INTERNATIONAL CIVIL AVIATION ORGANIZATION

SUMMARY OF DISCUSSIONS AND CONCLUSIONS OF

THE FORTY-SIXTH MEETING OF

THE NORTH ATLANTIC SYSTEMS PLANNING GROUP

Paris, 22 to 25 June 2010

PREPARED BY THE EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO JUNE 2010

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0. INTRODUCTION

PLACE AND DURATION

0.1 The Forty-Sixth Meeting of the North Atlantic Systems Planning Group (NAT SPG) was held in the European and North Atlantic (EUR/NAT) Office of ICAO from 22 to 25 June 2010.

OFFICERS AND SECRETARIAT

0.2 The Meeting was chaired by Mr Ásgeir Pálsson, the Representative of Iceland. Mr Karsten Theil, ICAO Regional Director, European and North Atlantic, was the Secretary of the Meeting and he was assisted by Mr George Firican, Deputy Regional Director / Technical Team Leader and Mrs Carole Stewart-Green, Messrs Gregory Brock, Sven Halle, Elkhan Nahmadov and Léon Vonlanthen, Regional Officers from the same Office. Messrs Walter Amaro, Chief Joint Finance and Gustavo De León, Regional Programme Officer both from ICAO Headquarters also supported the meeting. Additional assistance was provided by Mr Willie Muir and Mrs Nikki Goldschmid from the EUR/NAT Office of ICAO.

ATTENDANCE

0.3 In addition to the Representatives of the NAT SPG member States, representatives from the International Air Transport Association (IATA), the International Business Aviation Council (IBAC), the International Federation of Air Line Pilots Associations (IFALPA), the International Federation of Air Traffic Controllers' Associations (IFATCA) and Inmarsat attended the meeting. Lists of participants and **contacts** are at **Appendix A**.

AGENDA

0.4 The NAT SPG agreed to the following agenda for organising the work of the Meeting and the structure of the report:

Agenda Item 1: Review of significant international aviation developments

Agenda Item 2: Proposed air navigation systems performance monitoring and measurement

Agenda Item 3: NAT Planning and Implementation management issues

- 3.1 Implementation programmes updates:
  - a) Reduced lateral and longitudinal separation
    - operations procedures
    - safety case
    - cost analysis
    - conformance monitoring
  - b) Data-link mandate (including CBA)
  - c) Transition to PBN
  - d) FPL2012 for NAT Region
- 3.2 Performance monitoring (NAT DLMA report)

Agenda Item 4: NAT operational and safety improvements

- 4.1 CPDLC issues:
- 4.2 POS forwarding
- 4.3 SATCOM voice

4.4 FANS 1/A issues

4.5 Conformance monitoring (ADS-C and AIDC implementation)

Agenda Item 5: Safety Monitoring

Agenda Item 6: NAT Documentation

6.1 Volcanic Ash contingency plan

6.2 Other documentation

Agenda Item 7: Work programme, including sub-groups

Agenda Item 8: Any Other Business

1. DEVELOPMENTS

1.1 ICAO WORK PROGRAMME ON AVIATION SAFETY

1.1.1 The NAT SPG was informed about the outcome of the High-level Safety Conference that took place in ICAO Headquarters from 29 March to 1 April 2010. The Conference had recommended, *inter alia*:

- Sharing of safety related data in a transparent environment where the source of information would be protected;
- Commitment from States to the Continued Monitoring Approach to succeed the Universal Safety Oversight Audit Programme;
- Full implementation by States of the State Safety Programme and Safety Management Systems;
- Development of a common set of safety performance indicators; and
- Development of new Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS) to consolidate provisions related to aviation safety.

1.1.2 The NAT SPG was informed that the Council had approved the establishment of Regional Aviation Safety Groups (RASGs) and had also invited the Regional Directors to provide inputs with regard to their composition and structure. In this context it was noted that the NAT Safety Oversight Group (NAT SOG) had been established to oversee the safety performance of the air navigation system in the NAT Region and that the only State in the NAT Region not covered by another RASG would be Iceland. Therefore, a RASG for the NAT Region had not been envisaged, and the Regional Director would discuss the inclusion of Iceland in the structure for the EUR Region.

1.2 EURASIA RVSM IMPLEMENTATION PROGRAMME

1.2.1 The NAT SPG was informed that the work programme to implement Reduced Vertical Separation Minimum (RVSM) in the EURASIA part of the EUR Region was progressing in accordance with the schedule. With the implementation, which was foreseen on 17 November 2011, RVSM would be applicable in all of the EUR Region, thus eliminating the need for transfer between different flight level allocation schemes for flights along the cross-polar routes. The NAT SPG was also informed about the intention of Afghanistan to join the implementation programme. Finally, the NAT SPG noted that the RVSM

Task Force was currently undertaking a programme risk assessment of the effects of the current political situation in Kyrgyzstan in order to develop appropriate mitigation measures.

1.3 THE SINGLE EUROPEAN SKY

1.3.1 The NAT SPG was informed that establishment of Functional Airspace Blocks (FABs) in the Western part of the EUR Region in accordance with the Single European Sky (SES) Regulations was well under way. ICAO had assessed the impact of the FAB establishment on the Regional Air Navigation Plan (ANP) and had concluded that the establishment of an FAB in itself did not constitute an amendment to the plan. However, if the facilities and services provided were to change, the Regional ANP would have to be changed accordingly. This might have an impact also on the NAT ANP in case EUR Provider States would decide on the establishment of FAB(s) in the NAT Region.

1.4 ICAO REGULAR PROGRAMME BUDGET 2011-13

1.4.1 The NAT SPG was informed about the decision by the Council to recommend to the Assembly a Regular Programme Budget for the triennium 2011-13 under the principle of "zero real growth". If agreed by the Assembly, the Regional Director would expect to be able to serve the Group and its subsidiary bodies to the same extent as previously, and at the same time ways and means for extra-budgetary funding of specific projects would continue to be explored.

1.5 REVIEW BY THE AIR NAVIGATION COMMISSION OF THE NAT SPG/45 REPORT

1.5.1 The Secretariat presented the NAT SPG with a working paper regarding the action taken by the Air Navigation Commission (ANC) on the NAT SPG/45 Report. The NAT SPG recalled that following each Planning and Implementation Regional Group (PIRG) meeting, the report was first reviewed by the Working Group for Strategic Review and Planning (WG/SRP) of the ANC followed by the ANC itself. In the case of the NATSPG/45 Report, as there were not specific items that required Council action, the said report was not submitted to the Council. During these reviews, the ANC noted the report, made comments thereon and provided guidance to the PIRG as appropriate. Furthermore, the ANC took specific actions on certain conclusions contained therein, since the follow-up to some conclusions may require approval by the ANC. Follow-up actions by the ICAO Secretariat on conclusions and decisions of PIRG were then guided by the outcome of the ANC and the Council (when required) actions described above.

1.5.2 In this respect, the ANC when reviewing the NAT SPG/45 Report took specific action on certain conclusions that would require follow-up actions in the work programme of NAT SPG, as follows:

- Use of ADS-C for 5 minute separation. It was noted that work on the use of 5-minute longitudinal separation between automatic dependent surveillance — contract (ADS-C) equipped aircraft pairs had progressed and to that effect, validation trials were being planned (NAT SPG Conclusion 45/9). The ANC also noted with satisfaction that NAT SPG had recognized the need to coordinate such efforts with the Separation and Airspace Safety Panel (SASP) in order to ensure that the separation minima being considered were incorporated into ICAO provisions.

- Mandate for data link equipage in the NAT Region. It was noted that the NAT concept of operations to support reducing lateral separation to 25 Nautical Miles (NM) required the phased introduction of the aforementioned separation between 2012 and 2015 and to that effect, a mandate for carriage of ADS-C and controller-pilot data link communications (CPDLC) (on FANS-1/A platform) supported by a business case and an incentive framework would be necessary (NAT SPG Conclusions 45/10, 45/11 and 45/15). In this respect, the ANC noted that a similar mandate in the EUR Region called for the carriage of CPDLC only (based on an aeronautical telecommunication network (ATN) platform). The ANC recognized that the availability of existing equipage had to be considered by NAT SPG and to that end, agreed that

the Secretariat should closely monitor the progress on the preparation and implementation of such mandates and requested the Commission to call upon the Secretary General to ensure that appropriate ICAO provisions as necessary would be developed in support of the planned operations. It was requested by the ANC that the SASP clearly identify any requirement for relevant global provisions.

- Implementation of Air Traffic Services (ATS) interfacility data communications (AIDC). The ANC noted that the date of 15 November 2012 had been agreed to for the implementation of AIDC in the NAT Region and that plans had been made to coordinate with other regional bodies to develop a harmonized multiregional AIDC Interface Control Document (ICD) (NAT SPG Conclusion 45/25). In this respect, the ANC agreed that the Secretariat should ensure proper interregional coordination for the purpose of developing the aforementioned ICD that would be equally useful to other ICAO Regions.

- Use of strategic lateral offset procedures (SLOP). With reference to NAT SPG Conclusion 45/26, the ANC noted the strong desire by the NAT SPG for SLOP to be applied in the NAT Region as part of a concerted effort to reduce risk. The ANC was however informed by the Secretariat that the part of the proposed amendment to the *Regional Supplementary Procedures* (Doc 7030) (SUPPs) that would encourage the flight crew to fly a strategic lateral offset of 1 NM or 2 NM to the right of track conflicted with the discretionary powers assigned to the flight crew, as contained in the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM) (Doc 4444). As such, it was suggested by the Secretariat that efforts should be made to develop appropriate globally applicable procedures together with a roll out plan relating to the application of SLOP in close coordination with the Secretariat and airspace users. The concern expressed during NAT SPG/45 should also be communicated to user States to further encourage airline participation in SLOP application. The ANC agreed with the proposal by the Secretariat.

- Plan for future HF network operations. The ANC noted the intention of the NAT Region to establish a centralized high frequency (HF) management and coordination mechanism to increase the availability of a number of HF frequencies. The ANC requested the Secretariat to provide the necessary assistance and recommended that the NAT SPG develop a regional communication roadmap that includes satellite communication (SATCOM) so as to facilitate future regional and global planning activities. The ANC also requested the Secretariat to establish a task force between the NAT and Asia and Pacific (APAC) Regions to review the SATCOM guidance material for global applicability.

1.5.3 The NAT SPG noted the actions taken by the ANC on the NAT SPG/45 Report and agreed to include the follow-up actions in its work programme (**Appendix B** refers).

1.6 APPLICATION OF ADMINISTERED INCENTIVE PRICING TO THE AERONAUTICAL VHF BANDS

1.6.1 The NAT SPG was presented with ICAO's response to the public consultation issued by the United Kingdom government on application of Administered Incentive Pricing to aeronautical Very High Frequency (VHF) bands. It was noted that the ICAO Secretariat was closely monitoring this issue at the global and regional levels as instructed by the ANC. The main thrust of the response was that potential impact of this national initiative on global aviation safety, interoperability and efficiency should be considered and avoided. The NAT SPG noted that United Kingdom would continue to provide updates to the appropriate NAT SPG contributory groups on the progress of the foregoing consultation process.

2. PERFORMANCE MONITORING AND MEASUREMENT

2.1 AIR NAVIGATION SYSTEMS IMPLEMENTATION PERFORMANCE MONITORING AND MEASUREMENT

2.1.1 The Secretariat presented the NAT SPG with a paper on the performance based approach to air navigation planning and implementation. The NAT SPG noted that the ICAO planning objective was to implement a performance-based global Air Traffic Management (ATM) system, focused on apparent benefits, on a progressive, cost-effective and cooperative manner. The performance-based approach adhered to the following principles: strong focus on results through adoption of performance objectives and targets, collaborative decision-making driven by the results and reliance on facts and data for decision making. Assessment of achievements would be periodically checked through a performance review, which in turn required adequate performance measurement and data collection capabilities.

2.1.2 This performance-based approach was results-oriented, transparent and promoted accountability. It shifted from prescribing solutions to specifying desired performance, employing quantitative and qualitative methods, avoiding a technology driven approach, helping decision makers to set priorities and allowing optimum resource allocation.

2.1.3 The NAT SPG recalled that ICAO had developed the following guidance material to facilitate the realization of a performance-based Global ATM system:

a) *Global Air Traffic Management Operational Concept* (Doc 9854);

b) *Air Traffic Management System Requirements* (Doc 9882);

c) *Manual on Global Performance of the Air Navigation System* (Doc 9883); and

d) *Global Air Navigation Plan* (Doc 9750).

2.1.4 As the PIRGs were playing a pivotal role in facilitating and monitoring the implementation of regional air navigation infrastructure, it was proposed that PIRGs adopt a methodology for transition to a performance based Global ATM system, based on the principles and the methodology presented in Doc 9750, Chapter 1 and Doc 9883, Part II.

2.1.5 Considering the need to have a clearly defined common approach to performance monitoring and measurement and the need to agree on a uniform set of metrics, the NAT SPG acknowledged the need to identify a suitable set of metrics related to key performance areas of: access, capacity, cost effectiveness, efficiency, environment, flexibility, predictability and safety. These metrics would then be incorporated into a performance monitoring process.

2.1.6 The NAT SPG was cognisant that States subject to European Commission regulations would be bound by performance regulations that might not be appropriate to measure performance in the NAT Region ATM environment. For example, in the NAT Region it might be more appropriate to measure efficiency and predictability by tracking how closely the requested flight profile matched the oceanic clearance, rather than by comparing the cleared route to a great circle route. The NAT SPG also noted that once the metrics were agreed and established, it would be expected that a regional performance report for air navigation systems would be presented to each meeting of the NAT SPG, as a part of the air navigation systems performance monitoring and measurement process.

NAT SPG Conclusion 46/1 - NAT Region Performance Metrics

That the NAT Implementation Management Group (NAT IMG), in coordination with the NAT Economic and Financial Group (NAT EFG):

a) identify appropriate Key Performance Indicators (KPI) to measure NAT Region performance in the Key Performance Areas (KPA) of access, capacity, cost- effectiveness, efficiency, environment, flexibility, predictability and safety;

b) determine reporting mechanisms for the KPIs and the associated potential economical impact; and

c) report to NAT SPG/47.

3. NAT PLANNING AND IMPLEMENTATION MANAGEMENT ISSUES

3.1 IMPLEMENTATION PROGRAMMES UPDATES

REDUCED LATERAL AND LONGITUDINAL SEPARATION

Draft implementation plan for trial application of a reduced lateral separation

3.1.1 In order to provide an update concerning the existing planning for a trial application of a reduced lateral separation of 25 NM (RLatSM) in the NAT Region, the NAT SPG was presented with the current draft implementation plan. The NAT SPG noted that the draft plan provided details on the phased implementation of RLatSM, as detailed in *NAT SPG Conclusion 45/10 – NAT Concept of Operations to Support Reducing Lateral Separation to 25 Nautical Miles*. The draft plan, as presented, is provided at **Appendix C**.

3.1.2 The NAT SPG concurred that the wording in paragraphs 5.2 and 5.3 of the draft plan, which described how RLatSM would be applied, should be reworded to specify that "RLatSM spacing between core tracks in the NAT Organised Track System (OTS) will be ½ ° as measured between segments anchored every 10° of longitude" and that "RLatSM spacing between adjacent tracks will be at least 25 NM as measured perpendicularly between them". It was also noted that the flight planning requirements detailed in paragraph 10.2 did not correctly reflect the provisions specified in Amendment 1 to Doc 4444, 15th Edition, which would become effective on 15 November 2012. Finally, it was noted that the references to the NAT Data Link Monitoring Agency (NAT DLMA) in paragraph 10.5 should be updated in light of developments (paragraphs 3.2.1 through 3.2.5 refer).

3.1.3 As regards the planned phased introduction of segregated airspace, the NAT SPG supported the philosophy that expanding such airspace beyond the Phase 1 limits should be based upon a positive business case. In this regard, the term "business case" was meant to be interpreted broadly to mean either a clear indication from the airspace users that such an expansion was desirable or a more quantified benefits analysis. The NAT SPG then discussed a number of programme risks that had been identified with regard to the implementation of RLatSM. These risks had been identified as part of the work of the NAT EFG to address NAT SPG Conclusion 45/15 (paragraphs 7.3.3 through 7.3.6 refer). The Group agreed that the further development of the draft plan by the NAT IMG should take account of these risks, which are provided in **Appendix D**, along with all of the foregoing.

3.1.4 With regard to the Required Communications Performance (RCP) to proceed with a trial application, the NAT SPG noted that all planning was on the assumption that RCP240 would be a

requirement, although this, along with other details of the draft plan, should be verified by the NAT IMG and clearly indicated in the next update to the plan. Finally, some of the NAT provider States expressed reservations about proceeding forward with the necessary ground system changes, which would require significant resources, to support a trial application of RLatSM without assurance that Phase 1, at the least, was supported by the airspace users. IATA confirmed that, as an organization, it supported system enhancements that would increase safety and efficiency. It was noted, however, that some operators would be unable or unwilling to invest in the necessary equipage. This would be partially mitigated if sufficient notice were given so that the necessary investments could be included in operators' financial planning.

Implementation plan for trial application of a reduced longitudinal separation

3.1.5 The NAT SPG was provided with the current implementation plan for the trial application of a reduced longitudinal separation of 5 minutes between ADS-C equipped aircraft (RLongSM). This plan addressed the task of providing an update as required by *NAT SPG Conclusion 45/9 – Validation trial to sustain 5 minute longitudinal separation using Automatic Dependent Surveillance (ADS) Contract* and is provided at **Appendix E**. The NAT SPG was informed that the NAT IMG had satisfied itself that the necessary planning requirements had been met and that the trial should proceed, using an ADS-C periodic reporting rate of 18 minutes. The trial had commenced on 30 May 2010, with RLongSM being applied between eastbound aircraft in the Shanwick Oceanic Control Area (OCA) that were east of 30° West. The United Kingdom reported that the trial was proceeding well, with all expected ADS-C position reports being received, although it had been noted that the extra volume of reports was putting measurable extra processing workload on the Flight Data Processing System (FDPS). This extra workload did not have a negative safety impact and steps were being taken to ensure there would be no negative impact as more aircraft reported via ADS-C in the future. Thus far there had been no increase in risk arising from the trial. In the near future, United Kingdom planned to implement ADS-C lateral conformance monitoring to detect lateral deviations of 5 NM or more and ADS-C vertical conformance monitoring to detect vertical deviations of 300 feet or more. The trial application was being used to permit aircraft to climb through the altitudes of other aircraft and, when appropriate, to climb to the altitude of other aircraft with RLongSM being applied.

3.1.6 The NAT SPG noted that, although the plan stated that the current communications performance supported the assumptions of the RLongSM safety assessment, the technical details of those assumptions had not been detailed. Additionally, the plan did not specify that, as per the decisions of the NAT IMG, meeting RCP240 would be required for RLongSM to become operational, rather than being considered a validation trial. Finally, IFALPA requested that the plan specify the circumstances that would require suspending the application of RLongSM. The NAT SPG concurred with these viewpoints and noted that the NAT IMG would ensure they were taken into account as the plan was further developed in light of the experiences gained during the validation trial. Regular updates would be provided to the NAT IMG and a detailed update would be provided to NAT SPG/47.

3.1.7 The representative from IFALPA stated that it would not be possible to properly assess the outcome of the validation trial until the application of RLongSM was expanded beyond its current boundaries. Canada confirmed that it was confident of being able to join the validation trial in the autumn of 2010.

ISSUES RELATED TO THE NAT SPG INITIATIVES FOR DATA LINK MANDATE AND RLATSM

3.1.8 The NAT SPG was presented with a paper from the United States that provided a summary list of program risks and issues related to implementation of RLatSM initiatives that had been reviewed by NAT IMG/36. The paper identified some tasks assigned to NAT IMG contributory groups to progress the NAT SPG initiatives and suggested that the NAT SPG advise the contributory groups to consider the program risks and issues as they worked to fulfil their assigned tasks.

3.1.9 The NAT SPG recalled concerns from some member States regarding the timescales of 2015 for the NAT Region Data Link Mandate and the difficulties with the differences between the data link regulation of the SES and the NAT Region Data Link Mandate. It was noted that if the SES regulation had included ADS-C, the NAT Region would have welcomed the initiative and developed support for suitably equipped aircraft.

3.1.10 IATA commented that the crucial elements for any aircraft equipage mandate are preparation, timing and installation costs. They support the enhancement of the NAT system, but as it is not possible to have a single aircraft operator position due to the variety of aircraft types in use, the sufficient lead time for the equipage of the aircraft is the crucial element. The Group recalled that it would be highly desirable to have a common view from the aircraft operators (and also from the Member States), as this situation on the different data link requirements seemed to be a result of communicating different positions from States and organisations at different meetings. The NAT SPG agreed that a harmonisation of positions of States and Organisations would be needed to support a global approach.

3.1.11 Concerning the presented program risks and issues the NAT SPG agreed that the NAT IMG should consider these aspects, which are provided in Appendix D (paragraph 3.1.3 also refers).

3.1.12 In considering the foregoing, the NAT SPG noted that most of the questions arose because the NAT Region Data Link Mandate was being considered purely from a business case perspective, rather than a risk mitigation perspective, which had resulted in inter-relationships being inferred between the NAT Region Data Link Mandate and the RLatSM trial implementation plan. The NAT SPG agreed that this approach was not appropriate, given that the main reason for mandating data link equipage in the NAT Region was to address safety management concerns and that the planned implementation of RLatSM was primarily an operational improvement. Accordingly, the NAT SPG agreed that the approach to assessing the NAT Region Data Link Mandate should change and that the cost/benefit assessments for RLatSM and RLongSM should consider each initiative separately from each other and from the data link mandate.

DATA LINK MANDATE

3.1.13 The NAT SPG was presented with the status of NAT SPG Conclusion 45/11 – Mandate for data link equipage in the NAT Region and the associated NAT SUPPs proposal for amendment (PfA).

3.1.14 In this regard, the NAT SPG concurred that the availability of the data link service constituted a crucial component in providing safe, efficient and sustainable operations and future evolution of the ATM system in the NAT Region. It would enhance ATM surveillance and intervention capabilities and was seen as instrumental in allowing reduction of collision risk and meeting the NAT Target Level of Safety (TLS). This was particularly vital for the reduction of the collision risk in the vertical plane where the NAT TLS was currently not being met. The use of ADS-C for conformance monitoring of an aircraft position in the vertical and horizontal planes would significantly contribute to the resolution of this significant safety issue. The use of ADS-C would also greatly facilitate search and rescue operations and localisation of an aircraft in the event of an accident occurring in oceanic airspace.

3.1.15 In order to achieve the foregoing safety objectives it was important to increase the level of data link equipage in the NAT Region. In this regard, it was noted that the current level of data link usage in the NAT Region had reached 45-50 % and continued to grow. Introducing a mandatory data link equipment carriage requirement would increase the level of data link equipage in the NAT Region and support meeting the NAT TLS.

3.1.16 The NAT SPG also emphasised that the Data Link Service Implementing Rule (DLS IR) (Commission Regulation (EC) N° 29/2009 of 16 January 2009 laying down requirements on data link services for the single European sky) required implementing CPDLC in designated areas within the EUR Region based on the requirements contained in RTCA DO-280B/EUROCAE ED-110B Interoperability

Requirements Standard for ATN Baseline 1 (INTEROP ATN B1). This implementation would not meet the NAT Region operational needs. However, the DLS IR exempted aircraft fitted with RTCA DO-258A/EUROCAE ED-100A (or ED-100) compliant data link equipment and with an individual certificate of airworthiness first issued before 1 January 2014 for the life of that particular airframe. Aircraft commissioned after this date and equipped with the data link equipment required to operate in the NAT Region would also need to equip with DLS IR compliant data link equipment in order to operate in designated areas within the EUR Region. Accordingly, the NAT SPG agreed that the timeline and exemption policies, stipulated in the NAT SUPPs PfA supporting the NAT Region Data Link Mandate, should be equivalent to those declared by the European Commission DLS IR.

3.1.17 Regarding the vertical and horizontal limits of the area of applicability, the NAT SPG agreed that the NAT IMG would determine those limits. Once agreed, the limits would be published by the States concerned in their respective Aeronautical Information Publications (AIP). The NAT SPG noted that it was anticipated that the vertical limits would not be higher than FL390. The NAT SPG also noted that the NAT IMG would undertake to develop accommodation procedures for aircraft unable to equip.

3.1.18 Bearing the foregoing in mind, the NAT SPG agreed that it was urgent to begin processing the PfA in order to allow the necessary lead time for aircraft operators to equip. The United Kingdom agreed to make the necessary arrangements to formally submit the PfA (**Appendix F**) to the EUR/NAT Office of ICAO as soon as possible.

NAT SPG Conclusion 46/2 - NAT Region Data Link Mandate

That:

a) the United Kingdom submit the North Atlantic Regional Supplementary Procedures proposal for amendment (PfA) regarding a NAT Region data link mandate, as provided at Appendix F to this report, to the European and North Atlantic Office of ICAO as soon as possible;

b) the ICAO Regional Director, European and North Atlantic, process the submitted PfA in accordance with the formal procedure;

c) the NAT Implementation Management Group (NAT IMG) undertake a study to determine the vertical and horizontal limits of the area of application of the NAT Region data link mandate;

d) the NAT IMG undertake a st udy to specify the accommodation procedures for aircraft unable to equip in the framework of the NAT Region data link mandate;

e) the NAT IMG develop guidance material on the application of the NAT Region data link mandate to operators and aircraft; and

f) the NAT IMG report progress to NAT SPG/47.

3.1.19 The NAT SPG noted that the United States' capability to comply with the requirements of the foregoing NAT Region data link mandate would be constrained by the requirements and timelines of the national rulemaking process.

RNP 4 ISSUES

3.1.20 The NAT SPG endorsed the NAT IMG proposal that the planning for the RLatSM should proceed using Required Navigation Performance (RNP) 4 and that the necessary safety and implementation work to support the RLatSM plan would be conducted taking this decision into account. It was noted that a

comprehensive safety assessment of the planned RLatSM operational application would be carried out by Canada and that this assessment would take into account the actual navigation performance of RNP 4 certified aircraft. The NAT SPG agreed that this approach was fully in the spirit of the Performance-based Navigation (PBN) Concept as laid down in the *Performance-based Navigation (PBN) Manual* (Doc 9613).

