European and North
Atlantic Office

NAT SPG/37

Summary of Discussions and Conclusions of the

Thirty-Seventh Meeting of the

North Atlantic Systems Planning Group

Paris, 12 to 14 June 2001

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FOREWORD

i. Introduction

i.1 The Thirty-Seventh Meeting of the North Atlantic Systems Planning Group (NAT SPG) was held in the European and North Atlantic (EUR/NAT) Office of ICAO from 12 to 14 June 2001.

i.2 The Meeting was chaired by **Mr Ásgeir Pálsson**, the Member from Iceland. Mr Jacques Vanier from the EUR/NAT Office of ICAO acted as Secretary of the Meeting on behalf of Mr Christian Eigl who was unable to attend because of other commitments. He was assisted by Mr Jean-Claude Bugnet, Chief of the Joint Financing Section from ICAO Headquarters and by Mr. Robert Kruger and Mrs Nikki Goldschmid from the EUR/NAT Office of ICAO.

i.3 In the opening session, Mr Ásgeir Pálsson welcomed the new Member from Canada, **Mr Robert Fullarton** who replaced Mr Don MacKeigan and the new Member from the United States, **Mr Drazen Gardilcic** who replaced Mr Gerald Richard.

i.4 In addition to the Members of the NAT SPG, the Russian Federation, the International Air Carriers Association (IACA), 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) had been invited to attend the meeting. Spain and the International Council of Aircraft Owner and Pilot Associations (IAOPA) presented their regrets to be unable to attend. A list of participants is at **Appendix A**.

i.5 The Mathematicians' Working Group (MWG) had met in the EUR/NAT Office of ICAO from 23 to 27 April 2001 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.

i.6 The group charged with the scrutiny of navigation performance in the NAT Region, which was chaired by **Mr Jim Benson** of the United Kingdom, had met concomitantly with the MWG in the EUR/NAT Office of ICAO on 23 and 24 April 2001 and had provided the NAT SPG with their report.

i.7 The Aeronautical Communications Sub Group (ACSG), which is chaired by **Mr Joaquim Cabral** of Portugal, provided a report on the current use of High Frequency (HF) in the NAT Region.

i.8 The NAT Operations Managers had met in Reykjavik from 25 to 29 September 2000. Their report had been made available to the NAT SPG.

1.9 The NAT Traffic Forecasting Group (NAT TFG) had met once on the 15th and 16th of March 2001 and had submitted a report to the NAT SPG containing updated forecasts.

i.10 The NAT Implementation Management Group (NAT IMG) had met twice since NAT SPG/36 and a report on their activities had been presented to the Group.

i.11 The NAT Economic and Financial Group (NAT EFG) had met three times since NAT SPG/36 and a report on their activities and findings had been presented to the Group.

i.12 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.13 The Group then approved the following Agenda.

Agenda Item 1: Developments

- 1.1 ICAO Panels and Committees
- 1.2 Adjacent Regions
- 1.3 NAT provider States

Agenda Item 2: Planning and implementation

- 2.1 NAT Implementation Management Group (NAT IMG) report
- 2.2 Implementation planning
- 2.3 Outcome of the NAT Economic and Financial Group (NAT EFG) meetings
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- 2.5 Other issues

Agenda Item 3: Air navigation system review

- 3.1 Review of system safety performance
  - a) Scrutiny matters
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- 3.2 Review of systems operations
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Agenda Item 4: Documentation update

- 4.1 Minimum Navigation Performance Specifications (MNPS) Operations (OPS) manual
- 4.2 Guidance material
- 4.3 International General Aviation (IGA) Manual
- 4.4 Other documentation

Agenda Item 5: Any other business

- 5.1 Support to the NAT SPG
- 5.2 NAT SPG working methods
- 5.3 Next meeting

1. DEVELOPMENTS

1.1 ICAO Panels and Committees

1.1.1 The Group was informed that ICAO had just completed amending several Annexes and Documents relating to Air Traffic Services (ATS). In particular, it was pointed out that a new version of Doc 4444, which was renamed *Procedures for Air Navigation Services – Air Traffic Management* (PANS ATM), would become applicable in November 2001. In particular, it was noted that this new edition contained new material related to safety management.

1.2 Adjacent Regions

ACTIVITIES IN ADJACENT REGIONS

European (EUR) Region

1.2.1 The Group noted that the go decision to implement Reduced Vertical Separation Minimum (RVSM) in the EUR Region on 24 January 2002 had been made with the caveat that certain conditions be met by the end of September 2001. A process had been put in place to verify that these conditions had indeed been met. It was also noted that the United Kingdom successfully implemented RVSM in London and Scottish Flight Information Regions (FIR) on 19 April 2001. In addition, Austria and Germany had implemented RVSM on a tactical basis on the same date.

1.2.2 The Group was informed that Eurocontrol had launched a programme called Link 2000+ that addressed the implementation of data link applications in parts of the EUR Region. This activity, which was essentially based on the use of the Aeronautical Telecommunications Network (ATN), was being coordinated with the United States. Therefore, the outputs of the programme may provide important information for data link applications in the NAT Region.

North American (NAM) Region

1.2.3 As regards the NAM Region, the Group noted that plans were being developed for the implementation of RVSM in Northern Canadian airspace on 18 April 2002. It was pointed out that initially RVSM will be implemented from 57°N to the North Pole. Transition airspace will be established between 52°N and 57°N.

1.2.4 Furthermore, it was planned that RVSM would be implemented throughout the rest of Canada and in the United States circa 2004. It was noted that the implementation of RVSM in Southern Canadian airspace and in the United States domestic airspace would be coincident and that coordination had already begun.

ICAO Informal Trans-Asia/Trans-Siberia/Cross Polar Routes High Level Steering Group (ITASPS)

1.2.5 In follow-up to NAT SPG Conclusion 36/1, the Group was provided with an update concerning the Trans-Asia, Trans-Siberia and Cross Polar Routes. The Group noted that these routes, which had a limited impact on the North Atlantic Region itself, had been implemented and that airlines had started using them.

1.3 NAT Provider States

1.3.1 The Group was provided with an update concerning the Gander Automated Air Traffic System (GAATS). In addition, the Group noted airspace and route structure changes that had been implemented in Santa Maria Terminal Manoeuvring Airspace (TMA). The Group noted that the transition from the current ATS system used in Iceland to the new flight data processing system had commenced and would be completed in the latter part of 2001. The Group was informed that the United States had selected Lockheed Martin to develop and implement a new Oceanic Air Traffic Control (ATC) System. The Member from the United States agreed to keep the Group informed of developments. Portugal provided the Group with some information concerning technical developments of the system being implemented in Santa Maria.

2. PLANNING AND IMPLEMENTATION

2.1 Report of the NAT Implementation Management Group

2.1.1 The Group noted that the NAT IMG had met twice since NAT SPG/36. Its Air Traffic Management Group (ATMG), Future Air Navigation Systems (FANS) Implementation Group (FIG), Mathematicians Implementation Group (MIG) and Reduced Separations Standards Implementation Group (RSSIG) had also each met twice since NAT SPG/36.

Organizational changes

2.1.2 In light of NAT SPG Conclusion 36/7, the NAT IMG had carried out a review of its Terms of Reference (TOR) and agreed that no changes were required. The Group noted that changes to the terms of reference for the NAT MIG and the NAT RSSIG had been made taking into account the shifting priorities from the implementation of RVSM to reductions in horizontal separation minima. The Group agreed that the NAT SPG Handbook should be amended accordingly.

The NAT IMG Cost Effectiveness (NICE) Programme

2.1.3 The Group noted that, when comparing the NICE forecasts to the real traffic data from the year 2000, it had been shown that there had only been some minor variations. The traffic growth had been rapid since 1996 and the NICE group seemed to have predicted that growth quite well. The difference between the average daily traffic in 2000 and the forecast was 1,03%. The air traffic distribution by area pairing was valid in all cases. The key assumptions made in the fleet composition in the NICE study reflected the actual trend. Accordingly, the Group endorsed the NAT IMG finding that the general assumptions made in the NICE report from 1999 were within acceptable limits, which therefore validated the results contained in the NICE Report.

2.1.4 In accordance with NAT SPG Conclusion 36/2, the NICE programme had been used to carry out simulations on the effects that a volcanic eruption in Iceland could have on NAT traffic. The results indicated that the area affected by the volcanic ash cloud could be quite large within a short period of time. Further, there could be a significant number of aircraft airborne when the eruption starts. Many aircraft could therefore be affected either directly or indirectly by a volcanic eruption.

2.1.5 The results of the worst case scenario simulation had also revealed that, although there were flights in Reykjavik control area at a short distance from the initial ash cloud that would have to be handled expediently, the majority of the affected flights would be within the Scottish control area at the time of the eruption. Furthermore, Shanwick FIR could expect to receive the largest portion of the flights affected because of the need to reroute other traffic away from the ash cloud.

2.1.6 From the above, the Group concurred that effective cooperation amongst Reykjavik, Scottish and Shanwick was needed to safely handle traffic when a volcanic eruption occurs. With this in mind, it was agreed that, as a first step, Iceland and the United Kingdom should prepare a bilateral agreement to take due consideration of the effects of a volcanic eruption. In addition, the discussions should be expanded to include the NAT Operations Managers on the one hand and the NAT IMG on the other in order to include the entire NAT Region. As regards the need for contingency measures for volcanic eruptions, the Group agreed that the NAT Operations Managers should prepare a contingency plan for the entire NAT Region and that the NAT IMG should provide assistance as required.

