom that the speech-plus equipment would be relocated to Gander OAC. The change was to be completed in May 1985 and was expected to result in some improvement. Should this not be the case, the possibility of providing a discrete telegraph circuit for the data and of using the derived channel on the speech circuit as a data back-up had been envisaged.

2.3.22 Some procedural/technical problems had also been experienced on the Prestwick-Reykjavik-Gander omnibus circuit (SS4). These problems were being investigated and remedial action would be taken, on a priority basis, before the commencement of the summer 1985 traffic flow.

NAT VHF coverage charts

2.3.23 It was recalled that the services provided by the Søndre Strømfjord station on NAT HF Family "D" and GP/VHF (127.900 MHz) had been discontinued since 2 August 1984. As a consequence, the GP (general purpose) frequency 127.900 MHz, in use at the Søndre Strømfjord remote-controlled stations located at Kulusuk and Qaqatoqaq had been changed and the use of the NAT "D" HF Family frequencies had ceased, effective 1 December 1984. A domestic set of HF channels had been brought into use for domestic operations and for international flights operating within the Søndestrom FIR below FL 195. It was also reported that it was not intended to maintain an exclusive air-ground communications service but rather to integrate such a service into the FIS provided below FL 195. The staff and the facilities at Søndre Strømfjord had been tailored to the exclusive provision of that service.

2.3.24 As a consequence, the NAT VHF coverage charts, which now showed VHF coverage above FL 195 within the NAT Region, would have to be amended to reflect this limitation of the VHF communications service. The Group agreed that States issuing NAT VHF coverage charts should be invited to take related action as soon as possible.

CONCLUSION 22/18 - NAT VHF COVERAGE CHARTS

That States issuing NAT VHF coverage charts be requested to amend such charts to reflect the limitation of the VHF communications service currently provided by communications stations in Greenland.

2.3.25 In this connexion, the Group expressed its concern at the limitation of the GP/VHF communications services provided by Søndre Strømfjord from the remote-controlled stations of Kulusuk and Qaqatoqaq. These stations had been quite useful to international flights transiting the Søndrestrom FIR and parts of the Reykjavik CTA, in particular flights not carrying HF communications equipment and also, under subnormal HF conditions, HF-equipped flights within VHF coverage of those stations. Recognizing that the new situation was fully in conformity with the ICAO NAT Regional Air Navigation Plan, the Group refrained from making any Conclusion in this regard. However, the Group deemed it desirable to keep under review the implications of the reduction in VHF services. It did not exclude the possibility of having to discuss this matter again at its next Meeting.

Position reports and other ATS fixed message formats

2.3.26 Under this heading, the Group considered the requirement for standardization of operational and control messages exchanged between aeronautical communication stations, air traffic control centres and aircraft operating agencies. This requirement was recognized to become increasingly urgent, along with the progress achieved in the use of automation by aeronautical service users and providers in the NAT Region and in view of the problems being encountered by some flight service stations during the planning stage of automation, in particular with regard to interface with various users.

2.3.27 It was reported that incompatibilities had been found to exist between ICAO ATS message formats, as set out in Doc 4444 (PANS RAC), and the present requirements for the format of air-ground messages and the difficulties to automate their handling. It was recalled that, since 1976, studies had been conducted for the definition of compatible message types and formats that would facilitate the automatic exchange of data between OACs. In particular, the NAT SPG/13 Meeting (1977) had been presented with a proposal by the United Kingdom for the use of additional ATS message types and formats in the NAT Region, aimed at taking full advantage of the Flight Data Processing Systems (FDPS) planned at that time. Subsequent activities in this field had led, in 1979, to a trial application of the new ATS message formats throughout the NAT Region, based on procedures commonly agreed amongst all provider States directly concerned.

2.3.28 The Group noted that automation was scheduled to be implemented at Shanwick OAC in 1986 and at Gander OAC in 1987. Automated facilities were being introduced by other NAT provider States and by many international service users. In view of these developments, the Group considered that the time was now ripe for starting the development of agreed ATS message types and formats for the efficient exchange of messages between users and providers of electronic data processing facilities. It was agreed that the Member for Canada, in co-ordination with other Members of the Group, would prepare a relevant document for presentation to the next Meeting of the NAT SPG with a view to promoting amendments to the relevant ICAO provisions as necessary.

CONCLUSION 22/19 - DEVELOPMENTS OF ATS MESSAGE TYPES AND FORMATS

That the Member for Canada, in co-ordination with other Members of the NAT SPG, be invited to :

a) develop firm ATS message types and formats for the efficient exchange of messages between users and providers of electronic data processing facilities and for the benefit of users which are currently in the process of automating their message handling systems; and

b) present a relevant document to the NAT SPG/23 Meeting, with a view to promoting amendments to the relevant ICAO provisions as necessary.

Mid-point MET reports

2.3.29 The Group gave renewed consideration to the problem of communications workload which may arise from the transmission, by aircraft designated to provide AIREPS, of additional information on meteorological conditions at the intermediate longitude(s). It was recalled that, in compliance with NAT SPG provisions, trials were conducted in September 1983 and were resumed in August-September 1984. However, these trials did not provide a clear picture of the situation, since they were conducted during periods when communications were at their lowest.

2.3.30 A subsequent analysis of the results of a two-day survey of the MET reporting situation, conducted in January 1985, did not show a congestion or an excessive loading of the NAT HF channels. However, it was believed that an increase in both these factors would probably have been noted, had the survey been carried out during the peak period. Therefore, the Group agreed that, before deciding to curtail the programme of transmission of mid-point MET information or to adopt it on a permanent basis, an in-depth analysis was required over a longer time frame, inclusive of the peak traffic period.

CONCLUSION 22/20 - MID-POINT MET REPORTING IN THE NAT REGION - COM ASPECTS

That:

a) Canada be invited to conduct, on selected dates over a one-year period, an in-depth analysis of the NAT communications workload and HF channel congestion problems, which may arise from mid-point MET reporting; and

b) the findings of this analysis be reported to the NAT SPG/23 Meeting.

Note: Conclusion 22/11 on the operational aspects of that subject also refers.

Similarity of aircraft callsigns

2.3.31 It was reported to the Group that the situation regarding the use of similar aircraft callsigns, as noted in the course of the NAT SPG/21 Meeting, had remained practically unchanged. Examples were quoted, once again, of instances which may have led to confusion in air-ground communications.

2.3.32 The Group reiterated the view previously expressed that the difficulties encountered could only be overcome, or at least alleviated, through an improved discipline in communications, both on the part of pilots and ground personnel. It was confident that all concerned would continue their efforts to improve the situation.

ATTACHMENT
to the Summary
on Agenda Item 2

PROPOSED TEXT FOR THE AMENDMENT OF THE NAT REGIONAL SUPPS

(Doc 7030/3-NAT, Part 1, para 5)

1. Add a new sub paragraph c) to para 5.1:

"c) en-route diversion across the prevailing NAT traffic flow."

2. Amend penultimate sentence of para 5.1 to read:

"With regard to a) and c) the procedures are applicable primarily when rapid descent, and/or turn-back or diversion is required."

