INTERNATIONAL CIVIL AVIATION ORGANIZATION

SUMMARY OF DISCUSSIONS AND CONCLUSIONS OF THE FORTY-FOURTH MEETING OF THE NORTH ATLANTIC SYSTEMS PLANNING GROUP

Paris, 17 to 20 June 2008

PREPARED BY THE EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO JUNE 2008

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FOREWORD

i. Introduction

i.1 The Forty-Fourth Meeting of the North Atlantic Systems Planning Group (NAT SPG) was held in the European and North Atlantic (EUR/NAT) Office of ICAO from 17 to 20 June 2008.

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, Mrs Carole Green and Mr Elkhan Nahmadov from the same Office and Mr Chris Dalton from ICAO Headquarters. 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 Larry Lachance as the new member for Canada, Mr Per Harald Pedersen as the new member for Norway and Mr Matthew Temple-Smith as the new member for the United Kingdom.

i.4 The Group was informed that Mrs Carole Green had been appointed as an Air Traffic Management Regional Officer in the EUR/NAT Office of ICAO. She would be assisting with the work of the NAT SPG.

i.5 In addition to the Members of the NAT SPG, representatives from the International Air Transport Association (IATA), the International Business Aviation Council (IBAC), the International Federation of Air Line Pilots Associations (IFALPA) and the International Federation of Air Traffic Controllers' Associations (IFATCA) attended the meeting. A list of participants is at **Appendix A**.

i.6 The NAT Mathematicians' Working Group (NAT MWG) had met in the EUR/NAT Office of ICAO from 24 to 30 April 2008 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 NAT MWG report in support of the assessment of system safety performance in terms of lateral and vertical risk.

i.7 The NAT Safety Management Co-Ordination Group (NAT SMCG) had met in Ottawa from 29 October to 2 November 2007 and in the EUR/NAT Office of ICAO from 21 to 24 April 2008 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. The report on scrutiny errors was also used as one of the primary inputs to the risk assessments carried out by the NAT MWG.

i.8 The NAT Aeronautical Communications Group (NAT ACG) held its eighth meeting in Bodø, Norway from 6 to 8 May, 2008. The Rapporteur, **Mr Jose Cabral** from Portugal, presented their report.

1.9 The NAT Operations Managers (NAT OPS MNG) postponed their meeting until September 2008.

i.10 The 36th meeting of the NAT Traffic Forecasting Group (NAT TFG) was held at ICAO Headquarters in Montreal from 14 to 23 April 2008. The group's task was to update its low, base and high forecasts for the periods 2008-2010, 2015 and 2020. The Secretariat presented their report.

i.11 The NAT Implementation Management Group (NAT IMG) had met twice since NAT SPG/43 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/43 and a report on their activities and findings was presented by the Secretariat. Mr. Ásgeir Pálsson, the Chairman of the NAT SPG and of the NAT IMG participated in the NAT EFG/16 Meeting

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 Panels and Committees
- 1.2 Adjacent Regions
- 1.3 NAT provider States
- 1.4 Technology

Agenda Item 2: Planning and implementation

- 2.1 NAT Implementation Management Group report
- 2.2 NAT Economic and Financial Group report
- 2.3 NAT traffic forecasting
- 2.4 Data link implementation matters
- 2.5 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
  - a) Operations Managers report
  - b) Communications sub-group report
  - c) Systems operations

Agenda Item 4: Documentation update

- 4.1 MNPS Airspace Operations Manual
- 4.2 Other documentation
- 4.3 NAT SPG follow up

Agenda Item 5: Any other business

- 5.1 Working methods of the NAT SPG
- 5.2 Next meeting

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1. DEVELOPMENTS

1.1 ICAO Panels and Committees

ICAO's 36th Assembly

1.1.1 The Group was provided with highlights of ICAO's 36th Assembly (Montreal, 18 to 28 September 2007). As regards language proficiency requirements, which came into force on 5 March 2008, the 36th Assembly decided that the ICAO Council should provide guidelines to States on the development of implementation plans and that no extension to the applicability date beyond that of 5 March 2008 was envisaged.

1.1.2 Information was provided concerning a new Group on International Aviation and Climate Change composed of senior government officials, that had been created with a mandate to recommend an aggressive ICAO Programme of Action on International Aviation and Climate Change. The Group had been tasked with formulating an "implementation framework" consisting of strategies and measures that Contracting States of ICAO could use to achieve emissions reductions. Regarding Performance Based Navigation (PBN) implementation, the Assembly decided on various issues, including the need for familiarization seminars and training in all ICAO Regions, the establishment of task forces under the Planning and Implementation Regional Groups (PIRG) framework, the development of tools to assist States with implementation of PBN and the development of ICAO provisions and guidance material (paragraph 2.1.22 refers).

1.1.3 A proposal for amendment to Annex 2 provisions regarding the table of cruising levels had been presented to the 36th Assembly. ICAO had taken the necessary actions to process this amendment. The expected applicability date of the amendment, if adopted, would be November 2009. Comments received from States and international organisations were being reviewed by the Air Navigation Commission (ANC).

ICAO Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS)

1.1.4 The Group was informed that, on 27 May 2008, in accordance with established procedures, the President on behalf of the Council, had approved Amendment 1 to the 15th Edition of the *Procedures for Air Navigation Services Air Traffic Management* (PANS ATM) (Doc 4444). This Amendment related to flight plan provisions which could lead to a significant change to the flight plan form itself. The applicability date was 15 November 2012.

1.1.5 In addition, the ANC had begun examining a proposal to amend Doc 4444 in order to incorporate new provisions for contingency procedures that would take account of the concerns that had been raised by the NAT SPG. The amendment also proposed to relocate the Strategic Lateral Offset Procedures (SLOP) from "Chapter 15 – Contingencies" to "Chapter 16 – Miscellaneous Procedures". This should help reduce some of the confusion regarding the status of the SLOP. The expected applicability date was 19 November 2009.

1.1.6 The Group was informed that a new study group, known as the Aeronautical Information Services (AIS)-Aeronautical Information Management (AIM) Study Group (AIS-AIMSG), had been established by the ANC to assist the Secretariat with the development of:

a) a global strategy/roadmap for the transition from AIS to AIM, which should be completed by December 2008;

b) SARPs and guidance material, expected by 2010, related to the provision of a standard aeronautical information conceptual model and standard aeronautical information exchange model to enable the global exchange of data in digital format; and

c) other SARPs, guidance and training material necessary to support AIM implementation.

1.1.7 The Group also noted that the ANC had disbanded the Aeronautical Information and Charts Study Group (AISMAPSG) and the Aeronautical Data Modelling Study Group (ADMSG).

Special Africa-Indian Ocean (AFI) Regional Air Navigation Meeting

1.1.8 The Group was informed that ICAO had convened a Special Africa-Indian Ocean Regional Air Navigation Meeting (2008), to be held in Durban South Africa from 24 to 29 November 2008. All Contracting States, as well as the international organizations concerned were urged to attend the meeting which will offer an opportunity to strengthen region wide commitments to resolving deficiencies, address critical safety issues and serve as a checkpoint for assessing progress of the *Comprehensive Regional Implementation Plan for Aviation Safety in Africa* in the AFI Region.

1.2 Adjacent Regions

North American (NAM) and Caribbean (CAR) Regions

1.2.1 The Group was informed that work was progressing to implement Automatic Dependent Surveillance-Broadcast (ADS-B) and Very High Frequency (VHF) Direct Controller-Pilot Communications (DCPC) in the Hudson Bay area (November 2008) of Northern Canada as well as Southern Greenland. Exclusionary airspace will be established in the Hudson Bay area between FL350 and FL400 inclusive effective mid 2009.

European (EUR) Region

1.2.2 The following developments relating to the European Region were presented:

a) the further extension of 8.33 kHz channel spacing was subject to a new business case to be developed by Eurocontrol;

b) a new implementing rule on the use of the Flexible Use of Airspace (FUA) was being prepared by Eurocontrol on behalf of the European Commission (EC). In this connection, it was noted that a task force had been set up by the EUR/NAT Office of ICAO to examine ways and means to expand the FUA concept to the High Seas. NAT Region provider States had been invited to participate in the task force and the NAT IMG intended to monitor developments;

c) arrangements for the extension of the Reduced Vertical Separation Minimum (RVSM) monitoring budget for the EUR Region beyond 2008 were being developed by Eurocontrol;

d) the establishment of the Ireland/United Kingdom Functional Airspace Block (FAB) was formally announced at the European Council of Ministers for Transport meeting in Luxembourg, on 13 June 2008;

e) proposals to expand the Single European Sky (SES) Legislation, known as SES Package 2, were being finalised and new implementing rules would be drafted. The NAT IMG would monitor these developments and report to the NAT SPG as required; and

f) arrangements for the setting up of the SES Air Traffic Management (ATM) Research (SESAR) Joint Undertaking were to be finalised by October 2008. This would provide the framework for further developments.

1.2.3 The Group was informed about the progress of the SES interoperability implementing rule on Data Link Services (DLS). The Final Report for the Draft Implementing Rule on DLS was circulated and presented to the Single Sky Committee (SSC) and the formal adoption was expected by the end of 2008 by the EC. The implementing rule specifies the mandatory features for the provision and use of data link services. The Final Report envisions two milestones in datalink implementation: 7 February 2013 for all Instrument Flight Rules (IFR) flights above FL285 in the core European area and from 5 February 2015 within the remaining airspace of the EC member States above FL285.

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

1.2.4 The Group was informed that the second meeting of the Trans-Regional Airspace and Supporting ATM Systems Steering Group (TRASAS/2) had been held in the Asia and Pacific (APAC) Office of ICAO, Bangkok, Thailand, from 18 to 19 March 2008. Issues that required action by the NAT SPG had been presented separately.

1.3 NAT provider States

Implementation of West Atlantic Route System (WATRS) Plus Route Structure Redesign and Separation Reduction Initiative

1.3.1 The Group was informed that the implementation of the West Atlantic Route System Plus (WATRS +) changes had taken place without any difficulties on 5 June 2008. Although the proposal for amendment to the NAT *Regional Supplementary Procedures* (SUPPs) (Doc 7030) had not yet been approved, ICAO had given this matter a high priority.

2. PLANNING AND IMPLEMENTATION

2.1 NAT Implementation Management Group report

NAT Operational Contingency Plan

2.1.1 In follow up to NAT SPG Conclusion 43/26, the Group was informed that all NAT Air Navigation Service Providers (ANSP), except for New York Area Control Centre (ACC), had submitted their information and that the template had been used to consolidate the material. With the exception of Madrid, information regarding supporting procedures in adjacent airspace had also been integrated. Contingency route charts, which would include frequency and data link contact information to aid in their understanding, would be included.

2.1.2 The next step would be for each ANSP to complete the information for their section of the contingency plan and to review it for factual correctness. All the material collected would then be edited and the contingency plan would be posted on the NAT Region web site in accordance with NAT SPG Conclusion 42/8. The contingency plan will have controlled access and would not be publicly available. The deliverable should be completed by the end of 2008.

Volcanic Ash Contingency Planning

2.1.3 The NAT Volcanic Ash Contingency Plan was updated on the basis of the outcome of the EUR Region volcanic ash exercise held in February 2008 and would continue to be updated as required. Iceland remained the focal point and the Group expressed its appreciation for their efforts in supporting this activity. The need to disseminate coherent information regarding areas affected by volcanic activity as well as the areas forecast to be affected was considered an important step to mitigate risk due to volcanic activity. It was pointed out that an amendment to the NAT SUPPs regarding mass turn back procedures was required

before the NAT Volcanic Ash Contingency Plan could be finalised. Finally, the Volcanic Ash Contingency Pan would be incorporated into Part 2 of the NAT Operational Contingency Plan.

NAT IMG Cost Effectiveness (NICE) Group

2.1.4 The NICE group had been encountering difficulties collecting data which was used to maintain the data base in order to be able to use the NICE facilities when required. The NAT IMG had re-affirmed its support for this activity and agreed that the NICE group should be given the necessary data to ensure that the data bases were updated. The NAT IMG had been informed that the Canadian and United Kingdom ATS systems could be configured to provide the NICE group with copies of ADS messages in the form of Aeronautical Fixed Telecommunications Network (AFTN) Position (POS) messages in real time. Doing so would be conditional upon an assurance that the receiving party would not disclose the identified data outside ofthe NICE group. It would also be conditional on approval by IATA and IBAC, on behalf of their members. The Group accepted the aforementioned conditions and noted that the Secretary would seek the approval of the user organisations to use the data.

Programme Co-ordination Office (NAT PCO)

2.1.5 The transfer of the NAT PCO web site, which had begun in July 2007 from the United Kingdom host to the ICAO EUR/NAT host, had been completed. The transfer was transparent to the users and the web site would be fully integrated into the ICAO EUR/NAT web site as soon as possible. The members' site was still active but this would also be re-hosted on the EUR/NAT web site in the summer of 2008. This would entail some changes to the access procedures. The NAT SPG and other web site users would be informed of developments when necessary.

NAT Region Eastern Interface

2.1.6 The NAT IMG was informed that the arrival of a large number of aircraft at the EUR/NAT interface within a short period in the morning caused serious capacity problems in London Flight Information Region (FIR). The limited number of entry points compounded by the operators' desire to enter the London area holding fixes as close to 0600 UTC as possible to ensure that they arrived in sufficient time to enable flight connections, was exacerbating the problem. Against this background, it had been stressed that further reductions in separation minima in the NAT Region could aggravate the problem. Consideration would have to be given to implementing ways and means of managing the flow or to develop new operating concepts to accommodate the traffic, especially if the predicted increases of traffic resulting from the implementation of the Open Skies Agreement materialised. The Group was advised that the NAT IMG had incorporated into its work programme the need to take into account the concerns of all domestic interfaces when planning reductions in separation minima.

Coordination of NAT multi-state military operations

2.1.7 The Group noted that, on 21 June 2007, the French missile authority had conducted a second launch (Operation Marlin) of their M51 ballistic missile from the West coast of France (Landes) into the NAT Region, using multiple Danger Areas and Stationary Airspace Reservations to manage airspace access and to disseminate the necessary information. Operation Marlin had directly impacted the airspace operated by Brest, Prestwick, Santa Maria, Gander, Moncton and New York ACCs. Additionally, coordination had been required with, but not limited to, civil and other aviation authorities in Canada, France, Iceland, Ireland, Portugal, the United Kingdom, and the United States as well as the North American Aerospace Defence Command (NORAD) and the (Eurocontrol) Central Flow Management Unit (CFMU). This level of coordination was primarily initiated and maintained by NAV CANADA.

2.1.8 The Group was informed that the United States had agreed to develop material that could be used as the basis for common procedures in order to facilitate the coordination process. The product could

be a template or a check list for all concerned. It was pointed out that Annex 15 already contained provisions for the promulgation of multi-national aeronautical information. Finally, the French authorities would be provided with feedback in order to take account of the lessons learnt when planning future launches.

Rate of aircraft equipage

2.1.9 In follow up to NAT SPG Conclusion 42/4 - Importance of data regarding the rate of aircraft equipage, the NAT IMG had initiated a task to obtain the necessary information. In doing so, it had been recognised that it would be very difficult to acquire all the necessary data from the user community. As a result, Portugal had accepted the task of identifying the costs of getting the information from aircraft database suppliers. The Group noted that the NAT IMG had accepted the proposal to purchase the data at a cost of GBP 750.00 for the information and extra costs of GBP 1000.00 or GBP 1500.00 if the information was updated quarterly or monthly. The information would be supplied in EXCEL®/delimited format by airline with aircraft type, registration, Selective Calling System (SELCAL) and other information, and would include other pertinent references to aircraft in respect of orders and expected delivery timeframes.

2.1.10 In addition to the above, IATA had made available its Member Airlines Avionics Survey, updated to January 2008, which provided current fleet equipage for Navigation, Surveillance, Communications (CNS) and sub-fleet differences. IATA would provide the updates to the survey twice per year, concurrent with the NAT IMG meetings.

2.1.11 The two methods of collecting data would complement each other and improve the overall quality of the data-set therefore providing the required information to update the NAT Service Development Roadmap twice per year. The Group noted that this issue would be reviewed at NAT IMG/34 to determine whether the data met the planning requirements and the NAT SPG would be informed if necessary.

Report from the NAT FANS Central Monitoring Agency (NAT FCMA)

2.1.12 The Group was informed that the most significant focus for the NAT FCMA since NAT SPG/43 had been the coordination with International General Aviation (IGA) users to allow them to utilise the NAT Automatic Dependent Surveillance-Contract (ADS-C) Waypoint Position Reporting (WPR) system without any interoperability issues. A trial was conducted from 1 February 2008 to 30 March 2008 to ascertain the operational suitability of IGA using ADS automated WPR. As a consequence, a draft set of Success Criteria for ADS WPR trials had been produced by the NAT FCMA and issued to the NAT Air Traffic Services Units and the IGA companies. The Group was informed that, on the basis of the trials results, the NAT IMG had agreed that Gulfstream aircraft using the GULFSTREAM Software build designated as Certification Delta, or a later approved version, on the Honeywell Primus Epic platform operated by NJIINC (Netjets)/Gulfstream Aerospace Corp be accepted into the NAT FANS service. As other manufacturers equipped, the NAT FCMA would assist them in entering the NAT FANS service as well.

2.1.13 Concerning the future role of the NAT FCMA, the Group noted that the NAT IMG had supported the proposal that the NAT FCMA have access to test facilities in order to progress its work. As ADS and other applications were being integrated into the front-end systems, less test data was available from other sources such as the Centralised ADS (CADS). It would of course cost money to have access to test facilities. In addition, the role of the NAT FCMA would have to be expanded to include end-to-end monitoring of the satellite communications system, including problem reporting. The extent of the change would be determined by application of the new Guidance Material for End-to-End monitoring (paragraph 2.4.5 refers). Although it was too early for an in-depth evaluation of the future role of the NAT FCMA, the Group noted that Canada and the United Kingdom would continue to provide the necessary support to the NAT FCMA. It was however recognised that it may be necessary to review the future role of the NAT FCMA taking account of the possible need to regionally finance this activity.

Implementation of Phase IV[1] Controller Pilot Data Link Communications (CPDLC)

2.1.14 The Group noted that CPDLC Phase IV[1] had been successfully implemented in most NAT FIRs on 17 January 2008. The Group recalled that CPDLC had already been implemented in New York FIR; the member for Norway indicated that they were examining issues related to the implementation of CPDLC in Bodø Oceanic FIR and would report to NAT SPG/45.

Implementation of the Strategic Lateral Offset Procedures (SLOP)

2.1.15 The NAT IMG had recalled the importance that the NAT SPG 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. An Aeronautical Information Circular (AIC) related to safety issues in the NAT Region, including the SLOP, had been prepared during NAT SPG/43 and circulated by a State Letter issued by the EUR/NAT Office of ICAO.

2.1.16 The Group was informed that efforts had been undertaken by the Air Navigation Service Providers (ANSP) to increase the use of the SLOP. It acknowledged that every attempt needed to be taken to reduce risk in the NAT Region but noted that there had not been any consensus on the need to assign an offset on a region-wide basis. Nevertheless, the Group encouraged all concerned to continue their investigations on how to increase the uptake of the SLOP.

Updates to the NAT Common Co-Ordination Interface Control Documents (NAT ICD)

2.1.17 The Group was informed that the NAT Common Coordination ICD had not been updated for several years and that technology had progressed and global provisions had evolved. In addition, the President of the Council had recently approved an amendment to Doc 4444 which changed several elements of the flight plan and laid the ground work for a major revision in the 2012 time frame (paragraph 1.1.4 refers). Accordingly, the NAT IMG had established an Air Traffic Services (ATS) Inter-Facility Data Communication (AIDC) Task Force to update the NAT ICD. The Group noted that the task force would also discuss interface issues required for Future Air Navigation Systems (FANS) operations and ways and means of improving data transfer protocols so as to reduce coordination errors.

Implementation of AIDC in the NAT Region

2.1.18 It was recalled that a significant number of Large Height Deviations (LHD) reported to NAT SPG/43 by the NAT SMCG had involved coordination errors. It had therefore been recognised that the use of AIDC could enhance safety by eliminating or reducing the potential for co-ordination errors. The use of AIDC would also improve the efficiency of the ATS units by facilitating the co-ordinating process. Furthermore, used in conjunction with AIDC, CPDLC may possibly be used to deliver oceanic route clearances therefore reducing the possibility of gross navigation error (GNE) caused by insertion errors. Considering the benefits that could be derived from an expanded use of AIDC, the Group agreed that its implementation in the entire NAT Region be given a higher priority and that an implementation plan should be drafted.

NAT SPG Conclusion 44/1 - Implementation of Air Traffic Services (ATS) Inter-Facility Data Communication (AIDC) in the NAT Region

That the NAT Implementation Management Group:

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

a) prepare an AIDC implementation plan for the NAT Region; and

b) submit the plan to NAT SPG/45 for approval.

The use of ADS-C reporting for conformance monitoring

2.1.19 The Group was informed that the NAT IMG had initiated work to assess ways and means to use ADS-C event contracts to detect lateral and vertical deviations from the cleared route and flight level in order to reduce risk. This application would provide the air traffic controller with a very early indication that an aircraft was deviating from its cleared flight profile. Early detection of potential LHDs and/or GNEs and their early resolution would significantly reduce the amount of time flown at the wrong profile and therefore reduce risk. To maximise the safety benefits that could be achieved, periodic or event contracts would have to be set up with all ADS-C equipped aircraft operating in the NAT Region. This was strongly supported because it could help to reduce the level of risk below the Target Level of Safety (TLS).

2.1.20 In agreeing that periodic or event reporting should be used to contribute to reducing risk, the Group felt that the associated costs should not rest exclusively on those that were equipped because all aircraft benefited from the reduced risk. Accordingly, the Group agreed that the NAT Economic and Finance Group (NAT EFG) examine this issue to determine if a more equitable charging mechanism could be found.

NAT SPG Conclusion 44/2 – Use of Automatic Dependent Surveillance-Contract (ADS-C) to reduce risk due to departures from the cleared flight profile

That:

a) the NAT Implementation Management Group prepare an implementation plan for the use of ADS-C for safety related conformance monitoring;

b) the NAT Economic and Finance Group determine ways to ensure an equitable charging mechanism; and

c) NAT SPG/45 be provided with recommendations on the way forward.

Task force on assessment of communications infrastructure in the Northern airspace

2.1.21 The Group was informed that the TRASAS, at its second meeting, had agreed on Conclusion 2/3 which stipulated the need for the NAT SPG to establish a task force regarding improved communications in Northern airspace. The Group was also informed that the intent of the task force was to collect and analyse data concerning all forms of communications north of 80^{o} North in order to obtain a clear view of what communications facilities were available and what was needed. It was recognised that caution was required in order to avoid duplication of effort with the Cross-Polar Work Group (CPWG). With this in mind, the Group endorsed the establishment of the Surveillance and Communications in Northern Airspace Task Force (SCNATF).

NAT SPG Conclusion 44/3 – Establishment of the Surveillance and Communications in Northern Airspace Task Force (SCNATF)

That:

a) the SCNATF be established with the following terms of reference and working methods:

Purpose

Due to the development of aircraft capable of operations over extremely long distances, coupled with the availability of new routes, operations in the Polar region are steadily increasing in number. The area is characterised by unreliable HF communications and is outside the coverage area of geostationary communications satellites. At a recent meeting of the Trans-Regional And Supporting Air Traffic Management (ATM) Steering (TRASAS) Group it was therefore announced that the NAT SPG – a forum where all the ATM providers concerned are represented - would establish a Task Force for the purpose of investigating and proposing solutions to resolve communications related issues negatively impacting the safety and efficiency of cross-polar operations.

Terms of Reference The SCNATF should:

1. Carry out an analysis of existing surveillance and communications facilities available to provide Air Navigation Services (ANS) North of 80^{o} North.
2. Determine the future requirements for surveillance and communications facilities.
3. Propose ways and means to meet the requirements.
4. Report to the TRASAS through the NAT IMG.

Composition

The SCNATF is composed of representatives from Canada, Iceland, Norway, the Russian Federation and the United States.

Working Methods

The work of the task force shall be carried out by e-mail or teleconferences to the extent possible. Meetings may be required from time to time. Due consideration shall be taken of the work carried out by the Cross Polar Working Group so as to avoid all duplication of effort or conflict of interests.

Rapporteur Canada.

b) the rapporteur provide the next meeting of the NAT IMG with a report.

Performance based navigation (PBN)

2.1.22 The Group recalled that the ICAO Assembly had adopted Resolution 36-23 (paragraph 1.1.2 refers) on PBN global goals which urged all States to implement Area Navigation (RNAV) and Required Navigation Performance (RNP) air traffic services routes and approach procedures in accordance with the ICAO PBN concept laid down in the Performance Based Navigation Manual (Doc 9613). The Assembly also resolved that States and PIRGs should complete a PBN implementation plan by 2009 to achieve implementation of:

a) RNAV and RNP operations (where required) for en route and terminal areas according to established timelines and intermediate milestones; and

b) approach procedures with vertical guidance (APV) (Baro - Vertical Navigation (VNAV) and/or augmented Global Navigation Satellite Systems (GNSS) for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016 with intermediate milestones as follows: 30 per cent by 2010, 70 per cent by 2014.

2.1.23 The Group noted that harmonisation with the ICAO PBN concept in the NAT Region should be encouraged and that a transition path should be defined. One of the objectives should be to avoid the need for multiple airworthiness and operational approvals for intra and inter-regional operations. The ICAO PBN Manual provided guidance for implementing RNAV or RNP applications in a given region. The guidance included three processes: requirements determination, identifying ICAO navigation specifications for implementation, and planning and implementation. In most cases it would be possible to use an existing specification to satisfy the navigation requirements. However, the development of a new navigation specification would be considered in those very exceptional cases where it was impossible to find trade-offs between the defined airspace concept and navigational functional requirements that can be supported by a standard ICAO navigation specification. In this case, a new navigation specification would need to be developed which would be subject to ICAO review in order to avoid proliferation of regional standards. Such a specification should be applicable globally and not tied to a specific separation. If the need for such a specification was identified then this work should be undertaken by a global body.

2.1.24 The guidance was accepted and the Group stressed that the favoured solution would be to determine whether the NAT Region's requirements could be accommodated by an existing navigation specification. The Group noted that the NAT IMG had included in its work programme a task to determine whether existing navigation specifications would meet the NAT Region's operational requirements or whether a new navigation specification would need to be developed. The Group endorsed the proposal that the development of a new navigation specification would only be undertaken as a last resort if it were determined that the NAT operational requirements could not be met by existing navigation specifications.

