NAT SPG/43

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SUMMARY OF DISCUSSIONS AND CONCLUSIONS OF THE

FORTY-THIRD MEETING OF

THE NORTH ATLANTIC SYSTEMS PLANNING GROUP

Paris, 12 to 15 June 2007

PREPARED BY THE EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO JUNE 2007

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FOREWORD

i. Introduction

i.1 The Forty-Third 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 15 June 2007.

i.2 The Meeting was chaired by **Mr Ásgeir Pálsson**, the Member for Iceland. Mr Karsten Theil, Regional Director, EUR/NAT Office of ICAO, was the Secretary of the Meeting and he was assisted by Mr Jacques Vanier and Ms Carole Stewart from the same Office. Mr Herman Pretorius from the ICAO Planning and Global Coordination Office (PCO) in ICAO Headquarters participated in the meeting. Additional assistance was provided by Mrs Nikki Goldschmid from the EUR/NAT Office of ICAO.

i.3 In the opening session, Mr Ásgeir Pálsson welcomed Mr Torbjørn Henriksen as the new Member for Norway, who replaced Mr Knut-Bjarne Klaussen; he also welcomed Ms Rosa Maria Arnaldo, the new Observer from Spain.

i.4 The Group was informed that Mr Robert Kruger, Deputy Regional Director, had retired at the end of May after 14 years of service with ICAO, 11 of them with the EUR/NAT Office, and expressed its gratitude for his support as well as its wishes for a happy retirement. The Group welcomed Mr George Firican as Mr Kruger's successor in the position as Deputy Regional Director and Mr Elkhan Nahmadov in the position as ANS Implementation Officer, CNS. The Group noted that the process of recruiting a successor of Mr Firican in his previous position as ANS Implementation Officer, ATM had been initiated and that Ms Carole Stewart had been temporarily appointed as a consultant.

i.5 In addition to the Members of the NAT SPG and the Observer from Spain, representatives from the International Air Transport Association (IATA), the International Business Aviation Council (IBAC), the International Federation of Air Line Pilots Associations (IFALPA), the International Federation of Air Traffic Controllers' Associations (IFATCA), the International Society for Aeronautical Telecommunications (SITA) and Inmarsat, representing the International Mobile Satellite Organization (IMSO), attended the meeting. A list of participants is at **Appendix A**.

i.6 The Mathematicians' Working Group (MWG) had met at the EUR/NAT Office of ICAO from 19 to 27 April 2007 to consider the mathematical and statistical aspects of the safety of separation minima applied in the NAT Region. The Rapporteur, **Mr Dale Livingston** from the United States, presented the MWG report in support of the assessment of system safety performance in terms of lateral, vertical and longitudinal risk.

i.7 The Safety Management Co-Ordination Group (SMCG) had met from 23 to 27 October 2006 and from 16 to 19 April 2007 to carry out a scrutiny of errors used to determine the risk and to consider NAT system safety matters in accordance with NAT SPG Conclusion 40/19. The Rapporteur, **Mr David Nicholas** from the United Kingdom, provided the NAT SPG with the group's report, which was also used as one of the primary inputs to the risk assessments carried out by the MWG.

i.8 The Aeronautical Communications Group (ACG) had met in New York from 15 to 17 May 2007. The Rapporteur, **Mr Jose Cabral** from Portugal, presented their report.

1.9 The NAT Operations Managers (OPS MNG) had met in Bodø from 21 to 24 May 2007 and the Secretariat presented their report.

i.10 The NAT Traffic Forecasting Group (NAT TFG) had not met since NAT SPG/42.

i.11 The NAT Implementation Management Group (NAT IMG) had met twice since NAT SPG/42 and its Chairman presented the report on NAT IMG activities.

i.12 The NAT Economic and Financial Group (NAT EFG) had met twice since NAT SPG/42 and a report on their activities and findings was presented by the Secretariat.

i.13 The NAT SPG expressed its appreciation to all those who had worked within the above mentioned groups and associated task forces for the quality of the material that they had produced.

i.14 The Group approved the following Agenda:

Agenda Item 1: Developments

1.1 ICAO Global activities
1.2 Adjacent Regions
1.3 Technology

Agenda Item 2: Planning and implementation

2.1 NAT Implementation Management Group Report
2.2 NAT Economic and Financial Group Report
2.3 North Atlantic Traffic Forecasting
2.4 Other issues

Agenda Item 3: Air navigation system review

3.1 Review of system safety performance
- a) Scrutiny matters
- b) Mathematical matters
- c) Safety management

3.2 Review of systems operations
- d) Air Traffic Management
- e) Communications
- f) Systems operations

Agenda Item 4: Documentation update

4.1 Document management office report
4.2 NAT MNPS Airspace Operations Manual
4.3 NAT Basic ANP and FASID
4.4 Other documentation
4.5 Management of the NAT SPG follow up actions

Agenda Item 5: Any other business

5.1 Next meeting

1. DEVELOPMENTS

1.1 ICAO global activities

ICAO Standards and Recommended Practices (SARPs)

1.1.1 The Group was provided with an overview of amendments that affected the ICAO Annexes which included: the adoption of Amendment 168 to Annex 1, Amendment 74 to Annex 3, Amendments 31, 26 and 12 to Annex 6 (Parts I, II and III respectively), Amendment 82 to Annex 10, Amendment 40 to Annex 2, Amendment 45 to Annex 11, Amendment 34 to Annex 15, the proposal for amendments to Annex 3 and Annex 15 relating to the use of the public Internet and the proposal for amendments to Annex 10, Volume I, addressing navigation systems implementation issues and reflecting GNSS evolution

ICAO Manuals

1.1.2 The Group was also informed that the following new ICAO Manuals had been approved or were in the final approval stage:

- First edition of the Training Manual (PANS-TNG);
- final draft of the new Manual for Preventing Runway Incursions (Doc 9870);
- final draft of the Manual on Air Traffic Management System Requirements (Doc 9882); and
- final draft of the Manual on Global Performance of the Air Navigation System, Part I - Performance-Based Transition Guidelines (Doc 9883).

ICAO Worldwide Symposium on Performance of the Air Navigation System

1.1.3 The Group was presented with an overview of the ICAO Worldwide Symposium on Performance of the Air Navigation System, which had been held in Montreal from 26 to 30 March 2007. The symposium was intended to create awareness among government policy makers and regulators, Air Navigation Service Providers (ANSP), airport operators and airspace users of the need to create a performance framework to enhance safety and efficiency of the air navigation system. The Group noted the need to monitor the outcome of the symposium and further noted that the NAT IMG would determine whether work programmes needed to be adjusted.

ICAO Strategic Objectives

1.1.4 The Group was informed that the Council had approved, in principle, C-WP/12814 concerning revisions to the ICAO Strategic Objectives which are described in Appendix B to the cited Council Working Paper. The revised Strategic Objectives would serve as a high level steering document for the future work of the NAT SPG and should be taken into account in the planning process as had been done in the past. The Group would be provided with an update of the status of the Strategic Objectives in due course.

Committee on Aviation Environmental Protection (CAEP)

1.1.5 The Group was provided with a report of the outcome of the Seventh Meeting of the ICAO Committee on Aviation Environmental Protection (CAEP/7) which had met in February 2007. CAEP/7 agreed by consensus on proposed guidance for incorporating international aviation emissions into States' emissions trading schemes, consistent with the United Nations Framework Convention on Climate Change process. The essence of this agreement was that aircraft operators would be the international aviation entity

accountable for the purpose of emission trading and that States would need to put in place an accounting arrangement that would ensure that emissions from international aviation were counted separately and not against specific reduction targets that States may have under the Kyoto Protocol.

Safety Management Systems

1.1.6 The Group recalled that the Directors General of Civil Aviation (DGCA) Conference on a global strategy for aviation safety (DGCA/06, Montreal 20-22 March 2006) had recommended that States implement Safety Management Systems (SMS) across all safety-related disciplines and that States cooperate with ICAO by sponsoring regional training courses or by providing experts. ICAO agreed to deliver "train-the-trainer" courses on SMS to allow the development of resources in greater numbers than what could be provided by the regional SMS training courses. Demand for training went beyond the initial expectations and States continued requesting specific training for their specialists. ICAO had conducted or would be conducting nine courses during 2007.

Regional Implementation Plan for Africa

1.1.7 The Group noted that the Council (181-4) had approved a Comprehensive Regional Implementation Plan for Africa to further improve aviation safety in the Region. The Plan, and a draft Assembly resolution calling for voluntary and other contributions from States and donors to implement the Plan, would also be presented to a high level meeting to be convened immediately prior to the 36th Session of the ICAO Assembly, on 17 September 2007. It was noted that the Regional Offices accredited to States in Africa (Cairo, Dakar, Nairobi and Paris) would be charged with the follow-up of the plan. It was also noted that the Special Regional Air Navigation (RAN) meeting scheduled for the Africa-Indian Ocean (AFI) Region in 2008 would serve as a checkpoint for assessing progress of implementation in the Region.

1.2 Adjacent Regions

North American (NAM) and Caribbean (CAR) Regions

1.2.1 The Group was informed that the Federal Aviation Administration (FAA) had set up an Automatic Dependent Surveillance-Broadcast (ADS-B) programme office in order to support, *inter alia*, plans to create the Next Generation Air Transportation System (NEXTGEN). The Group was also informed that the developments and experience gained in the Pacific (PAC) Region regarding Required Navigation Performance (RNP) 4 and 30x30 NM separation minima would be taken into account by the NAT IMG when planning similar changes for the NAT Region. The Member for the United States indicated that the FAA planned to improve the efficiency of the tracks between the CAR and EUR Regions thereby improving the efficacy of operations in New York Oceanic Control Area (OCA).

1.2.2 The Member for Canada indicated that NAV CANADA was going to implement ADS-B in Canadian Northern airspace, initially in the Hudson Bay area, in order to cope with increasing traffic levels. It was noted that both Canada and the United States had agreed to share information about implementation plans so as to ensure harmonisation within the NAM Region but also with the NAT and EUR Regions. Although Canada would start installing equipment on the ground in the near future, mandatory carriage had not been finalised. Plans were to have ADS-B operational by the end of 2008. Consultations with customers and airspace users would be conducted beginning in mid 2007 to determine the most desirable method of application. Furthermore, ADS Waypoint Position Reporting (WPR) was expected to begin in the middle of 2007 in Edmonton Flight Information Region (FIR) and Controller Pilot Data Link Communications (CPDLC) would be introduced in some FIRs at the same time as the implementation of the Canadian Automated Air Traffic System (CAATS) became operational.

European (EUR) Region

1.2.3 The Group was informed that, in the context of the Single European Sky (SES), EUROCONTROL had been delivered several mandates by the European Commission (EC) in order to prepare future European Regulations. The following issues were highlighted:

a) developments regarding the future European EC Regulation on Air Traffic Flow Management (ATFM);

b) progress regarding the definition phase of the Single European Sky Air Traffic Management (ATM) Research[1] (SESAR) project;

c) developments relating to the use of the Dynamic Management of European Airspace Network (DMEAN);

d) progress achieved in developing a single European Aeronautical Information Publication (AIP); and

e) developments in respect of the work being carried out to formulate a common application of aeronautical regulations.

1.2.4 As regards DMEAN, the Group was informed that recent DMEAN developments, managed under the auspices of EUROCONTROL, had led to trials for an optimum sharing and use of airspace, on the day of the operations, between civil and military authorities, for the benefit of civil air traffic. It was explained that DMEAN was an enhanced application of the flexible use of airspace.

1.2.5 The Group was informed that the SES Regulations would be linked to the EUR Region but that this would not prevent States concerned from adhering to these regulations for portions of airspace in the NAT Region such as the Northern Oceanic Transition Area (NOTA), the Brest Oceanic Transition Area (BOTA) and the Shannon Oceanic Transition Area (SOTA). This should not however have any impact on the NAT Region itself.

1.2.6 The Group was informed that, in line with the inter-governmental negotiations between Ireland and the United Kingdom, NOTA had been fully operational since 26 October 2006.

1.2.7 It was noted that work was progressing on the implementation of Mode S and Precision Area Navigation (P-RNAV) in Terminal Control Areas (TMA), albeit at a slower pace than anticipated. The expansion of the mandatory carriage of 8.33 Very High Frequency (VHF) Channel Spacing radios down to FL195 in the EUR Region had been implemented. It was noted that the mandate in Spain and Portugal was limited to FL245 and above.

1.2.8 Finally, the North Atlantic Treaty Organisation (NATO) and EUROCONTROL had initiated a programme to enhance ATM security in the EUR Region. The NAT IMG would be monitoring this activity to determine if any action would be required to support this undertaking.

Trans-Regional Airspace and Supporting ATM Systems Steering Group (TRASAS)

1.2.9 The Group recalled that a co-ordinated effort of the international civil aviation community was required to implement future requirements and efficiencies in the airspace linking the ASIA, EUR, NAM and NAT Regions. This effort would involve States and Organisations from four of the ICAO Regions, therefore the establishment the TRASAS Group had been supported by both NAT SPG (NAT

[1] SESAR is comparable to NEXTGEN

SPG/42 paragraph 1.2.12 refers) and by the European Air Navigation Planning Group (EANPG/48, paragraph 4.34 refers). TRASAS held its first meeting in the EUR/NAT Office of ICAO from 2 to 3 May 2007. It was attended by 22 participants from seven States and three international organizations and it:

- reviewed and approved the proposed terms of reference of the Steering Group;
- reviewed and assessed the requirements of the airspace user community for a rational, modern, and economically viable airspace structure and ATM services;
- reviewed the work underway to enhance the Air Traffic Service (ATS) route network, using existing and future technologies, and plan for a transition towards a performance based navigation system; and
- agreed on short term, medium term and long term goals of TRASAS and established its Work Programme, including time frames, working methods and deliverables.

1.2.10 During the meeting, the aircraft operators, reiterating their statements made during the NAT SPG/42 and EANPG/48 meetings, underlined their continued need for improvements to the route structure and supporting infrastructure in the trans-polar area. It was therefore agreed that the following issues would be included in the TRASAS work programme:

a) opening of more routes and offering improved efficiency of the existing routes;

b) implementing Reduced Vertical Separation Minimum (RVSM) in the Russian Federation, China and other States;

c) improving the air navigation services coverage and hours of operations;

d) consolidating Area Control Centres (ACC);

e) developing improved ATFM tools that could be shared amongst States until target capacity was matched;

f) improving communications and surveillance in Northern Airspace;

g) ensuring airport availability for Extended Range Operations ; and

h) improving access to China and Russian Federation airspace.

1.2.11 The Group was informed that China intended to implement RVSM in all its FIRs on 22 November 2007, utilizing a metric Flight Level Allocation Scheme (FLAS) that was not compliant with the Tables of Cruising Levels specified in Annex 2 - Rules of the Air, Appendix 3. Several States at TRASAS/1 expressed concern with regard to the difficulties encountered in transitioning between four different flight level systems. Concern was also expressed by the representative of IFALPA, who indicated the Federation's strong preference for a single metric/feet conversion scheme that was globally applicable rather than the proliferation of various conversion tables. The Group noted that the Russian Federation had supported the planned Chinese RVSM implementation and that they intended to join with China in submitting an amendment proposal to Annex 2 in order to incorporate the proposed Chinese RVSM metric FLAS.

1.2.12 The Group was informed that TRASAS' main function was to coordinate various planning activities. Working groups had been established to address specific issues and, in particular a Cross Polar Trans East Air Traffic Management Work Group (CPWG) had been formed. TRASAS/1 had been provided with information on the activities performed by the CPWG since their first meeting in October 2006 and States concerned indicated that they would continue to support this initiative.

1.2.13 The Group noted that a traffic analysis had shown a steady increase in air traffic over the past five years, with an 11.8% increase in 2006. The Russian Federation expected that the traffic along the

Cross Polar Routes would increase by approximately 40% annually for some time. Therefore continuous efforts to address the capacity and route optimization issues would be necessary.

1.2.14 The Group noted that the establishment of the new ATS routes in the Russian Federation should considerably improve and increase the capacity and flexibility of the ATM system. Aircraft operators could be provided with better routes which should lead to the enhancement of the quality of the air navigation services.

1.2.15 The Group was informed that some ATFM problems related to the flights over the Arctic Ocean had been encountered. The Russian Federation indicated to the TRASAS that it was open for a constructive dialogue with its colleagues from Canada and the United States in order to reduce the existing slot-time procedures from 20 to 10 minutes.

1.2.16 The Group noted the plan to hold the second meeting of TRASAS in ASIA/PAC Office of ICAO in Bangkok from 18 to 19 March 2008.

Data Link Steering Group

1.2.17 The Group recalled that the EANPG and the NAT SPG had identified the need for convergence of data link applications between the EUR and NAT Regions. They had therefore mandated the EUR/NAT Office of ICAO with establishing a joint EUR/NAT Data Link Steering Group (DLSG), which would be tasked with developing a harmonised data link service (EANPG Conclusion 46/21 and NAT SPG Conclusion 40/7 refer).

1.2.18 It was recognised that data link was being implemented in different Regions with emphasis on local considerations which resulted in different aircraft avionics and procedures for the pilots and the air traffic controllers. Given that a considerable portion of aircraft and their crews operate globally, these differences had an impact on the safety and efficiency of international civil aviation. Aircraft would need to be equipped with a growing number data link systems and pilots would have to use different data link procedures for the same tasks as they moved from one part of the world to another. The role of the DLSG was to first halt the divergence between data link implementations and then to provide a path to an eventual single global data link system.

1.2.19 The Group was also informed that the DLSG would take into account the entire aviation community and avoid developing solutions that would prevent transparent data link operations across Aeronautical Telecommunication Network (ATN) and Future Air Navigation Systems (FANS) geographical environments for both air traffic controllers and the flight crews.

1.2.20 The Group was informed that the DLSG had reviewed the proposed draft changes to the *Manual of Air Traffic Services Data Link Applications* (Doc 9694), Part III (ADS-C) and concurred with the need for wider dissemination of this material in ICAO Planning and Implementation Regional Groups (PIRG) and non-ICAO forums to ensure further coordination. The DLSG also examined ways to influence the work of standards-producing industry groups such as the RTCA and EUROCAE so that the efforts of the DLSG were taken into account in their work. In parallel, the ICAO Secretariat would pursue ICAO participation in any future work in RTCA and EUROCAE and arrange for the presentation of the ADS-Contract (ADS-C) amendments to the first meeting of the Aeronautical Communications Panel (ACP) (Montreal, 10 to 18 May 2007).

1.2.21 The Group recalled that two ATS data link communications systems were deployed (FANS 1/A and ATN Link 2000+) with similar but non-interoperable functionalities. In order to achieve convergence, two resolutions were proposed by the DLSG. The first was the need to ensure independent development of the data link network layer separately from the high level application, such as ADS-C or CPDLC, by mutually segregating them. This would allow both the ATN and Aircraft Communications

Addressing and Reporting System (ACARS) communication services easier and faster migration to a common or converged solution.

1.2.22 The second resolution would be convergence in applications that could be progressed in two steps. The first step would be to cease evolving along diverging paths and the second would be to create convergence steps. Also, it was necessary to put in place measures to avoid further partial evolutions that were substantiated by local needs that did not take into account global harmonisation requirements.

1.2.23 Ways to establish a mechanism for coordinating convergence issues between the PIRGs working on data link implementation and other groups were evaluated. It was recognised that the process would not only necessitate ICAO involvement but would need to include non-ICAO entities. It was noted that inputs to the upcoming ICAO Assembly reflecting the above views could emphasize the importance of convergence, noting that continuing divergence may lead to reduced safety, additional costs, the loss of operational benefits, and hinder progress in moving forward with data link implementation, which needed to integrate aircraft capabilities with air traffic management.