CONCLUSION 37/1 - DEVELOP A CONTINGENCY PLAN TO TAKE INTO ACCOUNT VOLCANIC ERUPTIONS

That:

a) Iceland and the United Kingdom urgently prepare a bilateral agreement to take due consideration of the effects of a volcanic eruption in Iceland;

b) the NAT Operations Managers prepare a volcanic eruption contingency plan that takes account of the entire NAT Region; and

c) the NAT Implementation Management Group provide the necessary support to the NAT Operations Managers as required.

FANS 1/A Operational Trials

2.1.7 The Group noted that the operational trial of Automatic Dependent Surveillance (ADS) Waypoint Position Reporting (WPR) had begun on 29 January 2001. The Group was also informed that Iceland had begun pre-operational trials on 6 June 2001. It was noted that, although it had not been possible to achieve the full requirements of the agreed success criteria during the final 30 day pre-operational period, the failures had not been safety critical and, after consulting operational opinion, it was agreed that there was no reason to delay the start of the operational trial. It was also noted that the experience gained from developing these success criteria and then testing them against a real time environment had provided valuable information on how to develop success criteria in the future.

2.1.8 During the pre-operational trial, some issues had come to light. One major concern was the confusion engendered because of the use of the industry two-letter flight identifier as against the requirements of Field 7 of the ICAO flight plan, that is the use of the three-letter ICAO designator for aircraft operating agencies. In this connection, it was recognised that it would be very complicated to resolve this matter as the implications went way beyond data link applications themselves. The Group noted that the issue will be brought to the attention of groups that can address this matter from a global perspective.

2.1.9 Another issue that was highlighted was that some aircrews were unfamiliar with the operating procedure for the use of ADS-WPR which could therefore lead to an increase in HF communication workload. In this connection, the Group noted that Ireland would address this issue in order to ensure that additional information was made available to aircrews.

2.1.10 It was noted that the FANS Central Monitoring Agency (FCMA) had been established and was functioning. It was also noted that problem reporting forms and other types of documentation were being developed and that a prototype website was being set up. The NAT SPG will be kept informed of developments and it was noted that the Group will eventually have to endorse the NAT FCMA documentation that will be used to communicate to NAT provider and user States as well as NAT users.

2.1.11 Keeping in mind that the end state remained the implementation of the ATN, the Group addressed issues that related to the implementation of FANS 1/A technologies. As regards the implementation of ADS WPR, the Group recognized that the level of participation had exceeded original assumptions and that the Central ADS (CADS) had become a key component of the communications infrastructure.

2.1.12 Bearing this in mind, it was felt that the potential impact of a CADS failure needed to be analyzed and that the overall system architecture needed to be reviewed. It was therefore agreed that the NAT IMG should be entrusted with this task and that they should report their findings to NAT SPG/38.

CONCLUSION 37/2 - DEVELOP CONTINGENCY PLANS TO MITIGATE PROBLEMS ASSOCIATED WITH THE FAILURE OF THE CENTRAL AUTOMATIC DEPENDENT SURVEILLANCE (CADS) SYSTEM

That the NAT Implementation Management Group:

a) review the potential impact on the current High Frequency environment of a failure of the ADS Waypoint Position Reporting (WPR) system;

b) review the overall architecture of the ADS WPR system, focusing especially on aspects relating to availability and reliability; and

c) develop a contingency plan to take account of a catastrophic failure of the ADS WPR system.

The implementation of Reduced Vertical Separation Minimum

2.1.13 The Group recalled that to achieve RVSM implementation throughout the entire NAT Region between FL 290 and FL 410, two steps were required. The first consisted of horizontally expanding RVSM to the entire NAT Region on 1 November 2001, such that RVSM was applicable from FL 310 to FL 390. The second step, irrespective of the RVSM programme for the EUR Region, was to vertically expand RVSM throughout the entire NAT Region down to FL 290 and up to FL 410 from 24 January 2002.

2.1.14 In follow up to NAT SPG Conclusion 35/11, it was noted that plans for the implementation of RVSM in the entire NAT Region had been completed. As regards plans for the implementation of RVSM in the West Atlantic Route System (WATRS) area, it was noted that the weather deviation procedures, that had been developed as a prerequisite for the implementation of RVSM, (NAT SPG Conclusion 35/11 refers), have been completed. Because of the time required to process amendments, it was agreed that the United States publish the procedures as part of their RVSM implementation package and that the Secretariat process the amendment proposal to the NAT *Regional Supplementary Procedures* (SUPPS) (Doc 7030) for application in the entire NAT Region as soon as possible (**Appendix B** refers).

CONCLUSION 37/3 - WEATHER DEVIATIONS PROCEDURES IN REDUCED VERTICAL SEPARATION MINIMUM (RVSM) AIRSPACE

That:

a) the United States promulgate the Weather Deviation Procedures contained in Appendix B to this Report as part of their RVSM implementation package; and

b) the United States, on behalf of the NAT SPG, initiate an amendment proposal to the NAT Regional Supplementary Procedures.

2.1.15 The Group noted that work on the safety assessment for the implementation of RVSM in the WATRS area should be completed in the Summer of 2001. This will of course have an effect on the timing of the Go/No Go decision as aeronautical information would need to be promulgated by 6 September 2001, that is two AIRAC cycles before implementation. Because the Go/No Go decision will have to be made in the Summer of 2001 and there was no guarantee that all of the information required to implement RVSM would be available before 6 September 2001, it was agreed that the Go/No-Go decision for the implementation of RVSM in WATRS airspace should be based on projected levels of readiness and an assessment of all aspects of preparation. As regards implementation of RVSM in Bodø Oceanic FIR and in Santa Maria FIR South of 27^0 North, no additional safety studies or other preparations were required as the areas were already covered by the current RVSM procedures and safety assessments. However, Santa Maria would have to promulgate aeronautical information by 6 September 2001 outlining the changes including the expansion of Minimum Navigation Performance Specifications (MNPS) airspace South of 27^0 North. Because implementation of RVSM in Bodø Oceanic FIR would only take place on 24 January 2002 (paragraph 2.2.3 also refers), Norway should promulgate aeronautical information about Bodø Oceanic FIR by 1 November 2001.

2.1.16 As regards aircraft approvals and annual safety assessments, it was agreed that all RVSM approvals for the NAT Region, including the WATRS area, be sent directly to the Central Monitoring Agency (CMA) who would then have the responsibility to redistribute them to the other Regional Monitoring Agencies (RMA) in accordance with agreed procedures. It was also agreed that the Scrutiny Group should carry out scrutiny of operational errors for the entire NAT Region, including WATRS, and that the risk assessment should be carried out by the MWG and that the results would constitute a separate report to the NAT SPG from the one concerning the rest of the NAT Region.

CONCLUSION 37/4 - IMPLEMENTATION OF REDUCED VERTICAL SEPARATION MINIMUM (RVSM) IN THE ENTIRE NAT REGION

That:

a) the Go/No Go decision for the implementation of RVSM in the West Atlantic Route System (WATRS) area be made on the basis of projected levels of readiness and an assessment of all aspects of preparation;

b) aeronautical information concerning the implementation of RVSM be promulgated by 6 September 2001;

c) all RVSM approvals for the NAT Region, including the WATRS area, be sent directly to the Central Monitoring Agency (CMA);

d) the Scrutiny Group should carry out scrutiny of operational errors for the entire NAT Region, including WATRS; and

e) **the risk assessment for RVSM in the WATRS area be carried out by the Mathematicians Working Group and that the results be presented to the NAT SPG as a separate report.**

Future Monitoring requirements

2.1.17 The Group examined a proposal concerning the development of a long-term RVSM monitoring policy and in particular it examined the factors that may influence any decisions on long-term monitoring using Height Monitoring Units (HMU). In this connection, it noted that the Global Positioning System (GPS) Monitoring Unit (GMU) would only be used in the WATRS area on a contractual basis between the operators and service providers. The contract with ICAO concerning the use of the GMU had

therefore not been renewed. The future role of the HMUs however needed to be determined. It was recalled that the HMUs would reach the end of their economic life in 2004 and that a decision on their future use needed to be made bearing in mind that, in accordance with ICAO Guidance Material, some form of monitoring was required to sustain RVSM operations.

CONCLUSION 37/5 - LONG TERM REDUCED VERTICAL SEPARATION MINIMUM (RVSM) MONITORING REQUIREMENTS FOR THE NAT REGION

That the NAT Implementation Management Group develop a long term RVSM monitoring strategy taking into account the economic and operational life cycle of the NAT Height Monitoring Units.

Financial considerations

2.1.18 The Group was provided with information from the Joint Financing Section of ICAO Headquarters regarding the RVSM costs for 2000 as well as those that had been projected for 2001.

Continued use of NAT RVSM airspace by un-authorised operators

2.1.19 The Group noted the concerns that had been expressed yet again about the apparent abuse of RVSM airspace by non-RVSM approved aircraft. In particular, this related to requests by non-RVSM approved aircraft (operators) for special access to the RVSM airspace for special reasons. In some instances, this constituted an abusive use as the only reason for requesting access to the airspace appeared to be economy of operations. Recalling NAT SPG Conclusion 36/18 and considering the safety and efficiency issues connected with this problem, it was agreed that access to RVSM airspace by non-RVSM approved aircraft should be limited to humanitarian flights provided requests were made in advance with the first oceanic area control centre.