Lateral separation

2.1.25 The Group was informed that a study had been commissioned to determine the RNP necessary to implement ½ degree lateral separation between adjacent tracks whilst meeting the TLS. The analysis had concluded that the navigation performance specified for RNP 4 was not sufficient, but that the navigation performance specified for RNP 2 would be. The RNP 2 application exceeded that originally stated as a design goal for the ½ degree route spacing and, while potentially operationally desirable, may have limited use. On the other hand, aircraft approved for RNP 4 operations typically exhibited better navigation performance than what was specified for the approval.

2.1.26 The Group was informed that it may be possible to develop a consensus on the way forward as regards the RNP required to support ½ degree lateral separation. The Group supported the aim that the favoured solution would be to determine whether the NAT requirements could be accommodated by an existing navigation specification. The Group endorsed the NAT IMG view that one RNP value and one approval was the desired end result and that it would not be practical nor desirable to have aircraft approved to two different RNP values to operate in the NAT Region. Finally, the Group noted that because navigation performance was a pre-requisite for reducing lateral separation, work to determine an acceptable navigation specification would be carried out in parallel with the work associated with reducing the lateral separation to ½ degree.

Application of 5 minute climb/descent between GNSS equipped aircraft

2.1.27 The Group was informed that the NAT IMG had finalised the safety studies needed to support the implementation of 5-minute longitudinal separation between GNSS equipped aircraft climbing or

descending in an oceanic/remote procedural control environment where surveillance was not available and third party communications might be used. The ICAO approved comparative analysis method was used to carry out the safety studies. In respect of the hazards that had been identified, it was noted that the NAT IMG had been satisfied that the work done to mitigate the identified hazards had been sufficient to allow the procedure to be applied in the NAT Region provided controllers were trained and that the A*pplication of Separation Minima (ASM) Document* was amended. In respect of the latter, the following text should be used as the basis to amend the ASM Document:

> "3.4.2 G. 5 minutes between climbing or descending turbojet aircraft while vertical separation does not exist, provided that the level change is commenced within 10 minutes of the time the second aircraft has reported over a common point.
>
> Note: Both aircraft must be GNSS equipped
>
> Note: The clearance must contain a time by which the clearance is no longer valid. Therefore a 'CLEARANCE CANCELLED (time) addendum must be attached to the main part of the clearance authorizing the climb/descent manoeuvre."

2.1.28 The Group agreed that implementation should proceed with a target date of 15 January 2009. The Group also agreed that the NAT IMG should review all of the preparations in order to make a go/no go decision on behalf of the NAT SPG at its 33rd meeting in November 2008.

2.1.29 The Group was informed that the Separation and Airspace Safety Panel (SASP) was progressing an amendment to Doc 4444 which would address the proposed application.

NAT SPG Conclusion 44/4 – Implementation of 5 minute climb/descent between Global Navigation Satellite Systems (GNSS) equipped aircraft

That the NAT Implementation Management Group:

a) prepare an implementation plan with a target date of 15 January 2009 for the implementation of 5-minute longitudinal separation between GNSS equipped aircraft climbing or descending in an oceanic/remote procedural control environment where surveillance was not available and third party communications might be used;

b) review the implementation plans at its meeting scheduled for November 2008; and

c) make the go/no go decision on behalf of the NAT SPG.

Reduction in time-based longitudinal separation minimum between ADS equipped aircraft to 5 minutes (RLongSM-T5)

2.1.30 The introduction of reduced longitudinal separation to improve the efficiency of operations in the NAT Region has been a longstanding issue for the NAT Region. After many attempts to determine how to reduce the longitudinal separation minimum, it would appear that the implementation of 5 minutes longitudinal separation between ADS-C pairs of aircraft may be feasible. The application of this separation minimum would result in a reduction in fuel burn with a consequent reduction in greenhouse gas emissions through an increased likelihood of flights being able to operate at their optimum flight levels. RLongSM-T5 would be enabled by the improved confidence in aircraft position estimates provided by more frequent position reporting using ADS-C. However, the introduction of RLongSM-T5 would require changes to oceanic and domestic Air Traffic Control (ATC) systems, agreements on methods of operation by NAT Region ANSPs and aircraft operators as well as approval from appropriate regulatory authorities. The Group noted that the member for the United Kingdom had indicated that they would provide the NAT IMG with a revised concept of operations that took account of RLongSM-T5.

2.1.31 Key enablers for reduced longitudinal separation were the improved navigational performance and accurate time keeping associated with Global Positioning System (GPS), coupled with the enhanced surveillance and communication capabilities of data link. Therefore only pairs of aircraft equipped with GNSS, providing ADS-C reports and communicating using CPDLC would be eligible for the application of RLongSM-T5. It was noted that there were aircraft that had the capability to report using ADS-C which did not have CPDLC. In this regard it was considered essential that a safeguard be put in place to ensure that such aircraft did not form one of a pair of aircraft to which a reduced longitudinal separation was applied.

2.1.32 As regards the communication performance that would be required, the Group noted that the NAT IMG had determined that, in the absence of an approved Required Communications Performance (RCP) standard for the NAT Region to implement RLongSM-T5, the communications requirements defined by RCP 240[2] would be used.

2.1.33 The Group noted that the modelling work carried out so far provided sufficient assurance that a minimum longitudinal separation of 5 minutes was feasible and that if all hazards identified in the Preliminary Hazard Identification (PHI) could be mitigated there should be no barrier to RLongSM-T5 being implemented. However, it would be necessary to convert a feasibility study to an implementation plan and it would be necessary to ascertain that the satellite communications infrastructure could meet the requirements, which would be developed on the basis of the definition of RCP 240. The Group noted that the NAT IMG had put a high priority on this task and that it would present an implementation plan to NAT SPG/45 if it was timely to do so.

User requirements

2.1.34 The Group was informed that the leaders of the world's airlines met at the IATA Annual General Meeting in Istanbul from 2 to 3 June, 2008 and discussed the urgent crisis that were being driven by record oil prices and the slowdown in the global economy. Over the last six years, airlines have cut non-fuel unit costs by 18% and distribution costs by 25%; they have also improved fuel efficiency by 19% and there has also been a notable increase in labour productivity. But these great achievements have been completely overshadowed by an additional jet fuel cost burden of USD 99 billion that IATA Member airlines expect to face over the next 12 months if oil stays at USD130 a barrel.

2.1.35 A total of 24 airlines have ceased operations or entered into bankruptcy protection in the last five months. Many more will not survive unless the industry can work together to reduce the overall cost burden. Airlines were abruptly changing course by suspending flights, slapping new luggage fees on travellers, raising fuel surcharges on tickets, switching to smaller aircraft, grounding older, inefficient aircraft and raising fares. One carrier plans to cut domestic capacity by 12 percent in the fourth quarter of this year, and lay off perhaps thousands of employees. Another will cut domestic capacity by 15 percent in the fourth quarter, slash 1,500 jobs and jettison its low-fare unit.

2.1.36 All stakeholders in aviation faced a "perfect storm" from skyrocketing oil prices at USD 130 per barrel and the weakening global economy. Every USD 1 increase in oil prices adds USD 1.6 billion to the global airline fuel bill. IATA was predicting that the airline industry would make losses of USD 2.3 billion in 2008 because of sustained high oil prices. But these losses would worsen to a huge USD 6.1 billion if oil prices stayed at USD 135 per barrel for the remainder of 2008.

[2] As defined in the ICAO Manual on Required Communications Performance (ICAO Doc 9869) and RTCA DO-306/ EUROCAE ED-122 Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard)

2.1.37 These extraordinary times call for extraordinary measures. Airlines would continue to drive hard for more cost reductions and cost efficiencies within areas they could control but there was limited scope for further incremental savings. Airlines were an engine for the global economy. The global economic contribution of aviation was an estimated USD 3,560 billion, equivalent to 7.5% of World Gross Domestic Product, generating a total of 32 million jobs (Air Transport Action Group (ATAG) 2008). For this reason, failures in the airline industry would send economic shockwaves throughout the world. Whilst airlines were in the front line of this perfect storm, the impact of stagnating or even declining traffic would be felt very quickly by airports, air navigation service providers and Governments. A concerted effort by all parties was required.

2.1.38 With this in mind, the world's airline leaders published the Istanbul Declaration. This Declaration sought urgent attention in six specific areas, including greater cost and operational efficiency from our industry partners. IATA firmly believed that together we could identify and implement measures in 2008 that would greatly increase fuel savings. The industry was therefore requesting all concerned to strive to find any and all improvements in terms of operating efficiencies which would reduce fuel usage and carbon emissions.

2.1.39 Here are four examples of measures, provided by IATA, that could bring significant fuel and CO_2 savings:

a) Saving 1 minute of flight-time has significant value. For example, if we could save 1 minute for each flight in the United States alone the savings would equate to about 2 billion kg of fuel and 6.3 billion kg of CO_2 per year. This could be accomplished by turning aircraft quicker on course after departure, or clearing aircraft direct whenever possible, or finding ways to use military training airspace when not in use.

b) Initiatives such as 5 minute climbs/descents using GNSS, reduced time based (RlongSM-T5) or distance based longitudinal separation that could improve the ability of operators to obtain the most fuel efficient flight levels should be developed and implemented as rapidly as possible.

c) The reduction in costs associated with HF voice communications should also be considered. It was recalled that the NAT IMG working groups had all stated concerns about the ability of the existing HF infrastructure to provide the HF voice capacity to meet increases in NAT traffic. The users agreed that cost savings could be gained by changes to the way HF services were provided and the number of messages used. For example, reducing SELCAL requirements for functioning data-link equipped aircraft, obtaining MEL relief for aircraft that are data-link equipped and allowing frequency assignments using data-link instead of relaying by voice could be initiatives to be considered.

d) Continuous Descent Arrivals (CDA) or allowing pilot's discretion descents from their cruising level for arrival brings significant savings. CDA's bring about 10% savings in fuel and a 40% savings in noise. However, it does not have to be a formal CDA program, but just a cultural change of limiting the levelling off at low altitudes, which require aircraft to increase flaps (drag) and accelerate their engines. In terms of fuel, depending upon aircraft type, between 170 and 230 kg of fuel could realistically be saved per arrival.

2.1.40 Such measures that involved a change in technique, not investment in infrastructure, can bring enormous fuel and CO_2 savings.

2.1.41 The Group noted that the NAT IMG had already given direction to its working groups to take account of the concerns expressed by IATA. IBAC agreed that any and all efficiency improvements to the existing infrastructure and operating techniques within the NAT Minimum Navigation Performance Specifications (MNPS) airspace should be implemented as soon as technically feasible.

2.1.42 The member for Canada informed the Group that NAV CANADA had implemented new procedures that would allow air traffic controllers to evaluate the overall penalties that may be incurred by other traffic as a result of a re-clearance to an aircraft. This would permit ATC to use economic metrics rather than the traditional first come first served method to determine who receives what clearance.

The NAT Service Development Roadmap

2.1.43 It was recalled that NAT SPG/43 had endorsed the new version of the NAT Service Development Roadmap and that the NAT IMG had been tasked with maintaining the document. The Roadmap was not to be considered as a project management document but as one that clearly stated what planning activities the NAT Region intended to embark upon; it should also provide an indication to service providers and airspace users what to expect and when. With this in mind, the NAT IMG and its working groups were to examine the Roadmap at each meeting and provide comments as required. In addition, the members and user organisations would keep the document under review and provide suggestions for change.

2.1.44 Because of the uncertainty that had arisen as a result of the lack of reliability of the data link communications infrastructure, it had not been possible to carry out a systematic review in order to update the document accordingly. However, the United Kingdom had agreed to act as the focal point to collect all proposals for change, including those stemming from NAT SPG/44, and to consolidate them for presentation to the NAT IMG at each of its meetings. It was stressed that the aircraft equipage column would also be updated at the same time taking account of the information provided by IATA and Portugal (paragraphs 2.1.9 and 2.1.10 refer).

2.1.45 As regards the presentation of the document, the Concept of Operations, the Service Development Roadmap and the Communications Strategy would be melded into one document. When carrying out the editorial task, efforts would be made to improve the readability and consideration would be given to expanding the Roadmap to include inter-relationships with the work programmes of the various working groups as well as other related issues.

2.2 NAT Economic and Financial Group

Activities of the NAT EFG

2.2.1 The Group was advised that the NAT EFG had reviewed analyses of a NAT ANSP Survey results. The focus of the survey had been to evaluate strategies for increasing efficiency of operations in the NAT Region and promoting the adoption of data link communications. The results included information regarding perceptions of areas of inefficiency in NAT Region air navigation services and possible areas for service improvements. The Group was advised that the results had been provided to the NAT IMG.

2.2.2 The Group noted that work was ongoing in the United Kingdom to address the perceived inefficient use of frequency spectrum, including bandwidth that was currently set aside for aviation purposes. It was also noted that it was likely that any initiative or implementation of a frequency pricing or auction scenario could be repeated in other States. The United Kingdom Office of Communications (Ofcom) had published aeronautical frequency spectrum valuations[3] as a result of the preliminary feasibility studies. The Group was advised that the NAT EFG would continue to track this issue.

2.2.3 The Group was also advised that the United Kingdom Civil Aviation Authority (CAA) was actively engaged at appropriate levels to support the Department for Transport and Ofcom to resolve institutional, financial and band management issues. These discussions had regard to the United Kingdom

[3] The information can be found at http://www.ofcom.org.uk/research/radiocomms/reports/spectrumaip/

CAA's statutory duties, including international safety, operational and regulatory obligations, including the international coordination of frequencies required for aviation purposes.

Financial issues related to the replacement of the Strumble Height Management Unit

2.2.4 The Group was informed that the initial tendering process to replace the Strumble Height Monitoring Unit (HMU) had been completed. A tender for the sub-contract for the HMU procurement, which had been updated to account for a new concept of operations for the HMU, was in process and the original cost estimate of GBP 2.95 million was not likely to change. It was expected that a contract would be finalized by the end of June and that an aggressive schedule would be pursued toward the replacement being completed by spring of 2009.

Financial issues related to the provision of Air Navigation Services in the NAT Region

2.2.5 The Group noted that, given the need to maintain a voice infrastructure, data link equipage had not enabled a significant reduction in the High Frequency (HF) voice infrastructure in the NAT Region. The Group was advised that the NAT EFG would undertake further work to quantify the costs that had been avoided by the alleviation of HF congestion through use of data link. This could be considered when determining whether to differentiate communications charges.

2.2.6 The Group noted that the NAT EFG was continuing to study possible ways to harmonize NAT Air Navigation Services (ANS) charges. The Group also noted the NAT EFG's consensus that the goal of possible harmonization of NAT charges was to achieve a charging formula that properly took account of the level of effort and the value of the services being received which had an appropriate level of transparency for those paying the fees.

2.2.7 The Group was informed that the proposed amendments to the Danish and Icelandic Joint Financing Agreements had not received the necessary level of support and had therefore not been enacted. An informal meeting to address the concerns with the proposed amendments had taken place and it appeared that the proposal would be supported if the implementation of the changes to the ATC charging scheme could be phased in over three years. A modified amendment proposal was in process and it was expected that a revised agreement could come into force as early as January 2009.

2.2.8 The Group was advised that there had been an initial analysis of the impact of the Open Skies Agreement between the European Commission and the United States; the agreement had come into effect on 30 March 2008. Whilst understanding that only a short period had passed since its coming into force, the Group was informed that several changes in traffic patterns seemed to support an impact scenario of a combined effect of an alliance driven expansion and an initial surge in activity as existing low cost carriers and other new market entries offered United States/Europe services It was noted, however, that it was impossible to separate the effects due the rise in fuel prices and the changes in currency exchange rates, which were possibly influencing the observed increase in passengers from Europe to the United States. The Group was advised that the NAT EFG had determined that there had been a 9.7% increase in the number of scheduled flights between January and April of 2008 over the same period as last year and that there were indications that there would be a higher than usual increase in summer traffic (paragraph 2.3.5 also refers).

2.2.9 The Group was advised that some changes to the timing of flights and routes being flown had already been noted by ANSPs, such as an increase in the ratio of opposite direction traffic and a higher variability in city pairs being flown. As well, because less than 50% of NAT traffic was operating on the NAT Organized Track System (OTS), the complexity of NAT operations was increasing. Finally, the Group was informed that there was expected to be a significant increase in the amount of traffic operating in the Northern part of the Region due to increased cross polar operations (paragraph 2.2.10 below also refers).

Cross Polar Operations

2.2.10 The Group was advised that the Russian Federation was predicting traffic increases of 20 to 50% for cross polar flights, which could result in a significant increase in traffic in the Northern part of the NAT Region (paragraph 2.2.9 above also refers). Also, it appeared possible that a significant increase in flights between the Middle East and North America was likely to continue, creating traffic growth in the South, as well.

Updates to the NAT EFG Work Programme

2.2.11 The Group noted that the work related to the task "complete the cost comparison of service provision in the NAT Region" had been completed and the output would be used internally by the NAT EFG. Accordingly this task was removed from the NAT EFG work programme. No other changes were made to the work programme that had been endorsed by NAT SPG/43.

2.2.12 The Group noted that the Chairman of the NAT SPG and NAT IMG had advised the NAT EFG that there was concern that the current financial arrangements in place to finance regional projects might not have the necessary flexibility. The Group agreed that the NAT EFG should determine the feasibility of developing less complex means for financing Regional initiatives.

NAT SPG Conclusion 44/5 - Financial mechanism for funding NAT Regional initiatives

That the NAT Economic and Financial Group:

a) examine current arrangements for funding multi-national initiatives for the NAT Region;

b) determine what constraints must be taken into consideration for the funding of such initiatives;

c) develop a NAT Regional financing mechanism; and

d) provide a recommendation to NAT SPG/45.

2.3 NAT Traffic Forecasting

General

2.3.1 The Group examined the report of NAT TFG/36, which presented a synopsis of the traffic forecasts for the years 2008 to 2010 as well as for 2015 and 2020. It was noted that the work of the NAT TFG took account of NAT SPG Conclusion 43/10 and the coming into force of the open skies agreement. The NAT TFG wished to record their gratitude for the contributions that had been made by Mr Andrew du Boulay and Ms Jenny Hurley from NATS, who have left their administration. The full report is available on the ICAO EUR/NAT web site.

Forecast assumptions

2.3.2 The Group was informed that detailed statistics for two one-week periods, July 1 to 7 (peak) and November 1 to 7 (off peak) in 2006 and 2007, were provided by 4 (of 5) North Atlantic Area Control Centre (ACC) (Gander, Reykjavik, Santa Maria, and Shanwick) as well as the Edmonton ACC, which handles Polar flights. These data were matched to extract only those flights that cross 30^{o} West at Flight Level 250 (FL250) or above. The initial impact of Open Skies (partially reflected in planned schedules from late March/April onwards) was based on a combination of Official Airline Guide (OAG) intelligence and information collated and distributed to the NAT TFG by the EUR/NAT Office of ICAO.

2.3.3 The Group updated its estimate of 2006 aircraft movements and compiled what it considered to be a reasonable estimate of 2007 aircraft movements. The estimated 2006 and forecast 2007 aircraft movement count (derived at NAT TFG/35 in April 2006) were revised upwards as follows:

		Forecast 2006	2008 Actuals/Update	Var %
Passenger (Million)	**2006**	73.7	73.1	-0.81%
	2007	76.9	76.4	-0.65%
Traffic (Thousand)	**2006**	418.8	421.2	0.57%
	2007	435.3	442.5	1.65%

2.3.4 This upward revision in aircraft movements in the light of a downward revision in passengers was due to a combination of:

- Smaller aircraft size
- Increase in capacity/supply by some United States operator carriers (possibly due to Open Skies, which was more noticeable in the latter part of 2007)
- Reduced load factors

2.3.5 For the most part, the downward revision in the 2006 and 2007 passenger estimates reflected overall slower growth performance than anticipated due to a general economic slowdown and the reverberations of the recent credit crunch/sub-prime market crisis in the United States. Oil prices also continued to rise substantially. Although in real terms, ticket prices had bucked the trend of oil price growth in recent years, the 'tipping point' beyond the initial surge of Open Skies market growth was likely to see ticket prices change unless oil prices fell back fairly quickly. Should this trend become a long-term condition then this was likely to have a negative impact on the Base Case forecast (paragraph 2.3.7 refers).

2.3.6 A comparison of passenger and flight growth in the NAT Region between 2000 and 2007 had shown passenger traffic having grown by 7.7% (inclusive of the downturn due to 9/11 and the Gulf War) compared with an equivalent flight growth of 15.9% during the same period. This was largely due to some operators changing towards smaller sized aircraft during the period and latterly increases in seat supply/capacity by some United States operators that had led to a decrease in load factors.

Base Forecasts

2.3.7 Taking into account the expected effects of Open Skies, the NAT TFG projected that passenger demand would grow from 76.4 million passengers in 2007 to 136.7 million passengers in 2020, with average annual growth of 7.0% between 2007 to 2010 and successive five year average annual growth rates thereafter of 4.2% and 3.6% for 2010 to 2015 and 2015 to 2020 respectively. Flight forecasts for the same period were projected to grow from 442,500 flights in 2007 to 724,900 flights in 2020 with average annual growth of 6.2% between 2007 to 2010 and successive five year average annual growth rates of 3.2% for both 2010 to 2015 and 2015 to 2020.

2.3.8 Cargo flights were projected to increase at an annual rate of 3.0% over the period 2007 to 2020 from 23,400 in 2007 to 34,300 in 2020. This compared with 3.5% average annual growth assumed in the previous forecast for the same period.

2.3.9 International General Aviation (IGA) flights were forecast to increase from 28,200 in 2007 to 47,600 in 2020, an average annual growth rate of 4.1%. This was comparable with the 4.2% average annual growth assumed in the previous forecast for the same period.

2.3.10 The historical data for military flights crossing the North Atlantic showed that these had peaked in 2003 at the time of the Iraq War but had since dropped to the pre 9/11 levels seen in 2000. In the forecast, military operations were held at the 2007 level throughout the remainder of the forecast period.

High and Low Forecasts

2.3.11 The Group's high (optimistic scenario) and low (pessimistic scenario) forecasts of passenger demand (and hence flights) were formed primarily by varying the assumptions about economic growth in Canada, the United States and Western Europe. In addition, the varying impact of Open Skies had been factored into both the high and low case forecasts with the high case including a potential boost with the introduction of Stage 2 of the Open Skies agreement. The low case scenario however, excluded this assumption but erred on the side of optimism should Stage 2 not reach agreement. The low case in this scenario did not assume that the uplift in traffic associated with Stage 1 (introduction in March 2008) would be reversed.

2.3.12 Passenger demand in the low case (pessimistic scenario) was forecast to grow from 76.4 million passengers in 2007 to 119.4 million in 2020, with average annual growth between 2007 and 2010 of 4.5% and successive five year average annual growth rates thereafter of 3.4% and 3.0% for 2010 to 2015 and 2015 to 2020. Passenger demand in the high case (optimistic scenario) was forecast to grow to 156.9 million by 2020, with average annual growth between 2007 and 2010 of 9.7% and successive five year average annual growth rates thereafter of 4.8% and 4.3% for 2010 to 2015 and 2015 to 2020 respectively. In the low case, passenger levels in 2020 were forecast to be 12.7% below the baseline forecast; in the high case 14.8% above.

2.3.13 Total North Atlantic flights in the low case (pessimistic scenario) were forecast to grow from 442,500 flights in 2007 to 620,900 in 2020, with average annual growth between 2007 and 2010 of 3.1% and successive five year average annual growth rates thereafter of 2.3% and 2.7% for 2010 to 2015 and 2015 to 2020 respectively. Flights in the high case (optimistic scenario) were forecast to grow to 849,500 by 2020, with average annual growth between 2007 and 2010 of 9.4% and successive five year average annual growth rates thereafter of 3.8% and 3.9% for 2010 to 2015 and 2015 to 2020 respectively. In the low case, flights in 2020 were forecast to be 14.3% below the baseline forecast; in the high case 17.2% above. The forecasts, for aircraft movements are summarized in **Table 1** and **Figure 1** of **Appendix B.**

Comparison with 2006 forecasts (NAT TFG/35)

2.3.14 The latest forecasts assumed stronger growth than the previous forecasts in 2007 to 2010 produced at NAT TFG/35 due to the introduction of Open Skies (more than compensating for the weaker predicted European and North American economies and the impact of high oil prices on fares and demand). Weaker forecasts on the European to Central America/Caribbean (EUR-CAM/CAR) routes had been assumed throughout and were indicative of the pessimistic economic outlook.

2.3.15 The NAT TFG's new flight forecasts were comparable with those produced at NAT TFG/35 with the new base case flight forecast predicting -0.4% fewer flights in 2020 than previously forecast and was a result of the competing positive and negative influences of Open Skies and less optimistic world economic (Gross Domestic Product (GDP)/Oil Price) forecasts. Consequently within this overall difference of -0.4%, there were trade-offs at the detail level. The weighted contributions of the -0.4% difference was comprised of 2.9% higher growth for Europe and North American flights being offset by 3.2% slower predicted growth for EUR-CAM/CAR traffic. The remaining differences were associated with more positive IGA traffic growth (+0.9%) and less optimistic Cargo (-0.8%) and Military (-0.3%) traffic growth. The high case was influenced by the assumption of the introduction of Stage 2 Open Skies resulting in the base case being marginally closer to the low case forecast than the high for flights. This bias was less pronounced for the passenger forecast comparison as the high case assumption for flights was expected to be more supply

driven rather than demand driven. **Figure 2** and **Figure 3** in **Appendix B** shows the current base, low and high flights forecasts compared to the 2006 (NAT TFG 35) forecasts.

2.3.16 The table below compares absolute forecast changes and overall weighting by traffic category. Even with the relative downturn impact on economics (reflected for the EUR-CAM/CAR and Cargo markets) the EUR-United States' market still showed a net forecast growth by 2020 of 4% due to Open Skies. This was largely fueled by an initial supply boost in the early years and thereafter lower but more stable growth but off a higher base/starting point due to the maturity of new routes established due to Open Skies.