1.2.24 On the basis of the above, the Group agreed that the following data link harmonization strategy, as proposed by the DLSG, be adopted by the NAT SPG:

- Any additional ADS-C implementation should either:

    i) utilise without change the existing Future Air Navigation Systems (FANS 1/A) DO-258A/ED-100A ADS-C, or

    ii) move to the full implementation of the common technical definition that will be defined based on relevant provisions and guidance material *(Manual of Air Traffic Services Data Link Applications (Doc 9694))* developed by ICAO and its technical bodies;

    Partial or divergent ADS-C evolutions should not be pursued, as this would continue to promote divergent paths to the detriment to the broader community.

- Any additional CPDLC implementation should either:

    i) utilise without change the existing FANS 1/A (DO-258A/ED-100A) and ATN (DO-280B/ED-110B CPDLC for ACM/ACL/AMC data link services), or

    ii) move to the full implementation of the internationally agreed common technical definition, based on *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), and other operational material as appropriate. A common technical definition might be the technical provisions for the CPDLC application (*Manual on detailed technical specifications for the aeronautical telecommunications network (ATN) based on ISO/OSI standards and protocols* (Doc 9880, First edition).

    Partial or divergent CPDLC evolutions that result in excluding messages from aircraft systems should not be pursued, as they will continue to promote divergent paths to the detriment to the broader community.

- Procedural commonalities for implementation of the above packages were considered to be essential. Regional and other implementation groups should harmonise and adopt common procedural guidance packages, rather than each region developing and promulgating unique procedures for common functions

1.2.25 In discussing the outcome, the Group noted that there were differences between the NAT and PAC implementations of CPDLC. This was mainly due to the NAT decision not to use messages that could possibly lead to confusion and could therefore introduce risk (paragraph 2.1.16 refers). The Group felt that the DLSG should take these safety concerns into account in its future work and the Secretary would ensure that the necessary coordination is carried out. The Group also felt that the emerging future communications requirements should be considered. The Group was informed that ICAO Headquarters were full partners in this activity and the Secretary of the Operational Data Link Panel (OPLINKP) had been named the Secretary of the DLSG. Finally, the Group re-iterated its support for the DLSG.

1.2.26 In endorsing the proposed policy, the Group was cognizant that NAT IMG/30 had reviewed the strategy and it was stressed that implementation plans should converge to one transparent system. The Group emphasised that participation by the NAT service providers was important in order to ensure that all positions were taken into consideration, especially as the scope of this work was expanding to be more global.

NAT SPG Conclusion 43/1 - Data Link Harmonisation Strategy

That the following strategy be used when planning for data link implementation:

a) any additional Automatic Dependent Surveillance-Contract (ADS-C) implementation:

   i) utilise, without change, the existing Future Air Navigation Systems (FANS 1/A) DO-258A/ED-100A ADS-C, or

   ii) move to the full implementation of the common technical definition that will be defined based on relevant provisions and guidance material *(Manual of Air Traffic Services Data Link Applications (Doc 9694))* developed by ICAO and its technical bodies.

   Partial or divergent ADS-C evolutions should not be pursued, as this would continue to promote divergent paths to the detriment to the broader community.

b) any additional Controller Pilot Data Link Communications (CPDLC) implementation:

   i) utilise, without change, the existing FANS 1/A (DO-258A/ED-100A) and ATN (DO-280B/ED-110B CPDLC for ACM/ACL/AMC data link services), or

   ii) move to the full implementation of the internationally agreed common technical definition, based on *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), and other operational material as appropriate. A common technical definition might be the technical provisions for the CPDLC application (*Manual on detailed technical specifications for the aeronautical telecommunications network (ATN) based on ISO/OSI standards and protocols* (Doc 9880, First edition).

   Partial or divergent CPDLC evolutions that result in excluding messages from aircraft systems should not be pursued, as they will continue to promote divergent paths to the detriment to the broader community.

c) procedural commonalities for implementation of the above packages were considered to be essential. Regional and other implementation groups should harmonise and adopt common procedural guidance packages, rather than each region developing and promulgating unique procedures for common functions.

Atlantic Interoperability Initiative to Reduce Emissions (AIRE) Partnership

1.2.27 The Group was informed that the FAA and the European Union were discussing the creation of an Atlantic Interoperability Initiative to Reduce Emissions (AIRE) Partnership. The objective of AIRE would be to:

a) hasten development of operational procedures to reduce aviation's environmental footprint for all phases of flight, from gate to gate;

b) accelerate incorporation and world wide interoperability of environmentally friendly procedures and standards;

c) capitalize on existing technology and best practices; and

d) provide a systematic approach with short, medium and long-term results.

1.2.28 The Group noted that the FAA and the European Commission plan to work with air navigation service providers, airline and industry partners on the AIRE trans-Atlantic flight demonstration initiatives.

1.3 Technology

1.3.1 The Group recalled that Inmarsat operated Classic Aero services from three Inmarsat-3 (I-3) satellites in the Atlantic Ocean Region (AOR) East, the Indian Ocean Region (IOR) and the Pacific Ocean Region (POR) and one Inmarsat-4 (I-4) satellite Flight 2 (F2) in the AOR West. Two additional I-3 satellites were also in operation offering leased services and one I-4 F1 in the IOR offers the new generation of services via Broadband Global Area Network (BGAN). In addition, there were three Inmarsat-2 satellites still in operation that were not offering aeronautical services but which could be used in the event of contingency operations. All ten Inmarsat satellites had the capability of providing global beam data link which support FANS communications services.

1.3.2 The orbital positions of the I-4 satellites would change following the successful launch and deployment of the 3rd I-4 satellite. This movement of the I-4 satellites offered opportunities for the provision of additional Classic Aero ocean regions, thus increasing the availability of communications to Aircraft Earth Stations (AES). Seven ocean regions, instead of the current four, could be made available to support Classic Aero operations. Inmarsat planned to offer Classic Aero services, in addition to the new aeronautical service Swift Broadband, via the I-4 satellites. This would enable the use of a single antenna on the aircraft for all services. The architecture created by the I-4 satellites overlying the I-3 ones provided an opportunity to ensure redundancy by enabling the capability to switch between satellites. The Group noted that to take full advantage of the I-4 satellite services, the Ground Earth Stations (GES) were being updated (paragraph 3.2.19 refers).

1.3.3 The utilisation of Classic Aero Satellite Communications (SATCOM) data link was increasing year on year, and it was well known that more advanced ATS applications for oceanic control using data link were planned. As a result, over the past years efforts had been deployed to define a process to plan for the required system capacity. During these discussions it had become evident that some additional short and medium term system improvements could also be made. Consequently, Inmarsat was in the process of bringing the key stakeholders together in a 'FANS SATCOM Improvement Team' to identify, investigate, propose and implement enhancements to the system. The Group noted that the NAT IMG would be kept informed of developments through participation in the conferences.

2. PLANNING AND IMPLEMENTATION

2.1 Report on NAT Implementation Management Group programmes

Organizational changes

2.1.1 The NAT IMG agreed that no changes to its working methods or to its terms of reference were required. It was however recognised that the NAT IMG was relying on the ACG and NAT OPS MNGs to carry out tasks between NAT SPG meetings. Furthermore, closer co-ordination was required between these groups and NAT IMG. With this in mind, it was agreed that the NAT OPS MNGs and the ACG should report to the NAT IMG on matters relating to all planning activities. The groups would still report directly to the NAT SPG on matters related to the "health" of the system. The Group tasked the NAT IMG with reviewing the terms of reference of the two groups and proposing changes to NAT SPG/44.

NAT SPG Conclusion 43/2 - Changes to the terms of reference and reporting lines of the Aeronautical Communications Group (ACG) and the NAT Operations Managers (OPS MNG)

That the NAT Implementation Management Group (NAT IMG):

a) amend the terms of reference and reporting lines of the ACG and NAT OPS MNGs to:

   i) transfer the management of the groups' tasks in relation to planning to the NAT IMG; and

   ii) ensure that the groups report directly to the NAT SPG on matters involving the "health" of the system; and

b) present NAT SPG/44 with a proposal for change.

2.1.2 The Group noted that the NAT IMG and its working groups had expressed concerns about the lack of user participation, in particular with respect to official IATA participation, in their work. In order to progress the work programmes for improvements to the efficiency of NAT airspace, it was recognised that official IATA representation was considered essential.

ATFM initiatives

2.1.3 The Group was provided with an update on the activities related to the application of ATFM measures in the EUR and NAM Regions that may affect the NAT Region. It was recalled that the relationship between continental ATFM requirements and oceanic procedures had been considered in the past The Group recalled that the remit for planning for ATFM rested with the NAT IMG and felt that the NAT OPS MNGs were best suited to follow this matter and create the necessary connection to the NAT planning structure.

NAT SPG Conclusion 43/3 - Changes to the NAT Operations Managers work programme

That the NAT Operations Managers:

a) include in their work programme issues related to Air Traffic Flow Management (ATFM); and

b) report their findings to the NAT Implementation Management Group (IMG).

Implementation of reduced horizontal separation minima

2.1.4 The Group noted that action had been taken by the NAT IMG in follow up to NAT SPG Conclusion 42/9 regarding the feasibility of using time rather than position in the formulation of clearance restrictions. It was recalled that the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM) (Doc 4444) did not currently allow a geographic restriction to be applied by specifying a time nor could a time-based restriction be guaranteed by specifying a position. As well, the existing NAT operating concept of receiving position reports at each 10 degrees of longitude did not lend itself to making such a correlation between time and position. Accordingly, the Group endorsed the proposal that the initiative was premature but that the matter should be kept open.

2.1.5 In follow up to NAT SPG Conclusion 42/2, work had been initiated to finalise plans to implement the 5 minute climb/descent minimum using Global Navigation Satellite Systems (GNSS) waypoint reports. It was noted that a comparative analysis would be used to support the safety case because this approach should provide the regulators with the necessary material to approve the procedure and it was economical and expeditious. It was also noted that efforts were being deployed to clarify the ambiguities that existed in Doc 4444 concerning the application of the 5 minute climb/descent minimum before finalising the operational procedures.

2.1.6 The Group noted that a plan of work to support the implementation of reduced longitudinal and lateral separation minima had been agreed upon. Several studies had been initiated and all ANSPs were contributing to the definition of each others' studies or were actively involved in the research efforts. To this end, the Group endorsed the need that the ANSPs make available the necessary resources to maintain the momentum of these efforts. As regards the plans for a reduction in lateral separation, the Group recalled that NAT SPG/41 (NAT SPG/41, paragraphs 2.1.13 and 2.1.14 refer) had recognized that due account must be taken of the significant issues that would be involved in insisting upon an actual application of 30NM lateral separation in the NAT Region. In addition, it was acknowledged that the application of the Gentle Slope Rules would inevitably result in track spacing as low as 25.25NM if tracks were spaced by ½ degree of longitude. With this in mind, it was agreed that, for planning purposes, the safety case for reduced lateral separation should be based on an appropriate value for a ½ degree track spacing that would accommodate all applications of the Gentle Slope Rules, provide some flexibility in the use of the type of RNP and facilitate system programming.

NAT SPG Conclusion 43/4 - Determination of an appropriate value for the safety case to support a reduction to ½ degree track spacing

That the NAT Implementation Management Group (NAT IMG) ensure that all safety analyses supporting the implementation of ½ degree track spacing use a value that accommodates the requirements of the Gentle Slope Rules for the proposed lateral spacing between tracks.

NAT Service Development Roadmap

2.1.7 It was recalled that, in follow up to the decision taken at NAT SPG/40 regarding the need to prepare a long term ATM development plan, NAT SPG/41 had been presented with a proposal that would require the implementation of RNP-4, as well as the implementation of 30 NM lateral and 30 NM longitudinal separation minima. In agreeing with this proposal, NAT SPG/41 also recalled that the NAT IMG had spent considerable time and effort toward achieving reductions in time based longitudinal separation, but that this work had not yielded the expected efficiencies or benefits (NAT SPG Conclusion 41/3 refers).

2.1.8 In carrying out the tasks associated with planning to implement RNP-4 30NM lateral and 30NM longitudinal separation in the NAT Region, the Group was informed that the NAT IMG had come to the realization that it might be premature to specify a particular RNP type in order to support the desired

lateral separation reductions or to explore only the possibility of reducing distance-based longitudinal separation. It was recalled that NAT SPG/42 had advised the NAT IMG to look for reductions in separation minima using any methods available (NAT SPG/42, paragraph 2.1.8 refers).

2.1.9 With the above in mind, the subsequent reviews carried out by the NAT IMG and its working groups determined that the NAT Service Development Roadmap should be based on the following objectives:

a) depict in a clearer fashion the agreed way ahead;

b) incorporate a linkage with rates of aircraft equipage;

c) enable the connection of the Service Roadmap to the Global Planning Initiatives (GPI) and the Global Air Navigation Plan (ANP); and

d) provide an historical reference.

2.1.10 It was noted that the Roadmap would be structured in such a way that the following six main tasks would serve as the starting points and thereafter be expanded upon:

a) reduce lateral separation;

b) reduce longitudinal separation;

c) reduce Organized Track System (OTS) penalty;

d) reduce Meteorology (MET) penalty;

e) improve system efficiency; and

f) improve or maintain current levels of safety.

2.1.11 In addition, it was noted that the Roadmap would take account of the following issues:

a) not make reference to RNP 4 30X30 NM but rather to specific reductions in lateral and longitudinal separation minima based on definable improvements to Communications Navigation Surveillance (CNS) performance;

b) be updated on the basis of cost benefit analyses completed by ANSPs concerned;

c) confirm the net benefits to be derived by changes to the air navigation system as requested by the airspace user community;

d) provide more specific information from which to develop work programmes;

e) be updated regularly to remove dated material;

f) set goals and clear paths to achieve the agreed goals;

g) represent only what has been agreed as feasible; and

h) be evaluated regularly by the NAT IMG to re-validate the underlying assumptions.

2.1.12 With regard to 2.1.11 a) above, the Group agreed that Conclusion 41/3 should be re-stated in order to provide the maximum flexibility to the NAT IMG to explore any means possible to achieve reductions in lateral or longitudinal separation minima, and that the NAT Service Development Roadmap should use an appropriate value to support all applications of the Gentle Slope Rules when planning reductions to lateral track spacing (paragraph 2.1.6 also refers).

2.1.13 In reviewing the tasks associated with the Roadmap, it was noted that the MET and OTS penalties had been highlighted (paragraph 2.1.10 c) and d) above refer). The Group agreed that additional emphasis should be put on obtaining and using more timely MET data for use by Flight Data Processing Systems (FDPS) and to assist in the design of a more efficient OTS. It was recognised that obtaining additional MET forecasts with increased temporal granularity would incur additional costs, but the efficiency of operations should be improved. As regards to the design of the OTS, the Group was informed that fewer operators were submitting Preferred Route Messages (PRM) and that, since PRMs and the MET forecast were the basic building blocks for the OTS, the operators that did submit PRMs tended to benefit he most from the OTS. The representative of IATA agreed to bring this to the attention of his membership so that they could take action.

2.1.14 The Group confirmed that the NAT Service Development Roadmap should be supported by a continuous survey of the rate of equipage and its evolution. (NAT SPG Conclusion 42/4 refers).

NAT SPG Conclusion 43/5 - Changes to the NAT IMG work programme to take account of global planning

That the NAT Implementation Management Group (NAT IMG):

a) adjust its work programme to include specific reductions in lateral and longitudinal separation minima based on definable improvements to Communications Navigation Surveillance (CNS) performance; and

b) provide the NAT SPG with regular updates.

2.1.15 Taking into account the above, the Group endorsed the NAT Service Development Roadmap, which is at **Appendix B** and further agreed that the document should be maintained electronically on the ICAO EUR/NAT web site in order to ensure easy access and to facilitate its maintenance. The NAT IMG would remain the authority responsible for approving changes and that the NAT SPG should be kept informed of developments. Finally, it was noted that the initiatives envisioned with the Roadmap would be implemented based upon the results of the supporting safety cases and cost benefit analyses (paragraph 2.1.6 also refers).

NAT SPG Conclusion 43/6 - Publication of the NAT Service Development Roadmap as endorsed by NAT SPG/43

That the:

a) NAT Implementation Management Group (NAT IMG) publish the NAT Service Development Roadmap on the ICAO EUR/NAT site as endorsed by NAT SPG/43; and

b) NAT SPG be kept informed of developments.

Data link initiatives for the NAT Region

2.1.16 The Group noted that CPDLC Phase IV[2] implementation was planned for the fourth quarter of 2007. A list of downlink messages had been identified that would not be supported because they were either considered to be ambiguous or were not appropriate for an oceanic application. The list of messages had been included in Version 15 of the Data Link Guidance Material which had been published on the ICAO NAT PCO web site. It was noted that coordinated efforts continued with the PAC Region to ensure the maximum commonality of the data link application guidance material.

2.1.17 The Group was informed that the NAT IMG was examining ways to streamline the FANS Central Monitoring Agency (FCMA). To this end, the FCMA would provide NAT IMG with an update on developments as well as a proposal for a way forward. The suggestion to meld the FCMA with the Central Monitoring Agency (CMA) had been considered and rejected because of the incompatibility of the two agencies. It was noted however that some form of financial arrangement may need to be considered in the future to provide end-to-end monitoring of the data link communications infrastructure (paragraph 3.2.18 refers).

NAT Region Communications Strategy

2.1.18 In follow up to NAT SPG Conclusion 42/18, the development of a NAT Region Communications Strategy had begun on the basis of the work that had already been started by the High Frequency (HF) Regression Task Force and taking into account the NAT Service Development Roadmap. The strategy would be based on the need for communication services to be provided in the near, medium and long term in order to support the evolving requirements of ATM. It would embrace all aspects of CNS/ATM as the communications system was considered to be the backbone of the entire air navigation system.

2.1.19 The need for defined timeframes and avoidance of unnecessary equipage was deemed essential from the airspace users' point of view. Furthermore, voice communication should remain available as an essential complement to data link. There were however concerns expressed about the potential single point of failure scenario when considering SATCOM voice as the sole means of maintaining voice communications if data link was the primary means of communication. It was noted that the strategy was divided into two parts; the first dealing with rising HF traffic and the second addressing the long term communications strategy.

2.1.20 In considering the first iteration of the Strategy, the Group endorsed the NAT IMG proposal to seek clarification on the HF planning assumptions (NAT SPG Conclusions 41/6 and 41/7 refer). For example, it appeared that the assumption concerning the reduced levels of HF traffic may no longer be valid (paragraph 3.2.10 refers). Other assumptions may also need to be updated, in light of more up to date information and further considerations by the NAT SPG. It was recognised that the update to the assumptions would need to be multi-disciplinary and would require the expertise of the NAT SPG groups, such as the ACG, as well as the NAT EFG and the NAT IMG.

2.1.21 Taking account of the agreed new method to track progress of NAT SPG Conclusions (paragraph 4.1.10 refers), the Group agreed to direct the NAT IMG to review NAT SPG Conclusions 41/6 and 41/7 and to provide a recommendation to NAT SPG/44 for a revised, consolidated policy Conclusion regarding the planning assumptions to be used for further development of the NAT Region Communications Strategy. The NAT SPG would then be able to update the policy from time to time as circumstances dictated.

[2] CPDLC Phase IV: With the exception of certain agreed CPDLC messages, Phase IV was the full implementation of the defined CPDLC message set.

NAT SPG Conclusion 43/7 - Planning assumptions for the development of the NAT Region Communications Strategy

That the NAT Implementation Management Group (NAT IMG):

a) review the assumptions detailed in NAT SPG Conclusion 41/6;

b) review the policy decision detailed in NAT SPG Conclusion 41/7; and

c) report to NAT SPG/44 with a revised, consolidated draft policy Conclusion reflecting the recommended assumptions and policies to be considered when further refining the NAT Region Communications Strategy.