CONCLUSION 37/6 - ACCESS TO NAT REDUCED VERTICAL SEPARATION MINIMUM (RVSM) AIRSPACE BY NON APPROVED OPERATORS

That aircraft that are not RVSM approved shall not be allowed to operate in NAT RVSM airspace unless justification for humanitarian flights can be provided in advance to the first oceanic area control centre on the route of flight.

The need for global RVSM coordination

2.1.20 In follow up to NAT SPG Conclusion 36/5, it was noted that the EUR/NAT Office of ICAO had convened a meeting of all current RMAs. This forum had provided an opportunity to exchange information on monitoring policies, approval policies and other useful information that had added value to each other's work. The Group endorsed this endeavour and agreed that it should be pursued and requested that the Secretary make any necessary arrangements until such time as a formal global mechanism can be put in place. In addition, it was noted that the requirement to address RVSM issues at a global level had been brought to the attention of the All Planning and Implementation Regional Groups (ALLPIRG/4) Meeting and that this task had been included in the ALLPIRG activity list.

CONCLUSION 37/7 - THE NEED FOR GLOBAL REDUCED VERTICAL SEPARATION MINIMUM (RVSM) COORDINATION

That the European and North Atlantic Office of ICAO pursue the development of a Global RVSM coordination process.

The need to develop procedures for lateral off-sets

2.1.21 The Group noted the NAT IMG's concern about the need to urgently develop measures to mitigate the effects of increasing lateral overlap probability. In this connection, it was agreed that the only practical way of mitigating the effects was the introduction of some form of lateral offset procedure as part of the normal operating practice for the NAT Region. With this in mind, and taking account of NAT SPG Conclusion 36/16, the Group noted that the NAT IMG was developing lateral offset procedures as well as an amendment proposal to the NAT SUPPs. In order to process this matter without delay, it was agreed that the NAT SPG delegate to the NAT IMG the responsibility of initiating an amendment proposal on behalf of the NAT SPG.

CONCLUSION 37/8 - INITIATE AN AMENDMENT PROPOSAL TO THE NAT REGIONAL SUPPLEMENTARY PROCEDURES (SUPPS) (DOC 7030) FOR THE USE OF LATERAL OFFSETS TO MITIGATE RISK

That the NAT Implementation Management Group develop, on behalf of the NAT SPG, lateral offset procedures that would mitigate the impact on risk of the increasing lateral overlap probability which would be applicable in NAT Reduced Vertical Separation Minimum airspace.

Planning for reductions in longitudinal separation minima

2.1.22 It was noted that work had been carried out in support of reductions in longitudinal separation minima. However, this task had proven to be more complex than initially envisioned. In particular, it was noted that the interpretation of the use of the application of the Mach Number Technique (MNT) needed to be clarified. However, the risk modelling associated with the application of longitudinal separation was almost complete. The Group noted that the NAT IMG would continue to direct this work.

Planning for the transition from High Frequency services

2.1.23 In follow up to NAT SPG Conclusion 36/6, the Group noted that the NAT IMG had established a task force to develop proposals for the future provision of HF services in the NAT Region. In the context of the anticipated decline of HF voice communications requirements, the NAT IMG had examined information highlighting transition planning issues including operators' HF requirements, the required number of HF families, the need to re-equip during an agreed transition phase, regulatory implications, the number of service providers, the cost of service reduction, cost recovery during an agreed transition period, Flight Information Services (FIS) and alerting services. The Group noted the importance of these issues for provider States and therefore stressed that this matter needed to be addressed with urgency as the use of data links will certainly increase in the immediate future. It was also noted that the NAT IMG would identify all possible options and determine the advantages and disadvantages of each option. Finally, NAT SPG/38 will be presented with the initial recommendation on this matter.

Airborne Collision Avoidance System (ACAS II)

2.1.24 The Group noted that Amendment 198 to the NAT SUPPS stipulates the mandatory requirements for the carriage and operation of pressure reporting Secondary Surveillance Radar (SSR) transponders and the use of ACAS II in the NAT Region with effect from 31 March 2001. As regards implementation planning, it was recalled that the NAT SPG (NAT SPG/36, paragraph 1.2.2 refers) had endorsed the concept that implementation in the NAT Region should be linked to ACAS II activities planned for the EUR Region. With this in mind, State Letter T13/15.4 – L01-0061.ATM had been sent to all concerned on 28 February 2001. The State Letter provided an overview of the procedures that were effective from 31 March 2001. All States that had provided exemptions or had promulgated requirements which differed from those contained in Doc 7030, should have promulgated these differences in their National

Aeronautical Information Publications (AIP), in accordance with the provisions of Annex 15 – *Aeronautical Information Services* (cf. 4.1.1 and 4.1.2 c) and Appendix 1).

Measurement of system efficiency

2.1.25 The Group noted that the NAT IMG had begun analysing parameters and systems used by other organisations to measure system efficiency. It was also noted that it was premature to agree on any firm indicators of the efficiency of operations. Nevertheless, it was felt that this task needed to be addressed and that close cooperation with the NAT EFG was required in order to ensure that no duplication or overlaps of activities occurred (paragraph 2.3.6 also refers).

2.2 Implementation Planning

RVSM in Bodø Oceanic FIR

2.2.1 The Group was informed that Norway had based its RVSM planning on the assumption that the implementation of RVSM in Bodø FIR should coincide with the implementation of RVSM in the EUR Region planned for 24 January 2002. It was pointed out that to proceed otherwise would unnecessarily complicate the implementation process because of the need to introduce temporary arrangements which would only be valid for less than three months.

2.2.2 Such short-term arrangements would necessitate the establishment of a new Bodø EUR Region transition area to replace the existing transition area which is the entire Bodø Oceanic FIR. In this connection, it should be noted that delaying full RVSM implementation in Bodø Oceanic FIR would not have any effect on the provision of services to RVSM approved aircraft as the entire Bodø Oceanic FIR is already transition airspace.

2.2.3 Norway suggested that implementation of RVSM in Bodø Oceanic FIR to coincide with the implementation in the EUR Region on 24 January 2002 would benefit the users and simplify the transition process. The Group endorsed the proposal by Norway to delay full implementation of RVSM in Bodø Oceanic FIR until 24 January 2002. The Group also noted that the NAT IMG would ensure that Norway would be apprised of any changes that may be made to the NAT RVSM expansion plan (paragraph 2.1.15 also refers)

2.3 Outcome of the NAT Economic and Financial Group meetings

2.3.1 The Group noted that the NAT EFG had met three times since NAT SPG/36. The first two meetings were essentially devoted to organising its working methods and to developing an initial work programme based on the terms of reference established by the NAT SPG pursuant to Conclusion 36/7. The Group expressed its appreciation for the efforts that the NAT EFG had put into organising its working arrangements.

Organizational changes

2.3.2 It was noted that the NAT EFG had carried out a review of its working structure on the basis of its terms of reference and had agreed that no changes to their TORs were required for the time being and that the current structure should be reflected in the next issue of the NAT SPG Handbook. The Group endorsed the following initial work programme:

a) develop a possible funding mechanism for multinational projects or support functions;

b) examine financial considerations associated with the regression of the HF voice requirements;

c) develop best practices of cost identification, allocation and presentation;

d) develop best practices of cost recovery; and

e) develop performance and productivity indicators.

The development of a standard template to report annual expenditures

2.3.3 The Group noted that the NAT EFG had developed and thereafter refined a common template to report annual expenditures so that all concerned could use the same baseline when examining each other's expenditures. Additional work, such as agreeing on common terminology and definitions, was still required before the task was complete. The product will be presented to NAT SPG/38.

HF regression

2.3.4 It was noted it was premature for the NAT EFG to commence work on the financial implications of HF regression until much of the preliminary technical work has been completed. It was therefore agreed that the Secretary would monitor the issue and bring this matter to the NAT EFG's attention when required.

Extension of the use of the Joint Financing concept within the NAT Region

2.3.5 The Group was informed that the NAT EFG had examined a proposal to study the feasibility to establish a common cost recovery system concerning the provision of Air Navigation Services in the Northern part of the NAT Region, preferably within the framework of the ICAO Joint Financing arrangements. The NAT EFG had also examined a proposed outline "way ahead" which postulated the establishment of one user payment per flight, covering the costs of all services rendered within Reykjavik, Sondrestrom, Shanwick and Gander Oceanic FIRs. This single user charge would be levied to and paid by all international flights according to the rules within the present Joint Finance system. The Group acknowledged that the above proposal raised many questions, which would have to be addressed before any firm proposal could be made. The Group noted that it would be provided with a progress report on this matter at NAT SPG/38.

Development of performance indicators

2.3.6 The Group noted the work that had been initiated on developing performance indicators to be used throughout the NAT Region. In this connection, it was agreed that the NAT EFG would only address economic and financial performance indicators and that the NAT IMG should address operational performance indicators (paragraph 2.1.25 also refers). NAT SPG/38 will be provided with an update on this issue.

CONCLUSION 37/9 - DEVELOPMENT OF PERFORMANCE INDICATORS

That:

a) the NAT Implementation Management Group develop operational performance indicators; and

b) the NAT Economic and Financial Group develop economic and financial performance indicators.