FPL 2012 FOR NAT REGION

3.1.21 The NAT SPG noted the actions undertaken by the NAT IMG with regard to the implementation of the new format of the ICAO flight plan (FPL 2012) in accordance with Amendment 1 to Doc 4444, 15th Edition. The NAT SPG noted that in order to coordinate the implementation of FPL 2012 at the NAT Region level, the NAT IMG had developed the NAT Region FPL implementation plan (**Appendix G** refers) that contained information on contact points and national implementation plans from NAT provider States and Air Navigation Service Providers (ANSPs). The NAT IMG would act as a focal point in coordination of this implementation programme.

3.2 PERFORMANCE MONITORING (NAT DLMA REPORT)

3.2.1 The NAT SPG was presented with the status of the NAT DLMA and further actions recommended to support the effective conduct of the NAT data link performance monitoring function. The NAT SPG recalled that the NAT DLMA was established in response to NAT SPG Conclusion 45/18 and noted that the initial NAT DLMA service availability was declared at NAT IMG/35.

3.2.2 The NAT SPG noted that in view of the NAT DLMA initial capabilities availability, a State Letter was circulated by the ICAO EUR/NAT Office (ref. SL EUR/NAT 09-515.TEC) inviting States and Air Navigation Service Providers (ANSP) to provide all necessary support to the work of the NAT DLMA. Such support included upgrading the ground automation systems to support the NAT DLMA data collection function and integrating the data link problems reporting mechanism to the NAT DLMA into the local working practices and procedures.

3.2.3 Furthermore, the NAT SPG noted that the NAT DLMA roll out was in principle completed and the process of submission of problem reports, their analysis and monitoring of the NAT communications system performance started.

3.2.4 The NAT SPG was informed that the last remaining action to enable full-scale NAT DLMA operations was to finalise the NAT ground automation systems upgrades so that data would be provided to the NAT DLMA in accordance with Appendix D of the *Global Operational Data Link Document* (GOLD). In this regard, the NAT SPG concurred that continued commitment from the NAT Region service providers was required to complete the upgrades by the end of 2010. It was noted that the NAT IMG was keeping track of the progress of implementation and that tentative timelines had been determined. It was reported that in most cases the upgrades were planned to be completed by the end of 2010. In this regard the NAT SPG noted that Norway was not planning to implement the ground automation systems upgrades but would provide a point of contact to be included on the NAT DLMA points of contact list.

3.2.5 The NAT SPG was advised that the NAT Region data link related problem reports were being submitted to the NAT DLMA via a joint NAT DLMA and APAC Informal South Pacific ATS Coordinating Group FANS Implementation Team Central Reporting Agency (ISPACG-FIT-CRA) website at http://www.ispacg-cra.com. Currently, this web based service was provided to support collection, distribution and tracking of problem reports in support of the data link monitoring function in the NAT and APAC Regions. It was recalled that the NAT DLMA function was provided by the United States as an extension of the same service being provided to the APAC Region. The NAT SPG noted that the NAT IMG had agreed that continuing this approach would be the most pragmatic and efficient way forward to ensure uniformity of data collection and dissemination. Accordingly, the NAT SPG agreed that, for the present time, there was no requirement for a separate NAT-administered website for the submission of problem

reports to the NAT DLMA. Finally, in order to increase the involvement of operators in the activities of the NAT DLMA, the NAT SPG agreed to encourage strengthened attendance by operators at meetings of the NAT Communications, Navigation and Surveillance Group (NAT CNSG).

NAT SPG Conclusion 46/3 - NAT Data Link Monitoring Agency (NAT DLMA)

That the ICAO Regional Director, European and North Atlantic urge:

a) NAT Air Navigation Service Providers (ANSP) to complete upgrades of their ground Air Traffic Service systems in support of the NAT DLMA data collection by the end of 2010;

b) Airspace users to take an active part in the work of the NAT DLMA by participating in meetings of the NAT Communications, Navigation and Surveillance Group; and

c) States, ANSPs, Communications Service Providers, airspace users and industry to submit data link problem reports via the joint NAT DLMA/Informal South Pacific ATS Coordinating Group FANS Implementation Team Central Reporting Agency website.

4. NAT OPERATIONAL AND SAFETY IMPROVEMENTS

4.1 USE OF CPDLC FOR OCEANIC ROUTE RE-CLEARANCES

4.1.1 The NAT SPG noted the progress of the study on the use of CPDLC for oceanic route re-clearances. The NAT SPG noted that CPDLC provided an opportunity to reduce Gross Navigation Errors (GNE) caused as a result of verbal miscommunication and manual insertion of oceanic waypoints. Additionally, it was noted that when RLatSM would be implemented, the ability for pilots to import any route changes directly into their FMCs would be an important element in reducing potential lateral deviations due to human factors issues associated with manually loaded FMC changes. In this respect it was recalled that the current issues with manual entry of re-routes would be compounded by the implementation of ½ degree reduced separation due to the more complex waypoint specifications (inclusion of latitude minutes) (NAT SPG Conclusion 45/22 also refers).

4.1.2 The NAT SPG was informed that work was underway to expand implementation of CPDLC route clearances in the NAT Region. This would be documented in the GOLD along with additional procedures related to up-linking of CPDLC reroutes to flights that were already in oceanic airspace in order to address the problem of FMC route discontinuities. The necessary documentation was being prepared by the NAT IMG contributory groups in coordination with the GOLD ad-hoc group (paragraph 6.2.12 refers).

4.2 FORWARDING OF POSITION REPORTS

4.2.1 The NAT SPG was advised that the NAT IMG had previously determined that a procedure be developed to standardize the forwarding of position reports. A proposed procedure had been mainly accepted, but further examination was required to determine whether the position report should be forwarded on the basis of the location of the Next Position +1. Once the procedure was finalized, the NAT Common Coordination Interface Control Document (NAT ICD) and the NAT Aeradio ICD would be amended so that the procedure would apply equally to reports received via data link or voice.

4.3 SATCOM VOICE

4.3.1 The NAT SPG was presented with the status of the NAT SUPPs proposal for amendment with regards to the use of SATCOM voice for ATS communications.

4.3.2 The NAT SPG recalled that the foregoing proposal for amendment was developed in response to NAT SPG Conclusion 44/13 to remove the existing provision that limited the use of SATCOM voice to emergency and non-routine ATS communications. The proposal was later on reviewed and endorsed by NAT SPG Conclusion 45/28. In follow up t o the abovementioned Conclusion, the proposal for amendment (Serial No: EUR/NAT-S 08/12-NAT 3-3) had been circulated to the States and Organizations, for comment. One of the responses received was indicating that there were some concerns over the safe adoption of SATCOM voice for Air Traffic Control (ATC) purposes, even in the limited manner intended in the proposal for amendment.

4.3.3 The Fourth Meeting of the 183rd Session of the ANC, having reviewed the NAT SPG/45 report and having noted the foregoing information, requested the Secretariat to establish an inter-regional task force involving the NAT and APAC Regions to review the NAT SATCOM guidance material and determine its potential for global applicability. Accordingly, the ICAO Regional Director, European and North Atlantic established an inter-regional ad-hoc task force (State Letter EUR/NAT 10-0165.TEC dated 29 January 2010 r efers) composed of 18 representatives from 8 S tates, 3 international organisations and industry.

4.3.4 The NAT SPG was informed that the NAT SUPPs PfA had been revised by the inter-regional task force to take into account all concerns that were stated during the PfA consultation process (**Appendix H** refers).

4.3.5 The NAT SPG agreed that finalisation of the amendment was urgent, noting that some NAT provider States had already amended their respective AIPs to allow the use of SATCOM voice for ATS communication in anticipation of the imminent NAT SUPPs amendment. Other States had implemented the necessary capability in their ground systems but were waiting for the endorsement of the supporting NAT SUPPs amendment in order to proceed further with offering the service. In view of the foregoing, the NAT SPG agreed that the revised PfA should be forwarded to ICAO Headquarters so that processing of the amendment could continue.

NAT SPG Conclusion 46/4 – Use of SATCOM voice

> That the ICAO Regional Director, European and North Atlantic forward the revised NAT Regional Supplementary Procedures proposal for amendment on the use of Satellite Communication (SATCOM), as provided at Appendix H to this report, to ICAO Headquarters for further processing.

4.3.6 The NAT SPG noted the concerns expressed by the United States that there was insufficient guidance material for the operational use of Aeronautical Mobile Satellite (Route) Service (AMS(R)S) voice communication systems and that the implementation of AMS(R)S voice for ATC communications in the absence of such guidance material would most likely lead to confusion in its use and eventually end up with a region-specific solution. The only guidance material that existed for the use of AMS(R)S voice for routine and non-routine ATC communications was the material used for the North Atlantic satellite voice trial conducted in 2007. There were issues identified by the trial that needed to be further investigated.

4.3.7 The NAT SPG agreed that these concerns would be taken into account as part of the future work of the inter-regional task force. In this regard, the NAT SPG noted that the current NAT guidance material (available at http://www.paris.icao.int/documents_open/subcategory.php?id=106) might be difficult to adapt for global application. The existing NAT guidance material summarised the ATC and crew procedures used during the NAT SATCOM voice trials and represented a regional safety case in support of the SATCOM voice implementation for ATS communications. The NAT guidance material did not include guidance material for ground and on-board equipment standardization and verification, as this subject was covered by other material, e.g. FAA AC-20-150.

4.3.8 The NAT SPG noted that addressing all above-mentioned issues raised by the inter-regional task force and by the United States would go beyond the currently defined remit of the task force and would require much broader resource commitment and be much more time consuming than the original task. Therefore, the NAT SPG endorsed updated Terms of Reference (ToR) to define the scope of the future work of the inter-regional task force. The NAT SPG agreed that the new ToR (**Appendix I** refers) should be submitted to the Asia/Pacific Air Navigation Planning Group (APANPIRG) to solicit their agreement before any further action would be undertaken.

NAT SPG Conclusion 46/5 – Inter-regional ad hoc SATCOM task force

That:

a) the terms of reference of the inter-regional ad hoc Satellite Communication (SATCOM) task force as provided at Appendix I be endorsed pending a similar endorsement by the Asia/Pacific Air Navigation Planning Group;

b) the task force report to the NAT Implementation Management Group (NAT IMG); and

c) NAT IMG provide a progress report to NAT SPG/47.

4.4 FANS 1/A

FANS 1/A over Inmarsat

4.4.1 The NAT SPG was provided with information with regard to a transparent SwiftBroadband/I4/I3 solution being developed under the Inmarsat SwiftBroadband oceanic safety concept.

4.4.2 The NAT SPG was informed that, in view of the current estimates of Inmarsat 3 satellite life being approximately 2018, a clarification on the Inmarsat policies with regards to the future provision of the Classic Aero service had been requested by the NAT IMG. In particular, it was important to know whether the current I3 Classic Aero equipped fleet would continue to be "FANS 1/A over Inmarsat" capable after shutdown of the I3 satellite component.

4.4.3 In response to this request, Inmarsat clarified that the I3 Classic Aero equipped fleet, with the exception of a decreasing portion of older generation aircraft, should largely continue to be "FANS 1/A over Inmarsat" capable. They would gradually begin utilizing the I4 network and would not require any change to on board equipment.

4.4.4 Inmarsat also explained that their satellite lifetime estimates were now published in the Inmarsat Annual Report. The 2010 report gave estimates of I2 life ~2014, I3 life ~2018, I4 life ~2023. All these satellites were capable of supporting Classic Aero/FANS-1/A. It was also explained that five I3 satellites were currently in operation, four of them supporting operational ATS Classic Aero/FANS-1/A messaging. In the event of having to retire an I3 satellite the Inmarsat plan was to replace, if possible, the retired I3 satellite with the I3 spare. The plan was to continue to operate the I3 satellites until their necessary retirement.

4.4.5 With regard to the I4 Classic Aero/FANS-1/A operations, Inmarsat explained that SITA/Stratos implemented Classic Aero services for Classic/SwiftBroadband equipped aircraft in July 2009 and Arinc/Vizada in December 2009. It was recognised that a performance evaluation of the Classic over I4 network was required; therefore, in addition to the Classic/SwiftBroadband equipped aircraft currently entering the network, it was planned to bring a limited number of Classic-only equipped aircraft into the I4 network in a staged manner to support the evaluation activity.

4.4.6 To encourage service efficiency going forward, Inmarsat requested Aero-H+ avionics to be operated in the I4 network. Inmarsat reported that the number of users of the original high gain avionics type, Aero-H, was currently in decline.

4.4.7 The NAT SPG noted that Inmarsat was targeting RCP240 performance levels in the design of their SwiftBroadband Safety Service through the use of SwiftBroadband as a primary media in nominal operations with the ability to switch to Classic over I4 and I3 should the need arise.

FANS1/A over Iridium

4.4.8 The NAT SPG was provided with information on the FANS 1/A over Iridium (FOI) project undertaken by the United States Federal Aviation Administration (FAA)-sponsored Performance-Based Operations Aviation Rulemaking Committee's Communications Working Group (PARC CWG). It was noted that the objective of the FOI project was to substantiate recommendations to the FAA to use Iridium as a viable sub-network for FANS 1/A applications. The initial statistical data samples, gathered in the course of the FOI data collection that had commenced in December 2009, provided promising results but some further work was required. The NAT SPG was informed that data currently available on FOI performance substantiated that it was safe for current operations but there was insufficient evidence to substantiate that FOI could be used in support of RLongSM. The NAT SPG agreed that this was an important project and that the NAT service providers and NAT DLMA could start participating in it. In this regard it was noted that the United Kingdom had reserved their position with regards to conditions for allowing the use of FOI during the RLongSM trials in the Shanwick OCA.

FMC WPR over Iridium

4.4.9 The NAT SPG was also informed that a NAT Region pre-operational trial of Iridium data link for delivery of automatic FMC Waypoint Position Reports (WPR) from Continental Airlines B757 flights had been successfully carried out. The Group recalled that FMC WPR provided a way for non-FANS equipped fleets to greatly reduce their use of voice radio, saving workload for pilots and radio operators and eliminating errors. In this regard, the NAT SPG was advised that Canada, Iceland, Portugal and United Kingdom would review their ground automation configurations in order to start operational use of FMC WPR over Iridium.

Gulfstream/CPDLC over Inmarsat I3

4.4.10 The NAT SPG was informed that, since September 2008, NATS (the United Kingdom ANSP) had been working with Gulfstream and Honeywell to develop their Certification F software for CPDLC in the G450/G550 aircraft. In April 2009, the Gulfstream test aircraft N401SR running certificate F CPDLC software was flight tested in the NAT Region with full co-operation of all NAT ANSPs. From mid October 2009, G450 and G550 aircraft have been utilizing CPDLC in the NAT Region on the basis that NATS was notified of the flights. No operational issues had been identified with any of the notified flights utilizing CPDLC. Approximately 30 crossings had been recorded. In this regard, it was noted that further work was required on performance assessment to be carried out against GOLD requirements by the respective State of Registry or Operator in the framework of the operational authorization process, as appropriate.

4.5 ADS-C CONFORMANCE MONITORING, ADS-C AND AIDC IMPLEMENTATION

4.5.1 The NAT SPG noted that the implementation of ADS-C for conformance monitoring in line with NAT SPG Conclusion 44/2 and AIDC in line with NAT SPG Conclusion 45/25 was in progress and that the appropriate sections had been added to the NAT Table of implementation dates in order to track the progress (**Appendix J** refers). This Table together with the AIDC implementation matrix developed by the AIDC Task Force provided a means of tracking the progress of implementation in the NAT Region. In this

regard, the NAT SPG noted that Norway was not in position to adhere to the NAT AIDC implementation plan.

Pan-regional ICD for oceanic AIDC

4.5.2 The NAT SPG was presented with the follow up actions undertaken by the NAT IMG in response to NAT SPG Conclusion 45/25 c) whereby the NAT IMG was tasked to direct its contributory groups to assist in the development of a harmonised multi-regional AIDC ICD.

4.5.3 In this regard the NAT SPG agreed that the task of harmonising the NAT and APAC AIDC ICDs should be advanced in accordance with the following principles:

a) The United States should continue the effort by drafting a consolidated ICD with thorough bi-directional tracking of content;

b) Since the ICD would apply to oceanic regions only a title of the future document should be "Pan-regional ICD for Oceanic AIDC";

c) The content of the initial consolidated ICD should be confined to the existing substance of the NAT and APAC ICDs. Otherwise review would be unnecessarily complicated;

d) The above should be accomplished as quickly as practicable, and the NAT and APAC ICDs should be frozen in the interim; and

e) Once the NAT and APAC PIRGs had endorsed the resulting ICD, a new round of drafting and review could begin to incorporate any desired new substance, as part of the ongoing inter-regional maintenance of the document.

4.5.4 The NAT SPG also agreed that this work would be progressed in the framework of the NAT IMG and that a group of experts would be identified to review the draft consolidated NAT/APAC AIDC ICD. The Rapporteur of the NAT CNSG would coordinate this activity with the APAC Region. The work would be conducted via electronic means of communication as far as possible. A progress report would be provided to the next meeting of the NAT IMG where a decision would be taken regarding further steps.

4.5.5 In this respect, the NAT SPG emphasised that with regards to AIDC, the priority was the full AIDC implementation in the NAT Region by 15 November 2012. The changes necessitated by Amendment 1 to Doc 4444, 15th Edition, would also need to be addressed and incorporated into the NAT Common Coordination ICD. Therefore, acknowledging that the work on harmonisation of the regional AIDC ICDs would be a time and resource consuming task and that this was a task of lesser urgency, the NAT SPG noted that the priorities and resource availability would need to be carefully balanced and assessed in advancing this work.

Optimization of the NAT HF resource

4.5.6 The NAT SPG noted the report on the activities to address NAT SPG Conclusions 44/14 - Optimization of the NAT voice communication resource and 45/27 – Plan for future HF network operations.

4.5.7 The report included an analysis of so-called "nuisance reports" generated by data link equipped aircraft reverting to voice therefore creating voice network workload. The NAT SPG noted that this issue would be investigated via problem reporting to the NAT DLMA and that information collected in so far represented sufficient data sample for the NAT DLMA to start investigation and determine causes and mitigations.

4.5.8 With regards to NAT SPG Conclusion 45/27, it was noted that a frequency monitoring campaign was conducted, the suitable Regional and Domestic Air Route Area (RDADA) networks were identified for NAT regional use and contacts with the national radio regulators were established with regard to licensing of frequencies. The work continued on licensing of the most urgently needed frequencies through the national radio regulators. An update would be provided to the NAT SPG/47.

5. SAFETY MONITORING

5.1 SAFETY OVERSIGHT REPORTING

5.1.1 The NAT SPG was informed that the North Atlantic Safety Oversight Group (NAT SOG) met twice since the last NAT SPG Meeting. At its second meeting, the NAT SOG defined a new reporting form and developed therefore the "NAT Safety Performance Report, Issue 1; Summary of Events, Causal Factors and Mitigations" summarizing the collision risks estimates, the events, miscellaneous types of errors as well as air carriers behaviours and recommendations. This form also contained the SLOP usage estimation as well as the NAT Scrutiny Group (NAT SG) and the NAT Mathematicians' Working Group (NAT MWG) recommendations with the quantified risk estimates. This form would be used by the NAT SG and the NAT Central Monitoring Agency (NAT CMA) to summarize, twice a year, the results of their work; these results would be given to the NAT SOG, in a condensed format as an overview of the achievements and the associated trends. The NAT SPG agreed to the use of the "NAT Safety Performance Report, Issue 1" and requested that these reports be presented to future NAT SPG meetings. The NAT SPG also agreed that the NAT safety performance report should be used for safety performance measurement in the NAT Region.

5.2 NAT SOG VERTICAL RISK TASK FORCE

5.2.1 The NAT SPG was informed that the NAT SOG when considering the situation of the vertical risk that was exceeding the Target Level of Safety (TLS), agreed at its first meeting in September 2009 that this problem needed to be addressed in a robust, focused and transparent manner. It was decided therefore to form a Vertical Risk Task Force (NAT SOG VRTF). The NAT SOG VRTF started its work on 4 February 2010 and had held eight meetings since then via teleconference.

5.2.2 The NAT SOG VRTF presented its first report to the NAT SOG/02 meeting in May 2010. The NAT SOG VRTF identified four main categories or deviation types for Large Height Deviations (LHDs) which represented approximately 73% of all LHDs and 86% of total time at wrong flight level in the NAT Region and suggested twelve mitigations. It was underlined that if these four main categories of deviation types could be effectively controlled, the vertical risk in the NAT Region might be reduced by as much as 73% in number of occurrences (corresponding to 86% in total time of occurrences). The NAT SOG VRTF also agreed that the mitigations should be monitored for their effectiveness. To that purpose, sharing of information on current and planned mitigations would be of great importance. Accordingly, the NAT SOG agreed to provide the necessary data to the NAT SOG VRTF to populate and update the newly defined support to that effect, namely the OAC Implementation Status Report of Proposed Mitigations form.

5.2.3 The NAT SPG was informed that the NAT SOG had endorsed a request from NAT SOG VRTF to extend its mandate by six months allowing it to populate the OAC Implementation Status Report of Proposed Mitigations form, with the understanding that this work would be completed by November 2010 and a final report to be made available to NAT SOG/03.

5.2.4 The NAT SPG noted the necessity to find solutions to the highlighted problems and to measure the effectiveness of the corrective measures. Canada mentioned that events and repeated breaches were individually investigated and mitigations were followed up. Iceland mentioned the importance of consulting with experts from other groups with regard to some of the proposed mitigation (e.g. the use of

free text). Finally, the NAT SPG requested that the final report of the NAT SOG VRTF be submitted to the NAT IMG.

5.3 EFFECT OF SLOP ON THE VERTICAL RISK ESTIMATE IN THE NORTH ATLANTIC

5.3.1 The NAT SPG noted the analysis report prepared by UK NATS with the interpretation provided by the NAT MWG on the effect of the Strategic Lateral Offset Procedures (SLOP) on the vertical risk estimate in the NAT Region. It was recalled that SLOP had been formally introduced as a recommended procedure to the NAT Region in June 2004. Over the last year the members of the NAT MWG had agreed a way to use sampled SLOP usage data to modify the risk estimate for the general population of aircraft. The NAT SPG noted the influence of applying NAT SLOP usage by ADS-C equipped aircraft to the vertical operational collision risk estimates for the region. This analysis concluded that although the vertical risk estimates for the last four years were consequently reduced by the inclusion of the SLOP benefit factor, the vertical risk estimate remained above the TLS. Year 2009 figures showed that the combined vertical operational collision risk estimate of 67.2×10^{-9} fatal accidents per flight hour (fapfh) was reduced to 27.6×10^{-9} fapfh after SLOP usage was taken into account. This was, however, still over five times the TLS and also represented an increase in risk since 2008. The NAT SPG noted that the October-December 2009 data were showing 30% of the sampled aircraft using 1 NM right and only 10 % using 2 NM right. This showed clearly some potential improvement to gain the optimum benefit for the NAT Region. Also within the analysis report was an indication of approximately 50 cases of left offsets detected in the final quarter of 2009. The issue of follow up and information sharing was being handled internally by UK NATS. The NAT SG had "fast tracked" this subject to the NAT SOG.

General consideration

5.3.2 The Secretary of the NAT SPG recalled the good decision to create the NAT SOG and pointed out that this was the first time that the NAT SOG reports were delivered to the NAT SPG.

6. NAT DOCUMENTATION

6.1 VOLCANIC ASH CONTINGENCY PLAN FOR THE EUR AND NAT REGIONS

6.1.1 The NAT SPG considered a proposal for amendment to create a common volcanic ash contingency plan for the EUR and NAT Regions, which had been prepared as one of the principle deliverables of the EUR/NAT Volcanic Ash Task Force (EUR/NAT VATF).

6.1.2 The EUR/NAT VATF had been established by the ICAO Regional Director, Europe and North Atlantic, following the significant disruption to air traffic in the EUR and NAT Regions as a consequence of the eruption of the Eyjafjallajökull volcano in Iceland beginning 14 April 2010.

6.1.3 When considering the outcome of the EUR/NAT VATF, the NAT SPG supported the decision by the EUR/NAT VATF to have a common volcanic ash contingency plan for the EUR and NAT Regions, noting clearly that few provisions would be region-specific. The NAT SPG recognized that by having a common plan for both Regions, future amendments thereto would be processed in accordance with the existing procedure for amendment of documentation commonly applicable to the two Regions and managed by the European Air Navigation Planning Group (EANPG) and NAT SPG.

6.1.4 The NAT SPG noted that the proposal for amendment to the common volcanic ash contingency plan principally concerned the following:

i) The redefinition from an ATS to an ATM contingency plan;

ii) The availability (from some meteorological offices co-located with the VAACs in the EUR and NAT Regions) of ash concentration charts and data;

iii) The defining of areas of low-, medium- and high contamination airspace based on stated thresholds of ash concentration;

iv) The establishment of Danger Areas;

v) The inclusion of an example safety risk assessment; and

vi) Recommended procedures to apply when considering over-flight of contaminated airspace.

6.1.5 When considering the establishment of Danger Areas, the NAT SPG concurred with the view of the EUR/NAT VATF that such areas may be established in any airspace, and that States would retain their remit to establish Restricted Areas or Prohibited Areas within their Sovereign airspace. In addition, the NAT SPG acknowledged that ATC do not normally issue clearances through Danger Areas; however, depending on the State concerned, it may be permissible to provide a clearance to penetrate a Danger Area when specifically requested by the pilot-in-command. The NAT SPG also supported the fact that under no circumstances could access be denied to any part of High Seas airspace.

6.1.6 The NAT SPG noted that due to time constraints it has not been possible for the EUR/NAT VATF to develop template NOTAM, ASHTAM and SIGMET for inclusion in the proposed contingency plan. The NAT SPG concurred with the view of the EANPG COG/47 meeting (15 to 18 June 2010), when considering this matter, that the Secretariat be invited to identify the necessary expertise and resources to perform this task and circulate the material for approval by correspondence as soon as it would be available.

6.1.7 Having reviewed the consolidated proposal for amendment to the common plan as prepared by the EUR/NAT VATF, the NAT SPG considered additional proposals that had been submitted by IFALPA to the EANPG COG/47 meeting. The NAT SPG noted that the COG, when considering the IFALPA proposals, had recommended that further amendments be made to clearly explain the two different roles of the ICAO Contracting States – namely, that as a 'Provider State' and that as a 'State of the Operator'. In addition, the NAT SPG recommended that Appendix E to the contingency plan should reflect not only the 'State of the Operator', but also the 'State of Registry'.