3. Add a new section 5.5:

"5.5 Special procedures for en-route diversion across the prevailing NAT air traffic flow

5.5.1 In the event of a contingency which necessitates an en-route diversion to an alternate aerodrome across the direction of the prevailing NAT traffic flow, and prior ATC clearance cannot be obtained:

1) an aircraft able to maintain its assigned flight level should:

i) if above FL 290 climb or descend 300m (1000ft);

ii) if below FL 290 climb or descend 150m (500ft);

iii) if at FL 290 climb 300m (1000ft) or descend 150m (500ft);

while turning towards the alternate aerodrome.

2) an aircraft unable to maintain its assigned level should:

i) start its descent while turning to acquire a track separated by 30NM from its assigned route or track;

ii) continue descent to a level which can be maintained which differs from those normally used by 300m (1000ft) if above FL 290 or 150m (500ft) if below FL 290 before making a further turn towards the altenate aerodrome."

Agenda Item 3: Technological developments of interest to the NAT Region

3.1 Introduction

3.1.1 Under this Agenda Item, the Group considered the following specific subjects:

a) ATC automation and traffic display systems in Oceanic Area Control Centres;

b) use of satellite techniques for NAT ATS purposes;

c) automatic dependence surveillance; and

d) data link applications.

3.2 ATC automation and traffic display systems

3.2.1 The Group noted further progress made by States to introduce ATC automation and automatic flight plan data processing systems in a number of Oceanic ACCs since it last discussed this matter at its 21st Meeting (NAT SPG/21-Summary, para 3.3 refers). The intended commissioning of the automated system in Shanwick OAC had been delayed due to a number of software problems which had become apparent during extensive testing and air traffic controller familiarization with the new system. Extensive work was in hand to advance matters as rapidly as possible and it was now expected that operational commissioning would take place in spring 1986.

3.2.2 With regard to the automated air traffic control system used in Gander OAC, the Group noted a presentation by its Member for Canada on intended system enhancements. In 1985/1986 it was expected to implement an upgraded data link between Gander and Shanwick OACs and a data link between Gander OAC and Moncton ACC. Future enhancements will include conflict prediction capability of westbound flights and receipt of upgraded MET data from the US National Weather Service Headquarters in Suitland.

3.2.3 The Group also noted an updated system description of the FAA Oceanic Display and Planning System (ODAPS) for use in US Oceanic Air Traffic Control Centres. It was pointed out that installation of the system in the New York OAC could be expected in September 1986 and become operational early in 1987. The two-dimensional radar-type display system would initially be used in addition to the conventional flight progress strip system applied at the present time. The USA would continue to keep the NAT SPG updated on further progress in this field (see also para 3.4 below).

3.2.4 In this connexion, the Group recalled its Conclusion 21/19 which called for the need for compatibility of automated ATC systems, confirmed its continued validity and noted with appreciation the on-going exchange of documentation and information in the field of ATC automation developments.

3.3 Use of satellite techniques for NAT ATS purposes

3.3.1 The Group was presented with a descriptive outline of a satellite project programme undertaken by a number of European Space Agency (ESA) Member States regarding trials and demonstrations of satellite communications for maritime, terrestrial and aeronautical purposes using the INMARSAT MARECS-B satellite. In his presentation, the Member for the United Kingdom gave a detailed description the results of current trials involving a satellite earth station located in Spain which had proved very promising so far. It was hoped that about ten aircraft would be fitted for aeronautical tests which could start towards the end of 1986. In this connexion, it would be desirable that different airlines using different air navigation equipment on their aircraft would participate so that a wide spread of experience could be gained, both with respect to hardware used and the geographical distibution of aircraft in oceanic airspace. It was felt that this trial programme would present a welcome opportunity to demonstrate the potential of satellite communications to provide a service to ATC, particularly in Oceanic areas where the present communications and traffic surveillance were a constraining factor to the enhancement of ATC services.

3.3.2 On the same subject, the Member for the USA presented a project description developed by the MITRE Corporation with the objective to determine the technical viability of satellite aeronautical data communications based on shared use of an existing commercial satellite system. It was expected that a final report would become available by the end of 1985 and could be distributed to the NAT SPG Members shortly thereafter.

3.3.3 Discussion of the matter by the Group concentrated particularly on questions of cost-effectiveness of the systems described in the two presentations. It was pointed out that cost-effectiveness considerations would have to take into account long-term application and developments and should not only be based on a short-term outlook starting from the current comparatively satisfactory system efficiency as established under Agenda Item 2.

3.3.4 A number of questions were raised during the discussion relating to satellite system reliability and the need for redundancy of a system required to ensure air safety at all times. It emerged that the redundancy requirement would undoubtedly add to the overall cost, but would require less hardware duplication than was initially foreseen. It was felt that a satellite earth station in Europe and a satellite earth station on the North American continent would provide sufficient redundancy to support communication and surveillance.

3.3.5 The Group realized that the subject of the use of satellite techniques for the NAT Region was related to a number of matters discussed by the Group itself or by other competent bodies such as automatic dependent surveillance, automatic independent surveillance, communications, data link applications, etc.. The Group did therefore not advance consideration of this subject any further at this time, but agreed to continue to monitor developments in future.

3.4 Automatic dependent surveillance

3.4.1 It was recalled that, at its 21st Meeting, the NAT SPG had concluded that automatic dependent surveillance (ADS) should be considered as one of the possible options available for air navigation system improvements in the NAT Region (Conclusion 21/18 refers). The Member for the USA expressed the view that, upon further study of the matter, work towards the implementation of ADS should now proceed on a priority basis so that the expected benefits of increased safety, system efficiency and, possibly, improved cost-effectiveness may be realized. ADS would provide an effective traffic surveillance function by relaying to ATC, in real-time, information on aircraft identification, position, altitude, true airspeed, wind and outside air temperature. This information would be updated at suitably frequent intervals to provide source data for a computer-derived presentation to the air traffic controller. In the USA, automatic dependent surveillance was foreseen as an integrated element of the Oceanic Display and Planning System (ODAPS) discussed earlier (para 3.2.3 refers).

3.4.2 The USA was currently conducting a study of the operational feasibility and impact of automatic dependent surveillance. The results would be made available both to the NAT SPG and the ICAO Council Special Committee on Future Air Navigation Systems (FANS) to assist these Bodies in their work.

3.4.3 While there was no dissent in principle expressed during the discussion of that matter as to the potential usefullness of an automatic dependent surveillance function, caution was nevertheless voiced concerning the approach towards actual implementation, related lead-times, cost-effectiveness aspects, etc. Some Members felt that, before introduction of an automatic dependent surveillance system could be envisaged, it was necessary to undertake further detailed studies on a number of particular elements, both related to the airborne equipment environment as well as to the ground and, possibly, space elements of such a system. As to the possibility that automatic dependent surveillance might contribute substantially to a reduction of lateral separation in NAT MNPS airspace, initial mathematical-statistical studies had shown that this would not immediately allow a lateral spacing of adjacent tracks in the desired range of 30NM and/or a reduction of longitudinal separation to a desirable value in the order of 5 minutes.