2.4 North Atlantic Traffic Forecasting Group report

2.4.1 The Group was informed that an interim meeting of the NAT TFG had been held in Washington, from 15 to 16 March 2001 in order to address problems concerning the data used to generate forecasts. The NAT TFG had discovered that the 1999 sample data used contained some flaws. It was noted that the NAT TFG had corrected the flaws and had updated its forecasts accordingly[1].

New York CAR forecasts

2.4.2 The Group was informed that since the New York Oceanic Area Control Centre (OAC) is the sole handler of the traffic flow between New York Oceanic Control Area (OCA) and the Caribbean (CAR) Region, its erratic reporting of this flight data has resulted in the compiling of a data base for this traffic segment that is largely inconsistent and inadequate for forecasting future traffic demand in the area concerned. The Group was informed that new software had been installed at New York OAC and that this software should resolve problems that have occurred in the past and therefore provide the NAT TFG with the necessary information to develop forecasts. The Secretary agreed to inform the NAT TFG of the aforementioned.

Need for busy hour and day forecasts

2.4.3 The Group noted that the NAT TFG had not adjusted the busy hour forecasts at its interim meeting (refer to Tables 9 and 10 in the May 2000 report). They will update and recalibrate their forecast modules prior to the next formal meeting. However, before undertaking this task and considering that the generation of busy hour data is somewhat time consuming, the NAT TFG requested the NAT SPG to confirm whether it still requires busy hour counts and forecasts. In this connection, the Group felt that no changes to the forecasts should be made until such time as the operation performance indicators have been completed. Therefore, the NAT TFG should continue to produce busy hour forecasts.

NAT long Range Forecast

2.4.4 The Group noted that the long-term annual passenger and aircraft movement forecasts were not in sync with the short-term projections and that the NAT TFG intended to revise these forecasts at their next formal meeting in 2002.

2.5 Other issues

Definition of the term "Same Track" in Doc 4444

2.5.1 The Group examined a proposal to change the Doc 4444 definition of "same track" in order to clearly differentiate between aircraft flying in-trail and other aircraft flying in the same general direction. The Group noted the proposal but felt that this matter needed to be dealt with at a global level because of the need to change Doc 4444. Accordingly, it was agreed that the EUR/NAT Office of ICAO be requested to bring to the attention of ICAO Headquarters the concerns expressed in the presentation. It was also felt that changes to separation related definitions needed to be addressed in a holistic manner. It was also recognised that changes to the definitions could have an effect on the application of the MNT as well as on flight data processing system (FDPSs).

[1] For the detailed description of the updated forecasts, reference should be made to the report of the interim March 2001 meeting of the NAT TFG which had been tabled at the NAT SPG/37 and which is available on request from the EUR/NAT Office of ICAO

CONCLUSION 37/10 - DEFINITION OF SAME TRACK AND SAME DIRECTION TRACK

That the European and North Atlantic Office of ICAO bring to the attention of ICAO Headquarters the concerns expressed regarding the current definition of same track contained in Doc 4444.

The use of Satellite voice communications

2.5.2 The Group recalled that initial planning for Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) for the NAT Region stated that Satellite Communications would only be used for emergencies and non-routine communications. This decision was made in 1992 and it was acknowledged that technologies had evolved significantly since then. In this connection, it had been anticipated that datalink communications would precede voice communications using satellites however, the inverse has taken place. With this in mind, and considering that many aircraft cannot be equipped with FANS 1/A technology, the Group agreed that the NAT IMG should assess the viability of using satellite voice communications for waypoint position reporting as an initial step.

CONCLUSION 37/11 - THE USE OF SATELLITE VOICE COMMUNICATIONS

That the NAT Implementation Management Group assess the viability of using satellite voice communications and report their findings to NAT SPG/38.

2001 International Oceanic Conference (IOC)

2.5.3 It was noted that Canada had confirmed that IOC 2001, which is jointly sponsored by Canada and ICAO, will be held in Banff, Alberta, from 2 to 4 October 2001. Information on IOC 2001 was available on the NAVCANADA website which is www.navcanada.ca.

3. AIR NAVIGATION SYSTEM REVIEW

3.1 Review of system safety performance

SCRUTINY MATTERS [2]

Lateral navigation performance accuracy achieved in the NAT Region during the period 1 January 2000 to 31 December 2000

3.1.1 The Group noted a significant increase (33%) in the number of Gross Navigation Errors (GNEs) in MNPS airspace compared with the previous 12 month period. It also noted that the overall numbers of GNEs in the NAT Region as a whole had increased by four (12%) compared within the last period. However, it noted that there had been a 4.6% increase in traffic and an overall reduction in the estimated risk as a result of these errors.

3.1.2 In accordance with monitoring procedures, the Group noted that the CMA had taken follow-up action for any reported error in excess of 50 NM outside MNPS airspace. The Group noted that this only had to be done for 4 of 13 reported occurrences.

[2] 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/37 and which is available on request from the EUR/NAT Office of ICAO

3.1.3 Using flights per GNE as a measure of the lateral navigation performance, overall performance in 2000, while not poor, was notably worse than for 1999 for all three categories. Military aircraft performance was worse than in the previous three years.

3.1.4 The Group considered the part played by OACs in containing the number of GNEs through timely intervention to prevent an incorrect routing. During the monitoring period, Gander and Shanwick OACs advised the CMA with 81 (82 in 1999) occasions when action was taken to prevent a GNE. The following information was extracted from the available data:

a) 61 (71)[3] cases of crew or probable crew error;

b) 17 (9)[3] cases thought to be attributable to ATC error;

c) 2 cases thought to be a combination of ATC and crew error; and,

d) one from a cause not able to be determined.

3.1.5 It was noted that while the overall numbers of interventions was similar to the previous reporting year, those attributed to crew error had decreased by around 20% while those due to ATC error had, after two successive years of falling, risen by around 90%.

3.1.6 With respect to the continued application of the 10 minutes longitudinal separation, it was noted that the CMA had received four reports of erosions of longitudinal separation in excess of 3 minutes during the monitoring year compared to two in the previous year.

Methods of improving the observed standard of navigation performance

3.1.7 In considering the methods by which the observed standard of navigation performance might be improved, account was taken of the lessons derived from the review of navigation performance. As a general observation, the Group noted that there had been a poor response from operators to requests for information regarding GNEs. Furthermore, provision of Radio/Telephony (R/T) transcriptions, which would help in the scrutiny process, were not always made available. Moreover, the Group considered that a more representative view could be formed with the benefit of operational error reports from New York OAC.

3.1.8 As usual, a significant number of the GNEs had been caused by pilot error following a re-route, though the Group was pleased to note that the latest series of the most modern types of aircraft did not feature in these GNEs. Given past experience, it was considered that this was because modern Flight Management Systems (FMSs) have a “progress” or “report” page facility from which the pilot can directly read a position report. This is not the case for many older types which can lead pilots to carry out position reporting from the flight log which may have the correct clearance recorded but may not reflect what has been entered into the FMS. By reporting directly from the FMS progress page, any transcription error will most likely be noticed by ATC and an intervention to prevent a GNE will be made.

3.1.9 The Group noted that the number of errors which involved failure of ATC to carry out its role effectively had shown a marked increase on the previous year and during its scrutiny, it was recognised that there were a number of reasons within the ATC system which contributed to a GNE being committed. Typically, the errors involved straightforward controller error; poor Centre to Centre co-ordination; poor information exchange between the pilot and the third party communicator; and, poor information exchange between the controller and the third party communicator. With this in mind, it was agreed that additional ATM expertise should participate in Scrutiny Group meetings. It was further agreed that the NAT IMG should use its resources to address issues identified by the Scrutiny Group. Finally, it was agreed that the

[3] 1999 figures

NAT IMG could task the NAT Operations Managers to address safety related issues between NAT SPG meetings.

CONCLUSION 37/ 12 - THE NEED TO ADDRESS OPERATIONAL MATTERS THAT AFFECT SAFETY IN THE SYSTEM

That:

a) the NAT Implementation Management Group be tasked with addressing the Air Traffic Management issues identified by the Scrutiny Group;

b) the NAT Implementation Management Group task the NAT Operations Managers with making changes required to reduce risk levels in the system; and

c) the NAT Operations Managers address safety related issues between NAT SPG meetings.

CONCLUSION 37/ 13 - INCREASED PARTICIPATION BY AIR TRAFFIC MANAGEMENT (ATM) EXPERTISE IN THE SCRUTINY GROUP

That States ensure that sufficient ATM expertise participate in the Scrutiny Group meetings in order to clearly identify ATM related issues and propose solutions

Vertical navigation performance accuracy achieved in the NAT Region during the period 1 January 2000 to 31 December 2000.

3.1.10 The Group scrutinised the reports of altitude deviations of 300 ft or more received by the CMA during the period in an attempt to establish any trends in the operation of aircraft in the NAT Region which had led to operational errors in the vertical dimension. During the course of the scrutiny, it was noted that the major causes of the risk bearing errors were attributable to the following:

a) co-ordination between Area Control Centres (ACCs); and,

b) misunderstanding following a request for information regarding a future clearance to climb

3.1.11 Other points worthy of note which arose during the course of the scrutiny were that less confusion and potentially less errors would occur if, when a restriction or instruction is linked to a position, that position was referred to in full e.g. latitude and longitude, and not one or the other. Furthermore, it was suggested by the Scrutiny Group that mitigation of some errors could be achieved if pilots were reminded by controllers to report leaving and reaching a level and to include this in the readback. The Group felt that Conclusions 37/12 and 37/13 adequately address the concerns expressed by the Scrutiny Group.