Requirement to maintain HF VOLMET

2.1.22 The Group noted that the NAT IMG had examined the continued need for the requirement for HF VOLMET in the light of the gradual implementation of data link technologies. As regards the necessity for HF VOLMET, it was recalled that this stemmed directly from the needs of the airspace users and was included in the NAT ANP and Facilities and Services Implementation Document (FASID). With this in mind, the ACG had reviewed this matter and it was felt that the issue needed to be carefully considered as it could potentially have a significant impact on the voice network operations. The Group noted that the project to replace the existing VOLMET system at Ballygirreen had been suspended pending a decision by NAT SPG on the continuing requirement for HF VOLMET. The Member for Canada indicated that they had recently replaced their HF VOLMET system.

2.1.23 The Group was informed that data link would be a better option for delivering meteorological information, but since the percentage of data link equipped aircraft within the major traffic flows was, at the most 50%, a significant amount of aircraft would be unable to receive the meteorological information via data link and if those messages had to be transmitted over HF voice, the network would not have the capacity to cope.

2.1.24 The Group was informed that a very limited survey of the members of the IATA NAT/NAM Regional Coordinating Group as to their current and planned usage of VOLMET had been carried out. The answers varied greatly, ranging from “no use of VOLMET” to “routine use of VOLMET”. It was also pointed out that VOLMET represents the primary means of receiving SIGMETs for the region for many users. In light of the fact that there was still a significant percentage of the user community that make routine use of VOLMET services, IATA recommended that for the near future, VOLMET broadcasts be continued.

2.1.25 The representative for IBAC reported on the almost identical outcome of a similarly limited survey of business aviation. The Group was also informed of the International Council of Aircraft Owner and Pilot Associations (IAOPA) view of retaining HF VOLMET for as long as practicable.

2.1.26 Considering the limited information that was available from the user community, IATA and IBAC proposed to delay any decision regarding the future requirement for HF VOLMET and stated that they would submit a proposal to the next meeting of the NAT IMG. It was also pointed out that the requirements of Annex 3 to provide meteorological data to aircraft would still have to be met and that this could be problematic if the HF VOLMET service was discontinued. Based on the above, the Group felt that no action was required for the time being but that the NAT IMG should review the requirement based on the airspace users requirements and the ability to meet the requirements of Annex 3. If it was determined that the HF VOLMET requirements needed to be modified, the NAT IMG would initiate an amendment to the NAT ANP and FASID.

NAT SPG Conclusion 43/8 - Review the requirements for HF VOLMET

That the:

a) NAT Implementation Management Group (NAT IMG) review the requirement for HF VOLMET based on user requirements and the need to ensure that the Annex 3 requirements are met; and

b) Air Navigation Plan (ANP) and Facilities and Services Implementation Document (FASID) be amended if required.

The use of SATCOM voice for routine ATS communications

2.1.27 In follow up to NAT SPG Conclusion 40/8, work continued on developing a roadmap for the implementation of SATCOM voice for routine ATS. Canada had completed its SATCOM voice proof of concept trials and the results were promising in that SATCOM voice was able to support routine ATS operations. Furthermore, over the last two years a Satellite Voice Task Force (SVTF), implemented by Inmarsat under the auspices of the NAT IMG, had defined the required technical modifications and operational measures to conduct a trial for the use of Classic Aero SATCOM for routine ATS communications. The major tasks involved the introduction of enhanced security measures for ground to air calling, automated dialling systems at radio facilities and the development of appropriate air crew and operator guidance material.

2.1.28 Taking as a basis the lessons learnt during the Canadian trial and the upgrades to the communications system, a trial involving five airlines and all five HF radio stations began on 1 May 2007. The trial, which was planned to last 2 to 3 months, would provide the data to carry out a further assessment of the efficacy of SATCOM voice to support routine ATS. Initial results indicated that it was running smoothly, albeit some radio stations had had no calls. It was noted that NAT SPG/44 would be provided with an update and, if the trials were conclusive, a recommendation would be made on the way forward.

NAT IMG Cost Effectiveness (NICE) Group

2.1.29 The Group was informed that the NICE Group continued to collect data in order to keep all the data bases updated so that the facilities could be used when required. However, they were encountering difficulties collecting data from automated position reports. The NAT SPG re-affirmed its support for this activity and noted that the NICE group would be given access to the necessary data to ensure that the data bases were updated.

NAT Programme Co-ordination Office (PCO)

2.1.30 The Group was informed that the United Kingdom had continued to support the ICAO NAT PCO web site, which was providing an important tool for the working groups as it gave them an opportunity to carry out a significant amount of work between meetings. It also provided a convenient repository for meeting documentation that was accessible to those concerned. However, because of internal changes, the United Kingdom would no longer be able to support the web site after 31 August 2007.

2.1.31 As a result of the United Kingdom decision, beginning in July 2007, the EUR/NAT Office of ICAO would gradually take over the day-to-day management of the web site and coordination would be carried out between the NAT PCO and the EUR/NAT Office of ICAO in order to ensure continuity of the services provided and a smooth transition. The intention was to complete the transfer by January 2008, fully integrating the web site into the ICAO EUR/NAT site. This might eventually entail a change of the address but this would be transparent to the user. The NAT SPG and other web site users would be informed of developments as they occurred.

2.1.32 The NAT SPG expressed its appreciation to the United Kingdom for having developed the web site and maintained it for the last several years.

Civil military coordination

2.1.33 The Group was informed that the NAT IMG had put in place a mechanism to co-ordinate with military authorities from time to time in order to clearly determine their ATS requirements. This mechanism had been used to review issues related to altitude reservations and formation flights in RVSM airspace.

2.2 NAT Economic and Financial Group

2.2.1 Since NAT SPG/42, the NAT EFG had concentrated on developing of a vision for the future financing and funding of air navigation services in the NAT Region, completing the summary template of financial information on services provided on the NAT, discussing the possible harmonization of charges based on a flat fee or distance related formulae, examining differential charges and incentives for air navigation services, monitoring the financial aspects of replacing the Strumble Height Monitoring Unit (HMU) and keeping up to date on economic issues stemming from the Single European Sky and the outcome of the discussions regarding proposed changes to the Danish and Icelandic Joint Financing Agreements.

Development of a vision for the future financing and funding of air navigation services in the NAT Region

2.2.2 The Group noted the NAT EFG's comments concerning the discussions held during the IATA workshop which took place in conjunction with NAT EFG/13 and, in particular, the request for the development of a future vision regarding the provision of air navigation services in the NAT Region. The Group recognized that traditionally the NAT EFG provided advice on the economic and financial implications of proposed initiatives. It also recognised that the NAT Service Development Roadmap identified a requirement that any changes to the NAT air navigation services would consider the operational, economic and financial implications. The Group noted the following list, identified by the NAT EFG, of possible areas where changes in service provision or service charges might provide efficiency or economic benefits:

a) whether a harmonized incentive strategy could accelerate data link equipage;

b) whether the MET charges were equitably distributed between aviation and other users, based on the relative benefits to each group;

c) whether a harmonized charging scheme for the NAT Region would be possible; and

d) whether a single charge per NAT crossing would be possible.

2.2.3 The Group did not support the creation of a task force comprised of economic and operational expertise for the purpose of developing possible changes to the NAT concept of operations. It did, on the other hand, encourage the NAT EFG and the NAT IMG to co-ordinate closely with each other to ensure that the financial and economic implications of proposed changes were correctly captured, and to enable a free exchange of ideas regarding possible areas where efficiency benefits could be realised.

Convening of the ICAO Economic Conference

2.2.4 The Group noted that an ICAO Economic Conference was being planned for September 2008. Among the topics to be discussed was the global harmonization of charging schemes and of incentive schemes. The Group noted that the NAT EFG had agreed that it was important that the NAT perspective be represented at any conference where decisions in this regard might be made. The Group agreed with the

NAT EFG's recommendation that there be input from the NAT Region. The Secretary agreed to coordinate with ICAO Headquarters to determine whether and how inputs from the NAT Regional Planning mechanism could be considered at the planned conference and to inform the appropriate Groups. The Group also agreed that all inputs to the Conference relating to the NAT Region should be co-ordinated with the NAT SPG prior to submitting them to the Secretariat.

NAT SPG Conclusion 43/9 - NAT Region participation to participate in the ICAO Economic Conference

That the Regional Director of the ICAO EUR/NAT Office carry out the necessary co-ordination with ICAO Headquarters to ensure inputs from the NAT Region are submitted to the ICAO Economic Conference.

Possible harmonization of charges based on flat fee or distance related formulae in the NAT Region

2.2.5 The Group noted the outcome of the discussions held at the IATA workshop with the airlines on 18 October 2006 (NAT EFG/13 paragraphs 2.1 to 2.3 refer). In particular, there had been a request by IATA that a common charging formula, preferably based on a flat charge or that a distance related charge be levied for services in the NAT region. The Group agreed that fees based on weight related charge should not be excluded from any analysis. The Group noted the development of a NAT Fee Analysis Model developed by the United States to analyse various charging mechanisms and that the NAT EFG would be keeping track of this activity.

2.2.6 The Group noted that there might be challenges to implementing a harmonized NAT Region charging formula, especially by those States who were part of the EUROCONTROL multi-lateral agreement as well as the European Union. It was also noted that the particular traffic flows and aircraft mixes in each FIR were significant factors in determining whether a flat fee or distance-related formula was the most equitable. The Group endorsed the NAT EFG's decision to keep this item on their work programme pending the results of the NAT Fee Analysis Model (paragraph 2.2.18 below refers).

Differential charges and incentives for air navigation services

2.2.7 The Group noted that all NAT EFG Members had confirmed their ability to offer differential charges, multi-tariff charges and incentives within their regulatory frameworks, although some types of incentives, such as providing direct payments or equipment to particular operators or classes of operators might not be allowed.

2.2.8 The Group noted that IATA's formal position for incentives was as follows:

a) incentives must be available to all operators;

b) all incentives should be published and transparent;

c) incentives should not distort competition;

d) incentives must be time-limited (in order to provide incentives to those who equip early, prior to a mandate);

e) incentives cannot be cross-subsidized by other charges; and

f) incentives should be cost-related (i.e. it must be demonstrated that the new service is more cost efficient than the existing service).

2.2.9 The Group noted the NAT EFG statement that it might not always be the case that an existing service would be completely replaced by a new service and that in such cases placing a time limit on incentives might not be possible. The Group agreed with the NAT EFG recommendation that incentives must support an increase in capacity and cost efficiency while maintaining or improving the safety level, otherwise there would not be a business case for making the proposed change.

Support to the development of the NAT Region Communications Strategy

2.2.10 The Group noted the action taken by the NAT EFG in follow up to NAT SPG Conclusion 42/18 whereby a NAT Region Communications Strategy would be developed. The Group endorsed the proposal that the NAT EFG assist in the effort by developing various economic and financial scenarios resulting from a number of different levels of HF service. In doing so, it was recognised that close co-ordination would have to take place between the NAT EFG and the NAT IMG to ensure that the financial and economic implications associated with the NAT Region Communications Strategy were clearly identified and addressed. Furthermore, it recalled that the Communications Strategy provided for the NAT EFG's early input into the decision making process (paragraph 2.1.20 refers).

Financial aspects of replacing the Strumble Height Monitoring Unit (HMU)

2.2.11 The Group was advised that the United Kingdom had submitted an offer to ICAO under the current funding agreement to replace the Strumble HMU at a cost of GBP 2.95 million. ICAO had written to the States that were signatory to the agreement regarding their contributions and to advise that the operating and capital costs would be recovered via the current RVSM charge. In addition, coordination had taken place with ICAO to ensure a timely response in support of the planned June 2008 operational date.

2.2.12 The Group recalled that the United Kingdom intended to launch a competitive bid for the acquisition of the replacement of the HMU at Strumble (NAT SPG Conclusion 41/ refers) and that the capital costs associated with the replacement of the HMU at Strumble would be recovered from the users over the estimated useful life of the equipment, using the existing RVSM cost recovery mechanism. Furthermore, NAT SPG/42 had noted that the United Kingdom would provide a breakdown of the costs needed to ensure the continued reliable service of the HMU at Strumble and that ICAO would coordinate with the States that are signatory to the Arrangement on the Joint Financing of a North Atlantic Height Monitoring System.

2.2.13 ICAO was notified by a letter dated 4 April 2007 that the United Kingdom had estimated the cost for the renewal of the HMU at Strumble at GBP 2,950,000, that the contracting process should start as soon as possible and that the new system should be operational in June 2008. In accordance with Article III, paragraph 4 of the Arrangement, the funding for any replacement or new HMU equipment as determined by Canada, Iceland, Ireland, Portugal and the United Kingdom would be shared in accordance with their respective share of total NAT traffic for the latest calendar year available. With this in mind, a letter was sent to Canada, Iceland, Ireland, Portugal and the United Kingdom on 10 April 2007 asking for a written confirmation that they agreed to participate in the financing of the replacement of the HMU at Strumble at a total estimated cost of GBP 2,950,000. Written confirmation responses had been received from the United Kingdom and Ireland. Information indicated that written confirmations would be received from Iceland and Portugal shortly. Canada had provided a written confirmation with some conditions. The Group reviewed NAT SPG Conclusion 41/9 and determined that nothing had changed to alter the decision taken at that time. The Group noted that, as soon as written confirmations had been received from all signatories, the United Kingdom would be advised to proceed with the procurement.

Economic issues stemming from the Single European Sky

2.2.14 The Group noted that the NAT EFG had been provided with an update regarding activities stemming from the SES and SESAR. The Group was advised that the SES charging regulations would come

into effect this year, but that the operational aspects had not yet been approved by the EUROCONTROL member States. In addition, there was some uncertainty on how the regulations would be applied to EUROCONTROL member States who were not members of the European Union. Although SESAR and the SES Regulations theoretically did not include the NAT Region, the Group agreed that there would likely be financial implications for the NAT Region stemming from the various SESAR Work Packages and SES Mandates. The Group noted that the NAT EFG would continue to monitor developments (paragraph 1.2.5 refers).

Proposed changes to the Danish and Icelandic Joint Financing Agreements

2.2.15 The Group noted that the NAT EFG had been provided with a presentation regarding proposed amendments to the Denmark and Iceland Agreement based on a proposed new fee structure. The changes had been requested by IATA and it was indicated that the charge should provide a balanced approach to the calculation of user charges. The changes, which related to the charges for air traffic services and communications services, provided for 100% cost recovery. If accepted by the ICAO Council, the proposed amendments would be circulated to the Signatory States for their approval.

2.2.16 The representative from IBAC informed the Group that IBAC was opposed to the adoption of a changed formulae which did not take account of aircraft weight.

The future work of the Group

2.2.17 The Group noted the NAT EFG discussions related to the possible impact of the Open Skies Agreement. In particular, it was noted that it appeared likely that a significant increase in NAT traffic was possible, along with significant changes to traffic flows and fleet composition. The Group agreed that an analysis of possible economic and financial impacts of the Open Skies Agreement was needed and should therefore be added to the NAT EFG work programme. In addition, the Group noted the recommendation that the NAT TFG be requested to examine the potential impact of the Open Skies Agreement on NAT traffic (paragraph 2.3.5 refers).

2.2.18 The Group endorsed the following future work programme:

a) complete the cost comparison of service provision in the NAT Region;

b) assist the NAT IMG with the financial implications of its work;

c) analyse financial and cost recovery issues related to regional safety related initiatives;

d) oversee the financial aspects of replacing the Strumble HMU;

e) analyse possible harmonisation of charging formulae in the NAT Region;

f) review the outcome of the Joint Support Committee of the proposed changes to the Denmark and Iceland Agreement; and

g) analyse the financial and economic impact of the Open Skies Agreement on the NAT Region.

2.3 NAT Traffic Forecasting

2.3.1 The Group was informed that the Open Skies agreement between the United States and the European Commission had been signed on 30 March 2007. This was the first stage of a comprehensive air services agreement with an ultimate objective of creating a fully liberalised open aviation area covering the

United States and the European Union. The first stage agreement would come into force on 30 March 2008. The negotiations for a second stage (which would address further liberalization, security and the environment, among other subjects) must begin a maximum of 60 days later (30 May 2008), or there was a risk of the agreement being suspended.

2.3.2 The Open Skies agreement lifted existing restrictions on routes and fares and clarified marketing issues. It would allow EU airlines to fly from any European city to any American city, regardless of their home country, and removed restrictions on United States' airlines flying to EU airports.

2.3.3 The expected effects of the agreement were considered to be up to 12 billion EURO in economic benefits and up to 80,000 new jobs. In addition, some analysts believed there was a possibility of an additional 26 million passengers on transatlantic flights over a period of 5 years. This compared with existing annual traffic of just under 50 million (2007 figures). At the end of the fifth year, this would mean that the market could be 34% higher with the agreement than without the agreement. The resulting growth in the cargo market was expected to be from 1 to 2%.

2.3.4 It was recalled that the most recent NAT TFG report considered that a successful Open Skies agreement between the United States and the EU could result in differential market growth and could influence the types of aircraft being used in the North Atlantic (NAT TFG/35 Appendix A, paragraph 5.3 refers). It was noted that at the time of that report, it had not been possible to determine the likely effects this could have on the overall number of flights. It was also recalled that the NAT TFG had expressed concern about the possible impact the implementation of the Open Skies Agreement could have on NAT planning timelines.

2.3.5 The successful completion of the first stage of the Open Skies agreement had resulted in further information becoming available which would enable the NAT TFG to refine their previous forecasts. For example, some operators had indicated their intention to enter the North Atlantic market and a number of aviation analyses had become publicly available. Given the availability of more up to date information and the need to plan as soon as possible for changing air navigation service requirements, the Group agreed that the NAT TFG should meet in advance of their normally scheduled meeting in the spring of 2008 to consider these recent developments and report their findings to the NAT IMG. It would not be possible for the NAT TFG to collect all the necessary data to update the NAT traffic forecasts, including possible changes to the aircraft fleet and city pairs. Therefore, in addition to the urgent meeting that should be held in the fall, the NAT TFG should also meet at its regularly scheduled time in the spring of 2008. It was stressed that the NAT provider States should ensure that the necessary resources to support the NAT TFG would be made available.

2.3.6 The Group also felt that the implementation of the Open Skies Agreement could lead to some major structural changes such as changes to the fleets that may have an effect on data link equipage rates, and traffic patterns, including a possible change to the existing primarily diurnal flow. Of grave concern was the possible increase in safety risks as a result of the arrival of new operators with little oceanic experience. The Group agreed that this issue needed to be examined in order to begin planning to accommodate these changes. Therefore, it was agreed that the NAT IMG, on the basis of the inputs from the NAT TFG, should scope the issues and adjust the work programmes of its contributory bodies as required.

NAT SPG Conclusion 43/10 - Update to the NAT traffic forecasts to take account of the coming into force of the Open Skies Agreement

That:

a) the NAT Traffic Forecasting Group (NAT TFG) be urgently convened to update the NAT traffic forecasts as a result of the coming into effect of the Open Skies Agreement signed by

the United States and the European Union and report their findings to the NAT Implementation Management group (NAT IMG);

b) the NAT TFG meet again at its regularly scheduled time of spring 2008; and

c) on the basis of the inputs from the NAT TFG, the NAT IMG adjust the work programmes of its contributory groups.

2.3.7 The Group noted that France would present a working paper to NAT IMG/31 regarding this issue that would recognize the domains that would need to be discussed.

