**NAT SPG/39**

# *Summary of Discussions and Conclusions of the*

# *Thirty-Ninth Meeting of the*

# *North Atlantic Systems Planning Group*

***Paris, 17 to 19 June 2003***

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# FOREWORD

## i. Introduction

i.1 The Thirty-Ninth Meeting of the North Atlantic Systems Planning Group (NAT SPG) was held in the European and North Atlantic (EUR/NAT) Office of ICAO from 17 to 19 June 2003.

i.2 The Meeting was chaired by **Mr Ásgeir Pálsson**, the Member from Iceland. Mr Christian Eigl was the Secretary of the Meeting and was assisted by Mr Jacques Vanier from the EUR/NAT Office of ICAO. Assistance was also provided by Mr Jean-Claude Bugnet, Chief of the Joint Financing Section from ICAO Headquarters and by Mrs Nikki Goldschmid from the EUR/NAT Office of ICAO.

i.3 In the opening session, Mr Ásgeir Pálsson welcomed the new Members from Norway and Canada respectively, **Mr Frode Mo** who replaced Mr Ommund Mydland and **Mr Don Harris** who replaced Mr Bob Fullarton. Mr Knud Rosing stood in for Mr Lars Jensen, the Member for Denmark who was unable to attend. Mr Christian Eigl informed the Group that ICAO was experiencing financial difficulties and, as such would have to be careful how it expended its resources. He also congratulated the Group for the work that had been done in the financial and economic fields. It was stressed that this work was of a pioneering nature and that other regional planning groups would be looking at the NAT SPG results for guidance.

i.4 In addition to the Members of the NAT SPG, the Russian Federation, the International Air Transport Association (IATA), the International Business Aviation Council (IBAC), the International Federation of Air Line Pilots Associations (IFALPA) and the International Federation of Air Traffic Controllers' Associations (IFATCA) attended the meeting. The International Mobile Satellite Organization (IMSO) presented their apologies for not being able to attend. A list of participants is at **Appendix A** to this report.

i.5 The Mathematicians' Working Group (MWG) had met at the EUR/NAT Office of ICAO from 24 to 28 March 2003 to consider the mathematical and statistical aspects of the safety of separation minima applied in the NAT Region. **Mr Keith Slater**, the Rapporteur, presented the MWG report in support of the assessment of current system safety performance in terms of lateral, vertical and longitudinal collision risk. He also informed the Group that due to new changes and a reorganisation at the National Air Traffic Services Ltd (NATS), this was his last meeting and he introduced **Mr Stephen Kirby** as his replacement. The Group expressed its appreciation to Mr Slater for the excellence of the work carried out by the MWG during his tenure as Rapporteur.

i.6 The Scrutiny Group (SG) had met concomitantly with the MWG at the EUR/NAT Office of ICAO on 20 and 21 March 2003 and had been charged with the scrutiny of navigation performance in the NAT Region. The new Rapporteur, **Mr David Nicholas** of the United Kingdom, provided the NAT SPG with their report. The Group recalled that Mr Benson, the outgoing rapporteur, had been with the NAT SPG for many years and that he had played an important role during the implementation of Reduced Vertical Separation Minimum (RVSM). Through the Member for the United Kingdom, the Group expressed its appreciation for all of his efforts, which were very much appreciated.

i.7 The Aeronautical Communications Group (ACG) had met in Santa Maria, Portugal from 12 to 15 May 2003. The Rapporteur, **Mr Joaquim Cabral** of Portugal, provided the Group with the report on the current use of High Frequency (HF) in the NAT Region.

i.8 The NAT Traffic Forecasting Group (NAT TFG) had held an interim meeting at the Federal Aviation Administration (FAA) Headquarters in Washington from 20 to 21 March 2003 and had submitted a report to the NAT SPG containing an update of short, medium and long term forecasts.

i.9 The NAT Implementation Management Group (NAT IMG) had met twice since NAT SPG/38 and a report on their activities was presented to the Group.

i.10 The NAT Economic and Financial Group (NAT EFG) had met twice since NAT SPG/38 and a report on their activities and findings had been presented to the Group.

i.11 The NAT SPG expressed its appreciation to all those that had worked within the above mentioned groups for the quality of the material that they had produced.

i.12 The Group approved the following Agenda.

**Agenda Item 1:** Developments

- 1.1 ICAO Panels and Committees
- 1.2 Adjacent Regions

**Agenda Item 2:** Planning and implementation

- 2.1 Report of the NAT Implementation Management Group
- 2.2 Report of the NAT Economic and Financial Group meetings
- 2.3 North Atlantic Traffic Forecasting Group report

**Agenda Item 3:** Air navigation system review

- 3.1 Review of system safety performance
  - a) Scrutiny matters
  - b) Mathematical matters
  - c) Safety management
- 3.2 Review of systems operations
  - a) Air Traffic Management
  - b) Communications

**Agenda Item 4:** Documentation update

- 4.1 NAT documentation review

**Agenda Item 5:** Any other business

- 5.1 Next meeting

# 1. DEVELOPMENTS

## 1.1 ICAO Panels and Committees

1.1.1 The Group noted that, in response to Recommendation 2/2 of the fourth meeting of the Aeronautical Mobile Communications Panel (AMCP/4, Montreal, April 1996), the Air Navigation Commission (ANC) had tasked the Automatic Dependent Surveillance Panel (ADSP) (renamed as the Operational Data Link Panel (OPLINKP) in 2000) to develop the concept of Required Communication Performance (RCP). AMCP/4 had recognized the absence of objective criteria to evaluate communication performance requirements. Furthermore, AMCP/4 saw RCP as a set of parameters, the values of which would determine the operational requirements for communication systems in the various phases of flight.

1.1.2 On 2 March 2000, in response to a review of the fifth meeting of ADSP (ADSP/5, October 1999), the ANC had noted that the panel had recognized that there was widespread acceptance of the need for an RCP concept, which would provide a framework for the expression of the operational performance necessary for Air Traffic Services (ATS) communications. A variety of tasks that had been progressed to support this framework included the following:

a) the need to highlight the flexibility intrinsic in the concept, i.e. the concept could be applied to communications between systems and to communications between the human end-users;

b) the need to define what aspects of human performance would be taken into account; and

c) the need to define the parameters — availability, integrity and continuity of function — in greater detail.

1.1.3 ADSP/5 also noted that other issues would need to be further progressed, including legal aspects, timescale for implementation, Air Traffic Control (ATC) and flight crew procedures, transition issues, and the impact of the application of RCP on certification, performance monitoring and other approval processes.

1.1.4 The panel contended that before the advent of data communication systems for ATS, voice communication systems were assessed on the basis of actual performance, as it usually was readily evident when performance became degraded or was unavailable. Channel congestion or unavailability that would delay the communication of the ATC clearance was evident to the controller and crew almost immediately. Other indications, such as routine peak hours of the day and familiarity with component reliability, also provided information to the controller in advance of such events occurring. With data link, however, these indications were not provided in the same way. The acceptance of data communications as a technology for the Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) system, in addition to voice communications, meant that a formal method of determining and specifying communication performance suitable for a variety of ATS functions was desired. Such a concept should be seen as a complement to collision risk modelling. The Group agreed that there was a need to assess the various technical options of communication systems against such a set of parameters.

**CONCLUSION 39/1 - USE OF THE EVOLVING ICAO REQUIRED COMMUNICATIONS PERFORMANCE (RCP) CONCEPT**

**That the NAT Implementation Management Group take account of the evolving RCP concept in developing plans for the implementation of data link technologies and possible reductions in separation minima that may stem from the implementation of these new technologies.**

## 1.2 Adjacent Regions

**ACTIVITIES IN ADJACENT REGIONS**

*European (EUR) Region*

1.2.1 The Group was informed that a major on-going programme was the horizontal and vertical expansion of the use of 8.33 kHz channel spaced frequencies to the entire EUR Region. In this connection, the Group was informed that initiatives had been launched to expand the area of application of 8.33 kHz channelled radios down to FL 195 throughout the EUR Region circa 2006, including certain Terminal Control Areas (TMA). This vertical expansion, which would affect a new subset of the aircraft population, was under active consideration and should be reviewed during the forthcoming European Air Navigation Planning Group Meeting (EANPG) planned for December 2003.

1.2.2 The Group was given an update concerning activities related to the European Commission's initiative called a "Single European Sky". Although the programme had yet to receive legislative endorsement, some matters were advancing. The plan presently is to complete the regulatory material by the end of 2004. The most visible one being the project for the establishment of one Upper Flight Information Region (FIR) (UIR) above FL 285 throughout the European part of the airspace of the 15 Member States of the European Union. It was pointed out that no regulatory changes, other than an amendment to the European Air Navigation Plan (ANP), were required. The Group recognised that the above changes would not affect the current EUR/NAT interface; nevertheless, the Group felt that they should be kept informed of developments. The Secretary agreed to provide information as it became available.

1.2.3 The Group noted the progressive implementation as of November 2003 of Class C airspace above FL 195 in all States in the EUR Region that were Members of European Civil Aviation Conference (ECAC). In this connection, it was noted that restrictions on Visual Flight Rules (VFR) operations would be implemented simultaneously and that the changes would not in any way affect the NAT Region.

*North American (NAM) Region*

1.2.4 The Group was informed that the United States domestic RVSM programme was on schedule for implementation in January 2005. The Group was informed that the expansion of Canadian RVSM airspace to include its Southern airspace would take place concurrently with the implementation of United States domestic RVSM and that implementation of RVSM in the Caribbean (CAR) Region and the Gulf of Mexico would also be concurrent.

1.2.5 The NAV CANADA National Air Traffic Flow Management (ATFM) operations centre opened in early June 2003. Initially the functionality will be limited in en-route operations, with a migration to the major airports in 2004.

1.2.6 The Canadian Automated Air Traffic System (CAATS) was deployed in Moncton Area Control Centre (ACC) in May 2003. Other Canadian facilities, including NAT interface ones, will be brought online at a later date.

1.2.7 Gander and Shanwick Oceanic Area Control Centres (OAC) began a Controller Pilot Data Link Communications (CPDLC) Phases 1 and 2 operational trial in April 2003. Both centres plan to implement CPDLC Phase 3 trials in the fourth quarter of 2003.

## 2. PLANNING AND IMPLEMENTATION

### 2.1 Report of the NAT Implementation Management Group

2.1.1 The NAT IMG had met twice since NAT SPG/38. Its Air Traffic Management Group (NAT ATMG), Future Air Navigation Systems (FANS) Implementation Group (NAT FIG), Mathematicians Implementation Group (NAT MIG) had also each met twice since NAT SPG/38 whereas the Reduced Separations Standards Implementation Group (NAT RSSIG) had met once as did the Operations and Airworthiness Sub Group (NAT OPS/AIR).

*The implementation of Reduced Vertical Separation Minimum*

2.1.2 The Group was informed that all Regional Monitoring Agencies (RMA), including the NAT Central Monitoring Agency (CMA), had participated in a meeting, that had been held in conjunction with the Separation and Airspace Safety Panel (SASP) meeting, to discuss issues related to the development of global monitoring requirements. The Group recognised that it may be necessary to adjust the NAT RVSM monitoring policy as a result of the outcome of future RMA meetings.

2.1.3 The Group noted that, in relation to RVSM monitoring for the NAT Region, issues relating to long term monitoring requirements for the NAT Region had been examined. This had been done in order to clearly establish the linkage between monitoring requirements and infrastructure. It was recalled that the need for long term monitoring stemmed from two different sources. The first driver was the necessity to confirm the underlying assumption that Altimetry System Error (ASE) was stable whereas the second related to the need to measure the technical risk at an agreed interval in order to ensure that the Target Level of Safety (TLS) was being met.

2.1.4 In order to confirm that ASE was stable, a large data sample of repeated airframe measurements was required. The only way to obtain the necessary data using current technology was by using Height Monitoring Units (HMU). The Global Positioning System (GPS) Monitoring System (GMS) could not provide sufficient data required to draw conclusions with a sufficient level of confidence. In this connection, the Group recalled that the NAT Region monitoring infrastructure (the HMUs in Strumble, United Kingdom and Gander, Canada) was reaching the limits of its economic and technical life span. Therefore, a decision would be essential to determine the requirements for any future monitoring infrastructure if large amounts of data were still needed to determine the stability of ASE.

2.1.5 As regards the need to monitor the airspace for safety-related reasons, such as ensuring that the TLS was being met, the Group recalled that this was a requirement that existed in Annex 11. Nevertheless, it was also necessary to monitor in order to ensure that an up-to-date safety baseline was always available in order to be able to plan for future changes. This was important, as there was a requirement that all reductions in separation be based on a safety assessment. Monitoring was also needed to examine trends and to ensure that any remedial action that was implemented to correct shortcomings had indeed taken effect and had mitigated the shortcoming.

2.1.6 The Group therefore agreed that monitoring was required to provide sufficient data to carry out the studies associated with the stability of ASE. In addition, monitoring was required in order to carry out airspace safety assessments and to maintain a safety related baseline. It was noted that, in the NAT Region, by the end of 2003, the only method of monitoring ASE could be by using the GMS, which is not an efficient tool for this task, or by determining whether other sources of data could be used to carry out the annual safety related work. The Group noted that if other sources of data could be used, institutional issues would need to be addressed. This would not be the case if the NAT Region were to update its monitoring infrastructure considering that the institutional arrangements were already in place. The Group recognised that large amounts of data would nevertheless be required to be collected over a sufficiently long period in

order to provide confidence that ASE was stable. Finally, until new technology comes along, the HMU remains the best monitoring tool available.

2.1.7 The Group noted the information provided by the United Kingdom on the technical status of the HMU located at Strumble. It was noted that the technical life of the HMU could be maintained until the end of 2004, at which time it will have been completely depreciated. It was pointed out that it would not be necessary to change the existing financial arrangements. The HMU in Gander would also be available until the end of 2004. Finally, information on the financial aspects of this joint financed programme were made available to the Group by the ICAO Chief of Joint Financing.

2.1.8 Considering the above, the Group agreed that if the current monitoring infrastructure can no longer provide the necessary data required to sustain RVSM, then alternative measures would need to be considered. One option was the possibility of co-operating with other regions and using their data. Another would be to keep Strumble HMU operational as long as necessary with the caveat that the system would need to be maintained or replaced. It was recognised that the current financial arrangements could be extended to support continued monitoring. Finally, it was agreed that the NAT IMG should be tasked with ensuring that monitoring requirements be put in place in a timely fashion so as to assure the continuity of the NAT RVSM programme taking account of the long term monitoring requirements for the NAT Region and the need to meet the safety requirements of Annex 11. In preparation, it was agreed that costs for replacement of the HMU as well as the monitoring requirements should be determined in order to provide the necessary information to draft a recommendation.

**CONCLUSION 39/2 - DEVELOP REDUCED VERTICAL SEPARATION MINIMUM (RVSM) MONITORING REQUIREMENTS**

**That the NAT Implementation Management Group develop monitoring requirements in a timely fashion so as to assure the continuity of the NAT RVSM programme, taking account of the long term monitoring requirements and the need to meet the safety requirements of Annex 11.**

*Development of Key Performance Indicators (KPI)*

2.1.9 The Group was informed that the NAT IMG had not been able to pursue the development of KPIs because of the need to address issues of a higher priority. The Group noted that this task would require significant resources and that without these resources the job could not be satisfactorily addressed.