Methods of Improving the Current Monitoring Procedures

3.1.12 The Group concluded that the current monitoring methods were generally adequate to allow GNEs and altitude deviations to be investigated effectively but urged that **all** OACs report deviations and erosions of longitudinal separation to the NAT CMA in line with NAT SPG directives and in accordance with the procedures detailed in NAT Doc 001.

Review of the minimum height monitoring (technical) requirements for NAT RVSM airspace.

3.1.13 The Group undertook to review the methodology to update "Minimum Monitoring Requirements: North Atlantic RVSM". In carrying out the review, account was taken of the latest available height-keeping data provided by the monitoring programme and advice from the MWG. The Group recognised that there was now very much more data available as a result of EUROCONTROL's monitoring programme and that due consideration of this data should be made in order to further reduce the monitoring requirements for given aircraft types (paragraph 3.1.30 refers).

3.1.14 As regards the maintenance of the Table, the Group agreed that the NAT CMA was responsible for the updating of the "Minimum Monitoring Requirements" table. In this connection, the Group agreed that, on an annual basis, changes would be made in the joint meeting of the Scrutiny Group and the MWG. Between meetings, proposed changes, as identified by the NAT CMA, would be circulated to members of the Scrutiny Group and the MWG, and would be incorporated into the table when consensus had been achieved.

CONCLUSION 37/14 - PROCEDURE TO UPDATE THE REDUCED VERTICAL SEPARATION MINIMUM (RVSM) MINIMUM MONITORING REQUIREMENTS TABLE

That:

a) the Scrutiny Group (SG) and Mathematicians Working Group (MWG) update the RVSM Minimum Monitoring Requirements table at their annual meeting; and

b) between meetings, the NAT Central Monitoring Agency co-ordinate changes to the table with the SG and the MWG.

MATHEMATICAL MATTERS

2000 LATERAL AND VERTICAL COLLISION RISK ESTIMATES [4]

Lateral

3.1.15 The lateral risk and occupancy estimates were based on the full 12 months of 2000. Until further changes in airspace structure, such as the introduction of full RVSM, the risk would continue to be assessed on this calendar year basis.

3.1.16 The Group determined the lateral occupancy estimates for 2000 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. The 2000 estimates together with the estimates for the previous four monitoring years are shown in Table 1.

[4] For the 1999 lateral and vertical collision risk estimates together with a detailed discussion and analysis, reference should be made to the report of the MWG presented to NAT SPG/36 and which is available on request from the EUR/NAT Office of ICAO

Table 1: Lateral Occupancy Estimates for the years from 1996 to 2000

		Monitoring Year						
Direction	**Traffic**	1996	1997 Pre-RVSM	1997/98 RVSM Phase 1 ⊕	1998 RVSM Phase 1	1998/99 RVSM Phase 2 *	1999 RVSM Phase 2	2000 RVSM Phase 2
Same	**OTS**	1.491	1.479	1.098	1.151	0.818	0.959	0.996
	Random	0.274	0.282	0.204	0.222	0.156	0.173	0.165
	Comb	1.043	1.032	0.752	0.802	0.567	0.671	0.702
Opposite	**OTS**	0.003	0.004	0.003	0.002	0.003	0.004	0.005
	Random	0.013	0.013	0.008	0.007	0.008	0.010	0.012
	Comb	0.007	0.007	0.005	0.004	0.005	0.006	0.007

⊕ 9 month occupancy period * 7 month occupancy period

3.1.17 The estimate of the combined same direction occupancy value for 2000 had increased slightly since 1999 with an increase in the Organized Track System (OTS) occupancy values and a decrease in the Random occupancy values. The traffic in 2000 had increased by approximately 5%. For opposite direction traffic there had been little detectable trend in occupancy throughout the five-year period, with the 2000 estimates returning to values typical for pre-RVSM occupancies.

3.1.18 The MNPS GNEs reported in 2000 were examined in conjunction with the Scrutiny Group prior to the start of the MWG. This ensured that the two groups were in agreement over the categorisation of the events for risk assessment purposes. As a result, no subsequent changes were made to the GNE classifications during the course of the MWG.

3.1.19 Appropriate error weights for lateral GNEs were previously determined at NAT SPG/36, using the occupancies for 1999. These weights were used within the collision risk assessment and since no significant changes to occupancy were noted, no detailed examination of the appropriateness of the weights was made. The Group endorsed the proposal that, in future, the weights 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.

3.1.20 The 2000 lateral collision risk estimates together with the estimates for the previous four monitoring years are shown in Table 2. Compared to previous years, the Group noted that the overall collision risk estimate for all MNPS traffic had decreased and was in fact the lowest risk during that period. The risk for Random traffic had remained the same. All the estimates for 2000 are below the TLS of 20 x 10^{-9} fatal accidents per flight hour.

Table 2: Lateral Risk Estimates for the years from 1996 to 2000

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 Year						
	1996	1997 Pre-RVSM	1997 RVSM Phase 1 ⊕	1998 RVSM Phase 1	1998 RVSM Phase 2 *	1999 RVSM Phase 2	2000
OTS	6.5	0.0	0.0	4.5	3.3	1.6	0.0
Random	5.2	12.5	8.7	5.7	4.5	3.4	3.4
All MNPS	5.9	6.2	4.3	5.0	3.8	2.4	1.5

⊕ 9 month occupancy period * 7 month occupancy period

3.1.21 It was noted that no lateral errors on the OTS tracks were reported during 2000. It was suggested that using a 12-month sample period for estimation of the OTS track element of system risk may not allow an accurate estimate to be calculated. It was agreed that the feasibility of using a sample period greater than one year should be examined for future risk estimations within the OTS tracks.

CONCLUSION 37/15 - EXPANDED SAMPLE PERIOD TO ESTIMATE LATERAL RISK

That the Mathematicians Working Group examine the feasibility of using a Gross Navigation Error sample period greater than one year for the purpose of estimating the risk in the lateral dimension.

Vertical

3.1.22 The Group determined the vertical occupancy estimates for the 12 months of 2000 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.

Table 3: Vertical Occupancy Estimates for the years from 1998 to 2000

		RVSM levels			Non-RVSM levels		
Direction	**Traffic**	**1998**	**1999**	**2000**	**1998**	**1999**	**2000**
Same	**OTS**	1.153	1.324	1.303	0.051	0.039	0.050
	Random	0.133	0.143	0.165	0.035	0.035	0.057
	Comb	0.795	0.921	0.928	0.046	0.037	0.054
Opposite	**OTS**	0.001	0.002	0.002	0.015	0.014	0.015
	Random	0.033	0.032	0.027	0.022	0.021	0.025
	Comb	0.013	0.012	0.010	0.018	0.018	0.020

3.1.23 It was noted that the occupancy values have remained similar to those recorded in 1999. This was despite a traffic increase of approximately 5%. No obvious reason exists for the occupancies remaining stable but it was thought that one possible cause may be a spread in the time that the traffic was using the NAT. This may have occurred as the major hubs have reached their capacity during peak periods, thus requiring other less desirable time slots to be utilised.

Risk Due to Operational Errors

3.1.24 The operational element of vertical collision risk, in both RVSM and non-RVSM environments, is determined from the estimate of time spent by aircraft at uncleared levels or when incorrectly cleared to a level which results in a loss of lateral or longitudinal separation, and also the numbers of levels crossed without clearance during the monitoring year. It was noted that throughout 2000 *no reports* of Large Height Deviations (LHDs) were obtained from the New York and Santa Maria OACs. This has a deleterious effect on the accuracy of the collision risk estimate and the Group agreed that every effort should be made to obtain these event reports in future. In this connection, it was recognized that reporting of deviations from a clearance was an important adjunct to safety management and that all concerned should make every effort to ensure that this information is collected. With this in mind, the Group agreed to recommend to IFATCA that they inform there membership accordingly.

CONCLUSION 37/16 - THE NEED TO OBTAIN VERTICAL DEVIATION REPORTS

That:

a) every effort be made by all NAT Provider States to provide all deviation reports from all Oceanic Area Control Centres, as this data affects the accuracy of the risk estimate;

b) the International Federation of Air Traffic Controllers' Associations (IFATCA) inform its membership of the importance of these reports as they are an integral part of safety management systems.

3.1.25 As with the lateral errors, the LHDs reported to the CMA during 2000 were examined in conjunction with the Scrutiny Group to agree the classification for risk calculation purposes. There had been a decrease in the time spent at un-cleared levels and in the number of deviations reported. Nevertheless, there appeared to be considerable fluctuations in the times. While a single event can contribute significant time at an un-cleared level, the Group noted that continued vigilance was required by operators and providers to assure that if errors of this type occur they not be allowed to persist.

3.1.26 Based on the set of LHDs reported in 2000 the Group determined the operational vertical collision risk estimates. The estimates are shown in Table 4 together with, for comparison, the estimates under RVSM Phase 2[5] operations since 1998.

Table 4: Vertical Collision Risk Estimates between 1998 and 2000
(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 2000.

	RVSM levels			Non RVSM levels		
	1998*	**1999****	**2000**	**1998***	**1999****	**2000**
OTS	0.8	6.0 (11.9)	**0.51**	0.1	0.0 (0.0)	**0.043**
Random	6.1	8.9 (17.5)	**6.59**	1.9	4.4 (8.6)	**0.000**
Combined	3.2	7.2 (14.2)	**3.04**	1.2	2.5 (5.0)	**0.018**
TLS	5.0	5.0	5.0	20.0	20.0	20.0

*: 1998 values estimated for Phase 2 RVSM between October and December using 12 months LHD data.
**: Figures in parenthesis are the risks under the revised $P_y(0)$ used from 2000 onwards.