2.4 Other issues

Decommissioning of Akraberg Non-Directional Radio Beacons (NDB)

2.4.1 In follow up to NAT SPG Conclusion 42/7, which requested that Denmark and Portugal review their requirements for NDBs to support international civil aviation, the Group was presented with information regarding the NDBs located in the Faroese Islands. Denmark had evaluated the operational need for the three existing NDBs, namely Myggenaes (MY), Nolsoe (NL) and Akraberg (AB). It was determined that only Myggenaes and Akraberg were used for the international civil aviation. Nolsoe had been taken out of operation on 7 June 2007. Akraberg NDB and Myggenaes NDB supported ATS routes G11 and UM125 and Denmark was of the opinion that the requirement for two NDBs that closely located was not required and therefore proposed that Akraberg NDB be withdrawn.

2.4.2 To support the removal of the Akraberg NDB, Denmark proposed to realign ATS route G11 (SIDER – AB – MY) to route GONUT – MY. Additionally, it was proposed to realign UM125 (SUM – SIDER) to SUM – GONUT. The realignment of "The Blue Spruce Routes" was expected to be documented by the Secretariat and reflected in the MNPS Airspace Operations Manual and the NAT Region Guidance Material (NAT Doc 001).

2.4.3 Furthermore, it was pointed out that, in co-operation with the airport authority at Vagar Airport, Denmark decided to use Myggenaes NDB only for the instrument approach procedures. In addition, Naviair, the responsible ANSP, had carried out a safety assessment showing that the decommissioning of Akraberg and Nolsoe NDBs would not affect the overall safety of navigation. The Danish Civil Aviation Administration (CAA) concluded that the safety assessment conducted was sufficient to prove that the withdrawal could be carried out. Finally, the Group was informed that the Danish CAA had conducted a hearing amongst Danish users, the Icelandic CAA and ISAVIA, the Icelandic service provider, who also supported the withdrawal of Akraberg NDB. The Member for Denmark also indicated that coordination would be carried out with States concerned before publishing changes to the ATS route network. On the basis of the information presented, the Group endorsed the decommissioning of the NDBs and agreed that the NAT FASID be amended accordingly.

NAT SPG Conclusion 43/11 – Withdrawal of Akraberg Non-Directional Radio Beacon (NDB)

That the Regional Director of the ICAO EUR/NAT Office initiate, on behalf of Demark, a proposal for amendment to the NAT Facilities and Services Implementation Document (FASID) Part IV, to remove the requirement for Akraberg NDB.

2.4.4 The Member for Portugal informed the Group that the requirement for NDBs in Santa Maria was under review and NAT SPG/44 would be informed of the outcome.

NAT Region Volcanic Ash Contingency Plan

2.4.5 The Group was provided with information concerning the experience gained from the recent volcanic ash exercises that had been carried out in the EUR Region that had focussed on testing the information distribution by meteorological and NOTAM services. A number of deficiencies were discovered and mitigations developed. Given the problems that were revealed, Iceland agreed to be a focal point for developing a NAT Region exercise. This exercise would take account of the lessons learned from the EUR Region exercises and the results would be used to update the NAT Region Volcanic Ash Contingency Plan.

2.4.6 The results of the daily volcano eruption simulation carried out by Iceland had shown that, depending on the weather at the time, a volcanic cloud could have an extremely disruptive impact on aviation in the NAT Region, to the point whereby large parts of the airspace would need to be closed. This reinforced the requirement for mass turn back procedures and the need to develop a robust NAT Region Volcanic Ash Contingency Plan.

2.4.7 It was noted that a NAT Region ATM-centred exercise was planned for September 2007 and a similar one was planned for the EUR Region in early 2008. A combined inter-regional exercise would be planned thereafter. The NAT SPG would be kept informed of the outcome.

NAT Region Contingency Plan

2.4.8 In follow up to NAT SPG Conclusion 42/8, work had begun to update the NAT Region Contingency Plan. To finalise the task, all ANSPs would need to review the draft document. The update should be completed by the last quarter of 2007, at which time the document would be issued as Version 5.0 and all subsequent changes would be affected through the Secretariat in order to ensure that the appropriate coordination had been carried out.

2.4.9 Concerning the availability of the document to the public at large, the Group felt that consultations were required within administrations before a decision could be made. The final product would be presented to NAT SPG/44 for endorsement.

West Atlantic Route System (WATRS) plus route structure redesign and lateral separation reduction

2.4.10 The Member for the United States presented information concerning the FAA plans to implement changes to the WATRS area. The proposed changes, referred to as “WATRS Plus Route Structure Redesign and Lateral Separation Reduction” or “WATRS Plus”, affected both the CAR and the NAT Regions, namely the Atlantic portion of the Miami Oceanic Control Area (OCA), the Control Area (CTA) of the San Juan FIR and the WATRS area itself. In addition, New York Oceanic airspace outside of WATRS could be used as transition airspace where reduced lateral separation could be applied between appropriately authorized aircraft.

2.4.11 As part of its efforts to coordinate project plans and policies to improve the service level in the New York OCA and parts of the CAR and NAM Regions, the Group was informed that the United States had worked with the ICAO EUR/NAT and the North American, Central American and Caribbean (NACC) Regional Offices to provide detailed inputs to the appropriate NAT and CAR working groups to revise the appropriate ICAO documents. In addition, in September 2006 and May 2007, the ICAO NACC Regional Office and the FAA convened the NAT/CAR ATS Routes Working Group to progress work on the initiative.

2.4.12 The Group was informed that NAT IMG had reviewed the proposal to change New York OCA and had endorsed the plan, including the required proposal for amendment to the NAT *Regional Supplementary Procedures* (SUPPs). As regards flight planning requirements, the Group noted that the convention used in other parts of the world had been proposed for use in the NAT Region, namely including

the letter R followed by the letter Z in Item 10, the equipment Field, of the Filed Flight Plan (FPL) and including the annotation NAV/RNP10 or NAV/RNP4 in Item 18, the Other Information Field, of the FPL as appropriate. The Group endorsed this approach.

2.4.13 The Group was cognizant that it had to complete all tasks associated with this project, including endorsing the draft proposal for amendment at this meeting as the planned implementation date was 5 June 2008. On the basis of the above and taking account of the implementation schedule, the Group endorsed the draft proposal for amendment to the NAT SUPPs which is at **Appendix C**.

2.4.14 In concluding its discussion on the WATRS Plus project, the Group recalled NAT SPG Conclusion 42/2 and noted that one amendment proposal package, that included both the NAT and CAR Regions, would be circulated to all concerned. The NACC Office of ICAO would be the focal point for processing the proposal for amendment.

NAT SPG Conclusion 43/12 - West Atlantic Route System (WATRS) Plus route structure redesign and separation reduction

That the:

a) NAT SPG support the endeavours of the United States to improve the efficiency of the WATRS area; and

b) Member for the United States make arrangements, within his administration, to process the proposal for amendment of the NAT *Regional Supplementary Procedures* (SUPPs) through the North American, Central American and Caribbean (NACC) Office of ICAO.

3. AIR NAVIGATION SYSTEM PERFORMANCE REVIEW

3.1 Review of system safety performance

SCRUTINY MATTERS[3]

3.1.1 The Group recalled that the SMCG had evolved from the former Scrutiny Working Group (NAT SPG Conclusion 40/19 refers).

3.1.2 It was noted that the SMCG, in the context of its scrutiny tasks, had considered the following subjects:

a) conclusions of NAT/SPG42 regarding navigational performance in the NAT Region, and a review of subsequent progress;

b) vertical navigation performance in the NAT Region during the period 1 January 2006 to 31 December 2006;

c) lateral navigation performance in the NAT Region during the period 1 January 2006 to 31 December 2006; and

d) additional proposals to improve the observed standard of navigational performance in the NAT Region.

[3] For the detailed discussions and analysis of vertical and lateral navigation performance, reference should be made to the report of the SMCG which had been presented to NAT SPG/43.

The Vertical navigation performance achieved in the NAT Region

3.1.3 Altitude deviations of 300ft or more received by the CMA were studied by the Group in order to determine any trends in the operation of aircraft in the NAT Region which may have resulted in vertical errors. The CMA had recorded 80 (60*[4]) reports of risk bearing altitude deviations in MNPS airspace. Aircraft technical occurrences, such as those caused by poor estimation of air temperature or turbulence, accounted for 16 (11*) of these deviations, while of the remainder 61 (50*) were directly attributable to crew (31) or ATC (30) action.

3.1.4 The scrutiny process had highlighted the following as the major causes of risk bearing errors during 2006:

a) ATC co-ordination errors (including Automated Data Transfer errors) (31 events accounting for 372 minutes at un-cleared level, compared with 20 events in 2005);

b) non-compliance with an ATC clearance or restriction (28) (20*) of which 4 (16*) resulted in entry to oceanic airspace at an un-cleared level (The total time at un-cleared level was 196 minutes); and

c) turbulence, ambient temperature and aircraft technical defects (15) (11*) (The total time at un-cleared level was 34 minutes).

3.1.5 It was noted that the number of aircraft reported as crossing an oceanic boundary at an incorrect level had continued to increase and had accounted for 30 (22*) of the 59 (36*) events in (a) and (b) above. There had been a notable reduction in the instances of aircraft failing to request climb/descent to oceanic entry level, which has for a number of years been a major source of concern. The Group attributed this to a sustained effort in aircrew education via a number of media and an improved awareness of the issue within domestic ATC units. This success had, however, been more than countered by the marked increase in the instances of errors of ATC inter-centre co-ordination noted above.

3.1.6 Instances of misinterpretation of CPDLC data by crews continued to be noted with concern. There was a degree of unfamiliarity with the CPDLC conventions leading to misunderstanding of the printed information. The Group recommended that the profile of this issue be addressed by user groups to mitigate errors of this type. The presence in a CPDLC conditional clearance of the "by" or "at" terminology continued to underlie some of the more serious Large Height Deviations (LHD). The absence of a CPDLC message set for the express purpose of cancelling a previously issued clearance is an issue which the Group felt was worthy of resolution, while in CPDLC usage RECVD means "ACCEPTED" and implies understanding and compliance whereas this may not be the case in the cockpit.

3.1.7 While it was understood that most ambiguities might be addressed by improvements to training, the Group agreed that this was an area where the potential for confusion was likely to persist unless action was taken.

3.1.8 Reports of non-adherence to restrictions in clearances continued to be received by the CMA. Although reported by all Oceanic Area Control Centres (OAC) the majority of such events were reported by Santa Maria, where pilot confusion between similar north and west co-ordinates has been observed. To mitigate this, Santa Maria was introducing a change to their conditional clearance format whereby the relevant meridian or latitude would be preceded in the clearance by the word "longitude" or "latitude" as appropriate.

[4] Figures in brackets (*) refer to 2005

3.1.9 The practicability of establishing a short-term ADS Contract to facilitate Air Traffic Control (ATC) monitoring of adherence to conditional clearances was examined. The Group agreed that the NAT IMG give consideration to such a system to determine the effectiveness of the practice.

3.1.10 With regard to instances of poor co-ordination between adjacent OACs and ACCs this continued to be particularly apparent at the Madrid/Shanwick/Santa Maria interfaces. The inclusion of a representative from Brest ACC in the SMCG from 2003 had been most valuable in reducing in occurrences at the interface with Shanwick and this could also be the outcome of the participation of Spain in the work of the SMCG. No participant having been nominated from Madrid, the Group agreed that NAT SPG Conclusion 42/13 remained extant.

3.1.11 Instances continued to be observed of, mainly International General Aviation (IGA) aircraft flight planning at unrealistic levels, and then failing to achieve or maintain these levels when cleared accordingly. For commercial operations this had dispatch implications as well as crew briefing issues therefore the likelihood of flight planning unrealistic levels was less. In the IGA arena, issues of poor aircraft performance were frequently observed as were instances of late advice to ATC when difficulty was experienced in achieving a cleared flight level. On occasions, acceptance of a higher than optimum flight level where preferred levels were fully occupied may be the only way a non-stop flight could be achieved; however, this was considered poor airmanship and may lead to Airborne Collision Avoidance System (ACAS) encounters with aircraft at adjacent levels. The Group felt that the providers of computerised flight planning services could, in certain cases, improve their products to better reflect the performance of the aircraft.

3.1.12 The Group noted with appreciation the participation in their activities of a business jet pilot, who was also chairman of the IBAC Oceanic Standards Task Force which was supported by both the CMA and the SMCG. The task force was working to improve navigational standards of business/IGA aircraft in oceanic airspace generally and the NAT Region in particular. The Group expressed its gratitude to IBAC for providing additional pilot participation to the SMCG.

Lateral navigation performance accuracy achieved in the NAT Region

3.1.13 The Group completed a scrutiny of observed Gross Navigation Errors (GNE) in the NAT Region and found that a total of 33 (26)* errors were reported during the period under review. Of these errors, 13 (8)* occurred outside Minimum Navigation Performance Specifications (MNPS) airspace and were classified as Table “Charlie” errors. From the remaining 20 (18*), 17 (15*) were not eligible for inclusion in the risk analysis as defined at NAT SPG/17 (amended by NAT SPG/23) and were classified as Table “Bravo” errors. The remaining 3 (3)* errors were classified as Table “Alpha” errors.

3.1.14 The number of reported errors in MNPS airspace compared with the previous 12 month period (2005) again increased. It was noted that the overall number of GNEs in the whole NAT Region had increased by seven compared with the previous period. Overall, the effect of the reported GNEs in 2006 produced little change in the estimated lateral risk compared with 2005.

3.1.15 In accordance with monitoring procedures, follow-up action had been taken for any reported error in excess of 50NM. The Group noted that this had to be undertaken for 31 of the 33 reported occurrences. The Group also noted that action had been taken by OAC to contain the number of GNEs through timely intervention to prevent incorrect routing. During the monitoring period, Gander, Shanwick, and Reykjavik OACs advised the CMA of 136 (147*) occasions when action was taken to prevent a GNE. The Group noted that this was 11 less than reported during the previous 12 month period. The following information was extracted from the available data:

a) 111 (114*) cases of crew error, or probable crew error, including 80 (92*) where a filed flight plan route was followed instead of the cleared route;

b) 12 (29*) cases considered to be attributable to ATC or clearance delivery operator error;

c) 3 attributable to HF communications difficulties; and

d) 0 (4) attributable to flight dispatch errors.

3.1.16 The overall number of reported ATC interventions was slightly less than in the previous reporting year although the number of errors attributable to aircraft operating crew remained broadly similar.

3.1.17 With regard to the application of 10 minutes longitudinal separation, it was noted that the CMA had received 12 (9*) reports of erosions of longitudinal separation in excess of three minutes.

Further recommendations to improve the observed standard of navigational performance

3.1.18 In considering the methods whereby the observed standards of navigational performance might be improved, account was taken of the lessons derived from the review of navigation performance reported above and the ensuing discussions of the Group. The Group noted that CPDLC re-clearances were the source of a significant number of errors, in both the lateral and vertical dimensions. Use of the term "re-clearance" at the start of the message to ensure it is read would mitigate the problem of misunderstanding, or partial understanding, of the CPDLC message. The Group agreed that the NAT IMG address CPDLC re-clearances so as to minimise the possibility of misunderstandings.

3.1.19 It was noted that in recent years the ratio of ATC interventions to prevent GNEs reported by Shanwick and Gander had been 2:1. While there were a number of possible factors influencing this, it was noted that immediately prior to transfer from Gander Domestic to Gander Oceanic control a crew would be asked to confirm their first waypoint after oceanic entry. This allowed corrective action to be applied via VHF communication before the aircraft entered oceanic airspace and provided affirmation to ATC that the first oceanic segment would be in accordance with clearance.

3.1.20 The Group noted that several GNEs might have been detected sooner or may have been avoided, had aircrews adopted good navigational practice, in particular by using plotting charts and track in distance tables to check their routes. The Group agreed to request the Regional Director of the ICAO EUR/NAT Office to circulate a state letter to remind States and international organisations of the foregoing.

NAT SPG Conclusion 43/13 - Use of properly plotted navigation charts

That the Regional Director of the ICAO EUR/NAT Office circulate a letter to States and international organisations concerned explaining the safety benefits of the use of a properly plotted navigation chart as a Standard Operating Procedure (SOP) for NAT operations.

3.1.21 The Group noted that the SMCG had identified several safety related issues that would need the urgent attention of the NAT IMG and its specialist groups. It was therefore agreed that the NAT IMG modify its work programme to address the identified safety concerns.

NAT SPG Conclusion 43/14 - Urgent need to determine mitigation to reduce risk in the NAT Region

That the NAT Implementation Management Group (NAT IMG) urgently develop mitigation to address the following safety related items:

a) misinterpretation of some Controller Pilot Data Link Communications (CPDLC) messages;

b) monitoring compliance with conditional clearances;

c) unrealistic flight planning of flight levels;

d) the possibility that the current surveillance interval contributes to delays in detecting non compliance with clearances;

e) misinterpretation of re-clearance messages; and

f) verification of the first waypoint after oceanic entry;

3.1.22 The Group noted that the common interface areas between Shannon, Madrid and Santa Maria FIRs had been identified as an area that would benefit from improved compliance with vertical navigation performance standards. In this regard, it was agreed that a tri-partite meeting involving the relevant safety and operational managers from the ACCs concerned should be convened by the United Kingdom to address the necessary improvement to these interfaces.

NAT SPG Conclusion 43/15- Tripartite meeting of representatives from the Iberian Peninsula and Shanwick Flight Information Regions (FIR)

That the United Kingdom convene a tripartite meeting of representatives from the Madrid, Santa Maria and Shanwick FIRs to:

a) identify causes of aircraft entering the oceanic airspace at correct flight levels; and

b) develop procedures and mitigation to eliminate these errors.

3.1.23 The Group was informed that the CMA did not receive a copy of the flight plan when it received occurrence reports from some air traffic control units. It was felt that the information contained in the flight plan was essential to be able to carry out a full analysis to determine the cause of the occurrence and therefore to develop mitigation. It was therefore agreed to request that the Regional Director of the ICAO EUR/NAT Office inform States of the requirement to include the flight plan(s) when submitting occurrence reports to the CMA.

NAT SPG Conclusion 43/16- Requirement to include flight plans in reports to the Central Monitoring Agency (CMA)

That the Regional Director of the ICAO EUR/NAT Office inform States of the requirement to include a copy of the flight plan(s) when submitting occurrence reports to the CMA.

3.1.24 The Group recalled the success that the “On the Right Track” DVD had had with all airspace users and training establishments. It was recognised that the DVD was in need of updating and the Group therefore agreed to request that the United Kingdom proceed with renewing its content.

NAT SPG Conclusion 43/17- Updating the ‘On The Right Track’ presentation

That the United Kingdom:

a) update the “On The Right Track” presentation on the behalf of the NAT SPG; and

b) put in place a methodology for ensuring that all holders of the presentation are in possession of the current version.

MATHEMATICAL MATTERS

General

3.1.25 To assist the NAT SPG in reviewing system safety performance, NAT MWG was convened with the principal objectives of:

a) providing the NAT SPG with the estimates of lateral and vertical collision risk for the 2006 calendar year;

b) reviewing the ongoing monitoring of the risk in NAT MNPS airspace, including the height keeping performance and LHDs of aircraft approved to fly in that airspace; and

c) improving the methods used to estimate lateral and vertical risk.

3.1.26 The rapporteur of the MWG informed the Group that again this year, IATA had not attended the meeting. It was hoped the IATA would be able to attend next year's meeting as operational input into the discussions and conclusions was greatly valued.

2006 LATERAL AND VERTICAL COLLISION RISK ESTIMATES

Lateral Risk

3.1.27 2006 was the fourth calendar year of full RVSM operation in NAT MNPS airspace. The occupancy estimates for the year were based on a full twelve months of 2006, as were the error rates used in the risk estimates.