NAT SPG Conclusion 46/6 – Endorsement of the Volcanic Ash Contingency Plan – European and North Atlantic Regions

That:

a) the *Volcanic Ash Contingency Plan – EUR and NAT Regions*, as presented in **Appendix K** to this report, be endorsed;

b) future amendments to the *Volcanic Ash Contingency Plan – EUR and NAT Regions* be processed in accordance with the existing procedure for amendment of documentation commonly applicable to the two Regions and managed by the European Air Navigation Planning Group (EANPG) and NAT SPG;

c) the ICAO Regional Director, Europe and North Atlantic identify the expertise and resources necessary and initiate the development of templates for aeronautical information and meteorological messages to be promulgated by Provider States in case of a volcanic eruption; and

d) the ICAO Regional Director, Europe and North Atlantic inform the EANPG about this decision and invite it to endorse the *Volcanic Ash Contingency Plan – EUR and NAT Regions* as well as the procedure for future amendments.

6.1.8 The NAT SPG was informed that in addition to preparing proposals for amendment to the volcanic ash contingency plan, the EUR/NAT VATF had also drafted a number of recommendations based on the lessons learned and experiences gained from recent events. The recommendations had been forwarded for consideration by the International Volcanic Ash Task Force (IVATF), which had been recently established by ICAO Headquarters.

6.1.9 The NAT SPG noted that the recommendations principally concerned matters relevant to ATM, airworthiness and science, and had consequently been categorized according to the proposed sub-groups of the IVATF. The recommendations would be presented by the Secretariat to the first meeting of the IVATF, scheduled to take place in Montréal on 27 to 30 July 2010.

Activities of the Volcanic Ash Exercises Steering Group

6.1.10 The NAT SPG was apprised of the recent activities of the EUR/NAT Volcanic Ash Exercises Steering Group (VOLCEX/SG), which had included the conducting of volcanic ash exercises in the EUR/NAT Region in November 2009 and March 2010. The NAT SPG noted that the VOLCEX/SG traditionally provides regular updates on its activities to the EANPG COG and NAT IMG, as well as other regional groups, in accordance with its terms of reference.

6.1.11 When reviewing the future activities of the VOLCEX/SG, the NAT SPG noted that the NAT IMG/36 meeting (18 to 21 May 2010) had recommended that the VOLCEX/SG should reconsider their future activities or re-align their scope, to take into account the recent real eruption of the Eyjafjallajökull volcano in Iceland.

6.1.12 In addition, the NAT SPG noted that the EANPG COG/47 meeting (15 to 18 June 2010) had proposed that the VOLCEX/SG should consider holding a future exercise based on a simulated volcanic eruption in Kamchatka or Sakhalin (Russian Federation) with an impact scenario on Trans-East, Trans-Polar or Cross-Polar routes. Such an undertaking would require the involvement of Canada, the Russian Federation, the United States, as well as Japan with responsibility for VAAC Tokyo. Consequently, the NAT SPG noted that the EANPG COG/47 had agreed that the terms of reference of the VOLCEX/SG should be changed to include these four States. Since the EUR/NAT Office of ICAO was not accredited to Japan, the NAT SPG noted that an invitation to Japan would be coordinated with the APAC Office of ICAO.

6.1.13 In view of the recommendations and proposals of the NAT IMG/36 and EANPG COG/47, the Secretariat informed the NAT SPG that all currently planned activities of the VOLCEX/SG beyond 30 June 2010 (such as volcanic ash exercises and awareness events) were subject to change pending thorough discussion at the upcoming fifth meeting of the VOLCEX/SG (scheduled 29 June 2010). Consequently, a future work programme covering the usual two year planning period would be prepared at VOLCEX/SG/5, taking into consideration all of the above. An update would be provided by the Secretariat to future NAT IMG and EANPG COG meetings, as necessary.

6.1.14 The NAT SPG was informed that, on 11 June 2010, the Council of ICAO had approved, on a very urgent basis, a request by Iceland under the Icelandic Joint Financing Agreement for the purchase of a mobile weather radar for ash plume monitoring in Iceland. This enhancement in monitoring of the ash plume from volcanoes in Iceland would result in more precise data which could lead to better calculation of the dispersion of the ash. Therefore, the danger areas established on this basis would more accurately reflect the actual areas of contamination.

6.1.15 This request was supported by IATA and the ICAO Air Navigation Bureau. The cost of this weather radar was estimated at approximately 2 million USD. Iceland would endeavour to have this radar installed in the very near future.

6.2 OTHER NAT DOCUMENTATION

NAT Doc 001

6.2.1 The NAT SPG reviewed a proposal from the NAT Document Management Office (DMO) to retire *Guidance Material Concerning Air Navigation in the North Atlantic Region* (NAT Doc 001). This proposal arose from the NAT DMO's actions to address NAT SPG Conclusion 45/30, and as a result of this work it became obvious that, while updating the current document was feasible, it would leave the potential users of the NAT Region library of guidance material with significant difficulty, if not confusion. This was due to a large part of NAT Doc 001's content being currently embodied in the *NAT Minimum Navigation Performance Specifications Airspace Operations Manual* (NAT MNPSA Operations Manual) and some being repeated from the NAT SUPPs, SARPS, PANS or State Aeronautical Information. It was pointed out that such replications created a danger of the different documents providing different guidance, information or direction concerning the same subject.

6.2.2 The NAT SPG was advised that other information in NAT Doc 001 was no longer valid; some was only relevant to low level general aviation operations; and some was directed solely to NAT ATS Providers. Accordingly, the NAT DMO recommended against retaining NAT Doc 001 as a separate entity. The NAT SPG agreed that it would be safer and more straight-forward for airspace users and the producers of NAT Region guidance material if the NAT MNPSA Operations Manual, the NAT GA Manual and the *Application of Separation Minima – NAT Region* (NAT ASM) were expanded to incorporate any relevant or missing items. Consequently, it was agreed that NAT Doc 001 should be retired (paragraph 6.2.6 below also refers).

6.2.3 The foregoing decision would require an expansion of the NAT MNPSA Operations Manual which would also serve to provide "one-stop-shopping" in respect of operational guidance for the common benefit of both NAT MNPSA Operators and the State Regulators responsible for their approval. The "expanded" NAT GA Manual would achieve the same ends in respect of low-level General Aviation operations through the NAT Region and development of the NAT ASM Manual would provide a similar facility for NAT ATS Providers and their Regulators. To support this, these documents would be provided with NAT Document numbers in order to clarify their status as documents endorsed by the NAT SPG.

NAT MNPS Airspace Operations Manual

6.2.4 The NAT SPG was informed that, in response to *NAT SPG Conclusion 45/29 - Amendment to the NAT Minimum Navigation Performance Specifications (MNPS) Airspace Operations Manual*, the NAT DMO had completed the necessary updates to the NAT MNPS Airspace Operations Manual and the updated version had been made available on the ICAO EUR/NAT website. With regard to the next update of the document, the NAT DMO recommended that, in order to maintain its relevancy and currency, all up-to-date statistical data together with information on the recent progress and introduction of trial procedures would need to be included. In particular, reference should to be included to ADS-B trials currently underway and/or planned and there should be acknowledgement of the global nature of oceanic data link procedures utilised in the NAT Region. The NAT DMO would also take account of the various suggested additions and modifications to the manual emphasising on particular operational issues, which had been highlighted by various NAT SPG contributory groups in their summaries of discussions.

6.2.5 The NAT SPG supported the NAT DMO's contention that material promulgated in NAT OPS Bulletins (paragraph 6.2.8 refers) should not be replicated in the NAT MNPS Airspace Operations Manual; rather, a link to the NAT OPS Bulletins should be provided instead. If detailed guidance regarding

ADS-B operations was required, then it should also be provided in a separate document which would be referenced in the manual, as part of a general description of the operation. Finally, the NAT DMO recommended that a detailed review of the NAT SUPPs be undertaken to ensure that all necessary subjects were appropriately addressed in the NAT MNPS Airspace Operations Manual.

6.2.6 The NAT SPG, taking account also of its discussions concerning the disposition of NAT Doc 001 (paragraphs 6.2.1 through 6.2.3 above refer), supported all of the recommendations of the NAT DMO.

NAT SPG Conclusion 46/7 – NAT MNPS Airspace Operations Manual, Edition 2010

That the NAT Document Management Office:

a) continue to manage the NAT Minimum Navigation Performance Specifications (MNPS) Airspace Operations Manual; and

b) in coordination with the European and North Atlantic Office of ICAO, update the NAT MNPS Airspace Operations Manual, taking account of:

   i) changes to the NAT Air Navigation System since September 2009;

   ii) the full list of unique NAT Region procedures specified in the NAT *Regional Supplementary Procedures* (NAT SUPPs) (Doc 7030); and

   iii) decisions of the NAT SPG concerning:

      1. the disposition of material currently contained in *Guidance and Information Material Concerning Air Navigation in the North Atlantic Region* (NAT Doc 001);
      2. the future utility of NAT OPS Bulletins within the NAT Publications library; and
      3. revisions to the scope, status and title of the document.

6.2.7 The NAT SPG noted that the manual would be renamed to take account of its expanded scope. The NAT SPG expressed its sincere thanks to the NAT DMO for its thorough and professional approach and the quality of the work being produced.

NAT PCO Migration

6.2.8 The NAT SPG was informed that the ICAO EUR/NAT Secretariat had completed the task of migrating the NAT PCO website to the ICAO EUR/NAT website: www.paris.icao.int. Out of date documents had been removed from the public domain and access to NAT Region documents was now provided via a single source. To support a more consistent and timely NAT Region guidance maintenance process, a new type of document, the NAT Operations Bulletin, was created in order to facilitate the posting of "third party" documents such as Aeronautical Information Circulars (AIC), guidance material for clearance delivery via data link, etc. The NAT SPG noted that the NAT IMG had agreed that, rather than creating a formal process, the Secretariat should continue to use its discretion in determining what "third party" documents or material should be promulgated via these Bulletins. It was noted that NAT Operations Bulletins would also allow the NAT SPG to directly promulgate information or documents that would not be maintained as a permanent, numbered NAT Docs, such as the Oceanic Errors Safety Bulletin, flight crew guidance for 5 minutes separation between GNSS equipped aircraft, etc. Finally, the NAT SPG recommended that the Secretariat, as part of its maintenance activities, ensure that information in NAT OPS Bulletins be included in NAT Region Documents as appropriate or be regularly reviewed and updated if not permanent in nature.

GOLD

6.2.9 The NAT SPG was presented with an outcome of the review of the final version of the GOLD undertaken in follow-up to NAT SPG Conclusion 45/19 – Global Operational Data Link Document.

6.2.10 The NAT SPG recalled that the purpose of the GOLD was to facilitate global harmonization of existing data link operations and resolve regional and/or State differences impacting seamless operations. The document included required communication performance (RCP) and surveillance specifications, based on RTCA DO 306/EUROCAE ED 122, and guidelines on post-implementation monitoring. The GOLD was intended primarily for those who were involved in planning and implementation of data link services, and day-to-day operations, and would be the key to harmonizing oceanic and continental (domestic) data link operations worldwide.

6.2.11 The NAT SPG noted that the NAT IMG had reviewed the final version of the GOLD and concluded that the document had reached a sufficient level of maturity to recommend its adoption as a replacement for the NAT Data Link Guidance Material.

NAT SPG Conclusion 46/8 - Adoption of the GOLD

That, the *Global Operational Data Link Document* (GOLD) version 1.0, as provided at **Appendix L** to this report, replace *Guidance Material for ATS Data Link Services in North Atlantic Airspace* as regional guidance material for use by States and airspace users as the basis for operating Automatic Dependent Surveillance - Contract (ADS-C) and Controller Pilot Data Link Communications (CPDLC) in the NAT Region.

6.2.12 Finally, the NAT SPG concurred that a global configuration management process would need to be put in place by ICAO whereby the document would be maintained in coordination between the concerned PIRGs and the ICAO Secretariat. The NAT SPG also agreed that pending the implementation of this configuration management process, the GOLD ad-hoc group would continue to maintain and update the document. Therefore, the following Conclusion was endorsed:

NAT SPG Conclusion 46/9 - Global configuration management process for the GOLD

That:

a) ICAO establish a global configuration management process whereby the *Global Operational Data Link Document* (GOLD) will be maintained in coordination between the concerned Planning and Implementation Regional Groups and the ICAO Secretariat;

b) pending the implementation of the global configuration management process, the GOLD ad-hoc group should continue to maintain and update the GOLD; and

c) the NAT IMG provide a progress report to NAT SPG/47.

6.2.13 In concluding this subject, the NAT SPG thanked the GOLD ad-hoc group members for their contribution to the successful completion of the project.

7. WORK PROGRAMME INCLUDING SUB-GROUPS

7.1 NAT IMG OUTCOME

7.1.1 The NAT SPG was informed concerning the outcome of the NAT IMG addressing certain subjects and issues that had not been specifically addressed earlier in this report.

Transition to PBN

7.1.2 The NAT SPG was advised that a draft NAT Region PBN Transition Plan would be further developed and would focus on how the accommodation of RNAV 10 (RNP 10 label)[1] and RNP 4 approved aircraft in the NAT MNPS airspace could be achieved. In the process of further developing this plan, any part of the current NAT MNPS airspace requirements that would not be met by the requirements specified in Doc 9613 for obtaining an RNAV 10 (RNP 10 label) or RNP 4 aircraft approval would be identified. The plan would also identify appropriate mitigations and include an MNPS devolution strategy so that the current MNPS approval system could be transformed to a PBN-based system for the NAT Region.

7.1.3 The NAT SPG was informed that, because the PBN operational approval process would cover not only the aircraft navigation requirements, but also the procedures for safe operation in the NAT environment, it was felt appropriate that aircraft already certified for RNAV 10 (RNP 10 label) should be allowed to operate in NAT MNPS airspace without an additional approval. This approach would be supported by a study which would include an analysis to support the application of 50 NM lateral separation in NAT MNPS airspace between RNAV 10 (RNP 10 label) certified aircraft on intersecting tracks.

Use of CPDLC "AT" and "BY"

7.1.4 The NAT SPG was advised of the NAT IMG's actions to address concerns regarding the use of certain CPDLC message elements containing the words AT and BY. It was noted that it had not been considered feasible to pursue efforts to have these messages redefined, considering the technical, economic and logistical challenges of such an approach. The NAT IMG had noted that the NAT SOG intended to gather more detailed data concerning occurrences where it appeared that use of these messages (or equivalent voice phraseology) might have been a contributing factor. This information would be used by the NAT IMG as well as any available data from the NAT DLMA determine the basis for focussed mitigation. In the interim, the NAT IMG endorsed a proposal that ANSPs wishing to do so should encourage the use of certain combinations of standard CPDLC message elements, when possible, in cases where it was believed the use of "AT" or "BY" message elements could create a misunderstanding.

Elimination of requirement for routine voice meteorological reports

7.1.5 The NAT SPG was informed that Amendment 75 to the *International Standards and Recommended Practices — Meteorological Service for International Air Navigation* (Annex 3 to the Convention on International Civil Aviation) was adopted by the Council at the fifth meeting of its 189th Session on 22 February 2010 (State Letter AN 10/1.1-10/17 refers). This Amendment would become applicable on 18 November 2010 (except for paragraph 2.2.2 regarding quality management system which would become applicable on 15 November 2012).

7.1.6 Amendment 75 eliminated the requirement for routine voice reports related to weather; this had an impact on regional procedures, and in particular, on those contained in the *Regional Supplementary Procedures* (SUPPs) (Doc 7030). Therefore, the regional exemptions and designation procedures contained

[1] Doc 9613, Part B, Chapter 1 notes that RNAV 10 is designated and authorized as RNP 10.

in Section 12 of Doc 7030 would have to be amended or deleted. ICAO Headquarters would take the necessary steps to delete paragraphs 12.1.1, 12.1.2 and 12.1.3 from Section 12 of the NAT SUPPs, and replace them with "NIL"; these changes would be incorporated into the next amendment to Doc 7030. Similar changes would be accommodated in Section 12 of the MID/ASIA and NAM SUPPs (Section 12 of the EUR SUPPs are already "NIL").

NAT IMG work programme and next meeting

7.1.7 The NAT SPG noted that the NAT IMG had reviewed the proposed work programmes and follow-up actions of its contributory groups and made the necessary adjustments. In addition to the expected inputs and updates from its contributory groups, the NAT IMG had also agreed certain follow-up actions for itself. These actions were endorsed by the NAT SPG, with a clarification that the results of the RLongSM trial should only be considered once the implementation had expanded beyond its current geographical limits (paragraph 3.1.7 also refers). The NAT SPG was advised that the NAT IMG was testing improved methods for convening and conducting its meetings, with the main purpose of ensuring the availability of meeting documentation in sufficient time.

7.1.8 Finally, the NAT SPG noted that that NAT IMG/37 would be held in Dublin, Ireland from 2 to 5 November 2010.

7.2 NAT RCP AND ADS-C SURVEILLANCE PERFORMANCE REQUIREMENTS BASED OPERATIONS IMPLEMENTATION

7.2.1 The NAT SPG noted the current status of the NAT Required Communications Performance (RCP) implementation plan in conjunction with the NAT RLongSM implementation programme and that the NAT IMG had agreed to rename the plan the "NAT RCP and ADS-C Surveillance Performance Based Operations Implementation Plan" to more accurately reflect its scope. The NAT IMG contributory groups would review the plan (**Appendix M** refers) and provide their comments in due time so that a mature update could be provided to NAT SPG/47.

7.2.2 It was also noted that the NAT IMG had agreed that the RLongSM validation trial would support the collection of more data on the performance of the NAT communication and surveillance systems. This data could then be assessed against the RCP240 and ADS-C surveillance performance requirements detailed in the GOLD. The outcome of this analysis would enable the NAT IMG to determine further steps with regards to the NAT RCP and ADS-C surveillance performance requirements based operations implementation plan. Accordingly, cognizant that the trials had started on 30 May 2010, it was noted that the NAT IMG had agreed to defer decision on the target dates for the readiness review and decision to implement RCP and ADS-C surveillance performance requirements based operations until data from 12 months of the complete RLongSM validation trials would be available.

7.3 NAT EFG

7.3.1 The NAT SPG was provided with an update concerning the activities of the NAT EFG. The NAT EFG continued to examine the possibility of harmonizing NAT Region fees and expected that the development of the NAT Fee Analysis Model (NAT FAM) would be finalized by the time of NAT EFG/21. The NAT FAM would be used to model the potential effects of changes to the current fee structure. This would be used by the NAT EFG to assess whether and how the charging mechanisms or cost calculations could be harmonized by NAT Region ANSPs.

7.3.2 It was noted that it would not be possible to address the tasking arising from *NAT SPG Conclusion 45/16 – Data link charges* without specific information. IATA had agreed to seek the necessary inputs, but no operators had provided information concerning instances of being billed for uplink data link messages. The NAT SPG concurred with the NAT EFG recommendation that this issue should be considered closed.

7.3.3 The NAT SPG was advised that the NAT EFG had constituted a NAT Mandate Analysis Task Force (NATMA TF) to address *NAT SPG Conclusion 45/15 - NAT Region data link implementation business case and incentive strategy*. The United States was leading the work of the NATMA TF, which also consisted of participants from Canada, Iceland, Ireland, Portugal and IATA. It was determined that such an exercise could not be considered a business case, as such analyses were carried out to assist in the decision making process; in this case, the NAT SPG had already determined that data link equipage should be mandated in the NAT Region. As a result, the NAT EFG had agreed to carry out an economic assessment of the expected benefits of the NAT Region data link programme and the costs to operators and ANSPs to realise those benefits. The NAT SPG agreed with this approach and accordingly agreed that NAT SPG Conclusion 45/15 should be superseded. Additionally, the NAT SPG agreed to clarify that, rather than develop an incentive programme, the NAT EFG should identify what might induce NAT Region operators to equip earlier or to equip rather than choosing to avoid operating in airspace where data link was mandatory.

NAT SPG Conclusion 46/10 - NAT Region Data Link Mandate Economic Analysis

That the NAT Economic and Financial Group, in coordination with the NAT Implementation Management Group:

a) complete an analysis of the economic impact of the NAT Region Data Link Mandate (NAT SPG Conclusion 45/11 refers);

b) identify possible factors which might induce operators to equip earlier than the dates specified in the Mandate or to choose to comply with the Mandate rather than avoiding NAT Region airspace where data link has been mandated; and

c) report to NAT SPG/47.

7.3.4 The NAT SPG was advised that the NATMA TF had formed a Cost Focus Group, consisting of 36 participants from aircraft manufacturers, avionics manufacturers, commercial aviation, business aviation and ANSPs has been formed to support the completion of the cost assessment. This development was noted with appreciation, as it represented the establishment of an effective mechanism and lines of communication to obtain operators' equipage plans and estimated equipage costs. IATA advised that this unprecedented level of cooperation was a result of the focussed attention brought to this task, which included numerous briefings and teleconferences to highlight to operators the importance of the task and identification of the appropriate people within their organisations to provide the necessary information. Additionally, given the time lines specified in the NAT Region Data Link Mandate, it was clear to operators that the task was urgent. It was noted that the resulting data would be of benefit not only for the current exercise, but as a general source of information to inform the planning processes of the NAT SPG. It was expected that the necessary data gathering would be completed by end of the summer, initial analysis completed by late 2010 and mature analysis and conclusions developed by early 2011.

7.3.5 The approach to the benefits assessment had been developed based upon results obtained from a survey conducted in 2007 and 2008 which included participation of 27 airlines and all of the NAT Region ANSPs. Among other results, the research had shown that operators and ANSPs identified the following as significant operational benefits from data link equipage:

a) improved quality and availability of communications compared to HF voice;

b) reduction in HF congestion;

c) direct interface between pilots and controllers;

d) greater flexibility to grant and request clearances;

e) reduction in pilot and controller workload;

f) reduction in GNEs by eliminating manual position reports;

g) greater flexibility to request and avoid weather; and;

h) airline communication, in-flight monitoring, pre-flight operations.

7.3.6 The aforementioned research had also shown that operators had not been able to translate such operational benefits into economic benefits (i.e. fuel savings) in the NAT Region. Without direct economic benefits, operators could not justify a business case to equip with data link (i.e. FANS-1/A), as they could not close the gap between initial equipage costs and benefit return. To the contrary, operators reported that they were receiving fuel and time savings from their data link equipage in the South Pacific, where 30/30 NM separation had been introduced. Reducing separation standards was the area identified by survey participants as having the greatest potential to provide tangible benefits in the NAT Region.

7.3.7 The NAT EFG had taken note of the NAT SPG decision to focus on optimization of HF voice resources rather than pursue HF regression (NAT SPG Conclusion 44/14 refers). In view of the ongoing developments regarding alternatives to HF voice, the NAT SPG agreed that it might be useful to understand what circumstances could justify eliminating the requirement for HF voice in the NAT Region.

NAT SPG Conclusion 46/11 - Requirement for High Frequency (HF) voice in the NAT Region

That the NAT Implementation Management Group:

a) determine the circumstances which would permit the elimination of the requirement for HF voice in the NAT Region; and

b) provide a progress report to NAT SPG/47.

7.3.8 The NAT SPG was provided with an overview of the work being done to complete a program risk assessment. The main reasons for doing such an assessment were to identify potential impediments to the program so as to develop mitigation early enough to ensure a successful implementation. Understanding program risks would, *inter alia*:

a) help identify key central causes;

b) help identify consequences and impacts of risks;

c) help identify relationships between risks and costs and benefits;

d) help identify dependencies among risks; and

e) aid in prioritization of risk mitigation.

7.3.9 The program risk analysis addressed possible risks arising from the implementation of the NAT Region Data Link Mandate and the planned implementation of RLatSM. Risk assessment generally consisted of three steps, identify, analyse and mitigate. The analysis being carried out would complete the first two steps, the results of which could be used by the NAT SPG to determine a course of action to address the third. The completion of the initial data gathering phase expected by the end of summer 2010 and subsequent analysis was expected to require 2 to 3 months' work. Findings would be reported to the next meeting of the NAT EFG, or, if available, distributed earlier.

7.3.10 In considering the work that had been done to address the foregoing, the NAT SPG agreed with the NAT EFG Recommendation that business cases should preferably be completed prior to the final decisions concerning implementation. It was furthermore noted that a safety assessment was also required.

NAT SPG Conclusion 46/12 – Business cases to support NAT Region implementation planning

That the NAT SPG, as part of its decision making process, require a business case and/or a safety assessment, as appropriate, be completed and reviewed prior to accepting NAT Region implementation plans.

7.4 NAT TFG

7.4.1 The NAT SPG was informed concerning the outcome of the 37th meeting of the NAT TFG. The NAT TFG updated its short, medium and long-term forecasts of air traffic over the North Atlantic for the periods 2010-2011, 2015, 2020, and 2025. Annual forecasts were provided for total passengers and aircraft movements.

7.4.2 Since 1989, the NAT TFG had based its annual estimates of passengers and aircraft movements on a number of different (and not necessarily comparable) data sources. These data sources included the following annual statistics from the NAT TFG members: Electronic Collection of Air Transportation Statistics (ECATS) from Transport Canada; the U.S Immigration Naturalization INS Form I-92 (passengers only) and U.S Department of Transportation (DOT) Form T-100 (passengers and flights data) from the United States; and NAV Portugal (flights only). In addition, the Group uses data from IATA (Europe to Central America/Caribbean data), and air traffic counts from the Gander and Shanwick centres. The Group also uses flight data from the Official Airline Guide (OAG), and monthly airline statistics from ATA (Air Transport Association) and AEA (Association of European Airlines). Fleet statistics and forecasts were obtained from Airclaims Ltd. Finally, data is collected from the following oceanic centers: Reykavik, Gander, Santa Maria, Shanwick and Edmonton.

7.4.3 The historical database for passengers and flights was revised prior to the 37th Meeting and updated by the NAT TFG. Passengers and flights for 2010 were estimated, using the latest available data. Specifically, the estimated 2008 forecasted passenger count for North Atlantic passenger flights (derived at the April 2008 meeting), were revised downwards. 2008 was revised from 69.9 million to 67.3 million, down 3.9 %. Similarly, the forecasted 2008 aircraft movement count (derived at the April 2008 meeting) were also revised downwards from 350k to 336k flights, down -4%.