	Forecast Traffic for 2020			
(000's)	**TFG 2006**	**TFG 2008**	**% Var**	**Weighted Contribution to Total Var %**
EUR-NAM	530.8	552.0	4.0%	**2.9%**
EUR-CAM/CAR	99.5	76.5	-23.1%	**-3.2%**
International General Aviation	41.0	**47.6**	16.1%	**0.9%**
Cargo	39.9	**34.3**	-14.0%	**-0.8%**
Military	16.4	14.5	-11.6%	**-0.3%**
TOTAL	**727.6**	**724.9**	**-0.4%**	

Note: The weighted growth percentage figures are rounded values and hence do not sum to -0.4% as per the total variance.

Average day forecasts

2.3.17 The average day forecasts for each route (by sample period) were produced by analysis of historical traffic counts and the relationships between annual total traffic and sample period volumes by route. Initially traffic was grown by specific market forecast growth (e.g. Europe to the United States/Canada and Europe to Central America/Caribbean etc,) excluding the potential impact of Open Skies. Thereafter routes were assessed for Open Skies impact and the additional traffic growth associated with Open Skies apportioned. Further adjustments were incorporated for data anomalies, expected changes in the markets served, differing growth rates by routes, and peak spreading (particularly in the November off-peak period) where appropriate. Details of the average day forecasts are presented in the NAT TFG/36 report[4].

Aircraft type forecasts

2.3.18 The Group recalled that since NAT TFG/34, the forecasting process had been modified to more explicitly incorporate fleet data forecasts. The aircraft type forecasts were updated for 2010, 2015 and 2020. The Group noted that this should be of particular use for the NAT IMG for data link planning purposes.

2.3.19 There were three new aircraft types included in the forecasts: Boeing B787, Airbus A380 and Airbus A350. It was assumed that they would enter service in the NAT Region in 2009, 2011 and 2014 respectively. Future share was determined on each route with reference to the current operators on the route and the suitability of the aircraft type for each route. Where these aircraft were introduced, they were expected to take market share from their current equivalents (A380 from B747, and B787/A350 from B757/B767).

[4] The complete NAT TFG forecast can be obtained on the ICAO EUR/NAT web site: http://www.paris.icao.int/

Further Activities

2.3.20 It was recalled that until 1994, the NAT TFG had met annually to update their forecasts, but since then had met biennially, supplemented by interim meetings, when needed. The next formal NAT TFG meeting would be held in Paris in 2010.

2.3.21 The NAT TFG would monitor actual 2008 passenger and flight data throughout the year and make a decision early in 2009 as to whether an interim meeting would be needed to adjust their short and/or long-term assumptions and forecasts. If needed, an interim meeting would be held in Washington, DC in the spring of 2009. Because of the nature of the change in traffic demand across the NAT Region, due to the sharp increase in the price of fuel coupled with the anticipated restructuring of the demand for the system eventuated by the Open Skies Agreement, the Group encouraged full support for an interim meeting in the Spring of 2009.

2.3.22 As well as monitoring the forecasts and the annual processing of sample data, the Group endorsed the proposal that the NAT TFG carry out the following activities in the period before the next meeting:

a) continue to investigate the data sources for flights by business jets, to ensure that all flights by private business jets and business jet operators were being correctly attributed to IGA within the NAT TFG forecasts, in order to maintain the accuracy of these forecasts;

b) liaise with IATA regarding their source and determination of passenger data and forecasts for Europe to the Caribbean and Central America;

c) in the light of significant unforeseen events impacting forecasting accuracy on the North Atlantic in the period between 2000 and 2003, investigate previous long term accuracy for the NAT TFG forecasts which would be developed from the 2004 forecasting process onwards to verify the appropriate range for the low and high forecasts;

d) continue to work with Eurocontrol Statistics and Forecasting, sharing data, intelligence and forecasts;

e) document the improvements made for the sample day forecasting modules (for average day and aircraft type forecasts by route) in light of the lessons learned in applying them at the meeting;

f) ensure the key sheets used in determining the annual forecasts are “tidied up” in readiness for the next meeting, and that the estimation and forecasting processes as a whole were adequately documented; and

g) continue to work with the Oceanic ACCs to ensure data needs were met in the most efficient manner, and that intelligence was kept up to date.

ICAO forecasting activities

2.3.23 The Group was informed that, pursuant to the endorsement by the Air Transport Committee (183rd Session) of the Secretariat proposal to review ICAO forecasting activities, the Air Transport Bureau had initiated a review aimed at ensuring a better alignment of forecasting activities with ICAO Strategic Objectives. It was noted that all the stakeholders using ICAO forecasts would benefit and were therefore invited to participate in this activity by sending their inputs, comments and suggestions to ICAO. The final outcome of the review would be presented to the Air Transport Committee at its 185th Session (22 September to 10 October 2008).

2.4 Data link implementation matters

Data Link Harmonisation Strategy

2.4.1 A progress report on the work of the Data Link Steering Group (DLSG) and a revised Data Link Harmonisation Strategy was presented to the Group. It was recalled that the DLSG has been established by the ICAO EUR/NAT Office in response to NAT SPG Conclusion 40/7 and European Air Navigation Planning Group (EANPG) Conclusion 46/21 to address the need for convergence of data link applications between the EUR and NAT Regions.

2.4.2 The Group also recalled that, at its last meeting, it had reviewed the interim report of the DLSG and had endorsed NAT SPG Conclusion 43/1 which had invited all concerned to use the agreed Data Link Harmonisation Strategy when planning for data link implementation.

2.4.3 The Group recognised that the DLSG has gone as far as it could in obtaining convergence at an inter-regional level, and that a global approach was now needed. In agreeing that the work programme of the DLSG was largely completed, it was noted that an appropriate body would need to ensure that the harmonization strategy was kept current. Considering the expected reestablishment of the ICAO Operational Data Link Panel (OPLINK), which would be the focal point for the consolidation and development of ATM data link operational requirements, the Group felt that the OPLINK Panel was best suited to carry out the maintenance. The Group also agreed that, pending the establishment of the OPLINK Panel, NAT SPG Conclusion 43/1 should be updated to reflect the revised Data Link Harmonisation Strategy developed by the DLSG and that it should be used until a global process was put in place. The Group endorsed the proposal that the DLSG be disbanded subject to coordination with the EANPG. Finally, the Group thanked the DLSG for the quality of the work which was completed in a short time frame.

NAT SPG Conclusion 44/6 - Data Link Harmonisation Strategy

That the Secretariat update the entries in the NAT SPG Handbook to replace NAT SPG Conclusion 43/1 with the following:

a) Any additional aircraft implementation of Automatic Dependent Surveillance - Contract (ADS-C) should either;

   i) utilise without change the existing DO-258A/ED-100A[5] (FANS-1/A) ADS-C, or

   ii) move to the full implementation of the internationally agreed 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 aircraft data link evolutions should not be pursued, as they will continue to promote divergent paths to the detriment to the broader community. Interim steps or phases toward full implementation of the common technical definition in ground systems should only be pursued on a regional basis, after coordination between all States concerned.

b) Any additional aircraft implementation of Controller-Pilot Data Link Communications (CPDLC) should either;

   i) utilise without change the existing DO-258A/ED-100A (FANS-1/A) or DO-280B/ED-110B[6] (ATN) CPDLC for ACM/ACL/AMC[7] data link services, or

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5 *RTCA/EUROCAE Interoperability Requirements for ATS Applications Using ARINC 622 Data Communications (FANS 1/A INTEROP Standard)*

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

Partial or divergent aircraft data link 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. Interim steps or phases toward full implementation of the common technical definition in ground systems should only be pursued on a regional basis, after coordination between all States concerned.

c) Harmonization of operational procedures for implementation of the above packages is considered essential. States, planning and implementation regional groups, air navigation services providers and other ATS coordinating groups should adopt common procedures to support seamless ATS provision across flight information region boundaries, rather than each State or Region developing and promulgating unique procedures for common functions.

NAT SPG Conclusion 44/7 - Dissolution of the Data Link Steering Group (DLSG)

That, following coordination and in agreement with the European Air Navigation Planning Group, the DLSG be dissolved taking account that the work assigned to it has been completed.

Report of the NAT SPG task force on Required Communications Performance

2.4.4 In follow up to NAT SPG Conclusion 43/29, a Special North Atlantic Systems Planning Group, (NAT SPG SP2007), was held in the EUR/NAT Office of ICAO in Paris from 15 to 16 November 2007. The NAT SPG Special established a Task Force on RCP requirements which had met in Paris from 20 to 22 February 2008.

2.4.5 The purpose of the Task Force was to develop performance based communications guidance material for the NAT Region as well as a supporting programme for the implementation of RCP. Based on the initial work that had been presented to the Special NAT SPG (2007) Meeting, the Task Force refined the draft *Performance Based Guidance Material for Communications* as well as the draft *Guidance Material for End-to-End Performance Monitoring of ATS Communications Services for North Atlantic Airspace*. Both documents are reproduced in **Appendix C** and **Appendix D** respectively. The intent of the Guidance Material was to provide direction to the NAT IMG work regarding data link applications and to ensure global harmonisation.

2.4.6 When considering the draft guidance material, the Group recalled that no ICAO specification for an RCP for the NAT Region existed; however, the *Safety and Performance Standard for Air Traffic Data Link Services in* Oceanic *and Remote Airspace* (RTCA DO-306/EUROCAE ED-122), dated October 11, 2007, did specify performance requirements for oceanic 30 Nautical Mile(s) (NM) by 30NM separation minima. These standards would however need to be further validated to address NAT Regional ATS functions or reduced reliance on HF voice. The minima specified in DO-306/ED-122 appeared to be comparable to the reduced separations being discussed for the NAT Region. Thirty miles lateral would be similar to ½-degrees latitude track spacing and 30 NM longitudinal could be similar to 5 minutes (simplistically about 40NM) but with a more stringent RCP. It was noted that, while the RCP guidance material was intended to serve as a basis to progress the RCP specification for the NAT Region, it needed to fit into a global framework.

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6 *RTCA/EUROCAE Interoperability Requirements Standard For ATN Baseline 1 (ATN B1 INTEROP Standard)*

7 Air traffic control communications management/Air traffic control clearances and information/Air traffic control microphone check.

2.4.7 The Group was informed that it had yet to be determined whether Communications Service Providers (CSP) would be able to affordably meet the requirements specified in DO306/ED122. A number of issues remained to be resolved in order to ensure meeting overall availability requirements for the communication service. Additionally, the continuity requirement associated with the communication transaction time could be problematic. If the requirements could not be affordably met, and assuming that they would stand essentially as-is, then separation reductions that depended on the RCP may need to be delayed until technologies improved.

2.4.8 As indicated in paragraph 2.4.5 above, RCP guidance material had been developed for use by the NAT IMG to plan for the implementation of ATS data link applications in the NAT Region and to sustain the optimisation of the use of HF communications (paragraph 2.5.8 also refers). The Group agreed that the guidance material be adopted for use in the NAT Region as a basis for planning for the implementation of data link technologies and to support other planning requirements in the NAT Region, whether they were related to communications infrastructure rationalisation, reductions in separation minima or other requirements.

NAT SPG Conclusion 44/8 - Performance Based Communications Guidance Material for the NAT Region

That the:

a) NAT Data Link Guidance Material be amended by the Secretariat to incorporate the Performance Based Communications Guidance Material for Air Traffic Services (ATS) data link application as presented in **Appendices D** and **E** respectively to this report;

b) NAT Implementation Management Group (NAT IMG) use the Guidance Material to plan for the implementation of ATS data link applications and high frequencies (HF) communications optimisation; and

c) NAT IMG maintain the Guidance Material whilst ensuring that it fits into a global framework.

2.4.9 The Group supported a proposal that the data link Guidance Material documentation for the NAT, ASIA and PAC Regions should be as uniform as possible. To accomplish this task, it would be necessary to establish a mechanism to develop the document. This mechanism would require the nomination of a point of contact to carry out the work. This would be managed through the NAT IMG. In addition, it would be necessary to establish a working group composed of members from ICAO headquarters and regional offices, the NAT IMG and the Informal South Pacific Air Traffic Services Co-ordinating Group (ISPACG) Data Link Working Group; the work would be coordinated by the United States. The initial work would consist of the following and should be completed by the end of 2008:

a) make changes to align the *FANS 1/A Operations Manual (FOM)* with DO 306/ED 122 (ISPACG);

b) consider the *Guidance Material for ATS Data Link Services in North Atlantic Airspace* (NAT IMG); and

c) identify regional differences and make mutually acceptable changes that would enable planning and implementation regional groups to adopt a global operational data link document.

2.4.10 The Group supported the above proposal and agreed that the NAT IMG should manage this activity for the NAT Region and that this task be completed by the end of 2008.

NAT SPG Conclusion 44/9 - Development and publication of common performance based data link guidance material

That the NAT Implementation Management Group:

a) coordinate the NAT Region inputs to the common performance based data link guidance material;

b) oversee the maintenance of the NAT Region related data common performance based data link guidance;

c) coordinate on behalf of the NAT Region the overall maintenance of the guidance material;

d) complete the initial draft by December 31 2008; and

e) report to NAT SPG/45.

Develop draft material regarding notification of air traffic control and flight crews of data link based communications systems status

2.4.11 The Group was informed that the Task Force on RCP requirements had reviewed material regarding the need to notify ATC and flight crews of data link based communications systems status. Although ANSPs had established procedures for receiving and disseminating information regarding degradations and failures of any part of the ANS infrastructure, in many cases flight crews would not receive onboard indications of Satellite Communication (SATCOM) failures. The Task Force recognised that this issue needed to be addressed and had therefore proposed that it was necessary to refine the following methods for informing flight crews of information related to SATCOM service disruptions:

a) include appropriate phraseology if another data link mode (such as Very High Frequency (VHF) was available in the event of a SATCOM data link failure;

b) take account of applicable direction provided in ICAO Annex 10, Volume II; Eurocontrol procedures; Version 5 of the FANS 1/A Operations Manual (FOM); or other pertinent regional guidance material;

c) include harmonized phraseology regarding service resumption; and

d) include a requirement that flight crews advise ATS in the event they become aware of a SATCOM or data link failure.

2.4.12 The Group was also informed that a significant issue that needed to be addressed was the operational impact of a data link failure in the NAT Region. In the event that reduced separation was being applied, it might not be possible for ATC to establish another form of separation because a large number of aircraft in the airspace could be spaced at or near the minima. Given the current concerns regarding HF congestion, it was questionable whether the existing voice infrastructure would be sufficient to cope with a reversion to voice communications without instituting Air Traffic Flow Management (ATFM) measures even if SATCOM voice were available. It was therefore agreed that the NAT IMG should develop contingency procedures for loss of data link in one or more NAT Oceanic Control Areas (OCA) and examine the feasibility of reverting to voice procedures in the event of a data link failure.

2.4.13 In agreeing to the need to address operational concerns, it was recognized that a data link failure impacting a large sub-set of the population was a significant institutional issue which would need to be addressed when considering the current and future reliance on data link communications, especially if it was determined that reversion to voice procedures was not an option. In that case, it might become necessary to establish mandates in order to ensure that aircraft would have redundant means for data link communications (for example, requiring operators to have service agreements with more than one CSP, or for aircraft to be equipped to use more than one satellite service). If such mandates were established, there

would also be a necessity to ensure that the infrastructure supporting those mandates would remain accessible. It was also acknowledged that these issues could have an impact on any business case supporting operations that depended upon data link or the mandating of data link as currently envisaged in the NAT Service Development Roadmap. The Group also agreed that the NAT IMG should address institutional issues related to data link failure.

NAT SPG Conclusion 44/10 - Operational impact of a data link failure in the NAT Region

That the NAT Implementation Management Group:

a) oversee the development of procedures to ensure that flight crews are provided information related to Satellite Communication service disruptions;

b) address technical and procedural issues concerning the operational impact of a data link failure in the NAT Region;

c) address the institutional issues related to data link failure in the NAT Region; and

d) report to NAT SPG/45.

RCP implementation plan for the NAT Region

2.4.14 The Group was informed that the Task Force on RCP requirements had determined that robust project management was essential to advancing any project through the ICAO process that may have dependencies that are inter-regional and amongst different States, international organizations, Communications Service Provider (CSP), ANPSs and operators. It was also important to ensure that States, CSPs, ANSPs and international organizations make available resources to complete the project.

2.4.15 Because of the number of components relevant to advancing the implementation of RCP, the NAT SPG would need to oversee the coordination of the implementation of RCP to ensure success. In this respect, the NAT SPG would need to manage, to the extent possible, components such as project schedule, project organization and reporting lines, monitoring, project planning and tracking, communication and issue escalation.

2.4.16 In order to ensure that resources would be committed to this project, the Task Force felt that some form of service provision/equipage/ RCP mandate was required in the NAT Region. Otherwise, it would be very difficult to set milestones for all of the various activities. The requirement for a mandate could be met through an amendment to the NAT *Regional Supplementary Procedures* (SUPPS) (Doc 7030) with an applicability date in the last quarter of 2015. This should provide sufficient time to complete the requisite planning and would meet the generally accepted seven year notice for major equipage requirements for operators. Furthermore, this would be in line with the dates being considered by the European Commission for mandatory equipage for CPDLC within airspaces to be defined in the European SUPPs.

2.4.17 The Group was informed that, although an initial implementation plan had been drafted, the NAT IMG had felt that it would be necessary to obtain the endorsement for an RCP mandate before committing the resources needed to carry out the task. As regards the management of the project, the Group agreed that all documentation associated with the project would have to come under some form of configuration management to ensure that the stated objective of global harmonisation was maintained. For the NAT Region, the Group entrusted the NAT IMG with the management and coordination functions. The ICAO Secretariat would undertake to determine who would be responsible to carry out these functions in the other ICAO Regions. All inter-regional coordination would be done through the nominated entities with ICAO acting as the facilitator.

NAT SPG Conclusion 44/11- Development of a Required Communications Performance (RCP) implementation plan for the NAT Region

That the NAT Implementation Management Group (NAT IMG):

a) oversee the development of a project management plan for the implementation of RCP in the NAT Region;

b) develop a proposal to mandate RCP in the NAT Region by 2015 to support the implementation set out in the NAT Service Development Roadmap;

c) draft an amendment to the NAT *Regional Supplementary Procedures* (SUPPs) (Doc 7030); and

d) provide NAT SPG with yearly updates.

Follow up of the Special NAT SPG Meeting

2.4.18 The Group was informed that the Task Force on RCP requirements had agreed that it had completed the tasks assigned to it by the Special NAT SPG Meeting (Conclusion SP2007/6). The Task Force had therefore recommended that it be disbanded. Furthermore, since all other activities stemming from NAT SPG Special 2007 had been dealt with, the Group agreed that no further action be taken in relation to the report of NAT SPG Special 2007. In concluding, the Group expressed its appreciation to the Task Force members for the quality of work carried out in a very short time frame.

Conference on the Economics of Airports and Air Navigation Services (CEANS)

2.4.19 The Group recalled that it had been decided to convene a task force to address the institutional issues involved in ensuring adequate infrastructure for NAT Region data link operations (NAT SPG Conclusion SP2007/9 refers). The Group was informed that it had not been possible to hold the meeting of the task force. Subsequently, it had been determined that the Conference on the Economics of Airports and Air Navigation Services (CEANS), which would be held at ICAO Headquarters from 15 to 20 September 2008, would accommodate the necessary discussion and provide an opportunity to meet the spirit of NAT SPG Conclusion SP2007/9 whilst also recognizing the global nature of these issues. The Group reviewed a draft working paper to be presented at the conference by Iceland. The Group noted the contents and agreed to provide their comments regarding the draft and, at the same time, indicate to the Secretariat their willingness to be represented as co-presenters of the paper. The Group was advised that, in order to meet the deadline for submissions to the CEANS, inputs would need to be received no later than 10 July 2008, so as to allow the working paper to be finalized and submitted on 15 July 2008.

NAT SPG Conclusion 44/12- Presentation to the Conference on the Economics of Airports and Air Navigation Services (CEANS)

That:

a) the Regional Director of the European and North Atlantic (EUR/NAT) Office of ICAO circulate the draft CEANS working paper to the NAT Region provider States and NAT SPG Members;

b) States provide comments, if any, regarding the draft to the Regional Director of the EUR/NAT Office of ICAO no later than 10 July 2008;

c) States inform the Regional Director no later than 20 July 2008 in case they do not wish to co-sponsor the working paper; and

d) that the finalized working paper be submitted to ICAO Headquarters by Iceland on behalf of the co-sponsoring NAT provider States.

Use of SATCOM voice for Routine ATS Communications

2.4.20 The Group recalled that the use of SATCOM voice in the NAT Region was limited to emergencies and non routine communications. However, several ATS providers had started analysing the possible use of SATCOM voice as a valid communications media for routine ATS communications. To coordinate these trials, a SATCOM Voice Task Force (SVTF) had been established by the NAT IMG. In this respect, the Group recalled that the use of SATCOM voice tested during the SATCOM WPR Trials for airborne initiated calls and for voice position reports had not been problematic, that no major security threats had been identified and that SATCOM voice could be used for this type of routine communications.

2.4.21 It was also recalled that the report on the use of SATCOM voice presented to NATSPG/39 by Portugal had raised concerns regarding the use of this communication media over the Public Switched Telephone Network (PSTN), especially in relation to safety and costs. The SVTF had therefore analysed the issues and defined a set of measures required to minimize the negative impact of the use of the PSTN for the conduct ATS communications. A trial was setup to test and monitor the security measures and to evaluate the results in order to draw conclusions about the feasibility of using SATCOM voice for routine ATS voice communications in the NAT Region.

2.4.22 The main conclusions from the SVTF are summarised as follows:

a) the trials were successful in proving that the radio operators and crew procedures defined in the trials Guidance Material for the use of SATCOM voice for routine communications were adequate;

b) the security measures defined in the trials Guidance Material were adequate for the use of SATCOM voice for routine ATS communications;

c) the call setup times needed to be improved to allow quicker access to the communication media by ATS providers;

d) the priority Q12 should be reserved for ATS usage by CSPs that supply the service and this should become mandatory and globally implemented; and

e) network and ground systems capacity needed to be tested and implemented as required and related costs needed to be recovered.

2.4.23 On the basis of the trials results and the proposed mitigation regarding security as outlined above, the Group agreed that SATCOM voice could be used for routine ATS. The Group noted the disbandment of the SVTF and expressed its appreciation for the thoroughness of the work that had been carried out. Pending the development of the implementation plan, the Group agreed that current practices regarding the use of SATCOM voice be continued.

NAT SPG Conclusion 44/13 - Use of satellite communication (SATCOM) voice for routine Air Traffic Services (ATS)

That, considering that the migration to the use of SATCOM voice for routine communications was endorsed, the NAT Implementation Management Group (NAT IMG):

a) develop an implementation plan which:

i) would take account of the need to amend documentation;

ii) could be adapted for global use; and

iii) identified dependencies; and

b) report to NAT SPG/45.

2.5 Other issues

Optimisation of NAT voice communications resources – follow up to NAT SPG Conclusion 43/7

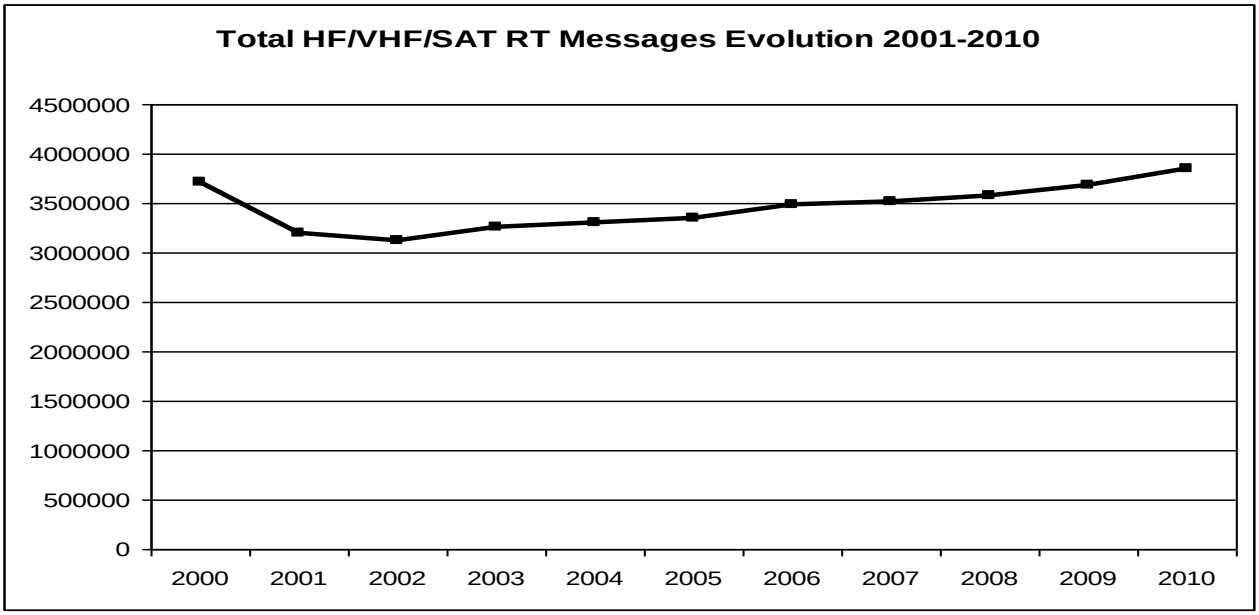
2.5.1 The Group recalled that the volume of voice messages had grown continuously until the year 2000 which had been creating capacity problems for the voice network. It had therefore been necessary to find ways to increase the capacity or to alleviate network congestion. The NAT SPG had decided not to increase the network capacity because it would require investments for infrastructure and there were no available HF frequencies to allocate to the NAT Region as per International Telecommunication Union (ITU) Appendix 27. Instead, it had been decided to take measures to reduce the network congestion based on the use of data link applications available through the accommodation of FANS 1/A equipped aircraft.

2.5.2 The use of data link, combined with other measures that had been taken, had caused an initial reduction of 16.5 % in the volume of messages between the years 2000 and 2002. It was felt at the time that an increase in the percentage of FANS 1/A equipped aircraft was going to occur which would lead to further reductions in voice traffic load.

2.5.3 With that in mind NAT IMG/21 had established the NAT HF Regression Task Force to analyse the future needs of the voice network and to propose scenarios on future voice requirements in the NAT Region. In doing so, the NAT IMG had developed a set of Planning Assumptions which had been endorsed by NAT SPG/41 (NAT SPG Conclusions 41/6 and 41/7 refer).