3.1.28 The lateral occupancy estimates for 2006 were 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 Canadian and United Kingdom 30°W estimates. The estimates were based on data for the 4th and 15th days of each month. Due to the introduction of the Shanwick Automated Air Traffic System (SAATS) in late November 2006, data from the Shanwick FDPS was not available for all of the required sample days. Consequently, two alternative United Kingdom data assessments were presented. It was accepted that the mixed data methodology was a complete sampling according to the original design and provided the most representative results. It also provided a bridge between the old and new datasets.

3.1.29 Both the OTS and random same direction occupancy values (and hence also the combined occupancies) have increased since the previous year (2005). Comparing the value for the traffic counts at the monitoring windows, provided by the CMA, there has been a 5.6% increase in traffic from 338,415 flights for 2005 to 357,238 flights for 2006.

3.1.30 The GNEs in MNPS airspace reported in 2006 were examined in conjunction with the SMCG. This ensured that the two groups were in agreement over the categorisation and weighting of the events for risk assessment purposes.

3.1.31 In accordance with NAT SPG Conclusion 41/17, the monitoring windows for 2006 were extended to include the boundary between Iceland domestic and Reykjavik oceanic regions. This enabled a more representative sample of GNEs in the NAT to be obtained. As a result of the addition to the monitoring windows, one extra GNE was included in the sample and therefore in the risk estimate for 2006. In total, there were three risk-bearing GNEs that were measured at the monitoring windows.

3.1.32 The Group noted that the weighted risk-bearing error rate was below the maximum acceptable level as set out in the corresponding NAT MNPS lateral error rate requirement of 1.3×10^{-4}. It

appeared that the actions taken by the NAT SPG such as the requirement to compare aircraft-derived estimates of the next and next+1 waypoints to the ATC clearance, along with the timely intervention to resolve differences have contributed greatly to the continued good performance in the lateral dimension.

3.1.33 The Group noted with appreciation that the risk estimates between 1999 and 2006 were below the target level of safety (TLS) for the lateral dimension, which was 20 x 10^{-9} fatal accidents per flight hour.

Traffic base for lateral error rates

3.1.34 The Group recalled NAT SPG/42 Conclusion 42/10 which stated that the MWG obtain the number of aircraft that transit Reykjavik oceanic airspace but do not enter Gander or Shanwick oceanic airspaces. The traffic base used to determine the lateral error rate was the total number of flights seen in Gander and Shanwick FIRs, which was the same airspace from which GNEs have been observed and reported prior to the decision by NAT SPG/41 to include GNEs observed by Reykjavik exiting the ocean. It was noted that the MWG would undertake additional analyses of these data sources, with a view to making the estimate more precise taking account of possible changes necessary due to the introduction of SAATS in Shanwick OAC. To identify those flights seen by Reykjavik radar, inbound, not also seen by Gander and/or Shanwick, for future estimates of lateral error rates, the Group agreed that a 24 day annual sample be used, comparing Reykjavik, Gander, and Shanwick daily traffic. This sample count should then be expanded to an estimate for the full year, and added to the traffic count used to determine OTS and Random lateral error rates. This method should bring the error and traffic base figures into alignment.

NAT SPG Conclusion 43/18 - Enhancement of the estimate of lateral error rates

That the Mathematicians Working Group (MWG) continue to enhance the estimate of lateral error risk taking account of the additional information provided by Reykjavik Area Control Centre and the implementation of Shanwick Automated Air Traffic System.

Inclusion of Lateral Errors Observed by Moncton FIR radars for flights entering or exiting New York Oceanic airspace

3.1.35 The Group was informed that, occasionally, lateral GNEs are observed by Moncton ACC radar sources for eastbound and westbound traffic flying to or from New York Oceanic passing through a narrow band of Moncton FIR radar coverage from approximately 50ºW to 65ºW, and from 42ºN to 45ºN. Considering the nature of the traffic and the orientation of the radar coverage, this could be considered as an extension of the existing radar window along the eastern edge of Gander Oceanic. It was noted that errors observed by Moncton FIR radars made by westbound flights exiting Gander oceanic were similar in nature to errors observed at the existing radar window. However, because of the geometry of the airspace for flights entering Moncton FIR radar coverage eastbound from New York, lateral errors observed for these flights were not similar to the existing radar window. The Group therefore agreed that the existing radar window be extended to include westbound GNEs observed by Moncton ACC.

NAT SPG Conclusion 43/19 - Extension of the radar window to monitor for Gross Navigation Errors (GNE)

That the:

a) radar window used for monitoring of GNEs be extended to include westbound flights observed by Moncton Area Control Centre; and

b) data be included as risk-bearing errors in the estimation of lateral risk.

3.1.36 The Group considered that GNEs observed for eastbound flights exiting New York OCA, passing through Moncton FIR radar coverage en route to Gander OCA, should not be included as risk-bearing errors in the estimate of lateral error. They should be classified as "window outbound" by the SMCG.

Lateral Overlap Probability $P_y(0)$

3.1.37 A key parameter that was used in calculations of vertical and longitudinal operational and technical risk was the lateral overlap probability $P_y(0)$ [5]. These risks increase in direct proportion to this value. Thus, halving $P_y(0)$ would halve vertical *and* longitudinal operational collision risk. $P_y(0)$ had consistently increased over the years. An increase in $P_y(0)$ reflected improvements in lateral navigational performance occasioned by the use of current-technology navigational systems, i.e., GNSS. As aircraft tended to concentrate more closely in the vicinity of the route centreline, the chance that two aircraft attempting to fly the route would overlap in the lateral dimension increased $P_y(0)$ commensurately.

3.1.38 A new estimate of $P_y(0)$ was made using a 12-month sample (January to December 2006) of individual cross track errors collected from Irish radar at the oceanic boundary. The data were filtered so that only cross track errors that were at or further West of 15°W and less than 17°W and were at RVSM flight levels and were for westbound aircraft, were considered. This produced 12,912 data points, which was a large sample. $P_y(0)$ was estimated to be 0.1185. It was noted that the revised estimate of $P_y(0)$ using updated data was only marginally greater than the value adopted last year and therefore the value of 0.1172 would continue to be used. The MWG would review the value annually.

Vertical Risk

3.1.39 The Group was informed that vertical occupancy estimates were calculated in the same manner as for the lateral occupancy estimates (paragraph 3.1.28 refers).

Vertical technical risk estimate

3.1.40 The estimate of vertical technical risk for 2006 was 1.5×10^{-9} fatal accidents per flight hour compared to the TLS for vertical technical risk of 2.5×10^{-9} fatal accidents per flight hour. The Group noted with appreciation that the estimate of vertical technical risk continued to be less than the vertical technical TLS.

Vertical operational risk estimate

3.1.41 The operational element of vertical collision risk was determined from two components. The first was the estimate of time spent by aircraft at un-cleared levels or when incorrectly cleared to a flight level. The second was for un-cleared level changes, which used the number of levels crossed without clearance or without following published contingency procedures (and the speeds at which the levels are crossed) during the monitoring year. The table below summarises LHD and the corresponding times at the wrong level observed between 1999 and 2006.

[5] $P_y(0)$ is pronounced 'pee-why-zero'. This is the probability that two aircraft that are on the same track are in lateral overlap.

LHDs and Time Spent at Wrong Levels for the Years 1999-2006

	1999 Phase II	2000 Phase II	2001 Phase II	2002 Full RVSM	2003 Full RVSM	2004 Full RVSM	2005 Full RVSM	2006 Full RVSM
Number of All LHDs	52	31	41	69	61	79	84	103
Time at Wrong Level (mins)	170	52	159	360	431	228	301	548

3.1.42 The Group was informed that, as with the lateral GNEs, the LHDs reported to the CMA during 2006 were examined in conjunction with the SMCG to agree on the classification for risk estimation purposes. The data had shown that there had been a large increase in the time spent at uncleared levels compared to 2005, and the total number of deviations reported, the sum of risk-bearing and non-risk-bearing, had increased, but to a lesser extent.

3.1.43 The random and combined vertical collision risk due to operational errors for 2006 was estimated above the TLS, and the 2006 combined risk was a 15% increase over the previous year. The risk estimate for the NAT had now been above the TLS for seven of the previous eight years. This was demonstrated graphically in **Figure 2** below, which also includes a trend line to highlight the relationship between the data points. Efforts to contain and reduce vertical operational risk were therefore not working and it was agreed that this matter needed to be addressed as a matter of urgency. The Group felt that concerted efforts by the NAT SPG and its component groups could reverse the recent trend and restore the system performance to previous levels.

3.1.44 The Group recalled that at the Limited NAT Regional Air Navigation Meeting (LIM NAT RAN) of 1992 held in Portugal, the Target Level of Safety of 5×10^{-9} fatal accidents per flight hour was selected as the benchmark against which the collision risk due to all causes in the vertical dimension was to be judged. Soon after RVSM implementation, the risk on the OTS as well as for those aircraft classified "random" was reasonably near to the target value. When viewed from the perspective of statistical process quality-control, the system would be considered "in control". However since 2001, total system risk dominated by the risk associated with those flights classified as random had grown, with the exception of 2004. This growth had occurred despite actions taken to stem the growth. Many of the measures undertaken had a long introduction cycle, so year-on-year comparison may not reflect progress. The trend in total risk over the past six years has shown an increase in the risk. Therefore, it was apparent that further action was necessary to address the amount of time spent flying at incorrect levels.

3.1.45 The classification "random" applied to aircraft that did not exclusively travel on the OTS during the period the tracks were published. This included operations that were on the published tracks but outside the published times. Additionally, "random" aircraft include those which travelled on the tracks most of the way but deviated from them by one or two of the waypoints, even during the time periods over which the tracks were published. "Random" aircraft often fly parallel to the OTS but just north or south of the tracks. Thus, the typical operator is exposed approximately equally to the risks on both OTS and "random" flights. For these reasons, the RVSM system performance should be judged by the combined or total risk estimate. Actions taken to stem risk can be applied selectively. However, contrary to a commonly held view, "random" operations did not appear to be the exclusive domain of a typical operational group, such as IGA, charter operators or military.

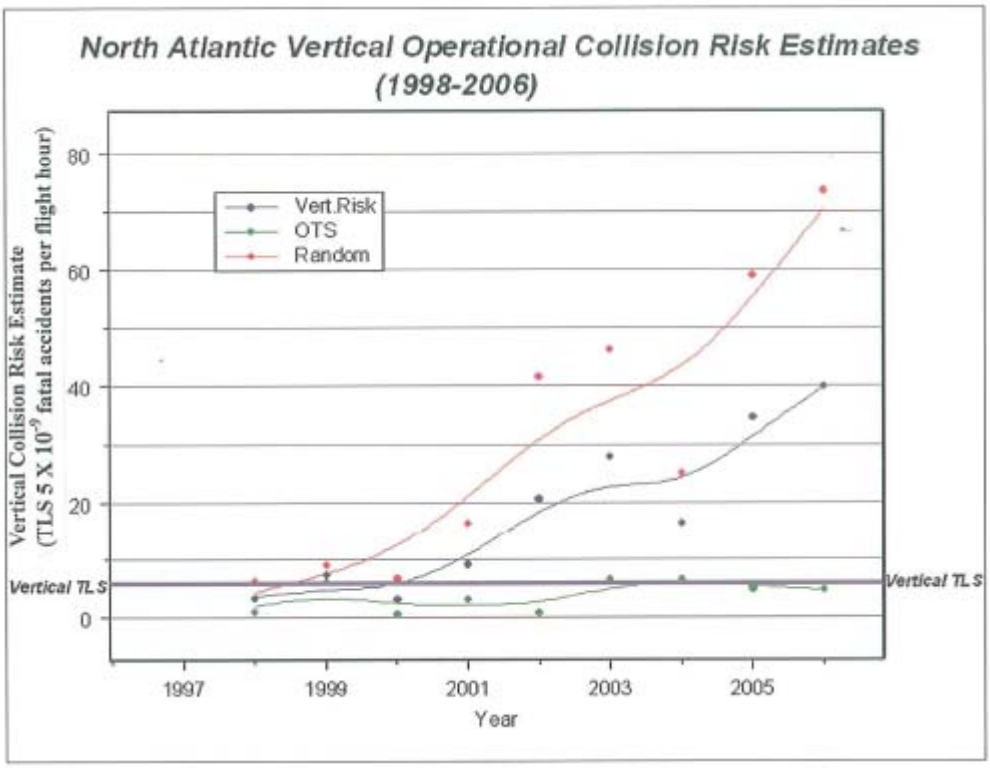

Figure 2: Plot of NAT System Vertical Operational Risk (1998-2006) Showing Trends

3.1.46 There were several reasons for the increase of vertical operational collision risk in 2006. A 82% increase in the number of minutes spent at wrong flight level, and an increase in opposite direction occupancy estimates, combined with the higher lateral overlap probability, $P_y(0)$ from 2005 (0.1172), have all contributed. However, two factors which helped limit the increase in vertical risk are the downward revision of aircraft dimensions from 2005 and the slight reduction in same direction random occupancy.

Analysis of Large Height Deviation Data

3.1.47 The majority of the 2006 risk was due to a small number of long duration LHDs (1373 minutes) and a number of substantial LHDs (6-12 minutes). Therefore a descriptive analysis was undertaken by the MWG in order to determine common patterns, since prevention of these long duration events in the future would radically reduce the vertical risk estimate.

3.1.48 With regard to the duration of events, the 2006 LHD data naturally fell into three categories, those 5 minutes and less in duration, those greater than 5 minutes and less than 13 minutes and those equal to or greater than 13 minutes. A relatively large contribution to the time spent at incorrect levels which was directly transferable to the vertical risk, is captured by few errors in the highest duration interval, 13 minutes and more. Elimination of the longest duration errors would reduce the risk by approximately two-thirds. In addition, the 13 LHDs in the middle category encompassed another 20% of the 2006 risk contribution. Thus, adopting measures that would also remove these LHDs would deflate the vertical risk estimate to the neighbourhood of the TLS. Alternately, if all errors greater than 5 minutes were reduced to 5 minutes each, the total risk estimate would be reduced by approximately by two-thirds.

3.1.49 Analysis of the long duration LHDs revealed that there was at least one occurrence of these serious events in airspace controlled by each of the air traffic service providers suggesting a common operational underpinning. Thus, action taken to address LHDs should be undertaken across the NAT region;

targeting a specific facility would not address the system-wide causative factors. Further, the longer LHDs contained examples of major trunk airlines as well as operators who have less frequent operations in the NAT. This meant that the causes behind the LHDs were not necessarily a function of the NAT experience of operators, as had been presumed. In addition, longer LHDs involved aircraft of recent manufacture as inferred from operator/aircraft type combination, potentially possessing the latest CNS equipment, suggesting that recent improvements in surveillance and communications are not being used to their fullest. In reviewing the frequency of LHDs, the Group observed that the most common cause of LHDs were incomplete inter-facility coordination of flight levels or flight level changes.

3.1.50 The Group agreed that extraordinary measures be taken, including technological and operational steps that would reduce or eliminate frequently occurring LHDs in a timely manner. Similarly, a decreased surveillance interval may help to identify these events before they become risk-bearing. As well, the development of equipment checks, maintenance of situational awareness and use of recommended operating procedures as recommended in NAT guidance material would improve this situation. This information needs to be conveyed to the operational community as high-priority material and included in pre-flight and shift briefings as well as standard training regimens.

3.1.51 It was noted that in domestic RVSM airspace, LHDs were typically identified and captured very quickly. However, surveillance in the vertical dimension is much more frequent than in oceanic airspace and near real-time communications allows timely intervention. With this in mind, the Group agreed to adopt a policy to reduce LHDs in duration and frequency which aimed to restore the vertical risk of collision to below the TLS. This policy included these factors:

- targets the long duration LHDs first;
- targets LHDs applicable to aircraft classified as random before those on the OTS;
- considers a surveillance interval much less than the current 10º of longitude waypoint reporting interval;
- gives serious consideration to developing a means of identifying and capturing LHDs within 5 minutes of their occurrence, but can specifically target aircraft that have received altitude changes or aircraft as they enter the ocean (i.e., may be used selectively if those aircraft can be identified)
- applies uniformly across all NAT OCAs, and;
- involves the collaboration of the complete operational community.

3.1.52 The Group agreed that awareness of these issues raised by the SMCG and the MWG needed to be highlighted to NAT operators as urgently as it would be to the NAT IMG. Accordingly, the Group developed common wording for publication by all NAT providers in their aeronautical information documentation which is at **Appendix D**. It was also agreed that this text should be circulated in a state letter from the Regional Director of the ICAO EUR/NAT Office to NAT user States and international organisations concerned. Finally, the Group agreed that the text should be published on the ICAO NAT PCO website.

NAT SPG Conclusion 43/20 - Publication of NAT safety related material

That:

a) all NAT Member States publish the agreed text in their aeronautical information documentations as soon as possible;

b) the Regional Director of the ICAO EUR/NAT Office circulate the agreed text to all States and international organisations concerned; and

c) the agreed text be published on the ICAO NAT PCO Website.

NAT SPG Conclusion 43/21 - Ways and means to reduce or mitigate the number of Large Height Deviations (LHD)

That the Regional Director of the ICAO EUR/NAT Office inform all States of the need to implement the following actions to reduce the frequency and duration of LHDs:

a) reduce in long duration LHDs as the first priority;

b) reduce LHDs attributable to aircraft classified as random before those operating on the Organized Track System (OTS) as the second priority;

c) develop means of identifying and capturing LHDs within 5 minutes of their occurrence;

d) apply the policy uniformly across all NAT Oceanic Control Areas; and

e) collaborate amongst the entire NAT Region operational community.

3.1.53 In addition to the foregoing, the Group agreed that the NAT IMG and its specialist contributing bodies urgently address the issues that had been identified with the view to developing solutions or mitigations in time to submit proposals to the SMCG meeting scheduled for 29 October to 2 November 2007.

NAT SPG Conclusion 43/22 - Urgent need to reduce or mitigate the number of Large Height Deviations (LHD)

That the NAT Implementation Management Group (NAT IMG):

a) urgently address the issue of reducing the number of LHDs; and

b) submit a report to the Safety Management Coordination Group (SMCG) meeting scheduled for 29 October to 2 November 2007.

3.1.54 The Group was provided with the following IFALPA Position Statement by the representative for IFALPA:

"IFALPA ATS Position Statement

During its June 2007 meeting in Montreal , the ATS committee received reports from several NAT working groups from the RVP NAT. The committee was briefed on ongoing initiatives with the stated goal of reducing lateral and longitudinal separation in the NAT Region as well as ongoing trials for replacement of HF with SAT Voice.

The committee noted some rather disturbing trends, especially pertaining to Vertical Operational Risk in the NAT most notably demonstrated by the widening divergence between Random Track operations and those in the OTS.

The trend is most disturbing in that the NAT has and continues to maintain a robust CMA with timely follow up and case resolution, yet in certain parameters, the trend is

increasingly negative.

THEREFORE BE IT RESOLVED that the IFALPA Air Traffic Services Committee, held at ICAO Headquarters in Montreal Canada from 04 – 06 June 2007 calls upon the NAT SPG:

The IFALPA ATS Committee has noted a disturbing trend emerging from monitoring reports in the NAT, especially as they pertain to an increasingly negative trend in the vertical operational risk assessment in the NAT Region.

The IFALPA ATS Committee urges the NAT SPG to take immediate steps to improve the vertical operational risk, in order to reverse this trend to a direction that converges rather than diverges from the TLS.

The NATs stated desire to safely reduce separation both longitudinally and laterally depends on this."