7.4.4 These revisions reflected the fact that, at the time that the 2008 report was published (Spring 2008), the indications that the world economy was entering a prolonged period of economic uncertainty were not well identified. In Spring 2008, the impact of the sub-prime market crisis in the United States had already reduced earlier forecasts. However, the subsequent magnitude and duration of the economic challenges had not been anticipated.

North Atlantic traffic forecasts 2010-2011, 2015, 2020, and 2025

7.4.5 The NAT TFG acknowledged the work done by the Air Transport Committee and observed that the committee intended to prepare its passenger-kilometre forecasts up to 2030. The NAT TFG was reluctant to prepare its forecasts out to 2030 given the 2008/09 recession and additional emerging issues such as the 2010 volcanic eruption and the economic challenges in Europe. Combined, all of these issues made it increasingly difficult to prepare accurate long-term forecasts.

7.4.6 Historically, the NAT TFG had introduced variables to account for 4 major world events: gulf war (1991), terror attacks of 9/11 (2001), Post-911 (2002-2025), and the Iraq war (2003). These variables were removed from the original model and then re-assessed individually. As a result, the NAT TFG agreed with the continued inclusion of these dummy variables.

7.4.7 The NAT TFG prepared its report in May 2010, following significant disruptions to the European Airspace as a result of the volcanic eruption of Eyjafjallajokull in Iceland. That incident resulted

in a loss of 100,000 flight movements. However, the NAT TFG felt that North Atlantic flights were a relatively small proportion of the overall impact. Further, it was not clear if volcanic activity would have any sustained impact beyond the initial eruption. As a result, it was felt it would be appropriate to treat the eruption as a largely isolated incident and to review this report at a later time as appropriate.

7.4.8 On this basis, the NAT TFG decided to make an important ad hoc adjustment to the model for 2010 and to return to the model for 2011 and beyond. The starting point for 2010 was based on the passenger forecasts of the United States of 1.8%. This was treated as a high-end estimate for total passenger forecasts.

Forecasted Results for 2010-2025
(Europe to North America, Scheduled and Non-Scheduled Passengers)

	Low Scenario	Base Scenario	High Scenario	Scheduled Load Factor (Base Scenario)	Non-Scheduled Load Factor (Base Scenario)
2010 (ad hoc adjustments)	0.6%	1.3%	1.8%	81.2%	76.6%
2011 (model)	3.0%	4.2%	6.1%	81.2%	76.6%
2011 (adjusted Model)*	2.8%	3.9%	5.6%	81.2%	76.6%
2015 (model)	2.6%	3.9%	4.5%	81.6%	76.6%
2020 (model)	3.2%	3.8%	4.4%	82.1%	76.6%
2025 (model)	2.9%	3.4%	3.7%	82.6%	76.6%

*Uses a weighted average based on 90% of the 2011 model and 10% of the 2010 results.

Future meetings

7.4.9 To better allocate limited staff and travel resources among the various ICAO forecasting groups (North Atlantic, Pacific, Latin America), members organizations agreed in 1995 to meet on a biennial basis rather than annually. As such, the NAT TFG was not scheduled to meet formally in 2011. Given the current uncertainties in the aviation industry, the NAT TFG would monitor the performance of their forecasts closely in the coming months and make a decision early in 2011 as to whether an interim meeting was required to revise the short-term outlook. Norway noted that, due to its commitments arising from the European Commission regulations concerning performance, it would be highly desirable to have more frequent updates of actual and forecast traffic. The NAT SPG noted with appreciation the quality and completeness of the NAT TFG report, which would be made available on the ICAO EUR/NAT website.

7.4.10 The NAT TFG expected to hold its next formal meeting in Montreal in the Spring of 2012.

8. ANY OTHER BUSINESS

8.1 RETIREMENT OF KARSTEN THEIL

8.1.1 The NAT SPG was informed that Mr Karsten Theil, the ICAO Regional Director, European and North Atlantic and Secretary of the NAT SPG would retire at the end of the year. Recalling with appreciation his many years of contributions to the NAT Region as the NAT SPG member for the Nordic States, an ICAO Council Member, Chairman of the NAT SPG prior to his current role, the Group wished

him a very happy retirement. Mr Theil thanked the NAT SPG for the gracious words and expressed his sincere hope that his next endeavours would involve working with them again in a different capacity.

8.2 DOCUMENTATION OF NAT TLS

8.2.1 The Secretariat advised the NAT SPG that the appropriate steps would be taken to document NAT Region target levels of safety (TLS) in the North Atlantic Basic Air Navigation Plan (Doc 9634).

8.3 NEXT MEETING

8.3.1 The Group agreed to convene its Forty-Seventh Meeting in the EUR/NAT Office of ICAO in Paris from 13 to 16 June 2011.

APPENDIX A - LIST OF PARTICIPANTS

(Paragraph 0.3 refers)

CHAIRMAN
Ásgeir PÁLSSON

CANADA
Larry LACHANCE
Jennifer TAYLOR

DENMARK
Kirsten SONDERBY
Bjarne BERLIN

FRANCE
Emmanuel SIEBERT

ICELAND
Hlin HOLM
Leifur HAKONARSON

IRELAND
Donie MOONEY

NORWAY
Gitte VIKSAAS
Per Harald PEDERSEN

PORTUGAL
Carlos ALVES
Francisco BALACO

SPAIN
José María CURA OCAÑA

UNITED KINGDOM
Matthew TEMPLE-SMITH
Pauline LAMB
Finlay SMITH

NAT CMA
David NICHOLAS

UNITED STATES
Anthony FERRANTE
Leslie SMITH
Ken MYERS
Daniel VACA
Roy GRIMES

IATA
Peter CERDA

IBAC
Peter INGLETON

IFALPA
Mark SEAL

IFATCA
Edward WALLACE

INMARSAT
Gary COLLEDGE

APPENDIX B -
REVIEW OF THE ACTIONS OF THE AIR NAVIGATION COMMISSION
ON THE REPORT OF NAT SPG/45
(Paragraph 1.5.3 refers)

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/1 **A**	**North Atlantic Region Safety Policy**	That the: a) NAT Region provider States and user organizations endorse the North Atlantic Region Safety Policy as shown in Appendix B to this report; and b) ICAO Regional Director, Europe and North Atlantic, on behalf of the NAT SPG: i) circulate in a State letter the North Atlantic Region Safety Policy to NAT Region provider and user States and to user organizations; and ii) publish the North Atlantic Region Safety Policy in the NAT SPG Handbook.	ICAO Headquarters ANB ICAO European and North Atlantic Office ICAO European and North Atlantic Office	Letter to Regional offices State letter Updated Hand book	Noted and requested the Secretariat to make this safety policy document available to other Regional offices for the attention of remaining PIRGs.	April 2010 Completed (28 July 2009) Completed (20 July 2009)

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/9 **A, D**	**Validation trial to sustain 5 minute longitudinal separation using Automatic Dependent Surveillance (ADS) Contract**	That the NAT Implementation Management Group (NAT IMG): a) after satisfying itself that all planning requirements needed to support 5 minute longitudinal separation using ADS-C have been met, determine a date to initiate validation trials; b) monitor the trial to ensure that safety requirements were being met; and c) provide the NAT SPG with progress reports.	ICAO European and North Atlantic Office/ NAT IMG	Validation trials	Noted and requested the Secretariat to follow the trials and to bring their findings to SASP for analysis and further action.	June 2010

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/10 **A, D**	**NAT concept of operations to support reducing lateral separation to 25 Nautical Miles (NM)**	That the: c) following concept of operations be used to develop an implementation plan for reducing lateral separation to 25 NM:	ICAO Headquarters ANB/ATM	Global provisions	Noted and requested that SASP clearly identify any requirements for relevant global provisions.	2011
		i) Phase 1 – 2012 – introduce 25 NM lateral separation by implementing ½ degree spacing between the two core tracks, FL350 to FL400 inclusive; only aircraft with the appropriate RNP approval, Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data Link Communications (CPDLC) would be permitted to operate on the ½ degree spaced tracks.	ICAO European and North Atlantic Office	Phase 1 plan		December 2012
		ii) Phase 2 – 2013 – expand the introduction of 25 NM lateral separation by implementing ½ degree spacing through the entire NAT Organised Track System (OTS), FL350 to FL400 inclusive; only aircraft with the appropriate RNP approval, ADS-C and CPDLC would be permitted to operate on the ½ degree spaced tracks.	ICAO European and North Atlantic Office/ NAT IMG	Phase 2 plan		December 2013

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/10 cont'd **A, D**	**NAT concept of operations to support reducing lateral separation to 25 Nautical Miles (NM)**	iii) Phase 3 – 2015 – introduce 25 NM lateral separation throughout the entire NAT Region, including for converging and intersecting track situations, between FL350 to FL400 inclusive. The application of the reduced separation standard between targets of opportunity should be permissible in any part of the NAT Region outside the OTS (mixed mode operations). d) NAT Implementation Management Group (NAT IMG) develop the following material to support implementation plan for reducing lateral separation to 25 NM:	ICAO European and North Atlantic Office/ NAT IMG	Phase 3 plan	Noted	December 2015
		i) a proposal for amendment to the NAT *Regional Supplementary Procedures* (Doc 7030); and	ICAO European and North Atlantic Office/ NAT IMG	Amendment to Doc 7030	Noted	2011

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/10 cont'd **A, D**	**NAT concept of operations to support reducing lateral separation to 25 Nautical Miles (NM)**	ii) safety material to so as to initiate the development of global provisions; c) ICAO Regional Director, Europe and North Atlantic coordinate with ICAO Headquarters in order to initiate the development of global provisions; and d) NAT IMG provide NAT SPG/46 with a progress report.	ICAO Headquarters ANB/ATM	Additional provisions	Noted and requested that SASP examine the subject concept of operation to ascertain the need for any additional ICAO provisions.	June 2011

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/11 **A, D**	**Mandate for data link equipage in the NAT Region**	That the NAT Implementation Management Group (NAT IMG): a) develop a NAT Region plan to mandate Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data Link Communications (CPDLC) equipment certified against requirements specified in RTCA DO-258A/EUROCAE ED-100A (or ED-100); b) determine the applicable flight level band taking account of the EUR Region mandate; c) ensures that the plan includes provisions for aircraft not able to be equipped within the above time frame; e) draft, on behalf of the NAT SPG, a proposal for amendment to the NAT *Regional Supplementary Procedures* (Doc 7030) in order to initiate the processing by 15 December 2009; and f) provide NAT SPG/46 with a progress report.	ICAO European and North Atlantic Office/ NAT IMG	Implementation Plan for data link equipage	Noted and requested that NAT SPG pay particular attention to the ATN-CPDLC mandate in EUR as well as to the accommodation of other (non-equipped) users.	June 2010

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/15 **A, D**	**NAT Region data link implementation business case and incentive strategy**	That the NAT Economic and Financial Group, in coordination with the NAT Implementation Management Group: a) develop a business case to support the planned data link mandate in the NAT Region; b) develop an incentive framework for operators to comply with the mandate; and c) report to NAT SPG/46.	ICAO European and North Atlantic Office/ EFG	Business case Incentive framework	Noted	June 2010 June 2010
C 45/17 **A**	**Establishment of a NAT Data Link Monitoring Agency (NAT DLMA)**	That the: a) United States establish by 31 December 2009 a NAT DLMA; b) NAT Implementation Management Group coordinate all safety related matters with the NAT Safety Oversight Group; and c) NAT IMG provide a r eport to NAT SPG/46.	ICAO European and North Atlantic Office / United States	NAT DLMA	Noted.	31 December 2009

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/20 **D**	**Amendment to the NAT Regional Supplementary Procedures (SUPPs) regarding the inclusion of the aircraft registration in the ICAO Filed Flight Plan (FPL)**	That the Representative of Iceland, on behalf of the NAT SPG, make arrangements within his administration to process the proposal for amendment to the NAT SUPPs, as shown in **Appendix I** to this report, regarding the requirement for the mandatory inclusion of the aircraft registration in the ICAO Filed Flight Plan (FPL) for all aircraft wishing to avail themselves of data link services in the NAT Region.	ICAO European and North Atlantic Office / Iceland	Proposal for amendment of SUPPs	Noted that other regions have advanced this issue through guidance material.	June 2010

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/25 **A, D**	**Implementation of Air Traffic Services (ATS) Inter-Facility Data Communication (AIDC) throughout the NAT Region**	That: a) all States make arrangements to fully implement AIDC, including the re-negotiation function, by 15 November 2012; b) the NAT Implementation Management Group (NAT IMG) oversee the development of a d etailed implementation plans to assist Air Navigation Service Providers (ANSP) to meet the 15 November 2012 date; c) the NAT IMG direct its contributory groups to assist in the development of a harmonised multi-regional AIDC Interface Control Document (ICD); d) the NAT Safety Oversight Group keep under review the impact that the gradual implementation of AIDC may have on reducing risk; and e) the NAT SPG be provided with regular progress reports.	ICAO European and North Atlantic Office/ NAT Region provider States ICAO European and North Atlantic Office/ NAT IMG	Implementation of AIDC Harmonised multi-regional AIDC ICD	Noted the conclusion and its relationship with Conclusion 20/14 of APANPIRG/20 and requested the Secretariat provide the necessary assistance towards the development of a single document to be used by all ICAO Regions.	15 November 2012 June 2012

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/26 **A**	**Amendment to the NAT Regional Supplementary Procedures (SUPPs)**	That the Representative of Iceland, on behalf of the NAT SPG, make arrangements within his/her administration to process the proposal for amendment to the NAT SUPPs regarding the application of Strategic Lateral Offset Procedures (SLOP) in the NAT Region as shown in **Appendix J** to this report.	ICAO European and North Atlantic Office/ Iceland	Proposal for amendment of SUPPs	Noted the conclusion and requested the NAT SPG to develop, in coordination with the Secretariat and airspace users, an amendment proposal to PANS-ATM (Doc 4444) as well as a roll out plan.	June 2010

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/27 **A, D**	**Plan for Future HF Network Operations**	That the NAT Implementation Management Group (NAT IMG): a) review, determine the timeline and ensure implementation of the following action plan in order to increase the number of high frequency (HF) frequencies available for the NAT Region; i) carry out radio monitoring of selected HF channels according to the agreed scheme by NAT aero radio stations and determine a list of unoccupied frequencies. Responsible – NAT aero radio stations; ii) EUR/NAT Office of ICAO to coordinate with ICAO Headquarters and other regional offices the list of unoccupied frequencies in order to detect possible users. States to approach national radio regulatory authorities to verify whether there is information available on the actual usage of the selected frequencies;	ICAO European and North Atlantic Office/ NAT IMG/ States	Implementation of an action plan to increase the availability of number of HF frequencies	Noted and the conclusion and its relationship with Conclusion 45/28 and: a) requested the ICAO HQ to provide the necessary assistance; and b) requested NAT SPG to develop a regional communications roadmap, that includes SATCOM, so as to facilitate future regional and global planning activities.	December 2010

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/27 cont'd **A, D**	**Plan for Future HF Network Operations**	iii) request International Telecommunication Union to amend Appendix 27 t o include additionally proposed HF frequencies. Responsible – States/ICAO; iv) draft a proposal for amendment to Doc 7030 to include the new HF frequencies. Responsible – NAT IMG; v) amend aeronautical Information Publications. Responsible – States; vi) plan to commence operations by the end of 2010. Responsible – States; and vii) draft an implementation plan to enable a centralized HF management and coordination mechanism.Responsible – NAT IMG; and b) Provide a progress report to NAT SPG/46.				

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action agreed by ANC 21 January 2010 (ANC 183-4)	Reporting/ Completion date
C 45/28 **A, D**	**Amendment to the NAT Regional Supplementary Procedures (SUPPs) regarding the use of SATCOM voice for Air Traffic Services (ATS) communications**	That the Representatives of Canada and the United Kingdom, on behalf of the NAT SPG, make arrangements within their administrations to process the proposal for amendment, as shown in **Appendix K** to this report**,** to the NAT SUPPs regarding the use of SATCOM voice for ATS communications in the NAT Region.	ICAO European and North Atlantic Office/ Canada/United Kingdom ICAO European and North Atlantic Office and Asia/Pacific Regional office	Proposal for amendment of SUPPs Review of SATCOM guidance material	Noted Noted and requested the Secretariat to establish a taskforce between NAT and Asia/Pacific regions to review the SATCOM guidance material for its global applicability.	2011 2010

Note: ICAO has established the following Strategic Objectives for the period 2005-2010:

A: Safety - *Enhance global civil aviation safety*

B: Security - *Enhance global civil aviation security*

C: Environmental Protection - *Minimize the adverse effect of global civil aviation on the environment*

D: Efficiency - *Enhance the efficiency of aviation operations*

E: Continuity - *Maintain the continuity of aviation operations*

F: Rule of Law - *Strengthen law governing international civil aviation*

APPENDIX C -
DRAFT IMPLEMENTATION PLAN FOR THE TRIAL APPLICATION OF RLatSM

(Paragraph 3.1.1 refers)

1. Introduction

Advancements in aircraft avionics and air traffic management flight data processing systems have driven analysis of whether the lateral separation standard in the current NAT MNPS airspace can be reduced to increase the number of tracks available and therefore increase capacity at optimum flight levels. The proposed change is to reduce lateral separation for aircraft operating from FL350 to FL400 inclusive, which can be practically achieved by establishing tracks which are spaced by ½ degree of latitude. This track spacing initiative will be referred to as Reduced Lateral Separation Minimum (RLatSM).

This implementation plan follows the guidelines provided in ICAO Doc 9689 (Manual on Airspace Planning Methodology for the Determination of Separation Minima)

2. Identification of the Need for Change

2.1 NAT customers request more fuel-efficient flight profiles and routes that will reduce operating costs and show a return on operator investment in aircraft avionics. Applying reduced lateral separation is expected to enhance the provision of fuel-efficient profiles and routes with minimal change to NAT operations.

2.2 The new separation standard is expected to result in a reduction in fuel burn and a consequent reduction in greenhouse gas emissions through an increased likelihood of flights being able to operate at their optimum flight levels and routes.

3. Description of the Current Airspace and the CNS/ATM Systems

3.1 Airspace Structure

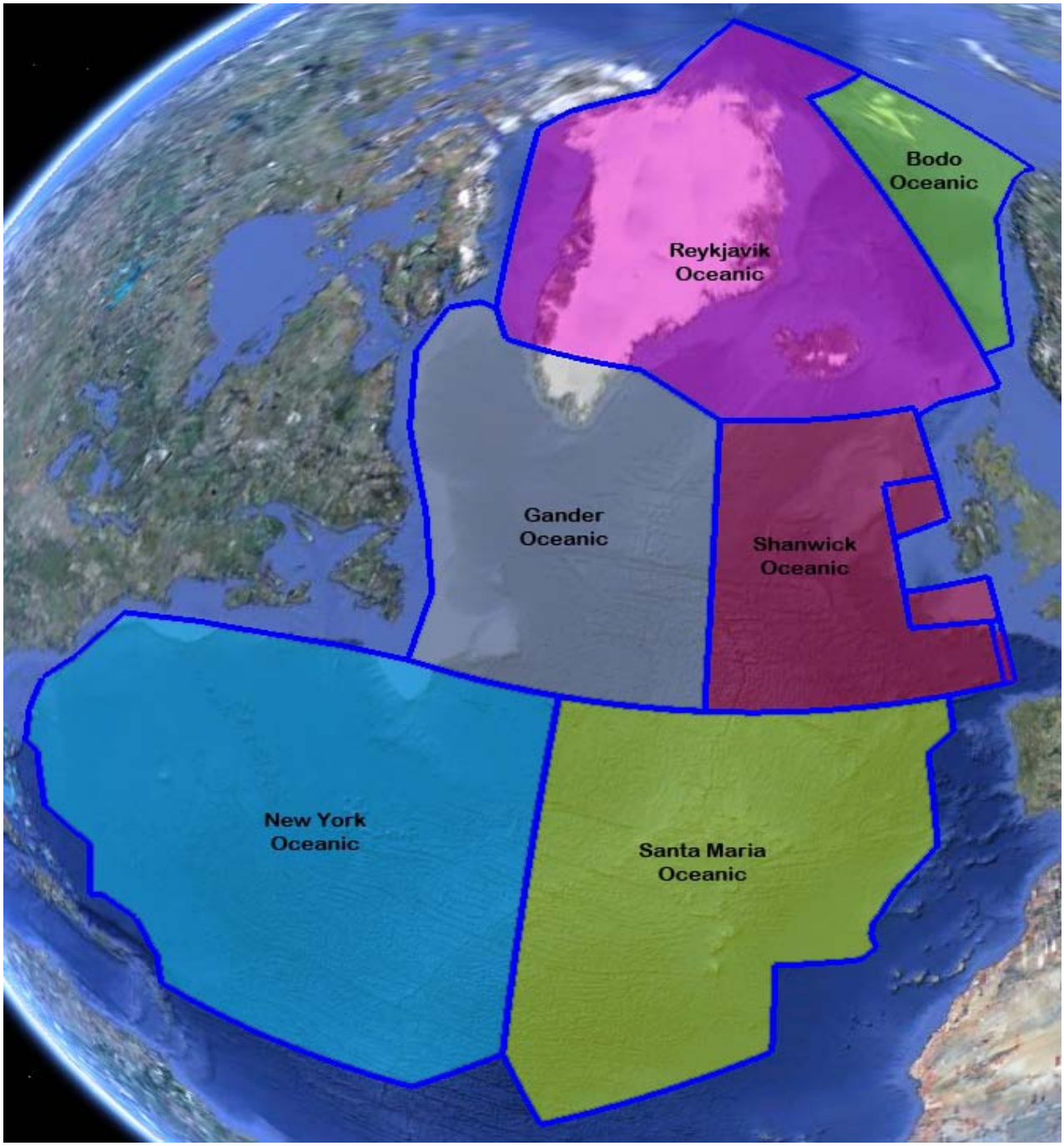
3.1.1 The responsibility for air traffic control services within the North Atlantic (NAT) Region is delegated by the International Civil Aviation Organisation (ICAO) to six states: the United Kingdom, Iceland, Canada, Norway, USA and Portugal.

3.1.2 The NAT Region is Class A airspace (at and above FL55); in which Instrument Flight Rules (IFR) apply at all times.

3.1.3 The NAT airspace is divided into seven Flight Information Regions (FIRs) or Control Areas (CTA) for the implementation of the Communications Navigation Surveillance/Air Traffic Management (CNS/ATM) systems. The NAT Region comprises the following FIRs/CTAs: Bodø Oceanic, Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria, Shanwick and Søndre Strømfjord.

3.1.4 Traffic is controlled by Oceanic centres at Reykjavik, Bodø, Gander, New York, Santa Maria, Søndre Strømfjord and Prestwick.

3.1.5 The following diagram illustrates;



3.1.6 NAT traffic is predominantly commercial. International General Aviation (IGA) Business aircraft comprise a high proportion of the higher altitude airspace operations.

3.1.7 For most of the North Atlantic (NAT) airspace radar surveillance and VHF voice communications is unavailable. Therefore, procedural control is exercised. The exception is the south and east sector of the Reykjavik area, where radar aided services are provided.

3.2 Strategic Lateral Offset Procedure (SLOP)

3.2.1 Strategic lateral offsets of one or two miles right of a route or track centreline have been introduced as a means of reducing collision risk and is now standard operating procedure in the entire NAT Region.

3.3 Airborne Collision Avoidance Systems (ACAS)

3.3.1 In addition to the requirements of Annex 6, (Part I, paragraph 6.16 and Part II, paragraph 6.14) ACAS II shall be carried and operated in the NAT Region by all turbine-engined aeroplanes having a maximum certificated take-off mass exceeding 5 700 kg or authorized to carry more than 19 passengers.

4. Traffic Patterns

4.1 General

4.1.1 The traffic is dominated by three major axes. First, there is the axis linking Europe (and the Middle East) to North America (excluding Alaska). Second, there is the axis linking the Eastern seaboard of North America with the Caribbean, South America and Bermuda. Third, there is the axis linking Europe to the Caribbean and South America. A substantial proportion of NAT traffic, namely that operating between cities in Europe and those in North America operate on the first axis.

4.1.2 The major traffic flow between Europe and North America takes place in two distinct traffic flows during each 24-hour period due to passenger preference, time zone differences and the imposition of night-time noise curfews at the major airports. The majority of the Westbound flow leaves European airports in the late morning to early afternoon and arrives at Eastern North American coastal airports typically some 2 hours later - local time - given the time difference. The majority of the Eastbound flow leaves North American airports in mid/late evening and arriving in Europe early to mid morning - local time. Consequently, the diurnal distribution of this traffic has a distinctive tidal pattern characterised by two peaks passing 30° W, the Eastbound centred on 0400 Universal Co-ordinated Time (UTC) and the Westbound centred on 1500 UTC.

4.2 North Atlantic Organised Track System (NAT OTS)

4.2.1 Although a number of fixed trans-Atlantic tracks exist, the bulk of traffic operates on tracks, which vary from day to day dependent on meteorological conditions. The variability of the wind patterns would make a fixed track system unnecessarily penalising in terms of flight time and consequent fuel usage. Nevertheless, the volume of traffic along the core routes is such that a complete absence of any designated tracks (i.e. a free flow system) would currently be unworkable given the need to maintain procedural separation standards in airspace largely without radar surveillance.

4.2.2 As a result, an OTS is set up on a diurnal basis for each of the Westbound and Eastbound flows. Each core OTS is comprised of a set, typically 4 to 7, of parallel or nearly parallel tracks, positioned in the light of the prevailing winds to suit the traffic flying between Europe and North America.

4.2.3 The main difference between the North American-Caribbean traffic axis and that between Europe and North America is that the former is constrained by the fixed track structure. Some of these fixed tracks are tied to Non Directional Beacon (NDB) and Very High Frequency Omni directional Range/Distance Measuring Equipment (VOR/DME) radio navigation aids and, where this is the case, appropriate separation standards apply. Where tracks are beyond the range of such aids, long-

range navigation systems are required. However, this part of the NAT Region is not yet designated as Minimum Navigation Performance Specifications (MNPS) Airspace and the 60 NM lateral separation minimum does not apply (see below).