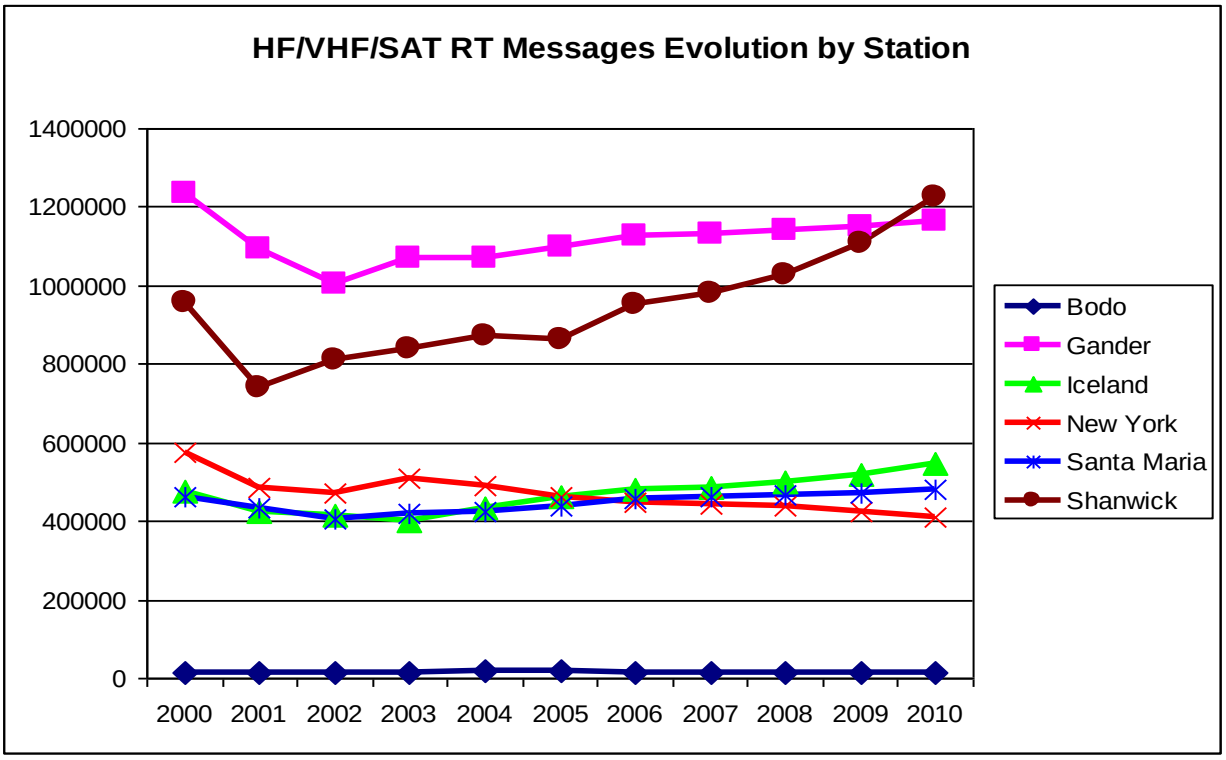
2.5.4 Because the planning assumptions did not prove to be valid and, as of 2002, a continuous increase in voice traffic messages had occurred, as can be seen in **Graphics 1 and 2** below, it had been concluded that the expected impact of data link to reduce voice traffic over the HF network had been over-optimistic; furthermore, the distribution of data link equipped aircraft varied significantly between FIRs.

Graphic 1 - Voice message evolution and forecast for the period 2000-2010



Source: NAT Data Consolidation Reports (2000 to 2006)

Graphic 2 - Voice message evolution and forecast for the period 2000-2010 by station



Source: NAT Data Consolidation Reports (2000 to 2006)

2.5.5 From the graphics, it can be seen that the tendency was for a continuous positive growth until 2010 at which time the voice traffic levels would be higher than the ones reached before the introduction of the data link trials. This forecast was very conservative in regards to the expected traffic increase and it did not take account of the Open Skies Agreement. Therefore, the real increase in traffic would likely be higher than the ones shown.

2.5.6 Based on these forecasts, the NAT Aeronautical Communications Group (ACG) ACG had stated that, if aircraft traffic continued to increase with no relief on the HF infrastructure, network congestion problems would definitely occur from 2009 and beyond. Because HF frequencies were not readily available, the result could possibly translate into operational challenges (paragraph 3.2.8 also refers).

2.5.7 With the above in mind and taking account of NAT SPG Conclusion 43/7, the following points had been considered when examining the basic HF regression planning assumptions agreed to by NAT SPG/41:

a) the unsatisfactory reliability of the data link communications infrastructure;

b) the implementation of the Open Skies Agreement and the continuous rise in HF traffic resulting from a possible surge in traffic by non-data link equipped aircraft; and

c) the lower than expected rate of aircraft equipage for data link applications.

2.5.8 The Group agreed that HF regression was no longer a viable objective *per se* for the medium term. Instead, it would be better to develop a communications strategy that included an optimised use of HF. Accordingly, the Group agreed that Conclusion 41/6 was no longer valid. In lieu of HF regression, it was agreed to optimise the use of HF in order to reduce reliance and to free up some capacity to cater for future

growth. The Group therefore agreed that the NAT IMG should find ways and means to optimise the use of HF in order to increase capacity and, if possible, reduce costs.

2.5.9 The NAT IMG should also consider the question of HF Minimum Equipment List (MEL) relief. It was acknowledged that any decision regarding MEL relief was contingent on the decision to use SATCOM voice for routine ATS communications (paragraph 2.4.23 above refers) and it was recognised that any MEL relief was subject to approval by State authorities.

2.5.10 As regards NAT SPG Conclusion 41/7 regarding the mandatory carriage of data link by aircraft operating in certain parts of the NAT Region, which would be applicable in 2015, the Group agreed that the Conclusion remained extant and that planning should be based on meeting that date. The 2015 mandate would coincide with plans to mandate data link equipage in the EUR Region by 2015. It was noted that this was also compatible with the proposed date for the RCP mandate (paragraph 2.4.17 refers).

NAT SPG Conclusion 44/14 - Optimisation of the NAT voice communications resources

That, having agreed that NAT SPG Conclusion 41/6 had become obsolete:

a) the NAT Implementation Management Group (NAT IMG) develop ways and means to optimise the use of voice communications resources so as to reduce traffic loading to the extent possible;

b) the NAT IMG update the NAT Service Development Roadmap accordingly; and

c) the NAT IMG report to NAT SPG/45.

NAT SPG Conclusion 44/15 - Mandating data link requirements

That, having agreed to mandate data link in the NAT Region by 2015; the NAT Implementation Management Group, taking account of developments in the European Region:

a) define portions of the NAT Region where the use of data link shall be mandatory;

b) develop an implementation plan;

c) update the NAT Service Development Roadmap accordingly; and

d) report to NAT SPG/45.

Note:- The data link requirement mandate of 2015 is coincident with the one to meet an RCP in the NAT Region – Conclusion 44/11 refers.

Discontinuation of the operation of Santa Maria, São Miguel and Flores Non Directional Beacons (NDB)

2.5.11 The Group recalled that NAT SPG Conclusion 42/7 a) stated that Denmark and Portugal should review their requirements for NDBs to support international civil aviation. Portugal carried out a review of the requirement for Santa Maria (SMA), São Miguel (MGL), Flores (FLO) and Horta (FIL) NDBs. NAV Portugal had carried out a safety assessment showing that no changes in the overall navigational safety situation would occur by the discontinuation of SMA, MGL and FLO NDB's. NAV Portugal, supported by the Portuguese Civil Aviation Administration (CAA), had agreed that the safety assessment conducted was sufficient and the withdrawal of the NDBs could proceed.

2.5.12 The Group supported the proposal from Portugal that SMA, MGL and FLO NDB's would be decommissioned as of the AIRAC date of August, 28th, 2008. The Regional Director of the EUR/NAT Office of ICAO was requested to initiate the proposal for amendment to the NAT Facilities and Services Implementation Document (FASID).

NAT SPG Conclusion 44/16 – Withdrawal of Santa Maria, S. Miguel and Flores non-directional radio beacon (NDB)

That the Regional Director of the EUR/NAT Office of ICAO initiate, on behalf of Portugal, a proposal for amendment to the NAT Facilities and Services Implementation Document, Part IV, to remove the requirement for Santa Maria, São Miguel and Flores NDBs.

Establishment of a Volcanic Ash Exercises Steering Group (VOLCEX/SG)

2.5.13 The Group recalled that the implementation of the procedures of the International Airways Volcano Watch (IAVW) had been on the work programmes of both the NAT SPG and of the EANPG since 2004. ATM volcanic ash contingency plans have been developed for the NAT and EUR Regions and published on the ICAO EUR/NAT web site. To support the contingency plans, EUR and NAT volcanic ash exercises had been conducted between 2006 and 2008 using different scenarios of Icelandic volcanic eruptions and upper air winds. The volcanic ash exercises held so far helped in identifying and resolving procedural and communication problems. It had been recommended to continue with the regular tests in both the NAT and EUR regions and to extend the aerial coverage of the tests to all areas that could be affected by volcanic ash coming from active volcanoes in Iceland, Italy or Portugal (the Azores).

2.5.14 In order to coordinate the testing activities, it had been proposed that a small steering group under the auspices of the NAT IMG and the EANPG Programme Coordinating Group (COG) be established. The steering group would ensure continuity of the volcanic ash tests and exercises and report the outcome of the exercises to the NAT IMG and the EANPG COG, including proposals for further improvements of the EUR and NAT volcanic ash contingency plans. To oversee and coordinate these activities, a small group of experts met to discuss how to handle the volcanic ash exercises in the future with the frequency of two per year in order to resolve issues and to ensure that the contingency measures would work in a real situation. The group of experts from Iceland, Italy, the United Kingdom, Eurocontrol and ICAO concluded that, in order to increase the efficiency of the exercises and reduce the workload involved, a small EUR/NAT Steering Group should be established to plan and coordinate the exercises and ensure that the lessons learnt were properly reflected in the respective contingency plans.

2.5.15 The Group was informed that Portugal had initiated actions to raise the awareness of the potential effects of volcanic ash in the Santa Maria FIR. In addition, the Member for Portugal indicated that Portugal wished to participate in the Steering Group.

2.5.16 The Group was also informed that both Canada and the United States, while not wishing to participate in the Steering Group itself, did express a desire to participate in exercises that would be concentrated on an Eastbound flow. Also, Norway informed the Group that whilst not wishing to participate in the Steering Group itself, it would support this important work in any way possible to bring it forward. This was noted and would be brought to the attention of the Steering Group.

2.5.17 The Group agreed that a EUR/NAT Volcanic Ash Exercises Steering Group (VOLCEX SG) should be established consisting of experts from States with active volcanoes (Iceland, Italy and Portugal), the Volcanic Ash Advisory Centres (VAAC) provider States (France and the United Kingdom), Eurocontrol, ICAO and IATA. The steering group would report to the NAT IMG and the EANPG COG in order to ensure a harmonized approach to the volcanic ash contingency planning in the EUR and NAT Regions. Iceland would act as the focal point for the NAT Region. The terms of reference are at **Appendix E**.

NAT SPG Conclusion 44/17 – Establishment of EUR/NAT Volcanic Ash Exercises Steering Group (VOLCEX SG)

That, in order to ensure the continuation of regular volcanic ash exercises in the NAT and EUR Regions, the NAT Implementation Management Group establish and manage a

EUR/NAT Volcanic Ash Exercises Steering Group (VOLCEX SG) with the terms of reference as presented in **Appendix E** to this report.

2.5.18 The Group noted that the EANPG would be informed of the foregoing at its 50th Meeting in December 2008.

3. AIR NAVIGATION SYSTEM REVIEW

3.1 Review of system safety performance

SCRUTINY MATTERS[8]

Vertical navigation performance in the NAT Region during the period 1 January 2007 to 31 December 2007

3.1.1 The Group was informed that reports of altitude deviations of 300 feet or more which had been submitted to the NAT Central Monitoring Agency (CMA) had been reviewed by the NAT SMCG. The reports were used to identify possible or actual trends which might have contributed to vertical errors or affected the severity of the vertical risk in NAT MNPS airspace arising from such errors. ATC coordination errors, non-compliance with an ATC clearance or restriction, and turbulence, ambient temperature and aircraft technical defects were the major causes of risk bearing errors in 2007.

3.1.2 The scrutiny process highlighted that ATC co-ordination errors were, by a significant margin, the main contributor to vertical risk in the NAT Region in 2007. These errors, which included errors involving automated data transfer, caused 34 events accounting for 273 minutes at un-cleared level, as compared to 31 events for 372 minutes in 2006. The other contributors accounted for 187 minutes at uncleared levels in 2007 and 230 minutes in 2006.

3.1.3 Non-compliance with an ATC clearance or restriction led to 27 events, (28 in 2006) resulting in a total time of 140 minutes at un-cleared level (196 minutes in 2006). Of these events, 18 (4 in 2006) resulted in aircraft entering oceanic airspace not at their cleared flight level. Non-classified crew actions accounted for 12 events in 2007 as compared to 3 in 2006.

3.1.4 Turbulence, air temperature and aircraft technical defects accounted for 11 events (15 events in 2006), resulting in a total time at uncleared level of 47 minutes (34 minutes in 2006).

Lateral Navigation Performance in the NAT Region during the period 1 January to 31 December 2007

3.1.5 The Group was advised that the scrutiny of observed Gross Navigation Errors (GNE) in the NAT Region had found that a total of 31 errors were committed in 2007 as compared to 33 in 2006. Of these, 9 (13 in 2006) occurred outside NAT MNPS airspace and were therefore classified as Table *Charlie* errors. A further 20 (17 in 2006) were not eligible for inclusion in the risk analysis as defined by NAT SPG/17 and amended by NAT SPG/23; accordingly, they were classified as *Table Bravo* errors. The remaining 2 (3 in 2006) were classified as *Table Alpha* errors.

3.1.6 There were 139 reported Interventions to Prevent a GNE in 2007, compared to 136 such reports in 2006. Since January 2007, this category has been further refined, with lateral errors of less than 25NM being reported. In 2007, 111 of the interventions to prevent a GNE could be considered to be completely successful with no lateral deviation occurring.

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[8] For the detailed discussions and analysis of vertical and lateral navigation performance, reference should be made to the reports of the NAT SMCG which had been presented to NAT SPG/44.

3.1.7 The scrutiny process was able to determine that 99 lateral errors in 2007 (111 in 2006) were attributable to crew error or probable crew error. This included 73 events (80 in 2006) where the filed flight plan, rather than the ATC clearance, had been followed. 8 cases (12 in 2006) were determined to be attributable to ATC or Clearance Delivery Officer (CDO) errors.

Erosion of longitudinal separation

3.1.8 Thirteen (13) reports were received in 2007 (12 in 2006) regarding occurrences of erosion of longitudinal separation in excess of three minutes.

MATHEMATICAL MATTERS[9]

General

3.1.9 To assist the NAT SPG in reviewing system safety performance, the 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 2007 calendar year;

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

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

3.1.10 The rapporteur of the NAT MWG advised the Group that the meeting had not been attended by a representative from IATA: IATA last participated in the work of the NAT MWG at its forty-first meeting in 2005 and it was hoped that an IATA representative would be able to attend next year's meeting as operational input into the discussions and conclusions was greatly valued by the NAT MWG. A representative from IFALPA was also unable to attend this meeting and their contributions were missed as well. Finally, the rapporteur of the NAT MWG acknowledged the benefit that had been derived through the use of the NAT Deviations and Errors Monitoring Application (NAT DEMA), which had recently been implemented by the NAT CMA (paragraph 3.1.53 also refers).

2007 LATERAL AND VERTICAL COLLISION RISK ESTIMATES

Lateral Risk

3.1.11 2007 was the sixth calendar year of full RVSM operation in NAT MNPS airspace. The Group was informed that the occupancy estimates for the year were based on the full twelve months of 2007, as were the error rates used in the risk estimates. The lateral occupancy estimates for 2007 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 obtained from the Shanwick Automated Air Traffic System (SAATS) and from the Gander Automated Air Traffic System (GAATS) for the 4th and 15th day of each month.

3.1.12 The Group was informed that the same direction lateral occupancy estimates for NAT OTS and Random flights had both increased from 2006 to 2007. However, due to the increasing relative proportion of aircraft not electing an OTS route and instead flying a random route (around 50% for the

9 For the detailed discussions and analysis of vertical and lateral navigation performance, reference should be made to the Mathematicians' Working Group report which had been presented to NAT SPG/44.

Shanwick Oceanic Control Area (OCA) and 40% for Gander OCA) and the linear relationship between the occupancy factors and the traffic counts, the combined occupancy value had remained similar to the previous year. In other words, the higher proportion of random flights had muted the relative change observed year on year to both of the contributing OTS and Random elements. The Random occupancy was still significantly below that estimated for the OTS for the same direction case.

3.1.13 The Group was advised that OTS and random same direction occupancies were generally increasing, with the combined same direction occupancy remaining roughly constant. The introduction of RVSM had resulted in a decrease in all of the same direction lateral occupancies; these values had now increased back to a level similar to pre-RVSM. The Group was informed that trends in same direction occupancy generally followed trends in traffic activity; however they were not directly proportional. Comparing the value for the traffic counts at the monitoring windows, provided by the NAT CMA, there had been a 7.7% increase in total traffic at the monitoring window from 357,238 flights for 2006 to 384,572 flights in 2007.

3.1.14 The Group was informed that, although it was difficult to identify trends for opposite direction occupancies because of the small number of aircraft (and therefore the small number of proximate pairs involved), the NAT MWG nevertheless monitored opposite direction occupancy in order to assure that it remained near to historical levels. Previously, the majority of traffic traversed the NAT in a concentrated mass, in one direction and then back again. Since 2004 there had been a consistent and sustained upward OTS and Random opposite direction occupancy trend which potentially reflected either changes in habits of aircraft scheduling or ANSPs' air traffic management. Either way, as a result of the Open Skies Agreement, it was agreed that it would be useful if the NAT MWG produced quarterly occupancy estimates so that the trend could be understood in more detail. The Group also agreed that it would be beneficial to understand, if possible, what factors had led to the observed increase. Under current demand patterns, the traditional unidirectional concentrations had spread out in time giving rise to an increasing chance of opposing flows in the system. With new interest from low cost carriers, it was possible that the NAT demand trend would change further to cover an extended period and that these changes would make the airspace more complex to manage.

NAT SPG Conclusion 44/18 - -Regular production of occupancy estimates

That the NAT Mathematicians' Working Group produce:

a) quarterly occupancy estimates; and

b) demand trends to refine the understanding of the changing airspace complexity resulting from the implementation of the Open Skies Agreement.

3.1.15 The Group noted that the Gross Navigation Errors (GNE) in NAT MNPS airspace reported in 2007 had been examined in conjunction with the NAT SMCG. This ensured that the two groups were in agreement over the categorisation and weighting of the events for risk assessment purposes. The Group was advised that there had not been any significant change in the ratios of the same to opposite direction occupancy estimates for 2007; therefore there was no need to update the error weights from those adopted at NAT SPG/36. They would continue to be reviewed annually.

3.1.16 In accordance with NAT SPG Conclusion 41/17, the monitoring windows for 2007 included the boundary between Reykjavik domestic and oceanic areas. The Group was informed that there had been a total of two risk-bearing GNEs that had been recorded at the monitoring windows. 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} errors per flight hour. The Group noted that the NAT MWG would continue to review data sources behind the determination of the traffic counts that were, in turn, used to combine OTS and Random risk estimates into a system-wide risk estimate. The implementation of SAATS by the United Kingdom, the extension of the monitoring window to include Reykjavik radar

observations and the decision to further extend the monitoring window to include errors observed by Moncton radars for Westbound flights entering New York oceanic airspace (NAT SPG Conclusion 43/19 refers) had helped to ensure that consistent and correct values were used. The Group was advised that the NAT MWG had not yet completely incorporated NAT SPG Conclusion 43/19 into their work, but would provide an update to NAT SPG/45.

3.1.17 The Group was advised that the OTS and combined errors in 2007 decreased compared to 2006 whereas the random error rate remained very similar. The Group was pleased to note the continued low number of GNEs. It appeared that the actions taken, such as the requirement to compare aircraft-derived estimates of the next and next+1 waypoints to the ATC clearance, along with timely interventions to resolve differences, remained significant contributors to the continued good performance in the lateral dimension. The IFALPA representative advised the Group that a significant contributor to navigation errors revolved around the requirement for flight crews to manually input route re-clearances and urged the Group to continue developments that would enable the direct loading of route re-clearances into aircraft flight management systems.

3.1.18 The estimates between 1999 and 2007 were below the TLS for the lateral dimension, which was 20×10^{-9} fatal accidents per flight hour.

Traffic base for lateral error rates

3.1.19 The Group recalled the need to account for the traffic base used for the generation of lateral error rate estimates. To this end, given that resources had been consumed in meeting the immediate need to address factors associated with vertical risk, the Group agreed that the NAT MWG should resume working toward rationalizing the traffic estimates. The Group recalled its Conclusion 42/10, which stated that the NAT MWG should obtain the number of aircraft that transited the Reykjavik OCA but did not enter the Gander or Shanwick OCAs. The traffic base used to determine the lateral error rate was presently the total number of flights seen in Gander and Shanwick OCAs, which was the same airspace from which GNEs had been observed and reported prior to the decision by NAT SPG/41 to include GNEs observed by Reykjavik exiting the ocean.

3.1.20 The Group agreed that the NAT MWG should undertake additional analyses of available data sources, with a view to making the estimate more precise taking account of possible changes necessary due to the introduction of SAATS. The Group noted that, to identify those flights seen by Reykjavik radar, inbound, but not seen by Gander and/or Shanwick, the NAT MWG would use a 24 day annual sample comparing Reykjavik, Gander, and Shanwick daily traffic. This sample count would 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 would bring the error and traffic base figures into alignment.

NAT SPG Conclusion 44/19 - Determination of future estimates of lateral error rates

> That, in order to identify flights seen by Reykjavik radar but not seen by Gander and/or Shanwick, that are used to determine estimates of lateral error rates, the NAT Mathematicians' Working Group compare Reykjavik, Gander and Shanwick daily traffic based on a 24 day annual sample.

Lateral Overlap Probability $P_y(0)$

3.1.21 A key parameter used in calculations of vertical and longitudinal operational and technical risk is the lateral overlap probability $P_y(0)$[10]. These risks change in direct proportion to this value. Thus, halving $P_y(0)$ would halve both the vertical and longitudinal operational collision risk (everything else being equal). Increases of $P_y(0)$ have been reported over the period 1995 to 2006. Increases in $P_y(0)$ reflect improvements in lateral navigational performance occasioned by the use of current-technology navigational systems, i.e., GNSS. As aircraft tend to concentrate more closely in the vicinity of the route centreline, the chance that two aircraft attempting to fly the route centreline will overlap in the lateral dimension commensurately increases $P_y(0)$. The Group was advised that the revised estimate of $P_y(0)$ using updated data was very similar to the last agreed value from 2006 and therefore the value of 0.1172 would continue to be used. The value of $P_y(0)$ would continue to be reviewed annually.

Evidence of Strategic Lateral Offsets

3.1.22 The Group was advised that the results of an analysis had estimated that approximately 27 percent of flights that reported via ADS-C were flying 1 or 2 NM offsets in accordance with the Strategic Lateral Offset Procedures (SLOP). Estimates of the proportion of the traffic flying in the NAT Region, reporting positions via ADS-C, were approximately 40 percent. While this was a substantial subset of the overall NAT Region population, the estimates of SLOP usage over time could not be directly projected to the non-ADS population at large. While all FANS 1/A aircraft had an advanced avionics suite that easily allowed offsets (and this was the overwhelming majority of the aircraft that reported positions via ADS-C), the non-ADS-C reporting part of the population may have older navigation systems not designed for routinely flying an offset to the route programmed.

3.1.23 The Group was encouraged by the current use of lateral offsets by ADS-C-reporting aircraft in mid-ocean, which had improved by seven percent since the previous study. This appeared to be the result of efforts taken by various parties to coordinate an information campaign about the beneficial effect of SLOP on vertical risk.

NAT SPG Conclusion 44/20 - Monitoring the effects of the implementation of Strategic Lateral Offset Procedures (SLOP) in mid-ocean

That the NAT Mathematicians' Working Group:

a) continue to collect and analyse data regarding the utilisation of the SLOP;

b) refine the methodology employed to estimate SLOP by using log files from the ground automation systems of Canada and the United Kingdom and any other data that might be available; and

c) report to NAT SPG/45.

NAT SPG Conclusion 44/21 - Promoting the correct application of the Strategic Lateral Offset Procedures (SLOP)

That the Regional Director of the European and North Atlantic office of ICAO circulate a State Letter to NAT provider and user States and international organizations concerned to encourage them to promulgate information regarding the correct utilisation of the SLOP including the need for randomness in the application of the procedures.

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

Strategic Lateral Offset in West Atlantic Route System (WATRS)

3.1.24 The Group was advised that there had been an increase in the proportion of aircraft flying lateral offsets, in accordance with the recommended procedure in the WATRS area, although it had been less than the proportion achieved in the 2005 sample. The Group recalled that SLOP had been a recommended procedure in WATRS since it had been introduced as an operational trial in late 2001, which was more than two years longer than for the rest of the NAT Region; however, the Group was advised that there had not appeared to be the same level of use in WATRS as in the rest of the NAT Region.

3.1.25 Regarding the NAT Region, there appeared to be differences among operators in the use of SLOP. The Group was advised that an information campaign had been undertaken by several ANSPs to address the fact that the potential benefits of SLOP in terms of reduced vertical and longitudinal risk were not being fully realised in WATRS airspace.

3.1.26 The Group noted that the implementation of the "WATRS Route Redesign and Separation Reduction Program" on 5 June 2008 would have a considerable effect on the traffic patterns and the route network in the area, which would have a consequential effect on the ability to analyze future SLOP performance by making historical comparisons. Accordingly, the Group agreed that it would be necessary to amend the methodology for assessing SLOP performance in the WATRS area and that it might not be possible to determine trends in SLOP performance, at least initially.

NAT SPG Conclusion 44/22 - 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 NAT Mathematicians Working Group (NAT MWG) adapt measurement techniques to assess the use of SLOP in WATRS to account for changes in the route structure and traffic patterns;

c) the NAT MWG monitor the evolution of the implementation of the SLOP in the WATRS area; and

d) the NAT MWG report to NAT SPG/45.