Vertical Monitoring Pack

3.1.55 The Group was informed that the MWG had reviewed the 'vertical monitoring pack', which was a collection of tables and graphs used for assessing the combined altimetry system error (ASE) performance of the aircraft sample captured. It was produced annually (paragraph 3.1.59 refers) with the intent of providing quality assurance data relevant to individual aircraft, aircraft groups and operators. The source of the data used for the generation of the pack was the CMA's database of HMU and Global Positioning System (GPS)-Based Monitoring System (GMS) ASE measurements. The global RVSM guidance material contains ASE performance specifications and the pack is used to ensure that individual aircraft, aircraft groups and operators continue to meet those specifications.

3.1.56 All apparently non-compliant height measurements (those of 300ft or more) were scrutinised and appropriate action was taken. Airframes with consistently poor performance (e.g., having a high proportion of aberrant height measurements, or having a deteriorating trend) were flagged up to the CMA for follow-up action. The CMA would follow up any aircraft exhibiting regularly aberrant ASE measurements over 200ft and contact the relevant operators.

Other issues

3.1.57 The MWG noted that both communication service providers had announced plans to decommission back-up satellite GESs when they upgrade facilities to the next generation of equipment. With this in mind, the MWG felt it might be necessary to closely monitor the reliability of the network since there may be related changes to system performance of interest to this Group (paragraph 3.2.26 refers).

3.1.58 As it appeared that there might be some confusion between the terms TLS and risk estimate, the rapporteur of the MWG provided the following explanation: a TLS is a threshold to compare risk estimates to and is a value that is chosen to be acceptable whereas a risk estimate is a measure of current system performance and can be compared against a TLS.

MWG Work Programme

3.1.59 The MWG's next annual risk assessment was planned to be performed by April 2008 to produce a timely report for NAT SPG/44. It was agreed that the MWG would meet immediately after the SMCG.

SAFETY MANAGEMENT MATTERS

Implementation of the Strategic Lateral Offset Procedures (SLOP)

3.1.60 The Group recalled the importance that it had placed on the implementation of the SLOP in the NAT Region to mitigate risk due to the increased probability of lateral overlap resulting from the increased navigation performance of aircraft. It was noted that a proposal to encourage ATC in direct communications with aircraft to encourage flights to apply the SLOP had been examined; however, because the SLOP had been developed as a pilot procedure to be initiated by pilots on a random basis and ATC was not to be involved in the process other than to be made aware that SLOP was being applied in specific airspaces, the it was felt that ATC involvement would not be appropriate. The Group did, however, agree that the NAT OPS MNGs should look at ways and means to encourage pilots to apply the SLOP and that they add this to their work programme (paragraph 3.1.68 refers).

3.1.61 It was also agreed that all opportunities to inform the pilot population, and in particular training establishments, of the importance of applying the SLOP should be pursued and, in doing so, it should be stressed that SLOP was a standard operating procedure, not a contingency manoeuvre. Therefore, it was agreed that the following text be included in the track message: "The primary purpose of the Strategic Lateral Offset Procedures is to decrease risk of aircraft collision in the event of an unplanned vertical excursion of 1000 ft or more. This should be applied as a standard procedure in NAT airspace. For additional information, refer to www.nat-pco.org "

3.1.62 In addition, the Group noted that the Secretary would clarify the intent and meaning of the SLOP as defined in various documents with the objective of removing all contradictions and/or mis-interpretations. It was agreed that it was necessary to document the required Regional Air Navigation Agreement needed for the regional application of the SLOP (Doc 4444, paragraph 15.2.4.1 d) refers), the area of application and the procedures that were unique to the NAT Region. The Group was informed that an amendment to the NAT SUPPs was being developed. It was stressed that all comments regarding the draft proposal for amendment should reach the Secretary by 15 September 2007 so that they can be taken into account when the Secretariat finalises the draft to be presented to the Air Navigation Commission (ANC). The applicability date will be 8 November 2008. As regards locating of the SLOP in the contingency section of Doc 4444, the Group was informed that ICAO Headquarters had agreed to move them from the contingency section as soon as possible. These changes should be completed to meet the November 2008 applicability date.

3.1.63 The representative from IATA indicated that his organisation was in the process of developing a global position on the use of SLOP. In addition, the Group was informed that IATA planned to hold its NAT Regional Coordination Group (RCG) meeting in Miami from 12 to 13 September 2007 and that the RCG was an ideal venue to explain the value and benefits of SLOP. It was noted with appreciation that IATA intended to add this matter to the agenda and invite the United Kingdom and the United States to participate in the meeting on this agenda item. Furthermore, the Group noted that IATA would be submitting the results of the RCG discussions to the next meeting of the NAT IMG.

NAT SPG Conclusion 43/23 - The use of Strategic Lateral Offset Procedures (SLOP)

That:

a) efforts be continued by the air navigation service providers and airspace user organisations to encourage the uptake and correct use of the SLOP to achieve maximum potential benefits;

b) the application of the SLOP continue to be promoted and publicised to operators by all appropriate means (NAT SPG Conclusion 43/20 refers);

c) text be added to the track message clearly stating that SLOP is a risk mitigation procedure, not a contingency manoeuvre;

d) the NAT Operations Managers (NAT OPS MNG) terms of reference be modified to include promoting ways and means to encourage the use of SLOP;

e) the NAT Implementation Management Group (NAT IMG) develop, on behalf of the NAT SPG, a proposal for amendment to the NAT *Regional Supplementary Procedures* (SUPPs) to include area of application and NAT specific procedures; and

f) all concerned ensure that the Secretary receives their comments on the draft proposal to amendment Doc 4444 by 15 September 2007 so that they can be taken into account when drafting the changes to Doc 4444.

Evidence of Strategic Lateral Offsets

3.1.64 The Group was informed that the results of an analysis had shown that approximately 20% of flights that reported via ADS were flying offsets in accordance with the SLOP. The current estimate of the proportion of the traffic flying in the NAT reporting positions via ADS was approximately 40%. The use of lateral offsets in mid-ocean by ADS-reporting aircraft was encouraging and had improved since previous studies. As was noted in 2006, if only one-third of the aircraft adopted offsets of one or two nautical miles, then a 50% reduction in $P_y(0)$ from the value where no offsets were flown would result and ideally if aircraft were to be distributed evenly across the three options, there would be a 66% reduction.

3.1.65 Part of the study contrasted the lateral offsets usage over time and it had shown that there was little change in the proportion of the sample using offsets until late 2006, when there was a marked increase in its use. This appeared to coincide with the adoption of the procedure by a few major operators and accounted for the time necessary for companies to introduce the policy into recurrent training. It therefore appeared that the inclusion of recommended SLOP practices into the training programmes seemed to be successful when implemented by operators.

3.1.66 The Group was informed that, because the data suggested that the use of SLOP was in a state of flux, the MWG would continue to collect, analyse and report on the utilization of SLOP in the NAT Region. When the figures stabilised, it would be possible to estimate the complete effect of SLOP on $P_y(0)$ and the NAT SPG would be informed accordingly.

Strategic Lateral Offset in WATRS

3.1.67 A study that had been carried out suggested that there had been a reduction in the proportion of aircraft flying lateral offsets in accordance with the recommended procedure in WATRS. SLOP had been a standard operating procedure in WATRS since 2001, i.e., three years longer than for the NAT, yet there did not appear to have been an increase in the use of offsets over time.

3.1.68 Comparing the results from 2006 to previous years, the Group believed that it was unlikely that there would be a significant use of strategic lateral offsets in the WATRS in 2007. The potential benefits of SLOP in terms of reduced vertical and longitudinal risk would therefore not be fully realised in WATRS airspace. Accordingly, the Group agreed that the MWG continue to monitor the evolution of the implementation of SLOP in WATRS and that all concerned should continue to encourage the use of SLOP as a means of reducing risk (paragraph 3.1.62 refers).

NAT SPG Conclusion 43/24 - Implementation of Strategic Lateral Offset Procedures (SLOP) in the West Atlantic Route System (WATRS) area

That:

a) efforts be continued by the air navigation service providers and airspace user organisations to encourage the uptake and correct use of the SLOP in the WATRS area to achieve maximum potential benefits;

b) the Mathematicians Working Group (MWG) monitor the evolution of the implementation of the SLOP in the WATRS area; and

c) the MWG report to NAT SPG/44.

Other safety management issues

3.1.69 The Group was informed that the Oceanic Error Safety Bulletin (OESB), which was introduced during 2006 had already proved to be an effective medium to publicise NAT Regional safety issues and was inexpensive to develop and to circulate. It was expected to be a valuable means of promulgating areas of concern, highlighting observed errors and providing advice to mitigate future recurrences. The OESB could be downloaded from the ICAO NAT PCO web site.

3.1.70 The SMCG had developed an Oceanic Checklist which was intended to provide guidance to those pilots whose organisations do not provide adequate material themselves or for whom oceanic operations were a new area of activity.

3.1.71 The Group was informed that, in the interest of understanding and mitigating all types of oceanic navigational and height keeping errors, the CMA had been encouraging more complete reporting of all errors. In addition, more active follow-up of reported errors had led to improved data collection and analysis methods and enabled the closing of the information loop with the operators and reporting agencies.

3.1.72 The SMCG had indicated that some ICAO reference documents, including the MNPS Airspace Operations Manual, continued to contain unrevised procedures. The continued presence of inaccurate material in such sources was noted with concern by the Group and had been cited as contributory in some instances where contingency procedures had been incorrectly adopted (paragraph 4.1.6 refers).

Proposed revised terms of reference of the Safety Management Coordination Group

3.1.73 The Group recalled that it had tasked the NAT IMG with defining the policy, scope and objectives for the future role of the SMCG and proposing revised terms of reference (NAT SPG Conclusion 42/14 refers). In carrying out the assignment, the NAT IMG agreed that the performance of other than the navigation element of CNS should be included in safety management.

3.1.74 When considering a framework for regional safety management, it was recalled that national safety management programmes and systems were in place in all the NAT provider States and interface States. Therefore any regional safety management function should be subject to coordination with national activities, and that any decision to mitigate identified safety risks should remain with the States. Accordingly, the role of the SMCG should remain that of a coordinator and facilitator and that the EUR/NAT Office of ICAO should be the interlocutor with the States.

3.1.75 The Group was informed that regional safety cases were an integral part of the decision making process before the implementation of major changes to the air navigation services systems and agreed that such safety cases should be developed and coordinated by the NAT IMG. Accordingly, the terms

of reference of the NAT IMG working groups concerned were amended in order to clarify their role as part of the implementation decision making process.

3.1.76 The Group agreed that, in addition to the coordination functions as mentioned in paragraph 3.1.74 above, monitoring of the safety performance of the system should also be part of the responsibilities of the SMCG. Therefore, as coordination of some air navigation safety related activities were already performed through the NAT CMA, the latter's work should be managed by the SMCG.

3.1.77 With the above in mind, the Group agreed with the proposed changes to the policy, scope and objectives and revised the terms of reference of the SMCG as shown in **Appendix E**.

Proposed revised terms of reference of the Central Monitoring Agency

3.1.78 Considering the linkage between the SMCG and the NAT CMA as outlined in paragraph 3.1.76 above, the Group endorsed the proposed changes to the terms of reference of the NAT CMA as shown in **Appendix E**. When approving the revised terms of reference, the Group acknowledged that the SMCG should coordinate directly with the NAT IMG for urgent safety related issues.

NAT SPG Conclusion 43/25 - Modifications to the terms of reference of the NAT Safety Management Coordination Group (SMCG) and the Central Monitoring Agency (CMA)

That the:

a) terms of reference of the NAT SMCG and NAT CMA be amended in accordance with Appendix E of the report of NAT SPG/43; and

b) NAT SPG handbook be amended.

3.2 Review of System Operations

AIR TRAFFIC MANAGEMENT

North Atlantic Operations Managers

3.2.1 The Group was informed that the NAT OPS MNGs met in Bodø, in May 2007 and that their report and its annexes were available on the ICAO NAT PCO web site. For the first time, the NAT OPS MNG Meeting was attended by a representative from Ireland.

3.2.2 The Group noted that the NAT OPS MNGs had reviewed NAT SPG Conclusion 42/8, *Management of the NAT Contingency Plan*, and determined that the plan lacked the specificity required to efficiently and quickly revert to a limited service or a no service configuration. The Group agreed that a more detailed and comprehensive NAT Region Contingency Plan should be developed that would expand on the current format and detail specific procedures and coordination steps for a limited service and for a no service configuration. It was also agreed that the NAT Region aeradio communications providers should be invited to participate in the development of the communications contingency element to the Contingency Plan.

NAT SPG Conclusion 43/26 - Update of the NAT Region Contingency Plan

That the NAT Implementation Management Group (NAT IMG) update the NAT Region Contingency Plan to include:

a) specific procedures and coordination steps for a limited service configuration;

b) specific procedures and coordination steps for a no service configuration;

c) a defined route structure traversing each air navigation service provider's (ANSP) airspace;

d) an associated altitude structure;

e) associated coordination/implementation procedures;

f) defined aircrew procedures as necessary;

g) communications contingency elements;

h) full service resumption procedures; and

i) draft NOTAM to provide customer notification.

3.2.3 The Group noted that the latest Jeppesen Atlantic High Low Chart update of 11 May 2007 had incorporated information about the SLOP and that action had been taken to include information about the SLOP on the OTS message (paragraph 3.1.61 refers). The NAT OPS MNGs had observed that, if voluntary use of SLOP did not create the desired results, then the NAT SPG might wish to consider making the procedure an operational requirement.

3.2.4 The Group noted that the NAT OPS MNGs had carried out a review of all Letters of Agreement (LoA). In general, LoA's were up to date or were being updated as required. The exception was the LoA between Edmonton ACC and Sondrestrøm Flight Service Station (FSS), which could not be updated due to differences in the understanding of the requirements applicable in uncontrolled airspace. The Group noted that the NAT IMG had been requested to assist in resolving this matter.

COMMUNICATIONS

Review of HF Network Operations

3.2.5 The Group was informed that the ACG had reviewed the NAT communications network operation, as defined by ICAO Annex 10 Volume II Chapter 5, NAT SUPPs, NAT FASID and the HF Frequency Management Guidance Material. It was reported that there were no major problems affecting current network operations and only minor issues were identified that could be resolved by better coordination between the watch managers on a more regular basis.

Review documentation

3.2.6 It was pointed out that some information in the HF Guidance Material (NAT Doc 003) needed to be updated. It was therefore agreed that all concerned should provide the rapporteur of the ACG with the necessary information so that the Guidance Material could be updated and posted on the ICAO NAT PCO web site. In addition, it was agreed that the frequency allocation table contained in the NAT SUPPs be removed and replaced by a note referencing NAT Doc 003. The Member for Portugal accepted the task of developing, with ICAO, a draft proposal for amendment.

NAT SPG Conclusion 43/27 - Amendment to the NAT Regional Supplementary Procedures (SUPPs)

That:

a) Portugal, in coordination with the ICAO EUR/NAT Office, develop a proposal for amendment to the NAT SUPPs regarding the frequency allocation table; and

b) the Member for Portugal make arrangements, within his administration, to process the proposal for amendment to the NAT SUPPs on behalf of the NAT SPG.

Traffic analysis

3.2.7 The Group was provided with the results of an analysis of the Consolidation Report, which is prepared annually by Portugal and which contained an investigation of the network messages, volume and distribution. The total amount of HF and GP VHF contacts for all Aeronautical Stations for the year 2006 was 3,481,675 messages, distributed as follows: 73.04 % by HF; 26.89 % by VHF frequencies and 0.07 % on SATCOM. The relative percentage of traffic for each Aeronautical Station was Gander (32.41%), Shanwick (27.40%), Iceland (13.79%), Portugal (13.13%), the United States (12.84%) and Norway (0.43%). The analysis also showed an increase in air-ground message traffic of 4.14% from 2005 to 2006.

3.2.8 This result reflected the general tendency of growth in voice traffic volume over the past five years as reported to NATSPG/42, and it demonstrated that, despite the implementation of data link, the voice network continued to play an important role. The Group noted that this situation was becoming critical and expressed concern that if the trend continued at the existing rate, the voice network would experience congestion in the short to medium term. Measures to mitigate overloading needed to be planned in advance and a possible increase in network capacity must be envisaged.

3.2.9 As an initial step to develop mitigation, an analysis of one week of message traffic was conducted by Portugal, Ireland and Canada. The results established that only a small percentage of messages could be reduced if the data link trials worked in accordance with expectations and all data link problems that generated voice messages were removed. In addition, the studies demonstrated that, in 2005 Shanwick Radio worked 8.72% more aircraft than in 2000 and handled 9.95% fewer messages and the average number of messages per aircraft fell from 2.8 to 2.32. In 2006, Gander Radio worked 10.8% more aircraft than in 2000 and handled 8.8% fewer messages and, in the same period, the average number of messages per aircraft fell from 3.97 to 3.09 messages.

3.2.10 Even after taking into account that a number of factors may have influenced the fluctuation in message count, expectations of significant reductions in messages as a result of the implementation of FANS 1/A may have been over optimistic. In the case of Shanwick, a data link aircraft which fully observed the data link procedures could only expect to make one less contact on HF than a similar HF only flight while transiting the Shanwick OCA. In addition, although the number of aircraft transiting the Shanwick area had increased by 9%, data link aircraft only accounted for approximately 40% of those.

3.2.11 In accordance with the decision to re-arrange the working methods of the ACG (paragraph 2.1.1 above refers), the Group noted that the ACG would coordinate their findings directly with the NAT IMG specialist groups concerned.

3.2.12 The Group was informed that Aeronautical Fixed Telecommunication Network (AFTN) outages affected the delivery of messages to some ATC units resulting in the delay or non-delivery of ADS/Flight Management Computer (FMC) WPR which in turn required voice intervention. This matter was brought to the attention of the Group because the AFTN is outside the remit of the ACG. The Group therefore agreed that the ANSPs should examine this matter in order to resolve the problems.

NAT SPG Conclusion 43/28 - Aeronautical Fixed Telecommunication Network (AFTN) message delivery delays

That Air Navigation Service Providers (ANSP) determine the cause(s) of AFTN delays in delivering position reports so as to eliminate the need for follow up by voice.

ACG participation in the development of the NAT Communications Strategy

3.2.13 The Group noted that the ACG had indicated that they should be closely associated with the development of the NAT communications strategy. The concerns were raised because some of the

communication service providers were not involved in the discussions leading to the development of the strategy. The Group noted the comments and felt that they were addressed in paragraph 2.1.1 above.

Joint HF communications service provision

3.2.14 The Group noted the information concerning the trial that had been carried out of the joint HF communications service provision in Shanwick and Iceland FIRs and further noted that full joint service provision commenced on 21 March 2007 and was functioning well.

Next meeting

3.2.15 The Group endorsed the proposal that the ACG meet annually and noted that their next meeting would be in the spring of 2008 in Bodø, Norway.

SYSTEM OPERATIONS

The Closure of Goonhilly Ground Earth Station (GES)

3.2.16 The Group was informed that the Goonhilly GES was closed on 28 February 2007. In preparation for the closure, work had been carried out to allow aircraft using Goonhilly as their primary GES to switch to the satellite AIRCOM GES in Aussaguel. It was mentioned that this transition should not have had any negative impact on satellite voice and data services and that SITA followed-up all reports of any performance anomalies following the shutdown.

3.2.17 The closure of the Goonhilly GES meant that there was no GES redundancy for NAT satellite applications. Furthermore, both communications service providers (ARINC and SITA) indicated that neither service provider had sufficient means or capacity to act as a back up in the event of a catastrophic failure of the other's GES. It was considered that this case represented a new FANS failure mode and two possible scenarios could be identified, either a short term failure or a catastrophic long term failure. In particular, ATC could lose contact with a whole sub set of the aircraft population at the same time. This would have a negative effect on any safety case to reduce separation minima using data link technologies because the intervention capability using CPDLC could be greatly diminished or lost.