*Turn Back Procedures*

2.1.10 The Group was informed that, as a result of the events of 11 September 2001, an analysis of the turn back procedures had been carried out. In particular, it was noted that a lateral offset of 20 NM in the event of a turn back might offer greater safety benefits as compared to the current offset of 30 NM. It was therefore agreed that the NAT IMG should examine whether it would be more appropriate to use a 20 NM offset in the case of all turn backs or deviations from the cleared track due to a contingency event. If this proved to be feasible and safer than the current procedures, it was agreed that efforts be made to amend the appropriate documentation.

**CONCLUSION 39/3 - DEVELOP GUIDANCE REGARDING TURN BACK PROCEDURES**

**That the NAT Implementation Management Group examine whether it would be more appropriate to use a 20 NM offset in the case of all turn backs or deviations from the cleared track due to a contingency event, and if feasible, develop appropriate amendments to NAT Region documentation.**

*Metrics to measure Future Air Navigation Systems performance*

2.1.11 The Group was presented with the following proposed metrics, which would be used to report to the FANS Central Monitoring Agency (FCMA) monitoring results related to data link usage and which would be subject to review as experience was gained:

a) to monitor the quality of the end-to-end FANS data delivery system in the NAT Region:

   i) a practical metric for downlinks would be the percentage of waypoint position reports, required of participating ADS flights, that were successfully received via data link within a given time after waypoint transit; and
   ii) a practical metric for uplinks would be the percentage messages that resulted in a successful Message Assurance (MAS) response within a given time after sending; and

b) to monitor data link message volume, in a way that would be useful in studies regarding HF regression, useful metrics would be counts of ADS, Flight Management Computer (FMC) WPR, and CPDLC messages of various types, for flights within, or at the entry point to each FIR.

2.1.12 The Group noted that, in order to ensure best results, the ATS Providers would need to supply the FCMA with one-day-per-week snapshots of the above metrics. The metrics would then be analysed for inclusion in NAT IMG reports for review.

2.1.13 The Group noted the concern regarding the use of ARINC specification 424 for the transmission of geographic coordinates. The Group agreed that the NAT Region should be in line with the Pacific (PAC) Region in that ARINC 424 should not be supported for the transmission of geographic coordinates because of the potential misunderstandings, which could have an effect on safety.

**CONCLUSION 39/4 - USE OF ARINC SPECIFICATION 424 FOR GEOGRAPHICAL COORDINATES**

**That ARINC Specification 424 not be used for the transmission of geographical coordinates when using ATS data links.**

2.1.14 As regards the use of HF Data Link (HFDL) for ATC purposes, the Group noted the work that had been carried out. It was noted that the NAT IMG would develop a draft policy statement on this matter so that they can make a recommendation to NAT SPG/40.

*Proposals for Amendment to the NAT Regional Supplementary Procedures (SUPPs) (Doc 7030)*

2.1.15 The Group noted that an amendment to the NAT SUPPs had been developed, which was required as a consequence of the introduction of the Mach Number Technique (MNT) in the *Procedures for Air Navigation Services Air Traffic Management* (PANS ATM) (Doc 4444). The United States agreed to initiate the proposal for amendment related to MNT, which is at **Appendix B** to this report.

**CONCLUSION 39/5 - INITIATE AN AMENDMENT PROPOSAL TO THE NAT REGIONAL SUPPLEMENTARY PROCEDURES (SUPPS) (DOC 7030) CONCERNING THE USE OF THE MACH NUMBER TECHNIQUE (MNT)**

**That the United States, on behalf of the NAT SPG, initiate an amendment proposal to the NAT Regional Supplementary Procedures as contained in Appendix B to the Report on Agenda Item 2.**

2.1.16 Another issue that required an amendment to the NAT SUPPs related to access to RVSM airspace, under specific circumstances, by non-RVSM approved aircraft. The Group endorsed the proposal and agreed that Canada should initiate a proposal for amendment.

**CONCLUSION 39/6 - INITIATE AN AMENDMENT PROPOSAL TO THE NAT REGIONAL SUPPLEMENTARY PROCEDURES (SUPPS) (DOC 7030) CONCERNING ACCESS TO REDUCED VERTICAL SEPARATION MINIMUM (RVSM) AIRSPACE**

**That Canada, on behalf of the NAT SPG, initiate an amendment proposal to the NAT Regional Supplementary Procedures as follows:**

**"ATC may provide an altitude reservation for a Minimum Navigation Performance Specifications (MNPS) approved aircraft that is not approved for RVSM operations to fly at RVSM levels provided that the route of flight will not adversely affect RVSM operations and that the aircraft:**

**a) is on a delivery flight; or**
**b) was RVSM approved but has suffered an equipment failure and is being returned to its base for repair and/or re-approval; or**
**c) is an air-ambulance or relief flight."**

2.1.17 In the course of the discussions it was pointed out that State aircraft should also be allowed to be exempted when appropriate. However, because of the requirements of the Chicago Convention regarding State aircraft, it was not possible to include them in Doc 7030. Accordingly, the Group endorsed the proposal that this exemption be included in the Minimum Navigation Performance Specifications (MNPS) Operations Manual at the next revision.

2.1.18 The Group agreed that the NAT SUPPs needed to be amended to clearly state the conditions under which SATCOM voice could be used. It was agreed that non-routine events should be communicated to the aeradio facility while emergency events should normally be communicated directly to the ATC centre. To facilitate this task, dedicated SATCOM telephone numbers (short codes) for aeradio facilities and ATC facilities should be published in national Aeronautical Information Publications (AIP). Accordingly, it was agreed that an amendment to the NAT SUPPs should be initiated by Iceland.

**CONCLUSION 39/7 - INITIATE AN AMENDMENT PROPOSAL TO THE NAT REGIONAL SUPPLEMENTARY PROCEDURES (SUPPS) (DOC 7030) RELATING TO THE USE OF SATCOM VOICE**

**That Iceland, on behalf of the NAT SPG, initiate an amendment proposal to the NAT Regional Supplementary Procedures as follows:**

**"6.5.1 Aircraft equipped for SATCOM voice shall restrict the use of such equipment to emergencies and non-routine situations occurring within the NAT region. Unforeseen inability to communicate by voice radio constitutes a non-routine situation. Since oceanic traffic typically communicates through aeradio facilities, a SATCOM call made due to inability to communicate by other means should be made to such a facility rather than the air traffic control centre unless the urgency of the communication dictates otherwise. Dedicated SATCOM telephone numbers (short codes) for aeradio facilities and air traffic control facilities are published in national AIPs."**

*The use of SATCOM voice for routine ATS communications*

2.1.19 The Group, having noted that work on the use of SATCOM for non-routine and emergency purposes had been completed, examined the proposal to extend the use of SATCOM voice to routine ATS communications. It was noted that the NAT IMG would be directing its working groups to further advance this activity. It was also noted that Portugal was using the two letters "SP" to identify SATCOM messages. Considering that the Air Navigation Plan (ANP) and possibly other ICAO documentation may need to be amended, the proposal that NAT SPG/40 be provided with a progress report regarding the use of SATCOM voice for routine ATS purposes was supported. It was therefore agreed that, noting the leadership that Portugal has taken in this matter, they should make the presentation, that would have the objective of facilitating decision making about the future use of SATCOM.

**CONCLUSION 39/8 - PRESENTATION ON THE USE OF SATCOM VOICE FOR ROUTINE COMMUNICATIONS**

**That Portugal make arrangements to provide NAT SPG/40 with a presentation on the work being carried out regarding the use of SATCOM voice for routine Air Traffic Services (ATS) communications.**

*Preparation of the Fifth Edition of the Application of Separation Minima Document*

2.1.20 The Group noted that a major revision of the Application of Separation Minima (ASM) Document was being developed. It was noted that one issue was the definition of "other means" used in respect of the application of the MNT as well as additional issues (including safety analysis) that needed to be resolved before the full implications of the agreed definition could be determined and the ASM amended. The Group noted that it would be kept informed of developments.

*Air Traffic Flow Management Issues*

2.1.21 The Group noted the work that had been carried out regarding improvements to ATFM affecting the NAT Region. In particular, it was noted that a Collaborative Decision Making (CDM) scheme for defining the Westbound Organized Track System (OTS) was being considered and that a proof of concept trial had been programmed for the summer of 2003. The objective of the scheme was to try and elaborate a system that would allow the construction of the OTS in such a way that domestic bottlenecks could be taken into account in the planning process. The Group supported the trial but some members expressed some reservations as to the consultation process that would be included within the CDM itself.

2.1.22 In addition, the Group noted the concerns of some European interface ACCs in the CDM process and it was noted that Canada, Ireland, France and the United Kingdom would formalise a co-ordination process. The Group confirmed that the construction and orientation of NAT tracks, including determination of entry and exit points, remained the prerogative of the Oceanic planners exclusively and agreed that the (Eurocontrol) Central Flow Management Unit (CFMU) input should only be in the context of providing information on European regulations likely to adversely impact NAT traffic.

*Contingency Matters*

2.1.23 The Group was informed that, in follow up to NAT SPG Conclusion 38/7, the Volcanic Ash Contingency Plan had been completed. As regards the publication of the plan, the Group agreed that the most effective method would be for Iceland and the United Kingdom to promulgate an Aeronautical Information Circular (AIC) and that the plan should be published on the NAT Programme Co-ordination Office (NAT PCO) web site.

**CONCLUSION 39/9 - DEVELOPMENT OF A NAT VOLCANIC ASH CONTINGENCY PLAN**

**That:**

**a) Iceland and the United Kingdom publish an Aeronautical Information Circular containing the agreed Volcanic Ash Contingency Plan;**

**b) the plan be posted on the NAT Programme Coordination Office web site; and**

**c) Air Navigation Service providers establish direct links from their web sites to the NAT Volcanic Ash Contingency Plan posted on the NAT PCO web site.**

2.1.24 As regards contingency planning in general, the Group was informed that the Council had adopted new Annex 11 provisions related to contingency planning and that they would come into effect in November 2003. It was noted that the major difference from the current contingency planning methodology was the involvement of the users when drafting the contingency plans and that this would be taken into account in the future for the NAT Region. With this in mind, it was noted that the NAT Contingency Plan had been updated by the NAT Operations Managers and that it would be published on the NAT PCO web site.

*NAT IMG Cost Effectiveness (NICE) Group*

2.1.25 The Group was informed that the NICE group continued to collect data in order to keep all the data bases updated so that the software could be used when required.

*Programme Co-ordination Office*

2.1.26 The Group noted with appreciation that the United Kingdom would continue to manage and support the web site (www.nat-pco.org). The Group re-affirmed that the web site was important especially as it provided access to certain documents such as the MNPS Operations Manual and the different Guidance Materials. It was agreed that Air Navigation Service providers should have a direct link from their individual web sites to the various documents posted on the NAT PCO web site as this would ensure the centralised distribution of documents (paragraph 3.2.4 also refers).

*Issues Related to HF Regression*

2.1.27 The Group was informed that the EUR/NAT Office of ICAO had agreed to act as moderator for the Task Force on HF Regression which had been established by the NAT IMG. The Group was informed that despite several attempts, it had not been possible to convene a meeting of the Task Force before NAT IMG/22; therefore, no progress report could be made to NAT SPG/39. It was further noted that a meeting should be convened at the first opportunity so that discussions could continue. It was expected that a progress report would be made to NAT SPG/40.

*Development of a data link implementation policy*

2.1.28 The Group recalled that NAT SPG/33 had endorsed a proposal that FANS-1/A equipped aircraft be accommodated within the NAT region while reiterating the policy that a Standards and Recommended Practices (SARPs) compliant, Aeronautical Telecommunication Network (ATN) based, data-linking environment remained the "end-state". The original enabling statement, as reported in the Report of NAT SPG/33 (paragraph 2.3.29 refers) is as follows:

*The Group endorsed the NAT IMG decision to accommodate Future Air Navigation Systems (FANS) 1/A equipped aircraft in the planning process although the agreed end system remained SARPs compliant avionics using the Aeronautical Telecommunications Network (ATN). This decision was predicated on the fact that aircraft were equipping with FANS 1/A avionics and it therefore appeared prudent to ensure that ground systems should support these aircraft. However, in arriving at this decision, it was stressed that the level of services that may be provided to FANS 1/A equipped aircraft operating in the NAT Region needed to be determined.*

2.1.29 At that time, no tangible benefits were identified that would result from FANS-1/A implementation. Since then, it has been determined that SARPs compliant avionics will not be implemented in the medium term and that some benefits of using non-SARPs compliant data link avionics have been identified, particularly in relation to HF voice cost containment. With this in mind, it was agreed to review the current policy to see whether it should be modified.

2.1.30 The Group noted the following information that brought to light some relevant issues:

a) the number of aircraft potentially FANS-capable (e.g. where only a software upgrade was needed to activate FANS) was high and could bring the percentage of FANS capable aircraft up to 70% of the total fleet (compared with the 30% currently using FANS 1/A);

b) while the decision to support FMC-WPRs using Airline Operational Control (AOC) was intended to accommodate non-FANS-capable aircraft, it may in fact be these potentially FANS-capable aircraft that would avail themselves of this service; and

c) some aircraft currently using the FANS ADS functionality for position reports would stop doing so and instead use FMC-WPRs once the Centralised FMC Waypoint Reporting System (CFRS), becomes operational.

2.1.31 The reason for this movement away from FANS 1/A appeared to be that, in addition to charges levied on ATM providers, airlines were also charged for FANS 1/A communications traffic. Since ADS reports do not adequately meet airline dispatchers' needs for flight following ("fuel remaining" data being missing), the airlines found themselves in the situation of needing to support and pay for two parallel forms of position reporting, one for ATC and the other for AOC.

2.1.32 Because the ATN end-state has been moved further into the future than originally planned, the Group agreed that it would be appropriate now to reconsider how best to integrate the available air-ground data link technologies into the NAT ATM system, and in particular whether additional system benefits might be derived from their use.

2.1.33 One benefit that has been clearly identified was the gradual reduction of the use of the HF infrastructure in favour of the use of data links. However, in order to realise these benefits, it was necessary to have a clear roadmap for data link implementation.

2.1.34 Another potential benefit could be the possibility of reducing some separation minima. Since any such reductions would certainly be predicated on more frequent updates of positions than provided by waypoint reports, this would place constraints on the options available within any roadmap.

2.1.35 Additionally, the availability of a more reliable communications infrastructure (CPDLC), and thus enhanced intervention capability, might permit a reduced emphasis on strategic separation as conflict probes could possibly be constrained to a "time horizon" instead of extending to landfall. This could lead to enhanced airspace usage.

2.1.36 Taking account of the foregoing, the Group agreed that the end system remained SARPs compliant avionics using the ATN. However, for planning purposes, the benefits that could be derived from the implementation of FANS 1/A or equivalent should be the current focus of developments whilst recognising that other forms of data link services could be accommodated when feasible.