Effect of SLOP on $P_y(0)$

3.1.27 The Group was advised that, in order to incorporate the effect of SLOP in the calculation of vertical risk, it would be necessary to accomplish two tasks. First, the utilisation of the three SLOP options (on-track, 1NM right of course and 2NM right of course) must be translated into a factor that would be multiplied by $P_y(0)$ and secondly $P_y(0)$ must be carefully estimated to capture typical lateral navigational performance. The Group was informed that, because the data suggested that the use of SLOP was in a state of flux, the NAT 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 produce an estimate of the SLOP factor that could be applied to $P_y(0)$ and the NAT SPG would be informed accordingly.

3.1.28 The Group noted that, for a same direction encounter (the most likely scenario in the NAT OTS) the probability of finding another aircraft vertically displaced would be significantly reduced if SLOP was used. The Group was advised that, because the proportion of offsets had risen to a substantial amount, the NAT MWG would begin the work of producing a separate estimate of $P_y(0)$ that would incorporate the benefits of SLOP into the vertical risk estimates.

NAT SPG Conclusion 44/23 - Refining the estimate of $P_y(0)$ to account for the use of the Strategic Lateral Offset Procedures (SLOP)

That the NAT Mathematicians' Working Group (NAT MWG):

a) re-estimate the value of $P_y(0)$ taking account of the benefits from the use of the Strategic Lateral Offset Procedures (SLOP); and

b) report to NAT SPG/45.

The need to randomize SLOP choices

3.1.29 The Group recalled the importance of the proper application of the SLOP to spread aircraft out laterally about their tracks, in order to minimise the chance of collision given an operational error or contingency procedure. The spreading of the lateral navigational density would have beneficial effects to the risk of collision in both the vertical and longitudinal dimensions, by consequently reducing the $P_y(0)$ estimate. Optimal benefit would result when there was an equal distribution of aircraft across all three of the SLOP options: centreline; 1NM to the right and 2NM to the right of centerline. This equal distribution would best be achieved by randomizing the choice of options on each occasion. Therefore, for the technique to minimize risk most effectively, pilots would need to have the flexibility to randomly select their options. The Group was advised that some airlines were specifying a fixed offset in incorporating the procedure into their company standard procedures. Whilst this could be seen as positive in increasing the initial SLOP uptake, if all airlines used the same fixed offset then the beneficial effects of SLOP would be erased. The Group was advised that the procedures for the correct application of the SLOP, including the need for randomness, had been incorporated into the Ninth Edition of the *NAT Minimum Navigation Performance Specifications Airspace Operations Manual* (paragraph 4.1.5 refers).

Vertical Risk

3.1.30 The Group was advised that the same method as had been used to determine the lateral occupancy estimates for 2007 had been used to determine the vertical occupancy estimates for 2007 (paragraph 3.1.11 refers). Total vertical risk was estimated by summing technical risk and operational risk.

Vertical technical risk estimate

3.1.31 The Group was informed that the estimate of vertical technical risk for 2007 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. There had been no change from the estimated vertical technical risk derived for 2006. This estimate used the Pz(1000) value from NAT SPG/34 and 2007 occupancy estimates. The Group noted with approval that the estimate of vertical technical risk continued to be less than the vertical technical TLS.

3.1.32 The Group agreed that the NAT MWG should re-estimate vertical overlap probability for aircraft flying at the same flight level, $P_z(0)$ and vertical overlap probability for aircraft nominally displaced by 1000 feet, $P_z(1000)$ given the passage of time since the last estimation and also because of experience in the European environment related to RVSM technical risk. The Group noted that it would be necessary for States to make resources available to conduct this work.

NAT SPG Conclusion 44/24 - Estimate of vertical overlap probability

That:

a) the NAT Mathematicians Working Group:

i) re-estimate vertical overlap probability for aircraft flying at the same flight level, $P_z(0)$ and vertical overlap probability for aircraft nominally displaced by 1000 feet, $P_z(1000)$; and

ii) report progress to NAT SPG/45; and

b) air navigation service providers assess the availability of the necessary resources to carry out the study identified in a) above.

Vertical operational risk estimate

3.1.33 The Group was advised that the operational element of vertical collision risk was determined from two components. The first component was the estimate of time spent by aircraft at uncleared levels or when incorrectly cleared to a flight level; in oceanic airspace, the time spent at uncleared levels is the primary contributor to the operational risk estimate. The second one was for uncleared level changes, which used the number of levels crossed without clearance or without following published contingency procedures (and the speeds at which the levels were crossed) during the monitoring year. Table 1 below shows the total number of large height deviations (LHDs) - not necessarily risk-bearing - reported to the NAT CMA and the estimate of risk-bearing time spent at incorrect levels for 2007 and the previous seven monitoring periods.

Table 1: LHDs and Time Spent at Wrong Levels for the Years 2000-2007

	1998 Phase I + Phase II	1999 Phase II	2000 Phase II	2001 Phase II	2002 Full RVSM	2003 Full RVSM	2004 Full RVSM	2005 Full RVSM	2006 Full RVSM	2007 Full RVSM
Number of All LHDs (flights)	69 (= 62 + 7)	52	31	41	69	61	79	84	103	114
Time at Wrong Level (mins)	70.2 (=60.2+10)	170	52	159	360	431	228	301	548	319

3.1.34 The Group was advised that, as with the lateral GNEs, the vertical LHDs reported to the NAT CMA during 2007 were examined in conjunction with the NAT SMCG to agree on the classification for risk estimation purposes. The Group noted that there had been a large decrease in the time spent at uncleared levels compared to 2006 even though the total number of deviations reported (i.e., the sum of risk-bearing and non-risk-bearing) had increased. The Group was advised that, there being no classification code for ATC coordination errors, the NAT CMA recorded such events as "Other", with a plain language explanation. While the provision of a code for this event type would be useful, the NAT DEMA could identify events of this type using the plain language event cause where no code is assigned and extract them using a query.

3.1.35 The 2007 risk estimates are shown in Table 2 below. The table also shows risk estimates dating back to 1999, for comparison purposes.

Table 2: RVSM Vertical Operational Collision Risk Estimates between 1999 and 2007

(All figures are in fatal accidents per flight hour and should be multiplied by 10^{-9}. These plus the technical risk estimate should be compared against the TLS of 5 x 10^{-9}.)

	1999 Phase II	2000 Phase II	2001 Phase II	2002† Full	2003 Full	2004 Full	2005 Full	2006* Full	2007 Full
OTS	6	0.5	3	0.6	6.3	6.3	4.8	5.1	5.9
Random	8.9	6.6	16.3	41.6	46.3	25.1	59	150	75.6
Combined	7.2	3	9	20.5	27.8	16.3	34.6	79.2	41.1
TLS(Op&Tech)	5								

†: 2002 values estimated for full RVSM (January 24 to December 31) using twelve months of LHD data.

**: 2006 used mixed SAATS and flight data processing system (FDPS) United Kingdom occupancy data and the risk value was revised post NAT MWG43*

Note: that $P_y(0)$ was increased in both 2000 and 2002.

Note: that $P_y(0)$ and aircraft dimensions were revised from 2005.

3.1.36 The Group noted that the random and combined vertical collision risk due to operational errors for 2007 was estimated above the TLS, but the 2007 combined risk was a 48% decrease compared to the previous year. The Group recalled that the vertical risk estimate for the NAT Region had been above the TLS since 2001. Current efforts to contain and reduce vertical operational risk were a matter of on-going priority and work was being done in various NAT SPG contributory groups. As the NAT RVSM airspace is large and complex, the full extent of the measures adopted to address vertical risk were not likely to be seen entirely within one reporting period. Additionally, some of the mitigations required changes to existing procedures and ground-based automated air traffic systems. Since some of those changes had not yet been completely put into place, it was anticipated that it would require several reporting periods before the vertical risk estimate would show the complete consequence of the many activities aimed at reducing vertical risk. The Group felt that continued concerted efforts by the entire NAT SPG working structure would restore the system performance to levels below the TLS.

3.1.37 The Group recalled that at the Limited NAT Regional Air Navigation (LIM NAT RAN) Meeting of 1992 held in Portugal, the TLS of 5 x 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 have been considered "in control" at that time. The NAT RVSM airspace is actively managed. While this allows some rapid reaction to events that might threaten safety management, the scale of the system certainly tends to moderate specific effects intended to produce change. The function of the annual risk estimation process and the inferential mathematics upon which the estimates and trends are based was to yield a longer view of the results of actions taken and provide comparative analyses.

3.1.38 The Group noted that the classification "Random" applied to aircraft that did not exclusively travel on the OTS during the period for which the tracks were published. This included operations that were on the published tracks but outside the published times. Additionally, "Random" aircraft included those which travelled 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 also often flew parallel to the OTS but just north or south of the tracks. Thus, the typical traveller and operator were 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 could 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 (i.e., IGA, charter operators, military).

Analysis of Large Height Deviation Data

3.1.39 The Group was informed that, as with the 2006 LHD data with regard to the duration of events, the 2007 LHD data fell into three categories (Summary of Discussions and Conclusions of the 43rd Meeting of the NAT SPG, paragraphs 3.1.47 and 3.1.48 refer): 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. Table 3 below summarizes the characteristics of the categories.

Table 3: Summary of RVSM Large Height Deviations Involving Time Spent at Incorrect Flight Level in NAT RVSM Airspace - Frequency and Duration for Calendar Year 2007

	Duration Interval [0, 5] mins		Duration Interval [6, 12] mins		Duration Interval [13, 73] mins		LHD Total	
	2006	2007	2006	2007	2006	2007	2006	2007
Number of Events	32	46	13	13	9	6	54	65
Average Duration (min)	2.6	1.5	8.5	8.1	39.4	24.3	10.1	4.9
Total Duration within Category (min)	83	68	110	105	355	146	548	319

3.1.40 That Group noted that, as was the case last year, a relatively large contribution to the time spent at incorrect levels (which was directly transferable to the vertical risk) was due to a few errors in the highest duration interval, 13 minutes and more. Elimination of the six events from the longest duration category would have reduced the risk by more than 45 percent. In addition, the 13 LHDs in the middle category encompassed another third of the 2007 risk contribution. Thus, adopting measures that would also remove these LHDs, would deflate the vertical risk estimate substantially. The Group noted that certain actions initiated and planned by States and ANSPs had the potential for reducing many of these occurrences, and that the information regarding these actions was being shared within the NAT SPG working structure in accordance with NAT SPG Conclusions 43/14, 43/21 and 43/22. The Group was encouraged by the information that it appeared that the larger duration frequency events had been reduced. This had been a main factor in helping to reduce the time spent at wrong flight levels this year and the Group looked forward to continued progress in this area. It also appeared that efforts undertaken in the past year to address vertical risk had begun to take effect and/or intensified. The Group noted that total minutes spent at wrong level decreased from 2006 to 2007; however, this was a single data point and might not be indicative of a trend. Continued progress would be reflected in the supporting statistical evidence over the coming years.

3.1.41 The Group was advised that a common cause of LHDs was incomplete inter-facility coordination of flight levels or flight level changes. The nature of this event was of concern since a missed coordination was unlikely to be identified or challenged by the aircrew (paragraphs 3.1.2 and 2.1.18 also refer).

NAT SPG Conclusion 44/25 - Ways and means to reduce inter-facility coordination errors

That the NAT Implementation Management Group (NAT IMG):

a) determine the underlying causes of inter-facility coordination errors;

b) develop appropriate mitigation; and

c) provide a progress report to NAT SPG/45.

Vertical risk mitigation strategies

3.1.42 The Group was informed that an analysis had been undertaken of the reductions in the vertical risk estimate that could be achieved by focusing efforts on reducing or eradicating the main causes of LHDs. This focused on the three main categories of LHDs that had contributed to the vertical risk estimate during 2006:

F – Entry into MNPS airspace at an incorrect level

E – Climb/descent without ATC clearance

D – Failure to climb/descend as cleared

3.1.43 The study showed that the theoretical benefit of reducing the three main LHD categories to a duration of less than or equal to 5 minutes would reduce the vertical risk estimate by approximately 50%, whilst eradicating all three categories could lead approximately to an 80% reduction. The Group noted that several operational facilities had already undertaken novel approaches to identifying, arresting or eliminating the occurrence of events related to larger errors. It was clear that significant actions were being undertaken to address the performance of the airspace.

Vertical Monitoring Pack

3.1.44 The Group was advised that the NAT MWG had reviewed the 'vertical monitoring pack', which is a collection of tables and graphs used for assessing the combined Altimetry System Error (ASE) performance of the aircraft sample captured. It was produced twice yearly with the intent of providing quality assurance data relevant to individual aircraft, aircraft groups and operators. The source of the data used for generation of the pack was the NAT CMA's database of HMU and GPS-Based Monitoring Unit (GMU) ASE measurements. The global RVSM guidance material contained ASE performance specifications and the pack was used to ensure that individual aircraft, aircraft groups and operators continued to meet those specifications.

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

NAT MWG Work Programme

3.1.46 The Group noted the request by the NAT MWG to discuss the work that was being carried out by the ANSPs in order to confirm what tasks were required and who the official customers were for each piece of work, as the historical record of the requirements were contained in various NAT SPG historical documents and thus were not easily determined. The Group noted that the tasks assigned to the NAT MWG constituted a high demand for limited resources and that it might be useful to prioritise the work. The Group noted the concerns and felt that this would best be dealt with in the context of the symposium being convened by the Regional Director of the EUR/NAT office of ICAO (paragraph 5.1.8 refers).

3.1.47 The Group was informed that the NAT MWG's next annual risk assessment would be performed by May 2009 for timely report to NAT SPG/45. It was noted that the NAT MWG would meet immediately after the NAT SMCG. Finally, the Group endorsed the NAT MWG work programme.

SAFETY MANAGEMENT MATTERS

Coordination between the NAT SMCG and the NAT IMG

3.1.48 The Group recalled that the terms of reference and reporting lines of some groups had been changed by the NAT SPG in order to utilize the lines of communication between them to efficiently exchange ideas, especially as regards possible improvements to safety and efficiency (NAT SPG Conclusions 43/2, 43/3 and 43/25 refer). The Group was advised that, in follow up to the aforementioned Conclusions, a list of safety management issues had been provided to the NAT IMG. This information was used by the NAT IMG for the timely assignment of safety management tasks. The Group agreed that the timely exchange of safety information was in line with the objective of improving safety performance in the NAT Region.

NAT SPG Conclusion 44/26 - Reporting by the NAT Safety Management Coordination Group

That, following each meeting, the NAT Safety Management Coordination Group (SMCG) provide:

a) a list of safety management issues directly to the NAT Implementation Management Group (NAT IMG); and

b) its Summary of Discussion to the NAT SPG, the NAT IMG and the NAT Operations Managers.

3.1.49 The Group noted that the NAT SMCG had discussed a proposal regarding possible changes to how vertical risk in the NAT Region was evaluated and noted the NAT SMCG's consensus that it was not appropriate at this time to recommend making significant changes to how the TLS was calculated or safety performance was measured in comparison to the TLS as a means of addressing the situation whereby the vertical risk had been exceeding the TLS for the past number of years, a situation that the NAT SPG and its subordinate bodies have actively been working to reverse. The Group also noted that this would be kept under review and specific suggestions for adjustments would be proposed if deemed appropriate at a future time.

3.1.50 In discussing the need to address risk in the NAT Region, the Group agreed that creating a more visible safety management process would allow for the coordinated tracking of risks, associated mitigations and effects from implementations of mitigation strategies. In this regard, the Group agreed that the NAT SMCG should act as the focal point.

NAT SPG Conclusion 44/27 - Provision of Mitigation Information to the NAT Safety Management Coordination Group

That the NAT Implementation Management Group implement, by 1 September 2008, a procedure for providing, to the NAT Safety Management Coordination Group, information regarding mitigations developed to prevent operational errors or reduce their associated risk.

NAT SPG Conclusion 44/28 – Update the terms of reference of the NAT Implementation Management Group contributory bodies

That the NAT Implementation Management Group, at its next meeting, review the terms of reference of its contributory bodies in order to ensure that they develop and keep under review mitigation strategies to address safety issues affecting NAT operations.

3.1.51 The Group reviewed a suggestion to update the terms of reference and working methods of the NAT SMCG that would include the need to track the effectiveness of mitigation strategies and to revise the working methods to read:

> "The NAT SMCG will meet just prior to the NAT MWG and in the autumn of each year. The Rapporteur will coordinate directly with the Rapporteur of the NAT MWG to provide the data arising from the scrutiny process for the purposes of calculating risk in the NAT Region. The NAT SMCG will provide a summary of safety management issues to the NAT IMG immediately following each meeting, and prepare a report from each meeting to summarize the interim scrutiny results and elaborate upon safety management issues. The Rapporteur will report directly to the NAT SPG regarding the past year's scrutiny results and all pertinent safety management issues. The length of each meeting shall accommodate the need to scrutinize all events from the previous 6 months, develop a list of safety management issues to be provided directly to the NAT IMG and address other issues within its remit as they arise."

3.1.52 In reviewing the proposed changes to the terms of reference of the NAT SMCG the Group was cognizant of the need to review the working methods of the NAT SPG as a whole. Accordingly, the Group noted that this issue would be dealt with at the symposium to be convened by the Regional Director of the EUR/NAT Office of ICAO (paragraph 5.1.8 refers).

3.1.53 The Group was advised that the NAT Deviations and Errors Monitoring Application (DEMA) had been implemented in January 2008. This database, designed on the Microsoft Access® platform, allowed stored information to be queried using multiple possible criteria. The NAT DEMA would enhance the NAT SMCG's ability to provide specific information to other NAT SPG contributory groups, depending on the level of detail in the information provided to the NAT CMA.

Safety Management issues identified by the NAT SMCG

3.1.54 The Group reviewed the detailed information provided to the NAT IMG by the NAT SMCG (paragraph 3.1.48 also refers). The Group noted that the NAT IMG had used the information to update work programmes, as appropriate, and that feedback had been provided to the NAT SMCG.

3.1.55 The number of aircraft reported as crossing an oceanic boundary at an incorrect level remained a matter for concern. ATC coordination errors and non-compliance with ATC clearances or restrictions had accounted for 18 (30 in 2006) of the 52 LHD (59 in 2006) attributable to flight crew or ATC coordination errors. There had been a further increase in reports of aircraft failing to request climb/descent to oceanic entry level, which had for a number of years been a source of concern. This was despite a sustained effort in aircrew education via a number of media and an improved awareness of the issue within domestic ATC units.

3.1.56 Instances of misinterpretation of CPDLC messages by crews also continued to be noted with concern. There appeared to be a significant degree of unfamiliarity with the CPDLC conventions leading to misunderstanding of the printed information. While it was understood that most ambiguities might be addressed by improvements to training, it was nevertheless an area where the potential for confusion was likely to persist for the indefinite future. There had been concerns raised, in particular, regarding the interpretation of restrictions that contained the words "AT" or "BY". In reviewing the explanations provided for messages containing these words, the Group agreed that the operational explanations should be examined with a view to possibly re-wording them so as to be clearer.

NAT SPG Conclusion 44/29 - Review of operational explanations for Controller Pilot Data Link Communications (CPDLC) uplink message elements containing the word "AT" or "BY"

That the NAT Implementation Management Group:

a) review the operational explanations of CPDLC uplink message elements containing the words "AT" or "BY";

b) identify explanations in the NAT Data Link Guidance Material that were not easily understood, taking account that, for some flight crews, English was not their native language; and

c) coordinate as necessary to revise unclear explanations, taking account of the need for standardization between ICAO Regions.

3.1.57 The Group was advised that this issue had been dealt with in the Pacific Region. It was suggested that the NAT IMG take their work into consideration when developing mitigation for the NAT Region so as to ensure global compatibility.

3.1.58 The Group was informed that all Oceanic Area Control Centres (OAC) continued to report instances of non-adherence to restrictions in clearances; the majority of such events had been observed by Santa Maria.

3.1.59 The Group recalled its decision that oceanic boundary issues involving Madrid might be mitigated by inviting a representative of Madrid ACC to participate in the NAT SMCG (NAT SPG Conclusion 42/13 refers). The Group was advised that there had been no response to the letter sent by the Regional Director of the EUR/NAT Office of ICAO to Spain, requesting their participation in the work of the NAT SMCG. The Group noted that high level contacts with Spain were being attempted by the United Kingdom and the United States in order to initiate some means of working cooperatively to address the safety concerns. With regard to instances of poor co-ordination between adjacent OACs and ACCs, the Group noted that this issued continued to be particularly apparent at the Madrid/Shanwick/Santa Maria interface and therefore agreed to renew its request for participation in the work of the NAT SMCG by a representative from Spain.

NAT SPG Conclusion 44/30 - Request for the nomination of an Observer from Spain to the NAT Safety Management Coordination Group

That the Regional Director of the European and North Atlantic Office of ICAO make a written request to the Spanish aviation authority and the NAT Systems Planning Group Observer from Spain to nominate an Observer from Spain to participate in the work of the NAT Safety Management Coordination Group starting from its next meeting.

3.1.60 The Group noted that action had been taken by OACs to contain the number of GNEs through timely interventions to prevent incorrect routing. In this regard, the Group was advised that the use of ADS-C enabled errors to be detected in a particularly timely fashion. With regard to those interventions which had been completely successful (i.e. there had been no lateral deviation), the Group noted that the majority had involved flights for which the next and next + 1 waypoints had been subject to conformance monitoring. For those that had been less successful (i.e. a deviation had occurred, although a GNE had been averted), the Group was advised that the majority had involved flights entering oceanic airspace where it had not been possible to verify the oceanic entry and next waypoints. The Group recalled their previous recommendation that a procedure be implemented that would support the verification of the first waypoint after oceanic entry prior to flights entering oceanic airspace (NAT SPG Conclusion 43/14 f) refers), and was advised that it had been determined that an identical procedure could not be implemented by all ANSPs.

Finally, the Group was informed that procedures were being implemented or planned that could mitigate this type of error, and that this was being tracked by the NAT SMCG.

3.1.61 The Group was advised that there were concerns that the behaviour of certain ground systems could impede the ability to detect and correct errors in a timely fashion. In particular, the following issues had been specifically identified by the NAT SMCG and did not constitute a comprehensive list:

a) if a position report was rejected by the ground system due to unexpected or missing data, no automated conformance checking would occur;

b) if ground systems produced an error every time an ADS demand report was requested, controller complacency regarding conformance errors in such instances could result; and

c) in cases of multiple non-conformities, the lack of highlighting of each separate non-conformant element in some ground systems could impede the controller's ability to note that more than one error had been detected.

3.1.62 The Group agreed that these issues should be examined as part of an overall review of conformance checking by automated systems and that ways and means of overcoming impediments should be developed.

NAT SPG Conclusion 44/31 - Review of ground system behaviour regarding conformance checking

That the NAT Implementation Management Group:

a) examine ground system behaviour to determine whether impediments to automated conformance checking exist;

b) develop ways and means to overcome issues identified in a) above, if they are found to exist; and

c) present a corrective action plan to mitigate identified issues to NAT SPG/45.

3.1.63 The Group was advised that IBAC had established a GNE Task Force to address the relatively high proportion of errors committed by IGA flights in the NAT Region. Also, the Group was informed that, in coordination with IATA, IBAC intended to move forward with an initiative to produce video clips regarding flight crew training points for operations in the NAT Region that were identified during the scrutiny process carried out by the NAT SMCG.

3.1.64 The Group noted that understanding of safety management at a Regional level continued to evolve and agreed that it would be desirable to clarify and define how safety was managed in the NAT Region. The goal would be to show the interrelationship between the activities being carried out by the NAT SPG and its contributory groups with a view to harmonizing their work and describing how information would flow between them. Once completed, this information would form a section in the NAT SPG Handbook. The Group agreed that this task should be addressed at the symposium being convened by the Regional Director of the EUR/NAT office of ICAO (paragraph 5.1.8 refers).

3.1.65 The Group noted that the safety information prepared at its last meeting had been well received (NAT SPG/43, paragraph 3.1.52 and Appendix D refer). Considering that the NAT SMCG was already preparing safety management information for use by the NAT IMG, along with making safety management recommendations to the NAT SPG as an integral part of its reporting, the Group agreed that the NAT SMCG should have a role to play with regards to the development of safety related information to be considered for distribution by the NAT SPG.

NAT SPG Conclusion 44/32 - Proposed subjects for Safety Related Information

That the NAT Safety Management Coordination Group propose a list of subjects to be considered by each meeting of the NAT Systems Planning Group as the basis for the preparation of a yearly NAT Safety Related Information bulletin.

3.1.66 The Group reviewed the composition of the NAT SMCG and, except for the lack of participation by a Representative from Spain (paragraph 3.1.59 above also refers), agreed that its current composition was adequate to address its tasks. The Group was advised that the work of the NAT SMCG had benefited from the participation of pilots at its Autumn 2007 meeting as a result of Representatives being provided by IBAC and IFALPA. Unfortunately, due to conflicting commitments, no such participation had occurred at the Spring 2008 meeting. The Group agreed to encourage consistent pilot support for this important safety management activity.

NAT SPG Conclusion 44/33- Increase pilot participation in the work of the Safety Management Coordination Group

That the Regional Director of the European and North Atlantic Office of ICAO make a written request by 1 September 2008 to IBAC and IFALPA to renew their efforts to increase pilot participation in the work of the NAT Safety Management Coordination Group (SMCG) so as to ensure the availability of alternate Representatives in the event that conflicting commitments prevent attendance at a NAT SMCG meeting by the usual Representative(s).

3.2 Review of System Operations

COMMUNICATIONS

NAT communications strategy

3.2.1 The Group noted the comments of the NAT ACG regarding HF regression, especially the conclusion that HF should be taken into consideration in the development of the NAT Communications Strategy. Based on the review of the material, the Group noted the NAT ACG's concerns that discussions were continuing on voice communications matters without proper consultation with the NAT ACG. The Group was informed that some members of the ACG did participate in the work concerning the development of the NAT communications strategy and, taking into consideration the agreement to modify the NAT ACG ToRs (paragraph 3.2.12 refers), this concern should be resolved. As regards the NAT Operational Contingency Plan, the Group was informed that coordination would be carried out with the radio stations concerned.

Current operations

3.2.2 The NAT ACG had reviewed the current NAT communications network operations as defined by ICAO Annex 10 Volume II Chapter 5, Doc. 7030, FASID and *HF Frequency Management Guidance Material*. The general consensus was that there were no major problems affecting current network operations and minor issues could be resolved by better coordination between the watch managers on a more regular basis. The tactical teleconferences between Gander, Iceland and Shanwick Radio Station Supervisors should be extended to include Supervisors from New York and Santa Maria Radio Stations.