4.2.4 The designation of an OTS facilitates a high throughput of traffic by ensuring that aircraft on adjacent tracks are separated for the entire oceanic crossing - at the expense of some restriction in the operator's choice of track. In effect, where the preferred track lies within the geographical limits of the OTS, the operator is obliged to choose an OTS track or fly above or below the system. Where the preferred track lies clear of the OTS, the operator is free to fly it by nominating a random track. Trans-Atlantic tracks, therefore, fall into three categories: OTS, Random or Fixed.

4.3 Minimum Navigation Performance Specification

4.3.1 MNPS airspace has been established between FL285 and FL420. Longitudinal separation between in-trail aircraft using the Mach Number Technique is 10 minutes - a reduced longitudinal separation minimum (RLongSM) of 5 minutes between eligible aircraft pairs is to be trialed commencing 2010. Aircraft tracks are separated using the earth's coordinate system to define tracks and effect separation laterally by *60 NM* or *1 degree* provided a portion of the route is within, above, or below MNPS airspace. Given the curvature of the earth, 'Gentle Slope Rules' have been adopted to ensure that the actual separation never falls below distances which vary with latitude but never fall short of 50.5 NM. To ensure the safe application of the reduced separation minimum, only MNPS certified aircraft are permitted to operate within the MNPS airspace. The current MNPS was established to ensure that the risk of collision as a consequence of a loss of horizontal separation would be contained within an agreed Target Level of Safety (TLS).

4.4 Reduced Vertical Separation Minimum (RVSM)

4.4.1 RVSM airspace has been established within the confines of MNPS airspace and associated transition areas. In RVSM airspace, 1000 ft vertical separation is applied between approved aircraft. Currently, RVSM is only applied between FL 290 and FL 410 inclusive. To ensure the safe application of the separation minimum, only RVSM approved aircraft are allowed to operate within RVSM airspace. Aircraft are monitored to ensure that the TLS is being met.

4.5 Aircraft Equipage in Target Environment

4.5.1 The on-board equipment that provides the CPDLC and ADS-C capabilities required for the use of RLatSM is provided by FANS 1/A. The State of Registry or the State of the Operator should verify that the equipment has been certified in accordance with the requirements specified in RTCA DO-258A/EUROCAE ED-100A or equivalent.

4.5.2 The navigational accuracy component to support RLatSM is expected to be provided by GNSS. The lateral containment provided by GNSS navigation far exceeds what will support 25 N M track separation. To ensure GNSS navigation is being used by aircraft availing of RLatSM, it is proposed that eligible aircraft be approved for RNP4 operations.

4.5.3 ADS-C position reports provide time-keeping accuracy of ± 1 second or better (Annex 2 paragraph 3.5.3 refers).

5. Determination of the Proposed System

5.1 RLatSM will be introduced to improve the efficiency of NAT operations. Initially it will involve establishment of tracks between core OTS published routes using the same vertical and longitudinal standards as conventional tracks.

5.2 RLatSM spacing along the core tracks will be ½ degree as measured between 10^0 meridians.

5.3 RLatSM spacing measured along a perpendicular to the tracks will be 25NM or greater.

5.4 FDPs will receive and process position (POS) reports to an accuracy of ± 1 second or better.

5.5 In accordance with NAT SPG Conclusion 45/10, RLatSM will be implemented using the following phased approach:

a) Phase 1 – 2012 – introduce 25 NM lateral separation by implementing ½ degree spacing between the two core tracks, FL350 to FL400 inclusive; only aircraft with the appropriate RNP approval, ADS-C and CPDLC would be permitted to operate on the ½ degree spaced tracks.

b) Phase 2 – 2013 – introduce 25 NM lateral separation by implementing ½ degree spacing through the entire NAT Organised Track System (OTS), FL350 to FL400 inclusive; only aircraft with the appropriate RNP approval, ADS-C and CPDLC would be permitted to operate on the ½ degree spaced tracks.

c) Phase 3 – 2015 – introduce 25 NM lateral separation throughout the entire NAT Region, including for converging and intersecting track situations, between FL350 to FL400 inclusive. The application of the reduced separation standard between targets of opportunity should be permissible in any part of the NAT Region outside the OTS (mixed mode operations).
Note: Phase 2 would likely enable an overall reduction of the lateral extent of the OTS, thereby increasing the flexibility for random operations and providing both economic and environmental benefits.

5.6 The introduction of RLatSM to any of the FIRs within the NAT will require changes to the associated ATC system. Respective ANSP FDPs will need to depict and conflict probe the RLatSM tracks.

5.7 Operational Application

5.7.1 In order to issue a flight with an RLatSM clearance, the following conditions must be met:

a) the aircraft concerned are RNP4 approved and confirm navigating using GNSS;

b) tracks are established with ½ degree spacing and aircraft are capable of navigating the waypoints;

c) the aircraft concerned will provide ADS-C position reports; and

d) CPDLC communication will be established with the aircraft concerned to minimise the time required for any interventions. It is also noted that the use of CPDLC to upload RLatSM clearances would significantly decrease the risk of FMS waypoint input errors, should this functionality be enabled.

6. Identification of the Method of Safety Assessment

6.1 Risk has been estimated using the Reich collision risk model.

6.1.1 Calculations used in the safety assessment are sufficient to allow provisions for the application of SLOP where RLatSM is being applied.

7. Evaluation of the Risk;

7.1 The TLS for NAT MNPS airspace in the lateral dimension is currently 20 x 10^{-9} fatal accidents per flight hour (fapfh). For RLatSM the TLS will be 5 X 10^{-9} fapfh. Ongoing monitoring will determine whether the TLS in the vertical and longitudinal dimensions is affected by the introduction of RLatSM.

7.2 Hazard Identification and Risk Analyses (HIRA) to assess the impact of the proposed change on the current system shall be carried out. These will be made available to the appropriate regulatory authorities and planning bodies as they are completed.

7.3 In accordance with NAT SPG Conclusion 45/22, the NAT Implementation Management Group will:

a) ensure that the errors arising from the input and display of ½ degree coordinates (for example, 48º30" North) are subject to specific hazard analysis and mitigation developed to address the identified hazards;

b) develop a robust plan to capture and contain errors arising from flight crews misconstruing ½ degree coordinates as a full degree coordinate or vice versa (for example, flying to 43º30" rather than 43º00" or vice versa); and

c) ensure that the results of a) and b) are an integral part of the implementation plan for reduced lateral separation.

8. Satisfaction of Safety Criteria

8.1 System Performance Criteria

8.1.1 Aircraft will be required to meet communication, navigation and surveillance requirements for RLatSM operations.

8.1.2 Aircraft will be authorized for an RNP 4 navigation specification and the aircraft found eligible for RNP 4 operations by the State of the Operator or the State of Registry, as appropriate.

8.1.3 GNSS may be approved using one of the following FAA Technical Standard Orders (TSO): C129a, C145c, C146c, or C196 or, one of the following Joint Technical Standard Orders (JTSO): C129a or C146. TSO C115b and JTSO C115b are applicable to GNSS equipment using Aircraft Autonomous Integrity Monitoring. Airworthiness approval for GNSS can be obtained using the guidance contained in the advisory circulars listed below (or their equivalent):

a) for multi-sensor systems integrating GNSS: U.S. FAA AC 20-130 (as amended); and

b) for all GNSS equipment: U.S. FAA AC 20-138 (as amended).

8.1.4 Operators intending to conduct RLatSM operations should obtain CPDLC/ADS-C operational authorization, where applicable, either from the State of Registry or the State of the Operator. The State of Registry or the State of the Operator should verify that the equipment has been certified in accordance with the requirements specified in RTCA DO-258A/EUROCAE ED-100A (or equivalent) and DO-306/ED-122, Annex B (or equivalent).

8.1.5 RCP240 is the guideline against which actual communication performance will be measured.

8.1.6 ANSP FDP software development to support RLatSM is expected to be fully functional in time for operational trials.

8.1.7 Air traffic management and control procedures are in development and will be finalized to provide timely training prior to implementation.

9. Modification of the Proposed System

9.1 The requirement for modification will be a result of constant assessment of the system performance.

10. Implementation and Monitoring of the Proposed System

10.1 It is intended to introduce RLatSM via an operational trial in 2012. Operators will be advised via Aeronautical Information Circular (AIC) as soon as possible but in any event, no less than three AIRAC cycles (84 days) prior to implementation. Any delay in the implementation date or significant change to the implementation plans shall be notified by NOTAM as soon as the information is available.

10.2 Eligible flights are those that are ADS-C and CPDLC equipped and have established appropriate data link communications for both of these systems and which are RNP4 approved,. There is no additional operational certification required and flight planning requirements have not changed from what currently exists for flight within NAT MNPS airspace. ATS systems use Field 10 (Equipment) of the standard ICAO flight plan to identify an aircraft's data link and navigation capabilities. The operator should insert the following items into the ICAO flight plan for FANS 1/A aircraft:

a) Field 10a (Radio communication, navigation and approach aid equipment and capabilities); insert "J2 – J7" as appropriate to indicate CPDLC FANS 1/A data link equipment.

b) Field 10b (Surveillance equipment and capabilities); insert "D1" to indicate ADS with FANS 1/A capabilities.

c) Field 18 (Other Information); insert the characters "PBN/" followed by "L1" for RNP4.

10.3 RLatSM will not be applied to flights with only HF equipment due to the inherent communication delay.

10.4 The use of RLatSM will be enabled by the improved confidence in aircraft position due to the navigation accuracy of GNSS, the position reporting using ADS-C and the intervention capability provided by CPDLC. Controllers will intervene via CPDLC free text or voice as appropriate if an aircraft track was forecast to drop below the specified minimum separation, to prevent loss of separation.

10.5 Monitoring of communication performance will be assisted by the establishment of the NAT Data Link Monitoring Agency (NAT DLMA):

a) in accordance with NAT SPG CONCLUSION 45/17, the United States will establish by 31 December 2009 the NAT DLMA in accordance with the approved terms of reference; and

b) in accordance with NAT SPG CONCLUSION 45/18 the NAT States, ANSPs and industry support the DLMA according to the GOLD requirements.

APPENDIX D -

PROGRAMME RISKS AND ISSUES

(Paragraph 3.1.3 refers)

1. ICAO standards have not been established for 25 NM lateral separation. It is suggested that a Safety Assessment should assess 25 NM lateral, 5 minute longitudinal and 1000 feet vertical in NAT airspace in the long term (i.e., for the next 5-15 years).

2. Estimated vertical risk in NAT airspace currently exceeds the agreed Target Level of Safety by a significant amount.

3. The first target dates for implementation of the NAT initiatives are only 2-3 years away in 2012 and 2013 and the implementation plans for the RLatSM and Data Link mandate are not yet complete.

4. The lead time for operators to procure funding, schedule and install aircraft data link and GNSS systems does not appear to be adequate to meet the time schedule for the reduction of separation. The cost/benefit analysis that would serve to justify to operators the need to incur large aircraft equipage costs is not yet available and when, completed may show that operator benefits do not outweigh operator costs.

5. The preliminary estimate of operator costs to retrofit data link and GNSS systems would appear to make such installations cost prohibitive for many operators. In addition, inadequate lead time can force operators to pull aircraft out of service to complete aircraft GNSS and/or data link system installations thereby increasing operator costs. Data link retrofit packages are not yet available for some aircraft types.

6. It has not been established that the data link system will support the operation of a track system based on reduced separation standards which rely on data link equipage. The reliability and availability of the data link system remains in question.

APPENDIX E –

IMPLEMENTATION PLAN FOR VALIDATION TRIAL OF RLONGSM
(Paragraph 3.1.5 refers)

1. Introduction

1.1 Advancements in aircraft avionics and air traffic management flight data processing systems have driven analysis of whether the current longitudinal separation standards in the NAT can be reduced to increase capacity at optimum flight levels. The proposed change is to reduce longitudinal separation within MNPS airspace to 5 minutes where lateral and vertical separation does not exist between aircraft pairs equipped with Automatic Dependent Surveillance-Contract (ADS-C), Controller-Pilot Data Link Communications (CPDLC) and Global Navigation Satellite System (GNSS).

This implementation plan follows the guidelines provided in ICAO Doc 9689 (Manual on Airspace Planning Methodology for the Determination of Separation Minima)

2. Identification of the Need for Change

2.1 NAT customers have indicated that the ability to "step climb" enables more fuel-efficient flight profiles. Applying reduced longitudinal separation to accommodating mid-ocean altitude requests is expected to enhance the provision of fuel-efficient profiles without changing basic NAT operations. This would provide opportunity for more frequent altitude changes on a case-by-case basis.

2.2 The new separation standard is expected to result in a reduction in fuel burn and a consequent reduction in greenhouse gas emissions through an increased likelihood of flights being able to operate at their optimum flight levels. This will have the added benefit of allowing return on operator investment in aircraft avionics without requiring a change from current NAT MNPS certification.

3. Description of the Current Airspace and the CNS/ATM Systems

Airspace Structure

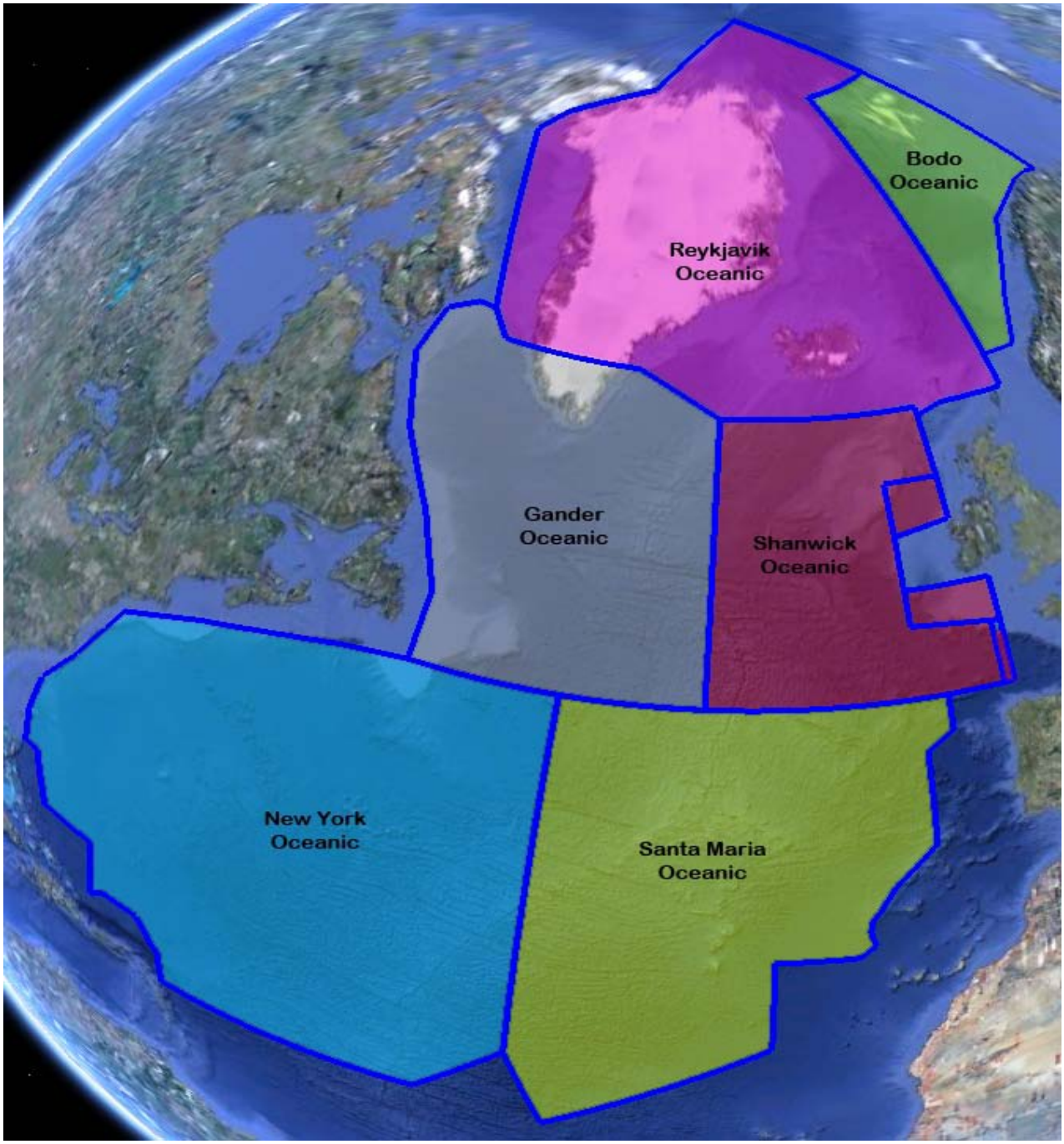
3.1 The responsibility for air traffic control services within the North Atlantic (NAT) Region is delegated by the International Civil Aviation Organisation (ICAO) to six states: the United Kingdom, Iceland, Canada, Norway, USA and Portugal.

3.2 The NAT Region is Class A airspace (at and above FL55); in which Instrument Flight Rules (IFR) apply at all times.

3.3 The NAT airspace is divided into seven Flight Information Regions (FIRs) or Control Areas (CTA) for the implementation of the Communications Navigation Surveillance/Air Traffic Management (CNS/ATM) systems. The NAT Region comprises the following FIRs/CTAs: Bodø Oceanic, Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria, Shanwick and Søndre Strømfjord.

3.4 Traffic is controlled by Oceanic centres at Reykjavik, Bodø, Gander, New York, Santa Maria, Søndre Strømfjord and Prestwick.

3.5 The following diagram illustrates;



3.6 NAT traffic is predominantly commercial. International General Aviation (IGA) Business aircraft comprise a high proportion of the higher altitude airspace operations.

3.7 For most of the North Atlantic (NAT) airspace radar surveillance and VHF voice communications is unavailable. Therefore, procedural control is exercised. The exception is the south and east sector of the Reykjavik area, where radar aided services are provided.

Strategic Lateral Offset Procedure (SLOP)

3.8 Strategic lateral offsets of one or two miles right of a route or track centreline have been introduced as a means of reducing collision risk and is now standard operating procedure in the entire NAT Region.

Airborne Collision Avoidance Systems (ACAS)

3.9 In addition to the requirements of Annex 6, (Part I, paragraph 6.16 and Part II, paragraph 6.14) ACAS II shall be carried and operated in the NAT Region by all turbine-engine aeroplanes having a maximum certificated take-off mass exceeding 5 700 kg or authorized to carry more than 19 passengers.

Traffic Patterns - General

3.10 The traffic is dominated by three major axes. First, there is the axis linking Europe (and the Middle East) to North America (excluding Alaska). Second, there is the axis linking the Eastern seaboard of North America with the Caribbean, South America and Bermuda. Third, there is the axis linking Europe to the Caribbean and South America. A substantial proportion of NAT traffic, namely that operating between cities in Europe and those in North America operate on the first axis.

3.11 The major traffic flow between Europe and North America takes place in two distinct traffic flows during each 24-hour period due to passenger preference, time zone differences and the imposition of night-time noise curfews at the major airports. The majority of the Westbound flow leaves European airports in the late morning to early afternoon and arrives at Eastern North American coastal airports typically some 2 hours later - local time - given the time difference. The majority of the Eastbound flow leaves North American airports in mid/late evening and arriving in Europe early to mid morning - local time. Consequently, the diurnal distribution of this traffic has a distinctive tidal pattern characterised by two peaks passing 30° W, the Eastbound centred on 0400 U niversal Co-ordinated Time (UTC) and the Westbound centred on 1500 UTC.

North Atlantic Organised Track System (NAT OTS)

3.12 Although a number of fixed trans-Atlantic tracks exist, the bulk of traffic operates on tracks, which vary from day to day dependent on meteorological conditions. The variability of the wind patterns would make a fixed track system unnecessarily penalising in terms of flight time and consequent fuel usage. Nevertheless, the volume of traffic along the core routes is such that a complete absence of any designated tracks (i.e. a free flow system) would currently be unworkable given the need to maintain procedural separation standards in airspace largely without radar surveillance.

3.13 As a result, an OTS is set up on a diurnal basis for each of the Westbound and Eastbound flows. Each core OTS is comprised of a set, typically 4 to 7, of parallel or nearly parallel tracks, positioned in the light of the prevailing winds to suit the traffic flying between Europe and North America.

3.14 The main difference between the North American-Caribbean traffic axis and that between Europe and North America is that the former is constrained by the fixed track structure. Some of these fixed tracks are tied to Non Directional Beacon (NDB) and Very High Frequency Omni directional Range/Distance Measuring Equipment (VOR/DME) radio navigation aids and, where this is the case, appropriate separation standards apply. W here tracks are beyond the range of such aids, long-range navigation systems are required. However, this part of the NAT Region is not yet designated as Minimum Navigation Performance Specifications (MNPS) Airspace and the 60 NM lateral separation minimum does not apply (see below).

3.15 The designation of an OTS facilitates a high throughput of traffic by ensuring that aircraft on adjacent tracks are separated for the entire oceanic crossing - at the expense of some restriction in the operator's choice of track. In effect, where the preferred track lies within the geographical limits of the OTS, the operator is obliged to choose an OTS track or fly above or below the system. Where the preferred track lies clear of the OTS, the operator is free to fly it by nominating a random track. Trans-Atlantic tracks, therefore, fall into three categories: OTS, Random or Fixed.

Minimum Navigation Performance Specification

3.16 MNPS airspace has been established between FL285 and FL420. Longitudinal separation between in-trail aircraft using the Mach Number Technique is 10 minutes and aircraft, which satisfy MNPS, are separated laterally by a minimum of 60 NM. To ensure the safe application of the reduced separation minimum, only MNPS certified aircraft are permitted to operate within the MNPS airspace. The current MNPS was established to ensure that the risk of collision as a consequence of a loss of horizontal separation would be contained within an agreed Target Level of Safety (TLS).

Reduced Vertical Separation Minimum (RVSM)

3.17 RVSM airspace has been established within the confines of MNPS airspace and associated transition areas. In RVSM airspace, 1000 ft vertical separation is applied between approved aircraft. Currently, RVSM is only applied between FL 290 and FL 410 inclusive. To ensure the safe application of the separation minimum, only RVSM approved aircraft are allowed to operate within RVSM airspace. Aircraft are monitored to ensure that the TLS is being met.

Aircraft Equipage in Target Environment

3.18 The on-board equipment that provides the CPDLC and ADS-C capabilities required for the use of RLongSM is provided by FANS 1/A and ATN systems. ATN coverage is not currently provided on the NAT Region, nor is ATN connectivity provided for SAATS. FANS1/A is therefore the relevant on-board equipment that will enable RLongSM implementation on the NAT. The State of Registry or the State of the Operator should verify that the equipment has been certified in accordance with the requirements specified in RTCA DO-258A/EUROCAE ED-100A or equivalent.

3.19 Currently, aircraft on the NAT report their position at waypoints, which are 10º of longitude apart. Previous work looking into RLongSM operations considered the use of additional reports every 5º of longitude or *circa* 20 minute periodic reporting, in order to be able to safely reduce separation below the current standard of 10 minutes.

4. Determination of the Proposed System

4.1 RLongSM will be introduced to improve the efficiency of NAT operations. It will only be applied between flights travelling in the same direction on the same or diverging tracks (either an OTS published route or a random route).

4.2 The introduction of RLongSM to any of the FIRs within the NAT will require changes to the associated ATC system. Initial operational trials will be conducted for eligible eastbound aircraft pairs operating solely within the Shanwick OCA and involve the Shanwick Automated Air Traffic System (SAATS) FDP. The trial will later expand to include the Gander OCA using the Gander Automated Air Traffic System Plus (GAATS+) FDP. The development of agreed methods of operation with other NAT OCAs will also be required.

4.3 FDPs will receive and process position (POS) reports to an accuracy of ± 1 second or better.

4.4 ADS-C position reports provide time-keeping accuracy of ± 1 second or better (Annex 2 paragraph 3.5.3 refers).

Operational Application

4.5 In order to issue a flight with an RLongSM clearance, the following conditions must be met:

a) the aircraft concerned have reported over a common point and follow the same track, or continuously diverging tracks, and a minimum of 5 minutes separation continues to exist until the oceanic exit point or until some other form of separation is established;

b) five minutes separation is applied to an accuracy of 1 second, i.e. 4 minutes and 59 seconds based on position reports over a common point would constitute a loss of separation;

c) RLongSM may be applied where there is a speed difference between aircraft, provided the requirement for a minimum separation (see a) above) is not breached;

d) if the aircraft have not reported over a common point, it is possible to ensure by RADAR or some other means approved by the State that the appropriate time interval will exist at the common point from which they follow either the same or continuously diverging tracks (Note: this condition is not applicable during the operational trial, where only targets of opportunity already in NAT airspace will be separated using RLongSM);

e) the aircraft concerned are providing periodic ADS-C reports at intervals of not more than 18 minutes (Note: all aircraft using ADS-C position reporting, even those not separated by the five minute minimum, will be required to provide 18 minute interval reports during the operational trial);

f) CPDLC communication has been established with the aircraft concerned to minimise the time required for any interventions; and

g) the aircraft to which RLongSM is applied will exit the oceanic control area into another oceanic control area in which RLongSM is applicable or into domestic airspace.

5. Identification of the Method of Safety Assessment

5.1 An evaluation of longitudinal risk has been made through the use of a statistical model based on the Reich model (NAT SARSIG/7 WP/05 refers). One of a number of assumptions made in the modelling of risk was that RLongSM would be applied to the entire population of aircraft i.e. the worst case scenario. The outcome of the modelling was that the estimated value of longitudinal risk which would be less than the Target Level of Safety (TLS) if ADS-C periodic position reports were received every 20 minutes and appropriate action taken by controllers on their receipt. Studies conducted subsequent to the original CRM indicated that, based on current controller practice during situations where longitudinal separation may be eroding, 100% intervention whenever the separation was estimated to fall below 5 minutes based on the periodic report estimates might not be assured and therefore, for the purpose of the operational trial, a more frequent reporting interval of 18 minutes would be applied in order to meet the TLS. The modelling process did not take into account the receipt of waypoint position reports. Had it done so, the effect would have been to reduce the value of estimated longitudinal risk. Initial conclusions from this modelling were presented to NAT SARSIG/7 and following off-line exchanges, it was agreed that the model was valid.