**CONCLUSION 39/10 - POLICY STATEMENT REGARDING THE IMPLEMENTATION OF DATA LINK TECHNOLOGIES IN THE NAT REGION**

**That:**

**a) the implementation of Standards and Recommended Practices (SARPs) using the Aeronautical Telecommunication Network (ATN) based avionics remained the desired goal of the future Air Traffic Management (ATM) system;**

**b) for planning purposes, benefits that could be derived from the implementation of Future Air Navigation Systems (FANS 1/A) or equivalent be the focus of developments; and**

**c) other forms of data link services also be accommodated.**

*Draft policy to move from an operational trial to an operational system*

2.1.37 The Group recalled that it had directed the NAT IMG to develop a draft policy to move from operational trials to operations (NAT SPG Conclusion 38/3 refers). The Group felt that it was appropriate that this action item should only be considered after the 11th Air Navigation Conference (ANConf/11). The Group however felt that this was an important issue, especially from an airworthiness and operations perspective, and therefore agreed that the requirement be re-stated.

**CONCLUSION 39/11 - POLICY STATEMENT REGARDING THE IMPLEMENTATION OF DATA LINK TECHNOLOGIES IN THE NAT REGION**

**That the NAT Implementation Management Group develop a regional roadmap to be used to move from an operational data link trial to an operational system.**

*Airborne Collision Avoidance System (ACAS II)*

2.1.38 The Group noted that a consequential amendment to the NAT SUPPs would be circulated by ICAO as a result of the recently approved amendments to Annex 6 and to the PANS ATM. It was noted that the consequential amendment would not modify the NAT requirements for the carriage of ACAS.

*2003 International Oceanic Conference (IOC)*

2.1.39 It was noted that the United States confirmed that IOC 2003 would be held in Honolulu from 17 to 21 November 2003. The Group was informed and supported that Ireland planned to host IOC 2005 in the Spring of 2005.

*Failure to communicate due to HF propagation problems*

2.1.40 As indicated in the report of the Scrutiny Group, operational errors were being caused because of HF propagation problems due to sun spot activity. The Group noted that Iceland had promulgated a NOTAM informing operators of the correct procedure to follow and that this should mitigate the operational errors and therefore reduce risk. Nevertheless, it was felt that this matter needed to be addressed within ICAO planning documentation. Accordingly, it was agreed that Iceland, in co-ordination

with the EUR/NAT Office of ICAO develop a proposal for amendment to the NAT SUPPs that would address the procedures that should be followed in the case of HF propagation problems.

**CONCLUSION 39/12 - PROCEDURES TO ADDRESS ISSUES RELATED TO HF PROPAGATION PROBLEMS**

**That Iceland, in co-ordination with the EUR/NAT Office of ICAO develop, on behalf of the NAT SPG, a proposal for amendment to the NAT *Regional Supplementary Procedures* (SUPPS) (Doc 7030) that would address operational issues related to HF propagation problems.**

## 2.2 Report of the NAT Economic and Financial Group meetings

2.2.1 The Group noted that the NAT EFG had met twice since NAT SPG/38. The first meeting concentrated on defining methods to improve cost recovery, charging, billing and collection. The second meeting concentrated on finalising a common NAT template to report costs and reviewing issues concerning cost constraints, analysis of the cost-effectiveness of service provision in the NAT Region and of examining issues related to differentiation of communication charging.

*Organizational changes, working methods and work programme*

2.2.2 The NAT EFG carried out a review of its working structure on the basis of its terms of reference and agreed that no changes were required. As regards the frequency of meetings, the Group endorsed the proposal that under normal circumstances no more than two meetings per year would be required, one in the October/November timeframe and the other in April or May.

2.2.3 The Group noted that the NAT EFG had carried out a review of the work programme that had been endorsed by the NAT SPG (paragraph 2.2.10 of NAT SPG/38 report refers). As a result, the work programme was updated taking into account tasks that had been completed or, as a result of the Group's work, were considered to no longer be relevant.

*The development of a standard template to report annual expenditures*

2.2.4 The Group carried out a review of the templates to report annual expenditures, which had been developed by the NAT EFG over the past few meetings. The templates had been prepared based on a set of previously agreed definitions. All service providers had supplied templates from which a combined template had been produced. The combined template was a first attempt at combining all financial information submitted by the individual States. It was however stressed that the financial information was still in draft form and that some clarifications and explanations were still being sought from all concerned.

2.2.5 Despite the preliminary nature of the combined template, the following initial conclusions could be drawn from the review of the combined financial information for 2001:

- total costs of ATC and communications service provision, excluding Meteorological (MET) and Search and Rescue (SAR), amounted to US$ 161 million.

- while certain areas in the NAT Region had broadly similar total costs, others areas had significantly lower costs.

2.2.6 The Group concluded that the templates provided a very useful basis for cost comparison within the NAT Region and, when examined in greater detail, should provide valuable information on differing costs and operating procedures.

*Analysis of the cost effectiveness of service provision in the NAT Region*

2.2.7 The Group noted the results of the review of a joint presentation of some initial financial indicators relating to service provision in the Gander and Shanwick FIRs. It was recognised that the information was draft material at an initial stage of development and, as such further analysis was required. As a result, the Group noted that additional comparative information needed to be reviewed on the staffing costs associated with those employees directly involved in the service provision, ie. Air Traffic Controllers, Air Traffic Assistants, and Supervisors in the case of ATC, and Radio Officers and their Supervisors in the case of Communications.

*Cost constraints*

2.2.8 The Group had been informed about some measures that had been taken regarding cost constraints which had resulted in significant reductions in costs whether by reductions in staff numbers and costs, deferral of investment in capital projects and other measures. The Group considered that this initiative should be pursued and therefore endorsed the suggestion that it be added to the NAT EFG work programme.

*Best practices for cost recovery and charging*

2.2.9 In follow up to NAT SPG/38 (paragraph 2.2.8 of the Report of NAT SPG/38), an examination of the possible financial benefits of consolidated billing and collection for services in the NAT Region had been carried out. In particular, the results of a member airline survey had been referred to and the general indications were that the cost of processing invoices for payment ranged between USD 85-125 per invoice, depending on the airline. IATA had estimated that if all NAT service providers were to consolidate all existing invoicing arrangements into one monthly invoice, the potential gross saving to all airlines operating in the NAT Region would only amount to US$ 500,000 per annum or approximately 0.3% of the estimated total annual cost of the provision of ATC and communications services for the NAT Region. This gross saving did not take account of costs of development or set-up of such a consolidated billing and collection system. After deliberating the pros and cons of the proposal, the Group decided not to pursue the issue of consolidated billing and collection any further in light of the insubstantial savings to the airlines and service providers. Accordingly, it is recommended that this matter be removed from the NAT EFG work programme.

*Differentiation of communication charges*

2.2.10 The Group was informed that NAV CANADA's basic rationale for the differentiation of communications charges was to encourage data link communication in order to avoid having to add to HF capacity against a background of capacity constraints of existing HF frequencies. The methodology took into account the differences in NAV CANADA's costs in the provision of HF and data link services.

2.2.11 ICAO informed the Group that, on the issue of incentive charges for CNS/ATM equipped aircraft, including data link, there was no direct support for it in the existing ICAO policy on cost recovery of air navigation services but at the same time the policy allowed its application provided that the reduction was not shouldered on to users with traditional equipment. However, the primary incentives to encourage CNS/ATM implementation should be found in the benefits the users will achieve in the form of more direct routes and better accommodation of optimum flight profiles, reduced fuel consumption and flight operating costs, reduced delays and diversions etc. rather than lower charges, considering that for example route charges only constitute 2.5 percent of airlines' total operating costs (in 2001). ICAO also pointed out several other elements that should be considered:

a) the ability to quickly make route changes and improve the planned route after departure associated with data link resulting in substantial cost savings for the equipped aircraft;

b) the development of data link projects having actually been paid by all users;

c) differential amounts per crossing would be very low; and

d) the simplicity associated with a flat combined single user charge thereby minimising the administrative costs.

2.2.12 The Group agreed that this issue needed clearer guidance and that it should therefore be referred to the Air Navigation Services Economic Panel (ANSEP) whilst taking due account of the relationship to Article 15 of the Chicago Convention. Nevertheless, the Group recognised the need to continue to explore the reasons for the differentiation in communications charges related to the migration to CNS/ATM.

**CONCLUSION 39/13 - INPUT TO THE AIR NAVIGATION SERVICES ECONOMICS PANEL (ANSEP)**

**That the Chairman of the NAT Economic and Finance Group, on behalf of the NAT SPG, present to the forthcoming ANSEP meeting a proposal regarding the need to develop globally applicable incentive management provisions.**

*Review of issues relating to incentive management regarding FANS 1/A*

2.2.13 The Group noted that work was being launched to determine ways and means of providing incentives to operators to equip with data link capability and in particular with FANS 1/A avionics. Although this task was in an early phase of development, it was nevertheless agreed that it should be added to the NAT EFG work programme and that this matter be closely coordinated with the NAT IMG.

*The future work of the Group*

2.2.14 The Group endorsed the following work programme:

a) finalise the cost templates in respect of 2001 and provide updates of the 2002 cost;

b) analyse and make recommendations concerning information on cost comparisons in the NAT Region in respect of operational staff for ATC and Communications Services for 2001 and 2002;

c) contribute to the Task Force on HF Regression; and

d) assess the feasibility of Incentive Management for the migration to CNS/ATM technologies.

## 2.3 North Atlantic Traffic Forecasting Group report

2.3.1 The Group noted that the NAT TFG had held an interim meeting at the FAA Headquarters in Washington from 20 to 21 March 2003 in order to update its forecasts in the light of recent events.

*Annual Flight Data*

2.3.2 The estimated 2001 and forecast 2002 aircraft movements count (derived at the 33rd Meeting) were revised to reflect the availability of later actual data. The 2001 aircraft movements count was revised from 367,700 to 368,900, up 0.3 percent. The 2002 forecast of aircraft movements was revised from 364,200 to 344,500, down 5.4 percent.

*Average Day By Route: July and November*

2.3.3 The number of flights in the 2002 sample period represent a decline of 9.8 percent in July and a 3.8 percent increase in November over 2001 counts.

2.3.4 The Europe - North America/East route continued to account for the majority of the North Atlantic traffic—52.2 and 54.0 percent in July and November, respectively. The three Europe–North America routes declined at the same rate as did total traffic in July (down 9.8 percent) but grew at a faster rate (up 5.5 percent) than total traffic in November.

*Aircraft Type By Route: July and November*

2.3.5 The aircraft types by route are summarized into nine categories for the two sample periods. These groupings were developed by considering two factors, speed and preferred flight level. It should be noted that there were many flights, particularly in the military and piston general aviation categories, at altitudes below 25,000 feet. Also, those military flights with a commercial designation (e.g., B-707 and VC-10) had been assigned to the commercial category.

2.3.6 A ninth aircraft category (Category 4-extended range twin-engine aircraft) was included in for the 16th successive year. The number of flights in this category has increased significantly since 1987, increasing its percentage share of total traffic (including military) from 4.6 percent in July 1987 to 55.7 percent in July 2002 (down from 56.3 percent in July 2001) and from 6.4 percent in November 1987 to 54.1 percent in November 2002 (up from 53.3 percent in November 2001).

2.3.7 The overall share of wide-bodied aircraft has declined significantly since 1996, from 51.4 percent in 1996 to 37.3 percent in 2002. This reflects not only the retirement of some of the older aircraft but also a change in carrier preference for the larger twin-engined aircraft, i.e. B-777 and A-330.

2.3.8 The inclusion of new aircraft types (B-777 and A-330) has resulted in aircraft categories that are becoming increasingly more diverse in their composition. Since 1998, the A-340 aircraft's share has increased from 10.0 to 23.5 percent. During the same time period, the combined share of the B-777 and A-330 aircraft has increased from 14.3 to 46.0 percent.

*Other Data*

2.3.9 The United States member of the NAT TFG had developed a monthly database of actual traffic (passengers and Revenue Per Miles (RPMs)) and capacity (Available Seats per Miles (ASMs)) for the period January 2000 to April 2003 so as to analyze the impacts of the events of September 11 and the 2003 Iraqi War based on the latest available actual data and developing trends since that time. This data was derived from statistics provided by the United States Air Transport Association (ATA) and the Association of European Airlines (AEA).

2.3.10 The double impact of the Iraqi War and Severe Acute Respiratory Syndrome (SARS) on world airline finances has been substantial. While one or more major carriers could be forced into liquidation during the coming year, explicit assumptions regarding the loss of individual carriers had not been made. Due to the overcapacity problems currently impacting the industry, it would be extremely difficult to quantify the impact unless specific assumptions were made regarding specific carriers and their route networks. However, this year's projections do include assumptions for scaled down airlines, who are currently operating in Chapter 11 bankruptcy. Efforts will continue to monitor these factors over the coming year.

*Forecast Methodology*

2.3.11 Because of the uncertainties created by the events of September 11 and the 2003 Iraqi War, the usual methods of preparing its annual short-term forecasts of passengers and flights, i.e., developing passenger demand from econometric models and then applying assumptions regarding aircraft seat size and load factor to derive the number of passenger flights had been altered. Instead, different methodologies to develop the current short-term forecasts for 2003 and 2004 had been used. Econometric models were still utilized to forecast demand for the 2005 to 2007 time period.

*Baseline Forecasts*

2.3.12 Based on preliminary traffic results from the ATA and AEA, including weekly updates during the Iraqi War, it was now expected that the number of passengers would decline an additional 1.5 percent in 2003 (to 58.9 million), 16.1 percent below the estimate made last May. Based on preliminary ATA and AEA capacity results, combined with Official Airline Guide (OAG) summer 2003 schedules, it was also expected that the number of flights would increase 3.4 percent in 2003 to 356,300. However, this represents 10.4 percent fewer flights than forecast by NAT TFG/33.

2.3.13 Compared to the forecasts prepared in May 2002, growth over the 2004 to 2007 time period is greater in terms of passengers and less in terms of flights. The number of passengers on the North and Mid-Atlantic increases to 74.2 million in 2007, average annual growth of 5.9 percent compared to 5.2 percent in last year's forecast. Flights increase to 414,600 in 2007, up 3.9 percent annually over the 4-year forecast period. In 2007, the number of passengers is 11.9 million passengers (13.8 percent) below those forecast at the 33rd meeting. The number of flights in 2007 is 48,900 (10.6 percent) below last year's forecast.

2.3.14 In actual terms, the revised baseline forecast is for the number of passengers to increase by 14.4 million between 2002 and 2007, an average annual growth rate of 4.4 percent. The equivalent increase in the number of flights is just over 70,100 (3.8 percent annually). This compares to growth of 5.8 percent for passengers and 4.9 percent for flights in the May 2002 forecast.

2.3.15 The number of cargo flights totalled 19,100 in 2002, down 5.3 percent from 2001. Cargo activity is forecast to increase to 23,500 in 2007, an annual growth rate of 4.2 percent over the 5-year period.