3.4.4 The representative of IATA informed the Group of the conditional support of his Organization for the introduction of automatic dependent surveillance for use throughout the NAT MNPS airspace. He stressed that, at all times and at all stages of planning of such a system, cost-effectiveness considerations would have to be taken into account particularly with respect to the necessity for all aircraft operating within the airspace concerned to carry the required on-board equipment. In this connexion, he also referred to the cost aspects related to the need to retain at least some capability for air-ground radiotelephony communications even after the introduction of ADS.

3.4.5 While the views expressed on that subject were diverging on several accounts, the Group nevertheless agreed that the Conclusion reached at NAT SPG/21 was still valid (NAT SPG/21-Summary, para 3.2 refers). It therefore restated its Conclusion 21/18:

CONCLUSION 22/21 - AUTOMATIC DEPENDENT SURVEILLANCE AS ONE OF THE POSSIBLE OPTIONS FOR NAT SYSTEMS IMPROVEMENT

That the concept of automatic dependent surveillance be considered as one of the possible options available for air navigation systems improvement in the NAT Region and therefore be taken into account in medium and long-term planning.

3.5 Data link applications

3.5.1 The elements related to data link applications in connexion with satellite techniques, automatic dependent surveillance, etc, have been discussed earlier under this Agenda Item (paras. 3.2, 3.3 and 3.4). Under this heading the Group therefore concentrated on a progress report presented to it by the Member for the USA concerning the subject of HF data link which had been discussed at several previous meetings.

3.5.2 In his presentation, the Member for the USA informed the Group of latest results achieved with test applications of that technique and of further plans for the future. He pointed out that, so far, several test results had not been entirely satisfactory as far as possible operational introduction of this technique was concerned. Nevertheless, valuable additional information had become available and preparations were now being made for the development of an improved modem which would reduce the currently achieved bit error rate to within acceptable values.

3.5.3 With respect to the sharing of HF voice channels with data transmissions in the interest of frequency spectrum economy, it was found that this was a technically unacceptable proposition due to mutual co-channel interference deteriorating the voice quality very substantially. Experience with acceptability of the new technique by pilots and ground personnel was generally positive and it was felt that it had potential for workload reduction, particularly in the cockpit environment.

3.5.4 In the ensuing discussion, a number of points were raised concerning the expected reliability of an operational HF data link system, the usage of the frequency spectrum and the potential of upgrading it technically to satellite based data link applications once the time had come for such systems. It was explained that an operational HF data link system in the NAT Region would be supported by suitably located ground stations which would ensure full coverage of the Region, including those areas in the North which were difficult from a High Frequency propagation point of view. With respect to the use and the availability of suitable HF channels, it was pointed out that initially the HF data link system would use aeronautical operational control frequencies and would make use of selected voice channels in the aeronautical mobile service band only as and when the requirement for voice communications was beginning to recede and such channels could therefore be freed for data link use.

3.5.5 It was explained that an evolutionary transition at the hardware level of HF data link to space based data link applications would be feasible. As such it was believed that HF data link might possibly bridge the gap between existing technology and sophisticated future technology expected to be introduced in the longer term.

3.5.6 There was support from some Members of the Group, as well as from the representatives of the international airspace user organizations as to continued trials in this field in order to assess the potential benefits that could be derived from an operational HF data link system. The Group agreed to monitor the situation in future and requested its Member for the USA to keep it fully informed on further developments.

3.6 Concluding Remarks

3.6.1 In concluding the discussion on this Agenda Item, the Group noted that the various elements discussed could, in fact, not be seen in isolation from each other, since they were very closely interleaved nor was the list of subjects reviewed considered to be exhaustive. From the discussions, however, a certain lack of information became apparent, particularly with regard to envisaged timeframes, possiblities and requirements for application and implementation, as well as realistic outlooks on the cost-effectiveness of technological developments towards which certain trends became discernible. It was believed important that these subjects be considered more closely, if related planning were to advance with the necessary speed and in a co-ordinated, systems orientated manner.

3.6.2 Furthermore, the Group felt that the various presentations by its Members of usually excellent information material at its Meetings might be insufficient in that it was not possible for the Group, and indeed the States concerned, to follow developments consistently so as to form opinions with respect to potential application and use of new technologies. It was obvious that matters like protection times for present and envisaged future systems had to be taken into account and amortisation of recent installations had to be considered. It would appear, overall, that major technological changes to the NAT air navigation system could be expected to occur not earlier than the 1990's. It was important therefore to keep abreast of developments, if decisions taken were to meet current trends. Cost-effectiveness studies would have to be undertaken by all concerned at the earliest possible stage so that less advantageous applications could be identified, before excessive efforts were invested in development and testing.

3.6.3 In the light of the above, the Group agreed that those Members who had access to relevant information concerning technological developments of interest to the NAT Region, including matters that had so far not yet been discussed by the NAT SPG (e.g. satellite navigation), keep the Group continuously abreast of trends and experience gained so that a full appreciation of the situation by all concerned becomes possible. It was felt that this would significantly contribute to the future work of the Group and would allow it to assume its role in air navigation systems planning for the NAT Region and to provide the input expected from it to all concerned.

Agenda Item 4: Evolutionary medium and long-term planning for the NAT Air Navigation System

4.1 Introduction

4.1.1 Under this Agenda Item, the Meeting discussed the following specific subjects:

a) results of studies available since the last NAT SPG Meeting;

b) reduced vertical separation and possible use of 1000 ft levels for crossing traffic;

c) traffic statistics and forecasts; and

d) review of the activities of the ICAO Special Committee on Future Air Navigation Systems (FANS).

4.2 Results of studies available since the last Meeting.

Consolidated documentation concerning air navigation in the NAT Region

4.2.1 When considering at its last Meeting the question of possible improvements that could be brought about through a consolidation of all material relevant to the planning and operation in the NAT Region in order to facilitate reference to and consultation of material which was often widely dispersed in different documents, the Group had requested its Member for Canada to prepare a draft outline on the basis of which further work could be undertaken. A respective document had been prepared and was now presented to the NAT SPG which was found not entirely complete, essentially because of a lack of timely input from other Members concerned. This was due mainly to the assignment of higher priority to other work related to the NAT SPG activities.

4.2.2 In this connexion, the Group noted a number of difficulties encountered by the ICAO Secretariat when preparing the Fourth Edition of the Guidance and Information Material for Flight Operations in the NAT Region for distribution by the European Office of ICAO. In the course of this work, the Secretariat had found numerous instances where the document appeared either outdated, cross references to material held by States were sometimes in doubt and overall, the lay-out and content appeared to merit close revision. Due to workload constraints, it had not been possible, within the time available for the preparation of the Fourth Edition, to embark on the modernization process but it was intended to proceed with this project in the foreseeable future. It was intended to present a draft to the next Meeting of the NAT SPG in order to sollicit the Group's comments before circulation.

4.2.3 In the light of this situation, the Group agreed that the Member for Canada would complete his submission of a consolidated list of relevant documentation, compiled with the active assistance of the other Members of the Group and that the Secretary should present his revised draft guidance material to the Group at the same time. It was intended to review both documents in conjuction and to determine to what extent integration or consolidation was possible or desirable.