Evaluation of the Risk;

5.2 The TLS for NAT MNPS airspace in the longitudinal dimension is currently 20 x 10^{-9} fatal accidents per flight hour (fapfh) but with any change of separation standard the NAT SPG has determined that a TLS of 5x10^{-9} fapfh be adopted to encapsulate both technical and operational risk.

5.3 Hazard Identification and Risk Analyses (HIRA) to assess the impact of the proposed change on the current system shall be carried out. These have or will be made available to the appropriate regulatory authorities and planning bodies as they are completed.

Satisfaction of Safety Criteria - System Performance Criteria

5.4 There are no additional aircraft specifications outside of MNPS certification and aircraft equipage with ADS-C, CPDLC, and GNSS meeting appropriate standards. Appropriate standards for ADS-C and CPDLC equipment are RTCA DO-258A/EUROCAE ED-100A (or equivalent). GNSS may be approved using one of the following FAA Technical Standard Orders (TSO): C129a, C145c, C146c, or C196 or, one of the following Joint Technical Standard Orders (JTSO): C129a or C146. TSO C115b and JTSO C115b are applicable to GNSS equipment using Aircraft Autonomous Integrity Monitoring. Airworthiness approval for GNSS can be obtained using the guidance contained in the advisory circulars listed below:

a) for multi-sensor systems integrating GNSS: U.S. FAA AC 20-130 (as amended); and

b) for all GNSS equipment: U.S. FAA AC 20-138 (as amended).

5.5 It has been determined that current NAT communications performance supports the assumptions of the RLongSM safety assessment (see NAT IMG/35 Summary of Discussions paragraph 3.7) and is acceptable for the purpose of an operational trial. However, RCP240 is the guideline against which actual communication performance will be measured, although it has been determined that, currently, specific aspects of the criteria are not being met. Ongoing monitoring will be carried out to ensure that the assumptions of the safety assessment continue to be valid.

5.6 Software development to support RLongSM is in progress and expected to be fully functional:

a) Spring 2010 for SAATS; and

b) Fall 2010 for GAATS+.

5.7 Air traffic management and control procedures are in development and will be finalized to provide timely training prior to implementation.

6. Modification of the Proposed System

6.1 The requirement for modification will be a result of constant assessment of the system performance. Due to system readiness limitations in many of the NAT ANSPs, the operational trial will be initially conducted using aircraft pairs transiting the Gander and Shanwick OACCs.

7. Implementation and Monitoring of the Proposed System

7.1 It is intended to introduce RLongSM via an operational trial. The target start date of the trial is 25 May 2010 for the Shanwick OCA. Operators have been advised via Aeronautical Information Circular

(AIC). Any delay in the implementation date or significant change to the implementation plans shall be notified by NOTAM as soon as the information is available.

7.2 Eligible flights are those which are ADS-C and CPDLC equipped and have established appropriate data link communications for both of these systems. There is no additional operational certification required and flight planning requirements have not changed from what currently exists for flight within NAT MNPS airspace. ATS systems use Field 10 (Equipment) of the standard ICAO flight plan to identify an aircraft's data link capabilities. The operator should insert the following items into the ICAO flight plan for FANS 1/A aircraft:

a) Field 10a (Radio communication, navigation and approach equipment); insert the letter "J" to indicate data link equipment.

b) Field 10b (Surveillance equipment); insert the letter "D" to indicate ADS capability.

c) Field 18 (Other Information); insert the characters "DAT/" followed by one or more letters as appropriate to indicate the type of data link equipment carried, when the letter "J" is inserted in field 10.

7.3 RLongSM will not be applied to flights with only HF equipment due to the inherent communication delay and due to the inability of such flights to provide POS reports to the required ± 1 second accuracy.

7.4 The use of RLongSM will be enabled by the improved confidence in aircraft position estimates provided by more frequent position reporting using ADS-C, the improved navigational performance and accurate time keeping associated with GPS, and the intervention capability provided by CPDLC. Controllers will intervene if the separation for any pair, based on either the synchronous or asynchronous reporting of aircraft pairs, was forecast to drop below the specified minimum separation, to prevent loss of separation.

7.5 Monitoring of communication performance will be assisted by the establishment of the NAT Data Link Monitoring Agency (NAT DLMA):

a) in accordance with NAT SPG CONCLUSION 45/17, the United States will establish by 31 December 2009 the NAT DLMA in accordance with the approved terms of reference; and

b) in accordance with NAT SPG CONCLUSION 45/18 the NAT States, ANSPs and industry support the DLMA according to the GOLD requirements.

European and North Atlantic Office

APPENDIX F – PfA DATA LINK MANDATE
(Paragraph 3.1.18 refers)

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

(Serial No.: EUR/NAT-S 09/18 – NAT/3)

a) Regional Supplementary Procedures:

Doc 7030/4 – NAT SUPPs

b) Proposed by:

The United Kingdom

c) Proposed amendment:

Editorial Note: Amendments are arranged to show deleted text using strikeout, and added text with grey shading (text to be inserted).

1. **Insert** the following in NAT SUPPs, Chapter 3 – Communications, paragraph 3.3 - Controller Pilot Data Link Communications (CPDLC)

Insert new text as follows:

Area of applicability

3.3.1 All aircraft intending to conduct flights in the airspace defined below shall be fitted with and shall operate Controller Pilot Data Link Communications (CPDLC) equipment:

a) from 7 February 2013, on specified tracks and flight levels within the NAT Organised Track System (OTS); and

b) from 5 February 2015, in specified portions of NAT Minimum Navigation Specifications (MNPS) Airspace.

Note 1 – The specified tracks and flight level band within the NAT OTS will be published by the States concerned in national AIPs.

Note 2 – The specified portions of NAT MNPS airspace will be published by the States concerned in national AIPs.

Means of compliance

3.3.2. Operators intending to conduct flights within the airspace specified in 3.3.1 shall obtain CPDLC operational authorization, where applicable, either from the State of Registry or the State of the Operator. The State of Registry or the State of the Operator shall verify that the equipment has been certified in accordance with the requirements specified in RTCA DO-258A/EUROCAE ED-100A or equivalent capable of operating outside VHF data link coverage.

3.3.3. Aircraft are exempted from the requirement stipulated in 3.3.2. in the following cases:

a) aircraft which have a certificate of airworthiness issued before 31 December 1997 and which will cease operation in the airspace referred to in Paragraph 3.3.1. before 31 December 2017;

b) state aircraft;

c) aircraft flying in the airspace referred to in Paragraph 3.3.1. for testing, delivery and for maintenance purpose; and

d) Types of aircraft reaching the end of their production life and being produced in limited numbers, types of aircraft for which re-engineering costs required would be disproportionate due to old design, and types of aircraft for which FANS 1/A equipment is not commercially available. Operators of such types of aircraft may, based on these criteria, request from the appropriate authority the granting of an exemption. Such requests shall be made prior to 30 September 2012 and include detailed information justifying the need for the granting of the exemption.

3.3.4. The services provided shall comply with the Oceanic Safety and Performance Requirements as specified in RTCA DO306/EUROCAE ED122 or equivalent.

End of new text

2. **Insert** the following in NAT SUPPs, Chapter 5 – Surveillance, paragraph 5.4 – Automatic Dependent Surveillance – Contract (ADS-C)

Insert new text as follows:

Area of applicability

5.4.1 All aircraft intending to conduct flights in the airspace defined below shall be fitted with and shall operate Automatic Dependent Surveillance - Contract (ADS-C) equipment:

a) from 7 February 2013, on specified tracks and on specified flight levels within the NAT Organised Track System (OTS); and

b) from 5 February 2015, in specified portions NAT Minimum Navigation Specifications (MNPS) Airspace.

Note 1 – The specified tracks and flight level band within the NAT OTS will be published by the States concerned in national AIPs.

Note 2 – The specified portions of NAT MNPS airspace will be published by the States concerned in national AIPs.

Means of compliance

5.4.2. Operators intending to conduct flights within the airspace specified in 5.4.1 shall obtain an ADS-C operational authorization, where applicable, either from the State of Registry or the State of the Operator. The State of Registry or the State of the Operator shall verify that the equipment has been certified in accordance with the requirements specified in RTCA DO-258A/EUROCAE ED-100A or equivalent capable of operating outside VHF data link coverage.

5.4.3. Aircraft are exempted from the requirement stipulated in 5.4.2. in the following cases:

a) aircraft which have a certificate of airworthiness issued before 31 December 1997 and which will cease operation in the airspace referred to in Paragraph 5.4.1. before 31 December 2017;

b) state aircraft;

c) aircraft flying in the airspace referred to in Paragraph 5.4.1. for testing, delivery and for maintenance purpose; and

d) Types of aircraft reaching the end of their production life and being produced in limited numbers, types of aircraft for which re-engineering costs required would be disproportionate due to old design, and types of aircraft for which FANS 1/A equipment is not commercially available. Operators of such types of aircraft may, based on these criteria, request from the appropriate authority the granting of an exemption. Such requests shall be made prior to 30 September 2012 and include detailed information justifying the need for the granting of the exemption.

5.4.4. The services provided shall comply with the Oceanic Safety and Performance Requirements as specified in RTCA DO306/EUROCAE ED122 or equivalent.

End of new text

d) Proposer's reason for amendment:

i. The CPDLC and ADS-C implementation based on RTCA DO-258A/EUROCAE ED-100A (or ED-100) avionics standards have started in the ICAO NAT region at the end of the 1990^{ties}. The provision of these data link services comply with the Oceanic Safety and Performance Requirements as specified in RTCA DO306/EUROCAE ED122 documents.
Currently, the availability of the data link service constitutes a crucial component in providing safe, efficient and sustainable operations and future evolution of the ATM system in the NAT Region. It enhances ATM surveillance and intervention capabilities and is seen as instrumental in allowing reduction of collision risk and meeting the NAT TLS. This is particularly vital for the reduction of the collision risk in the vertical plane where the NAT TLS is currently not being met. The use of ADS-C for conformance monitoring of an aircraft position in vertical and horizontal plane will allow resolving this significant safety issue. The use of ADS-C would also greatly facilitate to search and rescue operations and localisation of an aircraft following an accident in oceanic airspace.

In order to achieve the foregoing safety objectives it is important to increase the level of data link equipage in the NAT. The current level of data link usage in the NAT has reached 45-50 % and continues to grow. Introducing mandatory data link equipment carriage requirement shall allow increasing the NAT data link equipage level and meeting the NAT TLS.

ii. The Data Link Service Implementing Rule (DLS IR) was adopted by the European Commission (EC) that requires implementing CPDLC in designated areas within the EUR Region based on the requirements contained in RTCA DO-280B/EUROCAE ED-110B Interoperability Requirements Standard for ATN Baseline 1 (INTEROP ATN B1). This implementation is not meeting the NAT Region operational needs. However, the DLS IR exempts aircraft fitted with RTCA DO-258A/EUROCAE ED-100A (or ED-100) compliant data link equipment and with an individual certificate of airworthiness first issued before 1 January 2014 for the life of that particular airframe. Aircraft commissioned after this date and required to operate in the NAT would also need to equip with DLS IR compliant data link equipment in order to operate in the designated areas within the EUR Region. With this in mind, the timeline and exemption policies stipulated in this proposal are equivalent to those declared by the DLS IR.

iii. The exact vertical and horizontal limits of the area of applicability will be determined at the later stage and published by the States concerned in the respective AIPs. It is anticipated that the vertical limits would be not higher than FL390.

e) Proposed implementation date of the amendment:

Upon approval by Council.

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

The proposal has been circulated to the following States and International Organizations:

Afghanistan
Albania
Algeria
Andorra
Angola
Argentina
Armenia
Australia
Austria
Azerbaijan
Bahamas
Bahrain
Bangladesh
Belarus
Belgium
Benin
Bhutan
Bosnia and Herzegovina
Botswana
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso
Cameroon
Canada
Cape Verde
Central African Republic
Chad
Chile
China
Colombia
Congo
Côte d'Ivoire
Croatia
Cuba
Cyprus
Czech Republic
Democratic People's Rep. of Korea
Democratic Republic of the Congo
Denmark
Djibouti
Dominican Republic
Ecuador
Egypt
Eritrea
Estonia
Ethiopia
Finland
France
Gabon
Gambia
Georgia
Germany
Ghana
Greece
Guinea-Bissau
Haiti
Hungary
Iceland
India
Indonesia
Iran (Islamic Republic of)
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Kuwait
Kyrgyzstan
Latvia
Lebanon
Libyan Arab Jamahiriya
Lithuania
Luxembourg
Madagascar
Malaysia
Maldives
Mali
Malta
Mauritania
Mauritius
Mexico
Monaco
Mongolia
Montenegro
Morocco
Mozambique
Namibia
Nepal
Netherlands
New Zealand
Niger
Nigeria
Norway
Oman
Pakistan
Paraguay
Philippines
Poland
Portugal
Qatar
Republic of Korea
Republic of Moldova
Romania
Russian Federation
San Marino
Saudi Arabia
Senegal
Serbia
Seychelles
Sierra Leone
Singapore
Slovakia
Slovenia
Somalia
South Africa
Spain
Sri Lanka
Sudan
Suriname
Swaziland
Sweden
Switzerland
Syrian Arab Republic
Tajikistan
Thailand
The former Yugoslav Republic of Macedonia
Togo
Trinidad and Tobago
Tunisia
Turkey
Turkmenistan
Uganda
Ukraine
United Arab Emirates
United Kingdom
United Republic of Tanzania
United States
Uruguay
Uzbekistan
Venezuela
Viet Nam
Yemen
Zambia
Zimbabwe

Eurocontrol
IACA
IAOPA
IATA
IBAC
IFALPA

g) Secretariat comments:

TBD after the PFA is submitted to the ICAO EUR/NAT Office

APPENDIX G – FPL 2012 FOR NAT REGION

(Paragraph 3.1.21 refers)

NAT FPL2012
List of States, Impact Statements and Expected Readiness

COUNTRY/Group sorting order	(provisional) Contact NAME	FUNCTION/ Organisation	Confirmed as PoC 1=Y, 0=N	Impact Statement provided 1=Y, 0=N	Main issues of Impact Statement	Expect to be ready on 15 Nov. 2012	Expected Operational Readiness date (if later than 2012)	e-mail
CANADA	Dave Rowlands	Manager ATC Operational Requirements Gander ACC	0	0		Y		rowland@navcanada.ca
ICELAND	Mr.Leifur Hakonarson	ISAVIA	1	0	Not possible to assess yet			leifur@isavia.is
IRELAND	Mr Terry Deegan	Manager ANS Operational Requirements	1	1	suggest Eurocontrol approach Thales for all COOPANS States	Y		terry.deegan@iaa.ie
NORWAY	Ms Helene BRANTENBERG	Adviser ATM/ATFCM Avinor	1	0	Planning provided	Y		helene.terray.brantenberg@avinor.no
PORTUGAL	Mr Fortunato CARRETERO	Navegaçao Aérea de Portugal, NAV Portugal EPE	1	0	Limited impact statement. No problems expected	Y		fortunato.carretero@nav.pt
UNITED KINGDOM	Mr Anthony STEVENS	Civil Aviation Authority	1	1	Planning ready in early 2010			Anthony.Stevens@caa.co.uk
UNITED STATES	Diane Bodenhamer	Manager, Technical Performance Support						diane.bodenhamer@faa.gov

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APPENDIX H – PFA SATELLITE VOICE COMMUNICATIONS
(Paragraph 4.3.4 refers)

Secretariat note: Changes from the previous version of this PfA are highlighted in yellow.

PROPOSAL FOR AMENDMENT TO THE REGIONAL SUPPLEMENTARY PROCEDURES – DOC. 7030/5 NORTH ATLANTIC (NAT) REGION

(Serial No. EUR/NAT-S 08/12 - NAT 3-3)

a) Regional Supplementary Procedures:

Doc 7030/4 – NAT SUPPs

b) Proposed by:

Canada and the United Kingdom

c) Proposed amendment:

Editorial Note: Amendments are arranged to show deleted text using strikeout (~~text to be deleted~~), and added text with grey shading (text to be inserted).

Modify the following in Chapter 3, Section 3.4:

"3.4 SATELLITE VOICE COMMUNICATIONS (SATCOM)
(A2 – Chapter 3; P-ATM – Chapter 15; P-OPS, Vol. 1)

3.4.1 ~~Within the NAT Region, aircraft equipped for SATCOM voice shall restrict the use of such equipment to emergencies and non-routine situations. An unforeseen inability to communicate by voice radio constitutes a non-routine situation. Since oceanic traffic typically communicates through aeradio facilities, a SATCOM call due to an unforeseen inability to communicate by other means should be made to such a facility rather than the ATC centre unless the urgency of the communication dictates otherwise. Dedicated SATCOM telephone numbers (short codes) for aeradio facilities and air traffic control facilities are published in national AIPs.~~ Aircraft with installed ~~avionics capable of~~ Aeronautical Mobile Satellite (Route) Service (AMS(R)S) voice avionics~~SATCOM voice~~, as approved by the State of Operator or the State of Registry may use such equipment for ATS communications in accordance with the provisions of State AIPs.

3.4.2 Pilots electing to use ~~SATCOM~~AMS(R)S voice ~~as an alternative to HF voice communications~~ remain responsible for operating SELCAL in accordance with section 3.5.1 or maintaining a listening watch on the assigned HF frequency.

Note -~~3.4.3 Since oceanic traffic typically communicates through third party air-ground radio facilities,~~ AMS(R)S~~SATCOM~~ voice communications should ~~continue to~~ be made to third party air-ground radio ~~such~~ facilities rather than ATC centres unless the urgency of the communication dictates otherwise. ~~SATCOM~~ AMS(R)S voice communication initiated due to HF propagation difficulties does not constitute urgency and should be addressed to the air-ground radio facility. ~~Dedicated AMS(R)SSATCOM voice telephone numbers (short codes) for air-ground radio facilities and air traffic control facilities are published in national AIPs.~~"

d) Proposer's reason for amendment:

The current restriction on the use of AMS(R)S voice for emergencies and non-routine communications dates back to the tenth Air Navigation Conference. Since then, the costs of AMS(R)S voice has reduced significantly and the technology has improved therefore providing a cost effective and reliable means of communications.

The authorisation for the use of AMS(R)S voice for all ATS communications would provide States with an opportunity to ease the requirements regarding operating HF equipment. Instances of partial failure of the HF communications, one of two radios for example, but with fully functioning AMS(R)S equipment, has led to the aircraft being held on the ground for repairs thereby incurring considerable penalties to the users.

This migration should be viewed as an upgrade to the AMS(R)S voice service (currently limited to emergency and non-routine communications), and not as a technology alternative to Controller Pilot Data Link Communications (CPDLC). These data link capabilities would continue to remain high priority in the NAT Region planning. The AMS(R)S voice should also not be seen as a stand-alone alternative to HF communications but rather a means to provide for MEL relief by removing a requirement to carry two HF radios. It also should be noted that any MEL relief is subject to approval by State authorities.

e) Proposed implementation date of the amendment:

Upon approval by Council.

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

The proposal has been circulated to the following States and International Organizations:

Afghanistan
Albania
Algeria
Andorra
Angola
Argentina
Armenia
Australia
Austria
Azerbaijan
Bahamas
Bahrain
Bangladesh
Belarus
Belgium
Benin
Bhutan
Bosnia and Herzegovina
Botswana
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso
Cameroon
Canada
Cape Verde
Central African Republic
Chad
Chile
China
Colombia
Congo
Côte d'Ivoire
Croatia
Cuba
Cyprus
Czech Republic
Democratic People's Rep. of Korea
Democratic Republic of the Congo
Denmark
Djibouti
Dominican Republic
Ecuador
Egypt
Eritrea
Estonia
Ethiopia
Finland
France
Gabon
Gambia
Georgia
Germany
Ghana
Greece
Guinea-Bissau
Haiti
Hungary
Iceland
India
Indonesia
Iran (Islamic Republic of)
Iraq
Ireland

Israel	Niger	Switzerland
Italy	Nigeria	Syrian Arab Republic
Jamaica	Norway	Tajikistan
Japan	Oman	Thailand
Jordan	Pakistan	The former Yugoslav
Kazakhstan	Paraguay	Republic of Macedonia
Kenya	Philippines	Togo
Kuwait	Poland	Trinidad and Tobago
Kyrgyzstan	Portugal	Tunisia
Latvia	Qatar	Turkey
Lebanon	Republic of Korea	Turkmenistan
Libyen Arab Jamahiriya	Republic of Moldova	Uganda
Lithuania	Romania	Ukraine
Luxembourg	Russian Federation	United Arab Emirates
Madagascar	San Marino	United Kingdom
Malaysia	Saudi Arabia	United Republic of Tanzania
Maldives	Senegal	United States
Mali	Serbia	Uruguay
Malta	Seychelles	Uzbekistan
Mauritania	Sierra Leone	Venezuela
Mauritius	Singapore	Viet Nam
Mexico	Slovakia	Yemen
Monaco	Slovenia	Zambia
Mongolia	Somalia	Zimbabwe
Montenegro	South Africa	
Morocco	Spain	Eurocontrol
Mozambique	Sri Lanka	IACA
Namibia	Sudan	IAOPA
Nepal	Suriname	IATA
Netherlands	Swaziland	IBAC
New Zealand	Sweden	IFALPA

g) Secretariat comments:

This proposal for amendment was developed in response to NAT SPG Conclusion 44/13 on the use of satellite communication (SATCOM) voice for routine Air Traffic Services (ATS). The draft proposal was prepared in coordination among various NAT SPG sub-groups and presented to the 45th Meeting of the NAT SPG (23-26 June 2009) for approval. The NAT SPG had endorsed the following Conclusion:

NAT SPG Conclusion 45/28 - Amendment to the NAT Regional Supplementary Procedures (SUPPs) regarding the use of SATCOM voice for Air Traffic Services (ATS) communications

That the Representatives of Canada and the United Kingdom, on behalf of the NAT SPG, make arrangements within their administrations to process the proposal for amendment to the NAT SUPPs, regarding the use of SATCOM voice for ATS communications in the NAT Region.

"*TO BE FURTHER AMENDED BY THE SECRETARIAT PRIOR TO SUBMITTING TO THE ICAO HQ"*

APPENDIX I – TERMS OF REFERENCE OF THE ICAO INTER-REGIONAL SATCOM VOICE TASK FORCE

(Paragraph 4.3.8 refers)

Deliverable(s)

a) A globally applicable Guidance Material for the use of AMS(R)S voice for ATS communications.

Scope of work

The following are the broad principles describing the scope of work:

e) Take into account the NAT and any other existing guidance material related to the use of SATCOM voice for ATS communications;

f) In the spirit of the NAT SPG Conclusion 44/11 and NAT SPG/45, paragraph 2.2.4, the guidance material would be developed within the global ICAO RCP framework to provide States with some flexibility to apply different standards for different uses, without implication to seamless operations;

g) Take into account the FAA PARC CWG work on developing a performance based specification to evaluate third party SATCOM voice as an approved long range communication system (LRCS).

h) Take account of the ongoing revision of the aircraft equipment approval guidance material, e.g. by EASA and FAA; and

i) Accommodate any ICAO AMS(R)S compliant system.

The following items/scenarios should be considered in the scope of work:

a) Use of AMS(R)S voice for ATS communications via third party radio operator (No MEL relief considerations);

b) Minimum Equipment List (MEL) relief 1 HF + 1 SATCOM;

c) Use of portable SATCOM phones;

d) 1 or 2 portables or installed satellite phones and no HF radio at all; and

e) Use of SATCOM voice direct to controller communications.

Composition

Additional membership should be invited including aircraft operators, aircraft and equipment manufacturers, and satellite communications service providers.

Conduct of the work and schedule

The completion of this task requires more availability of resources than it was foreseen for the first 2 steps by the state letter EUR/NAT 10-0165.TEC. It would require a series of direct meetings among task force members in addition to teleconferences and other electronic means of communications. The ICAO Secretariat is ready to continue supporting this work but more involvement from the States will be required. The tentative completion date for this task, provided that this ToR is approved by the NAT SPG and APANPIRG and resources are made available, would be December 2011.

APPENDIX J –
NAT ADS-C TABLE OF IMPLEMENTATION
(Paragraph 4.5.1 refers)

TABLE OF NAT IMPLEMENTATION DATES

	Gander	***Shanwick***	***Reykjavik***	***Santa Maria***	***New York***	***Bodo***	***Shannon***
ADS-C							
ADS Waypoint and Met reporting	*Jan 2001*	*Jan 2001*	*Aug 2001*	*Oct 2001*	*Sep 2003*	*Mar 2004*	
Local ADS	*Feb 2005*	*Nov 2006*		*Dec 2006*	*June 2005*		
CPDLC							
NAT Phases 1&2	*Nov 2002*	*Nov 2002*	*Apr 2005*				
NAT phase 3	*Dec 2003*	*Dec 2003*		*Dec 2006*			
NAT Phase 4	*Jan 17 2008*	*Jan 17 2008*	*Jan 17 2008*	*Jan 17 2008*	*Mar 2003*	*N/A*	
Special cases							
Uplink SSR Code&frequency							*1Q2011*
FMC WPR	*Nov 25 2004*	*Nov 25 2004*	*2Q 2006*	*Nov 25 2004*		*2Q2005*	
Local FMC				*Apr 2007*			
OCL							
ARINC 623/ED106A Voiceless operation	*May 2006*	*Nov 1996*	*2Q 2010*	*Sep 2007*			
CPDLC OCL					*current*		

	Gander	***Shanwick***	***Reykjavik***	***Santa Maria***	***New York***	***Bodo***	***Shannon***
Conformance monitoring							
Automation of Altitude Range Event Contract (AREC)	*4Q 2010*	*1Q2010*	*1Q 2011*	*TBD*	*TBD*	*TBD*	
Automation of Lateral Deviation Event Contract (LDEC)	*TBD*	*1Q2010*	*1Q2011*	*TBD*	*TBD*	*TBD*	
Performance monitoring							
Support tools for DLMA in ground systems	*TBD*	*4Q2010*	*3Q2010*	*TBD*	*TBD*	*TBD*	
DO306/ED122 compliance	*Completed*	*Completed*	*Completed*	*TBD*	*Completed*	*TBD*	
Implementation of ADS-B surveillance	*TBD*		*1Q2012*				
GOLD implementation							
CPDLC reroutes							
Full AIDC implementation	*Nov 2012*	*Nov 2012*	*Nov 2012*	*Nov 2012*	*Nov 2012*	*N/A*	

**APPENDIX K – VOLCANIC ASH CONTINGENCY PLAN –
EUR AND NAT REGIONS**
(Paragraph 6.1.7 refers)

EUR Doc 019
NAT Doc 006, Part II

INTERNATIONAL CIVIL AVIATION ORGANIZATION

PROPOSED AMENDMENT TO THE VOLCANIC ASH CONTINGENCY PLANS

EUR AND NAT REGIONS AS ENDORSED BY THE NAT SPG 23 JUNE 2010

This version shows the text in final format

June 2010

THIS DOCUMENT IS ISSUED BY THE EUR/NAT OFFICE OF ICAO
UNDER THE AUTHORITY OF THE EANPG AND THE NAT SPG

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FOREWORD

Within and adjacent to the North Atlantic (NAT) and European (EUR) Regions there are areas of volcanic activity which are likely to affect flight in the NAT and EUR Regions. This plan sets out standardised guidelines for the alerting of aircraft when eruptions occur, and procedures to be followed.