Technical Risk

3.1.27 It was agreed at NAT SPG/36 that a full technical risk assessment should be carried out in time for NAT SPG/37. A preliminary estimate of the technical risk was noted by the Group. It was further noted that a revised estimate would be produced for presentation to NAT SPG/38.

[5] Phase 2 was the downward and upward expansion of RVSM to FL 310 and FL 390 respectively

Altimetry System Error (ASE) Stability Studies

3.1.28 As an adjunct to the technical risk assessment, the Group recalled that an underlying assumption of the Minimum Aircraft System Performance Specification (MASPS) was that ASE is stable over time. In this connection, an investigation of an aircraft's ASE stability was presented. Within the study, a sample of RVSM approved aircraft that had many ASE measurements in the NAT database were examined to determine if there was any evidence that an airframe's ASE drifts over time. It was concluded that there was strong evidence that some airframe ASEs do drift over time. In addition, in the majority of instances examined, the drift was towards more negative ASE.

3.1.29 It was agreed that this area required further investigation and it was further agreed that any progress of these investigations should be reported to NAT SPG/38. It would be helpful to correlate the maintenance history of specific airframes with their estimated ASEs over time. Every effort should be made to obtain maintenance histories for identified airframes from the operators.

CONCLUSION 37/17 - REQUIRED WORK TO DETERMINE THE BEHAVIOUR OF ALTIMETRY SYSTEM ERRORS (ASE) OVER TIME

That the NAT Implementation Management Group arrange to carry out further work on ASE stability and report to NAT SPG/38.

Height Monitoring Data

3.1.30 Recalling NAT SPG Conclusion 34/1 concerning the requirement for the NAT CMA to share RVSM monitoring data with Eurocontrol, the Group was informed that data was now available from the European monitoring programme. The Group agreed that this data should be used for NAT safety studies where appropriate. In this connection, it was noted that a meeting of RMAs has been established under ICAO auspices and it was noted that the CMA and the MWG would monitor developments.

CONCLUSION 37/18 - THE USE OF MONITORING DATA FROM OTHER THAN NAT SOURCES

That the Mathematicians Working Group, where appropriate, use European and Pacific data for NAT safety studies.

3.1.31 It was noted that seven non-compliant measurements were listed since 1996. However, there was some doubt as to the validity of one of the measurements (>600ft). A review of the process for validating non-compliant measurements had therefore been made. It was agreed that it would be beneficial if the time taken to validate non-compliant approved measurements were tightened significantly. These are important events and timely action was required to limit the hazard of large ASEs. In addition, there appeared to be some confusion concerning responsibilities during the validation process; therefore, it was agreed that the validation process be reviewed by the appropriate bodies and action taken to ensure that the verification of non-compliant measurements takes no more than one week.

CONCLUSION 37/19 – VALIDATION OF NON-COMPLIANT MEASUREMENTS

That the validation process of non-compliant measurements be reviewed by the NAT Central Monitoring Agency and that action be taken to ensure that the verification of non-compliant measurements takes no more than one week.

Opposite direction traffic levels during OTS track times

3.1.32 At NAT SPG/36, the MWG was asked to analyse the growth in opposite direction flights particularly during the daytime track structure. To determine if there was an increase in opposite direction traffic, data collected from the GAATS database was investigated from January 1995 to December 2000. It was concluded that there was very little change observed in the number of Westbound flights during the night tracks. However, although the number was highly variable from day to day, the average number of Eastbound opposite direction flights during the day track structure had steadily increased from approximately 20 per day in early 1995 to almost 40 per day in 2000. As a percentage of flights, the number of Eastbound day time flights had increased from 9% in 1995 to almost 12% in 2000.

Terms of Reference for the NAT CMA

3.1.33 Because the NAT CMA would be affected by the expansion of RVSM to the entire NAT Region, the Group had felt that it was important that terms of reference be developed. Furthermore, it was recalled that no terms of reference existed and that the only formal agreement regarding the NAT CMA stemmed from the NAT Limited Regional Air Navigation (RAN) Meeting of 1992. With the above in mind, the Group examined and endorsed the TORs which are at **Appendix C** of this Report and agreed that they should be included in the NAT SPG Handbook.

CONCLUSION 37/20 - TERMS OF REFERENCE FOR THE NORTH ATLANTIC CENTRAL MONITORING AGENCY (NAT CMA)

That the NAT CMA carry out its functions in accordance with the terms of reference (TOR) as shown in Appendix C to this Report.

3.2 Review of system operations

AIR TRAFFIC MANAGEMENT

North Atlantic Operations Managers' Meeting

3.2.1 The NAT Operations Managers Meeting was held in Reykjavik from 25 to 29 September 2000. In accordance with existing procedures, the host nation chaired the meeting. A users day was held on Thursday 28 September 2000.

3.2.2 The Operations Managers carried out a comprehensive review of operational issues and determined ways and means to resolve these issues. These matters included letters of agreements, automation, the application of separation minima and civil as well as military operations. It was felt by the Operations Managers that user participation was very useful as it permitted the exchange of valuable information.

3.2.3 In follow up to NAT SPG Conclusion 36/18, the Operations Managers discussed the abuse of RVSM airspace by non-RVSM approved operators and concluded that there were still some companies abusing the system, mainly ambulance services. It was agreed that more stringent procedures should be put in place and that all requests should be recorded in the centres. In addition, it was agreed that the centres should monitor all non-RVSM approved flight requests within the system and report all requests to the NAT CMA, irrespective of whether approval was granted. (NAT SPG Conclusion 37/6 also refers).

3.2.4 As a follow up to NAT SPG Conclusion 36/14, the NAT Operations Managers undertook to identify areas and procedures that could reduce the incidence of operational errors in the NAT Region, which could compromise the Target Level of Safety (TLS). To this end it was noted that each occurrence would be analysed in order to determine lessons learnt.

3.2.5 In follow up to NAT SPG Conclusion 35/9 concerning C 17 formation flights, the Group noted that the NAT Operations Managers had developed a tracking and reporting mechanism that has been put in place. Any anomalies that were encountered would be brought to the attention of the NAT SPG through the NAT CMA.

3.2.6 As regards the suspension of RVSM due to turbulence, it was noted that Prestwick had informed the NAT Operations Managers that, from 3 April 1999 to 8 June 2000, it had recorded 14 suspensions of RVSM due to turbulence and RVSM was suspended once during the same time period because of sunspot activities and bad HF radio conditions. The NAT Operations Managers had discussed this item and had agreed that if and when suspension takes place and controllers increase separation to two thousand feet they could use either even or odd levels for separation depending on traffic (NAT SPG Conclusion 35/21 refers).

3.2.7 The Group noted that the increasing use of track notes had presented problems with the OTS message harmonisation. It had therefore been proposed and agreed that the routine reminders included in the track message should be rotated to reduce quantity and repetitiveness of the information and thereby avoiding complacency.

CONCLUSION 37/21 - ROTATION OF INFORMATION ON THE ORGANISED TRACK SYSTEM (OTS) TRACK MESSAGE

That Gander and Prestwick coordinate amongst themselves to ensure that the notes on the NAT OTS track message be regularly rotated.

3.2.8 The Group discussed how the NAT Operations Managers Group should be managed in the future. Considering that discussion were on going about the level of support to the NAT SPG as a whole, including the NAT Operations Managers, the Group agreed that no action be taken until such time as a commitment about the level of support to the NAT SPG has been determined.

COMMUNICATIONS

3.2.9 The Group recalled that in accordance with NAT SPG Conclusion 29/13, a report should be prepared by the NAT ACSG. The report should contain HF contacts as well as an analysis of the performance of the HF network used for the NAT Region. The Group noted that no such meeting had taken place for the last two years. However, in this connection it did express its appreciation to Portugal, the Rapporteur of the ACSG, for compiling relevant statistics related to HF and General Purpose (GP) Very High Frequency (VHF) communications. With the above in mind and recognizing that the HF network was still a very important pillar supporting the NAT Air Navigation System, it was agreed that States should nominate representatives to participate in the work of the ACSG.

3.2.10 The Group also recognized that the ACSG would have a role to play in the discussions relating to the regression of HF facilities. With this in mind, it was agreed that an ACSG meeting should be convened immediately before the NAT IMG HF Ad Hoc Transition Group meeting. The ACSG should address HF family allocation and the optimization of the HF family utilisation and should develop amendment proposals if required.

CONCLUSION 37/22 - AERONAUTICAL COMMUNICATIONS SUB-GROUP (ACSG) MEETING

That an ACSG meeting be convened immediately before the next High Frequency (HF) Ad-hoc Transition Group meeting, to address the following issues:

a) HF Family allocation;

b) Optimisation of the HF family utilization; and

c) Prepare and propose procedural changes, if necessary, to the NAT SPG to be included in ICAO documentation, regarding the HF Network operations in the NAT Region.

3.2.11 The Group noted that, in accordance with NAT SPG Conclusion 33/16, Portugal had discontinued the HF intercept procedures.