CONCLUSION 22/22 - CONSOLIDATED DOCUMENTATION CONCERNING AIR NAVIGATION IN THE NAT REGION

That, for presentation to the next Meeting of the NAT SPG:

a) the Member for Canada, with the active assistance of the other Members of the Group, prepare a draft outline of a consolidated documentation concerning air navigation in the NAT Region;

b) the Secretary prepare a revised draft version of the Guidance and Information Material concerning Air Navigation in the NAT Region, issued by the European Office of ICAO;

so that the Group may decide on the most suitable document to be prepared to meet the intended purpose.

UK computer model for estimating cost penalties within the NAT air navigation System

4.2.4 At its 21st Meeting, the Group had been presented by its Member for the United Kingdom with a description of a computer model developed by the United Kingdom CAA suitable for cost-effectiveness studies of the North Atlantic Air Navigation System (NAT SPG/21-Summary, para 4.6 refers).

4.2.5 At this Meeting, the Group reviewed the outcome of a validation exercise of the model by comparison of calculated results with actual traffic samples. It was found that these were close to identical. In the light of this, the Group reaffirmed its appreciation for the quality of the work undertaken by the United Kingdom on this subject and was confident that the use of the computer model would significantly assist the NAT SPG in its future deliberations.

4.2.6 In fact, a computer simulation exercise had been carried out with this model in order to assess the cost-effectiveness of the application of composite separation in NAT MNPS airspace and this was used in the discussions of that matter under Agenda Item 2 (para 2.2.43 refers).

4.3 Reduced vertical separation and use of 1000 ft levels for crossing traffic

4.3.1 With respect to the question of reducing vertical separation minima above FL 290, the Group briefly reviewed progress made by the ICAO RGCS (Review of the General Concept of Separation) Panel and noted encouraging interim results. No indication was available at this time as to when such reduction would become operationally feasible.

4.3.2 The Group addressed itself to a proposal made by IATA to consider the use of 1000 ft vertical separation between aircraft established on the same track and one aircraft wishing to cross that track. It appeared essential to carefully consider the potential risk level of a vertical separation application of that kind before proposing it for application in a wider form. To this extent the Group considered a mathematical analysis of that problem undertaken by the Member from the United Kingdom which produced a less than optimistic outlook.

4.3.3 The analysis revealed the probable impact, given currently available data on vertical performance, along track parameter estimates and other significant parameters, of aircraft crossing a fixed track vertically separated by 1000 ft on the risk estimate. The risk experienced by the crossing aircraft per crossing event was taken to be the joint probability of vertical and horizontal overlap with an aircraft on the organized tracks being crossed. The effect of crossing angle and relative velocity of the track and crossing aircraft were considered. Using parameters applicable to the North Atlantic OTS, equal velocities for crossing and on-track aircraft and assuming the lower value for P_z (1000) assumed by NAT SPG/5 and /6 (0.0003), the risk was shown to vary between 6.7×10^{-8} and 3.8×10^{-7} per crossing event for crossing angles between 20 and 160 degrees.

4.3.4 These figures were converted into the risk per flying hour by assuming that the risk was spread over the entire duration of a North Atlantic crossing - approximately 4 hours. The figures were then compared to a tentative target level of safety of 1×10^{-8} per flying hour - assuming that half the target level of safety or vertically separated aircraft could be taken up by the crossing risk. By this comparison, the risks associated with crossing traffic were unacceptable. If lower values for P_z (1000) could be justified it might be possible to change this conclusion.

4.3.5 In view of this situation the Group refrained from entering into this question in any more detail at this time and agreed to await further developments in connexion with the reduction of vertical separation minima.

4.4 Traffic statistics and forecasts

4.4.1 The Meeting noted that, pursuant to its Conclusion 21/24, the North Atlantic Traffic Forecasting Group (NAT TFG) had made arrangements to convene a NAT Traffic Forecasting Workshop which was now planned to be held, in conjunction with the 19th Meeting of that Group, from 3 to 5 June 1985. The Group noted that most of the States invited and IATA had confirmed their participation and hoped that the intended approach to the subject matter would yield interesting and useful results. It was expected that the report of the workshop as well as the results of the deliberations of the 19th Meeting of the NAT TFG (6 to 13 June 1985) would also be made available to the ICAO FANS Committee so that the required information on future outlooks would be available to that body, although the product would only show the situation in one specific part of the world.

4.4.2 While on the subject of traffic forecasting for the NAT Region, it was noted that, on most occasions, the NAT TFG had scheduled its Meetings after the Meetings of the NAT SPG. As a result, the NAT SPG was not in a position to work with latest forecast information and statistical data. It was pointed out that the Forecasting Group received its raw data only very late in the year and could therefore not systematically schedule its own Meetings much earlier than the month of May. In addition, it was noted that the NAT provider and user States as well as the Members of the NAT SPG, all recipients of the NAT traffic forecast, were able to use the forecast product developed by the NAT TFG upon receipt. The availability of more recent data at the NAT SPG Meetings might therefore be of somewhat less significance.

4.4.3 Recognizing these constraints, the Group nevertheless requested the NAT TFG to schedule its Meetings, as much as possible, in advance of NAT SPG Meetings so that the latest data would become available by the time the NAT SPG met.

CONCLUSION 22/23 - SCHEDULING OF MEETINGS OF THE NAT TRAFFIC FORECASTING GROUP

That the NAT Traffic Forecasting Group schedule its Meetings, as far as this is possible, in advance of Meetings of the NAT Systems Planning Group so that its reports may be taken into account in the work of the latter.

4.5 Review of the activities of the ICAO FANS Committee

4.5.1 The Group briefly reviewed the activities that had taken place so far within the ICAO Special Committee on Future Air Navigation Systems (FANS) and noted the outcome of the 1st Meeting of that Body. From information of those Members whose States had also nominatd Members to the FANS Committee, it was apparent that the approach taken by them was consistent with the input provided by them to the work of the NAT SPG. The Group confirmed its intention to continue to monitor the FANS Committee's activities and to take action as and when this appeared necessary in order to contribute to the long-range systems planning efforts undertaken by both bodies.

Agenda Item 5: General Matters

5.1 Introduction

5.1.1 Under this Agenda Item, the Group considered the following specific subjects:

a) IGA operations in the NAT Region;

b) Disposition of the NAT MNPS Airspace Operations Manual;

c) Proposed Transatlantic Air Rally-1985;

d) Formation flying in the NAT Region; and

e) Preparation for the LIM NAT (RAC/COM/MET) RAN Meeting.

5.2 IGA Operations in the NAT Region

5.2.1 Under this heading, the Member for the USA presented the Group with a consolidated document concerning IGA flights across the North Atlantic outside MNPS airspace. This document had been developed in accordance with agreements reached by the Group at earlier meetings (see NAT SPG/21-Summary, para 5.3). The Group commended its author for the document which had proved particularly difficult to develop and it was hoped that its circulation would achieve the expected improvements and would assist IGA operators in the planning and conduct of their operations across the inhospitable North Atlantic environment.