Volcanic ash may be a hazard for flight operations. Recent encounters with volcanic ash have resulted in one or more of the following and other problems:

- Engine failures and malfunctions
- Subsequent failure of electrical, pneumatical and hydraulic systems
- Blocking of sensors, resulting inter alia in erroneous airspeed indications
- Smoke, dust and/or chemical pollution of cabin air; resulting in the need for aircrews to use oxygen masks
- Communication problems
- Loss of visibility through cockpit windows

Regulatory authorities of State of the Operator[2], or State of Registry [3]as appropriate, should therefore prescribe appropriate operational procedures for flight crew to be followed in case of operation in or near airspaces that are contaminated by volcanic ash. Operators are required by ICAO Annex 6 to assess the risk of operation in volcanic ash and to implement appropriate mitigation measures in accordance with their Safety Management System as approved by the State of the Operator/Registry as appropriate.

It should be noted that this document is an Air Traffic Management (ATM) contingency plan including its interfaces with supporting services such as Aeronautical Information Service (AIS}} and Meteorological (MET) and that the Plan therefore primarily addresses the Provider States[4]. Where distinct actions by the Meteorological Watch Offices (MWOs) are described, these are additional procedures to be considered by MWOs. Where actions by Volcanic Ash Advisory Centres (VAACs) and operators are described, these are for clarification only.

Volcanic Ash can also affect the operation of aircraft on aerodromes. In extreme cases, aerodromes might no longer be available for operation at all, resulting in repercussions on the ATM system; e.g. diversions, revised traffic flows, etc.

These suggested procedures are not intended to establish or confirm a sa fe level of ash concentration. Values have been agreed to depict an area of ash concentration as low, medium or high. Operation through any area where volcanic ash is forecast is at the discretion of the operator.

[2] The term "State of the Operator" refers to the role of a Contracting State as the regulatory authority with regard to aircraft operators having been issued an Aircraft Operator's Certificate (AOC) by that` State.
[3] The term "State of Registry" refers to the State on whose register the aircraft is entered.
[4] The term "Provider State" refers to the role of a Contracting State as responsible for the provision of air navigation services within airspace over its territory and, as agreed by Regional Air Navigation Meeting, within defined airspace over the High Seas.

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N**OTE** All modeled ash concentrations are subject to a level of uncertainty relative to errors in the estimation of the eruption strength.

Considering that a commercial aircraft will travel about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by turbine-engine aeroplanes in half that time, timely response to reports of volcanic ash is essential.

It is imperative that information on the volcanic activity is disseminated as soon as possible. In order to assist staff in expediting the process of originating and issuing relevant messages (SIGMET, NOTAM, ASHTAM), a series of templates should be available for different stages of the volcanic activity. Examples of SIGMET, NOTAM and ASHTAM announcing operational measures and volcanic activities in the different stages and are contained in Attachment I. ASHTAM will not be promulgated by service providers in the NAT Region.

A list of ICAO registered volcanoes should be available at the international NOTAM office with volcano name, number and nominal position.

In order to ensure the smooth implementation of the Contingency Plan in case of an actual volcanic eruption, annual VOLCEX exercises should be conducted.

Terminology

Area of Low Contamination: An airspace of defined dimensions where volcanic ash may be encountered at concentrations equal to or less than $2x10^{-3}$ g/m^3.

Area of Medium Contamination: An airspace of defined dimensions where volcanic ash may be encountered at concentrations greater than $2x10^{-3}$ g/m^3, but less than $4x10^{-3}$ g/m^3.

Area of High Contamination: An airspace of defined dimensions where volcanic ash may be encountered at concentrations equal to or greater than $4x10^{-3}$ g/m^3, or areas of contaminated airspace where no ash concentration guidance is available.

It should be noted that "defined dimensions" refers to horizontal and vertical limits.

The response to a volcanic event that affects air traffic has been divided into three distinct phases as described briefly below. Volcanic activity at many locations is continuously monitored by the scientific community. Furthermore, flight crew are required to report observations of significant volcanic activity by means of a Special Air Report(AIREP). Arrangements are in place to ensure that such information is transferred without undue delay to the appropriate aeronautical institutions responsible for subsequent action.

ALERTING PHASE The initial response, "raising the alert", commences when a volcanic eruption is expected. Alerting information will be provided by SIGMET, NOTAM or ASHTAM as appropriate and disseminated to affected aircraft in flight by the most expeditious means. In addition to the normal distribution list, the NOTAM/ASHTAM will be addressed to meteorological/volcanological agencies.

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If it is considered that the event could pose a hazard to aviation, a Danger Area[5] will be declared by NOTAM around the volcanic source. Normally, clearances will not be issued through the Danger Area.

REACTIVE PHASE The Reactive Phase commences at the outbreak of the volcanic eruption and entrance of volcanic ash into the atmosphere and mainly pertains to aircraft in flight. A "Start of Eruption SIGMET" will be issued and a Danger Area will be declared by NOTAM. Normally, clearances will not be issued through the Danger Area.

PROACTIVE PHASE The Proactive Phase commences with the issuance of the first VAA after completion of reactive responses. The T+0 hours and T+6 hours forecasts of the contaminated area are to be issued as SIGMET. The T+12 hours and T+18 hours (and further into the future) forecasts of contaminated areas are to be issued as NOTAM/ASHTAM. Significant changes may result in a reversion to a temporary Reactive Phase situation and unscheduled issuance of VAA, SIGMET and NOTAM/ASHTAM. As appropriate, Danger Areas will be notified via NOTAM.

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[5] Wherever this document discusses the possible establishment of Danger Areas, States are not prevented from establishing Restricted or Prohibited Areas over the sovereign territory of the State if considered necessary by the State concerned.

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1. ALERTING PHASE

1.1 This phase is characterised by a limited availability of information on the extent and severity of the volcanic event. The purpose of this phase is to ensure the safety of aircraft in flight and to promulgate information as a matter of urgency. Regardless of the extent of information available the Alerting Phase actions should be carried out for every event.

1.2 ORIGINATING ACC ACTIONS (eruption in its own flight information region)

1.2.1 In the event of significant pre-eruption volcanic activity, a volcanic eruption occurring, or a volcanic ash cloud being reported which could pose a hazard to aviation, an Air Traffic Control Centre (ACC), on receiving information of such an occurrence, should carry out the following:

a) Define an initial Danger Area in accordance with established procedures, if no such procedures have been established, the danger area should be defined as a circle with a radius of 222 km (120 NM). If the eruption has not commenced or if no information on upper winds is available, the circle should be centred on the estimated location of the volcanic activity. If the eruption has started and predicted upper wind information is available, the circle should be centred 111 km (60 NM) downwind from the volcano whilst enclosing it. The purpose of this initial Danger Area is to ensure safety of flight in the absence of any prediction from a competent authority of the extent of contamination.

b) Advise the associated Meteorological Watch Office (MWO) and the appropriate VAAC (unless the initial notification originated from either of these entities). The VAAC will then inform the appropriate Air Traffic Flow Management (ATFM) units.

c) Alert flights already within the Danger Area and offer assistance to enable aircraft to exit the area in the most expeditious and appropriate manner. Aircraft that are close to the Danger Area should be offered assistance to keep clear of the area. Tactically re-clear flights which would penetrate the Danger Area onto routes that will keep them clear. The ACC should immediately notify other affected ACC's of the event and the location and dimensions of the Danger Area. It should also negotiate any re-routings necessary for flights already coordinated but still within adjacent flight information regions (FIRs). It is also expected that adjacent ACCs will be asked to reroute flights not yet coordinated to keep them clear of the Danger Area.

d) Ensure that a NOTAM/ASHTAM is originated. This must provide as precise information as is available regarding the activity of the volcano. The name (where applicable), reference number and position of the volcano should be included along with the date and time of the start of the eruption (if appropriate). It is imperative that this information is issued by the international NOTAM office and disseminated as soon as possible.

e) In order to assist staff in expediting the process of composing the NOTAM/ASHTAM, a series of templates should be available for this stage of the volcanic activity. Example NOTAM and ASHTAM are provided in Attachment I.

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1.2.2 In addition to sending the NOTAM/ASHTAM and any subsequent NOTAM/ASHTAM to the normal distribution list, it will be sent to the relevant meteorological agencies after adding the appropriate World Meteorological Organisation (WMO) header. Example NOTAM and ASHTAM are provided in Attachment I.

1.3 ADJACENT ACC ACTIONS

1.3.1 During the Alerting Phase aircraft should be tactically rerouted to avoid the Danger Area. Any ash contamination should be contained within a limited area and disruption to traffic should not be excessive. Adjacent ACCs should take the following action to assist:

a) When advised, re-clear flights to which services are being provided and which will be affected by the Danger Area.

b) Unless otherwise instructed, continue normal operations except:

i) if one or more routes are affected by the Danger Area, stop clearing aircraft on these routes and take steps to reroute onto routes clear of the Danger Area; and

ii) initiate a running plot of the affected area.

1.4 ATFM UNIT ACTION

1.4.1 The ATFM unit and the VAAC will determine how their initial communications will take place on the basis of bilateral agreements. Upon reception of information on volcanic activity from the VAAC, the ATFM unit should initiate actions in accordance with its procedures to ensure exchange of information between Air Navigation service Providers (ANSP), MWOs, VAACs and aircraft operators concerned.

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2. REACTIVE PHASE

2.1 This phase commences at the outbreak of volcanic eruption. Major activities of the Reactive Phase are: Issuance of an eruption commenced SIGMET, eruption commenced NOTAM/ASHTAM, rerouting of airborne traffic, first VAA and issuance of SIGMET/NOTAM/ASHTAM based on the first VAA. As appropriate, Danger Areas will be notified via NOTAM. This phase will last until such time as the Proactive Phase can be activated.

2.2 ORIGINATING ACC ACTIONS (eruption in its own FIR)

2.2.1 The ACC providing services in the FIR within which the volcanic eruption takes place should inform flights about the existence and extent of volcanic ash and provide information useful for the safe conduct of flights.

2.2.2 Rerouting of traffic commences immediately or may be in progress if the alerting time has been sufficient to facilitate activation of the Alerting Phase. The ACC should assist in rerouting aircraft around the Danger Area as expeditiously as possible. Adjacent ACCs

should also take the Danger Area into account and give similar assistance to aircraft as early as possible.

2.2.3 During this phase the ACC should:

a) Maintain close liaison with its associated MWO. The MWO should issue a SIGMET message on the ash cloud and the forecast extent of the ash contamination at least every 6 hours, valid for 6 hours, based on the valid VAA as supplemented by additional appropriate sources of information.

b) Based on these forecasts and in cooperation with the adjacent ACCs, ATFM measures should be devised and updated when necessary to enable aircraft to remain clear of Danger Areas.

c) Ensure a NOTAM is originated to define a Danger Area.

d) Ensure that reported differences between published information and observations (pilot reports, airborne measurements, etc.) are forwarded as soon as possible to the appropriate authorities.

e) Should significant reductions in intensity of volcanic activity take place during this phase and the airspace no longer is contaminated by volcanic ash, a NOTAMC cancelling the last active NOTAM shall be issued stating the cause for cancellation; new ASHTAM should be promulgated to update the situation. Otherwise, begin planning for the Proactive Phase in conjunction with the appropriate ATFM unit and the affected ACCs.

2.3 ADJACENT ACC ACTIONS

2.3.1 During the Reactive Phase adjacent ACCs should take the following actions:

a) Maintain close liaison with the appropriate ATFM unit and the originating ACC to design, implement and keep up to date ATFM measures which will enable aircraft to remain clear of Danger Areas.

b) In the event that tactical measures additional to those issued by the appropriate ATFM unit are required, the adjacent ACC should, in cooperation with the originating ACC, impose such measures. Details are included in the ATFM Procedures section of this document.

c) Maintain a running plot of the affected area.

d) Begin planning for the Proactive Phase in conjunction with the appropriate ATFM unit and ACCs concerned.

2.4 ATFM UNIT ACTIONS

2.4.1 During the Reactive Phase, depending on the impact of the volcanic ash, the appropriate ATFM unit should organise the exchange of latest information on the developments with the VAAC, ANSPs, and MWOs and operators concerned .

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3. PROACTIVE PHASE

3.1 The Proactive Phase commences with the issuance of the first VAA after completion of the reactive responses. The meteorological office co-located with the VAAC will, where feasible, issue forecasts at six-hourly intervals with a nominal validity time of 00:00Z, 06:00Z, 12:00Z and 18:00Z which will define Areas of Low, Medium and High Contamination.

3.2 Following the Reactive Phase, the forecasts for the time of issuance T+0 hours and T+6 hours should be used to define airspace volumes encompassing the furthest extent of contamination predicted for that period. These volumes should be used to:

a) Publish NOTAM indicating the extent of Danger Areas, indicating which areas of contamination are included therein;

b) Issue SIGMET warning of potential hazard from areas of volcanic ash contamination;

c) Publish NOTAM to separately indicate the extent of Areas of Medium Contamination if not included in a Danger Area; and

d) Apply appropriate ATFM measures.

3.3 For the longer term, T +12 hours and T +18 hours forecasts should be used to generate NOTAM in order to ensure that adequate information is available to support flight planning. These messages should differentiate between levels of contamination.

3.4 Operators should use the information published regarding Areas of Low, Medium and High Contamination to plan their flights in accordance with their regulatory requirements and the service that will be provided in the airspace concerned. Operators should be aware that, depending on the State concerned, Danger Areas may be established to contain an Area of High Contamination, Areas of Medium/High Contamination, or Areas of Low/Medium/High Contamination.

3.5 The volcanic ash may affect any combination of airspace; therefore, it is impossible to prescribe measures to be taken for any particular situation. Nor is it possible to detail the actions to be taken by any particular ACC. The following guidance may prove useful during the Proactive Phase but should not be considered mandatory:

a) ACCs affected by the movement of the ash should continue to originate NOTAM/ASHTAM at appropriate intervals. A CCs concerned and the appropriate ATFM unit should continue to publish details on measures taken.

b) Depending on the impact of the volcanic ash, the appropriate ATFM unit may take the initiative to organise teleconferences to exchange latest information on the developments with the VAACs, ANSPs and MWO's and operators concerned .

c) During this phase the VAAC should endeavour to assess the vertical extent of the ash contamination and provide appropriate VAA to define the contaminated airspace as accurately as possible. For the purpose of flight planning operators should treat the horizontal and vertical limits of the Danger Area to be overflown as they would mountainous terrain. O perators are cautioned regarding the risk of cabin depressurisation or engine failure resulting in the

inability to maintain level flight above the Danger Area, especially where Extended Twin Operations (ETOPS) aircraft are involved.

d) Any reported differences between published information and observations (pilot reports, airborne measurements, etc.) should be forwarded as soon as possible to the appropriate authorities; and

e) When the airspace is no longer contaminated by volcanic ash, a NOTAMC cancelling the active NOTAM shall be promulgated. New ASHTAM should be promulgated to update the situation.

4. ATFM PROCEDURES

4.1 Depending on the impact of the volcanic ash, the appropriate ATFM unit should organize the exchange of latest information on the developments with the VAACs, ANSPs and MWOs and operators concerned.

4.2 The ATFM unit will apply ATFM measures on request of the ANSPs concerned. The measures should be reviewed and updated in accordance with updated information. Operators should also be advised to maintain watch for NOTAM/ASHTAM and SIGMET for the area.

NOTE Procedures applicable to the EUROCONTROL Central Flow Management Unit (CFMU) area of responsibility are contained in the EUROCONTROL – Basic CFMU Handbook. This document is available at http://www.cfmu.eurocontrol.int/cfmu/public/standard_page/library_index.html

5. AIR TRAFFIC CONTROL PROCEDURES[6]

5.1 If volcanic ash is reported or forecast in the FIR for which the ACC is responsible, the following procedures should be followed:

a) Relay all available information immediately to pilots whose aircraft could be affected to ensure that they are aware of the horizontal and vertical extent of the ash contamination;

b) Iif requested, suggest appropriate rerouting to assist flights to avoid areas of known or forecast ash contamination;

c) When appropriate, remind pilots that volcanic ash may not be detected by ATC radar systems;

[6] This information is adapted from the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691). Refer to this document for full details.

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d) If modelled ash concentration charts are available showing Areas of Low, Medium and High Contamination, the Provider State may establish Danger Areas. Depending on the State concerned, the Danger Areas will be established to contain an Area of High Contamination, Areas of Medium/High Contamination, or Areas of Low/Medium/High Contamination;

e) In the absence of ash concentration guidance, the entire area of forecast volcanic ash should be considered as an Area of High Contamination, for the purposes of applying ATC procedures, until ash concentration guidance is available;

f) Normally, ATC should not provide a clearance for an aircraft to enter or operate within a Danger Area. Assistance to enable an aircraft to exit a Danger Area in the most expeditious and appropriate manner should be provided;

g) In the NAT Region, so far as practicable, Organized Tracks will not be established through a Danger Area. If Organized Tracks are established through contaminated areas, a note will be included on the NAT Track Message to identify such tracks; and

h) If the ACC has been advised by an aircraft that it has entered an area of ash contamination and indicates that a distress situation exists:

i) consider the aircraft to be in an emergency situation;

ii) do not initiate any climb clearances to turbine-powered aircraft until the aircraft has exited the area of ash contamination; and

iii) do not attempt to provide vectors without pilot concurrence.

5.2 Experience has shown that the recommended escape manoeuvre for an aircraft which has encountered volcanic ash is to reverse its course and begin a descent (if terrain permits). However, the final responsibility for this decision rests with the pilot.

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6. GENERAL GUIDANCE FOR THE DEVELOPMENT OF ATS CONTINGENCY PLANS FOR VOLCANIC ASH[7]

6.1 In a contingency plan relating to volcanic ash certain steps need to be taken to provide a coordinated and controlled response for dealing with an event of this nature. Responsibilities should be clearly defined for the manager in charge, supervisors and Air Traffic Controllers (ATCO)s. The plan should also identify the officials who need to be contacted, the type of messages that are to be created, the proper distribution of the messages and how to conduct business.

6.2 ATCOs need to be trained and be made aware of the potential effects if aircraft encounter unsafe levels of volcanic ash.

6.3 Some particular points of guidance are as follows:

a) Volcanic ash contamination may extend for hundreds of miles horizontally and reach the stratosphere vertically

[7] This information is adapted from the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691). Refer to this document for full details.

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b) Volcanic ash may block the pitot-static system of an aircraft, resulting in unreliable airspeed indications;

c) Braking conditions at airports where volcanic ash has recently been deposited on the runway will affect the braking ability of the aircraft. This is more pronounced on runways contaminated with wet ash. Pilots and ATCOs should be aware of the consequences of volcanic ash being ingested into the engines during landing and taxiing. For departure it is recommended that pilots avoid operating in visible airborne ash; instead they should allow sufficient time for the particles to settle before initiating a take-off roll, in order to avoid ingestion of ash particles into the engine. In addition, the movement area to be used should be carefully swept before any engine is started;

d) Volcanic ash may result in the failure or power loss of one or all engines of an aeroplane; and

e) Airports might have to be declared unsafe for flight operations. This might have consequences for the ATM system.

6.4 The ACC in conjunction with ATFM units serves as the critical communication link between the pilot, dispatcher and meteorologists during a volcanic eruption. During episodes of volcanic ash contamination within the FIR, the ACC has two major communication roles. First and of greatest importance is its ability to communicate directly with aircraft en route which may encounter the ash. Based on the information provided in the volcanic ash SIGMET and VAAs and working with MWO, the ATCOs should be able to advise the pilot of which flight levels are affected by the ash and the projected trajectory and drift of the contamination. Through the use of radio communication, ACCs have the capability to coordinate with the pilot alternative routes which would keep the aircraft away from the volcanic ash.

6.5 Similarly, through the issuance of a NOTAM/ASHTAM for volcanic activity the ACC can disseminate information on the status and activity of a volcano even for pre-eruption increases in volcanic activity. NOTAM/ASHTAM and SIGMET together with AIREPs are critical to dispatchers for flight planning purposes. Operators need as much advance notification as possible on the status of a volcano for strategic planning of flights and the safety of the flying public. Dispatchers need to be in communication with pilots en route so that a coordinated decision can be made between the pilot, the dispatcher and ATC regarding alternative routes that are available. The ACC should advise the ATFM unit concerning the availability of alternative routes. It cannot be presumed, however, that an aircraft which is projected to encounter ash will be provided with the most desirable route to avoid the contamination. Other considerations have to be taken into account such as existing traffic levels on other routes and the amount of fuel reserve available for flights which may have to be diverted to other routes to allow for the affected aircraft to divert.

6.6 The NOTAM/ASHTAM for volcanic activity provides information on the status of activity of a volcano when a change in its activity is, or is expected to be, of operational significance. They are originated by the ACC and issued through the respective international NOTAM office based on the information received from any one of the observing sources and/or advisory information provided by the associated VAAC. In addition to providing the status of activity of a volcano, the NOTAM/ASHTAM also provides information on the location, extent and movement of the ash contamination and the air routes and flight levels affected. NOTAM can also be used to limit access to the airspace affected by the volcanic

ash. Complete guidance on the issuance of NOTAM and ASHTAM is provided in Annex 15 — *Aeronautical Information Services*. Included in Annex 15 is a volcano level of activity colour code chart. The colour code chart alert may be used to provide information on the status of the volcano, with "red" being the most severe, i.e. volcanic eruption in progress with an ash column/cloud reported above flight level 250, and "green" at the other extreme being volcanic activity considered to have ceased and volcano reverted to its normal pre-eruption state. It is very important that NOTAM for volcanic ash be cancelled and ASHTAM be updated as soon as the volcano has reverted to its normal pre-eruption status, no further eruptions are expected by vulcanologists and no ash is detectable or reported from the FIR concerned.

6.7 It is essential that the procedures to be followed by ACC personnel, including supporting services such as MET, AIS and ATFM should follow during a volcanic eruption/ash cloud event described in the foregoing paragraphs are translated into local staff instructions (adjusted as necessary to take account of local circumstances). It is also essential that these procedures/instructions form part of the basic training for all ATS, AIS, ATFM and MET personnel whose jobs would require them to take action in accordance with the procedures. Background information to assist the ACC or Flight Information Centre (FIC) in maintaining an awareness of the status of activity of volcanoes in their FIR(s) is provided in the monthly Scientific Event Alert Network Bulletin published by the United States Smithsonian Institution and sent free of charge to ACCs/FICs requesting it.

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APPENDIX A

ANTICIPATED PILOT ISSUES WHEN ENCOUNTERING VOLCANIC ASH

1. ATCOs should be aware that flight crews will be immediately dealing with some or all of the following issues when they encounter volcanic ash:

a) Smoke or dust appearing in the cockpit which may prompt the flight crew to don oxygen masks (could interfere with the clarity of voice communications);

b) Acrid odour similar to electrical smoke;

c) Multiple engine malfunctions, such as stalls, increasing Exhaust Gas Temperature (EGT), torching, flameout, and thrust loss causing an immediate departure from assigned altitude;

d) On engine restart attempts, engines may accelerate to idle very slowly, especially at high altitudes (could result in inability to maintain altitude or Mach number);

e) At night, St. Elmo's fire/static discharges may be observed around the windshield, accompanied by a bright orange glow in the engine inlet(s);

f) Possible loss of visibility due to cockpit windows becoming cracked or discoloured, due to the sandblast effect of the ash;

g) Cockpit windows could be rendered completely opaque; and/or

h) Sharp distinct shadows cast by landing lights as compared to the diffused shadows observed in clouds (this affects visual perception of objects outside the aircraft).

2. Simultaneously, ATC can expect pilots to be executing contingency procedures. This may include a possible course reversal and/or an emergency descent.

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APPENDIX B

ACTION TAKEN BY METEOROLOGICAL WATCH OFFICES (MWO) IN THE EVENT OF A VOLCANIC ERUPTION[8]

1. On receipt of information of a volcanic eruption and/or the existence of volcanic ash, the MWO will:

a) Notify, if necessary, the VAAC designated to provide VAA for the FIR for which the ACC is responsible that a volcanic eruption and/or ash has been reported. In the event that the MWO becomes aware of the occurrence of pre-eruption activity, a volcanic eruption or ash from any source other than the ACC, the information will be passed with all available relevant details on the extent and concentration of volcanic ash immediately to the ACC and to the designated VAAC;

b) Reported differences between ash encounters by aircraft and the information published in VAA, SIGMET or NOTAM received by an ACC shall be made available as soon as possible to the respective MWO, preferably in the form of a AIREP. The MWO will relay the information to the respective originators of the published information;

c) Notify adjacent MWOs designated to provide VAA that a volcanic eruption and/or ash cloud has been reported, provide available relevant details on the extent and concentration of volcanic ash. In the event that any other MWO becomes aware of the occurrence of volcanic ash cloud from any source other than the VAAC, the information should be passed immediately to the VAAC and any adjacent MWO(s) downstream of the moving ash cloud;

d) As soon as practicable, advise the ACC and the VAAC whether or not the volcanic ash is identifiable from satellite images/data, ground based or airborne measurements or other relevant sources;

e) Issue SIGMET relating to the expected movement and vertical extent of volcanic ash for a validity period of 6 hours, to which is appended an 'outlook' providing information for up to a further 12 hours. Include in the SIGMET address all VAACs, the London World Area Forecast Centre (WAFC), the Vienna International OPMET data base and regional OPMET data bank;

f) provide information to assist with the origination of NOTAM by ACCs and maintain continuous coordination with ACCs, adjacent MWOs and the VAAC concerned to ensure consistency in the issuance and content of SIGMET and NOTAM/ASHTAM; and

g) provide, if possible, regular volcanic briefings, based on the latest available ash observations and forecasts, to ACCs, ATFM units, Airport Operators and aircraft operators concerned, giving an outlook for more than T +12hours.