2.3.16 General aviation activity on the North Atlantic totalled 17,100 in 2002, an increase of 13.1 percent over 2001. Activity in 2007 is forecast to total 18,400, an average annual increase of 1.5 percent.

2.3.17 Military activity totalled 17,600 in 2002, an increase of 2.6 percent from the previous year. This category is expected to increase to 20,000 (up 13.6 percent) in 2003 as a result of the Iraqi War, and then decline to 17,800 (down 11 percent) in 2004 and to 16,100 (down 9.6 percent) in 2005. Military activity remains at this level through 2007.

*Forecast Scenarios*

2.3.18 In the optimistic case, passengers increase to 60.9 million (up 1.8 percent) in 2003, 68.0 million (up 11.7 percent) in 2004, and total 84.1 million in 2007, an average annual growth rate of 7.1 percent over the 5-year forecast period. Flights increase to 359,400 (up 4.3 percent) in 2003 and to 379,500 (up 5.6 percent) in 2004. Over the 5-year forecast period, flights increase at an annual rate of 5.6 percent, reaching a total of 452,500 in 2007.

2.3.19 In the pessimistic case, passengers decline by 7.7 percent (to 55.2 million) in 2003 then grow by 7.1 percent (to 59.1 million) in 2004. Passengers total 66.2 million in 2007, up an average 2.1 percent over the 5-year period. The number of flights decline to 342,300 in 2003, down 0.6 percent from 2002. Flights increase to 358,900 (up 4.8 percent) in 2004 and to 380,700 in 2007, growing at a yearly rate of 2.0 percent over the forecast period.

2.3.20 The range between the 2007 optimistic and pessimistic forecast is 17.9 million (27.0 percent) passengers and 71,800 (18.9 percent) flights.

*North Atlantic Long-Range Forecasts*

2.3.21 The forecasts of passengers and flights beyond 2007 was not revised. Obviously, the long-term annual passenger and aircraft movement forecasts prepared by NAT TFG/33 are not in sync with the revised short-term projections. In terms of both passengers and flights, it appeared that the revised baseline projections lined up with the May 2002 low forecast while the revised high forecast lined up with the May 2002 baseline forecast.

2.3.22 The long-range forecast will be revised at the NAT TFG/34, which is tentatively scheduled to be held at the ICAO Montreal Office, in the spring of 2004.

**LONG-TERM FORECASTS OF AIRCRAFT MOVEMENTS IN THE ICAO NORTH ATLANTIC REGION (THOUSANDS)**

| | ACTUAL | | | FORECAST | | | |
|---|---|---|---|---|---|---|---|
| **SCENARIO** | **2000** | **2001R** | **2002E** | **2005** | **2007** | **2010*** | **2015*** |
| OPTIMISTIC | | | | 410.4 | 452.5 | 566.3 | 702.3 |
| BASELINE | 381.9 | 368.9 | 344.5 | 386.0 | 414.6 | 514.4 | 605.6 |
| PESSIMISTIC | | | | 365.9 | 380.7 | 456.8 | 502.8 |

**AVERAGE PERCENTAGE CHANGE IN AIRCRAFT MOVEMENTS PER ANNUM**

| | ACTUAL | | | FORECAST | | | |
|---|---|---|---|---|---|---|---|
| **SCENARIO** | **2000/99** | **2001/00** | **2002/01** | **2005/02** | **2007/05** | **2010/07** | **2015/10** |
| OPTIMISTIC | | | | 6.0% | 5.0% | 7.8% | 4.4% |
| BASELINE | 4.6% | -3.4% | -6.6% | 3.9% | 3.6% | 7.5% | 3.3% |
| PESSIMISTIC | | | | 2.0% | 2.0% | 6.3% | 1.9% |

E Estimate
R Revised
* Prepared at 33rd Meeting

**FORECASTS OF AIRCRAFT MOVEMENTS IN THE ICAO NORTH ATLANTIC REGION (THOUSANDS)**

| | ACTUAL | | | | | | | FORECAST | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SCENARIO** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001R** | **2002E** | **2003** | **2004** | **2005** | **2006** | **2007** |
| OPTIMISTIC | | | | | | | | 359.4 | 379.5 | 410.4 | 430.5 | 452.5 |
| BASELINE | 302.8 | 313.9 | 338.4 | 365.0 | 381.9 | 368.9 | 344.5 | 356.3 | 374.7 | 386.0 | 400.5 | 414.6 |
| PESSIMISTIC | | | | | | | | 342.3 | 358.9 | 365.9 | 372.4 | 380.7 |

**ANNUAL PERCENTAGE CHANGE IN AIRCRAFT MOVEMENTS**

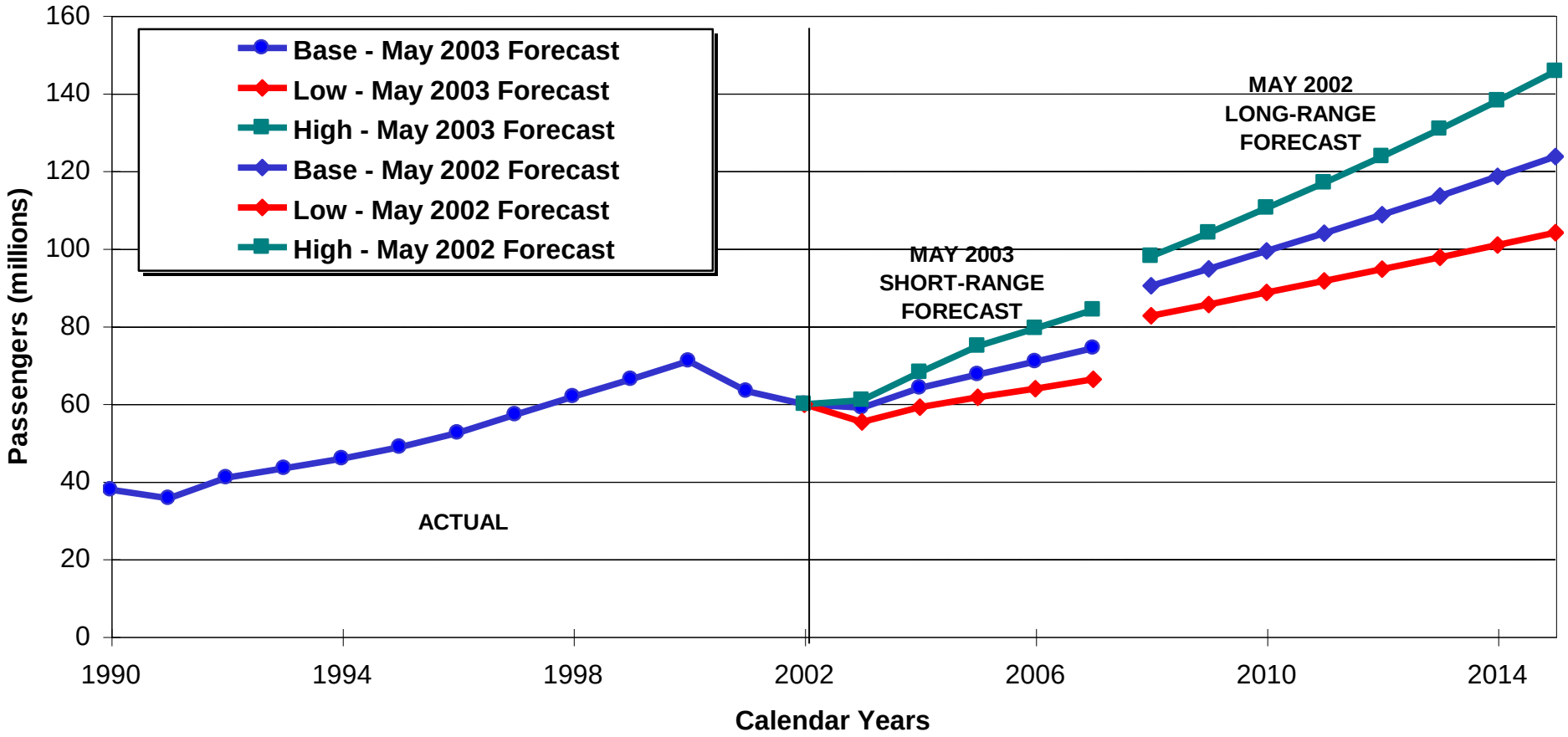
| | ACTUAL | | | | | | | FORECAST | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SCENARIO** | **1997/96** | **1998/97** | **1999/98** | **2000/99** | **2001/00** | **2002/01** | **2002/96*** | **2003/02** | **2004/03** | **2005/04** | **2006/054** | **2006/05** |
| OPTIMISTIC | | | | | | | | 4.3% | 5.6% | 8.1% | 4.9% | 5.1% |
| BASELINE | 3.7% | 7.8% | 7.9% | 4.6% | -3.4% | -6.6% | 2.2% | 3.4% | 5.2% | 3.0% | 3.8% | 3.5% |
| PESSIMISTIC | | | | | | | | -0.6% | 4.8% | 2.0% | 1.8% | 2.2% |

E Estimate

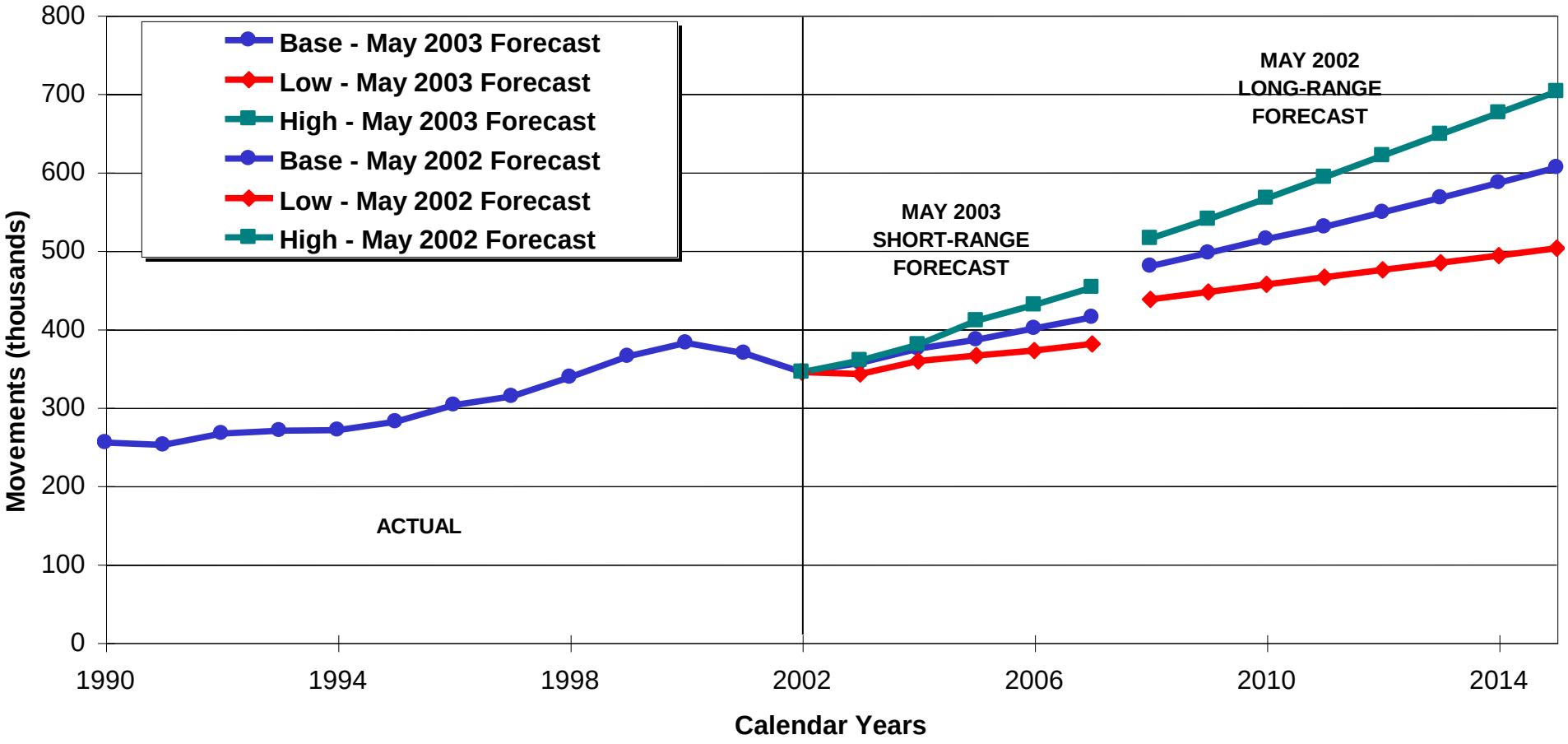
* Average annual percentage growth rate

R Revised

# *NORTH ATLANTIC TRAFFIC FORECASTS*
# *ANNUAL PASSENGERS: 1990-2015*



# *NORTH ATLANTIC TRAFFIC FORECASTS*
# *AIRCRAFT MOVEMENTS: 1990-2015*



# 3. AIR NAVIGATION SYSTEM REVIEW

## 3.1 Review of system safety performance

**SCRUTINY MATTERS** [1]

*Lateral navigation performance accuracy achieved in the NAT Region during the period 1 January 2002 to 31 December 2002*

3.1.1 The Group completed a scrutiny of observed Gross Navigation Errors (GNE) in the NAT Region and found that a total of 22 (29)* errors were reported during the period under review. Of these errors, 12 (11)* occurred outside MNPS airspace and were classified as Table "Charlie" errors. From the remaining 10 (18)*, 6(11)* were not eligible for inclusion in the risk analysis as defined at NAT SPG/17 (amended by NAT SPG/23) and were classified as Table "Bravo" errors. The remaining 4 (7)* errors, forming the basis of the scrutiny, were classified as Table "Alpha" errors.

* Figures in brackets refer to 2001

3.1.2 A decrease was noted (45%) in the numbers of errors in MNPS airspace compared with the previous 12 month period. It was also noted that the overall number of GNEs in the whole NAT Region had decreased by seven (25%) compared with the last period. Overall, the effect of the reported GNEs in 2002 produced a reduction in the estimated risk compared with 2001. However, it was noted that during the reporting period total traffic in NAT/MNPS airspace had reduced by 6% compared with the previous reporting period.

3.1.3 In accordance with monitoring procedures, follow-up action was taken for any reported "charlie" error of 50 NM or greater. The Group noted that this had to be undertaken for all but one of the reported occurrences. The Group considered the action taken by OACs to contain the number of gross navigation errors through timely intervention to prevent incorrect routing.

3.1.4 During the monitoring period, Gander and Shanwick OACs advised the CMA of 84 (79*) occasions when action was taken to prevent a GNE. The Group noted that this was 5 more than reported during the previous 12 month period. The following information was extracted from the available data:

a) 78 (64) cases of crew error, or probable crew error

b) 5 (13) cases considered to be attributable to ATC error; and

c) 1 (2) from an indeterminate cause.

(*2001 figures)

3.1.5 The overall number of interventions was slightly greater than in the previous reporting year. Specifically, the Group noted an increase in the number of errors attributable to the crew. It was also noted that six of the interventions concerned FANS-equipped aircraft.