5.2.2 The Group reviewed the material in detail and amended it editorially as necessary. As to its publication, it was agreed that it should receive widest possible circulation amongst IGA operators and pilots in order to achieve the desired enhanced safety of their flight operations. To this effect, the material would be circulated in the form of a loose-leaf Amendment to the Guidance and Information Material concerning Air Navigation in the NAT Region issued by the European Office of ICAO under reference T 13/5N. It was hoped that States and International Organizations, recipients of this Amendment, would take necessary action to reproduce the material and ensure widespread distribution within the IGA community. It was noted that the ICAO cover letter under which the material would be circulated would contain words to that effect.

5.2.3 Noting that the document contained a chart showing the available General Purpose VHF coverage at 15 000 ft, the suggestion was made, also to include a similar chart depicting the coverage that could be expected at 10 000 ft. It was agreed that, as part of any future amendments that might be necessary to the material, the Member for the United Kingdom would undertake to prepare such a chart in co-operation with the NAT provider States which were requested to provide him with the necessary information. Furthermore, it was believed useful to introduce a suitable chart showing the reliable LORAN-C coverage within the NAT Region for guidance of pilots of aircraft equipped with the corresponding navigation equipment. The Member for the United States agreed to provide that chart to the Secretary for inclusion in the document.

5.2.4 The guidance material concerning IGA flights across the North Atlantic outside MNPS airspace as endorsed by the Group is contained in the Attachment to the Summary on Agenda Item 5.

CONCLUSION 22/24- GUIDANCE MATERIAL FOR IGA FLIGHTS ACROSS THE NORTH ATLANTIC OUTSIDE MNPS AIRSPACE

That the European Office of ICAO circulate a suitable Amendment to the 4th Edition of the Guidance and Information Material concerning Air Navigation in the NAT Region to incorporate the Guidance Material for IGA flights across the North Atlantic outside MNPs airspace, contained in the Attachment to the Summary on Agenda Item 5, inviting States to ensure widest possible distribution of the material within the IGA community.

5.3 Disposition of the NAT MNPS Airspace Operations Manual

5.3.1 The Member for the United Kingdom informed the Group that the 4th Edition of the NAT MNPS Airspace Operations Manual which was prepared and published by the United Kingdom, in co-authoriship with IATA, on behalf of the NAT SPG, had been distributed in autumn 1984 in accordance with NAT SPG Conclusion 21/25. The Secretary confirmed that the French, Russian and Spanish language versions of that document, prepared by ICAO, had also been distributed in accordance with established practice.

5.3.2 Although this document was intended for widespread distribution at the operational level, and was available for reproduction by third parties without restriction, the Copyright disclaimer contained in the document, as a routine matter, had posed certain problems in a number of cases. The Member for the United Kingdom confirmed that this was not intended to restrict the disposition of its content in any way and he agreed to take action within his Administration with a view to resolve this matter for any future editions of the Manual.

5.4 Proposed Trans-Atlantic Air Rally

5.4.1 In late 1984, the attention of some Members of the Group had been drawn to the appearance of advertisements in the specialized aviation press concerning a proposed Transatlantic Air Rally to take place during the month of June 1985 and inviting prospective entrants to register with the organizers. In view of the experience made with a similar undertaking in 1981, arrangements were made to invite, as an exceptional measure, representatives of the organizers to participate in discussions related to the event at this Meeting. The organizers accepted this invitation and Mr.Laffargue and Mr Vilocel, representing the organizers, attended the Group's proceedings on 23 April 1985.

5.4.2 Answering in considerable detail the various questions posed by the Members of the Group to the representatives of the Air Rally organizers, it appeared that the event had been prepared in a thorough and professional manner. It was expected that approximately 80 aircraft, nearly all of them registered in Canada and the USA, would participate in the undertaking which foresaw a departure from Morristown, New Jersey, on 15 June 1985. The rally would proceed via Montreal-Frobisher-Godthab-Kulusuk-Reykjavik-Aberdeen-London to Paris Le Bourget with an expected arrival on 23 June 1985. Participating aircraft types ranged from single piston-engine to twin-jet light aircraft. The organizers explained that the detailed requirements for North Atlantic international general aviation flights had been clearly notified to the prospective participants and every entrant's aircraft would be checked before departure with respect to the equipment carried and its functional status.

5.4.3 Although the submission of bulk flight plans or stored flight plans would have been desirable to the organizers, the Group explained to them that this was not an acceptable proposition for the provider States concerned, particularly with respect to the aspects related to alerting and Search and Rescue Services. The organizers were fully aware of the safety aspects of the undertaking and agreed to impress on participants the particular environmental constraints that they were likely to encounter during the Rally. With respect to the filing of individual flight plans for the participating aircraft, the Group requested the organizers to ensure that they be submitted in a timely manner, possibly one hour and preferably two hours in advance of the planned departure time. It was also stressed that the services provided by ATC units and air radio stations would be the same as those routinely provided to other users of the airspace, particularly in view of the fact that the addition of 80 general aviation movements to the routine operation of the air navigation system was likely to cause considerable strain.

5.4.4 Responding to a detailed question posed by the Member of France, the representatives of the organizers explained that flights would operate in accordance with IFR up to Dieppe and would then enter into a VFR precision navigation contest requiring them to arrive in three minute intervals over Le Bourget airport. The Member for France suggested that the organizers make early contact with the French Civil Aviation Admininstration in order to discuss any organizational matters which would affect their services.

5.4.5 The representatives of the organizers were asked to stress to entrants the need for efficient survival equipment and the limitations of the SAR facilities.

5.4.6 Concluding its discussions on this subject, the Group expressed some concern as to the return trips of the many participants crossing the North Atlantic westbound without support from the Rally organizers. It expressed the hope that participants would be made aware of the occasionally somewhat more complicated conditions encountered in westbound ocean crossings, flying into the wind and therefore exposed to the environment for significantly longer periods of time. It was also felt necessary that the organizers reminded the pilots of the fact that the same stringent requirements imposed on them during their eastbound trip would also apply on their journey home because these were not Rally organizational constraints but necessary to meet actual ATC requirements and regulatory provisions.

5.4.7 The Group agreed that the Secretary should send an extract of this Summary covering the discussion to the organizers of the Transatlantic Air Rally, together with the Guidance Material concerning IGA flights across the North Atlantic outside MNPS airspace that had been finalized during this Meeting (para 5.2 refers). It expressed the hope and the wish that the Rally and the return flights by its participants may be conducted safely and concluded successfully.

5.5 Formation flying in the NAT Region

5.5.1 The Group addressed itself to a matter which had been discussed already at its 17th Meeting and again at its 19th Meeting and which had resulted in specific guidance material concerning temporary airspace reservations in the NAT Region, fomation flying whithin these airspace reservations and the separation standards to be applied by ATC in this respect. The latest material available on that subject is contained in the Guidance and Information Material Concerning Air Navigation in the NAT Region issued by the European Office of ICAO under reference T 13/5N (pages 4-3 to 4-7 of that document refer).

5.5.2 Renewed discussion of this matter had become necessary because of certain cases where formation flights by State aircraft in the NAT Region and by civil registered tactical aircraft were unable to conform to the provisions governing temporary airspace reservations, particularly with respect to the advance co-ordination processes required between designated Agencies and the ATC authorities concerned. The discussion proved exceedingly complex because of the different status of State aircraft and civil registered aircraft in the framework of the Convention on International Civil Aviation (ICAO Doc 7300/6). The Group therefore decided to address the two categories of flights separately, although, from an ATC operational point of view, the subjects were very closely interrelated.