System efficiency

3.2.12 The Group was presented with the ATS system efficiency assessment for Gander ACC for 2000. In this connection, the Group recalled its previous discussion on this matter and noted that this information should be provided to the NAT IMG in order to assist them in developing operational performance indicators (paragraph 2.1.25 above refers).

4. DOCUMENTATION UPDATE

4.1 NAT Documentation review

MNPS Operations Manual

4.1.1 The Group noted that the Ninth Edition of the NAT Minimum Navigation Performance Specifications Operations Manual had been published and was available on the web site (www.nat-pco.org).

NAT Guidance Material – NAT Doc 001

4.1.2 As regards the Seventh Edition of the NAT Guidance Material, an interim copy had been posted on the NAT Programme Co-ordination Office (PCO) web site (www.nat-pco.org) in order to collect comments from all concerned. It was agreed that the document would become the definitive Seventh Edition after NAT SPG/37, subject to any comments during the meeting. In order to ensure continued maintenance, once the document has been published, updates and proposals for amendment will be made at each NAT SPG meeting.

NAT Air Navigation Plan (ANP) and Facilities and Services Implementation Document (FASID)

4.1.3 It should be noted that the review of the NAT Air Navigation Plan (ANP) and the NAT Facilities and Services Implementation Document (FASID) required to bring them into line with the ICAO Council decisions regarding new ANPs and FASIDs had not been carried out (NAT SPG Conclusion 36/22 refers). However, the Group noted that a mechanism was being put in place to ensure that this task would be carried out prior to NAT SPG/38.

Contingency Plan

4.1.4 The Group noted that the NAT IMG had completed its work on the NAT Contingency Plan and had handed over the task of maintaining the document to the NAT Operations Managers. The Group endorsed this action.

4.1.5 In this connection, it was noted that the NAT Operations Managers had noted the requirement for them to update the contingency plan. Furthermore, they had identified the need for additional updates by some States. It was therefore agreed that Prestwick should be the focal point and that they would keep and maintain the original copy of the Plan. The NAT OPS Managers meeting will in the future have this issue on its agenda in order to ensure that the plan is constantly up to date.

NAT Implementation Plan

4.1.6 As regards the NAT ATM Implementation Plan, Version 7, the Group noted that it had been declared by the NAT IMG as being no longer valid. This resulted from the NICE Report and some of the findings stemming from the work on reductions in horizontal separation minima. The Group noted that NAT IMG had undertaken to develop a revised ATM Implementation Plan taking account of the NICE Report, the NICE simulation facilities and the work that was being carried out in support of reductions in separation minima.

IGA Manual

4.1.7 The Group noted that the NAT Operations Managers had agreed to take under their auspices the maintenance of the North Atlantic International General Aviation (IGA) Operations Manual. This manual, which is currently updated by the Federal Aviation Administration (FAA), has proven to be a very valuable tool for general aviation, however no formal mechanism is in place regarding its update. The NAT Operations Managers had spent considerable time reviewing the manual and had updated it completely. It was noted that the Manager from New York had agreed to take the updated version back to his administration in order to update the original document and make arrangements to have it re-published. The Group agreed that the Operations Managers keep this matter on their agenda in the future and make regular updates as needed. Finally, once the IGA Manual has been updated, it should be posted on the NAT PCO web site.

CONCLUSION 37/23 - MAINTENANCE OF THE NAT INTERNATIONAL GENERAL AVIATION (IGA) OPERATIONS MANUAL

That:

a) the NAT Operations Managers be tasked with updating, on a regular basis, the NAT IGA Operations Manual; and

b) the NAT IGA Operations Manual be posted on the NAT Programme Coordination Office web site as soon as the new edition has been finalised.

NAT SPG Handbook

4.1.8 The Group was informed that the NAT SPG Handbook was being revised to take account of the NAT SPG structure and that a new edition should be published shortly.

Other issues

4.1.9 In concluding the discussion on NAT Region documentation, it was proposed and agreed that a list of all documentation should be prepared and put on the web site. In this connection, the Group noted that the EUR/NAT Office of ICAO would initiate work in this respect.

5. ANY OTHER BUSINESS

5.1 Support to the NAT SPG

5.1.1 The Group recalled that, at its last meeting, it had requested the Chairman to develop a proposal to increase the level of support needed to sustain NAT SPG activities that are considered important to current operations as well as activities that are considered as pre-requisites to continue to plan for the future. The Chairman was also requested to report his findings to NAT SPG/37 (NAT SPG Conclusion 36/8

refers). It was pointed out that, in follow up to the Conclusion, the Chairman had established a Task Force. This Task Force was aware that no clear precedent existed to develop a proposal to increase the level of service provided to a regional planning group beyond the ICAO resources allotted to the planning group. It was however recognised that institutional arrangements had been put in place in other ICAO Regions to partially address planning support for those regions. With this in mind, the Task Force had agreed that, as a pre-amble to determining the need for continuous as well as an increase in the level of service, the following points needed to be taken into account:

a) the EUR/NAT Office of ICAO has supported the NAT SPG since its establishment in 1965 and has been supporting planning groups since the establishment of the NAT SPG Task Force by NAT SPG/25 in 1988;

b) activities, such as the CMA, the PCO, the FCMA and the editing of some documents were being carried out by States;

c) serious consideration had to be given to the synergy of bringing all these activities together under one management;

d) serious consideration needed to be given to assuring the continuation of these activities without gaps;

e) due consideration needed to be given to the changes that were taking place within the organisational structures of NAT Provider States and the possible effects that these changes could have on the provision of the above services; and

f) consideration needed to be taken of the consequences of doing nothing.

5.1.2 Considering the above, it was noted that the Task Force had agreed that the level of service provided in support of the NAT SPG should not decrease indeed an increase was required. It was also recognised that ICAO's ability to meet the needs of the NAT SPG was limited considering its other commitments. With this in mind, the Task Force examined the following possibilities:

a) request ICAO to provide all the support needed for the NAT Region;

b) establish a support unit completely outside of the ICAO machinery;

c) do nothing; or

d) use ICAO's resources to the extent possible and supplement them as needed.

5.1.3 The Group noted that the Task Force had agreed that options a) to c) were not feasible because they were either not achievable, desirable or they may create management difficulties. Furthermore, it was felt that these options would not provide the NAT SPG with the control of the end result that they would require.

5.1.4 The Group agreed with the Task Force that the only viable option available was to use ICAO's resources to the extent possible (option d)) and to supplement them as needed in order to meet the NAT SPG’s needs. The Group also agreed with the Task Force that this option was achievable, would provide the best value and would ensure that the management of the support function would rest with the NAT SPG itself.

5.1.5 The Group also felt that option d) could be done by initially taking over the functions of the NAT PCO i.e. managing the NAT web site, carrying out all necessary co-ordination between the various

groups and managing all the NAT documentation. In addition, support would be given to NAT SPG related activities such as support to the NAT Operations Managers Meetings as well as other meetings that are pre-requisites to the preparation of the annual NAT SPG Meeting itself.

5.1.6 The Group examined the feasibility of incorporating the CMA and FCMA into the proposed support cell. It was however felt that it would be premature to do so as these activities were currently funded and were providing the level of support required. However, it was recognised that the current situation could change and that an alternate method of providing these services may be required in order to ensure that these activities, which are directly related to safety management, can be maintained without interruption.

5.1.7 On the basis of the above, the Group analysed an in-depth review of the tasks required to fully support the NAT SPG. The Group was also provided with an overview of the resources that ICAO could provide to any support cell. It was indicated that ICAO could provide administrative support to any proposed support cell but that it could not provide office neither space nor office equipment or travel costs. These resources would have to be financed outside of the budget of the EUR/NAT Office of ICAO. The Group was also informed that the EUR/NAT Office of ICAO could not increase the level of human resources currently attributed to the NAT SPG. However, it was indicated that the current level of support would be maintained.

5.1.8 As regards financial and managerial control, it was agreed that this role be attributed to the NAT SPG itself. This would mean that the NAT SPG would have to endorse the previous year's expenditures and agree on future expenditures. This mechanism could be put in place using the NAT EFG and the Joint Financing section of ICAO, including their auditors if required. It was agreed that the ICAO administrative support mechanisms be used to the extent possible. The Group however agreed that, before any final decision could be made, it would be necessary to prepare a detailed management and financial control plan. In addition, it was agreed that a detailed plan needed to be developed and circulated to all NAT SPG members before 15 September 2001.

5.1.9 It was noted that all eight NAT Provider States already contribute to the General ICAO Budget and that until now, the EUR/NAT Office of ICAO has supported NAT SPG activities out of its regular budget although some work has been carried out by States as well as under other arrangements. These facts notwithstanding, at least one State expressed its concern that it may have difficulty in participating in a project that may seem to bypass the normal ICAO funding mechanisms for its regional offices in support of Regional Planning Group activities. Concern was also expressed that if this mechanism was adopted, these additional resources might be used for support of other ICAO EUR/NAT Regional activities outside the NAT SPG.

5.1.10 Considering that the actual costs of the additional support functions would be relatively small and that the States within the region are relatively homogeneous in respect of socio-economic factors, the NAT SPG agreed that if an agreement is reached to proceed on this matter, the mechanism for financing the costs of support functions to NAT SPG activities would be equally shared between the eight States with FIR's within the NAT Region (Canada, Denmark, Iceland, Ireland, Norway, Portugal, United Kingdom and United States of America). It was also agreed that, if the support functions and/or the costs develop significantly in the future the recommended mechanism would be reconsidered or amended.