3.2.18 The NAT ANSPs felt that, in these circumstances, the NAT SPG ought to have been consulted well in advance of any such change so that the necessary mitigation or changes could have been put in place to ensure the safety of the air navigation system. The closure of the Goonhilly GES clearly brought to light the need for end to end monitoring of the communications infrastructure used to support the use of data link applications, particularly when such technology was used as an enabler for reduced separation minima. It was recalled that many of the planned reductions in separation minima in the NAT Region were dependent on a robust communications infrastructure and in particular a reliable intervention capability.

GES Upgrades

3.2.19 The Group was informed that in February 2005, Inmarsat had announced a USD 3.8 Million development contract for a new generation of channel units and other related improvements to the GES computers. These new components would increase service availability, improve operational efficiency and ensure long term support of the data and voice services. Key to the future sustainability of the aeronautical GES had been the development of the new channel unit.

3.2.20 The Group was informed that the GES upgrade programme was being delivered to all GES operators and that Aussaguel and Perth GES' (SITA) had had both their voice and data systems upgraded, as of the end of April 2007. The Telenor Satellite Services stations (Eik and Santa Paula) would undergo

upgrades by the end of 2007. This new equipment will provide Aeronautical Mobile Satellite Service (AMSS) via the Inmarsat satellites in their current locations but Inmarsat informed the meeting that they planned to move their fourth generation satellites into new orbits over the three main land masses. This would require provision of AMSS service via seven Inmarsat satellites and that would require upgrades of current GES or deployment of new GES to point to the new satellite locations. In this context it was noted that the potential locations for new GES included the sites of Burum, Netherlands and Hawaii, United States, which would be the sites of the stations providing new generation broadband service via the Inmarsat fourth generation satellites. SITA reported that Inmarsat rough order of magnitude estimates of the cost of these deployments, for a one GES per 14 satellite solution, were be in the range of USD 5-10 Million. Inmarsat reported that internal funding had been secured for a cost efficient implementation.

Use of GES to support satellite based applications

3.2.21 The Group recalled that FANS data link applications and some voice communications in the NAT Region used satellites owned by Inmarsat that were connected to ground data and voice network GES'. The use of Inmarsat satellites was sold to GES operators, who then sold satellite services to aircraft communications service providers including SITA and ARINC. The Inmarsat satellites were linked to multiple GES' providing identical functionality. However, the number of GES' had been reduced because the operators of the GES' that get limited usage could not justify keeping them in operation for business reasons. The GES' had been in place since 1991 and their components were becoming obsolete, therefore requiring the installation of new channel units at significant cost, as mentioned in paragraph 3.2.19 above.

3.2.22 The Group was informed that the GES' had only been equipped with enough channel units to handle the ACARS traffic of the aircraft contracted to use the GES. Therefore, the GES closures and capacity reductions had taken away GES redundancy and increased the probability of service interruptions. For a GES to be used to backup another GES without undermining the performance for its primary users, the GES would need extra channel units costing approximately USD 1 Million per GES which would need to be financed.

3.2.23 The Group was informed that it was believed that ANSP's using FANS desired high levels of satellite ACARS performance and therefore backup GES'. This conflicted with the economic logic of the GES operators to merge and shut down duplicate stations to reduce costs, to offer lower prices and therefore to maximize their business. This was amplified in the case of satellite ACARS by the desire of the airlines to obtain the lowest possible price.

3.2.24 The Group agreed that ANSP's using FANS needed to consider whether the FANS benefits could be achieved by having access to a better performing satellite ACARS service. This should take account of potential savings in HF voice operating costs and the increasing number of aircraft. This would have to justify the ANSP's compensating ACARS service providers for the cost of equipping each other's primary GES with enough capacity to be used for backup.

3.2.25 The Group agreed that the issues raised were sufficiently important and, because they were of a policy nature including safety, finance and service provision, coordination was required within administrations, ANSPs and the airspace user communities. It was further agreed that no decision could be made but that the issue needed to be urgently addressed. It was therefore agreed that a Special NAT SPG Meeting should be convened to be held at the same time as NAT IMG/31 during the week of 12 to 16 November 2007 at which time a way forward could be agreed. The Special NAT SPG Meeting should be preceded by a meeting of technical experts including system engineering, operations, safety management and business developments who would be tasked with preparing for the Special Meeting. The Secretary agreed to act as the focal point to coordinate this activity.

3.2.26 Although the problem highlighted above was considered to be a global issue and should therefore be examined at that level, it also needed to be addressed at the regional level because communications were an integral part of the NAT Regional development programme.

NAT SPG Conclusion 43/29 - Convening of a Special NAT SPG Meeting

That the Regional Director of the ICAO EUR/NAT Office:

a) convene a Special Meeting of the NAT SPG from 15 to 16 November 2007;

b) convene a meeting of technical experts to prepare for the Special NAT SPG meeting during the week of 1 to 5 October 2007 to draft documents to include but not be limited to the following:

i) technical requirements to ensure Ground Earth Station (GES) redundancy;

ii) cost to ensure GES redundancy;

iii) communications requirements necessary to implement and improve the level and efficiency of services;

iv) effects on the High Frequency (HF) infrastructure;

v) monitoring requirements;

vi) cost of doing nothing taking account of forecast increases in traffic and "Open Skies"; and

vii) incentives to meet the communications requirements such as the use of Future Air Navigation Systems (FANS) with redundant GES' only.

4. DOCUMENTATION UPDATE

4.1 NAT Documentation review

NAT Document Management Office (DMO) report

4.1.1 The Group noted a report from the Document Management Office (DMO) regarding the on-going work, which would result in amendments to NAT Regional documentation, namely:

a) amendments to Doc 4444 and the NAT SUPPs in respect of the contingency procedures;

b) amendment to NAT SUPPs in respect of mass turn backs;

c) a draft of consolidated NAT flight planning guidance material; and

d) a list of technical discrepancies between the performance specification principles used for MNPS and RNP.

4.1.2 As regards the status of the ICAO provisions that affected the NAT Region, it was recalled that in the past two years, several changes had been made to the NAT SUPPs and to Doc 4444. Some of the changes materialized from the inclusion of new provisions into Doc 4444, which had a consequential effect on the NAT SUPPs. In addition, provisions relating to mass turn backs had been developed for inclusion in the NAT SUPPs (NAT SPG Conclusion 40/3 refers). In order to simplify the processing of these changes in a coherent manner, it was decided to divide the various changes into the following four separate packages:

a) material that was inadvertently removed from the NAT SUPPs would be re-inserted at the first opportunity;

b) turn back contingency procedures to cater for RNP 10 and RNP 4 applications;

c) procedures to sustain mass turn backs; and

d) the inclusion of the SLOP in Doc 4444 (paragraph 3.1.62 above refers).

4.1.3 As regards the contingency procedures for RNP 10 operations and the SLOP, they would require further examination by the NAT IMG before they could be submitted for processing. The Secretariat's intention was to present the material to ICAO Headquarters in early September so that the deadline of early October for review by the ANC could be respected with the objective of meeting the 20 November 2008 applicability date. With this deadline in mind, the NAT SPG consultation process must be completed by 1 September 2007 so that the NAT Region's comments could be taken into account when formulating the proposal to be presented to the ANC and before it was officially circulated to States. It was noted that the SLOP and the turn back contingency procedures would be included in the next amendment to Doc 4444. The Group would be provided with updates as they developed so as to prevent last minute surprises.

4.1.4 The time frame for the development of procedures to sustain mass turn backs was not as constraining as for the SLOP and the turn back contingency procedures but it was important to proceed with this development as soon as possible as these procedures were required as a part of the NAT Region Volcanic Ash Contingency Plan (paragraph 2.4.6 refers).

Application of Separation Minima document (ASM)

4.1.5 The Group noted that the update to the ASM document was complete and had been endorsed by the NAT IMG with the knowledge that some issues remained outstanding but that they did not deter from the update. The Group endorsed the new Version of the ASM document and noted that it would only be published electronically on the ICAO NAT PCO web site.

MNPS Airspace Operations Manual

4.1.6 The Group noted that the NAT IMG had stressed that the NAT MNPS Airspace Operations Manual was in need of a significant update and that the necessary resources should be made available to carry out this task. It was recalled that many pilot training facilities used the MNPS Airspace Operations Manual as part of the basic training package used to instruct pilots intending to operate in the NAT Region. Also, because some of the material was out of date or incorrect, elements of confusion and possibly of risk may have been introduced. Some issues that needed to be incorporated included: turn back contingency procedures, communications failure procedures applicable in the northern part of the Region, the need to remove all references to supersonic flight, the inclusion of Phase IV CPDLC, the inclusion of SLOP and volcanic ash procedures. The Group agreed that the Manual should be updated as a matter of urgency and that a new version should be published by 15 November 2007. This amendment would be based on approved material and the Manual would be further amended as new provisions were approved or adopted by ICAO or the NAT SPG.

NAT SPG Conclusion 43/30 - Updates to the NAT Minimum Navigation Performance Specifications (MNPS) Airspace Operations Manual

That the Regional Director of the ICAO EUR/NAT Office make arrangements, through the NAT Document Management Office, to publish an updated version of the NAT MNPS Airspace Operations Manual by 15 November 2007.

NAT Region Flight Planning Manual

4.1.7 The NAT IMG recalled the need to update the NAT Region Flight Planning Manual and to provide a progress report to NAT SPG/43. The task had not been completed but a programme had been agreed for the completion of the update in time to present the draft document to NAT SPG/44 for their endorsement.

NAT Region Guidance Material (Doc 001) and the International General Aviation (IGA) Manual

4.1.8 The Group recalled that Doc 001 and the IGA Manual had not been updated for several years and that both documents were out of date. It was endorsed the proposal that once the NAT MNPS Airspace Operations Manual has been updated, the next priority should be Doc 001 and the IGA Manual.

NAT Air Navigation Plan (ANP)

4.1.9 The Group was advised that the EUR/NAT Office of ICAO was in the process of developing a proposal to revise the format and content of Regional ANPs. A proposed amendment to the European ANP would be developed as a pilot project and presented to the Council. If accepted, the revised European ANP would be used as a template to incorporate the work already done to update the NAT ANP into an amendment proposal. An update would be provided to NAT SPG/44.

Management of the NAT SPG follow up actions

4.1.10 The Group carried out a review of its follow up action list and noted that all items, with the exception of Conclusion 42/15 – Convening a NAT users meeting, all issues had been completed or were being progressed. Concerning Conclusion 42/15, the Group was informed that the Secretary was coordinating with the users and NAT SPG Members to organise a meeting in the first half of 2008.

4.1.11 The Group noted that the Secretariat had carried out a review of the structure of the follow up action list and the result had been a significant departure from the past. A the list was structured in such a way so as to facilitate the eventual transfer of the follow up action items into a data base that would be maintained in an accessible electronic format. References to the ICAO Strategic Objectives and GPIs had been included in order to facilitate the linkage of the work of the NAT SPG to global ICAO activities. The list would also include references to material, whether letters, reports, etc. that had a bearing on the action concerned in order to facilitate tracking. The document would be maintained on-line and would be accessible through the member's portal of the EUR/NAT web site. The Group agreed to the foregoing and noted they it would be provided with a progress report and that the follow up action for NAT SPG/43 would be prepared along the agreed lines.

4.1.12 In addition, it was agreed that all Conclusions that were of a policy nature be sorted by subject area and published on-line in the NAT SPG Handbook, which itself would only be published electronically. Updates to the Conclusions could be proposed to the NAT SPG on a continuous basis in order to maintain the relevancy of the Conclusions. The Group fully supported the initiative and noted that, on the basis of this endorsement, the Secretariat would proceed with the development of the NAT SPG follow up action list and the modifications to the NAT SPG Handbook.

NAT SPG Conclusion 43/31 - Format of NAT SPG follow-up action list

That the NAT SPG follow-up action list:

a) identify related Strategic Objectives, Global Planning Initiatives (GPI), and/or Global Air Traffic Management System Goals for each Conclusion;

b) identify which work programme(s) is/are responsible for specific actions;

c) track progress on each Conclusion until it is closed; and

d) be maintained on-line and be available via the members' portal on the ICAO EUR/NAT web site.

NAT SPG Conclusion 43/32 - Updates to NAT SPG Handbook

That the Secretariat update the NAT SPG Handbook to incorporate Conclusions that are of a policy nature as soon as practicable after each NAT SPG meeting.

5. ANY OTHER BUSINESS

5.1 Next meeting

5.1.1 The Group agreed that NAT SPG/44 be held in the ICAO EUR/NAT Office, from 17 to 20 June 2008.

APPENDIX A -

LIST OF PARTICIPANTS

(Paragraph i.5 refers)

CHAIRMAN

Mr Asgeir PALSSON*

CANADA

Mr Randy SPEIRAN*

DENMARK

Mr Knud ROSING**
Mr Kurt ANDREASEN

FRANCE

Mr André BERMAN *
Mr Philippe TANGUY

IRELAND

Mr Pat RYAN*
Mr Donie MOONEY

ICELAND

Mr Leifur HAKONARSON

NORWAY

Torbjørn HENRIKSEN*

PORTUGAL

Mr Carlos ALVES*
Mr Jose CABRAL
Mr Jose SOUSA

SPAIN

Ms Rosa Maria ARNALDO #

UNITED KINGDOM

Mr Bob THOMSON**
Mr David NICHOLAS

UNITED STATES

Mr Luis RAMIREZ*
Mr Anthony FERRANTE**
Mr David MALOY
Mr Dale LIVINGSTON
Mr Dan VACA

IATA

Mr Peter CERDA
Mr Rick SHAY
Mr Luis A. RUIZ #

IBAC

Mr Peter INGLETON

IFALPA

Mr Mark SEAL

IFATCA

Mr Edward WALLACE

INMARSAT

Mr Gary COLLEDGE

SITA

Mr Philip CLINCH #
Mr Damien McCORMACK #

ICAO

Mr Karsten THEIL (NAT SPG Secretary
Mr Jacques VANIER
Mr Herman PRETORIUS
Ms Carole STEWART
Mr George FIRICAN
Mr Elkhan NAHMADOV
Mrs Nikki GOLDSCHMID

* Member ** Alternate Member # Part time

APPENDIX B – NAT SERVICE DEVELOPMENT ROADMAP

(Paragraph 2.1.15 refers)

Changes: The roadmap was modified to incorporate the following, which are listed in no specific order:

a) Split horizontal separation into its lateral and longitudinal components and considered each separately;

b) For longitudinal separation, looked at time-based improvements separately from the more complex transition to distance based separation;

c) For lateral separation, recognised that in order to support ½ degree track spacing, an appropriate value that would accommodate all applications of the gentle slope rules would be considered in safety analyses;

d) Removed the linkage to RNP4 and to 30x30 NM horizontal separation minima;

e) Added the 5 minute GNSS based climb through separation minimum; and

f) Added a requirement for cost benefit analysis to proceed to distance based longitudinal separation.

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2004	SAATS development		Q3 - Analysis of Mach no technique safety impact	Q2 – Development of Mach number procedures		30-32% of position reports by ADS[6] 25% of flights using CPDLC[7]	FMC WPR trials begin in Shanwick, Gander and Santa Maria

6 NATS/NAV CANADA operational monitoring statistics
7 Ibid.

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2005			Definition of required aircraft capability for reduced longitudinal	Agreement on mandating of data link by 2015 NAT IMG agrees to adopt distance based approach to accommodate future capacity demands		40% FANS/ATN equipage[8]	Q2 – CPDLC Phase 1 and 2 in Reykjavik ATOP Ocean21 operational in Q2 2005
2005		AIDC connectivity completed between BIRK-CYQX					
2006			To be carried out by the United States so as to amend Doc 7030	Q2 – conduct a feasibility study to introduce RNP 10 in WATRS.			
2005		AIDC connectivity between KZWY-LPPO					

[8] NAT FIG/7 – IP/5 Datalink Initiatives for the NAT Region

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2006				Feasibility study for change of NAT airspace from MNPS to RNP Development of future data link standard, ATN or other			Q3 – SAATS O' date FMC WPR trials begin in Reykjavik
2006			Develop a safety case to sustain moving from an operational trial to operations for data link applications	Consider the feasibility of the application of elements of ASAS Reykjavik – begin feasibility study of ADS-B surveillance			CPDLC Phase 3 implemented in Santa-Maria Q4 2006

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2007		AIDC connectivity between CYQX-LPPO	Develop safety case for GNSS-based 5 minute climb-through separation				
2007	Shanwick - Boundary clearance error detection	Mutual Gander-Prestwick Contingency capability	Determine the RNP required to support a reduction to ½ degree lateral separation taking account of the gentle slope rules. Develop safety case for a reduction to ½ degree lateral separation taking account of the gentle slope rules.[9] Develop safety case for reduced time-based longitudinal separation (E.G. < 7 mins)				Q4 CPDLC Phase IV implementation

[9] The lateral and longitudinal dimensions have been split and will be documented separately

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2008	Confirm FDPSs ability to accommodate a reduction to ½ degree lateral separation taking account of the gentle slope rules and reduced time-based longitudinal Modify FDPS' for GNSS-based 5 minute climb-through separation			Develop RNP based lateral procedures for ½ degree track spacing taking account of the gentle slope rules. Develop procedures for reduced time-based longitudinal separation (e.g. ≤ 7 mins) Develop procedures for GNSS-based 5 minute climb-through separation	Commitment to mandating RNP to support a ½ degree track spacing (taking account of the gentle slope rules) between F285 to F415 from 2012	60% of communications via ADS, CPDLC, FMC WPR[10]	
2009	NATS – NAV CANADA HIPS O' date						Implement GNSS-based 5 minute climb-through separation

[10] Projection from NATS/NAV CANADA operational monitoring statistics

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2009	Develop cost/benefit analysis of distance-based longitudinal separation - balancing greater staffing levels and system requirements against enhanced flexibility.			Implement ATN based ADS/CPDLC (subject to ADG deliberations)			Limited implementation of ½ degree track spacing (taking account of the gentle slope rules) between FANS aircraft operating between F285 and F415 (E.G. extra tracks or subset of levels).
2010		GAATS/SAATS hardware rehost?	Develop safety case for distance-based (tactical) longitudinal, separation taking account of the conceptual shift involved.			65% to 80% of communications via data link (FANS, FMC, ATN)[11](To be re-assessed)	

[11] Projection from report of HF Regression Task Force

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2011	Modify FDPS systems for application of distance-based longitudinal separation			Develop procedures for distance-based longitudinal separation			Implementation of RNP (is a GNSS time source sufficient?) based reduced time-based longitudinal separation (E.G. <= 7 mins) between FANS aircraft between F285 and F415
2012					RNP to support ½ degree lateral separation (taking account of the gentle slope rules) mandated in NAT Region between FL285 and FL 415		Full implementation of RNP based on ½ degree track spacing (taking account of the gentle slope rules) separation between FANS aircraft between F285 and F415.
2013							RNP distance-based longitudinal separation implemented between F285 and F415

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2014							
2015				Free flight concept and procedure development commences	Data link communication mandated in the NAT Region where deemed beneficial		
2016							
2017							
2018	Analysis of impact of airborne separation monitoring on FDPs						
2019	ASM development						
2020						50% ADS-B-in equipage	

NAT Service Development Roadmap as endorsed by NAT SPG/43							
Date	**Ground System Development**	**Ground System Sustainment**	**Safety Analysis**	**Operational Development**	**Equipage requirements**	**Equipage level**	**Operational milestones**
2021	Analysis of ASAS impact on FDPs		Analysis of ASAS safety impact	Airborne separation assurance procedure development			
2022							
2023				Airborne separation assurance trials			
2024							
2025					ADS-B-in mandated		Airborne separation assurance

APPENDIX C - PROPOSAL FOR AMENDMENT TO THE NAT REGIONAL SUPPLEMENTARY PROCEDURES (SUPPS) (Doc 7030)

(Paragraph 2.4.13 refers)

(Serial no.:)

a) **Proposed by: The United States of America**

b) **Proposed amendment**:

"Amend the SUPPs in the **NAT Region** as shown below:

4.0 REQUIRED NAVIGATION PERFORMANCE (RNP)

4.1 Means of Compliance
(A2 – 5.1.1; A11 – 2.7 and ATT B; A6, Part I – 7.2.2 and Chapter 3, Note 1; A6, Part II – 7.2.2 and Chapter 3, Note 1; P-ATM – 2.4)

4.1.1 In order for 93 km (50 NM) lateral separation to be applied between aircraft in the New York Oceanic FIR/CTA, the requirements listed below shall be met.