[1] For the detailed discussions and analysis of lateral navigation performance, reference should be made to the report of the Scrutiny Group which had been presented to NAT SPG/39 and which is available on request from the EUR/NAT Office of ICAO

3.1.6 With regard to the continued application of 10 minutes longitudinal separation, it was noted that the CMA had received 7 reports of erosions of longitudinal separation in excess of three minutes compared to three in the preceding year.

*Methods of Improving the Observed Standard of Navigation Performance*

3.1.7 In considering the methods whereby the observed standard of navigation performance might be improved, account was taken of the lessons derived from the review of navigation performance reported above and the ensuing discussions of the Group. Following the observations made by the 2002 Scrutiny Group, the Group was pleased to note an improvement in occurrence reporting by both Santa Maria and New York, which should lead to a more representative picture of the actual number of GNEs occurring in MNPS airspace. Furthermore, the improved submission of related records (flight plans and transcripts) has assisted the analysis and subsequent scrutiny of reported occurrences.

3.1.8 As in previous years, it was observed that re-routing was a factor in a significant proportion of the reported GNEs. The Group noted that the recommended practice of ATC confirming a clearance with the pilot, rather than asking the pilot to confirm his routing, would in most cases prevent the development of a major track deviation.

3.1.9 The avoidance of errors by reporting position directly from the Flight Management System (FMS) progress or report pages remained a desirable objective along with systematic use of track and distance tables to validate FMS data entry.

3.1.10 As noted in previous years, the Group observed that radar coverage in part of Gander oceanic airspace had helped to prevent GNEs through ATC intervention. However, the CMA had not received any data regarding radar being used to help carry out a similar function in Reykjavik oceanic airspace.

3.1.11 On the basis of these observations, the Group noted the need for the following:

a) to encourage crew adherence to plotting and cross-checking procedures (as published in the NAT MNPS Operations Manual) when inserting waypoints, approaching and crossing waypoints, and conducting waypoint cross-checks;

b) to reinforce the practice of crew position reporting directly from the FMS in accordance with the NAT MNPS Operations Manual;

c) to promote use of track and distance tables by crews as a cross-check when entering a re-route into the FMS;

d) to emphasise to controllers the importance of confirming the cleared route to the crew without delay whenever a “next” position reported by an aircraft does not comply with the current cleared routing; and

e) to re-emphasise to ACCs the requirement for the retention of transcripts and records in any event where it appeared that a navigation error may have occurred, and the provision of these to the CMA at the time of reporting a GNE or an altitude deviation of 300 ft or more.

3.1.12 After reviewing these observations and recalling that many of these issues had been raised in the past, the Group agreed that the best way to inform the user community would be to promulgate an AIC. However, in order to ensure that a common AIC was developed, the Group agreed that the United Kingdom should take the lead in developing one and thereafter, inform other NAT provider States.

**CONCLUSION 39/14 - PROMULGATE AN AERONAUTICAL INFORMATION CIRCULAR (AIC) CONCERNING BEST PRACTICES TO BE OBSERVED WHEN OPERATING IN NAT MINIMUM NAVIGATION PERFORMANCE SPECIFICATIONS (MNPS) AIRSPACE**

**That:**

**a) the United Kingdom act as the focal point to develop a common AIC reflecting best practices to be observed when operating in NAT Minimum Navigation Performance Specifications (MNPS) airspace; and**

**b) NAT provider States promulgate the AIC.**

*Vertical navigation performance accuracy achieved in the NAT Region during the period 1 January 2002 to 31 December 2002*

3.1.13 The Group scrutinised the altitude deviations of 300 ft or more received by the CMA during the period in an attempt to determine any trends in the operation of aircraft in the NAT, which may have resulted in vertical errors.

3.1.14 The CMA gathered 35 reports of risk bearing altitude deviations in MNPS airspace. Aircraft technical occurrences, such as those caused by poor estimation of air temperature or turbulence, accounted for 11 of these deviations, while of the remainder, 19 were directly attributable to crew or ATC action.

3.1.15 The scrutiny process, highlighted the following as the major causes of risk bearing errors:

a) non-compliance with ATC clearance (11);

b) turbulence, ambient temperature and aircraft technical defects (11); and

c) communication difficulties, HF blackouts and crew/HF radio operator/ATC communication delays and misunderstandings (4).

3.1.16 It was noted that the number of incidents as a result of entry into oceanic airspace at the incorrect level was significant and accounted for 6 of the 11 events in (a) above. As noted in last year's report, the issue of joint crew/ATC responsibility for ensuring that an aircraft enters oceanic airspace at the oceanic clearance level was discussed and consideration was given to means of reducing the incidence of failure to receive, or in some cases to request, clearance from domestic control, to achieve the cleared oceanic level. The pilot community continues to express reluctance to change their domestic level without clearance to do so, and the Group expressed the desirability of having either a clearly standardised procedure (applicable to all ACCs with a NAT oceanic boundary) or clear publication on oceanic navigation charts of a safe procedure for oceanic entry in the event of domestic clearance having not been received. It was generally agreed that orbiting outside oceanic airspace, possibly with communication difficulties, was not a practical solution. It was noted that in the Pacific region, for example, aircraft were required to maintain their last assigned level. The Group considered that this may help in finding a solution to this on-going problem in the NAT.

**CONCLUSION 39/15 - DEVELOP A PROCEDURE TO PROVIDE CLEAR GUIDANCE TO CREWS REGARDING THE FLIGHT LEVEL AT WHICH THEY SHOULD ENTER OCEANIC AIRSPACE**

**That the NAT Implementation Management Group (NAT IMG) review the radio failure procedures applicable to aircraft that have received an Oceanic clearance but have not been re-cleared to their Oceanic level.**

3.1.17 It was noted that there were continuing, if infrequent, instances of crew misinterpretation of an acknowledgement (usually from the communicator) of a request to climb as being a clearance to climb.

3.1.18 The unreliable VHF coverage in the Brest area was identified by the Scrutiny Group as being contributory to a number of occurrences.

3.1.19 The Group noted the following and agreed some of the issues be incorporated in the AIC to be developed (Conclusion 39/14 refers):

a) that efforts be made by all OACs to continue to improve inter-centre co-ordination;

b) that the pilot community be reminded of the importance of accurate time estimates;

c) the Group welcomed the offer from France to organize a meeting between the United Kingdom and France in order to examine the VHF situation at the interface between Shanwick and Brest in both technical and operational domains; and

d) that, in the interests of improved co-operation and communication, a representative of Santa Maria OAC be designated to join the Scrutiny Group in 2004.

*Methods of Improving the Current Monitoring Procedures*

3.1.20 While in agreement that existing monitoring procedures were adequate for the purpose and allowed for effective investigation, the Group recognised that adequate reporting is the key to effective analysis of risks and trends, and considered it to be essential to re-emphasise to all oceanic ACCs the importance of timely and comprehensive reporting of occurrences.

**MATHEMATICAL MATTERS**

*2002 LATERAL AND VERTICAL COLLISION RISK ESTIMATES*

*Lateral*

3.1.21 On 24th January 2002 the vertical flight level structure in NAT MNPS airspace, including West Atlantic Route System (WATRS), was changed from Phase 2 RVSM to full RVSM (FL 290 to FL 410 inclusive). Due to this change, the occupancy estimates for the year were based on the final eleven months of 2002 only. The error rates used in the risk estimates were however based on error data from the full twelve months of 2002. Until further significant changes occur in airspace structure, the risk for 2003 and future years will be assessed on a calendar year basis using occupancies and errors for the full calendar year.

3.1.22 The Group determined the lateral occupancy estimates for 2002 based on the traffic weighted average of the United Kingdom 20°W estimates, the Canadian 40°W estimates and the traffic weighted average of both 30°W estimates. The estimates were based on data for the 4th and 15th days of each month except for the 4th and 15th of January. An examination of the 4th and 15th of January 2002 occupancies showed nothing unusual. As noted, data from these days was not used since RVSM Phase 2 was still in

force. The 2002 estimates together with the estimates for the previous six monitoring periods are shown in Table 1.

**Table 1: Lateral Occupancy Estimates for the periods from 1997/98 to 2002**

| | | Monitoring Period | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Direction** | **Traffic** | **1997/98 RVSM Phase 1 †** | **1998 RVSM Phase 1** | **1998/99 RVSM Phase 2 *** | **1999 RVSM Phase 2** | **2000 RVSM Phase 2** | **2001 RVSM Phase 2** | **2002 Full-RVSM §** |
| **Same** | **OTS** | 1.098 | 1.151 | 0.818 | 0.959 | 0.996 | 1.008 | 1.002 |
| | **Random** | 0.204 | 0.222 | 0.156 | 0.173 | 0.165 | 0.174 | 0.166 |
| | **Comb** | 0.752 | 0.802 | 0.567 | 0.671 | 0.702 | 0.716 | 0.683 |
| **Opposite** | **OTS** | 0.003 | 0.002 | 0.003 | 0.004 | 0.005 | 0.002 | 0.003 |
| | **Random** | 0.008 | 0.007 | 0.008 | 0.010 | 0.012 | 0.006 | 0.007 |
| | **Comb** | 0.005 | 0.004 | 0.005 | 0.006 | 0.007 | 0.003 | 0.004 |

† nine month occupancy period
* seven month occupancy period
§ eleven month occupancy period

3.1.23 Both the OTS and Random (and hence also the combined) same direction occupancy values have decreased since the previous year (2001). This decrease was considered to be due to a combination of two factors:

a) the introduction of full RVSM, making four more flight levels available (FL 290, 300, 400 and 410) to be included in the occupancy estimate (with current traffic patterns this results in a reduction in the occupancy estimate), and;

b) an observed reduction in number of flights from 2001 of approximately 6%.

3.1.24 For comparison, the NAT traffic for 2001 was 3% less than for 2000, but in that case, where no change in airspace structure occurred, the same direction occupancy actually showed an increase. The opposite direction occupancies usually show little detectable trend because of the small number of aircraft involved. The opposite direction values for 2002 were higher than those 2001 but were still lower than those for the year 2000.

3.1.25 Although occupancy values in the years immediately preceding the introduction of RVSM were higher than current values, RVSM occupancy values were generally increasing to levels similar to those during RVSM Phase 1. This trend should point out the importance of adequate lead times when planning airspace changes designed to ultimately increase capacity. This was particularly so when such changes were accompanied by the introduction of more stringent TLS values, since occupancy values directly affect the risk estimates.

3.1.26 It would not be possible to examine trends in occupancy until the airspace structure has been maintained for several years. The significant changes to NAT operations have great influence on the occupancies. The Phase 2 structure in place during 2001 was replaced by full RVSM on the 24th January 2002 and this affected occupancy values. Only after the system remained without significant system or separation changes for a period of time would it be possible to apply statistical techniques designed to determine any significant trends.

3.1.27 It was noted that the MNPS GNEs reported in 2002 were examined in conjunction with the Scrutiny Group. This ensured that the two groups were in agreement over the categorisation of the events for risk assessment purposes.

3.1.28 It was agreed that, in future, the error weights for lateral GNEs should be reviewed each year by the MWG using the latest occupancy estimates. A recommendation to update the weights would then be made as required. Based on the occupancy estimates for 2002 it was found that there was no need to update the error weights from those adopted at NAT SPG/36. They will continue to be reviewed annually.

3.1.29 Table 2 presents the weighted GNEs used in preparing the risk estimate with Table 3 providing the weighted risk-bearing rates since 1997.

**Table 2: 2002 Weighted Gross Navigation Errors**

| Class | > 30 NM | Risk bearing | OTS | Random | Comb |
|---|---|---|---|---|---|
| **A** | 0 | 0 | 0.00 | 0.00 | 0.00 |
| **B** | 0 | 0 | 0.00 | 0.00 | 0.00 |
| **C1** | 1 | 0 | 0.00 | 0.00 | 0.00 |
| **C2** | 0 | 0 | 0.00 | 0.00 | 0.00 |
| **C3** | 2 | 1 | 0.00 | 0.33 | 0.33 |
| **D** | 0 | 0 | 0.00 | 0.00 | 0.00 |
| **E** | 0 | 0 | 0.00 | 0.00 | 0.00 |
| **F** | 2 | 0 | 0.00 | 0.00 | 0.00 |
| **Unknown** | 0 | 0 | 0.00 | 0.00 | 0.00 |
| **Total** | 5 | 1 | 0.00 | 0.33 | 0.33 |
| **Sample Traffic Count** | | | 160671 | 132693 | 293364 |
| **Error Rate** | **$x10^{-4}$** | | **0.00** | **0.02** | **0.01** |

**Table 3: - Weighted Risk-Bearing Error Rates (x $10^{-4}$) for the years from 1997 to 2002**

| Sample | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|
| **OTS** | 0.00 | 0.06 | 0.03 | 0.00 | 0.00 | **0.00** |
| **Random** | 0.45 | 0.31 | 0.21 | 0.20 | 0.12 | **0.02** |
| **Comb** | 0.18 | 0.17 | 0.10 | 0.08 | 0.05 | **0.01** |

3.1.30 The 2002 lateral collision risk estimates together with the estimates for the previous five monitoring years are shown in Table 4. Compared to previous years it can be seen that the overall collision risk estimate for all MNPS traffic had decreased and was in fact the lowest risk during that period. The estimated risk for Random traffic had also decreased while the calculated values for traffic on the OTS have remained constant at zero during the last three years. All the estimates for 2002 were below the TLS (for the lateral dimension) of 20 x $10^{-9}$ fatal accidents per flight hour.

3.1.31 Based on the available evidence, it appeared that procedures aimed at keeping large lateral navigational errors to a minimum have had some effect, especially on the OTS.

3.1.32 In accordance with NAT SPG Conclusion 38/13 to develop new values for aircraft size parameters, a study based on the NAT aircraft population for the calendar year 2002 showed that NAT aircraft average dimensions had not changed significantly. Consequently, the aircraft size parameters have not been changed from the values used for the 2001 risk estimation. It was however agreed, in accordance with Conclusion 38/13, that average aircraft dimensions for the NAT fleet should continue to be reviewed periodically and new values adopted as necessary.

**Table 4: Lateral Risk Estimates for the years from 1997 to 2002**

*All figures are in fatal accidents per flight hour and should be multiplied by $10^{-9}$.*
*These should be compared against the TLS of 20 x $10^{-9}$.*

| | Monitoring Period | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1997 Pre-RVSM** | **1997 RVSM Phase 1 †** | **1998 RVSM Phase 1** | **1998 RVSM Phase 2 *** | **1999 RVSM Phase 2** | **2000 RVSM Phase 2** | **2001 RVSM Phase 2** | **2002 Full RVSM §** |
| **OTS** | 0.0 | 0.0 | 4.5 | 3.3 | 1.6 | 0.0 | 0.0 | 0.0 |
| **Random** | 12.5 | 8.7 | 5.7 | 4.5 | 3.4 | 3.4 | 1.8 | 0.4 |
| **All MNPS** | 6.2 | 4.3 | 5.0 | 3.8 | 2.4 | 1.5 | 0.9 | 0.2 |

† nine month occupancy period
* seven month occupancy period
§ eleven month occupancy period

*Review of Lateral Risk Methodology*

3.1.33 In accordance with NAT SPG Conclusion 38/15 to review the lateral risk estimation methodology, several studies were in progress. Current studies concern the optimisation of the sampling period, the occupancy estimation methodology and a review of the concept of the sampling window for GNEs.