CONCLUSION 37/24 - SUPPORT TO THE NAT SYSTEMS PLANNING GROUP

That:

a) the Chairman and Secretary prepare a detailed Plan to sustain an increase in States participation in supporting NAT SPG activities;

b) the detailed Plan be circulated to all NAT SPG Members by 15 September 2001;

c) a special meeting of the NAT SPG Members only be convened on 8 October 2001 to consider the detailed Plan;

d) the proposed financing of a NAT SPG support cell be based on an equal distribution of costs between Canada, Denmark, Iceland, Ireland, Norway, Portugal, United Kingdom and United States of America; and

e) the NAT Implementation Management Group be tasked with implementing any decision taken by the Special NAT SPG Meeting.

5.2 Next meeting

5.2.1 The Group agreed that its next meeting be held in the EUR/NAT Office of ICAO, from 11 to 13 June 2002. However, considering that it may be necessary for a closed session of the NAT SPG to address the establishment of a support cell, it was noted that it might be necessary for the Members to meet on Monday afternoon of 10 June 2002. The Secretary will confirm this requirement.

APPENDIX A
LIST OF PARTICIPANTS

(Paragraph i .4 refers)

CANADA
Mr Robert FULLARTON*

DENMARK/DANEMARK
Mr Lars Peter JENSEN *
Mr Knud ROSING

FRANCE
Mr André BERMAN*
Mr B. HALLER#
Mr Kamel REBAI#

ICELAND/ISLANDE
Mr Asgeir PALSSON*
Mr Leifur HAKONARSON
Mr Heimir Mar PETURSSON

IRELAND/IRLANDE
Mr Patrick RYAN*

NORWAY/NORVÈGE
Mr Ommund MYDLAND*

PORTUGAL
Mr Carlos MONTEIRO*
Mr Luis RODRIGUES
Mr Henrique NUNES
Mr Joaquim CABRAL

RUSSIAN FEDERATION/
FÉDÉRATION DE RUSSIE
Mr Oleg TROUKHTANOV
Mr Victor STEBLEVETS
Mr Boris SAFRO

UNITED KINGDOM/ROYAUME UNI
Mr Jim BENSON **
Mr Keith SLATER

UNITED STATES OF AMERICA/
ÉTATS UNIS D'AMÉRIQUE
Mr Drazen GARDILCIC*
Mr Gerry L. RICHARD**
Ms Roberta LEFTWICH
Mr David MALOY

International Organizations/Organisations internationales

IACA
Mr Gareth PHILLIPS

IATA
Mr Alan GILBERT
Mr Jerry WILMOT

IBAC
Mr Peter INGLETON

IFALPA
Mr Robert SWAIN

IFATCA
Mr Eddie WALLACE

INMARSAT
Mr Lindsay NORRISH

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

APPENDIX B
WEATHER DEVIATIONS PROCEDURES IN REDUCED VERTICAL SEPARATION MINIMUM (RVSM) AIRSPACE

(Paragraph 2.1.14 refers)

European and North Atlantic Office

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

(Serial No.: EUR/NAT-S 01/10-NAT RAC/9)

a) **Regional Supplementary Procedures:**

Doc 7030/4 – NAT, Part 1, Rules of the Air, Air Traffic Services and Search and Rescue, RAC as modified by Amendment 200 dated 12 December 2000.

b) **Proposed Amendment:**

Add the following requirement concerning weather deviations:

"6.6 Weather deviation procedures for oceanic-controlled airspace
(A 2-2.3-1)

6.6.1 General

6.6.1.1 The following procedures are intended to provide guidance for deviations around thunderstorms. All possible circumstances cannot be covered. The pilot's judgment shall ultimately determine the sequence of actions taken and ATC shall render all possible assistance.

6.6.1.2 If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an air traffic control clearance shall be obtained at the earliest possible time. In the meantime, the aircraft shall follow the procedures detailed in paragraph 6.6.4 below.

6.6.1.3 The pilot shall advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the centre line of its cleared route.

6.6.2 Obtaining priority from ATC when weather deviation is required.

6.6.2.1 When the pilot initiates communications with ATC, rapid response may be obtained by stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response.

6.6.2.2 The pilot still retains the option of initiating the communications using the urgency call "PAN PAN" (preferably spoken three times) to alert all listening parties to a special handling condition which will receive ATC priority for issuance of a clearance or assistance.

6.6.3 Actions to be taken when controller-pilot communications are established

a) The pilot notifies ATC and requests clearance to deviate from track, advising, when possible, the extent of the deviation expected.

b) ATC takes one of the following actions:

1) if there is no conflicting traffic in the horizontal dimension, ATC will issue clearance to deviate from track; or

2) if there is conflicting traffic in the horizontal dimension, ATC separates aircraft by establishing vertical separation; or

3) if there is conflicting traffic in the horizontal dimension and ATC is unable to establish vertical separation, ATC shall:

i) advise the pilot unable to issue clearance for requested deviation;

ii) advise pilot of essential traffic; and

iii) request pilot's intentions.

SAMPLE PHRASEOLOGY:

"Unable to clear (requested deviation), traffic is (call sign, position, altitude, direction), advise intentions."

c) The pilot will take the following actions:

1) Advise ATC of intentions; and

2) Comply with air traffic control clearance issued; or

3) Execute the procedures detailed in 6.6.4. below. (ATC will issue essential traffic information to all affected aircraft).

4) If necessary, establish voice communications with ATC to expedite dialogue on the situation

6.6.4 Actions to be taken if a revised air traffic control clearance cannot be obtained

6.6.4.1 The pilot shall take the actions listed below under the provision that the pilot may deviate from rules of the air, when it is absolutely necessary in the interests of safety to do so.

6.6.4.2 If a revised air traffic control clearance cannot be obtained and deviation from track is required to avoid weather, the pilot should take the following actions:

a) if possible, deviate **away** from an organized track or route system;

b) establish communication with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position (including the ATS route designator or the track code) and intentions (including the magnitude of the deviation expected) on the frequency in use, as well as on frequency 121.5 MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45).

c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

d) turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

e) for deviations of less than 10 NM, aircraft should remain at the level assigned by ATC;

f) for deviations of greater than 10NM, when the aircraft is approximately 10 NM from track, initiate a level change based on the following criteria:

Route centre line track	Deviations >10 NM	Level change
EAST (000-179 magnetic)	LEFT RIGHT	DESCEND 300 ft CLIMB 300 ft
WEST (180-359 magnetic)	LEFT RIGHT	CLIMB 300 ft DESCEND 300 ft

Note: - 6.6.4.2 b) c) above call for the pilot to: broadcast aircraft position and pilot's intentions, identify conflicting traffic and communicate air-to-air with near-by aircraft. If the pilot determines that there is another aircraft at or near the same FL with which his aircraft might conflict, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

g) if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

h) when returning to track, be at its assigned flight level, when the aircraft is within approximately 10 NM of centre line."

c) **Originated by:**

The United States of America

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

To be determined by the Secretary with the rapporteurs of the RSSIG and MIG

e) **Intended date of implementation:**

1 November 2001

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

To be added later

g) **Secretariat's comments:**

This amendment proposal has been endorsed by NAT SPG.

This amendment proposal is similar to the one that was approved for application in the Pacific Region.

APPENDIX C
TERMS OF REFERENCE FOR THE NORTH ATLANTIC CENTRAL MONITORING AGENCY (NAT CMA)

(Paragraph 3.1.33 refers)

Terms of reference The NAT CMA is responsible to the NAT SPG for certain aspects of operations monitoring and reporting in the NAT Region. Specifically its principle functions are:

1. to establish and amend, as required, mechanisms for the collection of operational error data for use in the risk assessment process;

2. to establish and operate a database of RVSM approvals, for the NAT Region, issued by State aviation authorities;

3. to investigate and analyse the causes of operational errors in the NAT region and take follow-up action with State aviation authorities as required;

4. to establish a mechanism for the tactical monitoring of aircraft approvals and take follow-up action with State aviation authorities as required;

5. to act as the custodian of all aircraft technical height keeping data collected as part of the NAT Region monitoring process and take follow-up action, as required, with operators and State aviation authorities of aberrant or non-compliant aircraft;

6. to be responsible for the amendment and publication of the "NAT Minimum Monitoring Requirements" table in co-ordination with the Mathematicians Working Group and Scrutiny Group;

7. to provide NAT customers and State aviation authorities with height monitoring data on request;

8. to ensure that the requisite height monitoring is completed by operators of aircraft listed in the RVSM approvals database and to take appropriate action where necessary;

9. to ensure that system risk is assessed each calendar month and that appropriate action is taken if the risk in either dimension exceeds the published target level of safety;

10. to produce a quarterly report on operational performance in the NAT Region for distribution to NAT SPG members and other interested parties; and,

11. to liaise with other regional monitoring agencies in order to achieve an exchange of monitoring and RVSM approvals data amongst the regions.

LIST OF ACRONYMS

ACARS	Aircraft Communication Addressing and Reporting System
ACAS	Airborne Collision Avoidance System
ACAS II	Airborne Collision Avoidance System – Phase 2
ACC	Area Control Centre
ACSG	Aeronautical Communications Sub-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
ATS	Air Traffic Services
BOTA	Brest Oceanic Transition Area
CAA	Civil Aviation Authority
CADAG	Communications, Automation and Data Link Applications Group
CADS	Central Automatic Dependant 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
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
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 –