3.2.3 The Group supported the proposal by the NAT ACG that Canada, Ireland and the United States evaluate the possibility of broadcasting SIGMETs for the Santa Maria FIR on meteorological information for aircraft in flight (VOLMET); this could reduce the voice workload when such meteorological information was required to be transmitted to a large number of aircraft flying in the Santa Maria FIR.

3.2.4 The NAT ACG analyzed the Consolidation Report prepared by Portugal which contained an analysis of the 2007 network message volume and distribution. The total amount of HF and General Purpose (GP) VHF contacts for all Aeronautical Stations for the year 2007 was 3,691,755 messages, distributed as follows:

a) 73.57 % by HF;

b) 26.23 % by VHF frequencies;

c) 0.21 % on SATCOM voice; and

d) the relative percentage of traffic for each Aeronautical Station was Gander (33.04%), Shanwick (27.88%), Iceland (14.82%), Portugal (12.24%), United States (11.59%) and Norway (0.43%).

3.2.5 Analyzing the Data Consolidation Report had shown that an increase of 6.03% from 2006 to 2007 in the number of air-ground messages had occurred. The increase in the number of messages on HF was 7.02% and on VHF/SATCOM voice was 3.37%. This reflected the continuing growth in voice traffic volume over the past years, which was in line with previous reports. The criticality of the network workload was high and the expected peak-time capacity problems previously reported were becoming more evident.

3.2.6 Taking into account the current voice network workload and the recommendations in relation to the optimisation of voice communications (paragraph 2.5.8 refers), various possibilities to improve the network capacity in order to absorb the continuous growth of the message volume and to cope with the traffic demand were examined. In addition, the Group was informed that it was possible to increase the number of frequencies available for the Aeronautical Mobile Service, based on the existing ITU frequency allotment plan as defined per ITU Appendix 27 Aer 2.

3.2.7 The use of additional frequencies would not require additional investment in equipment because existing transmitters and receivers used synthesised technology which allows the programming of different frequency channels to a single transmitter. This technology enabler, in conjunction with the HF frequency propagation characteristics, allows radio stations to activate usable frequencies according to proper time of day or night therefore allowing certain frequency channels to be released in each daily timeframe.

3.2.8 The Group agreed to pursue the creation of three regional sub-networks POR-IRE, IRE-ICE and IRE-CAN, therefore extending the network capacity in the peak periods with specific usable frequency bands. It also agreed that the HF Service Providers, using the NAT ACG as the focal point, should initiate a more detailed study and formulate implementation plans.

NAT SPG Conclusion 44/34 - Plan for future High Frequency (HF) network operations

That the NAT Aeronautical Communications Group:

a) evaluate the need and ability to increase the number of HF frequencies available for use in the NAT Region;

b) develop an implementation plan that would take account of the need to amend ICAO documents and the effects on human resources;

c) provide the NAT Implementation Management Group with an interim progress report; and

d) provide NAT SPG/45 with a final report, including recommendations.

Next meeting

3.2.9 The Group agreed that the next meeting of the NAT ACG should take place in Paris from 12 to 14 May 2009.

Proposal for Amendment to the NAT SUPPs regarding the use of HF Families

3.2.10 In follow up to work carried out by the NAT ACG, Portugal, with the assistance of the EUR/NAT Office of ICAO, developed a proposal for amendment to the NAT SUPPs to harmonise the current provisions regarding the use of HF families with those that have been agreed to by all NAT ANSPs and included in the *NAT High Frequency Management Guidance Material for the North Atlantic Region*. The Group noted the draft proposal for amendment, which is at **Appendix F,** which will be sent to the Regional Director of the EUR/NAT Office of ICAO for processing.

NAT SPG Conclusion 44/35 – Proposal for amendment of the NAT *Regional Supplementary Procedures* (SUPPs) (Doc 7030) regarding the use of High Frequencies (HF) families

That the ICAO Regional Director, on behalf of Portugal, process, in accordance with the standard procedure, the draft proposal for amendment to the NAT SUPPs concerning the use of HF families in the NAT Region, as presented in **Appendix F** to this report.

SYSTEM OPERATIONS

Update the terms of reference and working methods of the NAT ACG and NAT OPS MNG

3.2.11 The Group recalled that, at NAT SPG/43, it had been recognised that the NAT IMG relied on the NAT ACG and NAT OPS MNG to carry out tasks between NAT SPG meetings and that closer co-ordination was required between these groups and the NAT IMG. The NAT SPG had therefore agreed that the NAT OPS MNGs and the NAT ACG should report to the NAT IMG on matters relating to planning and implementation activities; however they would still report directly to the NAT SPG on matters related to the "health" of the system.

3.2.12 The Group then reviewed a proposal to modify the terms of reference of the NAT ACG and of the NAT OPS MNGs and agreed that they be amended as shown in **Appendix G**. For both groups, the Group stressed the importance of drawing the reporting boundary between the NAT IMG and the NAT SPG in accordance with their main functions, namely the health of the system for the NAT SPG and planning and implementation activities for the NAT IMG. The Group also agreed that the NAT SPG Handbook be modified to reflect the changes. Finally, the Group noted that this matter would be further addressed at the Symposium to review the NAT SPG structure and working methods (paragraph 5.1.8 refers).

NAT SPG Conclusion 44/36 - Update the Terms of Reference and working methods of the NAT Aeronautical Communications Group (NAT ACG) and NAT Operations Managers (NAT OPS MNG)

That the:

a) Terms of Reference and working methods of the NAT ACG and NAT OPS MNGs be amended as shown in **Appendix G**; and

b) NAT SPG Handbook be updated accordingly.

4. DOCUMENTATION UPDATE

4.1 NAT MNPS Airspace Operations Manual

Background and Philosophy

4.1.1 The Group recalled that there are unique features of NAT operations for which special solutions had been developed and implemented. These solutions have resulted in unique planning and operational procedures to be followed by NAT pilots and dispatchers. These procedures are incorporated in official ICAO documentation, including Doc 001 and the NAT SUPPs. They are also stated in the AIS documentation of NAT Provider States. The *NAT MNPS Airspace Operations Manual* also describes these procedures. However, the document also attempts to encourage memory of, and adherence to, the procedures by providing the background to, and the original rationale for, the development of the procedures.

4.1.2 Many of these procedures originated decades ago. Since then traffic levels have continued to grow, including those on axis that were previously minor. Technologies have been implemented that in some instances dilute the original imperative for some of the procedures. Furthermore, some concepts, first uniquely implemented in the NAT Region, have subsequently migrated to other regions, either intact or in a modified/developed form.

Updates to Edition 2005

4.1.3 The latest draft of the *NAT MNPS Airspace Operations Manual* had been uploaded to the NAT PCO Members' website. The Group was informed that all efforts had been concentrated on the text and data. Significant work was required on the pagination, paragraphing, headers & footers and the automated Table of Contents. It was proposed that this work be accomplished once the text and data were agreed by NAT SPG.

4.1.4 The NAT MNPS Airspace Operations Manual included many references to other documents and State AIS material. Some of these publications had been updated since 2005 and most of them were available via various websites. Efforts had been made to incorporate the latest relevant link and reference data. Additional internal links had been included to facilitate cross-referencing between different sections of the Manual.

4.1.5 Significant procedures, airspace organisation and infrastructure developments had been undertaken in the NAT Region and adjacent areas during the three years since the last edition of the Manual was published. These included such issues as: Northern Oceanic Transition Area (NOTA) final phase implementation; North Atlantic European Routing Scheme (NERS) introduction; United States East Coast Routes publication; Canadian Northern OTS trials; Additional Single- Long Range Navigation System (LRNS) Routes; Centralised Automatic Dependent Surveillance (CADS) replacement by Operational ATS unit-based ADS; CPDLC Phase IV; and WATRS Plus and associated RNP. Additionally, the formal monitoring and scrutiny of reported operational errors, together with the recent experience of safety regulators, had highlighted the need for a re-emphasis of certain recommended procedures. Other issues had also arisen during this time that required reflection, including amendments to Doc 4444 in respect of contingency procedures and the SLOP. The Group noted the non-exhaustive, Chapter by Chapter, list of the more significant changes resulting content changes. The Editor gratefully acknowledged the assistance provided and the patience exercised by many individual representatives of NAT State ATS Providers and safety regulators and not least, by the ICAO Secretariat.

4.1.6 The NAT ATS Providers and the Safety Regulators of the NAT operators would need to ensure the veracity of the information and guidance provided in the Manual. However, it was recalled that the Manual was intended to provide guidance to NAT operators. It had been developed to be both a comprehensive reference document and the basis of training aids. In particular it was aimed at educating those pilots and dispatchers new to NAT operations. Consequently, it was for the operators and their representative associations to advise on the usefulness and usability of the content and presentation.

Further actions awaited

4.1.7 It had been requested by some reviewers that the old hard copy front cover chart, showing the boundaries of the NAT MNPS Airspace be included in this edition. Action is in hand to provide this. Statistics on OTS/Random traffic data for 2007 would be included. A new Figure 3 was under production courtesy of ICAO Headquarters.

Future Updates

4.1.8 The production and distribution of hard copies of the Manual ceased with edition nine in 2000. It was then expected that a "soft" copy, residing on the ICAO NAT-PCO website could be continuously updated. Circumstances mitigated against this goal and the NAT MNPS Airspace Operations Manual was not amended for five years. To address this problem, it was agreed soon after the publication of Edition 2005 of the NAT MNPS Airspace Operations Manual that an agenda item "Required (*consequential)* Amendments to the NAT MNPS Airspace Operations Manual" be added to the agenda for all NAT SPG sub-group meetings. It was clear from the volume of amendments that had now been necessary that the objective was not met.

4.1.9 Amendments to the NAT MNPS Airspace Operations Manual have to reflect procedure and infrastructure implementations and current operational experience. The majority of the NAT SPG working groups were focussed on planning for future developments. Also, the majority of the attendees at these working group meetings were representatives of NAT ATS Providers. As such they were not the intended users of the NAT MNPS Airspace Operations Manual and hence perhaps did not need to be fully conversant with its contents and emphasis. Only at the annual NAT SPG meetings was there a comprehensive review of recent implementations and operational experience. It would be practical for the NAT MNPS Airspace Operations Manual to receive a comprehensive review and update annually following each NAT SPG meeting.

4.1.10 However, in the interim between NAT SPG Meetings, information on changes which could require amendments to the NAT MNPS Airspace Operations Manual would be promulgated in the AIS of States. If more frequent updating, or even a one-off urgent update, of the NAT MNPS Airspace Operations Manual was considered necessary, then a process needed to be devised to provide the NAT Document Management Office (DMO) with access to relevant AIS. In the case of an interim update an alert could be posted on the ICAO NAT-PCO website and in the Remarks section of the daily OTS Messages.

4.1.11 With regard to the input of the safety regulators of NAT operators, the NAT DMO established a comprehensive and successful working relationship with safety regulator representatives of the two States providing the bulk of NAT operations. The NAT DMO representative had also been afforded the opportunity to participate in some NAT IMG related meetings.

NAT SPG Conclusion 44/37 - Endorsement of the 2008 Edition of the NAT Minimum Navigation Performance Specifications Airspace Operations Manual

That, having endorsed the revised NAT MNPS Airspace Operations Manual:

a) the NAT Document Management Office complete the update of the Manual contents and work with the ICAO Paris Office secretariat to finalise it for publication; and

b) the Tenth Edition of the NAT MNPS Airspace Operations Manual be published electronically on AIRAC date 28 August 2008.

NAT SPG Conclusion 44/38 - Updates to the NAT Minimum Navigation Performance Specifications (MNPS) Airspace Operations Manual

That:

a) the NAT Document Management Office (NAT DMO) carry out an annual review and update of the NAT MNPS Airspace Operations Manual following each meeting of the NAT SPG;

b) Air traffic services providers and safety regulators advise the NAT DMO of any significant developments between NAT SPG meetings, which demand immediate amendments to the Manual;

c) the NAT Implementation Management Group ensure that the NAT MNPS Airspace Operations Manual is reviewed on a regular basis in order to provide updates; and

d) in the event of interim amendments being made to the NAT MNPS Airspace Operations Manual, an alert be posted on the ICAO NAT Programme Coordination Office (PCO) website and in the Remarks section of the NAT Organized Track System Message.

4.2 Other Documentation

NAT Guidance Material

4.2.1 The Group recalled that the NAT Guidance Material (Doc 001) had not been updated since the Seventh Edition was published in January 2002. The Group acknowledged that the same arguments presented in paragraph 4.1.5 above regarding the NAT MNPS Airspace Operations Manual also applied to the Guidance Material. Accordingly, it was agreed that the DMO should concentrate its efforts on updating Doc 001 and that a progress report should be made to NAT SPG/45.

NAT SPG Conclusion 44/39 - Updates to the NAT Guidance Material (Doc 001) and the International General Aviation (IGA) Manual

That the NAT Document Management Office:

a) update the NAT Guidance Material (Doc 001) and meld it with the IGA Manual; and

b) provide NAT SPG/45 with a progress report.

NAT SPG Handbook

4.2.2 The Group was informed that the Ninth Edition of the NAT SPG Handbook, dated June 2008, would be published in July 2008. The working structure specified in the document would be updated to reflect the agreed changes as would terms of reference, working methods and lines of communications. The details regarding the NAT SPG Membership would also be amended. Finally, NAT SPG Conclusions that are of a policy nature would be updated to take account of the outcome of NAT SPG/44.

4.3 NAT SPG follow-up

4.3.1 The Group was informed that the EUR/NAT Office of ICAO had reviewed past NAT SPG Conclusions to determine which could be proposed for inclusion in the NAT SPG Handbook as Policy Conclusions (NAT SPG/43, paragraph 4.1.12 refers). The Reports of the NAT SPG from NAT SPG/32 onwards were reviewed. It was clear from the Secretariat review that, particularly with regard to older Conclusions, careful consideration was needed to determine whether those Conclusions which appeared to be policy statements were, in fact, properly reflective of the current view of the NAT SPG. It was therefore agreed that these "candidate" policies be examined by the NAT IMG, along with the Conclusions from

previous meetings, and that a recommendation be made to NAT SPG/45 regarding which past Conclusions should be maintained as NAT SPG Policies and which should be amended and re-stated in the NAT SPG Handbook. In carrying out this review, the Secretariat would also be taking account of Recommendations and Conclusions stemming from the Limited NAT Regional Air Navigation (RAN) Meeting (Cascais, Portugal, 1992).

NAT SPG Conclusion 44/40 - Extant policies of the NAT SPG

That the NAT Implementation Management Group:

a) review NAT SPG Conclusions of a policy nature from all meetings prior to NAT SPG/40 to determine which Conclusions:

   i) remained extant; and

   ii) should be amended; and

b) provide an update to NAT SPG/45.

4.3.2 The Group noted that all activities and the status of each NAT SPG/43 Conclusion had been recorded in the NAT SPG Conclusion Follow-up Action List. The Group noted that the follow up action list would be posted on the NAT PCO web site and that all concerned were invited to provide the Secretary with their comments. The list would be updated on the basis of the outcome of NAT SPG/44 and when proposals for change were received.

5. ANY OTHER BUSINESS

5.1 Working methods of the NAT SPG

5.1.1 The Group noted that a considerable amount of work had been progressed and was continuing to be progressed by the ICAO Council and the ANC on the subject of increasing the effectiveness of the PIRGs.

5.1.2 The Council, on 18 March 2008, in taking the action proposed by the ANC in its report, agreed that the ANC should present, on an annual basis, a consolidated report to the Council containing the ANC's analysis of regional air navigation developments and the status of the resolution of air navigation deficiencies, as well as an indication of the value added from the PIRGs' activities. Consequently, it could be expected that the NAT SPG Reports would be reviewed by the Commission. While agreeing to retain, for the time being, the terms of reference of PIRGs, except those of the AFI Planning and Implementation Regional Group (APIRG) and the CAR/SAM Regional Planning and Implementation Group Caribbean/South American (GREPECAS) which should be amended to exclude security matters, the Council had also requested that the Commission study the merits of the PIRGs.

5.1.3 The Group noted that the Council had agreed that all ICAO Contracting States to which a Regional Office was accredited should be included in the membership of that Regional Office's PIRG. However, in the implementation of this amendment, some difficulties were encountered in terms of role of the States in the development of Regional ANP. Taking into account the fact that PIRG membership should encompass the development of the respective ANP, a revision has being proposed to the President of the Council for his review, in consultation with the members of the Council, that all ICAO Contracting States, who are service providers in an air navigation region and part of that Region's ANP, should be included in the membership of that Regional Office's PIRG. Furthermore, user States would be entitled to participate in any other PIRG meetings as a non-member. International organizations recognized by the Council may be invited as necessary to attend as observers to the PIRG meetings. In this regard, the Group noted that all

service providers in the NAT Region were already NAT SPG members and recognized that this particular action was more applicable to the other PIRGs.

5.1.4 The Meeting also noted that further work was being undertaken by the ANC to increase the effectiveness of PIRGs, encompassing development of new structures to coordinate business plan implementation activities related to safety, security and environmental subjects. In this regard, it was recognized that further review of the terms of reference by the Council and ANC might conclude that the Region would need to evaluate and agree to a formal construct for dealing with safety. Such a construct might include the PIRG playing a greater or lesser role, or sharing the safety responsibilities within a larger framework. An evaluation of NAT SPG's current working structure would assist the Group in determining its capability to take on additional tasks or look for alternatives to support the Global Aviation Safety Plan (GASP).

5.1.5 It was recognized by the Group that whilst the Council and ANC were reviewing the PIRGs from their perspectives, there was a need for the Group itself to re-evaluate the extent it was meeting the challenges brought about by the separation of regulation/oversight and ANS provision, changing traffic characteristics, technological advances and its ability to carry out a range of tasks from developing proposals for Communications, Navigation and Surveillance (CNS)/ATM systems implementation through to proposals for institutional arrangements. It was natural that, from time to time, such a re-evaluation should be necessary to ensure that the Group was adding value at the right time and the right place. Separation of service provision from the regulatory function begged the questions if this should also necessitate changes in the organization/function of NAT SPG, what would be the role of the "supervisory authorities" in the context of the Group, and how would CAAs/regulators/supervisory authorities fit into the NAT SPG structure? Although the appropriate States were included in its membership, the State delegates were often represented by ANSPs without their regulator counterparts.

5.1.6 It was also noted that representatives from some States and observers had sometimes not attended. This may be due to the vast number of meetings. The feeling was expressed that the direction or Roadmap of the NAT SPG has become unclear and that the sheer number of sub-groups, possibly with overlapping tasks, had resulted in a slow, inefficient and sometimes redundant process. There was the risk that as the work programmes of sub-groups "evolved", work processes could become duplicated or leave gaps in the work needed to complete an implementation initiative. If that were the case, a review of the internal working structure should be an appropriate initial step to mitigate some of these areas and as a way forward.

5.1.7 Given the need to make best use of scarce resources while ensuring that the Group met its core objectives and in order to rationalize and clarify the roles of the various bodies and their documentation, while providing opportunities for synergy, the Group agreed to commence an initiative to reflect the realities of the day. These realities included the need to be more performance-oriented, the need to ensure greater global collaboration in the implementation process and safety oversight related issues and the need to reassess options for lines of communication between the various sub-groups. The work of the Group should better take into account, in practical terms, the global context of implementation and more explicitly consider its impact on achieving a global interoperable air traffic management system.

5.1.8 In this respect, the Group invited the Chairman and the Secretary to conduct a symposium from 3 to 5 November 2008 at the EUR/NAT Office of ICAO. The symposium should identify the essential functions to be performed by the NAT SPG and analyse to what extent such functions are performed in the most efficient way in the current structure of the NAT SPG sub-ordinate bodies. If found necessary, the symposium should develop proposals to re-organise the work and submit such a proposal, through the NAT IMG, to NAT SPG/45.

5.1.9 To ensure that the symposium achieves its objectives, written contributions from volunteer can be sent to the Secretariat.

NAT SPG Conclusion 44/41 – Structure and working methods of the NAT SPG

That the NAT SPG Chairman and Secretary convene, from 3 to 5 November 2008 in the ICAO EUR/NAT Office, a Symposium to:

a) review the structure and working methods of the NAT SPG; and

b) develop a recommendation for a NAT SPG Safety Policy to:

   i) describe how safety is managed in the NAT Region taking account of the Global Aviation Safety Plan (GASP);

   ii) show the inter-relationship between the NAT SPG contributory groups with regard to safety management activities; and

   iii) show how safety management information is to be exchanged between the NAT SPG contributory groups.

c) submit proposals to NAT SPG/45 through NAT IMG/33

ICAO Budget constraints

5.1.10 The Regional Director informed the Group about the limited resources available to the EUR/NAT Office on the current budget, i.e. financial as well as human resources. To make the most effective use of such resources he invited the Group and its sub-ordinate bodies to select "easy-to-reach" meeting places for meetings requiring secretariat support from the EUR/NAT Office.

5.2 Next meeting

5.2.1 The Group agreed that NAT SPG/45 be held in the EUR/NAT Office of ICAO from 23 to 26 June 2009.

5.3 Farewells

5.3.1 The Group bid farewell to Mr Randy Speiran, the outgoing member for Canada, who would be retiring shortly. The Group also bid farewell to Mr Pat Ryan, the member for Ireland who would be retiring prior to NAT SPG/45. Pat had been working with the NAT SPG for many years and his Gaelic wit will be missed. The Group wished Randy and Pat all the best in their future endeavours.

APPENDIX A -

LIST OF PARTICIPANTS

(Paragraph i.5 refers)

CHAIRMAN
Asgeir PALSSON*

CANADA*
Larry LACHANCE*
Randy SPEIRAN

DENMARK*
Knud ROSING**
Kurt ANDREASEN

FRANCE*
André BERMAN*
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APPENDIX B – NAT TRAFFIC FORECASTING

(Paragraphs 2.3.13 and 2.3.15 refer)

TABLE 1

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

	ACTUAL								FORECAST				
SCENARIO	2000	2001	2002R	2003	2004R	2005R	2006R	2007E	2008	2009	2010	2015	2020
OPTIMISTIC									493.5	541.0	580.0	700.5	849.5
BASELINE	382.0	368.9	345.5	360.1	382.7	402.1	421.2	442.5	470.7	499.1	529.9	620.1	724.9
PESSIMISTIC									454.8	469.8	485.0	544.7	620.9

ANNUAL PERCENTAGE CHANGE IN AIRCRAFT MOVEMENTS

	ACTUAL							FORECAST				
SCENARIO	2001/00	2002/01	2003/02	2004/03	2005/04	2006/05	2007/06	2008/07	2009/08	2010/09	2015/10*	2020/15*
OPTIMISTIC								11.5%	9.6%	7.2%	3.8%	3.9%
BASELINE	-3.4%	-6.3%	4.2%	6.3%	5.1%	4.8%	5.1%	6.4%	6.0%	6.2%	3.2%	3.2%
PESSIMISTIC								2.8%	3.3%	3.2%	2.3%	2.7%

E = Estimate
R = Revised
* Average annual percentage growth rate

TABLE 2

COMPARISON WITH PREVIOUS FORECASTS OF AIRCRAFT MOVEMENTS IN THE ICAO NORTH ATLANTIC REGION (THOUSANDS)

	ACTUAL								2008 FORECAST				
SCENARIO	2000	2001	2002	2003	2004R	2005R	2006R	2007E	2008	2009	2010	2015	2020
OPTIMISTIC									493.5	541.0	580.0	700.5	849.5
BASELINE	382.0	368.9	345.5	360.1	382.7	402.1	421.2	442.5	470.7	499.1	529.9	620.1	724.9
PESSIMISTIC									454.8	469.8	485.0	544.7	620.9

	ACTUAL						2006 FORECAST						
SCENARIO	2000	2001	2002	2003	2004R	2005E	2006	2007	2008	2009	2010	2015	2020
OPTIMISTIC							424.1	445.8	472.4	503.7	533.2	668.8	818.4
BASELINE	382.0	368.9	345.5	360.1	382.0	400.6	418.8	435.3	456.9	480.7	503.5	609.6	727.6
PESSIMISTIC							414.8	420.0	437.5	456.4	473.0	552.0	635.4

Percentage Difference of 2008 Forecast & Actuals from 2006 Forecast & Estimate

	% DIFFERENCE								
SCENARIO	2005	2006	2007	2008	2009	2010	2015	2020
OPTIMISTIC				4.5%	7.4%	8.8%	4.7%	3.8%
BASELINE	0.4%	0.6%	1.7%	3.0%	3.8%	5.2%	1.7%	-0.4%
PESSIMISTIC				4.0%	2.9%	2.5%	-1.3%	-2.3%