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[8] This information is adapted from the *Handbook on the International Airways Volcano Watch (IAVW)* (Doc 9766). Refer to this document for full details.

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APPENDIX C

ACTION TO BE TAKEN BY THE VOLCANIC ASH ADVISORY CENTRE (VAAC) IN THE EVENT OF A VOLCANIC ERUPTION[9]

On receipt of information from a MWO or any other source, of significant pre-eruptive/eruption activity and/or a volcanic ash cloud observed, the VAAC should:

a) Initiate the volcanic ash computer trajectory/dispersal model in order to provide advisory information on volcanic ash trajectory to MWOs, ACCs, ATFM units and operators concerned;

b) Review satellite images/data and any available pilot reports of the area for the time of the event to ascertain whether a volcanic ash cloud is identifiable and, if so, its extent;

c) Inform the appropriate ATFM unit of the volcanic ash activity;

d) Prepare and issue advisories on the extent, and forecast trajectory, of the volcanic ash contamination in message format for transmission to the MWOs, ACCs, ATFM units and operators concerned in the VAAC area of responsibility, to the London WAFC, and to the Vienna International OPMET data base and to other VAACs;

e) Monitor subsequent satellite information or other available observations to assist in tracking the movement of the volcanic ash;

f) Continue to issue advisory information to MWOs, ACCs, ATFM units and operators concerned at least at 6 hour intervals, and preferably more frequently, until such time as it is considered that the volcanic ash is no longer identifiable from satellite data, no further reports of volcanic ash are received from the area and no further eruptions of the volcano are reported; and

g) Maintain regular contact with other VAACs and meteorological offices concerned, and, as necessary, the Smithsonian Institute Global Volcanism Network, in order to keep up to date on the activity status of volcanoes in the VAAC area of responsibility.

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[9] This information is adapted from the *Handbook on the International Airways Volcano Watch (IAVW)* (Doc 9766). Refer to this document for full details.

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APPENDIX D

PROCEDURES FOR THE PRODUCTION OF MODELLED ASH CONCENTRATION CHARTS

1. The following procedures are to be applied by the meteorological office of a Provider State, having accepted, by regional air navigation agreement, the responsibility for providing a VAAC within the framework of the International Airways Volcano Watch (IAVW).

2. All (VAA) and Volcanic Ash Graphics (VAG) information issued by a Meteorological Office under designation as a VAAC within the framework of the IAVW shall be prepared in accordance with ICAO provisions.

3. Additionally, where feasible, the meteorological office may issue modelled ash concentration charts and corresponding coordinate data files at 6-hourly intervals showing the different ash concentrations for the validity periods T+0, T+6, T+12 and T+18 hours after data time. These charts will show forecast ash distribution in terms of Areas of Low, Medium and High Contamination and be published at the same time, and with the same validity periods, as the VAA/VAG described above. Updated charts and data files should be distributed prior to the end of the validity time of those previously distributed.

4. These data may be used by Provider States to prepare SIGMET and NOTAM and establish Danger Areas as appropriate.

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APPENDIX E

RECOMMENDED ACTIONS BY STATES OF THE OPERATOR/REGISTRY WITH REGARDS TO AIRCRAFT OPERATIONS IN THE EVENT OF A VOLCANIC ERUPTION

Safety Risk Assessments For Flights In Airspace Proximate To Volcanic Ash

1 Introduction

1.1 It is recommended that States of the Operator/Registry as appropriate which intend to allow operators under their jurisdiction to operate in areas of volcanic ash contamination consider requiring operators to carry out a safety risk assessment prior to carrying out such operations.

1.2 Safety risk assessments should be completed prior to planned operations in airspace or to/from aerodromes which may be contaminated by volcanic ash.

2 Applicability

2.1 All operators conducting flights in airspace and/or to/from aerodromes which could be affected by volcanic ash.

3 Recommendations

3.1 In accordance with ICAO Annex 6, Chapter 3, paragraph 3.3- Safety Management, it is recommended that States of the Operator/Registry as appropriate require all operators, planning to operate in areas where the presence of volcanic ash is forecast, to carry out a safety risk assessment prior to planned operations. The safety risk assessment should include a requirement for the operator to:

a) Conduct their own risk assessment and develop operational procedures to address any remaining risks;

b) Put in place appropriate maintenance ash damage inspections; and

c) Ensure that any ash related incidents are reported by AIREP and followed up by a Volcanic Activity Report (VAR).

3.2 Guidance in the preparation of such a safety risk assessment is provided in Appendix F of this document.

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APPENDIX F

EXAMPLE SAFETY RISK ASSESSMENT PROCESS

1 Introduction

1.1 The safety risk assessment process is described in the *Safety Management Manual* (Doc 9859) .The process involves identifying the hazards associated with the activity (in this case airspace proximate to volcanic ash or flying to and from aerodromes affected by volcanic ash), considering the seriousness of the consequences of the hazard occurring (the severity), evaluating the likelihood or probability of it happening, deciding whether the consequent risk is acceptable and within the organisation's safety performance criteria (acceptability), and finally taking action to reduce the safety risk to an acceptable level (mitigation).

2 Hazard Identification

2.1 A hazard is any situation or condition that has the potential to cause adverse consequences. A suggested list of topics, that is not necessarily exhaustive, to be considered is attached at **Appendix G**

3 The Safety Risk Assessment

3.1 Risk is an assessment of the likelihood and the severity of adverse consequences resulting from a hazard.

3.2 To help an operator decide on the likelihood of a hazard causing harm, and to assist with possible mitigation of any perceived safety risk, all relevant stakeholders should be consulted.

3.3 The safety risk from each hazard should be assessed using a suitably calibrated safety risk assessment matrix. An example risk assessment matrix is given in *Safety Management Manual* (Doc 9859) but an alternative which aligns with an organisation's own Safety Management System (SMS) would be equally appropriate. The safety risk should be derived by considering the severity of the safety outcome arising from the hazard, together with the likelihood of the outcome.

3.4 The severity of any adverse consequences resulting from a particular hazard should be assessed using a suitably calibrated severity scale. Example scales are given in *Safety Management Manual* (Doc 9859) but an alternative, which aligns with an organisation's own SMS would be equally appropriate. Note that, for any flight, the safety outcome of a volcanic ash encounter may be significant.

3.5 Risk Likelihood

3.5.1 The likelihood or probability of adverse consequences resulting from a particular hazard should then be assessed. The likelihood should be agreed using a suitably calibrated likelihood or probability scale. An example probability scale is given in *Safety Management Manual* (Doc 9859), but an alternative which aligns with an organisation's own SMS would be equally appropriate.

3.5.2 When assessing likelihood or probability the following factors should be taken into account:

- The degree of exposure to the hazard.
- Any historic incident or safety event data relating to the hazard. This can be derived from data from industry, regulators, other operators, Air Navigation Service Providers, internal reports etc.
- The expert judgement of relevant stakeholders.

3.5.3 The results of the assessment should be recorded in a hazard log, sometimes referred to as a risk register. An example of a hazard log is at **Appendix H**.

3.6 Risk Tolerability

3.6.1 At this stage of the process the safety risks should be classified in a range from acceptable to unacceptable. A suitable set of definitions for Risk Classification is given in *Safety Management Manual* (Doc 9859).

3.6.2 Appropriate mitigations for each identified hazard should then be considered, recorded on the hazard log and implemented. Mitigations must be adopted in order to reduce the safety risks to an acceptable level, but additional mitigation wherever reasonably practicable should also be considered where this might reduce an already acceptable safety risk even further. Thus, the mitigation process should reduce the safety risk to be as low as reasonably practicable.

3.6.3 Not all hazards can be suitably mitigated in which case the operation should not proceed.

3.7 Mitigating Actions

3.7.1 Mitigating actions by themselves can introduce new hazards. Where an organisation has an effective SMS then procedures will exist for continual monitoring of hazard, risk and involvement of qualified personnel in accepting the mitigating actions or otherwise. Operators without an effective SMS should repeat the safety risk assessment following any mitigation process and at regular intervals as the circumstances on which the original assessment was predicated may have changed. This ensures ongoing safety management or monitoring.

3.8 Records

3.8.1 The results of the safety risk assessment should be documented and promulgated throughout the organisation and submitted to the operator's national safety authority. Actions should be completed and mitigations verified and supported by evidence prior to the start of operations.

3.8.2 Any assumptions should be clearly stated and the safety risk assessment reviewed at regular intervals to ensure the assumptions and decisions remain valid.

3.8.3 Any safety performance monitoring requirements should also be identified and undertaken through the organisation's safety management processes.

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APPENDIX G

EXAMPLE TABLE OF CONSIDERATIONS FOR PLANNED OPERATIONS IN AIRSPACE OR TO/FROM AERODROMES WHICH MAY BE CONTAMINATED BY VOLCANIC ASH.

Considerations	Guidance
Operator Procedures	
Type Certificate Holder Guidance	Operators must obtain advice from the Type Certificate Holder and engine manufacturer concerning both operations in potentially contaminated airspace and/or to/from aerodromes contaminated by volcanic ash, including subsequent maintenance action.
Guidance for Company Personnel	Publish procedures for flight planning, operations and maintenance. Review of flight crew procedures for detection of volcanic ash and associated escape manoeuvres. Type Certificate Holder advice on operations to/from aerodromes contaminated by volcanic ash including performance.
Flight Planning	These considerations will be applicable to all flights that plan to operate in airspace or to/from aerodromes which may be contaminated by volcanic ash.
NOTAM and ASHTAM	The operator must closely monitor NOTAM and ASHTAM to ensure that the latest information concerning volcanic ash is available to crews.
SIGMETs	The operator must closely monitor SIGMETs to ensure that the latest information concerning volcanic ash is available to crews.
Departure, Destination and any Alternates	Degree of contamination, additional performance, procedures and maintenance consideration.
Routing Policy	Shortest period in and over contaminated area.
Diversion Policy	Maximum allowed distance from a suitable alternate. Availability of alternates outside contaminated area. Diversion policy after an ash encounter.

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Minimum Equipment List / Dispatch Deviation Guide	Consider additional restrictions for dispatching aircraft: • air conditioning packs; • engine bleeds; • air data computers; • standby instruments; • navigation systems; • Auxiliary Power Unit (APU); • Airborne Collision Avoidance System (ACAS); • Terrain Awareness Warning System (TAWS); • provision of crew oxygen; and • supplemental oxygen for passengers. (This list is not necessarily exhaustive.)

Considerations	Guidance
Operator Procedures	
Provision of Enhanced Flight Watch	Timely information to and from crew of latest information.
Fuel Policy	Consideration to the carriage of extra fuel.

Considerations	Guidance
Crew Procedures	These considerations will be applicable to all flights that plan to operate in airspace or to/from aerodromes which may be contaminated by volcanic ash.
Pilot Reports	Requirements for reporting in the event of an airborne encounter. Post-flight reporting.
Mandatory Occurrence Reports	Reminder regarding the necessity for filing MORs following an encounter.
Standard Operating Procedures	Review changes to normal and abnormal operating procedures: • pre-flight planning; • operations to/from aerodromes contaminated with volcanic ash; • supplemental oxygen; • engine-out procedures; and • escape routes. (This list is not necessarily exhaustive.)

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Technical Log	Any actual or suspected volcanic ash encounter will require a tech log entry and appropriate maintenance action prior to subsequent flight. Penetration (detail and duration) of airspace or operations to/from aerodromes which may be contaminated by volcanic ash will require a tech log entry.

Considerations	Guidance
Maintenance Procedures	Operators, who are operating in areas of ash contamination, are recommended to enhance vigilance during inspections and regular maintenance and potentially adjust their maintenance practices, based upon the observations, to prevent unscheduled maintenance. Observations should include signs of unusual or accelerated abrasions, corrosion and / or ash accumulation. Operator co-operation is requested in reporting to manufacturers and the relevant authorities their observations and experiences from operations in areas of ash contamination. If significant observations are discovered beyond normal variations currently known, manufacturers will share these observations, and any improved recommendations for maintenance practices, with all operators and the relevant authorities.

Note: The above list is not necessarily exhaustive and operators must make their own assessments of the hazards on the specific routes they fly.

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APPENDIX H

EXAMPLE OF A HAZARD LOG (RISK REGISTER)

HAZARD		Incident Sequence Description	Existing Controls	Outcome (Pre-Mitigation)			Additional Mitigation Required	Outcome (Post-Mitigation)			Actions and Owners	Monitoring and Review Requirements
No.	Description			Severity	Likelihood	Risk		Severity	Likelihood	Risk		

(additional rows as necessary)

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APPENDIX I

EXAMPLE SIGMET, NOTAM, ASHTAM

NOTAM establishing Danger Area to include Area of High Contamination

NOTAM establishing Danger Area to include Area of Medium/High Contamination

NOTAM establishing Danger Area to include Area of Low/Medium/High Contamination

NOTAM to define Area of Medium Contamination

ASHTAM pre-eruption

ASHTAM eruption

ASHTAM reduction in activity

SIGMET notifying eruption

SIGMET notifying ash contamination

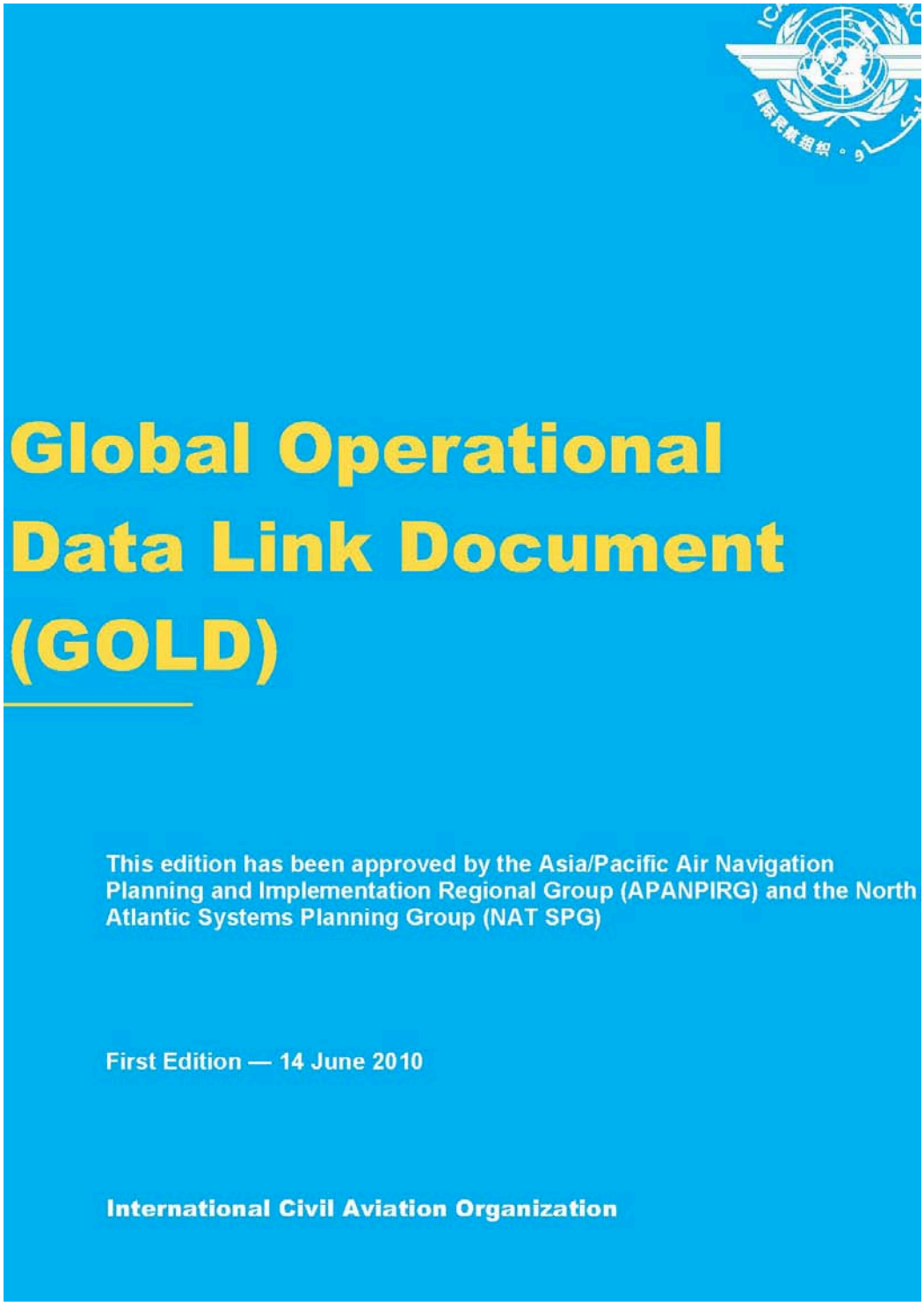
NOTAM/ASHTAM including explanation of proper WMO header (see Alerting Phase, paragraph 1.2.2)

SECRETARIAT NOTE – THE CONTENT FOR THESE MESSAGES NEEDS TO BE DEVELOPED

- END -

APPENDIX L – GLOBAL OPERATIONAL DATA LINK DOCUMENT

(Paragraph 6.2.11 refers)



Full document provided separately

APPENDIX M – NAT RCP AND ADS-C
SURVEILLANCE PERFORMANCE BASED OPERATIONS IMPLEMENTATION PLAN
(Associated with the NAT RLongSM implementation)

(Paragraph 7.2.1 refers)

	TASKS	COMPLETE BY	STATUS	LEAD	Remarks
	GENERAL PROJECT DEVELOPMENT & MANAGEMENT				
1	Prepare a draft RCP plan outlining the way forward for consideration by the NAT IMG	NAT IMG/34	Done	NAT FIG	
2	Identify Key Target Dates on mandating the RCP in support of specific implementation, that should include:	NAT IMG/34		NAT IMG	
	Target date for readiness review and decision to implement				
	Target date for publication of notice of implementation decision				
	Identify Target Airspace				
	Target date(s) for operators eligibility				
3	Develop operational concept for implementation of specific reduction in separation supported by associated RCP	NAT SPG/46	Ongoing	NAT ATMG	

	TASKS	COMPLETE BY	STATUS	LEAD	Remarks
	Assess Feasibility	NAT IMG/35	done	DLMA/CNSG/SARSIG	Actual communications and surveillance performance was validated against CRM assumptions
	DOCUMENTATION				
8	Develop communication performance requirements guidance material for the NAT Region	NAT SPG/44	Completed	NAT CNSG	
9	Develop end-to-end monitoring guidance material for the NAT region	NAT SPG/44	Completed	NAT CNSG	
10	Development of the GOLD material in support of reduced longitudinal; *-the provisions for data link service (AIC, guidance for AIPs, eligibility requirements etc)* *-performance specifications* *-initial qualifications for RCP operations of operators, aircraft and ATC* *-post implementation monitoring*	NAT SPG/46	Ready for approval	GOLD ad-hoc group	
11	Examine ways and means to ensure that ATC and flight crews receive timely alerts, where necessary, of any degradations or failures in the communications services (linked with GOLD work	NAT SPG/46	Ready for approval	NAT ATMG/CNSG	Part of the GOLD
12	Develop guidance material for initial qualification and ongoing configuration management, problem reporting, end-to-end monitoring, analysis and resolution(predecessor to implementation of automation to collect)	NAT SPG/46	Ready for approval	NAT ATMG/CNSG	Part of the GOLD
13	Develop the criteria for altering and for terminating RCP-based procedures due to degraded performance	end 2012	In progress	NAT ATMG/CNSG	
14	Develop the criteria for resuming RCP-based procedures after service termination due to degraded performance.	end 2012	In progress	NAT ATMG.CNSG	

	TASKS	COMPLETE BY	STATUS	LEAD	Remarks
15	Develop amendment to the NAT Regional Supplementary Procedures (SUPPS) (Doc 7030) to make possible the implementation of RCP in support of specific reduction in separation. Procedures that should be considered for inclusion might include criteria for operator eligibility, aircraft equipage, requirements for flight planning, monitoring, alerting and reporting	2012		NAT ATMG	
16	Amend AIPs and other State documents to support SUPPs amendment	2012		States	
17	Confirm applicable RCP specification for reduced longitudinal separation	2009	done	NAT SARSIG	RCP240 as a target Measure actual performance and validate against CRM assumptions as an interim solution until meeting RCP240 becomes feasible
18	Develop initial Safety Assessment Document	2009	Done	NAT SARSIG	
19	Implement operational c ommunications performance m onitoring capability in ATC automation	End of 2010	ongoing	NAT CNSG/DLMA	
	AIR TRAFFIC CONTROL				
20	Upgrade ground ATC systems operational functionality	June 2012		ANSPs	
21	Controllers training	June 2012		ANSPs	
	AIRWORTHINESS AND OPERATIONAL ELIGIBILITY				
22	Specify the aircraft equipage eligibility requirements taking the GOLD into account	End 2012		State regulators	
23	Specify the operators eligibility requirements	End 2012		State regulators	

	TASKS	COMPLETE BY	STATUS	LEAD	Remarks
24	Track operator/aircraft fleet RCP readiness			IATA	
	STATE RESPONSIBILITIES FOR RCP240/400 AUTHORIZATION				
25	Develop or revise State guidance and/or regulations, as necessary			State regulators	
26	Establish State RCP240/400 airworthiness requirements			State regulators	
27	Establish operational policy/procedures requirements for RCP240/400 authorization			State regulators	
28	Prepare State inspectors to perform RCP240/400 authorization tasks			State regulators	
29	Plan to authorize national operators for RCP240/400 by [date], to extent possible			State regulators	
	OPERATOR RESPONSIBILITIES & TASKS				
30	Develop plans to obtain RCP240/400 authorization			Operators	
31	Train pilots and, if applicable, dispatchers on RCP aspects of reduced separation			Operators	
32	Develop and distribute operations manuals, pilot bulletins or other appropriate docs containing RCP policy/procedures			Operators	
	POST IMPLEMENTATION TASKS				
33	6-month review and safety assessment		End of 2012	DLMA/SARSIG	
34	12-month review and Safety assessment		End of 2013	DLMA/SARSIG	
35	Periodic review and safety assessment			DLMA/SARSIG	

List of Acronyms

ADS-C	Automatic Dependent Surveillance – Contract
AIC	Aeronautical Information Circular
AIDC	Air Traffic Services Interfacility Data Communications
AIP	Aeronautical Information Publication
AMS(R)S	Aeronautical Mobile Satellite (Route) Service
ANC	Air Navigation Commission
ANP	Air Navigation Plan
ANSP	Air Navigation Service Provider
APAC	Asia and Pacific
APANPIRG	Asia/Pacific Air Navigation Planning Group
ATC	Air Traffic Control
ATM	Air Traffic Management
ATN	Aeronautical Telecommunications Network
ATS	Air Traffic Services
COG	EANPG Coordinating Group
CPDLC	Controller Pilot Data Link Communications
DLS IR	(European Commission) Data Link Service Implementing Rule
Doc 4444	Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)
Doc 7030	Regional Supplementary Procedures (SUPPs)
Doc 9613	Performance-based Navigation (PBN) Manual
Doc 9750	Global Air Navigation Plan
Doc 9854	Global Air Traffic Management Operational Concept
Doc 9882	Air Traffic Management System Requirements
Doc 9883	Manual on Global Performance of the Air Navigation System
EANPG	European Air Navigation Planning Group
EUR	European
EUR/NAT VATF	European/North Atlantic Volcanic Ash Task Force
EUR/NAT	European and North Atlantic
FAB	Functional Airspace Blocks
FDPS	Flight Data Processing System
FPL 2012	New format of the ICAO Flight Plan Form arising from Amendment 1 to Doc 4444, 15th Edition
GNSS	Global Navigation Satellite System
GOLD	Global Operational Data Link Document
HF	High Frequency
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
IVATF	International Volcanic Ash Task Force
KPA	Key Performance Area
KPI	Key Performance Indicator
LHD	Large Height Deviation
MNPS	Minimum Navigation Performance Specifications
NAT CMA	North Atlantic Central Monitoring Agency
NAT CNSG	North Atlantic Communications, Navigation and Surveillance Group
NAT DLMA	North Atlantic Data Link Monitoring Agency
NAT DMO	North Atlantic Document Management Office

NAT EFG	North Atlantic Economic and Financial Group
NAT IMG	North Atlantic Implementation Management Group
NAT MWG	North Atlantic Mathematicians' Working Group
NAT OTS	North Atlantic Organized Track System
NAT SG	North Atlantic Scrutiny Group
NAT SOG	North Atlantic Safety Oversight Group
NAT SPG	North Atlantic Systems Planning Group
NAT	North Atlantic
NATMA TF	NAT Mandate Analysis Task Force (of the NAT EFG)
NM	Nautical Mile
OCA	Oceanic Control Area
PANS	Procedures for Air Navigation Services
PANS-ATM	Procedures for Air Navigation Services – Air Traffic Management (Doc 4444)
PBN	Performance Based Navigation Concept
PfA	Proposal for Amendment
PIRG	Planning and Implementation Regional Group
RASG	Regional Aviation Safety Group
RCP	Required Communications Performance
RDADA	Regional and Domestic Air Route Area
RLatSM	Reduced Lateral Separation of 25 Nautical Miles (NAT Region)
RLongSM	Reduced Longitudinal Separation of 5 minutes between ADS-C equipped aircraft
RNP	Required Navigation Performance
RVSM	Reduced Vertical Separation Minimum
SARPs	Standards and Recommended Practices
SASP	Separation and Airspace Safety Panel
SATCOM	Satellite Communication
SES	Single European Sky
SLOP	Strategic Lateral Offset Procedures
SUPPs	Regional Supplementary Procedures (Doc 7030)
TLS	Target Level of Safety
ToR	Terms of Reference
VAAC	Volcanic Ash Advisory Centre
VHF	Very High Frequency
VOLCEX/SG	Volcanic Ash Exercises Steering Group
VRTF	Vertical Risk Task Force (of the NAT SOG)

- END -