4.1.1.1 The aircraft and Operator must be authorized RNP 10 or RNP 4 by the State of the Operator or the State of Registry, as appropriate. RNP 10 is the minimum navigation specification for the application of 93 km (50 NM) lateral separation.

4.1.1.2 States shall ensure, when granting authorization for RNP 10 or RNP 4, *that Operators establish programmes to mitigate the occurrence of large lateral track errors due to equipment malfunction or operational error.*

5.1.2 Note.— The ICAO Performance Based Navigation (PBN) Manual Volume I – Concept and Implementation Guidance (Doc 9613) provides guidance on aircraft, operations and maintenance programmes for the initial achievement and continued compliance with the authorized navigation specification. Doc 9613 will be supplemented and updated as required and as new material becomes available.

4.1.1.3 Adequate monitoring of flight operations shall be conducted to provide data to assist in the assessment of the achieved lateral navigation performance of the population in relation to the lateral separation minimum. These data shall include statements of the core of the lateral navigational performance, the proportion greater than one-half the lateral separation minimum and the proportion in the vicinity of the adjacent route centreline as these measures have been shown to have a direct link to the risk of collision. A safety assessment shall be carried out periodically, based on the data collected, to confirm that the safety level continues to be met. Data shall include operational errors due to all causes.

Note.— Monitoring will be conducted in accordance with the appropriate guidance material issued by ICAO. Detailed guidance is contained in the Manual on Airspace Planning Methodology for the Determination of Separation Minima (Doc 9689) and the Safety Management Manual (Doc 9859).

4.2 Area of Applicability

4.2.1 93 km (50 NM) lateral separation *may be applied between aircraft authorized RNP 10* or RNP 4 *in all controlled airspace within the New York Oceanic* FIR/CTA.

~~4.0~~5.0 FLIGHT PLANS

5.1.5 *Approval status and aircraft registration*

5.1.5.1 All RVSM-approved aircraft intending to operate in the NAT Region shall include the letter "W" in Field 10 of the flight plan. Furthermore, all RVSM-approved aircraft intending to operate in the NAT Region shall include the aircraft registration in Item 18 of the flight plan.

5.1.5.2 All MNPS-approved aircraft intending to operate in the NAT Region shall include the letter "X" in Field 10 of the Flight Plan.

5.1.5.3 All operators authorized RNP 10 or RNP 4 shall include the letter "R" and the letter "Z" in Item 10 of the Filed Flight Plan and NAV/RNP10 or NAV/RNP4, as appropriate, in Item18.

9.0 SEPARATION OF AIRCRAFT

9.1 Lateral separation
(P-ATM, 5.4.1 and 5.11)

9.1.1 Minimum lateral separation shall be:

a) *93 km (50 NM) between aircraft authorized RNP 10* or RNP 4 *operating within the New York Oceanic FIR*/CTA *except, minimum lateral separation between* aircraft transitioning from MNPS airspace in the New York Oceanic FIR/CTA to other *MNPS airspace shall be 110 km (60 NM)*;

b~~a~~) 110 km (60 NM) between aircraft which meet the minimum navigation performance specifications (MNPS) provided that a portion of the route of the aircraft is within, above, or below MNPS airspace;

c~~b~~) 167 km (90 NM) between aircraft operating outside the MNPS airspace and at least one aircraft does not meet the MNPS;

1) between the Iberian Peninsula and the Azores Islands; and

2) between Iceland and points in Scandinavia and in the United Kingdom;

d~~c~~) 167 km (90 NM) between aircraft not authorized RNP 10 or RNP 4 operating outside MNPS airspace where no portion of the route of the aircraft is within, above, or below the MNPS airspace:

1) between the United States or Canada and Bermuda; and

2) West of 55°W between the United States, Canada or Bermuda and points in the CAR Region; or

e~~d~~) 223 km (120 NM) between other aircraft;

except that lower minima in 5.4.1.2 of the PANS-ATM (Doc 4444) may be applied, or further reduced in accordance with 5.11, where the conditions specified in the relevant PANS-ATM provisions are met (see 9.4)."

"Re-number all subsequent paragraphs."

c) **Intended date of implementation:**

5 June 2008

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

e) **Originator's reasons for amendment:**

On 5 June 2008, the United States, in coordination with States providing Air Traffic Services in the Caribbean and North Atlantic and with international organizations, is planning to implement a redesigned route structure in conjunction with a reduction of lateral separation within the control area of the San Juan FIR, the Atlantic portion of the Miami Oceanic control area and the West Atlantic Route System (WATRS). 93 km (50 NM) lateral separation is planned to be applied between aircraft authorized Required Navigation Performance 10 (RNP 10) or RNP 4 by the State of Registry or State of Operator, as appropriate, operating on oceanic routes or areas. (Guidance and direction for RNP authorization is provided in ICAO Annex 6, Parts I and II, paragraph 7.2 (Navigation equipment). Guidance on the application of 93km (50NM) lateral separation between aircraft authorized RNP 10 or RNP 4, is provided in ICAO Annex 11, Attachment B).

Reduction of lateral separation from 167 km (90 NM) to 93 km (50 NM) will enable an increase of approximately 40% in the number of routes and associated altitudes. Increased availability of routes and altitudes will enable more aircraft to operate on time and fuel efficient routes and altitudes thereby reducing fuel burn and engine emissions. In addition, en route capacity and Air Traffic Management (ATM) flexibility will be enhanced.

Analysis of aircraft types operating in the oceanic areas affected by this initiative indicates that approximately 90% of the flights conducted in the airspace are now flown by aircraft meeting RNP 10 or RNP 4 standards without modification.

Aircraft that are not authorized RNP 10 or RNP 4 (Non-RNP 10 aircraft) will be allowed to continue to file any route at any altitude in areas listed above. They will be cleared to operate on their preferred routes and altitude as traffic permits and will be separated from other aircraft by the existing 167 km (90 NM) standard. The FAA enhanced air traffic control automation system, Ocean21, will aid the controller in applying the applicable separation standard between aircraft authorized RNP 10 or RNP 4, and Non-RNP 10 aircraft.

93 km (50 NM) lateral separation has been applied between operators/aircraft authorized RNP 10 or RNP 4 since 1998 in Pacific oceanic areas. It is also currently applied in the European-South American Corridor; on routes between Santiago, Chile and Lima, Peru; on routes connecting Australia, Asia, the Middle East and Europe south of the Himalayas and, it is planned for trans-Africa routes. Project planners will apply the experience gained in these operations.

f) **Secretariat comments:**

APPENDIX D - AERONAUTICAL INFORMATION CIRCULAR (AIC) ON SAFETY RELATED MATTERS

(Paragraph 3.1.52 refers)

The ICAO North Atlantic Systems Planning Group (NAT SPG), at its forty-third meeting in Paris from 12-15 June 2007, noted a list of safety-related issues affecting the operations in the NAT Region. The Member States want to alert airspace users to the following issues:

Strategic Lateral Offset Procedure (SLOP)

SLOP was created to reduce the risk of collision. SLOP involves the selection of offsets to the right of the cleared track as a Standard Operating Procedure (SOP). Random distribution of aircraft on and to the right of the centre line is key to compensating for the extremely accurate navigation capabilities of modern aircraft. This accuracy creates a situation where aircraft can be at immediate risk of collision if there is an unintended loss of vertical separation between flights following the same or reciprocal tracks.

By allowing pilots to randomly select to fly either 1 or 2 nautical miles (nm) right of the centre line, SLOP also incorporates wake turbulence avoidance.

Although some NAT operators have successfully implemented this procedure as a SOP, there is still relatively little uptake on the part of the majority of NAT operators. Since certain aircraft cannot fly programmed offsets, those that are capable are strongly encouraged to fly an offset of one or two nm right of the centre line.

In practical terms:

1. if your aircraft can be programmed to fly an offset, fly a one nm or a two nm offset to the right of the centre line

2. being random is key to the procedure - follow your company's SLOP SOPs or find ways to choose different offsets for each flight

3. always fly your offset to the right of the centre line

4. you should fly an offset from oceanic entry to oceanic exit

5. you don't need an ATC clearance for an offset

6. you don't need to report that you are flying an offset if you are in the NAT Region

7. if your offset causes wake turbulence problems, choose a different SLOP option (0, 1 or 2 nm to the right of the centre line)

Further information regarding the use of SLOP in the NAT Region is available on the NAT Programme Coordination Office (NAT PCO) Website at www.nat-pco.org.

Report Leaving, Report Reaching

The early discovery of altitude deviations is extremely important to the overall safety of NAT operations. Recently, it has been discovered that pilots frequently defer the required reports of leaving and reaching flight levels until the next routine communication. This has led to instances where aircraft have flown at the

incorrect flight level for long durations. This is not acceptable from a system safety standpoint. While the actual number of vertical errors in the NAT Region is relatively small, the fact that some of these errors continue undetected (and therefore uncorrected) for long durations, has resulted in an unacceptable situation.

In practical terms:

1. report leaving a flight level as soon as you begin your climb or descent
2. similarly, report reaching a flight level as soon as you are level
3. in RVSM airspace, provide the reports even if ATC has not specifically requested them

Adherence to Oceanic Clearance

As a key part of ensuring the overall safety in the NAT Region, pilots are reminded of the importance of strict adherence to the oceanic clearance. The NAT oceanic clearance provides separation from all known aircraft from oceanic entry to oceanic exit. This separation can only be assured if all aircraft enter oceanic airspace in accordance with their oceanic clearance.

Although it may be desirable to defer climb or descent to the cleared oceanic flight level, delaying the request may result in entering oceanic airspace at an incorrect flight level. This has an extremely negative impact on the overall safety situation.

In practical terms:

1. flights must enter oceanic airspace level at the cleared oceanic flight level
2. flights must enter oceanic airspace at the cleared oceanic entry point
3. flights must maintain the assigned true Mach number
4. if a pilot cannot comply with any part of the oceanic clearance, ATC must be informed immediately
5. pilots must ensure that their aircraft performance enables them to maintain the cleared oceanic flight level for the entire oceanic crossing
6. if a pilot discovers that the aircraft is not able to reach or remain at a cleared flight level, ATC must be informed immediately

Further information regarding recommended practices in the NAT Region can be found in the NAT MNPS Airspace Operations Manual and the “On the Right Track” presentations, available on the ICAO NAT PCO Website at www.nat-pco.org .

APPENDIX E - SAFETY MANAGEMENT COORDINATION GROUP (SMCG) REVISED TERMS OF REFERENCE

(Paragraph 3.1.77 refers)

Policy: The level of safety in the North Atlantic Region shall be continuously monitored and improved.

Scope: *In the context of safety management,* ~~W~~within the North Atlantic Region, the SMCG will coordinate the actions related to the identification of trends, the development of mitigation proposals and communications with interested stakeholders.

Objectives: To support improvement of ~~operational~~ System Safety ~~p~~Performance ~~and reduce the incidence of errors maintain safe operations~~ in the NAT Region.

Terms of Reference: The SMCG is responsible to the NAT SPG for coordinating elements of safety management in the NAT Region and will aim to review the navigation and safety performance in the NAT Region. To that end, the SMCG will:

~~1.Manage the activities performed by the CMA.~~

~~2.Recommend methods of improving safety performance in the NAT Region~~

1. Review the ~~aircraft navigation~~ system ~~and~~ safety performance in the NAT Region.

2. Categorise, for the purpose of mathematical analysis, navigational errors and altitude deviations of 300ft or more occurring in NAT MNPS airspace.

3. In co-ordination with the Central Monitoring Agency and the NAT Operations Managers share data on all ATM occurrences in the NAT Region.

4. Work in close co-operation with the CMA to compile data necessary to conduct safety analysis in the NAT.

5. Promote best practices in the ~~operations and~~ management of safety in the NAT Region.

~~Consider all aspects of CNS performance to improve safety in the NAT Region~~

~~8.~~6. Through the CMA, co-ordinate with stakeholders, including the appropriate regulatory authority in cases of safety occurrences. In addition, inform the Secretariat in cases of safety occurrences ~~,~~requiring immediate action~~, coordinate with the Secretariat~~.

~~9.~~7. Review safety monitoring methods and analysis and recommend improvements to the process as appropriate;

~~9.~~8. ~~Establish~~ Employ common procedures for submitting, analysing and~~,~~ categorising ~~and prioritising~~ occurrence~~s~~ reports.

~~10.~~9. Address other related issues as necessary;

~~11.~~10. Report to the NAT SPG.

Composition The Safety Management Coordination Group is composed of representatives from Canada, Denmark, France, Iceland, Ireland, Portugal, the United Kingdom (Central Monitoring Agency (CMA)), the United States, IATA, IBAC, IFALPA and IFATCA.

Rapporteur/secretary The United Kingdom (Central Monitoring Agency (CMA)) representative.

Working Methods The Safety Management Coordination Group meets in conjunction with the Mathematicians Working Group on an annual basis around 2 months before the NAT SPG, and again in autumn for interim scrutiny purposes. The report from the meeting will normally be presented to the NAT SPG by the Rapporteur.

NORTH ATLANTIC CENTRAL MONITORING AGENCY (NAT CMA)
REVISED TERMS OF REFERENCE

(Paragraph 3.1.78 refers)

Terms of reference

The NAT CMA is responsible to the ~~NAT SPG~~ SMCG 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 and analysis of occurrences data, including operational errors ~~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 occurrences, including 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 Safety Management Coordination 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

AAD	Assigned Altitude Deviation
ACARS	Aircraft Communication Addressing and Reporting System
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACG	Aeronautical Communications Group
ACP	Aeronautical Communications Panel
ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance- Contract
AES	Aircraft Earth Station
AFI	African
AFTN	Aeronautical Fixed Telecommunications Network
AIP	Aeronautical Information Publication
AIRE	Atlantic Interoperability Initiative to Reduce Emissions
AMSS	Aeronautical Mobile-Satellite Service
ANC	Air Navigation Commission
ANP	Air Navigation Plan
ANS	Air Navigation System
ANSP	Air Navigation Service Provider/s
AOR	Atlantic Ocean Region
ASE	Altimetry System Error
ASM	Application of Separation Minima (Document)
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATMG	Air Traffic Management Group
ATN	Aeronautical Telecommunications Network
ATS	Air Traffic Services
BGAN	Broadband Global Area Network
BOTA	Brest Oceanic Transition Area
CAA	Civil Aviation Authority
CAATS	Canadian Automated Air Traffic System
CAEP	Committee on Aviation Environmental Protection
CAR	Caribbean
CMA	Central Monitoring Agency
CNS	Communications, Navigation and Surveillance
CNS/ATM	Communications, Navigation and Surveillance/Air Traffic Management
CPDLC	Controller Pilot Data Link Communications
CPWG	Cross Polar Trans East Air Traffic Management Work Group
CTA	Control Area
DGCA	Director(s) General of Civil Aviation
DLSG	Data Link Steering Group
DMEAN	Dynamic Management of European Airspace Network
EANPG	European Air Navigation Planning Group
EC	European Commission
EFG	Economic and Financial Group
EUR	European
EUR/NAT	European and North Atlantic
EUROCAE	The European Organization for Civil Aviation
FAA	Federal Aviation Administration
FANS	Future Air Navigation Systems
FANS 1/A	Boeing/Airbus implementations of FANS
FASID	Facilities and Services Implementation Document
FCMA	FANS Central Monitoring Agency
FDPS	Flight Data Processing System
FIR	Flight Information Region

FLAS	Flight Level Allocation Scheme
FMC	Flight Management Computer
FPL	Filed Flight Plan
FSS	Flight Service Station
GES	Ground-Earth Station
GMS	Global Positioning System Monitoring System
GNE	Gross Navigation Error
GNSS	Global Navigation Satellite System
GP	General Purpose
GPI	Global Planning Initiative
GPS	Global Positioning System
HF	High Frequency
HMS	Height Monitoring System
HMU	Height Monitoring Unit
IAOPA	International Council of Aircraft Owner and Pilot Associations
IATA	International Air Transport Association
IBAC	International Business Aviation Council
ICAO	International Civil Aviation Organisation
IFALPA	International Federation of Air Line Pilots' Associations
IFATCA	International Federation of Air Traffic Controllers' Associations
IGA	International General Aviation
IMSO	International Mobile Satellite Organization
IOR	Indian Ocean Region
LHD	Large Height Deviation
LIM NAT RAN	Limited North Atlantic Regional Air Navigation
LoA	Letter of Agreement
MET	Meteorology
MNPS	Minimum Navigation Performance Specifications
MWG	Mathematicians Working Group
NACC	North American, Central American and Caribbean
NAM	North American
NAT	North Atlantic
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
NATO	North Atlantic Treaty Organisation
NDB	Non-Directional Radio Beacons
NEXTGEN	Next Generation Air Transportation System
NICE Group	NAT IMG Cost Effectiveness Group
NM	Nautical Mile
NOTA	Northern Oceanic Transition Area
OAC	Oceanic Area Control Centre
OCA	Oceanic Control Area
OESB	Oceanic Error Safety Bulletin
OPLINKP	Operational Data Link Panel
OPS MNG	NAT Operations Managers
OTS	Organized Track System
PAC	Pacific
PANS-ATM	Procedures for Air Navigation Services – Air Traffic Management
PANS-TNG	Procedures for Air Navigation Services – Training
PCO	Programme Co-ordination Office
PIRG	Planning and Implementation Regional Group
POR	Pacific Ocean Region
PRM	Preferred Route Messages
P-RNAV	Precision Area Navigation
RAN	Regional Air Navigation
RCG	Regional Coordination Group

RNAV	Area Navigation
RNP	Required Navigation Performance
RTCA	Radio Technical Commission for Aeronautics
RVSM	Reduced Vertical Separation Minimum
SAATS	Shanwick Automated Air Traffic System
SARPs	Standards and Recommended Practices (ICAO)
SASP	Separation and Airspace Safety Panel
SATCOM	Satellite Communications
SESAR	Single European Sky Air Traffic Management (ATM) Research
SES	Single European Sky
SITA	Société internationale de Télécommunications aéronautiques/ International Society for Aeronautical Telecommunications
SLOP	Strategic Lateral Offset Procedure
SMCG	Safety Management Coordination Group
SMS	Safety Management Systems
SOP	Standard Operating Procedure
SOTA	Shannon Oceanic Transition Area
SUPPs	Regional Supplementary Procedures
SVTF	Satellite Voice Task Force
TLS	Target Level of Safety
TMA	Terminal Control Areas
TRASAS	Trans-Regional Airspace and Supporting ATM Systems Steering Group
VHF	Very High Frequency
WATRS	West Atlantic Route System
WPR	Waypoint Position Report
www	World Wide Web

– END –