E = Estimate
R = Revised

FIGURE 1

NORTH ATLANTIC TRAFFIC FORECASTS

Aircraft Movements Forecast & Variation

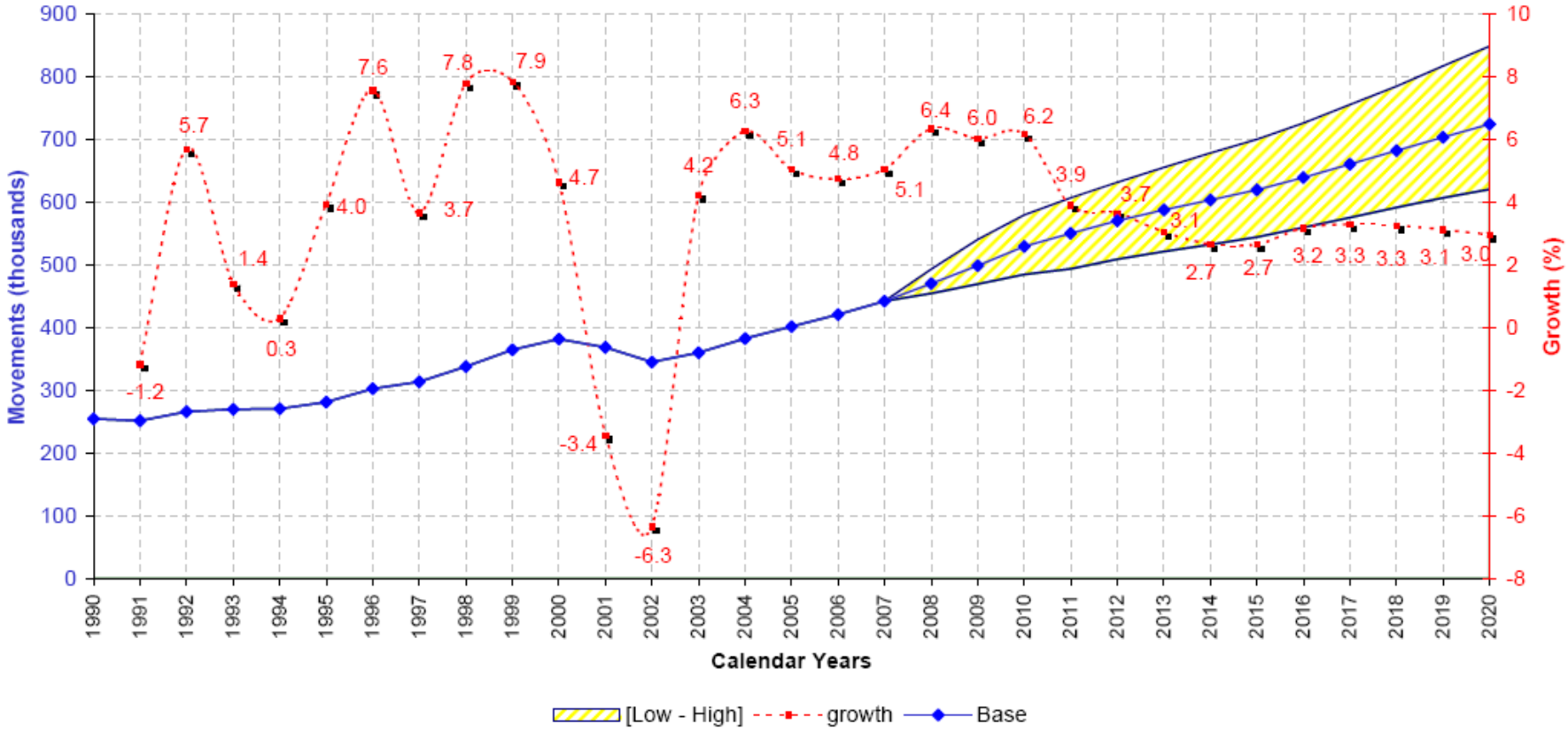


FIGURE 2
COMPARISON OF 2006 AND 2008 FORECASTS
AIRCRAFT MOVEMENTS: 2000-2020

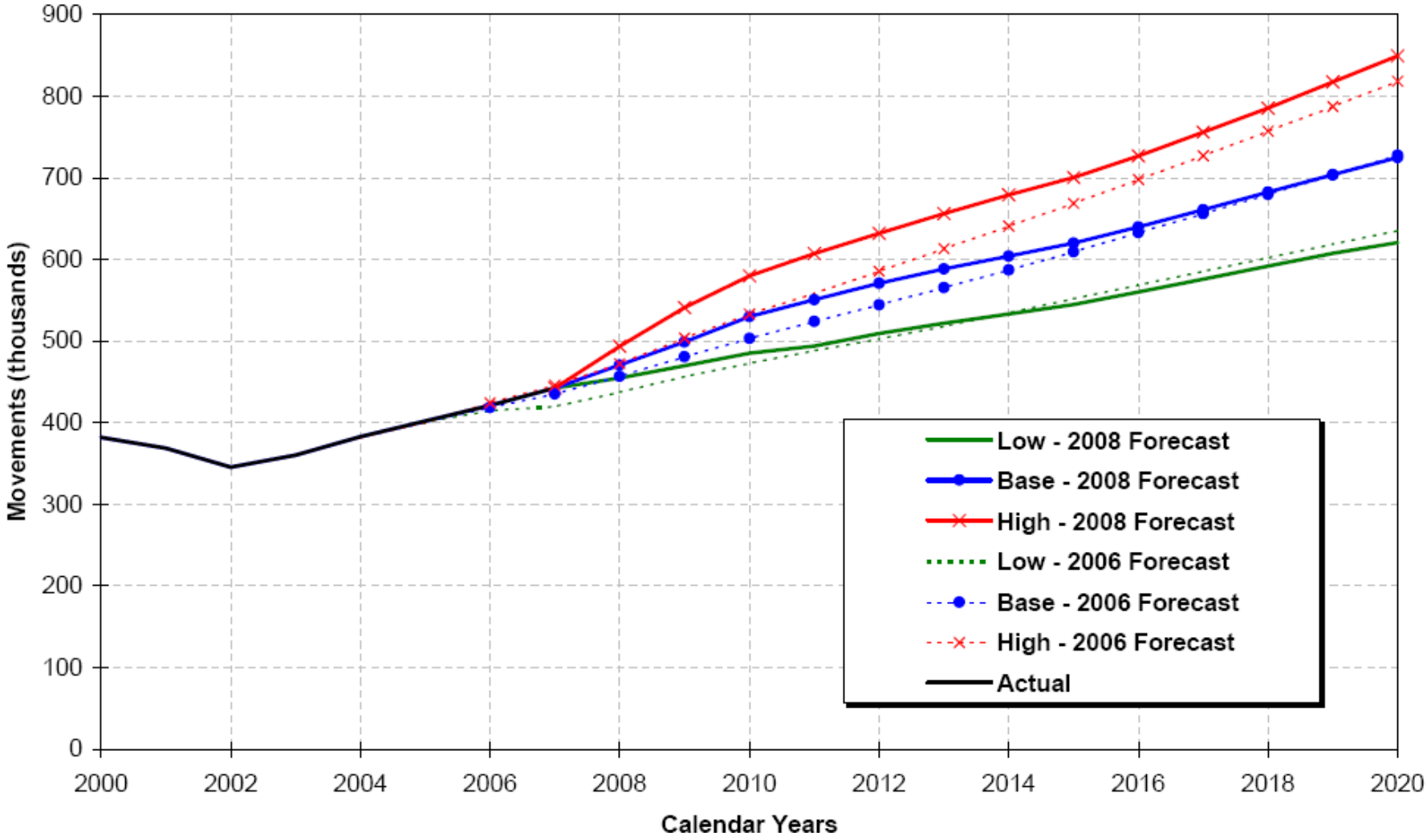
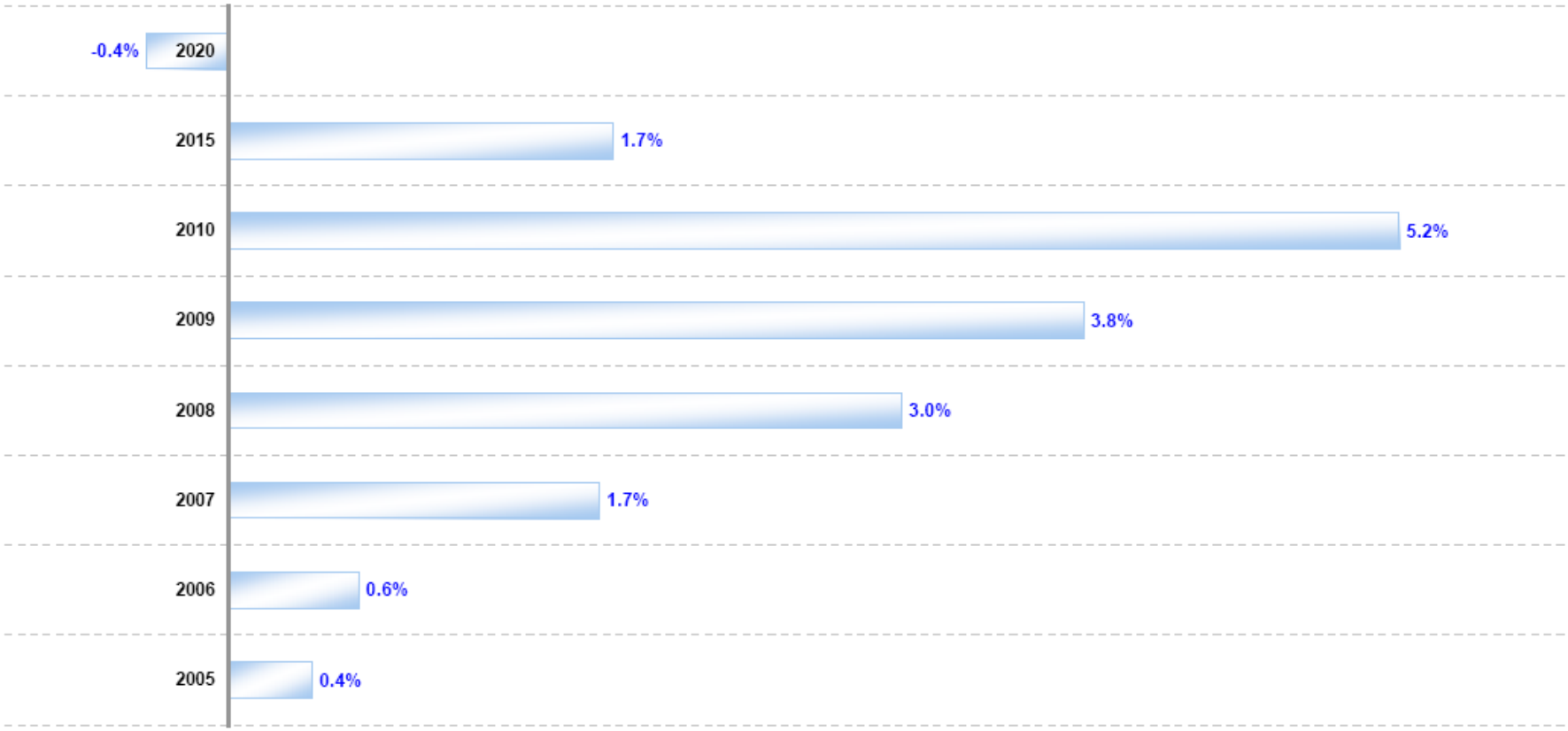


FIGURE 3

% DIFFERENCE BETWEEN 2008 and 2006 FORECAST AIRCRAFT MOVEMENTS



APPENDIX C - PERFORMANCE BASED GUIDANCE MATERIAL FOR COMMUNICATIONS

(Paragraph 2.4.5 refers)

12 Performance Based Guidance Material for Communications

12.1 Application

1.1.1 Each State should ensure that the ANSPs provide communication services that meet the RCP type, and that contracted CSPs meet their RCP allocations for each oceanic area control centre (OACC) and the flights it serves. The risks represented by the requirements are regarded as being minimum for the specified ATS function to maintain operational efficiency and meets the safety needs.

1.2 Purpose

1.2.1 The requirements herein are intended to support operational and safety requirements as traffic grows, and as horizontal separation minima are reduced. Reduced longitudinal separations will require air traffic control to become more tactical, supported by enhanced intervention capability. The performance requirements will be subject to validation and change as safety risks are further analysed, as monitoring is enhanced, and as operational experience is gained.

1.2.2 The requirements herein are intended to provide meaningful benchmarks for reference to safety oversight, initial qualification, and continued operational performance monitoring.

1.3 Relationship to standards documents

1.3.1 The requirements herein are based on the RTCA DO-306/EUROCAE ED-122 Safety and Performance Standard for Air TrafficData Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard), which includes a supporting safety and performance assessments for existing separation standards provided in ICAO Doc 4444.

1.3.2 Whereas DO-306/ED-122 specifies an Availability value based on safety assessment of the operational effects of the loss of the service, the Availability requirement herein is more stringent, based on an additional need to maintain orderly and efficient operations.

1.3.3 Whereas the DO-306/ED-122 specifies a requirement to indicate loss of the service, an additional time value was associated with the requirement to indicate the loss to the ANSP.

1.4 Performance parameters and meanings

The following are RCP parameter definitions taken from DO-306/ED-122, which are consistent with the ICAO Doc 9869, Manual On Required Communications Performance, and augmented by derived meanings that pertain to the different parts of the end-to-end service.

1.4.1 Meanings for communication supporting intervention and surveillance

Intervention - operational communication transaction -

The process a human uses to initiate the transmission of an instruction, clearance, flight information, and/or request, and is completed when that human is confident that the transaction is complete. (ICAO Doc 9869)

Surveillance – position report delivery

- Periodic report, from the start of the periodic interval. The start of the periodic interval occurs when the periodic report is sent by the aircraft/flight crew;
- Waypoint change event report, from the actual time the aircraft crosses the waypoint or is abeam the waypoint;
- Lateral deviation event report, from the time the aircraft system detects that the event has occurred
- Vertical deviation event report, from the time the aircraft system detects that the event has occurred

1.4.2 Communication transaction time - The maximum time for the completion of the operational communication transaction after which the initiator should revert to an alternative procedure.

Position report delivery time – The maximum time for the delivery of a position report from the aircraft to the ANSP.

Meanings for the end-to-end service -

- Monitored operational performance (TRN) - The portion of the operational communication transaction (used for intervention) that does not include message composition or recognition of the operational response.
- Required Communication Technical Performance (RCTP) – The technical portion of the operational communication transaction (used for intervention) that does not include message composition, operational response, and recognition of the operational response times.

Meanings for the aircraft –

- $RCTP_{AIR}$ for Intervention – The critical transit times for an ATC intervention message from the aircraft's antenna to the flight crew's indication of receipt of the message and from sending the message to the aircraft's antenna.
- $RCTP_{AIR}$ for Surveillance – The critical transit time for a position report from the aircraft's avionics to the antenna.

Meanings for communications service –

- $RCTP_{CSP}$ for Intervention – The summed critical transit times for an ATC intervention message and a response message, allocated to the CSPs.
- $RCTP_{CSP}$ for Surveillance – The critical transit time for a position report allocated to the CSPs.

1.4.3 Continuity - The probability that an operational communication transaction or position report delivery can be completed within the communication transaction time.

Meanings for the end-to-end service -

- The proportion of intervention messages and responses that can be delivered within the specified TRN for Intervention.
- The proportion of intervention messages and responses that can be delivered within the specified RCTP for Intervention.

Meanings for the aircraft -

- The proportion of intervention messages and responses that can be delivered within the specified $RCTP_{AIR}$ for Intervention.
- The proportion of position reports that can be delivered within the specified RCTPAIR for Surveillance.

Meanings for communications service –

- The proportion of intervention messages and responses that can be delivered within the specified $RCTP_{CSP}$ for Intervention.
- The proportion of position reports that can be delivered within the specified RCTPCSP for surveillance.

1.4.4 Availability – The probability that an operational communication transaction or position report delivery can be initiated when needed.

Meaning for communications service – Total outage proportion of communications service for any given observation period. An outage is an interval during which a communications service fault prevents the Continuity requirement from being met or service from being initiated, affecting multiple aircraft.

1.4.5 Integrity - The probability of one or more undetected errors in a completed communication transaction or position report delivery. (Modified for clarity from ICAO Doc 9869).

1.5 RCP 400/D Specification

1.5.1 Per DO-306/ED-122, this specification is applicable to data communication.

1.5.2 The end-to-end service shall meet or better these performance parameter values

RCP type	RCP 400	
TRN	370	320
RCTP	310	260
Continuity	0.999	0.95
Integrity	10-5	

The aircraft shall meet or better these performance parameter values:

RCP type	RCP 400	
RCTPAIR for intervention ..(seconds antenna-HMI-antenna]	15	10
RCTPAIR for surveillance (seconds avionics-antenna]	30	15
Continuity	0.999	0.95
Aircraft equipage availability	0.999	

The communications service shall meet or better these performance parameter values:

RCP type	RCP 400	
RCTPCSP for intervention [seconds ATC-aircraft-ATC]	280	240
RCTPCSP for surveillance [seconds aircraft-ATC]	340	270
Continuity	0.999	0.95
Service Availability1	0.999	
Mean time between failures2 (MTBF) [days]	15	
Maximum outage [minutes]	30	
Outage indication delay 3 [minutes]	10	

Notes:

1 – Service Availability of 0.999 implies no more than 9 hours of total outage time in any 12-month period.

2 – A failure is any outage of more than 20 minutes affecting 5 or more aircraft within an OAC's airspace. Failures causing outages for multiple OAC's are not counted more than once.

MTBF of 15 days implies no more than 24 failures in any 12-month period.

3 – After an outage begins, indication delay is the time before the communications service provides ATC automation with a positive indication that there is an outage.

1.6 RCP 240/D Specification

1.6.1 Per DO-306/ED-122, this specification is applicable to data communication.

1.6.2 The end-to-end service shall meet or better these performance parameter values:

RCP type	RCP 240	
TRN ..[seconds ATC HMI-aircraft-ATC HMI]	210	180
RCTP --[seconds ATC HMI-aircraft HMI & aircraft HMI-ATC HMI]	150	120
Continuity	0.999	0.95
Integrity	10-5	

The aircraft shall meet or better these performance parameter values:

RCP type	RCP 240	
RCTPAIR for intervention ..(seconds antenna-HMI-antenna]	15	10
RCTPAIR for surveillance (seconds avionics-antenna]	5	3
Continuity	0.999	0.95
Aircraft equipage availability	0.999	

The communications service shall meet or better these performance parameter values:

RCP type	RCP 240	
RCTP for Intervention [seconds ATC-aircraft-ATC]	120	100
RCTP for surveillance [seconds aircraft-ATC]	170	84
Continuity	0.999	0.95
Service Availability1	0.9999	
Mean time between failures2 (MTBF) [days]	90	
Maximum outage [minutes]	15	
Outage indication delay 3 [minutes]	5	

Notes:

1 – Service Availability of 0.9999 implies no more than 50 minutes of total outage time in any 12-month period for orderly and efficient operations. DO-306/ED-122 requires 0.999 for safety.

2 – A failure is any outage of more than 10 minutes affecting 5 or more aircraft within an OAC's airspace. Failures causing outages for multiple OAC's are not counted more than once. MTBF of 90 days implies no more than four failures in any 12-month period.

3 – After an outage begins, indication delay is the time before the communications service provides ATC automation with a positive indication that there is an outage.

1.7 Monitoring and Alerting

1.7.1 While aircraft, operators and air traffic service provision may be qualified for a specific RCP type operation, failures may occur which may cause degradation in the performance of the service to something below that which is required by the intended operation. In such cases, real time monitoring and alerting may be necessary to provide indication to the flight crew and/or controller. The monitoring and alerting criteria are yet to be defined.

1.8 Applicability of RCP specifications

1.8.1 Applicability to data link communications

Per DO-306/ED-122RCP types, in conjunction with suitable navigation performance, are deemed to match the needs for safe, orderly and efficient operations as follows.

RCP type	Satisfies requirements as
RCP 240	Normal means of communication for application of 30 NM lateral separation and reduced longitudinal separation minima
RCP 400	Alternative means of communication for application of 30 NM lateral separation and reduced longitudinal separation minima
RCP 400	Normal means of communication for application of lateral separation greater than or equal to 50 NM and time-based longitudinal separation

1.8.2 Applicability to voice communications.

End-to-end voice communications performance required for a given ATC application would be the same as for data link in the same application. However, one link in the end-to-end chain would be

very different: Instead of the CSP domain for data link there would be the pilot and ground voice operator and their data displays and keyboard interfaces to their avionics and ATC automation. Regarding RCP240 it would not be possible for a human-to-human-to-machine link to meet the CSP performance requirements. In fact the same is true for RCP400, which in order to support safety improvements specifies integrity and availability well above the level of existing voice communications.

1.8.3 Fallback from data link to voice communications

In evaluating the suitability of voice as a fallback arrangement for a data link service outage it must be borne in mind that controllers might be unable to cope with the workload imposed by DCPC voice – data link and third-party voice share the characteristic of presenting data in a format lending itself to processing by FDPSs without any controller intervention.

From a practical point of view a suitable backup for data link communications arrangement may therefore be required to be either voice through a third-party (implying a need to retain sufficient voice communications operators to carry traffic during failures) or an independent backup data link system.

APPENDIX D - GUIDANCE MATERIAL FOR END-TO-END PERFORMANCE MONITORING OF ATS COMMUNICATIONS SERVICES FOR NORTH ATLANTIC AIRSPACE

(Paragraph 2.4.5 refers)

2 Guidance Material For End-To-End Performance Monitoring Of ATS Communications Services For North Atlantic Airspace

2.1 Background

2.1.1 The North Atlantic FANS Implementation Group (NAT FIG), of the NAT System Planning Group (NAT SPG), has established specific performance requirements for data link systems that support ATS communications and surveillance (CPDLC and ADS-C) in the Region. Those requirements are specified in the GUIDANCE MATERIAL FOR ATS DATA LINK SERVICES IN NORTH ATLANTIC AIRSPACE. The introduction of guidance material for Required Communication Performance (RCP) has added to the monitoring requirements for ATSP's. To ensure that those requirements would be met, there was a need to develop guidance material for end-to-end monitoring of performance against them. A ready model for that was the GUIDANCE MATERIAL FOR END-TO-END SAFETY AND PERFORMANCE MONITORING OF AIR TRAFFIC SERVICE (ATS) DATALINK SYSTEMS IN THE ASIA/PACIFIC REGION. The guidance material here was based on that document, much of the detail copied verbatim. However many substantial changes were necessary, to account for differences between the APAC and NAT airspaces and the organisations and existing terms of reference of the ICAO groups and agencies serving them.

2.2 ICAO Requirement to carry out performance monitoring

2.2.1 Annex 11, at 2.26.5, states:

"Any significant safety-related change to the ATC system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that an acceptable level of safety will be met and users have been consulted. When appropriate, **the responsible authority shall ensure that adequate provision is made for post-implementation monitoring** to verify that the defined level of safety continues to be met."

2.2.2 ATS datalink applications, such as ADS and CPDLC, are being used increasingly in support of separation and will be use in support of reduced separation minima. Accordingly, it is necessary to provide the monitoring to those datalink services, as required by Annex 11. Datalink services comprise both a technical and an operational element. This Guidance Material, which provides a structure and methodology for monitoring, applies only to the technical element.

2.2.3 The requirement for on-going monitoring after implementation is based on several factors, including both degradation of performance with time and changes to equipment which may occur, either through modification or under renewal programmes. A major impetus for increased monitoring has been the unanticipated closure of many Ground Earth Stations (GES) around the globe, resulting in loss of dual-GES redundancy in the NAT Region and elsewhere. That has caused grave concern within the NAT System Planning Group (NAT SPG) as to the continuous availability of data link communications for supporting safe and orderly ATS operations in the Region.

2.3 Purpose of Guidance Material

2.3.1 The purpose of this guidance material is to:

- Promote a globally standardised approach for ATS data link communications performance monitoring.

- Promote regional monitoring as opposed to merely per-State monitoring, in order to maximise efficient use of resources including expertise, and to enable a broader shared view of performance.

- Promote the sharing of performance information across regions.

- Provide detailed guidance on the requirements for operating the FANS Central Monitoring Agency (FCMA).

2.4 Role of the NAT FANS Implementation Group (FIG)

2.4.1 The role of the FIG regarding monitoring is to address technical and operational problems affecting the transit of datalink aircraft through international airspace. To do this it must oversee the end-to-end monitoring process to ensure the datalink system meets, and continues to meet its performance requirements.

2.4.2 The specific tasks of the FIG in that regard are (from the FIG Terms Of Reference):

1. to develop the methodology for the FANS implementation process including harmonization of implementation activities, monitoring requirements*, reporting functions and arrangements among its members for use and distribution of FANS related data*

…

3. to evaluate FANS end to end performance

4. to establish and oversee configuration management for the implementation of FANS systems for the NAT Region

…

7. to implement and administer FANS performance/problem monitoring and reporting system

2.5 NAT FCMA Role and Resources

2.5.1 Work must be done on a daily basis for the NAT FIG to fulfil its role. The NAT FCMA is required to do the daily monitoring, coordination, testing and problem research tasks for the FIG.

2.5.2 Recognising safety oversight responsibilities regarding the implementation and continued use of ATS datalink systems, the following apply:

a) States should ensure that the NAT FCMA has the required tools and personnel with the technical skills and experience to carry out the required functions.

b) States should ensure that the agency is adequately funded to carry out its required functions.

2.5.3 The Terms Of Reference for the NAT FCMA are:

The NAT FANS Central Monitoring Agency (NAT FCMA) will be jointly managed by Canada and the United Kingdom and will report to the NAT IMG with respect to FANS implementation, trials and operations.

It will receive and process routine and ad-hoc data and problem reports from end users and interested parties to perform the following functions:

1 Monitor and report communications performance, availability, and problems, with respect to requirements.

2 *Develop and promulgate forms, specifications, and procedures required for reporting of problems and routine data.*

3 *Monitor and report message traffic statistics.*

4 *Co-ordinate end-to-end system functionality, performance, and interoperability.*

5 *Co-ordinate in order to diagnose and resolve system problems.*

6 *Co-ordinate the development of ground system navigation databases.*

7 *Report ATSUs' FANS capabilities with respect to trials and operational requirements for the Region. Receive advisories of same from ATS providers.*

8 *Co-ordinate with similar agencies for other airspaces.*

9 *Collect notices of service disruptions, restorations, and major system changes. Correlate the information same* to problems reported.

2.5.4 NAT FCMA Resource Requirements

i. To be effective, the NAT FCMA must have adequate resources and tools. Level of effort depends on the complexity of the traffic being monitored. There are several factors that affect complexity from an ATS monitoring standpoint such as organisation of the airspace, variety in operating procedures, number of aircraft operators, number of airborne equipment variants, number of air traffic service providers, number of ground equipment variants and number of communication service providers.

ii. Coordination is an important part of the NAT FCMA work. In the pursuit of problem resolution, action item resolution, monitoring and testing, many issues arise that require coordination among the various stakeholders. The NAT FCMA has a primary responsibility to provide this coordination function as delegated by the FIG. Coordination with similar agencies in other regions is also important, particularly to expand the information database on problems and trends. An incident may appear to be an isolated case, but the collation of similar reports from different regions might indicate an area that needs more detailed examination.

iii. The following table shows NAT FCMA tasks and the associated resource requirements.