3.1.34 The twelve month sample periods for the OTS have been discussed at previous meetings where it was considered that they might not allow accurate estimates of the system risk to be calculated. For the past three monitoring periods the calculated value of this risk has been estimated to be zero. It is known that the true risk in the system cannot be identically zero. Furthermore, there is evidence from Table Bravo GNEs of the occurrence of errors in the OTS, which are not included in the current risk estimate.

3.1.35 A study into methods for estimating lateral and vertical occupancies for flights classified as either OTS or Random has been carried out. The reason for this work was that flights are only classified as OTS flights if they follow all of the waypoints of an OTS track from coast out to coast in. Flights that deviate from such a track, even if they follow most of the OTS waypoints, are labelled in the data base as Random. Hence, many flights, which are classified as Random, may in fact be following part or most of an OTS track and contributing to the true occupancy of the OTS. Furthermore, any GNEs suffered by such flights could actually be occurring in the OTS region of the airspace, even though they are not classed as OTS GNEs. These factors may result in artificially low risk estimates for the OTS.

3.1.36 The study treated the region(s) of NAT MNPS airspace occupied by OTS tracks as an 'OTS Block' and any flights observed in that block were treated as OTS flights, regardless of their full path from coast out to coast in. Data was sampled from 30W for this particular study. Because of a decrease in the number of flights classified as OTS, it was found that in general OTS same direction occupancy was increased under the new definition, in both the lateral and vertical dimensions, with some variation depending on the time the tracks were considered to be active at 30W. In general the Random same

direction occupancies were also increased under the new definition, due to an increase in the number of Random/Random proximate pairs following the reclassification of some OTS flights as Random. This occurs because although some flights are traditionally classed as OTS, and are following the path of OTS tracks, they are actually above or below the published OTS levels, or are outside the times when the OTS is in effect. Under the new definition these flights are classed as Random and proximate pairs formed with other flights will be Random/Random instead of OTS/Random.

3.1.37 Under any definition of an OTS flight there remains some variability in the vertical, geographical and temporal boundaries of the "block" depending on the flight levels requested by pilots or cleared by controllers on an OTS track, and whether or not published track times are strictly adhered to.

3.1.38 For opposite direction occupancies, which can be potentially important in risk estimation, it was found that the opposite direction lateral occupancies were unchanged. The opposite direction vertical occupancy increased in the OTS and decreased in Random airspace. It should be pointed out that new definitions of occupancy have not been adopted for current risk estimation. The above work is also applicable to the vertical risk estimation.

3.1.39 It was also highlighted that the system risk estimate is a linear combination of its constituents (OTS and Random) and as such the total system risk estimate would not change under any re-apportionment. The study was undertaken, in part, to suggest, how the elemental risk contributions could be more accurately portrayed.

3.1.40 It was noted that it would be worthwhile, for model development purposes, to estimate the risk for 2003 using both definitions of occupancy. A re-classification of errors as OTS or Random based on the new definitions should also be carried out for that study.

3.1.41 A third component of the review of lateral risk methodology concerns the concept of the ‘sampling window’, or ‘radar window’. Lateral errors are currently only counted as risk-bearing, for risk calculation purposes, when they are observed at the ‘window’. Using statistical techniques an estimate of the overall lateral risk in NAT MNPS airspace is derived by weighting the risk-bearing errors so that they represent equivalent errors occurring, at the same rate at all other reporting points across the ocean. While statistically valid, it is considered that with the amount of good quality data now available from mid-ocean, a review of the sampling of errors "not at the window" should be carried out and the methodology revised to allow this additional information to be incorporated in a statistically appropriate way.

3.1.42 The review of lateral risk estimation methodology should also include a re-evaluation of the average oceanic crossing time.

3.1.43 In addition to radar data from the 'window' and that obtained from other ATC facilities, there are now several other reliable sources of data, namely those using data link systems such as CADS, CPDLC and FMC WPR as well as other potential systems. It was felt that all sources of data would be valuable in the development of the new risk estimation methodology, although studies will be necessary to determine appropriate error weights and to gauge the effect of error probabilities associated with individual systems and communication channels. It was noted that the existence of these data link systems and the navigation performance data so provided will also need to be incorporated into any future mathematical models developed to investigate the feasibility of any proposed reductions in lateral separation standards. It was recognised the lead time traditionally required for such implementations was considerable and therefore felt that a clear, condensed list of available systems and their usage would be a reference source equally valuable to studies of both current and future risk estimation methodologies. In consequence, the Group felt that consideration should be given to the inclusion of such information in the road map (Conclusion 39/11 refers).

*Vertical*

3.1.44 As for lateral occupancies, the Group determined the vertical occupancy estimates for the eleven months of 2002 based on the traffic weighted average of the United Kingdom 20°W estimates, the Canadian 40°W estimates and the traffic weighted average of both 30°W estimates. The estimates were based on data for the 4th and 15th days of each month except that for the 4th and 15th of January, when RVSM Phase 2 was still in force. The 2002 estimates together with estimates since 1998, for RVSM levels, are shown in Table 5. Occupancies for non-RVSM levels are no longer being shown since full RVSM is now operational.

**Table 5: Vertical Occupancy Estimates for the years from 1998 to 2002 at RVSM levels**

| Direction | Traffic | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|
| Same | OTS | 1.153 | 1.324 | 1.303 | 1.283 | 1.276 |
| | Random | 0.133 | 0.143 | 0.165 | 0.160 | 0.155 |
| | Comb | 0.795 | 0.921 | 0.928 | 0.914 | 0.848 |
| Opposite | OTS | 0.001 | 0.002 | 0.002 | 0.001 | 0.001 |
| | Random | 0.033 | 0.032 | 0.027 | 0.029 | 0.027 |
| | Comb | 0.013 | 0.012 | 0.010 | 0.010 | 0.011 |

*Risk Due to Operational Errors*

3.1.45 The operational element of vertical collision risk is determined from the estimate of time spent by aircraft at uncleared levels or when incorrectly cleared to a level and, additionally for uncleared level changes, the number of levels crossed without clearance or without following published contingency procedures (and the speeds at which the levels are crossed) during the monitoring year. Table 6 shows the total number of (not necessarily risk bearing) large height deviations reported to the CMA and the estimate of risk-bearing time spent at uncleared levels for 2002 and the previous six monitoring years.

**Table 6: Large Height Deviations and Time Spent at Wrong Levels for the Years 1996 - 2002**

| | 1996 | 1997 (pre-RVSM)[1] | 1997 (RVSM Ph 1)[2] | 1998 (RVSM Ph 1)[3] | 1998 (RVSM Ph 2)[4] | 1999 (RVSM Ph 2) | 2000 (RVSM Ph 2) | 2001 (RVSM Ph 2) | 2002 (Full RVSM) |
|---|---|---|---|---|---|---|---|---|---|
| **Number of Deviations** | 49 | 24 | 56 | 62 | 7 | 52 | 31 | 41 | **69** |
| **Time at Wrong Level (mins)** | 182 | 83 | 266 | 60.2 | 10 | 170 | 52 | 159 | **360** |

1: Collection period from January to March 1997.
2: Collection period from April to December 1997.
3: Collection period from January to 7 October 1998.
4: Collection period from 8 October to December 1998.

3.1.46 As with the lateral errors, the large height deviations reported to the CMA during 2002 were examined in conjunction with the Scrutiny Group to agree on the classification for risk calculation purposes. Table 6 shows that there has been an increase in the time spent at uncleared levels and the number of deviations reported.

3.1.47 Based on the set of large height deviations reported in 2002 the Group determined the operational vertical collision risk estimates. The estimates are shown in Table 7 together with, for comparison, the estimates under RVSM Phase 1 and Phase 2 operations since 1997. As noted above, the values for average aircraft dimensions used in last year's risk estimation have been adopted as the current best estimates for those parameters.

**Table 7: RVSM Vertical Collision Risk Estimates between 1997 and 2002 (Large Height Deviations Only)**

*All figures are in fatal accidents per flight hour and should be multiplied by $10^{-9}$.*
***Bold figures** are the risk estimates for 2002.*

| | 1997* | 1998** | 1999 | 2000 | 2001 | 2002† |
|---|---|---|---|---|---|---|
| **OTS** | 3.2 | 0.8 | 6.0 | 0.51 | 3.03 | **0.58** |
| **Random** | 19.1 | 6.1 | 8.9 | 6.59 | 16.3 | **41.6** |
| **Combined** | 10.3 | 3.2 | 7.2 | 3.04 | 8.97 | **20.5** |
| | **TLS = 5.0** | | | | | |

*: 1997 values estimated for Phase 1 RVSM between April and December using twelve months of LHD data.
**: 1998 values estimated for Phase 2 RVSM between October and December using twelve months of LHD data.
†: 2002 values estimated for full RVSM (January 24 to December 31) using twelve months of LHD data.
Note that $P_y(0)$ was increased in both 2000 and 2002.

3.1.48 Table 7 shows that the random and combined vertical collision risk due to operational errors at RVSM levels for the year 2002 is estimated to be just over four times the TLS.

3.1.49 In reviewing the RVSM vertical risk estimates for the last six monitoring periods, it was noted that the combined vertical collision risk has now exceeded the TLS four times. It was also noted from the risk estimates that the risk presented by random traffic was consistently higher than that presented by OTS traffic. After the 2002 risk value, the next highest value occurred in 1997 during the RVSM pre-operational trial phase (later called Phase 1). A major component of the 1997 risk was provided by a single large height deviation where an aircraft flew an entire NAT crossing at an incorrect flight level. By contrast, the high risk estimate for 2001 had no specific source as the main risk contributor but was due to a combination of several events.

3.1.50 The Group noted that mitigating factors, such as the reviewing of operating procedures and the implementation of strategic lateral offsets, were being put in place in order to reduce the risk due to operational errors. In this connection, it was stressed that the risk due to operational errors was not related to the separation minima being used, RVSM in this case. Nevertheless, the Group agreed that this matter needed to be kept under review in order to determine whether or not the mitigation was reducing risk.

**CONCLUSION 39/16 - REDUCTION IN RISK DUE TO OPERATIONAL ERRORS**

**That:**

**a) all concerned ensure that the necessary mitigation is put in place in order to reduce risk due to operational errors; and**

**b) the Central Monitoring Agency (CMA) monitor this matter and report to the NAT SPG through the Secretary as required.**

3.1.51 An analysis of the vertical risk for 2002 shows that approximately 70% of the total risk is accounted for by three large height deviations involving crew error (out of a total of 23 risk-bearing large height deviations included in the risk estimate). The single event that contributed the most to the vertical risk was due partly to the flight crew not adhering to their clearance, coupled with a coincident period of HF blackout. This event accounted for approximately 40% of the vertical collision risk. However, even without the three most significant errors being present, the vertical risk would still exceed the vertical TLS.

3.1.52 One further factor, which has resulted in a general increase in vertical risk, is the increase in the lateral overlap probability for two aircraft on the same track $P_y(0)$. This has increased by 16% since the year 2000, resulting in a 16% increase in all vertical (and longitudinal) risk values. This risk could be mitigated with the use of the strategic lateral offset procedure (SLOP), which is awaiting final approval. The SLOP and $P_y(0)$ are discussed further below.

3.1.53 It was noted that over the period of RVSM operations since 1997, there has been considerable fluctuation in the vertical risk estimates. The risk is produced by large height deviations due to operational errors or equipment failures, which, by their nature and in a statistical sense, are rare events with highly variable individual risks. That is, one event can contribute a large risk while another will only have a small effect. Given the nature of the underlying risk-generating errors it is entirely expected that the total risk will exhibit considerable variation from year to year.

3.1.54 Given the year-by-year variations in vertical risk estimates the Group considered the possibility that the sampling period for vertical errors is too small. It was felt that the annual risk estimation process should certainly be maintained, but that in parallel a study of accumulated vertical error data from the beginning of RVSM operations to date should be carried out. The aim of such a study would be to determine if a better statistical understanding of the risk-generating processes involved could be obtained. The data accumulated to date could be used to produce distributions for vertical error frequency and duration, which could aid in finding an optimum sampling period. It would have to be borne in mind that vertical errors, also by their nature and because of the measures taken to limit them, are not expected to be a statistically stationary process.

3.1.55 After consideration of the operational vertical risks estimated since 1997, it appeared likely that the NAT system was operating above its prescribed TLS in the vertical dimension. This situation would be monitored by the NAT CMA (Conclusion 39/15 refers).

*WATRS RVSM Risk Assessment*

3.1.56 As part of the vertical risk assessment process for RVSM in the WATRS, an ongoing study of vertical occupancy in the WATRS was presented. (It was noted that lateral occupancies in the WATRS are not calculated since routes are generally separated by more than 90 NM.) Previously, the Enhanced Traffic Management System (ETMS) of the FAA, which provides traffic data on a minute-by-minute basis, has been used for estimating occupancy. A new method for occupancy estimation under development makes use of the entry fix, route, and assigned Mach number for each flight.

3.1.57 A recent preliminary estimate of the WATRS RVSM opposite direction vertical occupancy shows that there has been a significant drop (from 0.832 to 0.548) following the introduction of RVSM, even though there has been some traffic growth. This occupancy drop will have a significant effect on risk estimates (that is, it will reduce them) particularly since the occupancy estimates are for opposite direction traffic.

3.1.58 Lateral offsets, in both the WATRS specifically and the NAT in general, were discussed. However one area that was not fully discussed was the issue of pilot education. Although the lateral offset procedure devised for WATRS and the NAT has been promulgated and will be the subject of an upcoming amendment to the *NAT Regional Supplementary Procedures* (Doc 7030), it was suggested that greater use might be made of the procedure if the underlying reasons for it could be explained more fully to pilots. To this end it was felt that it would be worthwhile exploring the possibility of publishing an accessible explanation in flight safety journals or other journals read by pilots. The Group also agreed that a common application date for the entire NAT Region would need to agree upon.

**CONCLUSION 39/17 - INFORMATION CAMPAIGN CONCERNING THE USE OF LATERAL OFFSETS**

**That an information campaign be launched as soon as the proposal for amendment concerning the use of lateral offsets has been approved by the Council and before implementation by all concerned, on a commonly agreed date.**

*Lateral Overlap Probability*

3.1.59 In accordance with NAT SPG Conclusion 38/17 a new estimate of the lateral overlap probability $P_y(0)$ has been made. The lateral overlap probability is the probability that two aircraft, nominally on the same track, are actually in lateral overlap. It is equivalent to the probability that two aircraft would be in collision at a given waypoint if they attempted to pass that waypoint at exactly the same time, at the same level and along the same track. This probability is not equal to one since aircraft typically exhibit some lateral deviation from their cleared track centreline due to their normal navigational performance. The more likely aircraft are to deviate from track centreline in some random fashion (due to normal navigational performance), the less likely they are to be in lateral overlap at any one time (and hence $P_y(0)$ will tend to be lower).