5.5.3 It was found that, in both cases, the problems arose primarily with respect to formation flights by State aircraft between Canada, Greenland and Iceland, between the USA, Greenland and Iceland, and between Canada and the USA respectively and Portugal (Azores). In view of this situation the Members concerned agreed on the following provisions for such formation flights that would permit them to be considered as a single aircraft for separation purposes. The Group agreed that these provisions should be published in the Guidance and Information Material concerning Air Navigation in the NAT Region and in State publications as appropriate. The Group expected to discuss this matter further, as necessary.

Provisions on Formation Flying by State Aircraft in the NAT Region

1. Definition of formation flight:
More than one State aircraft which, by prior arrangement between the pilots, operate as a single aircraft with regard to navigation and position reporting. Separation between the aircraft within the formation remains the responsibility of the flight leader and the pilots of the other aircraft in the flight. This includes transition periods when aircraft within the formation are manoeuvring to attain separation from each other to effect individual control and during join-up and break-away.

2. All aircraft within the formation shall operate so that the wing aircraft maintain a distance of not more than 1 NM laterally or longitudinally and a vertical displacement of not greater than 100ft from the flight leader.

3. The formation flight will be considered as one aircraft by ATC for separation purposes. If at least one of the aircraft participating in the formation flight is MNPS approved, the entire formation flight is considered to be approved for operation in NAT MNPS airspace.

4. ATC clearances will be issued to the formation leader only.

5. The formation shall file an appropriate ICAO flight plan for the operation.

5.5.4 In this context, the question was raised as to the possible need to develop specific contingency procedures for formation flights, covering cases such as break-away by participating aircraft during the flight, etc.. It was expected that the Group of States concerned would also address this question as necessary.

5.5.5 With respect to formation flights by civil registered tactical aircraft of types normally used as State aircraft, intending to operate as formation flights in the NAT Region, the Group agreed that its Members should study the various aspects related to this particular kind of flight in relation to applicable ICAO provisions. Specifically, the point was raised as to whether formation flying in controlled airspace under instrument flight rules by civil aircraft was permissible within the provisions of ICAO Annex 2 (para 3.2.1.2, stipulating that aircraft shall not be flown in formation except by pre-arrangement) and any other ICAO provisions that may be applicable. It appeared important to resolve this question before detailed procedures for this type of operation could be developed, along the lines of the guidance provided in para 5.5.3 above. The Group agreed that this matter should be addressed at its next Meeting.

CONCLUSION 22/25 - FORMATION FLIGHTS IN THE NAT REGION

That:

a) the provisions concerning formation flights by State aircraft in the NAT Region as set out in para 5.5.3 be incorporated in the Guidance and Information Material concerning Air Navigation in the NAT Region (reference T 13/5N) and the European Office of ICAO take the necessary action to circulate a suitable amendment to that document;

b) the Members of the NAT SPG study the aspects related to IFR formation flights in controlled airspace by civil registered tactical aircraft of types normally used for State aircraft, particularly with respect to their acceptability within the framework of existing ICAO provisions and with the aim of developing relevant NAT Regional Supplementary Procedures, if necessary.

5.6 Preparation of the LIM NAT (RAC/COM/MET) RAN Meeting

5.6.1 Referring to its discussions at its last and earlier Meetings concerning preparations for the LIM NAT (RAC/COM/MET) RAN Meeting (NAT SPG/21-Summary, para 5.2 refers), the Group recalled its latest views concerning a possible suitable period for its convening, in late 1986/early 1987.

5.6.2 In the light of the discussions held at this Meeting as reflected in this Summary, the Group came to the conclusion that, from its point of view, the various potential subjects for discussion had still not reached a degree of maturity justifying discussion at a formal ICAO Regional Air Navigation Meeting. In fact, developments had taken place since the Group last discussed this matter, which confirmed this view, in particular the creation of the ICAO Council Special Committee on Future Air Navigation Systems (FANS). Against this background, the Group agreed that tentative plans might usefully be made by ICAO for the convening of the LIM NAT (RAC/COM/MET) RAN Meeting by late 1987 at the earliest.

ATTACHMENT
to the Summary on
Agenda Item 5

GUIDANCE MATERIAL FOR INTERNATIONAL GENERAL AVIATION (IGA) FLIGHTS ACROSS THE NORTH ATLANTIC OUTSIDE MNPS AIRSPACE

Note: Flight Operations in NAT MNPS Airspace have to meet stringent additional requirements described in the NAT MNPS Airspace Operations Manual.

1. OBJECTIVE - The objective of this material is to provide operational information to pilots for flight planning and operation of IGA flights across the North Atlantic, in particular those operations carried out by light aircraft.

1.1 A number of incidents have occurred with North Atlantic IGA flights which have been caused by non-compliance with basic requirements for navigation and communications equipment needed for oceanic flights or flights over remote areas.

1.2 Most of the incidents were potentially hazardous to the occupants of the aircraft, and to aircrew members of aircraft called upon to search for them.

1.3 Some of the incidents resulted in needless and expensive alert activities on the part of ATC communicators and controllers, and in search activities on the part of rescue facilities.

1.4 Reduction or elimination of the incidents, which have generally involved flights which are considerably off-course or have not reported their position as required, is needed so that the unnecessary expenditure of resources is eliminated.

2. THE NAT OPERATIONAL ENVIRONMENT

2.1 The climate affecting NAT flight operations is demanding throughout the year, with storms or other adverse weather likely to be encountered during any season. It is probable that at least a portion of the route will be affected by adverse weather conditions.

2.2 The scarcity of alternate aerodromes available to trans-Atlantic flights requires that all significant weather systems along the route be considered during flight planning.

2.3 Radionavigation systems available to pilots include OMEGA/VLF and LORAN-C, but LORAN-C coverage is incomplete in many areas.

2.4 Several high power non-directional radiobeacons are located in the NAT Region which are useful to ADF-equipped aircraft. Some of these stations, including commercial band transmitters, are not monitored for outages or interference by transmitters on adjacent frequencies and may be severely affected by atmospheric conditions.

2.5 VHF communications coverage extends to line-of-sight distance from facilities in Canada, Iceland, Greenland, the Azores and coastal Europe. The Canadian VHF coverage is extended by use of a remoted facility in southern Greenland.

2.6 High Frequency (HF) communications are available throughout the NAT Region for ATC purposes. Use of HF by pilots on IGA flights permits proper monitoring of the flight's progress (for actual requirements see para. 4.3.2.3.1).

2.7 HF-equipped flights should be able to receive HF VOLMET broadcasts which contain continual updates on the meteorological situation at major terminals in Europe and North America and SIGMET warnings.

2.8 Search and rescue vessels and aircraft are stationed at some locations in the NAT Region, but search and rescue aircraft may not always be available.

2.9 Flights at the higher flight levels of the NAT - FL275 to 400 inclusive - are required to be equipped and authorized by their aviation authority for flights in NAT Minimum Navigation Performance Specifications (MNPS) airspace.