NAT FCMA Task	Resource Requirement
• **Manage any data confidentiality agreements as required**	Access to legal services Technical expertise
• **Develop and administer problem report process:** • **De-identify all reports prior to publication** • **Keep the identified reports for processing** • **Request audit data from communication service providers** • **Assign responsibility for problem resolution where possible** • **Analyse the data** • **Identify trends**	Problem reporting data base Decode capability for ATS datalink messages logs and flight datalink message traces from CSPs
• **Administer and monitor an informal end-to-end configuration process.**	Technical expertise
• **Report to the FIG**	Technical expertise

2.6 Working Principles for the NAT FCMA

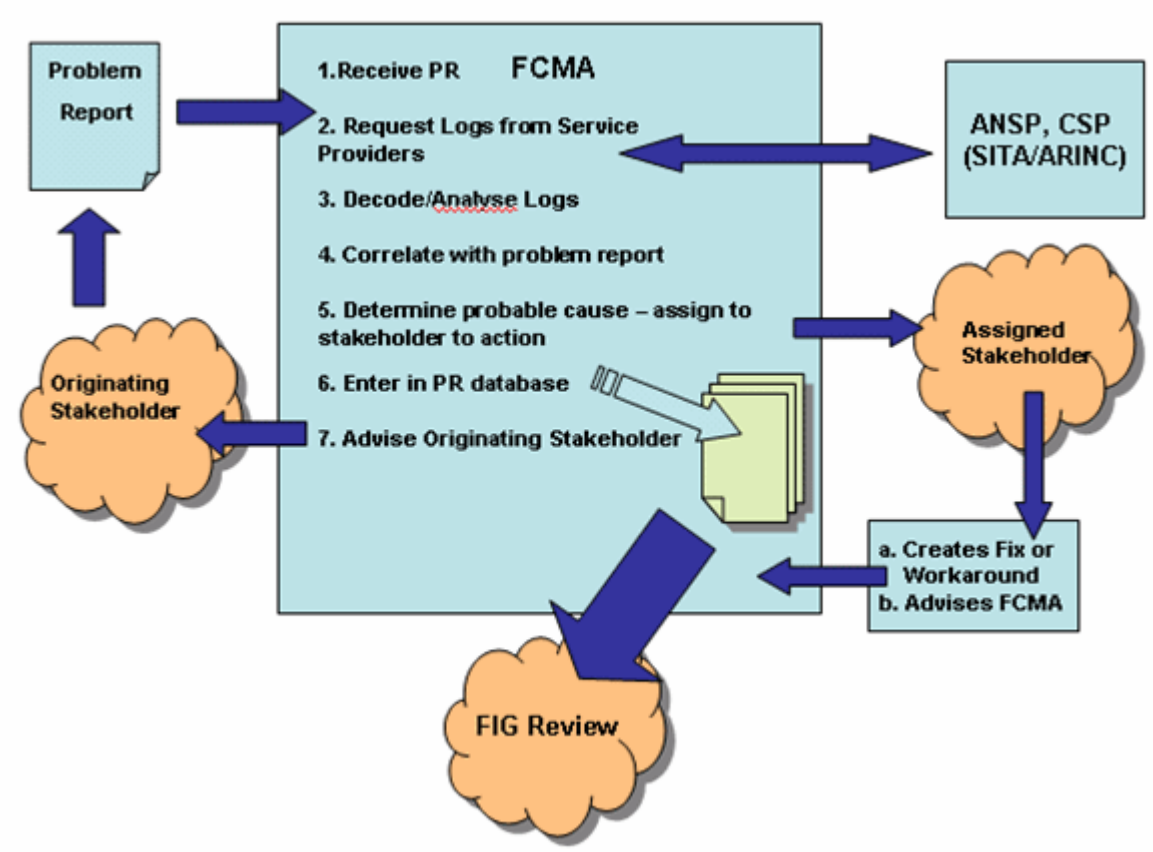
2.6.1 Confidentiality Agreements

i. Confidentiality of information is an established principle for problem reporting, and so reports must be de-identified before being made accessible to other agencies. However, it is necessary for the NAT FCMA to retain the identity of the original reports so that problem resolution and follow-up action can be taken.

ii. The NAT FCMA may initiate and maintain confidentiality agreements with each entity providing problem reports, to the extent required by each. In many cases an entity will have a requirement for confidentiality in one case, but not in another, so it is often more expeditious to address confidentiality on a case-by-case basis.

2.6.2 Problem Identification and Resolution

i. The problem identification and resolution process, as it applies to an individual problem, consists of a data collection phase, followed by problem analysis and coordination with affected parties to secure a resolution, and recommendation of interim procedures to mitigate the problem in some instances. This is shown in the diagram below.



ii. The problem identification task begins with receipt of a report from a stakeholder, usually an operator, ATS provider or communication service provider. If the person reporting the problem has included sufficient information, then data collection can begin. If not, additional data may have to be requested from the person reporting the problem.

iii. The data collection phase consists of obtaining message logs from the appropriate parties (which will depend on which service providers were being used and operator service contracts). This usually means obtaining logs for the appropriate period of time from the communication service providers involved. Usually, a log for a few hours before and after the event that was reported will suffice, but once the analysis has begun, it is sometimes necessary to request additional data, (perhaps for several days prior to the event if the problem appears to be an on-going one).

iv. Additionally, some airplane-specific recordings may be available that may assist in the data analysis task. These are not always requested initially as doing so would be an unacceptable imposition on the operators, but may occur when the nature of the problem has been clarified enough to indicate the line of investigation that needs to be pursued. These additional records include:

- Aircraft maintenance system logs.
- Built-In Test Equipment data dumps for some airplane systems.
- SATCOM activity logs.

v. Logs and printouts from the flight crew and recordings/logs from the ATS provider(s) involved in the problem may also be necessary. It is important that the organisation collecting data for the analysis task requests all this data in a timely manner, as much of it is subject to limited retention.

vi. Once the data has been collected, the analysis can begin. For this, it is necessary to be able to decode all the messages involved, and a tool that can decode every ATS datalink message type used in the region is essential. These messages include:

- AFN (ARINC 622), ADS and CPDLC (RTCA DO-258/EUROCAE ED-100)
- ARINC 623 messages used in the region.

vii. The analysis of the decoded messages requires a thorough understanding of the complete message traffic, including:

- Media management messages.
- Relationship of ground-ground and air-ground traffic.
- Message envelope schemes used by the particular datalink technology (ACARS).

viii. The analyst must also have a good understanding of how the aircraft systems operate and interact to provide the ATS datalink functions, as many of the reported problems are airplane system problems.

ix. This information will enable the analyst to determine a probable cause by working back from the area where the problem was noticed to where it began. In some cases, this may entail manual decoding of parts of messages based on the appropriate standard to identify particular encoding errors. It may also require lab testing using the airborne equipment (and sometimes the ground networks) to reliably assign the problem to a particular cause.

x. Once the problem has been identified, then the task of coordination with affected parties begins. The stakeholder who is assigned responsibility for fixing the problem must be contacted and a corrective action plan agreed. The stakeholder who initiated the problem report shall be provided with regular updates on the progress and resolution of the problem.

xi. This information (the problem description, the results of the analysis and the plan for corrective action) is then entered into a database covering datalink problems, both in a complete form to allow continued analysis and monitoring of the corrective action and in a de-identified form for the information of other stakeholders. These de-identified summaries are reported at the appropriate regional management forum and then forwarded to other regional NAT FCMA's .

2.6.3 Mitigating Procedures

i. The NAT FCMA responsibility does not end with determining the cause of the problem and identifying a fix. As part of that activity, and because a considerable period may elapse while software updates are applied to all aircraft in a fleet, procedural methods to mitigate the problem may have to be developed while the solution is being coordinated. The NAT FCMA should identify the need for such

procedures and provide information to support their development for implementation by the service providers and operators involved.

2.6.4 Routine Datalink Performance Reporting

i. An important part of datalink safety performance is the measurement of the end-to-end performance. This should, of course, be carried out prior to implementation of new separation minima, but should continue on a regular basis to give assurance that the safety requirements continue to be met. Datalink performance assessment is based on the RCP parameters and values in the Performance Based *Guidance Material for Communications* and ATS providers should provide the NAT FCMA with regular measurements of these parameters. It is essential that a common format is used by all ATS providers when supplying their data to the NAT FCMA to simplify the task of creating regional performance assessments.

ii. The NAT FCMA will use the information supplied by ATS providers to produce a performance assessment against the established datalink requirements for the region. These requirements are set according to the separation minima being applied, and so may differ within different areas according to usage.

iii. The NAT FCMA performance assessment should be made available to the NAT FIG for their evaluation of system performance against the minimum values defined in the *Performance Based Guidance Material for communications*.

iv. ADS round-trip times are normally measured as the time between sending a contract request and receiving the associated Acknowledgement (ACK) or Message Assurance (MAS) message. CPDLC round-trip times are normally determined from the ATSU end-system time stamps for transmission of the uplink message and reception of the associated MAS.

v. ADS and CPDLC downlink one-way times are defined by the difference between the aircraft time stamp and the ASTU end-system reception time stamp.

vi. ADS and CPDLC success rates are only available for uplink messages. The success rate is expressed as the percentage of messages that receive a successful ACK or MAS within a specified time.

vii. CPDLC Actual Communications Performance (ACP) used for monitoring the RCP TRN is determined by the difference between the time stamp on the CPDLC uplink from the ATSU requiring a Wilco/Unable response to reception of the associated downlink from the aircraft.

Note. When monitoring RCP only those transactions requiring a WILCO/UNABLE response are assessed in order to provide the best modeling of the performance of a CPDLC message used for intervention in a reduced separation scenario.

viii. CPDLC Actual Communications Technical Performance (ACTP) used for monitoring RCTP is determined by the measurement of the difference between the time stamp on the CPDLC uplink and the reception of the corresponding MAS divided by two plus the associated CPDLC downlink time defined by the difference between the aircraft time stamp and the ATSU end-system reception time stamp.

ix. CPDLC Crew Performance is determined by the difference between ACP and ACTP for the same transaction.

2.6.5 Configuration Monitoring

i. A variety of technical systems are involved in the datalink process and changes, particularly to software and software parameters, are not infrequent; any change may have an impact on the overall performance of the datalink. It is therefore important that the NAT FCMA is kept informed of each change of configuration of each system including aircraft systems. With this information it is often possible to identify changes that lead to improvements or deteriorations in the datalink performance or that may be associated with particular problems.

ii. All ATS providers, communication service providers, aircraft operators and avionics suppliers should therefore report all system configuration changes to the NAT FCMA. The NAT FCMA will then maintain a database of configuration changes for each system or sub-system. It is not necessary for the NAT FCMA to know the details of changes, but where a change is expected to affect performance, information on the likely effect should be provided.

2.6.6 New Procedures and Improved Performance Requirements

i. The NAT FCMA may recommend new end-to-end datalink system performance requirements, either to accommodate new operational procedures, or to enable better monitoring, or to take account of recognised problems.

APPENDIX E - EUR/NAT VOLCANIC ASH EXERCISES STEERING GROUP (EUR/NAT VOLCEX/SG)

(Paragraph 2.5.17 refers)

TERMS OF REFERENCE

Objective: Improve the response to volcanic eruptions and volcanic ash clouds by the relevant service providers (ATS, AIS, ATFM, MET) and airspace users in the EUR and NAT Regions through organizing regular volcanic ash exercises in order to validate and continually improve the regional volcanic ash contingency plans and procedures.

Tasks:

1. Co-ordinate with all participants in the volcanic ash exercises (ACCs, airlines, VAACs, MWOs, CFMU) the schedule for the exercises and their scenarios; ensuring that exercises cover all parts of the EUR and NAT Regions that could be affected by volcanic ash.

2. Keep under review the regional VA exercise procedures and make improvements based on the lessons learnt. (Regional VA Exercise Procedures to be posted on the EUR and NAT websites)

3. Organize in parallel with the VA exercises awareness events, such as seminars and presentations, in order to enhance the awareness of the participants regarding the hazardous effects of volcanic ash and the established contingency measures.

4. Based on the outcome of the VA exercises, propose (to EANPG COG and NAT IMG) improvements to the regional contingency plans, as well as, to the national and regional operational procedures.

5. Report the results of its activities to the EANPG COG and the NAT IMG on an annual basis. The group should also liaise with the METG of the EANPG and the NAT ATMG.

Composition: France, Iceland (Co-Rapporteur), Italy, Portugal, the United Kingdom (Co-Rapporteur), Eurocontrol (incl. CFMU), ICAO (Secretary), and IATA.

APPENDIX F - DRAFT PROPOSAL FOR AMENDMENT TO THE NAT SUPPS REGARDING THE DEPLOYMENT OF NAT HF FAMILIES

(Paragraph 3.2.10 refers)

European and North Atlantic Office

PROPOSAL FOR AMENDMENT OF THE REGIONAL SUPPLEMENTARY PROCEDURES, NAT REGION (Doc 7030/5)

(Serial No.: EUR/NAT-S 08/.0x NAT)

a) Regional Supplementary Procedures:

Doc 7030/5 – NAT SUPPs

b) Proposed by:

Portugal

c) Proposed amendment:

1. **Amend** paragraph 3.5.2, HF operations, as follows:

"3.5.2 HF operations
(A10, Vol. II – Chapter 5)

3.5.2.1 Assignment of voice traffic to HF Families

3.5.2.1.1 Procedures for the distribution of the NAT HF air-to-ground message traffic of the users on the NAT routes between the various NAT HF families are indicated in the table below.

HF NAT Family	Route or portion of route flown	Radio Stations	Obs.
D	Aircraft flying routes with reporting point coordinates north of 62N	Bodo Gander Iceland Shanwick	During off peak periods, and when watch is reduced on other families, Family D should remain the primary assignment for aircraft flying north of 62N.
B and C	Aircraft flying routes with reporting point coordinates between 47N and 64N	Gander Iceland Shanwick	In order to ensure even peak-time distribution of traffic between Family B and C, aircraft may be assigned to either family on the basis of; state of registry, Airline Company or other such criteria as agreed between Shanwick Radio and Gander Radio.

F	Aircraft flying routes entirely within the Gander and Shanwick areas	Gander Shanwick	Hours of operation of Family F shall be coordinated on a tactical basis between Shanwick Radio and Gander Radio
A	Aircraft flying routes with reporting point coordinates between 43N and 47N	Gander New York Santa Maria Shanwick	During off peak periods, and when watch is reduced on other families, Family A should remain the primary assignment for aircraft flying south of 43N.
E	Aircraft flying routes with reporting point coordinates south of 43N	New York Santa Maria	During off peak periods, and in the case of reduction of the number of available families, the guard of this family should be discontinued

3.5.2.1.2 In the event of overloading of a family or for other operational reasons, stations should not assign aircraft flying routes outside the areas defined in table above, without prior coordination and agreement of other network stations, in order to minimise adverse impact on existing sub-network traffic.

2. **Add** the following paragraph:

3.5.2.2 Intercept procedures

3.5.2.2.1 NAT radio Stations do not apply the intercept procedures recommended in Annex 10 Vol. II, paragraph 5.2.3.1.2. Instead, they work as a network and render assistance to each other and to all aircraft as necessary, as recommended by ICAO in Annex 10 Vol. II, paragraph 5.2.2.4."

d) Proposer's reason for amendment:

e) Proposed implementation date of the amendment:

Upon approval by Council.

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

g) Secretariat comments:

APPENDIX G - THE TERMS OF REFERENCE AND REPORTING LINES OF THE AERONAUTICAL COMMUNICATIONS GROUP (ACG) AND THE NAT OPERATIONS MANAGERS (OPS MNG)

(Paragraph 3.2.12 refers)

NAT AERONAUTICAL COMMUNICATIONS GROUP (NAT ACG)

Terms of Reference

The NAT ACG is responsible for monitoring and analyzing the efficiency and effectiveness of the NAT high frequency (HF) and general purpose/very high frequency (GP/VHF) voice systems in the NAT Region and provides advice on the operational impact of traffic growth and the implementation of new communications technologies on short to medium term operations.

The main tasks of the NAT ACG are:

1. Monitor and analyze the efficiency and effectiveness of the existing HF and GP/VHF systems.
2. Address short term issues and propose solutions to problems related to fixed/mobile services.
3. Keep under review the current network management arrangements including the distribution of traffic over the HF families of frequencies and to resolve unequal distribution of traffic.
4. Provide advice on the operational communications requirements related to transition issues associated with the implementation of new communications technologies.
5. Provide advice/comment, as required, to the NAT FIG and NAT ATMG on the impact of the implementation of communications systems and/or changes in ATC procedures on HF voice communications.
6. Address related issues as directed by the NAT SPG.
7. Address and report to the NAT IMG regarding issues related to planning and implementation, as directed by the NAT IMG
8. Report to the NAT SPG on issues related to the health of the system.

Composition

The NAT ACG is composed of representatives from Canada, Iceland, Ireland, Norway, Portugal, the United States, IATA and others as the Rapporteur may designate.

Working Methods

Through correspondence to the extent possible. Meetings may be required from time to time.

Rapporteur

Portugal.

NAT OPERATIONS MANAGERS (NAT OPS MNG)

Terms of Reference

The annual NAT OPS MNG Meeting was established by NAT SPG/30 and was tasked to address operational issues that fall within a 12-month time frame on the basis of the following terms of reference:

1. Identify and propose remedial action for shortcomings and deficiencies.
2. Co-ordinate the implementation of changes affecting air traffic management.
3. Examine the effects of short to medium term operational developments on air traffic management.
4. Co-ordinate airspace changes.
5. Co-ordinate airspace reservation activities and Civil/Military issues.
6. Examine day to day operational issues and inter-centre co-ordination; and
7. Co-ordinate the development of contingency plans.
8. Examine Air Traffic Flow Management (ATFM) issues.
9. Promoting ways and means to encourage the use of the Strategic Lateral Offset Procedures (SLOP).
10. Examine other issues that might arise that may have any effect on day to day operations.
11. Address and report to the NAT IMG regarding issues related to planning and implementation, as directed by the NAT IMG
12. Report to the NAT SPG on issues related to the health of the system.

Composition

The NAT OPS MNG Meeting is composed of representatives from Bodø, Gander, New York, Reykjavik, Santa Maria and Shanwick OACs and Sondrestrom FIC together with representatives of civil and military users and the NAT IMG or NAT SPG Member from the host State.

The Meeting may invite participation by representatives from other air traffic control and flow management units as required.

Working Methods

Meetings of the NAT OPS MNG shall be limited to a maximum of five days. A day shall be given to military and civil users. Any additional user participation would be decided depending on agenda items, as determined by the host State. Sufficient time shall also be set aside to facilitate a visit to the operations room at the host location.

The NAT OPS MNG Meetings shall be held concurrently with NAT user conferences or at NAT ATC facilities in Bodø, Gander, New York, Reykjavik, Santa Maria or Prestwick if no user conference is scheduled.

The host State shall be responsible for providing the Chairman as well as secretariat services. The Chairman will ensure that appropriate follow up action is taken after the meeting.

Proposed agenda and call for papers should be sent out 90 days prior to the Meeting.

Working Papers and Information Papers, including user inputs, should be distributed to the participants 30 days prior to the meeting.

The NAT SPG Member or the NAT IMG Member of the host State will participate in the meeting to the extent necessary to ensure compatibility with the overall NAT SPG objectives.

The Chairman of the meeting will ensure a Working Paper containing details of the meeting process, conclusions and recommendations will be sent to the Secretary of the NAT SPG within 30 days of the end of the meeting. The working paper should be limited to issues that are relevant to the NAT SPG and should not contain issues that are germane only to the NAT OPS MNG itself.

LIST OF ACRONYMS

AAD	Assigned Altitude devi£ation
ACARS	Aircraft Communication Addressing and Reporting System
ACAS	Airborne Collision Avoidance System
ACAS II	Airborne Collision Avoidance System – Phase 2
ACC	Area Control Centre
ACG	Aeronautical Communications Group
ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
AFI	African and Indian Ocean
AFTN	Aeronautical Fixed Telecommunications Network
AIC	Aeronautical Information Circular
AIDC	ATS Inter-Facility Data Communication
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
ALLPIRG	All Planning and Implementation Regional Groups
AMSS	Aeronautical Mobile-Satellite Service
ANC	Air Navigation Commission
ANP	Air Navigation Plan
ANS	Air Navigation Services
ANSP	Air Navigation Service Provider/s
APAC	Asia and Pacific Regions
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
ATMIP	Air Traffic Management Implementation Plan
ATN	Aeronautical Telecommunications Network
ATOP	Advanced Technologies and Oceanic Procedures
ATS	Air Traffic Services
BOTA	Brest Oceanic Transition Area
CAA	Civil Aviation Authority
CADS	Central Automatic Dependent Surveillance
CAR	Caribbean
CDA	Continuous Descent Arrivals
CDM	Collaborative Decision Making
CFMU	Central Flow Management Unit (Eurocontrol)
CMA	Central Monitoring Agency
CNS	Communications, Navigation and Surveillance
CNS/ATM	Communications, Navigation and Surveillance/Air Traffic Management
COG	EANPG Programme Coordinating Group
COM	Communication
CONOPS	Concept of Operations
CPDLC	Controller Pilot Data Link Communications
CRM	Collision Risk Model
CSP	Communications Service Provider
CTA	Control Area
DCPC	Direct Controller-Pilot Communications
DEMA	NAT Deviations and Errors Monitoring Application
DLSG	Data Link Steering Group

DMO	Document Management Office
EANPG	European Air Navigation Planning Group
EC	European Commission
ECAC	European Civil Aviation Conference
EFG	Economic and Financial Group
EGNOS	European Geostationary Navigation Overlay Service
ELT	Emergency Locator Transmitter
ETMS	Enhanced Traffic Management System (US)
EUR	European
EUR/NAT	European and North Atlantic
EUROCAE	The European Organization for Civil Aviation
FAA	Federal Aviation Administration
FAB	Functional Airspace Block
FANS	Future Air Navigation Systems
FASID	Facilities and Services Implementation Document
FCMA	FANS Central Monitoring Agency
FDE	Fault Detection and Exclusion
FDPS	Flight Data Processing System
FIG	FANS 1/A Implementation Group
FIR	Flight Information Region
FIS	Flight Information Services
FMC	Flight Management Computer
FMS	Flight Management System
FOM	Figure of Merit
FTE	Flight Technical Error
FUA	Flexible Use of Airspace
GAATS	Gander Automated Air Traffic System
GASP	Global Aviation Safety Plan
GAT	General Air Traffic
GLONASS	Global Orbiting Navigation Satellite System
GMS	Global Positioning System Monitoring System
GMU	Global Positioning System Monitoring Unit
GNE	Gross Navigation Error
GNSS	Global Navigation Satellite System
GP	General Purpose
GPS	Global Positioning System
HF	High Frequency
HFDL	HF Data Link
HMS	Height Monitoring System
HMU	Height Monitoring Unit
IACA	International Air Carrier Association
IAOPA	International Council of Aircraft Owner and Pilot Associations
IATA	International Air Transport Association
IBAC	International Business Aviation Council
ICD	Interface Control Document
IFALPA	International Federation of Air Line Pilots' Associations
IFATCA	International Federation of Air Traffic Controllers' Associations
IGA	International General Aviation
Inmarsat	International Maritime Satellite Organization
INS	Inertial Navigation System
IOC	International Oceanic Conference
IRS	Inertial Reference System
ISPACG	Informal South Pacific Air Traffic Services Co-ordinating Group
ITASPS	ICAO Informal Trans-Asia/Trans-Siberia/Cross Polar Routes High Level Steering Group
ITU	International Telecommunications Union
JAA	Joint Aviation Authorities
KPI	Key Performance Indicators

LHD	Large Height Deviation
LIM NAT RAN	Limited North Atlantic Regional Air Navigation
LOA	Letter of Agreement
LRNS	Long Range Navigation System
MAS	Message assurance
MASPS	Minimum Aircraft System Performance Specification
MEL	Minimum Equipment List
MET	Meteorology
MNPS	Minimum Navigation Performance Specifications
MNPS OPS	Minimum Navigation Performance Specifications Operations
MNT	Mach Number Technique
MOC	Memorandum of Cooperation
MOPS	Minimum Operational Performance Standards
MOU	Memorandum of Understanding
MSSR	Monopulse Secondary Surveillance Radar
MWG	Mathematicians Working Group
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
NERS	North Atlantic European Routing Scheme
NICE Group	NAT Implementation Management Cost Effectiveness Group
NOAA	National Oceanic and Atmospheric Administration
NOTA	Northern Oceanic Transition Area
OAC	Oceanic Area Control Centre
OCA	Oceanic Control Area
OCD	Oceanic Clearance Delivery
OLDI	On Line Data Interchange
OPLINKP	Operational Data Link Panel
OPS MNG	NAT Operations Managers
OPS/AIR	Operations/Airworthiness
OTS	Organized Track System
PANS	Procedures for Air Navigation Services
PBN	Performance Based Navigation
PCO	Programme Co-ordination Office
PHI	Preliminary Hazard Identification
PIRG	Planning and Implementation Regional Group
POS	Position
PTSN	Public Telephone Switched Network
R&D	Research and Development
R/T	Radio Telecommunication
RAIM	Receiver Autonomous Integrity Monitoring
RCP	Required Communications Performance
RHSM	Reduced Horizontal Separation Minima
RLongSM-T5	Reduced Longitudinal Separation Minimum – 5 minutes using ADS
RMA	Regional Monitoring Agency
RNAV	Area Navigation
RNP	Required Navigation Performance
RTCA	Radio Technical Commission for Aeronautics
RVSM	Reduced Vertical Separation Minimum
SAATS	Shanwick Automated Air Traffic System
SAR	Search and Rescue
SARPS	Standards and Recommended Practices (ICAO)
SARSIG	Safety Analysis and Reduced Separation Implementation Group
SASP	Separation and Airspace Safety Panel
SATCOM	Satellite Communications

SES	Single European Sky
SESAR	Single European Sky Air Traffic Management Research
SLOP	Strategic Lateral Offset Procedure
SMCG	Safety Management Coordination Group
SOP	Standard Operating Procedure
SOTA	Shannon Oceanic Transition Area
SSC	Single Sky Committee
SSR	Secondary Surveillance Radar
SUPPs	Regional Supplementary Procedures
SWM	NAT Mid-Level Significant Weather Forecast Chart
TA	Traffic Advisors
TCAS	Traffic Alert and Collision Avoidance System
TIBA	Traffic Information Broadcast by Aircraft
TLS	Target Level of Safety
TOR	Terms of Reference
TRASAS	Trans-Regional Airspace and Supporting ATM Systems Steering Group
TVE	Total Vertical Error
UIR	Upper Information Region
VAAC	Volcanic Ash Advisory Centers
VHF	Very High Frequency
WAAS	Wide Area Augmentation System
WATRS	West Atlantic Route System
WGS-84	World Geodetic System – 1984 Standards
WPR	Waypoint Position Report

– END –