3.1.60 It has been noted in previous meetings that because of the increased carriage of GPS navigation equipment by aircraft, the probability and magnitude of deviations from track centreline of the NAT fleet are being reduced. This will increase the value of $P_y(0)$ and hence the probability of collision (in direct proportion) given that an appropriate vertical error has occurred.

3.1.61 The Group was provided with an update of a study which used radar observations of aircraft entering the ocean at 15W to determine deviations of those aircraft from the intended track centreline. Observations of 3871 flights were made from which a distribution of deviations (or cross-track errors) was constructed. The distribution was then fitted by a Double Double Exponential distribution to ultimately obtain a revised value of $P_y(0)$ of 0.0601. The previously used value, determined in 2000, was 0.0519. Prior to that, the value in use was 0.0263, calculated in 1995. That is, a doubling of $P_y(0)$ was observed from 1995 to 2000, and a further 16% increase has occurred during the last three years. The value of $P_y(0)$ is now close to the Global System Performance Specification value for $P_y(0)$ of 0.064, which further highlights the need for the use of lateral offsets. Full use of the lateral offset procedure could reduce $P_y(0)$ to about a third of its current value, which would also reduce risk estimates by a corresponding proportion (other factors remaining constant).

**CONCLUSION 39/18 - REVIEW OF SAMPLING PERIOD**

**That the Mathematicians working group review the sampling period for risk estimation and make a recommendation to NAT SPG/40**

**CONCLUSION 39/19 - VALUE OF $P_Y(0)$**

**That the value for $P_y(0)$ of 0.0601 be adopted for risk estimation purposes.**

*REVIEW OF ON-GOING MONITORING PROCEDURES*

*Vertical*

3.1.62 The Group noted the Vertical Monitoring Pack, which is a collection of tables and graphs used for assessing the combined ASE performance of the population of aircraft that traverse the NAT. It is produced twice yearly with the intent of providing quality assurance data relevant to individual aircraft, aircraft groups and operators. The basic data used for generation of the pack is the database of HMU and GMS ASE measurements. The global guidance material contains ASE performance specifications and the pack is used to ensure that individual aircraft, aircraft groups and operators continue to meet those specifications.

3.1.63 The pack contains two tables of unusually large ASE measurements, labelled aberrant measurements and non-compliant measurements. Aberrant measurements are recorded to allow early detection of trends that might result in future non-compliance by an individual airframe or a possible breach of performance limits by an aircraft group. Non-compliant measurements result in CMA action to remove the aircraft from the airspace until that airframe can be demonstrated to again meet performance requirements.

3.1.64 The list of aberrant measurements was reviewed by the Group. In doing so, it was noticed that several aircraft exhibited more than one aberrant measurement. The list was scanned in order to identify those airframes that had multiple aberrant measurements in excess of ten per cent of their total record of observations. Subsequently, a closer look of the serial record of ASE observations (records in chronological order) was undertaken to determine whether it might be desirable to recommend to the CMA that the operator of the aircraft be notified so that he could take early action before the aircraft exhibited a non-compliant measurement. Another possible outcome would be that the operator had already identified and corrected the performance as a part of his continuing maintenance programme. Such a scan of the aberrant measurements was carried out resulting in the identification of a few aircraft that required a review of the serial record. In a couple of cases, aircraft that had multiple aberrant measurements also appeared on the "non-compliant table".

3.1.65 The Group was informed that, in reviewing the table of non-compliant measurements, there was expected to be rare performance events that require extreme action. Over the course of amassing some 350,000 observations since the inception of RVSM in the NAT only six such observations had previously been recorded. There were no new validated entries on the table, however there were some large measurements for which complete information was not yet available. It was recommended that the CMA take action to resolve the data on the "non-compliant table" as soon as possible.

3.1.66 The Group noted that the MWG had reviewed a set of graphical tools developed to quickly identify aircraft groups, airframes or operators that either did not meet performance requirements or from which more data was needed in order to completely assess performance. In the case of aircraft group performance, the assessment with respect to the requirements that the mean of the group be less than 80 feet and the absolute value of the mean plus three standard deviations be less than 245 feet was, in some cases, very sensitive to the choice of the models of aircraft that compose the aircraft group. Thus, the performance

must be judged in concert with the contributing elements of the group, especially in the case where there might be some question regarding whether the exhibited performance may not meet the criteria. The group performances have been assessed previously and there are only a couple of new groups to review, all of which have too few airframes observed to be able to firmly establish their performance with respect to the criteria. However, none appeared to exhibit definitively performance outside the criteria. In regard to individual airframe performance, the MWG reviewed the catalogue of individual airframe measurements and identified several airframes that might show shifting ASE performance. It will be necessary to look more deeply into the serial record of performance for those airframes to determine whether this may be the result of a trend (i.e., ASE drift). In all, the Group noted that MWG felt that the Vertical Monitoring Pack proved a valuable tool in assessing the database of monitoring results.

**SAFETY MANAGEMENT**

*Safety Tracking and Reporting System (STAR)*

3.1.67 The Group was informed that the United Kingdom had identified a business need to provide an information system to support maintaining and improving National Air Traffic System safety performance and to be able to demonstrate the safety of its NATS to staff, managers, the United Kingdom Safety Regulator and customers. The Group noted with appreciation the information presented and in particular the potential use for the CMA and other NAT providers. The Group felt that this issue was indeed worth exploring and therefore agreed that all service providers should examine the proposal and that the NAT IMG should develop a recommendation for NAT SPG/40.

**CONCLUSION 39/20 - THE POSSIBLE USE OF A SAFETY TRACKING AND REPORTING SYSTEM**

**That:**

**a) all NAT service providers examine the proposal from the United Kingdom for a unified safety related data base; and**

**b) the NAT IMG develop a recommendation on the way forward on this matter.**

## 3.2 Review of system operations

**AIR TRAFFIC MANAGEMENT**

*North Atlantic Operations Managers' Meeting*

3.2.1 The Group was informed that the Operations Managers had met from the 26 to 29 May 2003, in accordance with the Terms of Reference of the NAT SPG. Besides being given a thorough presentation of NAV PORTUGAL OAC's new oceanic Flight Data Processing System (FDPS) a visit was made by the participants in the Operations Managers meeting to the operations room where the integrated operation of NAV PORTUGAL's OAC was explained. The main issues of the meeting were as follows:

a) the need for secretarial support for operational managers meetings;

b) discussions and decision for the International General Aviation (IGA) manual;

c) discussions on the importance and implementation of NAT SPG Conclusions 38/10 and 38/11 regarding operational matters that affect safety in the system, specifically the Report Leaving/Report Reaching issue, which was a standard operating practice in all NAT OACs;

d) the suggestion regarding the increase of separation when there were reports of more than moderate turbulence would be followed and all ACCs would discuss and update their Letters of Agreement (LoA) to that effect; and

e) the HF guidance material was endorsed by the NAT Ops Managers, but the Group had identified the need for further action and guidance from ICAO in what concerns the timely dissemination of information to ATC of known abnormal HF propagation conditions.

3.2.2 The Group noted that the Operations Managers revised and agreed on changes to the current Flight Level Allocation Scheme (FLAS) and decided to have the NAT Region FLAS agreement included in a separate NAT document, that is the NAT Flight Planning Guidance Material that was being developed.

3.2.3 As indicated in paragraph 2.1.23, the NAT Volcanic Ash Contingency Plan, developed under auspices of the Icelandic Civil Aviation Administration, has been finalised. It was noted that the update of the NAT Volcanic Ash Contingency Plan would now revert to the NAT OPS Managers.

3.2.4 It was noted that the General NAT Contingency plan had been updated and it was agreed that it be posted on the NAT PCO web site (paragraph 2.1.23 refers). It was also noted that individual air Navigation Service providers should have a direct link to this document on this web site.

**CONCLUSION 39/21 - GENERAL NAT CONTINGENCY PLAN**

**That:**

**a) the Secretary make the necessary arrangements to post the General NAT Contingency plan on the NAT Programme Coordination Office (PCO) web site; and**

**b) the Air Navigation Service providers establish direct links from their web sites to the General NAT Contingency Plan posted on the NAT PCO web site.**

3.2.5 As regards the need for ICAO Secretariat support, it was pointed out that this would be difficult considering the current financial climate. It was suggested and accepted that the host State should provide the necessary support to draft the report and prepare the meeting material.

3.2.6 The Group was provided with information regarding the difficulties that some non-MNPS and/or non-RVSM approved State aircraft were encountering when flight planning across the North Atlantic. The Group recalled that procedures existed to accommodate such flights and if operational problems were being encountered, they should be addressed by the NAT OPS Managers. The Group concluded that the NAT Operations Managers should examine this matter and, if necessary propose an amendment to the NAT Guidance and Information Material (NAT Doc 001).

**COMMUNICATIONS**

*Aeronautical Communications Group*

3.2.7 The Group noted that the current NAT Communications Network operation as defined by ICAO Annex 10 Volume II Chapter 5, Doc. 7030, the NAT Facilities and Services Implementation Document (FASID) and the HF Frequency Management Guidance Material had been reviewed. The impact on voice network operations of the introduction of ADS WPR in the NAT region was taken into account.

3.2.8 It was also noted that the introduction of better tactical coordination between the stations shift managers' has introduced efficiencies in the network. These efficiencies were translated into better frequency and human resources management, and improvements in the overall service provided to the users.

3.2.9 The Group noted the request that ACG would benefit from the presence of a representative of the pilot community. This would assist in improving the quality of the service provided by arriving at a more objective assessment of the network. It was noted with appreciation that IFALPA would endeavour to attend the next meeting of the ACG.

3.2.10 The IATA representative had expressed his appreciation for the general improvements in network capacity, efficiency and tactical cooperation between stations. It was his hope that these measures would obviate unnecessary investment to extend network capacity.

*Review documentation*

3.2.11 The Group was presented with a draft of the "HF Frequency Management Guidance Material". After reviewing the document, the NAT SPG endorsed it and agreed that it should be made available to the NAT aeronautical community and that it should be published on the NAT PCO web site. In so doing, the Group was cognisant of the fact that the NAT Operations Managers had requested that additional information regarding expected sun spot activity be included in the guidance material in order to assist operations. The Member for Portugal agreed to carry out this task. It was also agreed that Portugal carry out a review of relevant documentation and initiate proposals for amendment as appropriate.

**CONCLUSION 39/22 - NAT HF FREQUENCY MANAGEMENT GUIDANCE MATERIAL**

**That:**

**a) the HF Frequency Guidance Material for the NAT Region be published on the NAT Programme Coordination Office (PCO) web site as a controlled NAT document;**

**b) Portugal arrange to include in the Guidance Material information related to expected sun spot activity; and**

**c) Portugal initiate a review of NAT documents and initiate proposals for amendment as required.**

*Traffic analysis*

3.2.12 The Group noted that the ACG had analysed the busiest day date and consolidation reports had been prepared by Portugal. It was noted that because minor differences existed in the manner in which the stations collected the data, the current busiest day format should be replaced by a new format. It was also noted that the rapporteur of the ACG would coordinate with all concerned in implementing the new report format, which would be based on traffic information covering two 60 day periods, one each in the summer and winter periods. From this data, peak loading by frequency and family for all stations would be identified. The first period selected was January 15 to March 15.

3.2.13 The total amount of HF and GP VHF contacts for the year of 2002 was 3.117.582 messages, distributed by all Aeronautical Stations, being 74.97% by HF and 25.03% by VHF frequencies. For each one of the Aeronautical Stations the percentage of traffic was Gander (32.21%), Shanwick (25.97%), Iceland (13.30%), Portugal (12.93%), United States (15.10%) and Norway (0.49%). The result for New York includes 15% of messages received through the intercept procedure. After analysing the data consolidation, it was shown that the reduction in the total number of messages between 2001 and 2002 was only 2.4%. This indicated that the impact of the current data link initiatives had stabilized and no major decrease was expected in the short term unless further initiatives were introduced.

3.2.14 The NAT TFG results have shown a reduction in aircraft movements of 3.4% from year 2000 to 2001 and 6.6% from 2001 to 2002. These reductions in movements were not matched by a proportional reduction in the volume of HF messages, which showed a reduction of 16.1% from 2000 to 2001 and 2.4% from 2001 to 2002. The Group noted that actual frequency occupancy had decreased, i.e. actual "on-air" time, as result of the reduction in the number of position reports. However, a significant number of "nuisance reports" from pilots of FANS aircraft such as duplicate HF and ADS reports; querying log-on status; and requests for confirmation of receipt of ADS reports had been reported. If pilots could be discouraged from making such reports, a further reduction in the number of voice messages could be expected.

3.2.15 Notwithstanding the impact of the current trials, the number of messages handled by the network was still above 3 million, but this figure was considered to be within the capacity of the network.

*Frequency management.*

3.2.16 The introduction of the new principles of network management, especially those related to tactical coordination, monitoring only usable frequencies at any given time of the day (not H24 monitoring all frequencies) and family allocation based on geographical locations, has had a different impact on each of the stations, however, it was the consensus that the improved tactical coordination has introduced added efficiencies in the network.

3.2.17 Despite the absence of any reports of adverse impact on the network resulting from the introduction of the new network management principles, it was agreed that some mechanism to obtain feedback from the users needed to be implemented in order to objectively identify the true impact of the measures.

**CONCLUSION 39/23 - FREQUENCY MANAGEMENT**

**That airspace users provide Portugal with feedback regarding the application of the new principles of frequency management in order to determine the impact on the network.**

*Frequency utilization*

3.2.18 The difficulties posed by HF blackouts, which were a particular problem in the Arctic region, was raised. A number of instances of prolonged communications failure caused by subnormal HF propagation had occurred. The Group noted that Norway planned to implement a new HF transmitter and receiver site in Northern Norway and that the coverage of the Northern part of the NAT could be improved.

3.2.19 Canada informed the Group that it planned to start using 11279 MHz by the fall of 2003, which would lead to an increased capacity on NAT Family D.

*Intercept procedures*

3.2.20 The United States informed the Group that the intercept procedure could be discontinued in the future, but this is dependent on the implementation of the new automated Advanced Technologies and Oceanic Procedures (ATOP) system at New York Oceanic Centre.

*Workshop for radio operators*

3.2.21 The Group was informed that NAV Portugal had taken the opportunity of having all the Station Managers and the IATA representative at Santa Maria to organize a Workshop for the radio operators, in which each one of the service providers presented information regarding their facilities and the users presented their perspectives about the HF Service being provided in the NAT Region. The main

objectives of this event were to provide the radio operators with an overview of global network operations, working methods, operational constraints, etc. Such an exchange of information was expected to contribute to increase cooperation between stations and to improve overall efficiency. Considering the benefits that were derived from this event, the Group endorsed the proposal that they should be continued in conjunction with future meetings of the ACG.