3. PILOT QUALIFICATION REQUIREMENTS

3.1 Minimum pilot qualifications for any flight across the North Atlantic is a Private Pilot Licence (PPL). Unless operating below FL60, the pilot-in-command shall hold an instrument rating (see paras 4.2.2 and 4.4.4).

3.2 Pilot experience requirements: the demanding North Atlantic operational environment requires that the pilot-in-command has, in addition to cross-country flight time, the following flight experience:

3.2.1 Recent experience requirements stipulated by the State of Registry for the pilot-in-command.

3.2.2 A "check-out" in the aircraft by the pilot-in-command so that he or she is familiar with all systems, particularly the long range navigation and communications equipment.

4. REGULATORY REQUIREMENTS FOR NORTH ATLANTIC FLIGHTS

4.1 National Regulations

4.1.1 Pilots must comply with regulations imposed by the State of Registry of the aircraft being flown.

4.1.2 Pilots must also comply with regulations of countries in which they land or which they overfly.

4.2 Flight Rules over the high seas: International Civil Aviation Organization (ICAO) Member States have agreed that the flight rules which apply over the high seas will be those established by ICAO. However, responsibility for enforcement of these rules rests with the State of Registry of the aircraft. The flight rules are contained in ICAO Annex 2 (to the Chicago Convention, an international treaty) and procedural aspects are covered in ICAO Doc 7030/3-NAT Supplementary Procedures applicable in the NAT Region. Some of the procedural requirements follow (paraphrased):

4.2.1 All flights which cross international borders must file a flight plan.

4.2.2 All flights must file an IFR flight plan when intending to fly in North Atlantic controlled airspace. This includes flights at FL 60 and above in New York, Gander, Shanwick, Santa Maria and Reykjavík oceanic flight information regions (FIRs), and flights at FL 200 and above in the Søndrestrom FIR.

4.2.3 While en-route, all changes to IFR flight plans shall be reported as soon as practicable to the appropriate air traffic services unit as prescribed.

4.2.4 An arrival report must be sent to the appropriate air traffic services unit. When the flight plan cannot be closed by means of the aircraft radio, a telephone or telegraphic message should be sent. Failure to close flight plans may result in needless search operations.

4.3 Operation of Aircraft: ICAO Standards in ICAO Annex 6 apply. In general, ICAO Member States have agreed that aircraft with their registration mark will comply with the Standards concerning the operation of aircraft contained in ICAO Annex 6, as a minimum. Some pertinent Standards are (paraphrased):

4.3.1 Flight preparation

4.3.1.1 Before commencing the flight, the pilot must be satisfied that the aircraft is airworthy, duly registered, and that appropriate certificates are on board.

4.3.1.2 The instruments and equipment are appropriate for the operation, considering expected flight conditions.

4.3.1.3 Meteorological information relevant to the flight must be obtained by the pilot-in-command and evaluated with regard to the planned route and destination, and to alternative courses of action.

4.3.1.4 Maps and charts which are current and suitable for the flight, including alternative routes, must be available on aircraft.

4.3.1.5 Search and rescue (SAR) information, including location of facilities and procedures to be used, should be obtained by the pilot-in-command.

4.3.1.6 NOTAMs should be checked prior to departure with regard to the status of radionavigation aids and aerodrome restrictions.

4.3.1.7 Night operations can present additional problems which must be provided for, which could include increased navigation difficulties, fatigue, more demanding pilot skills, and other factors.

4.3.1.8 The Aeronautical Information Publications (AIP) of States where landings will be made or which will be overflown should be checked prior to departure. Commercial publications are available which provide the necessary operational information derived from the AIPs, particularly with respect to the requirements for the carriage of survival equipment.

4.3.2 Equipment Requirements

4.3.2.1 Life rafts will be carried when single engined aircraft operate more than 100 NM from shore, and when multi-engined aircraft operate more than 200 NM from shore. They will contain:

a) pyrotechnic distress signals;

b) food and water;

c) VHF survival radio.

4.3.2.2 Navigation equipment. On trans-Atlantic flights, aeroplanes shall be equipped with navigation equipment which will enable it to proceed:

a) in accordance with the flight plan;

b) in accordance with the requirements of the air traffic services;

c) in accordance with MNPS requirements when operating in that airspace.

NOTE: Aircraft equipped with only VOR and ADF receivers are limited to the Canada/Greenland/Iceland/Europe route, for controlled flights, or to VFR flights in uncontrolled airspace.

4.3.2.3 Communications equipment. In controlled airspace, flights must be able to conduct two-way radio communications on required frequencies.

4.3.2.3.1 In the Gander, Shanwick, Santa Maria, Reykjavik, Søndrestrom and New York flight information regions (FIRs), HF radios are required to contact air traffic control centres when beyond the range of VHF in controlled airspace.

4.3.2.3.2 Subject to prior arrangement, VHF-only flights may be made via Canada/Greenland/Iceland/Europe, provided the Shanwick FIR is avoided (see applicable AIPs).

4.3.2.3.3 VHF emergency frequency 121.5 is not authorized for routine use. The authorized air-to-air channel 128.950 MHz should be used.*

4.4 Special Requirements for Canadian Departures.

4.4.1 Canadian Air Regulation S.540 prohibits single-engined aircraft from trans-oceanic flight unless authorization is obtained from the Minister. This Regulation also applies to multi-engined aircraft which cannot maintain flight after failure of the critical engine.

4.4.2 Authorization to commence a trans-Atlantic flight from Canada must be obtained by the pilot-in-command of a single-engined aircraft after landing at Moncton Airport, New Brunswick. When the Regional Director, Aviation Regulation or his representative is satisfied that requirements are met, the authorization will be granted.

4.4.3 At least 48 hours prior to landing at Moncton, the pilot should inform the Regional Director, Aviation Regulation, 95 Foundry Street, Moncton, New Brunswick, E1C 8K6, Telex 0142 666, of his intended trans-Atlantic flight, stating date and time of his arrival at Moncton, aircraft type, registration mark, and pilot's and passenger's names and addresses.

*Approval action still in hand (May 1985)

4.4.4 At Moncton, the pilot-in-command shall satisfy an examining officer of the following:

a) his certification as a pilot with an instrument rating;

b) his knowledge of the meteorological, communications, air traffic control, and search and rescue facilities and procedures on his route;

c) his knowledge of radio and other navigational aids, and his ability to use these aids enroute.

4.5 Special Requirements for Flights Transiting Greenland.

4.5.1 Terrain Clearance: The elevation of the highest point in Greenland is 13,120 feet MSL, and the general elevation of the ice-cap is 9,000 feet MSL. Due to low temperatures and high wind speeds, the lowest usuable flight level under certain conditions may be FL 235 near the highest point, and FL 190 over the ice-cap.

4.5.2 High-capacity cabin heating systems are needed due to the very low in-flight temperatures usually encountered, even in the summer.

4.5.3 Rapidly changing weather situations involving severe icing, severe turbulence and heavy precipitation are common and require extra vigilance by pilots. The changes may be so rapid that they are difficult to forecast.

4.5.4 An Emergency Locator Transmitter (ELT) is required transiting Greenland due to the very difficult terrain which hampers searches.