*Next meeting of the ACG*

3.2.22 The Group endorsed the proposal that NAT ACG/6 be held in Gander, Canada in May 2005.

## 4. DOCUMENTATION UPDATE

### 4.1 NAT Documentation review

4.1.1 The Group noted that the Ninth Edition of the NAT Minimum Navigation Performance Specifications Operations Manual has been published and was available on the web site. It was also noted that the Secretariat had initiated action in order to begin preparing the Tenth Edition, which was required because of all the changes that had taken place since the publication of the Ninth Edition. The Group noted that it would be kept informed of developments. As regards the Seventh Edition of the NAT Guidance Material, it has been posted on the NAT PCO web site (www.nat-pco.org) and it will also be updated in light of the changes to the NAT MNPS OPS Manual. The Group noted that the Third Edition of the International General Aviation (IGA) Manual had been completed and that it would shortly be posted on the NAT PCO web site. It is planned to use the same process as was used for the Guidance Material.

4.1.2 It was noted that the review of the NAT Air Navigation Plan (ANP) and the NAT Facilities and Services Implementation Document (FASID) would take place following the 11th Air Navigation Conference and that this work was being co-ordinated by the NAT IMG. The Group also noted that it would be provided with an update at NAT SPG/40.

4.1.3 The Group was informed that the NAT SPG Handbook had been revised on the basis of changes to the NAT IMG working groups and information provided by Members and observers.

*Proposals to amend the NAT Facilities and Services Implementation Document (FASID)*

4.1.4 The Group was presented with a proposal regarding the continued need for a NAT Mid-level Significant Weather Forecast (SWM) chart, which is currently being produced by Canada but will be produced by the Washington World Area Forecast centre as of September 2003. The United Kingdom indicated that they had no requirement for the chart. The Group agreed that Members would consult within their administrations and inform the Secretary of the outcome. On the basis of the information provided, a course of action will then be suggested.

4.1.5 The Group was presented with a proposal to include a form for reporting harmful interference in the NAT FASID. The Group agreed to the proposal and further agreed that whenever harmful interference is detected, the completed form should be sent to the Member for Portugal so that the information can be compiled in the ACG report.

**CONCLUSION 39/24 - PROPOSAL FOR AMENDMENT OF THE NAT FACILITIES AND SERVICES IMPLEMENTATION DOCUMENT (FASID)**

**That:**

**a) the Secretary make the necessary arrangements to amend the NAT FASID to include the harmful interference reporting form;**

**b) the harmful interference reporting form be included in the high frequencies (HF) Guidance Material; and**

**c) States inform Portugal of instances of harmful interference using the form.**

## 5. ANY OTHER BUSINESS

### 5.1 Next meeting

5.1.1 The Group agreed that NAT SPG/40 be held in the EUR/NAT Office of ICAO, from 22 to 24 June 2004. Considering the benefit of starting the meeting on Tuesday, the same procedure will be applied for the next meeting.

# APPENDIX A -
# LIST OF PARTICIPANTS / LISTE DES PARTICIPANTS

*(Paragraph i.4 refers)*

**CHAIRMAN/PRESIDENT**

Mr Asgeir PALSSON

**CANADA**

Mr Don HARRIS

**DENMARK/DANEMARK**

Mr Knud ROSING

Mr Kurt ANDREASEN

**FRANCE**

Mr André BERMAN

Mr Kamel REBAI

Mr André VIGNOLES

**ICELAND/ISLANDE**

Mr Leifur HAKONARSON

**IRELAND/IRLANDE**

Mr Pat RYAN

Mr Denis DALY#

**NORWAY/NORVEGE**

Mr Frode MO

**PORTUGAL**

Mr Carlos MONTEIRO

Mr Jose Joaquim CABRAL

Mr Henrique NUNES

Mr Luis F. RODRIGUES

**RUSSIAN FEDERATION/**
**FEDERATION DE RUSSIE**

Mr Vicheslav MOSASHVILI

Mr Victor STEBLEVETS

Mr Vitali TANDOURA

**UNITED KINGDOM/ROYAUME-UNI**

Mr George BALLANTYNE

Mr Keith SLATER#

Mr Stephen KIRBY#

Mr David NICHOLAS

**UNITED STATES/ETATS UNIS**

Mr Drazen GARDILCIC

Mr Dan SMILEY

Mr David MALOY

Mr Gerald L. RICHARD

**IATA**

Mr Alan R.L. GILBERT

Mr Cees GRESNIGT

Mr Mark HURSTON

**IBAC**

Mr Peter INGLETON

**IFALPA**

Mr Madison WALTON

Mr John FUENTES

**IFATCA**

Mr Edward WALLACE

* Member/ Membre
** Alternate Member / Membre suppléant
# Part time / à temps partiel

**APPENDIX B -**
**PROPOSAL FOR AMENDMENT TO THE NAT SUPPS**

*(Paragraph 2.1.15 refers)*

European and North Atlantic Office

**PROPOSAL FOR AMENDMENT OF THE ICAO REGIONAL SUPPLEMENTARY PROCEDURES (DOC 7030)**

(Serial No.: EUR/NAT-S 03/xx-NAT RAC/y)

**a) Regional Supplementary Procedures:**

Doc 7030/4 – NAT, Part 1, Rules of the Air, Air Traffic Services and Search and Rescue, incorporating Amendment No. 204.

**b) Proposed by:**

The United States of America

**c) Proposed amendment:**

**Amend** Section 9 "SEPARATION OF AIRCRAFT" and **renumber** subsequent paragraphs:

**9.0 SEPARATION OF AIRCRAFT**

9.2 **Longitudinal separation**
(P-ATM, 5.4.2 and 5.11)

9.2.2 *Subsonic transport operations*

9.2.2.1 Minimum longitudinal separation between turbo-jet aircraft shall be :

a) 15 minutes; or

b) 10 minutes, provided the Mach number technique is applied whether in level, climbing or descending flight; and the aircraft concerned have reported over a common point to follow continuously diverging tracks until some other form of separation is provided; and:

1) at least 10 minutes longitudinal separation exists at the point where the tracks diverge; and
2) at least 5 minutes longitudinal separation will exist where lateral separation is achieved; and
3) lateral separation will be achieved at or before the next significant point (normally ten degrees of longitude along track(s)) or, if not, within 90 minutes of the time the second aircraft passes the common point or within 1 112 km (600 NM) of the common point, whichever is estimated to occur first .

*Note.—The minima contained in 9.2.2.1 b) is in addition to that found in the PANS/ATM (Doc 4444) paragraph 5.4.2.4, LONGITUDINAL SEPARATION MINIMA WITH MACH NUMBER TECHNIQUE BASED ON TIME.*

9.2.2.2 Minimum longitudinal separation between non-turbo-jet aircraft shall be:

a) 30 minutes; and

b) 20 minutes in the West Atlantic Route System (WATRS) area.

*Note.— The WATRS area is defined beginning at a point 2700N 7700W direct to 2000N 6700W direct to 1800N 6200W direct to 1800N 6000W direct to 3830N 6000W direct to 3830N 6915W thence counter-clockwise along the New York Oceanic control area/flight information region boundary to the Miami Oceanic control area/flight information region boundary, thence southbound along the Miami Oceanic control area/flight information region boundary to the point of beginning.*

9.2.3 En-route climbs and descents

9.2.3.1 The application of longitudinal separation between aircraft carrying out climbs/descents en route and other aircraft operating in the same direction shall be based on condition that the required separation between the climbing/descending aircraft and other en-route affected aircraft exists at the time a climb/descent clearance is issued and will continue to exist during climb/descent and at the recleared flight level(s), unless lateral separation is provided.

*Note.— Application of longitudinal separation between climbing/descending aircraft when Mach number technique is used is based on the assumption that the last assigned Mach number will be maintained during en-route climbs and descents. In the event that it is not feasible to do so, pilots of aircraft concerned must inform ATC at the time of the climb/ descent request or clearance.*

**d) Proposer's reason for amendment:**

The Group reviewed changes to the PANS ATM regarding the application of the use of the Mach Number Technique. Furthermore the Group noted that Amendment 1 to the PANS ATM had become effective on 28th November 2002 and that these changes should be taken into account when developing or planning for changes in separation minima. It was recognised that the provisions in Doc 4444 superseded the contents of the NAT SUPPs. Therefore, it was agreed that all redundant references to the Mach Number Technique should be removed from the NAT SUPPs and that only the specificities of the NAT Region should be reflected in the NAT SUPPs.

**e) Proposed implementation date of the amendment:**

Upon approval by Council.

**f) Proposal circulated to the following States and international organizations:**

To be added

**g) Secretariat comments:**

The proposal for amendment is consequential as a result of the inclusion of the Mach Number Technique (MNT) in the PANS ATM. Only those aspects of the use of the MNT that have not been included in the PANS ATM, but that are used in the NAT Region, have been retained.

# LIST OF ACRONYMS

| | |
|---|---|
| AAD | assigned altitude deviation |
| ACARS | Aircraft Communication Addressing and Reporting System |
| ACAS | Airborne Collision Avoidance System |
| ACAS II | Airborne Collision Avoidance System – Phase 2 |
| ACC | Area Control Centre |
| ACG | Aeronautical Communications Group |
| ADS | Automatic Dependent Surveillance |
| AFI | African |
| AFTN | Aeronautical Fixed Telecommunications Network |
| AIC | Aeronautical Information Circular |
| AIP | Aeronautical Information Publication |
| AIS | Aeronautical Information Services |
| ALLPIRG | All Planning and Implementation Regional Groups |
| AMSS | Aeronautical Mobile-Satellite Service |
| ANP | Air Navigation Plan |
| ASE | Altimetry System Error |
| ATC | Air Traffic Control |
| ATM | Air Traffic Management |
| ATMG | Air Traffic Management Group |
| ATMIP | Air Traffic Management Implementation Plan |
| ATN | Aeronautical Telecommunications Network |
| ATOP | Advanced Technologies and Oceanic Procedures |
| ATS | Air Traffic Services |
| BOTA | Brest Oceanic Transition Area |
| CAA | Civil Aviation Authority |
| CADAG | Communications, Automation and Data Link Applications Group |
| CADS | Central Automatic Dependent Surveillance |
| CAR | Caribbean |
| CMA | Central Monitoring Agency |
| CNS | Communications |
| CNS/ATM | Communications, Navigation and Surveillance/Air Traffic Management |
| CPDLC | Controller Pilot Data Link Communications |
| CRM | Collision Risk Model |
| CTA | Control Area |
| EATCHIP | European Air Traffic Control Harmonization and Integration Programme |
| ECAC | European Civil Aviation Conference |
| EFG | Economic and Financial Group |
| EGNOS | European Geostationary Navigation Overlay Service |
| ELT | Emergency Locator Transmitter |
| EUR | European |
| EUR/NAT | European and North Atlantic |
| FAA | Federal Aviation Administration |
| FANS | Future Air Navigation Systems |
| FASID | Facilities and Services Implementation Document |
| FCMA | FANS Central Monitoring Agency |
| FDE | Fault Detection and Exclusion |
| FDPS | Flight Data Processing System |
| FIG | FANS 1/A Implementation Group |
| FIR | Flight Information Region |
| FIS | Flight Information Services |
| FMS | Flight Management System |
| FTE | Flight Technical Error |

| | |
|---|---|
| GAATS | Gander Automated Air Traffic System |
| GAT | General Air Traffic |
| GLONASS | Global Orbiting Navigation Satellite System |
| GMS | Global Positioning System Monitoring System |
| GMU | Global Positioning System Monitoring Unit |
| GNE | Gross Navigation Error |
| GNSS | Global Navigation Satellite System |
| GP | General Purpose |
| GPS | Global Positioning System |
| HF | High Frequency |
| HFDL | HF Data Link |
| HMS | Height Monitoring System |
| HMU | Height Monitoring Unit |
| IACA | International Air Carrier Association |
| IAOPA | International Council of Aircraft Owner and Pilot Associations |
| IATA | International Air Transport Association |
| IBAC | International Business Aviation Council |
| ICD | Interface Control Document |
| IFALPA | International Federation of Air Line Pilots' Associations |
| IFATCA | International Federation of Air Traffic Controllers' Associations |
| IGA | International General Aviation |
| Inmarsat | International Maritime Satellite Organization |
| INS | Inertial Navigation System |
| IOC | International Oceanic Conference |
| IRS | Inertial Reference System |
| ITASPS | ICAO Informal Trans-Asia/Trans-Siberia/Cross Polar Routes High Level Steering Group |
| ITU | International Telecommunications Union |
| JAA | Joint Aviation Authorities |
| LHD | Large Height Deviation |
| LIM NAT RAN | Limited North Atlantic Regional Air Navigation |
| MAS | Message assurance |
| MASPS | Minimum Aircraft System Performance Specification |
| MEL | Minimum Equipment List |
| MIG | Mathematicians Implementation Group |
| MNPS OPS | Minimum Navigation Performance Specifications Operations |
| MNPS | Minimum Navigation Performance Specifications |
| MOPS | Minimum Operational Performance Standards |
| MNT | Mach Number Technique |
| MSSR | Monopulse Secondary Surveillance Radar |
| MWG | Mathematicians Working Group |
| NAM | North American |
| NAT EFG | North Atlantic Economic and Financial Group |
| NAT IMG | North Atlantic Implementation Management Group |
| NAT SPG | North Atlantic Systems Planning Group |
| NAT TFG | North Atlantic Traffic Forecasting Group |
| NAT | North Atlantic |
| NICE Group | NAT Implementation Management Cost Effectiveness Group |
| NOAA | National Oceanic and Atmospheric Administration |
| OAC | Oceanic Area Control Centre |
| OCA | Oceanic Control Area |
| OCD | Oceanic Clearance Delivery |
| ODAPS | Oceanic Display and Planning System |
| OLDI | On Line Data Interchange |
| OPS MNG | NAT Operations Managers |
| OPS/AIR | Operations/Airworthiness |
| OTS | Organized Track System |
| PCO | Programme Co-ordination Office |
| R&D | Research and Development |

| | |
|---|---|
| R/T | Radio Telecommunication |
| RAIM | Receiver Autonomous Integrity Monitoring |
| RHSM | Reduced Horizontal Separation Minima |
| RMA | Regional Monitoring Agency |
| RNAV | Area Navigation |
| RNP | Required Navigation Performance |
| RSSIG | Reduced Separation Standards Implementation Group |
| RTCA | Radio Technical Commission for Aeronautics |
| RVSM | Reduced Vertical Separation Minimum |
| SAR | Search and Rescue |
| SARPS | Standards and Recommended Practices (ICAO) |
| SATCOM | Satellite Communications |
| SOTA | Shannon Oceanic Transition Area |
| SSR | Secondary Surveillance Radar |
| SST | Supersonic Transport |
| SUPPS | Regional Supplementary Procedures |
| TA | Traffic Advisors |
| TCAS | Traffic Alert and Collision Avoidance System |
| TIBA | Traffic Information Broadcast by Aircraft |
| TLS | Target Level of Safety |
| TOR | Terms of Reference |
| TVE | Total Vertical Error |
| UIR | Upper Information Region |
| VHF | Very High Frequency |
| WAAS | Wide Area Augmentation System |
| WATRS | West Atlantic Route System |
| WGS-84 | World Geodetic System – 1984 Standards |
| WPR | Waypoint Position Report |
| WWW | World Wide Web |

**– END –**