4.5.5 Compliance with the regulations is monitored and States of Registry will be informed of any infractions.

4.5.6 Two-way communications capabilities are required within the Narsarsuaq and Nuuk Air Traffic Zones and within Ilulissat Traffic Information Zone.

4.5.7 Aerodrome Flight Information Service is provided at the aerodromes at Narsarsuaq, Nuuk/Godth°b, Kulusuk and Ilulissat/Zallobshavn.

4.5.8 Only Flight Information Service and alterting service are provided within the Søndrestrom FIR below FL 195.

4.5.9 Pilots are cautioned that no dedicated search and rescue units are assigned to Greenland, although military or transient aircraft may be used for search and rescue purposes.

4.6 Special Requirements for Flights Transiting Iceland

4.6.1 Terrain Clearance: the general elevation of mountainous areas in Iceland is approximately 8000 feet MSL. Due to the great difference in pressure and high wind speeds, the lowest useable flight level may, under certain conditions, be FL 120.

4.6.2 An Emergency Locator Transmitter (ELT) with its own energy supply independent of that of the aircraft shall be carried, which is capable of:

a) functioning continuously outside the aircraft for at least 48 hours; and

b) transmitting simultaneously on the frequencies 121.5 and 243 MHz.

4.6.3 Aircraft should be equipped with sufficient and appropriate arctic survival equipment.

4.6.4 Continuous watch on the appropriate frequency of Iceland Radio will be maintained by flights operating in the Oceanic sector of the Reykjavik FIR. When operations take place outside of VHF coverage of the air-ground station required for use, carriage of an HF transceiver, operational on appropriate frequencies, is mandatory.

4.6.4.1 However, flights between FL 80 and FL 195 on the route between Greenland and Iceland and passing through 65N 30W and Kulusuk will serve aircraft as far as VHF coverage permits. Such flights are exempted from the HF transceiver requirement, provided aircrews use VHF and are familiar with the required procedures.

4.6.4.2 In addition, flights operating between the United Kingdom and Iceland which are routed at/or north of 61N 10W above FL 240 are considered adequately covered by VHF and are exempted from the HF requirement.

4.6.4.3 Prior approval must be obtained for flights outside VHF coverage without HF equipment within the Reykjavik FIR.

4.6.4.4 Flights operating without HF under prior approval must obtain such prior approval from other ATS units when passing through airspace which they control.

4.6.5 Navigation equipment adequate to navigate in accordance with the flight plan and in accordance with ATC clearances, will be carried.

4.6.6 SSR transponders with Mode 3/A and C are required in Iceland.

4.6.6.1 Pilots shall operate SSR transponders continuously on Mode A, Code 2000, except that departing aircraft shall retain the last assigned Code for 30 minutes after entry into NAT oceanic airspace, unless otherwise instructed by ATC.

4.6.6.2 This procedure does not affect the use of special purpose codes 7500, 7600 or 7000 when they are required.

4.6.7 Aeronautical Information Publications and NOTAM information is available at all Iceland airports of entry and from:

Directorate of Civil Aviation
Aeronautical Information Service
Reykjavik Airport, Iceland.

Telegraph address: CIVILAIR ICELAND
TELEX:.....2250 FALCON ISLAND
AFTN:.....BICAYN

Agenda Item 6: Updating of the work programme of the NAT SPG

6.1 Introduction

6.1.1 The Group undertook its customary review and updating of its future work programme and agreed to retain the following items:

6.2 Future work programme

6.2.1 AIR NAVIGATION SYSTEM SAFETY PERFORMANCE REVIEW

a) Target level of safety factors:

i) Lateral performance
ii) Longitudinal performance
iii) Vertical performance
iv) Occupancy
v) Others

b) ATC System Loop Errors.

6.2.2 AIR NAVIGATION SYSTEM OPERATIONS REVIEW

a) Air Traffic Services Operations:

i) Application and refinement of separation standards

ii) Review of domestic/oceanic interface problems, and transition problems adjacent to NAT MNPS airspace

iii) Review of short-term ATS improvements and efforts towards further improvements

iv) Extended-range twin-engined aircraft operations in the NAT Region

v) IGA operations in the NAT Region

vi) Flight planning processes

vii) Review of ATS operational contingency planning in the NAT Region, as necessary

b) Communications Operations:

i) Fixed services
ii) Mobile services

c) Determination of the efficiency level of the NAT air navigation system and the service provided to the airspace users.

6.2.3 TECHNOLOGICAL DEVELOPMENT

a) Automated ATC Systems in OACs - review of plans/compatibility

b) Developments in navigation systems (e.g. Global Positioning System)

c) Data Link development (satellite, HF)

d) Automatic dependent surveillance as an option in the NAT Region

e) Other technological developments of relevance to the NAT Region.

6.2.4 PLANNING

a) Air navigation systems planning and production of statistical supporting data on future traffic demand

b) Development of medium and long-term NAT Air Navigation Plans

c) Further efforts towards the introduction of 30NM/1000ft composite separation in the NAT MNPS airspace and its implications in the oceanic/domestic interface areas (see also para 6.2.2 a) ii))

d) Consideration of the possible introduction of reduced vertical separation above FL 290 in the NAT Region

e) Improvements to the provision of MET Services for NAT operations

f) Monitoring of the activities of the FANS Committee and providing input as required.

6.2.5 GENERAL MATTERS

a) Interception of civil aircraft

b) Formation flying in the NAT Region

c) Updating of the NAT Guidance and Information Material and the NAT MNPS Operations Manual

d) Consolidation of documentation relevant to NAT operations

e) Preparation for the LIM NAT (RAC/COM/MET) RAN Meeting

f) Monitoring of processing of outstanding proposals for amendment of the NAT Regional Supplementary Procedures.

6.3 Arrangements for the next Meeting

6.3.1 The Member for Portugal extended a warm invitation on behalf of his State to the NAT SPG to hold its next Meeting in Lisbon. Accepting this invitation with appreciation, the Group agreed that NAT SPG/23 should be held from 5 - 16 May 1986.

6.3.2 The necessary administrative arrangements would be made in due course in co-ordination between the Member for Portugal and the Secretary of the Group.

Agenda Item 7: Election of Chairman

7.1 The Group unanimously re-elected Mr. J.V. Feehan from Ireland as its Chairman and Mr. G. Matthiasson from Iceland as its Vice-Chairman for a further full term up to and including the next Meeting of the NAT SPG.

Agenda Item 8: Any other business

Concorde NAT operations - ATC use of SST Track "SO"

8.1 The Group was informed of action taken in order to minimize ATC ground delays resulting from the current strategic departure slot procedures for westbount NAT Concorde operations departing from London and Paris. Agreement had been reached between Canada, the United Kingdom and the USA and the operators concerned on the tactical ATC use of SST Track "SO" by London ACC to resolve westbound longitudinal conflicts occurring on Track "SM". In order to ensure that there can be no simultaneous use of Track "SO" (eastbound and westbound), its use was limited to the following specific periods:

Eastbound flights: New York/Washington departures which estimate 60W during the period 1700-0500 UTC.

Westbound flights: London/Paris departures which estimate 15W during the period 0900-1300 UTC.

Common NOTAM action was about to be taken with an implementation date of 6 June 1985.

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